Joint Base Anacostia-Bolling

Installation Master Plan

Naval District Washington

NAVAL FACILITIES ENGINEERING COMMAND

Joint Base Anacostia-Bolling

Installation Master Plan

Pre-Final Draft
February 2014

Prepared For

NAVFAC
Naval Facilities Engineering Command

Prepared by the Joint Venture of

ATKINS | THE Louis Berger Group, INC.

ACKNOWLEDGEMENTS

In 2012, NAVFAC Washington engaged The Louis Berger Group (LBG) to update the Joint Base Anacostia-Bolling (JBAB) Master Plan and Transportation Management Program (TMP). The documents will help all stakeholders make informed development decisions that will promote the best use of finite monetary and land resources.

Representatives from JBAB JCodes, the Public Works Department (PWD), and NAVFAC Washington joined together and dedicated many hours of hard work in the development of the documents.

We would like to thank everyone for their excellent work and commitment to the JBAB Master Plan and TMP.

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NAVAL DISTRICT WASHINGTON

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Acronyms and Abbreviations

ACP	Access Control Point
ADA	Americans with Disabilities Act
ADP	Area Development Plan
AFB	Air Force Base
AICUZ	Air Installation Compatible Use Zone
AT/FP	Anti-Terrorism/Force Protection
AWTP	Advanced Wastewater Treatment Plant
AWI	Anacostia Waterfront Initiative
BRAC	Base Realignment and Closure
CDC	Child Development Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLRP	Financially Constrained Long-Range Transportation Plan
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
DCA	Ronald Reagan Washington National Airport
DC Water	District of Columbia Water and Sewer Authority
DDOE	District Department of Environment
DDOT	District Department of Transportation
DHS	Department of Homeland Security
DIA	Defense Intelligence Agency
DIAC	Defense Intelligence Analysis Center
DoD	Department of Defense
DON	Department of the Navy
EAR	Evaluation Appraisal Report
EISA	Energy Independence and Security Act
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ESQD	Explosive Safety Quantity Distance
ESCO	Energy Services Company
ESPC	Energy Savings Performance Contract
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GHG	Greenhouse Gas
GSA	General Services Administration
GSF	Gross square feet
HMX-1	Marine Helicopter Squadron One
HVAC	Heating, Ventilating, and Air Conditioning
HWMP	Hazardous Waste Management Plan
IAP	Installation Appearance Plan
ICRMP	Installation Cultural Resource Management Program
iNFADS	internet Navy Facility Assets Data Store

IR	Installation Restoration
JBAB	Joint Base Anacostia-Bolling
JADOC	Joint Air Defense Operation Center
kV	Kilovolts
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
LQD	Large Quantity Generator
LUC	Land Use Control
MARC	Maryland Area Regional Commuter
MILCON	Military Construction
MTA	Maryland Transit Administration
MTPD	Metro Transit Police Department
MWCOG	Metropolitan Washington Council of Government
MWR	Morale, Welfare, and Recreation
n/a	not applicable
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NCPC	National Capital Planning Commission
NCR	National Capital Region
NDW	Naval District Washington
NEX	Navy Exchange
NHPA	National Historic Preservation Act
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRL	Naval Research Laboratory
NSF	Naval Support Facility
NSMA	Naval Systems Management Activity
NSV2035	Navy Shore Vision 2035
OPNAVINST	Office of the Chief of Naval Operations Instruction
PEPCO	Potomac Electric Power Company
PHNST	Potomac Heritage National Scenic Trail
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PPV	Public Private Venture
PRTC	Potomac and Rappahannock Transportation Commission
PWD	Public Works Department
RIMG	Regional Mission Integration Group
RIMP	Regionally Integrated Master Program
RPM	Restoration Project Manager
SF	Square Feet
SHPO	State Historic Preservation Office
SOV	Single Occupancy Vehicle
TMP	Transportation Management Plan
UFC	Unified Facility Criteria
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
VOCs	Volatile Organic Compounds
VRE	Virginia Rail Express
WIP	Watershed Implementation Plan
WNY	Washington Navy Yard
WSSC	Washington Suburban Sanitary Commission

Planning Vision

As a premier installation providing superior customer service and administrative mission support for Department of Defense activities in the National Capital Region and worldwide, Joint Base Anacostia-Bolling will be a sustainable community with walkable development, enhanced recreational amenities, and protected historic assets linked by park-like corridors and multi-modal transportation networks.

1.0 Introduction

1.1 Purpose

The purpose of this Joint Base Anacostia-Bolling (JBAB) Master Plan is to develop a comprehensive approach for effective installation development and land use in adherence to the Department of Defense (DoD) Instruction 4165.70 §6 and the Memorandum of the Under Secretary of Defense dated May 28, 2013 (Appendix A). The Memorandum requires that DoD components exercising management responsibility over each installation shall develop or update installation master plans to incorporate all required planning strategies by October 1, 2018.

Contracted under Indefinite Delivery, Indefinite Quantity A/E Contract N40080-10-D-0301, the JBAB Master Plan is a working document that provides directions on the installation's long-term development in support of its mission readiness and quality of life. The recommendations in the Master Plan are intended to guide the installation in implementing orderly and comprehensive development over a period of 20 years.

1.2 Regional Influence

Regional influence and involvement in JBAB's land use planning and decision-making process is extensive. The National Capital Planning Commission (NCPC), the central planning agency for the federal government in the National Capital Region (NCR), is empowered with review authority over all federal development projects in the region to ensure their consistency with the *Comprehensive Plan for the National Capital* (hereafter referred to as the *Comprehensive Plan*). The planning strategies and development directions outlined in the Master Plan's goals and objectives pursuant to DoD instructions and the 2013 memorandum align with the policies in the *Comprehensive Plan*.

1.3 Document Structure

This JBAB Master Plan, following the approach proposed by Naval Facilities Engineering Command (NAVFAC) Washington in 2011, presents information in three broad topics:

- **Evaluation of Existing Conditions**: The Master Plan includes significant efforts to study and document the current state of the installation and its immediate surroundings. It also includes an examination of the constraints and opportunities at the installation as well as impacts from potential development outside. Understanding the internal and external context helps inform appropriate approaches toward a desirable future.
- **Long-Range Framework Plan:** Considering the evolving internal mission requirements and external development initiatives, the JBAB Master Plan is intended to be flexible and responsive to changing situations. The planning recommendations consist of planning vision, goals and o objectives, and a series of framework plan overlays including land use, circulation, stormwater management, open space and outdoor recreation, landscape design, architectural design, historic preservation, and energy conservation. These elements serve as integral parts of the installation's development and are designed to function together.
- **Five-Year Development Program (2013-2018)**: The long-term development of a military installation can be affected by factors such as the DoD mission realignment, unexpected tenant mission growth and movement, and funding. The Five-Year Development Program aligns with the Navy's five-year development and funding process for construction projects, and integrates currently approved and funded projects into the Master Plan. These projects serve as the initial step in implementation of the installation's long-term development vision.

To retain the ability to discuss each former installation as a distinctive entity, this plan refers to the site of the former Naval Station Facility (NSF) Anacostia as the "Anacostia side" and the site of the Bolling Air Force Base (AFB) as the "Bolling side."

1.4 Existing Rules and Laws Governing JBAB Master Plan

1.4.1 Department of Defence

DoD Instruction 4165.70 §6

DoD Instruction 4165.70 §6 establishes the requirement that base master plans or comprehensive plans shall be developed for all installations. Such plans shall cover at least a 10-year period and be updated every five years (more often if necessary).

Unified Facilities Criteria (UFC) 2-100-01

UFC 2-100-01, *Installation Master Planning*, is issued under the authority of DoD Instruction 4165.70. It prescribes the DoD minimum requirements for master planning processes and products through the preparation of five linked master plan components that can be implemented in total or incrementally based on each service's needs and resources (see Figure 1-1). Consisting of a vision plan, installation planning standards, an installation development plan comprised of area development plans, an investment strategy, and a summary plan, these five components may be called different names by each service.

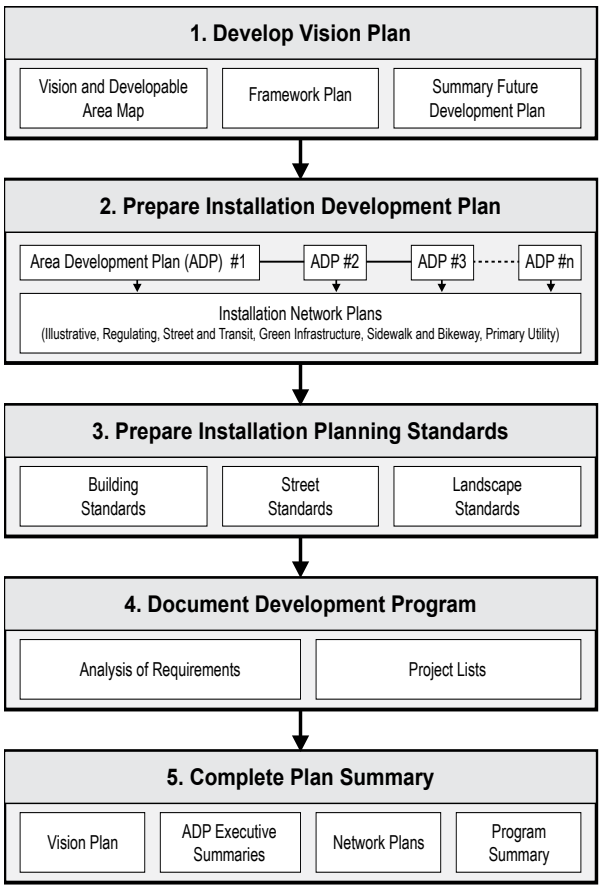
This JBAB Master Plan serves as the vision plan required by the UFC. It is intended to provide an examination of the constraints and opportunities as well as existing and potential missions at the installation, define the conceptual framework for future land use and facility decisions, identify locations targeted for known requirements, and deconflict future project sitings.

Consistent with the process prescribed by the UFC, this Master Plan is the first step to ensure real property master planning at JBAB proactively addresses the installation's long-term mission requirements. Other master plan components, such as individual area development plans and installation planning standards, also called the Installation Appearance Plan (IAP) by the Navy, will be prepared in full compliance with the UFC when funding is available. These components will be guided and tied together by the overarching planning visions set forth in this document. Together, the master plan components create a comprehensive blueprint for guiding future facility improvements to JBAB.

Memorandum (28 May 2013) on Installation Master Planning

The memorandum issued by The Under Secretary of Defense (Appendix A) following the publication of UFC 2-100-01 establishes that DoD components exercising management responsibility over each installation shall develop master plans

FIGURE 1-1: MASTER PLANNING PROCESS PRESCRIBED BY UFC 2-100-01



that define opportunities for site development and alternate land use by October 1, 2018 and incorporate the following planning strategies:

- Sustainability allows an installation to meet present mission requirements without compromising its ability to meet future requirements. Sustainability also conserves limited natural resources (including land and fossil fuels) through compact, mixed-use development.
- Resource management preserves and enhances natural, historic, and cultural resources.
- Transportation alternatives provide for pedestrian, bicycle, and transit-friendly communities that allow residents opportunities for regular physical activity and, consequently, healthier lifestyles while decreasing dependence on automobiles.
- Defensibility protects critical infrastructure and incorporates appropriate safeguards to prevent mass casualties in the event of a terrorist attack.
- Area and network planning creates identifiable and connected districts based on geographical features, land use patterns, building types, and transportation networks.

- Form-based planning guides the scale and character of development, prescribing the size and form of buildings, the patterns of circulation between buildings, and the relationship between buildings and outdoor space.
- Local and regional coordination ensures that planning within the installation boundary considers constraints and opportunities beyond the boundary and promotes compatibility with local authorities.

Regionally Integrated Master Program (RIMP)

The RIMP was developed by Naval District Washington (NDW) in 2009 to provide an integrated programmatic vision and guidance for the Navy's regional growth management. The RIMP is supported and guided by the NDW Regional Mission Integration Group (RIMG), who proposed a set of guiding principles for development within the region:

- Implement the ideal land use model.
- Consolidate into Centers of Excellence.
- Recapitalize critical Research, Development, Acquisition, Testing and Evaluation assets.
- Leverage Special Venture opportunities.
- Relocate from leased and temporary facilities.
- Recap or divest high Mission Dependant Index/low Installation Figure of Merit facilities.
- Right organizations in the right sites.
- Relocate organizations to maximize efficiency.
- Protect missions from encroachment.
- Demolish inadequate and excess facilities.
- Leverage and prepare for special funding opportunities when they arise.

This JBAB Installation Master Plan builds on the RIMP analysis of existing conditions and land use vision to accommodate new and emerging planning considerations inside and outside JBAB. The broad recommendations in the RIMP study (such as great future integration of sustainable development process, accommodation of ever increasing transportation loads and associated security concerns with particular attention to alternative transportation modes and/or associate parking, and accommodation of higher density housing and associated community support facilities) informed the planning goals and objectives, framework plans, and development strategies in this document.

1.4.2 NCPC and The Comprehensive Plan

Per the National Capital Planning Act, NCPC is the central planning agency for the federal government in the NCR. NCPC is empowered with review authority over all federal development projects to ensure orderly and coordinated development of the federal government in the region and consistency with the *Comprehensive Plan*. Therefore, all individual site and building plan projects must be submitted to NCPC for review prior to the preparation of construction plans [40 U.S.C. 8722(b)(1)].

NCPC's review authority over further planning, development, and construction of the "Bolling-Anacostia" complex is advisory, which is stated in Public Law 93-166, § 601(a), approved on November 29, 1973, as follows:

"Sec. 610 (a) Notwithstanding any other provision of law, the Secretary of Defense, in consultation with the National Capital Planning Commission and other interested agencies, but without being subject to the approval of such Commission or any other agency, is directed, within available authorizations and appropriations, to proceed with the further planning, development, and construction of the Bolling-Anacostia Complex. The Secretary shall use as a guide to such further planning and development the Bolling-Anacostia Base Development Concept included with the final environmental impact statement filed with the Council on Environmental Quality on July 26, 1973, under the provisions of section 102 (20)(C) of the National Environmental Policy Act of 1969."

According to NCPC's Master Plan Submission Guidelines, "*Agencies are encouraged to review master plans on a periodic basis to insure that both inventory material and development proposals are current. Such reviews should be conducted at least every five years. Sponsoring agencies should advise the Commission of the results of such reviews and provide to the Commission proposed schedules for the updating of master plans on a five-year cycle when updating is determined to be needed.*"

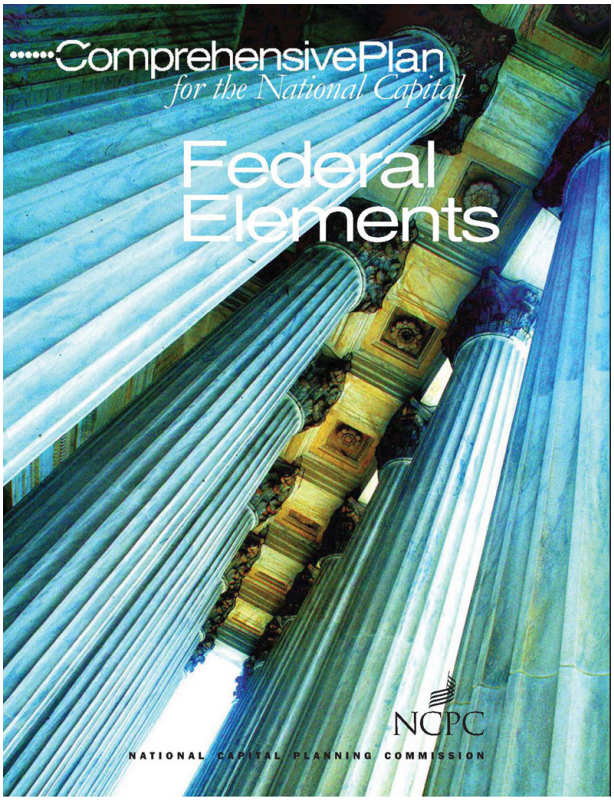
The *Comprehensive Plan* is a document that provides principles, goals, and planning policies for the growth and development of the NCR for the next 20 years. It is composed of two elements - *Federal Elements* and *District of Columbia Elements*. The following sections provide discussions focusing on their implications to JBAB.

Federal Elements

The *Federal Elements* plan was developed by NCPC. It is a living document currently undergoing a full update to ensure its policies remain effective and support the most recent planning initiatives. Additionally, the policies are being evaluated for their alignment with the goals of Executive Order 13514 "Federal Leadership in Environmental, Energy, and Economic Performance" and supporting policy guidelines.

The *Federal Elements* plan addresses matters related to federal properties and federal interests in the NCR. It acknowledges the impact federal agencies have on their surrounding neighborhoods and seeks to integrate federal facilities with their neighborhoods to the greatest extent possible. As a federal agency, the Navy will follow all the general guidelines in the *Federal Elements,* which influences the planning of JBAB in five major aspects.

First, the *Federal Workplace* chapter of the *Federal Elements* highlights the need to "locate the federal workforce to enhance the efficiency, productivity, and public image of the federal government; to strengthen the economic well being and expand employment opportunities of the region and localities therein; and to give emphasis to the District of Columbia as the seat of the national government." In addition, *Federal Workplace* chapter includes policies that address federal development's relationship to local surrounding communities as follows: "Consult with local agencies to ensure that federal workplaces enhance the design qualities and vitality of their communities" and "Plan federal workplaces



Federal Elements of the Comprehensive Plan for the National Capital

to be compatible with the character of the surrounding properties and community and, where feasible, to advance local planning objectives such as neighborhood revitalization." JBAB has been a federal employment center in Southwest D.C. for many years. Its presence contributes to local employment and economic growth in many ways. Improving the quality of the total environment of the installation for those who live, visit, or work at JBAB and coordinating the installation's development with local communities is an important consideration for this Master Plan.

Second, the *Transportation* chapter of the *Federal Elements* sets parking ratio goals for all federal facilities in the NCR. Although NCPC's authority is advisory for projects at JBAB, the installation is working towards lowering its parking ratio by implementing a Transportation Management Plan, which is part of the master planning process, to encourage alternate modes of transportation.

Third, the *Parks and Open Space* chapter of *Federal Elements* states that the federal government should "conserve and enhance the park and open space system of the NCR, ensure that adequate resources are available for future generations, and promote an appropriate balance between open space resources and the built environment." JBAB has approximately three miles of shoreline, which constitutes the major open space and recreational resource at the installation. Due to the secure nature of the installation, public park spaces will not be created at JBAB, but the installation will preserve and enhance its significant existing open spaces and improve the overall visual appearance through various landscaping strategies. In addition, a site on the south-side of the JBAB marina offers prominent views and an interpretive setting associated with the southern approach to the nation's capital. It has been identified by NCPC's *Memorials and Museums Master Plan* (2001 with 2006 update) as a potential waterfront memorial site (Site No. 81). Future development on this site will require coordination between NCPC and the installation.

Fourth, the *Federal Environment* chapter of *Federal Elements* identifies several policies regarding federal stewardship of the environment in air quality, water quality, water supply, land resources, and human activities. JBAB as a federal property is required to support and comply with applicable federal, state, and local regulations on stormwater management, mitigate air and water pollution, and rehabilitate hazardous sites. The installation has cultural and natural resource management plans in place and they are updated every five years to remain compliant with the latest regulations and to monitor emerging legislation.

Fifth, the *Historic Preservation* chapter of *Federal Elements* identifies policies to "preserve, protect, and rehabilitate historic properties in the NCR and promote design and development that is respectful of the guiding principles established by the Plan of the City of Washington (L'Enfant and McMillan Plans) and the symbolic character of the capital's setting." There is a historic district in JBAB eligible to be listed

in the National Register of Historic Places (NRHP). JBAB will protect the integrity of its historic assets and retain viewsheds to prominent landmarks in the District.

District of Columbia Elements

The *Comprehensive Plan for the National Capital: District Elements* was updated in 2006, followed by an approved amendment in 2011. It contains 13 Citywide Elements and 10 Area Elements that present goals, objectives, and policies to guide investment and policy decisions throughout the District of Columbia over the next 20 years. *District Elements* is intended to bridge the small area plans in D.C. and provide a crosscutting plan of how development will be managed.

The 13 Citywide Elements include 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. While many of these elements are covered in the previous discussion related to the *Federal Elements* of the Comprehensive Plan, the *District Elements* provide additional insights that guide the JBAB master plan.

First, the *Economic Development* chapter of *District Elements* highlights the need to sustain federal presence in the District of Columbia. To maintain military and civilian jobs in the city and on the installation for mission readiness, the Navy and the District could become strategic partners in various aspects of the economy, such as land use and transportation.

Second, the *Urban Design* chapter identifies the goals to respect natural features in development and protect views between significant resources. It further suggests improving waterfront identity and design by creating continuous public access to the water's edge. JBAB occupies three miles of low-lying river flats, which form a significant portion of the panoramic views to the east of the Potomac and Anacostia Rivers. New construction at JBAB will should strive for preserving the natural features and viewsheds rather than altering them to accommodate development. In addition, as a secured military property, JBAB will not be regularly accessible to the public. So far, none of the existing waterfront plans in the *DC Elements* have included JBAB's shoreline, but as waterfront developments emerge in the vicinity of the installation, increased boating activity on the rivers will provide additional commuting options as well as higher security requirements for the installation.

1.5 Planning Context

In addition to the planning directions described in the previous section, a number of considerations were taken into account in the JBAB Master Plan, such as the installation's geographic location, Base Realignment and Closure (BRAC), NCPC's response to the 2010 JBAB Draft Master Plan, and the installation's population. JBAB's historical context and its previous master planning efforts are detailed in Appendix B.

1.5.1 Geographic Location

As shown in Figure 1-2, JBAB occupies a 966-acre long and relatively narrow strip of land in Southwest Washington, D.C. It is bounded by the Potomac and Anacostia Rivers to the west, South Capitol Street, Overlook Avenue, and Interstate 295 (I-295) to the east, Naval Research Laboratory (NRL) to the south, and South Capitol Street Bridge, also known as the Frederick Douglass Memorial Bridge, on the north. JBAB is located within the "Historic District of Columbia Boundaries" defined by the *Comprehensive Plan*.

Regional access to JBAB is provided via I-295, Interstate 95 (I-95), Interstate 495 (I-495), Interstate 395 (I-395), Maryland 270 (MD 270), U.S. 50, and Interstate 66 (I-66).

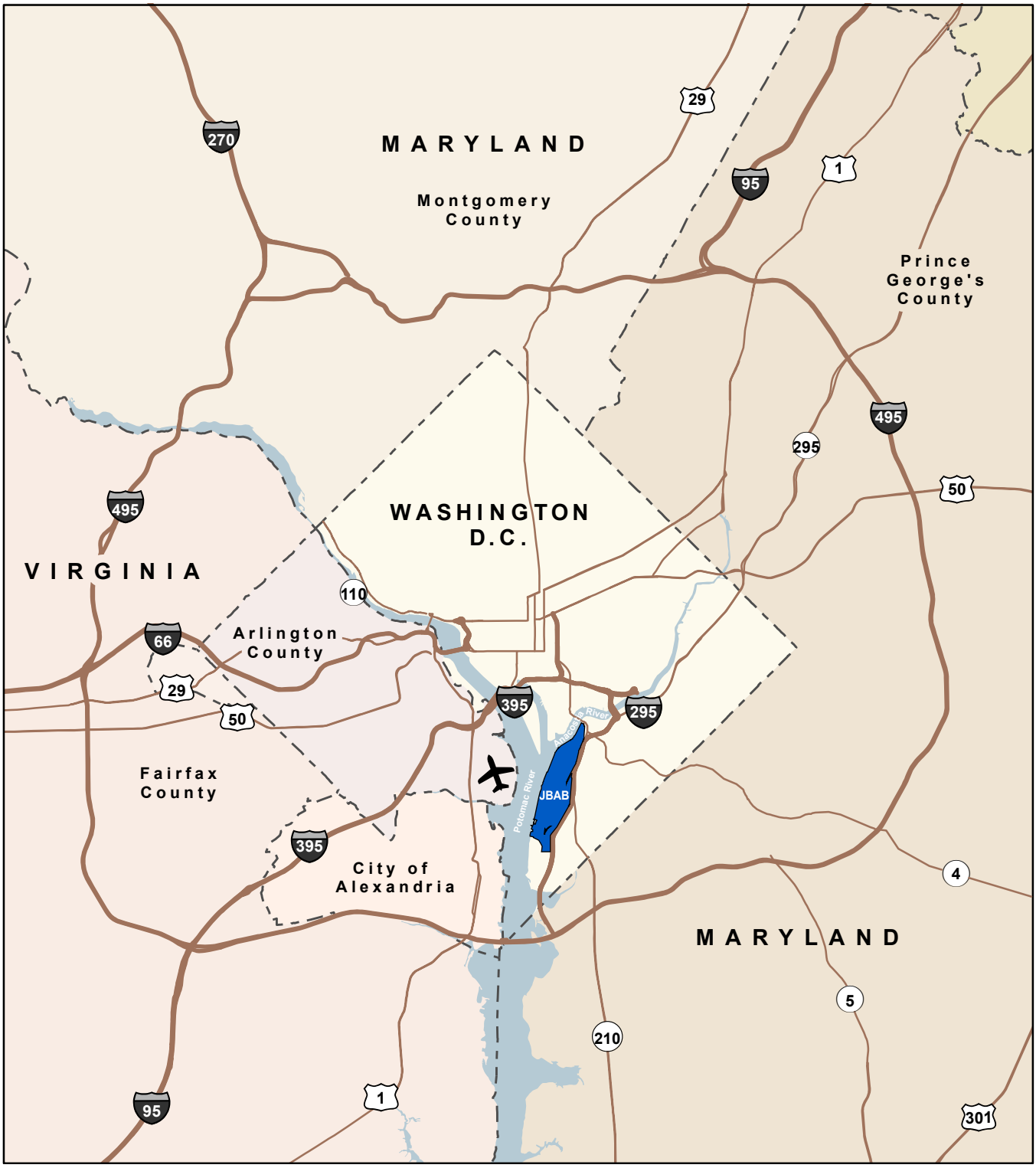
1.5.2 BRAC 2005

Subsequent to the BRAC 2005 legislation that ordered the unification of the NSF Anacostia and Bolling AFB into one joint base, DoD issued "Supplemental Guidance for Implementing and Operating a Joint Base - Real Property" in April 2008, which directed each of the joint bases to develop a Joint Base Installation Master Plan. The former Bellevue Navy Housing Area south of the Bolling AFB was also merged as part of JBAB. This joint base command structure reports to NDW and is on equal footing with the other NDW installations. The transition began with an initial operating capability on January 31, 2010, and reached full operational capability on October 1, 2010.

BRAC 2005 defined the supporting and supported service components on each joint base. The supporting service component of a joint base provides installation support, while supported components receive installation support. Their roles are governed by a Joint Base Memorandum of Agreement, which defines the service obligations and financial responsibilities between the supporting and supported components and the tenants. Joint bases are "national assets" for joint use rather than "owned" by any single service component for their primary use. The Navy is the supporting component at JBAB, responsible for managing the installation's assets and real property, and reviewing and consolidating all service components master plans.

The 2010 JBAB Draft Master Plan was prepared with the unification context. Phase One of the planning process included existing document review and stakeholder interviews with more than 50 representatives from Navy, Air Force, and key tenants on NSF Anacostia and Bolling AFB. A concept workshop was conducted to develop a consensus in planning vision, goals, and objectives as well as alternative possibilities for future physical development. Phase Two of the project continued the interview process and focused on coordination with other government agencies. A workshop was conducted to help define the preferred alternative for a land use and urban design framework.

FIGURE 1-2: REGIONAL CONTEXT OF JBAB



Ronald Reagan National Airport

Interstate Highways

US Highways and Selected State Highways

County Boundary

Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Miles

1.5.3 NCPC Review of 2010 JBAB Master Plan

NCPC reviewed the 2010 JBAB Draft Master Plan. The May 5, 2011 NCPC Commission Action commented favorably on "the inclusion of development strategies that limit the visual impacts of future base development on surrounding communities, on the Plan's landscaping standards that help preserve the character of existing JBAB neighborhoods, and on the Site Environment/Sustainability chapter, which promotes a wide variety of sustainability-oriented strategies for future base development." The Commission however commented unfavorably on the Plan's proposed employee parking ratio of one parking space for every 2.42 employees (1:2.42), which exceeded NCPC's parking ratio goal of one parking space for every four employees (1:4) for locations within the Historic District of Columbia Boundaries, because the 2010 JBAB Transportation Management Plan (TMP) did not justify why JBAB would not meet the parking ratio goal and the Master Plan Environmental Assessment did not analyze an alternative that met the 1:4 parking ratio. The Commission Action also provided other recommendations and requests for additional information. See Appendix C for the complete NCPC Commission Action on May 5, 2011 (NCPC File No. MP55).

1.5.4 JBAB Population

As the nation's premier joint base, JBAB supports presidential, ceremonial, homeland security, and defense support to civil authorities and national security missions conducted by all five of the nation's armed forces and other federal agencies.

The major employee population and facility changes at JBAB since BRAC 2005 include:

- The Naval Systems Management Activity (NSMA) added about 800 new personnel and 200 parking spaces to JBAB. A new five-story administration building with warehouse was built in 2011.
- The Air Force had a net reduction of 261 personnel at JBAB.
- The Defense Media Activity that was in Building 168 was relocated to Fort Meade, resulting in a reduction of 119 personnel at JBAB.
- The Naval Criminal Investigative Service brought in 182 personnel to Building 168 at JBAB.
- Joint Area Defense Operations Center (JADOC) employees at JBAB will be relocated to a building newly constructed at the southern end of the installation from a few trailers being used as office spaces. This project will result in no net increase in population or parking spaces.

As of January 2014, the total number of employees at JBAB is 13,811[1] and no population growth is expected to occur in the next five years.

[1] Calculated using the baseline data of 13,209 personnel reported in the 2010 JBAB Draft Master Plan.

JBAB also provides family housing, bachelor housing (barracks) and lodging accommodations for DoD. According to JBAB housing office, 5,519 people reside on JBAB, including 4,671 in family housing and 848 in bachelor housing. Based on the number of dwelling units and population living in bachelor housing, 1,886 JBAB residents are active duty.

The JBAB Master Plan seeks to address the needs of both residents and employees and facilitate the process to provide people adequate facilities, improved amenities, and better modes of transportation.

1.6 Planning Process and Coordination

Outside the installation, significant urban growth is occurring in the region. The development in the vicinity of JBAB changes the context of the installation and has the potential to benefit or threaten the quality of missions, both current and future, within the installation fence line.

To respond to the fluctuating internal and external contexts and ensure that mission-critical activities are accomplished, NAVFAC Washington initiated the effort to update the JBAB Master Plan in order to reflect the Navy's current planning for the installation.

The RIMP studies and the 2010 JBAB Draft Master Plan serve as the starting point for this Master Plan to understand the existing and emerging visual and/or functional issues, considerations, and opportunities at different areas of the installation. Building on the efforts of the previous master planning process, this Master Plan incorporates updated information from recent studies on JBAB's facilities, land use, transportation, environment, and planned development pertinent to the master planning at JBAB and its vicinities.

Further interviews and site visits were conducted to ensure coverage of the latest information. Meetings with installation leadership and key stakeholders were held to review, refine, and gain approvals on future land use and feasible transportation management measures. Greater coordination with NCPC, Department of Homeland Security (DHS), the District Department of Transportation (DDOT), and other federal and local agencies also ensued to facilitate integration of the concurrent planning efforts in the region.

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2.0 Evaluation of Existing Conditions

An analysis of the existing and background conditions at JBAB was performed to gain a thorough understanding of the land use, facility assets, on-site resources, operational constraints, circulation, and infrastructure. This analysis identified opportunities and constraints for the future development of the installation, which have shaped the planning strategies of the Master Plan.

2.1 Existing Installation Land Use

JBAB's current land use reflects the continuation of the mission functions before the joint basing. The Anacostia side of the installation is characterized by loosely organized large facilities dedicated to mission/administrative, airfield operations, industrial, and base support functions. The Bolling side is characterized by a more geometrical arrangement of roads and facilities, dominated by base support and housing functions. Open spaces and recreational uses occur along the waterside portions of the installation and the installation's perimeter fence.

The existing land use map (Map 2-1) categorizes the different types of mission activities taking place in physical or functional terms at JBAB. Table 2-1 provides a breakdown in acreage of land area by use. The land use categories are explained below with definitions derived from UFC 2-000-05N Category Codes and Navy Shore Vision 2035 (NSV2035) Shore Capability areas, followed by a narrative summary of where they occur at JBAB.

Airfield Operations

This land use refers to facilities associated with activities related to aircraft and their maintenance and support functions. Airfields contain runways, taxiways, aircraft maintenance/storage hangars, wing headquarters facilities, air operations structures, air terminal facilities, training facilities, and line-shacks, as well as fueling areas and other utility service areas.

Airfield Operations land use on JBAB encompasses 46.72 acres, about 4.84 percent of JBAB land. This land use allows rotary-wing air operations in two designated areas. The large area is for the Marine Helicopter Squadron One (HMX-1) helicopter operation. It is centrally located at the installation, encompassing a compound around Buildings 91 and 398. There is also a small helicopter landing area just south of the Defense Intelligence Agency (DIA) complex and MacDill Boulevard.

TABLE 2-1: EXISTING LAND USE ACREAGE DISTRIBUTION

Land Use		Total Acreage	% of Total
Airfield Operations		47.02	4.87
Base Support		152.59	15.80
Family and Bachelor Housing		296.78	30.72
Industrial/Logistics		80.15	8.30
Mission/Administrative		240.84	24.93
Open Space/Outdoor Recreation		113.08	11.70
Port Operations		10.59	1.10
Temporary Lodging		24.95	2.58
JBAB Land - Total:		**966.00**	**100**
CSX Parcels *	Parcel near South Gate	2.80	
	Parcel near DIA complex	0.85	
Total:		**3.65**	

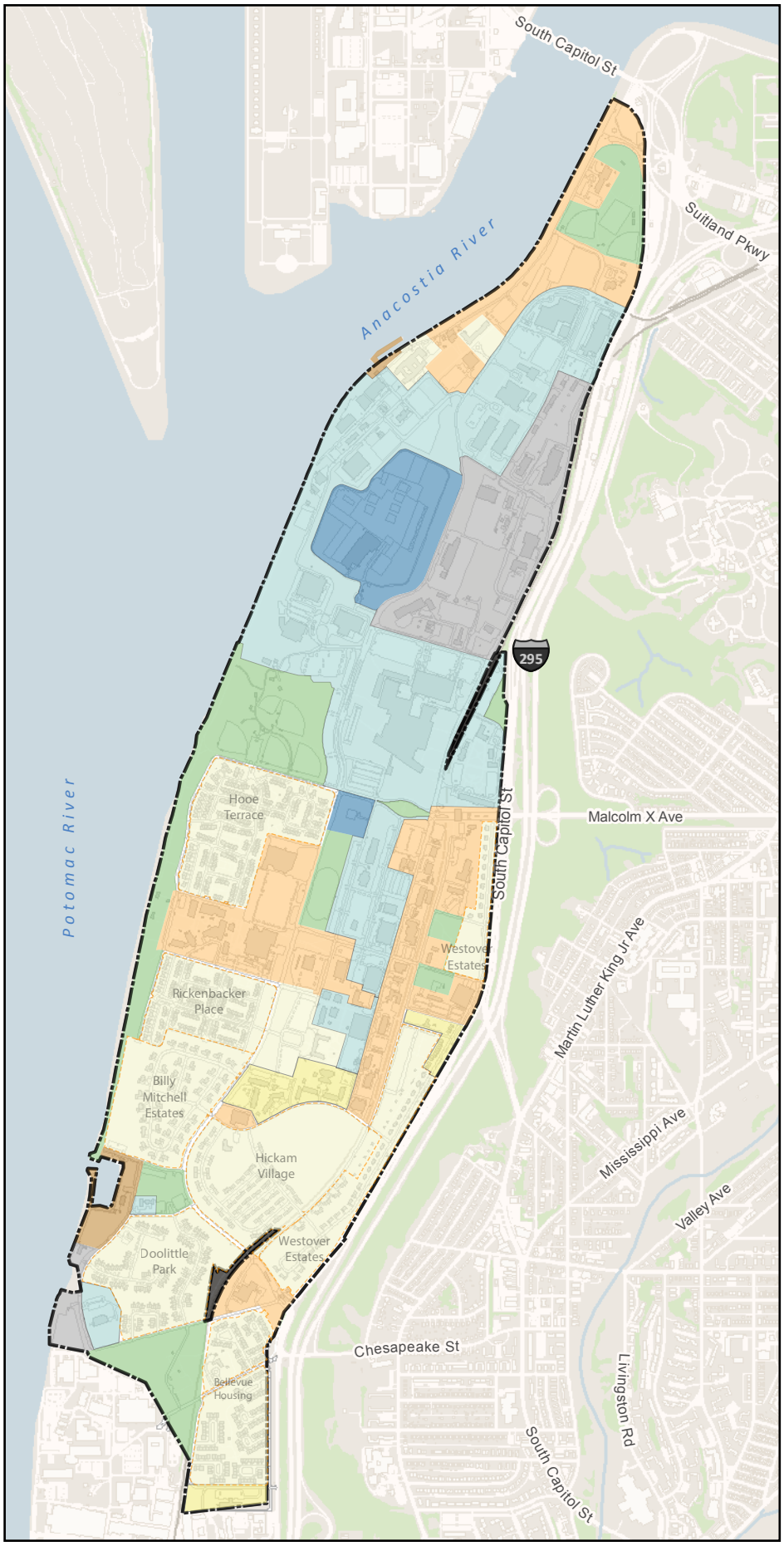
Sources: NAVFAC Washington 2013; Washington, D.C., GIS, 2013; ESRI - StreetMap, 2012.

* Within JBAB perimeter, CSX owns approximately 3.65 acres of land in fee simple and can use over 7,400 linear feet of railroad easement outside its parcels. The CSX parcels and easement information is detailed in the section of Operational Constraints.

MAP 2-1: EXISTING LAND USE MAP

- Installation Boundary
- Airfield Operations
- Base Support
- Family and Bachelor Housing*
- Industrial
- Mission/Administrative
- Open Space/Outdoor Recreation
- Port Operations
- Temporary Lodging
- CSX Parcel

* *Labeled areas are the seven Family Housing communities.*



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Base Support

This land use refers to facilities associated with public safety and base-wide services. These uses include: fire/emergency, police/security, conference centers, dependent schools, Child Development Centers (CDCs), religious facilities, military working dog kennels, transit stations, and installation gates. Functions being performed are essential operations that serve all installation personnel and essential visitors.

Four areas at JBAB are categorized as Base Support land use, which encompasses 152.59 acres, about 15.80 percent of JBAB's total land area. Three of them encompass the installation gates and nearby facilities, such as the fire station, bowling center, the club, auto hobby shop, CDCs, medical and dental services, and housing welcome center. The only Base Support area not immediately adjacent to the installation gates is within the residential housing area. This area can be easily accessed from the Arnold Gate and includes the Base Exchange, Commissary, shoppette, youth center, restaurants, and others community functions.

Family and Bachelor Housing

This land use refers to residential dwellings and associated grounds that serve as the primary place of habitation for eligible personnel and any of their dependents. Eligible personnel are commissioned officers, warrant officers, or enlisted members and key civilian employees.

The Family and Bachelor Housing is the largest land use at JBAB, including a total of 296.78 acres, or 30.72 percent of JBAB land. It is estimated that 5,519 people reside on JBAB, including 4,671 in family housing (Table 2-2 and Map 2-2) and 848 in bachelor housing. Based on the number of dwelling units and population living in bachelor housing, approximately 1,886 JBAB residents are active duty personnel.

MAP 2-2: JBAB FAMILY HOUSING COMMUNITIES

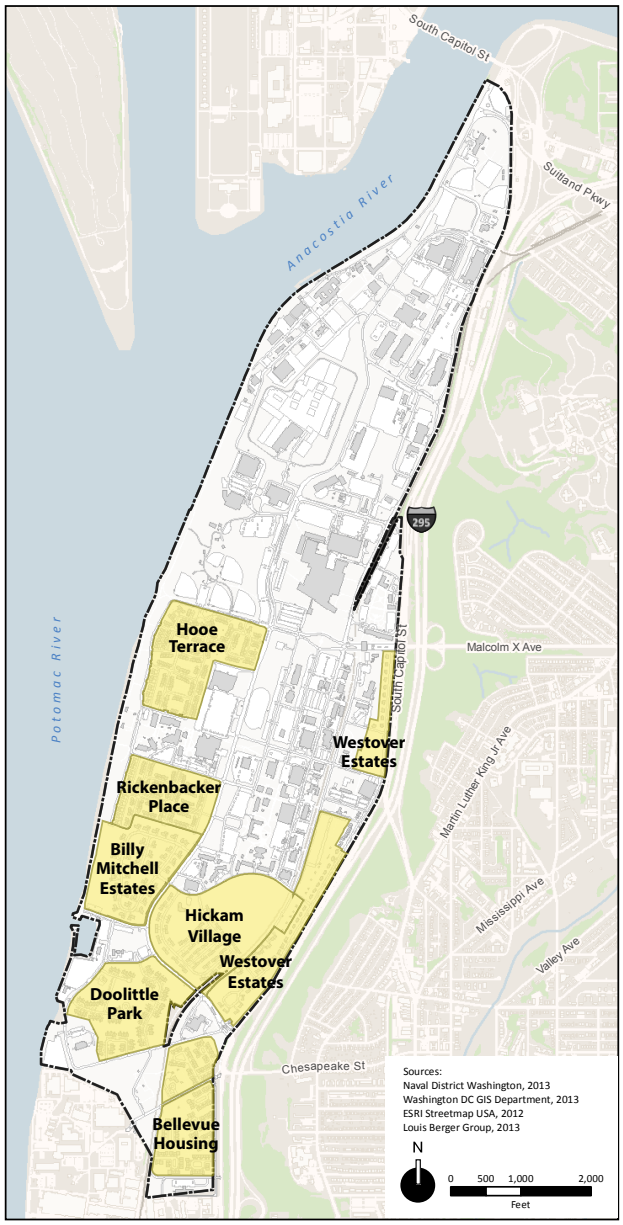


TABLE 2-2: JBAB FAMILY HOUSING DATA

Community Name		Multi-Family Dwelling Units	Single Family Dwelling Units	Total Dwelling Units	Population
Bellevue Housing		188	0	188	846
Bolling Family Housing	Billy Mitchell Estates	0	41	41	185
	Doolittle Park	178	0	178	801
	Hickam Village	78	0	78	351
	Hooe Terrace	306	0	306	1,377
	Rickenbacker Place	198	0	198	891
	Westover Estates	10	39	49	221
Total:		**958**	**80**	**1038**	**4,671**

Assumptions:

1) Each dwelling unit is headed by at least one military active duty member given that the number of DoD Civilian headed household is unknown.

2) Household population is based on JBAB Housing Office's assumption, i.e. 2.5 children and 2 adults per dwelling unit. Therefore, each dwelling unit has 4.5 people regardless of unit type.

Source: GIS count of dwelling units and JBAB Housing Office

All family housing is privatized and located at the southern portion of the installation, including Bellevue Housing at the southern end of the installation and six communities of Bolling Family Housing between the South Gate and the Arnold Gate. Together these communities encompass 230.66 acres of land leased to private entities.

Under the authorities of the Military Housing Privatization Initiative enacted on February 10, 1996 as part of the National Defense Authorization Act, privatized housing on or off government property is governed by a business agreement in which the Navy has limited rights and responsibilities. The private entity is entirely responsible for construction, renovation, maintenance, and day-to-day management of the housing. Under the current Public Private Venture (PPV) partnership, Bellevue Housing at JBAB is managed by Lincoln Military Housing while Bolling Family Housing is managed by Hunt Military Community. The installation has no practical control over these family housing areas. According to JBAB Housing Office, the 50-year lease of Bolling Farmily Housing started on September 28, 2007. There was a five-year period for demolition and construction. This period ended in 2012 and the developer has decided to reduce excess land from the lease. Therefore, the land use right of approximately 46.5 acres of Bolling Family Housing will be returned to the federal government and open to new missions at JBAB.

The Bachelor Housing at JBAB is provided at four separate buildings in two primary locations for a total of 848 enlisted service members of the Armed Forces, including Navy Ceremonial Guard Furnari Hall (Building 417), Enterprise Hall (Building 72), Blanchard Barracks (Building 1302), and the Air Force Honor Guard Building (Building 47).

Blanchard Barracks (Building 1302) and the Air Force Honor Guard Building (Building 47) are at the southern portion of the installation, while the other two are situated north of the Airfield Operations Compound along the Anacostia River.

Industrial

This land use refers to facilities associated with industrial, logistics, and weapons training/storage functions. Examples of these types of functions include logistics operations such as supply management, and industrial operations such as vehicle maintenance and storage, weapons training ranges, and facilities maintenance. Real property associated with these facilities may entail safety quantity distance arcs, buffers, and storage lots.

The area dedicated to Industrial functions is about 80.15 acres, representing approximately 8.30 percent of JBAB land. It is located at the northern portion of the installation along the east perimeter between the installation's boundary and Defense Boulevard. Major Industrial functions include the public works facilities and vehicle operation and maintenance compounds. Several Army National Guard heavy equipment compounds and the Seabees compound are also located here.

Mission/Administrative

This land use refers to facilities associated with the installation's primary mission activities and office-oriented functions, such as headquarters, program management, information technology, personnel support, and other administrative activities. Some supporting functions are also permitted in this land use, including food service, auditoriums, banks, postal services, data processing centers, libraries, and gyms.

Mission/Administrative land use is about 240.84 acres, or 24.93 percent of JBAB land. It represents the largest concentration of personnel at JBAB. Facilities are grouped toward the northern and central portion of the installation. Key tenants include the 11th Wing Headquarters, Mission Support Group Headquarters, White House Communications Agency, U.S. Air Force Band, the Ceremonial and Honor Guards, DIA, NSMA, HMX-1, U.S. Secret Service, and JADOC.

Open Space/Recreation

This land use refers to real property dedicated for outdoor public use or for the protection of natural/cultural features. Examples include parks, recreation fields, ceremonial parade fields, habitat preservation areas, and view sheds. Outdoor facilities include athletic fields/courts, swimming pools, dog parks, playgrounds, marinas, and amphitheaters.

JBAB has 113.08 acres (or 11.70 percent) of land for Open Space and Recreation. With an estimated number of 5,519 residents at JBAB, the open area at JBAB is about 21.7 acres per 1,000 residents.

The installation shoreline constitutes the major open space and recreational resource on the site. The waterfront jogging trail connects the marina on the south, Giesboro Park in the middle, and extends into the mission area northwest to the Airfield Operations compound. This area provides not only recreational opportunities for installation personnel, but favorable views of the river, historic Fort McNair, and the U.S. Capitol Building.

Mission/Administrative functions – 11th Wing Headquarters

The northern tip of the installation and the family housing area also contain large open spaces with various sports fields. They are connected by smaller interspersed linear open spaces along Defense Boulevard, Chappie James Boulevard, and the CSX railroad easement.

JBAB currently meets and exceeds the minimum mission requirements for outdoor recreation facilities. Table 2-3 provides a comparison of the existing outdoor recreation facilities at JBAB and the outdoor recreation requirements based on 1,886 active duty personnel at the installation.

TABLE 2-3: OUTDOOR RECREATION FACILITIES AT JBAB

Outdoor Recreation Facility	Existing	Requirements based on # of Active Duty Personnel *
Softball Field	7	1 with lights 1 with/without lights
Multipurpose Field	2	1 with lights
Tennis Courts	9	2
Swimming Pool	1	Access to aquatic resources in the local community.

* Source: http://www.navyfitness.org/fitness/fitness_standards_and_metrics

Port Operations

This land use refers to facilities along the shoreline or extending into navigable water for ship repair, fueling, training, cargo and/or passenger transfers, and other related services and facilities essential to fulfill the mission, such as potable water, electric power, compressed air, waste disposal, and communications.

JBAB's location at the confluence of the Potomac and Anacostia Rivers gives the installation access to the waterways. Port Operations is present along the Anacostia River near the boat crew maintenance shop (Building 84) and the installation marina on the Bolling side. This land use occupies 10.59 acres, or 1.10 percent of JBAB land.

Open Space/Recreation functions – Giesboro Park

Temporary Lodging

This land use refers to facilities that provide temporary living accommodations normally rented for a service charge for overnight or short-term use to authorized personnel. Eligible personnel include official military or civilian personnel of the installation, visitors to the installation, and transient personnel/families awaiting assignment to quarters. Facilities can be apartment-style, hotel-style, motel-style, or dormitory-style living quarters. Additional amenities may be included such as outdoor recreation areas, dining halls or kitchenettes, and laundering facilities.

Temporary Lodging facilities are located at three areas of the installation, including the Navy Lodge (Building 4412) on Boyer Road, some transient quarters along Angell Street and Westover Avenue, and Gateway Inns and Suites (Building 93) north of the Airfield Operations compound. This land use occupy 24.95 acres, representing 2.58 percent of JBAB's total land area.

Port Operation functions – Installation Marina

Temporary Lodging functions

2.2 Existing Facility Assets

The New Footprint (NF) Military Construction (MILCON) Moratorium issued by the Department of the Navy (DON) on September 19, 2010 requires recapitalization of existing facilities in lieu of NF MILCON be pursued as a matter of policy. The Moratorium also requires to "program, at a minimum, a 2:1 equivalent infrastructure reduction for Commander, Navy Installations Command (CNIC) waived NF MILCON" (i.e. demolish a minimum of two square feet (SF) of existing footprint for every one square-foot new construction).

2.2.1 Building Use

Using the UFC 2-000-05N *Facility Planning Criteria for Navy/ Marine Corps Shore Installations*, Map 2-3 illustrates JBAB's facility types by category codes.*

- The 100 Series - Operational and Training use exists both on the northern side and southern side of the installation, including facilities for airfield operations, D.C. National Guard Training Center, U.S. Air Force Band, and functions alike.
- The 200 Series - Maintenance and Production facilities are mostly along the installation's east perimeter on the northern side of the installation.
- The 600 Series - Administrative use encompasses major facilities for large tenants that have special security requirements, such as DIA, U.S. Secret Service, GSA, NSMA, and White House Communications.
- The 700 Series - Housing and Community use occupies the majority of facilities at JBAB, particularly on the original Bolling side.

Other types of facilities are minimal at JBAB and are distributed among other uses.

* Because data on some mission-critical facilities is incomplete, no further information can be provided other than designated building use.

2.2.2 Building Age and Condition

As shown in Map 2-4, the oldest buildings at JBAB are more than 70 years old. They are arranged in two principal groupings.

- One grouping is associated with the Bolling AFB Historic District, which is an intact collection of Pre-World War II and World War II buildings. Buildings 1, 2, 20, and 21 have been determined individually eligible for listing on the NRHP (See Section 2.4.2 Cultural Resources). These buildings are contributing resources to the historic district and have an adequate rating for condition according to the facility data provided by the installation (Map 2-5).
- The other grouping is on the Anacostia side near the waterfront. It consists of facilities built between the 1920s and 1940s, but none of them meet the NRHP criteria for listing. As shown in Map 2-3, these buildings are mostly substandard, if not inadequate, in terms of physical condition. Due to their adjacency to the river and the low elevation of the site, these buildings are also subject to flooding during storm events, which makes annual maintenance costs excessive. In many instances, the cost of rehabilitating them to acceptable standards cannot be justified when compared to new construction. A few buildings in this grouping, including Buildings 29, 53, 97, 106, 445, and 471 are slated for demolition when funds are available.

Buildings that support the installation's current core missions today are mostly less than 50 years old. They are located at the center of the installation, indicative of successive eras of expansion and growth when early airfield operations diminished and new missions were added. [redacted]

According to evaluations on physical condition, most buildings on the Bolling AFB side still have an adequate rating while quite a few on the Anacostia side are rated substandard. [redacted] Table 2-4 and Map 2-5 indicate buildings that have been identified for removal or replacement when funds are available.

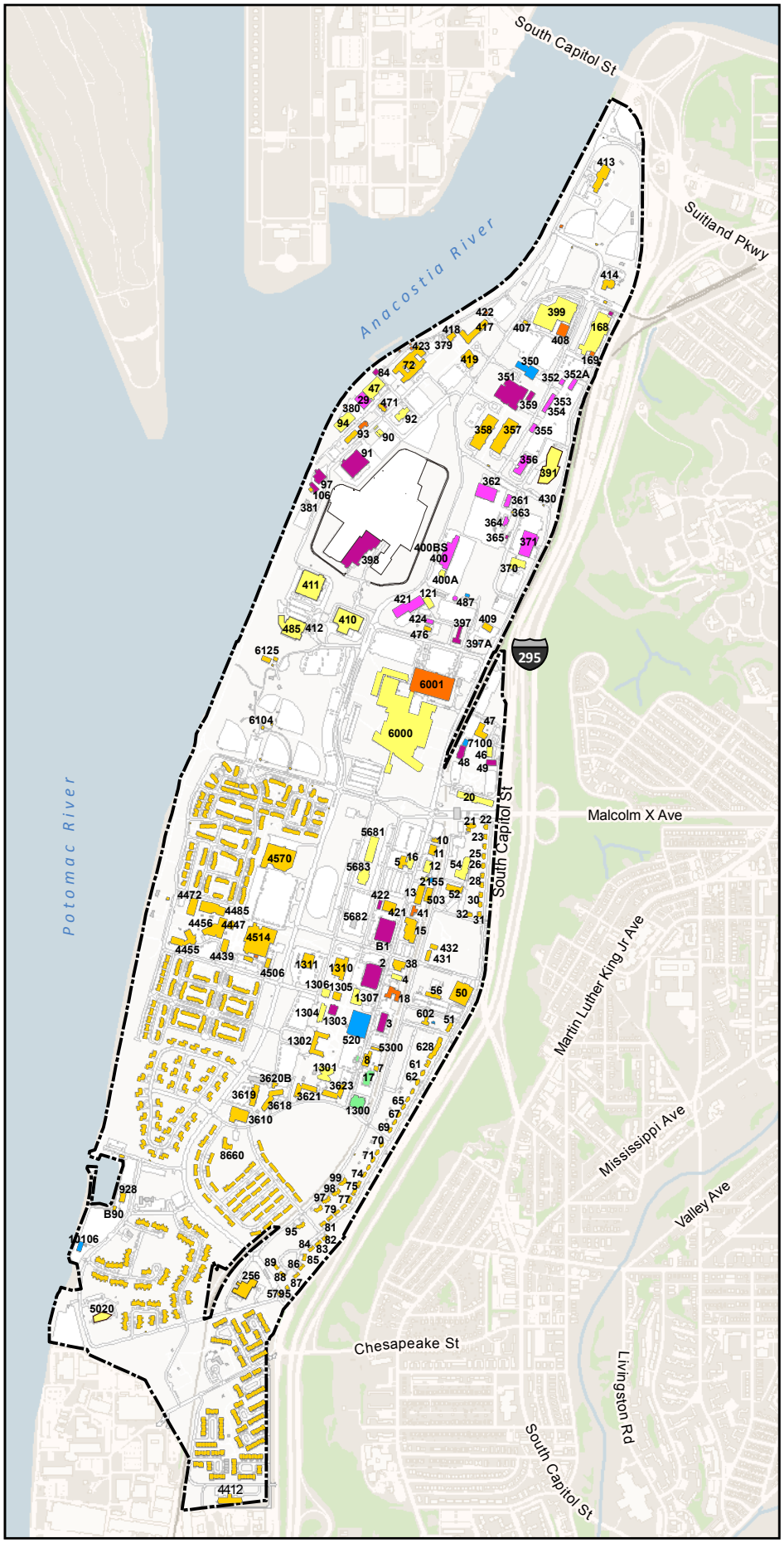
2.2.3 Building Height

Building height represents the overall elevation from the ground to the topmost portion of the structure. Building heights in relation to site elevation can be an important factor in the perception of building masses.

JBAB lays on a flat riverfront plain on a north-south axis near sea level. A small portion of Anacostia is below sea level. The ground slopes upwards gradually along the installation's east perimeter where most buildings are family housing. Most family housing and community facilities at JBAB are low-slung, one or two stories in height, while core mission-related facilities are mostly three to four stories or equivalent in height. Many buildings are not highly visible from outside areas because they are at much lower elevations than the perimeter walls and landscaping. The NSMA building (five stories), DIA building (six stories), and the Blanchard Barracks (nine stories) are the only exceptions. The top floors of the NSMA building are highly visible due to its adjacency to South Capitol Street. The DIA building and Blanchard Barracks are situated at the center of the installation and dominate the horizon when viewed from afar.

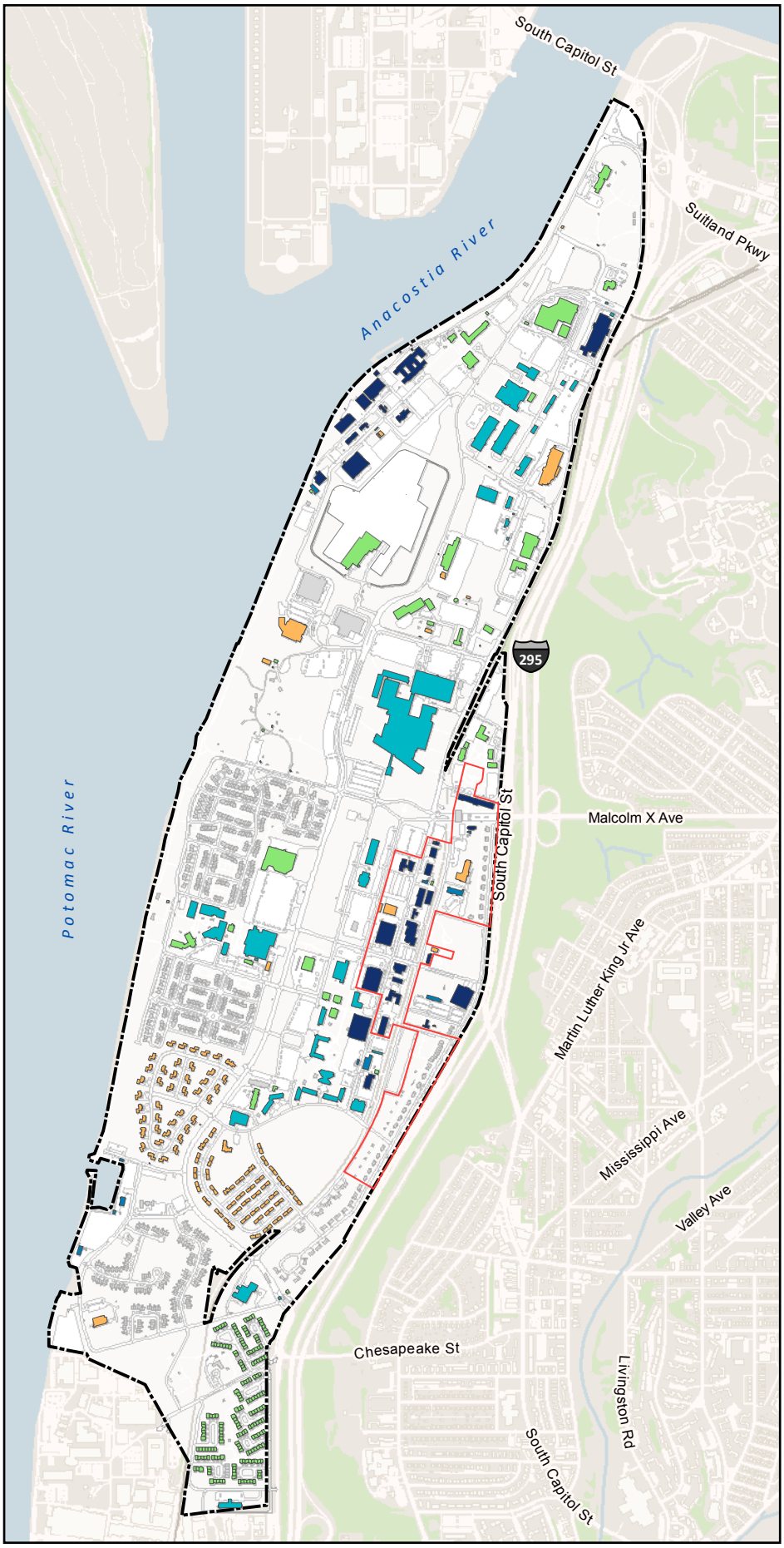
MAP 2-3: BUILDING USE

- Installation Boundary
- 100 Series - Operational and Training Facilities
- 200 Series - Maintenance and Production Facilities
- 400 Series - Supply Facilities
- 500 Series - Hospital and Other Medical Facilities
- 600 Series - Administrative Facilities
- 700 Series - Housing and Community Facilities
- 800 Series - Utilities and Ground Improvements Facilities
- Not Inventoried



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

MAP 2-4: BUILDING AGE



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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2.3 Existing Installation Circulation

2.3.1 Access Control Points (ACPs)

As shown in Map 2-6, there are five access control points to JBAB, four of which exist on the east side of the installation and are serviced primarily by I-295 and South Capitol Street.

- **Arnold Gate (Main Gate)**: This gate is at the intersection of South Capitol Street and Malcolm X Avenue. It is operational 24 hours a day, seven days a week. A DoD identification card will be needed to access this gate. There are three inbound lanes and two outbound lanes, and it has guard locations to supplement security screening and processing during peak demand periods.
- **Firth Sterling Gate**: This gate is located at the intersection of Firth Sterling Avenue and South Capitol Street. This gate is operational between 5:00 AM and 8:45 PM daily, and is used primarily by personnel with DoD identification cards. Two inbound and two outbound lanes are provided with adjacent pedestrian gates. This gate is about ½ mile from the Anacostia Metrorail Station.
- **South Gate (Visitor's Gate):** The South Gate is located at the intersection of Chappie James Boulevard and Overlook Avenue. It is open between 5:00 AM and 9:00 PM daily. In addition to serving employee access, it is the dedicated entry point for visitors. It provides two inbound lanes, with an adjacent two-bay vehicle inspection facility, as well as a "turn around" for vehicles directed to the adjacent visitor's center. Access to the visitor's center is one-way inbound; outbound vehicles may egress via McGuire Avenue.
- **Bellevue Housing Gate:** This gate is at the intersection of Overlook Avenue and Magazine Road/Chesapeake Street. It is operational 24 hours a day, seven days a week. There are two vehicular lanes, one inbound and one outbound. One pedestrian gate is provided next to the outbound lane.

These four gates are all manned, with security screening provisions. There is also a seldom-used fifth gate at the northern end of the installation, known as the North Gate. JBAB is considering shifting the truck screening facility to the north. The new truck gate configuration will be coordinated with the South Capitol Street Bridge Project.

In addition to these five gates, JBAB shares its southwest perimeter with NRL, where NRL has a North Gate connecting to JBAB at the terminus of Magazine Road. This gate is used for emergency purpose and is currently closed for operation. Since NRL has more stringent security requirements than JBAB, future use and modification of this gate will be determined by NRL's mission.

2.3.2 Internal Road System

Three categories of internal roadways are found at JBAB: primary, secondary, and local. They are summarized below.

Primary Roadways

The primary roadways provide continuity of flow between the entry points and the major facilities on the installation. They consist of the following:

- Defense Boulevard running between Boundary Road (mid-base) and the Firth Sterling Gate (to the north).
- Chappie James Boulevard, which runs from the South (Visitor's) Gate (to the south) up to Boundary Road, and connects to Defense Boulevard.
- MacDill Boulevard runs east-west between the Arnold Gate and the housing area to the western extremity, close to the bank of the Potomac River.

Functionally, Defense Boulevard and Chappie James Boulevard serve as a continuous spine route between the Firth Sterling Gate and the South Gate, and intersecting with MacDill Boulevard to serve the Arnold Gate at the approximate center of JBAB. The basic design intent of the spine road and its three principal ACPs is to distribute peak ingress and egress traffic to the South Capitol Street Corridor more uniformly among the length of the installation.

Secondary Roadways

The secondary roadways make up the majority of the vehicle circulation routes within JBAB. They form a generalized grid pattern of north-south and east-west streets, principal among which are Brookley Avenue, Mitscher Road, McChord Street, Angell Street, and Duncan Avenue. Most of these roadways are east of Chappie James Boulevard/Defense Boulevard, with the exceptions of Tinker Street and the section of MacDill Boulevard west of Chappie James Boulevard. The latter two roadway sections serve the residential area adjacent to the Potomac River.

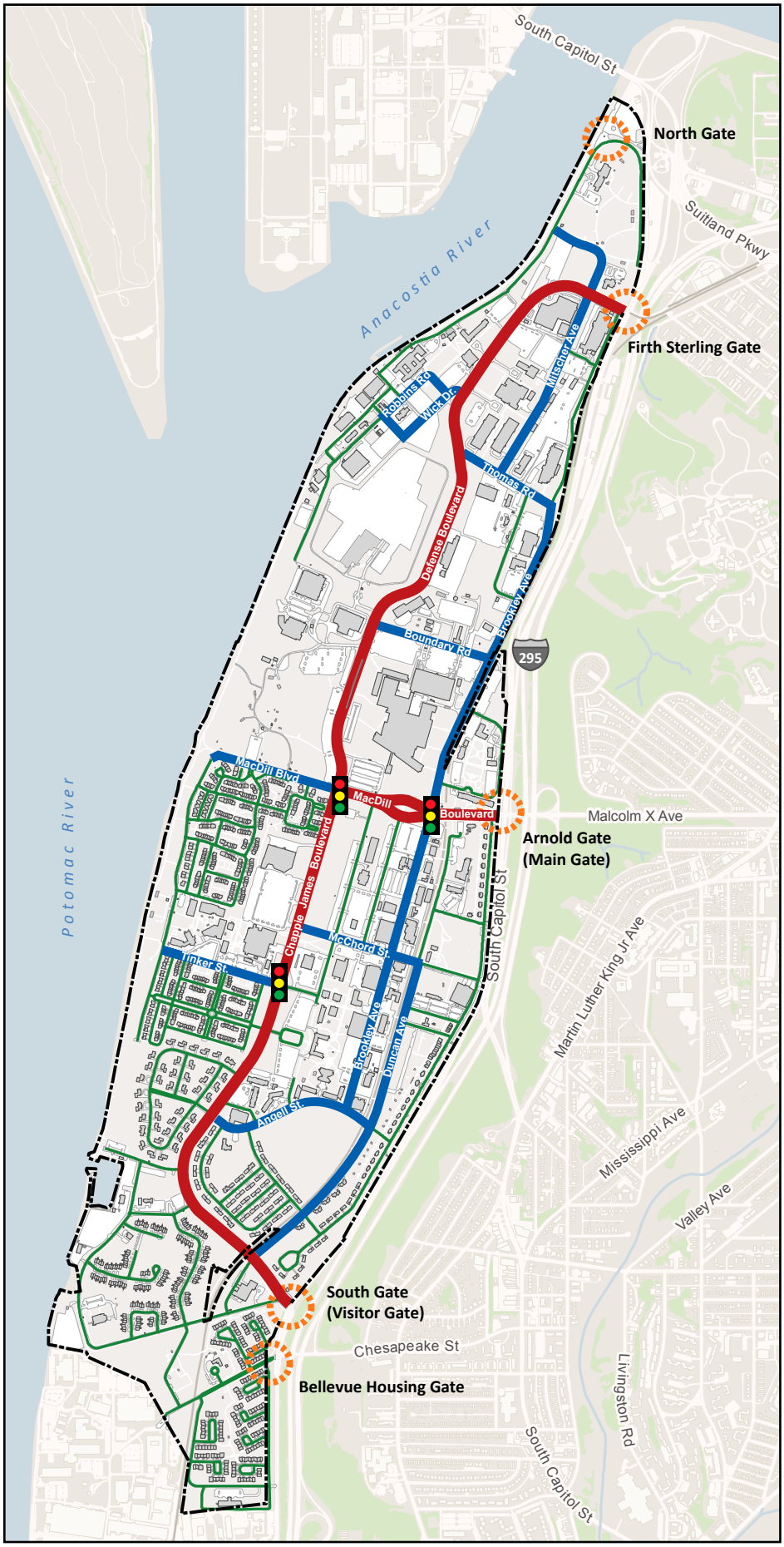
Local Roadways

Local roadways at JBAB are primarily along the installation perimeter and within the residential zones west of Chappie James Boulevard.

A number of relatively major nodes are at the intersection points between the major and secondary roadways. There are three signalized intersections within the installation: MacDill Boulevard at Brookley Avenue, MacDill Boulevard at Chappie James Boulevard, and Tinker Street at Chappie James Boulevard.

MAP 2-6: INTERNAL ROAD SYSTEM

- Installation Boundary
- Access Control Point
- Primary Road
- Secondary Road
- Local Road
- Paved Area
- Traffic Light



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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2.3.3 Parking

Parking facilities at JBAB include paved surfaces designated for parking and multi-level garages that permit higher density parking in situations of land restrictions and/or economic considerations.

Large surface lots are spread throughout JBAB and provide the majority of vehicle parking for employees, visitors and mission operations. DIA, as the largest tenant at JBAB, uses over 3,600 parking spaces centrally located at JBAB for its own personnel demand. JBAB also has two two-story garages, Buildings 357 and 358, in the northern part of the installation. A DIA shuttle runs between a remote parking lot near the ballfields on Defense Boulevard, the two parking garages, and the DIA Complex to service their employees.

According to JBAB Parking Data Inventory, there are 8,259 employee parking spaces distributed throughout the installation, of which 230 spaces are reserved as handicap spaces and 326 spaces are reserved for specific personnel or tenants (Table 2-5). Non-staff parking includes 2,523 visitor and customer spaces for the large number of family and community support facilities at JBAB, such as the visitor's center, Commissary, Base Exchange, lodging, clinics, clubs, gyms, shoppette, CDCs, post office, police station, and functions alike. The data does not include dedicated residential parking and vehicle maintenance and storage. As of February 2014, there are 13,811 employees at JBAB, so the current parking ratio is one parking space for every 1.67 employees (1:1.67).

Parking near the DIA complex is always in high demand

2.3.4 Public Transit and Shuttles

JBAB is located in an area that is poised for growth over the next 20 years as a result of planned waterfront development, revitalization, and new federal employment centers. As the region continues to grow, mass transit will play an important role in supporting accessibility to the installation and giving employees alternatives to driving a single-occupancy vehicle (SOV).

Metrorail and Metrobus

Public transportation throughout the area near JBAB is provided by the Washington Metropolitan Area Transit Authority (WMATA) by means of Metrorail and Metrobus.

The Anacostia Metrorail Station, on the Green Line, is located along Howard Road, approximately ½ mile from the Firth Sterling Gate. It is also served by 22 Metrobus routes.

Congress Heights Metrorail Station, also on the Green Line, is located on Alabama Avenue and approximately 1½ miles east of the Arnold Gate. It is served by eight Metrobus routes.

WMATA also operates several Metrobus routes that run within the local area and have stops in proximity to JBAB gates (Table 2-6). Bus hours vary by route.

- Routes W4 and W5 directly serve the Arnold Gate during peak commuting hours. These bus routes connect JBAB with Anacostia Metrorail Station and the neighborhoods east of JBAB in the District.
- Routes W2/W3 run among several metrorail stations and among the local neighborhoods east of JBAB. They have stops on Firth Sterling Avenue near the Firth Sterling Gate, but only W2 operates during peak hours.
- There is no Metrobus connection between JBAB and Virginia or Maryland during peak hours.
- Routes A4 and W5 have stops near Bellevue Housing on Overlook Avenue, but W5 serves the Arnold Gate.
- The W13, P17, and P19 are express buses with limited boarding or alighting. They travel by the installation, but do not have stops outside JBAB or at the Anacostia Metro Station.
- No Metrobus routes have operated within JBAB since September 11, 2001.

TABLE 2-5: EXISTING PARKING INVENTORY

Government Fleet	Customer Parking	Employee Parking			Total Parking Spaces	Total JBAB Employees	Existing Parking Ratio
265 spaces	2,523 spaces	8,259 spaces			11,047 spaces	13,811 personnel	1 parking space for every 1.67 employees
		Handicap	Reserved for Specific Personnel	Undesignated Parking			
		230 spaces	326 spaces	7,703 spaces			

FIGURE 2-1: REGIONAL PUBLIC TRANSIT

- Installation Boundary
- D.C. Boundary
- VRE Commuter Rail
- VRE Station
- Metrorail Station
- 10-Minute Walking Distance (approximately 2,000 feet)

Metrorail Lines

- Blue
- Green
- Orange
- Red
- Yellow

Metrobus Lines Serving Stops Outside JBAB Gates

- A4,W5
- W14
- W4
- P18
- W2/W3

Commuter Bus Lines Serving JBAB*

- MTA Bus 907

DC Circulator Bus Lines

Note:
Bus services available from Anacostia Metro Station include 90, 94, A2, A4, A7, A8, A42, A46, A48, B2, P1, P2, P6, P18, U2, W2, W3, W4, W5, W6, W8, and W14.
* Information about the commuter bus from Virginia is removed due to security reasons.

Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Feet

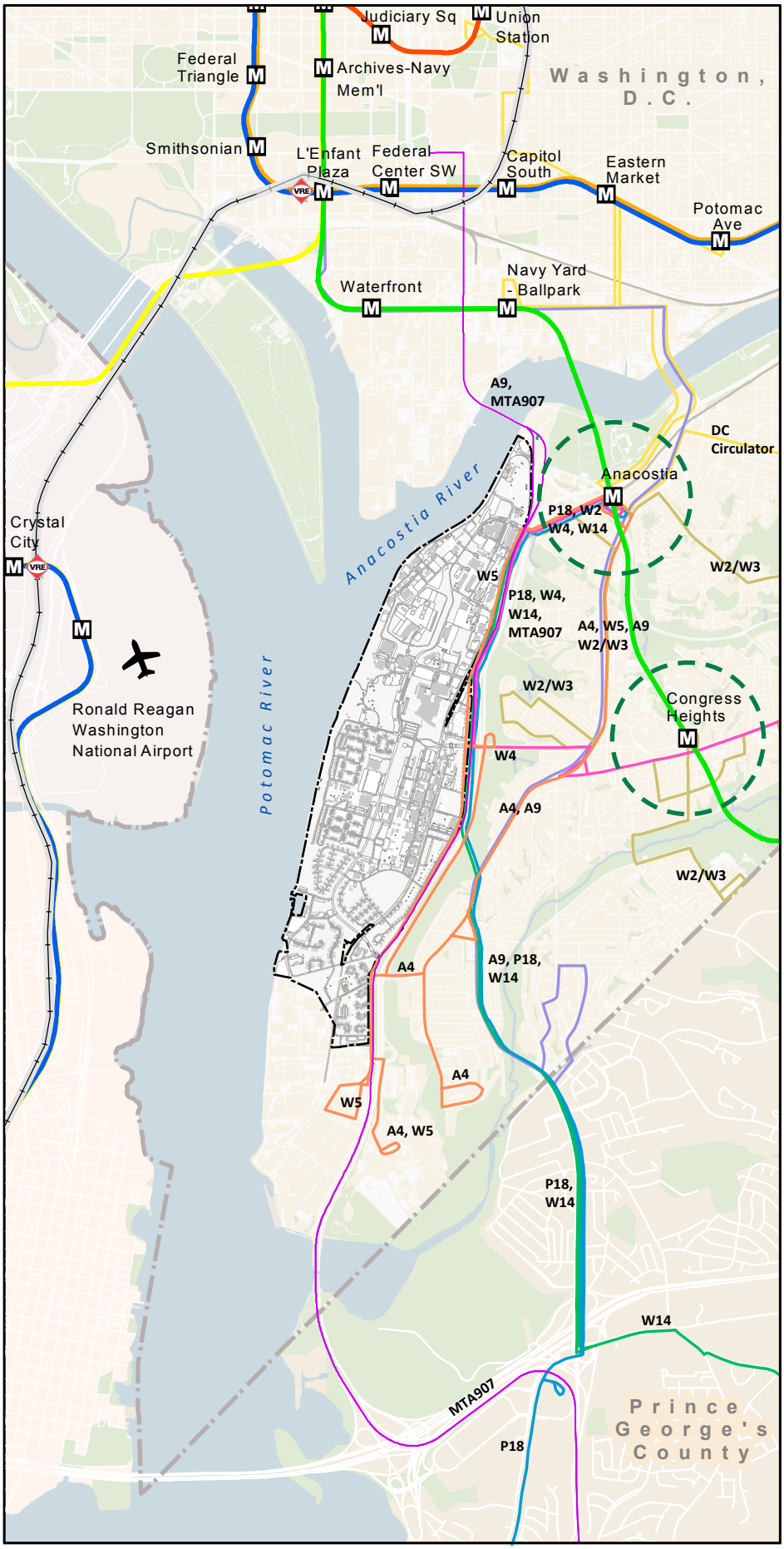


TABLE 2-6: METROBUS SERVICE NEAR JBAB

Route	Name	Stop(s) at JBAB Gate(s)	Peak Period Service near JBAB Gate(s)	Peak Hour Headway* - AM/PM	Origin	Destination	Service beyond Ward 8
W2/W3	United Medical Center – Anacostia Line	Near Firth Sterling Gate	W2 only	9 min/17 min	United Medical Center	Washington Overlook	Ward 7
W4	Deanwood-Alabama Avenue Line	Arnold Gate	Yes	10 min/15 min	Deanwood Metro Station	Anacostia Metro Station	Ward 7
W14	Brock Road Line	Arnold Gate and Firth Sterling Gates	No	(hourly, non-rush)	Friendly, MD	Anacostia Metro Station	PG County
P18	Oxon Hill – Fort Washington Line	Arnold Gate and Firth Sterling Gates	No	(hourly, non-rush)	Fort Washington Park and Ride Lot	Anacostia Metro Station	PG County
A4, W5	Anacostia – Fort Drum Line	Bellevue Housing Gate (A4 and W5) Arnold Gate (W5 only)	Yes	A4: 9-16 min/20 min W5: 18-23 min/20 min	D.C. Village	Anacostia Metro Station	--

* Peak Hour Headways are for travel in the main rush hour direction - northbound in the morning towards Washington, D.C., southbound in the evening.

Source: WMATA Website

Maryland Commuter Bus

The Maryland Transit Administration (MTA) provides an express bus service (No. 907) from Charles County to Washington D.C. with scheduled stops at JBAB's Arnold Gate. This route only has limited service hours with limited running frequency, particularly in the morning (Table 2-7).

TABLE 2-7: MTA NO. 907 SERVICE SCHEDULE

Bus Service at JBAB's Arnold Gate (Main Gate)							
Northbound from La Plata/Waldorf to Washington, D.C. (AM)							
5:48		6:21		6:55		7:42	
Southbound from Washington, D.C. to Waldorf/La Plata (PM)							
3:41	4:01	4:16	4:36	4:56	5:11	5:31	5:51

Source: MTA Website

Virginia Commuter Bus

OmniRide is the Potomac and Rappahannock Transportation Commission (PRTC)'s commuter bus service that offers weekday service from locations throughout Prince William County, Virginia, along the I-95 corridor and Manassas and Gainesville areas along the I-66 corridor to destinations that include the Pentagon, Crystal City, Rosslyn/Ballston, downtown Washington, D.C., Capitol Hill, and the Washington Navy Yard (WNY).

OmniRide has six commuter bus lines serving the Pentagon and one serving the WNY, but none of its bus lines services JBAB. The nearest Metrorail Station from JBAB served by OmniRide is the Navy Yard-Ballpark Station on Green Line, one Metro stop away from the Anacostia Metrorail Station. In addition to OmniRide, a commercial service provider operates commuter bus between a location in Virginia and JBAB once in the morning and once in the afternoon on weekdays.

DC Circulator

DC Circulator operates five bus routes throughout Washington, D.C. The stop nearest to JBAB is at the Anacostia Metrorail Station on a route running between Skyland in Southeast D.C. and the Potomac Avenue Metrorail Station on Blue and Orange lines. The bus operates in winter (October 1 to March 31) from 6:00 AM to 7:00 PM during weekdays; and in summer (April 1 to September 30) 6:00 AM to 9:00 PM during weekdays and 7:00 AM to 9:00 PM on Saturday. Although the bus runs at 10-minute intervals, this route primarily serves the Anacostia neighborhoods further northeast away from JBAB.

Commuter Rail

Washington, D.C. is served by two commuter rail systems. Virginia Rail Express (VRE) operates 30 trains a day on two commuter rail service lines from points in Virginia into Washington, D.C., stopping at L'Enfant Plaza Station and Union Station within the District. Maryland Area Regional Commuter (MARC) operates 90 trains a day on three service lines from points in Maryland and West Virginia to Union Station. There is no expansion of services expected for both rail systems in the foreseeable future. Direct access to these services is not available at JBAB and requires a transfer or connection to another type of service for access.

Shuttle Bus

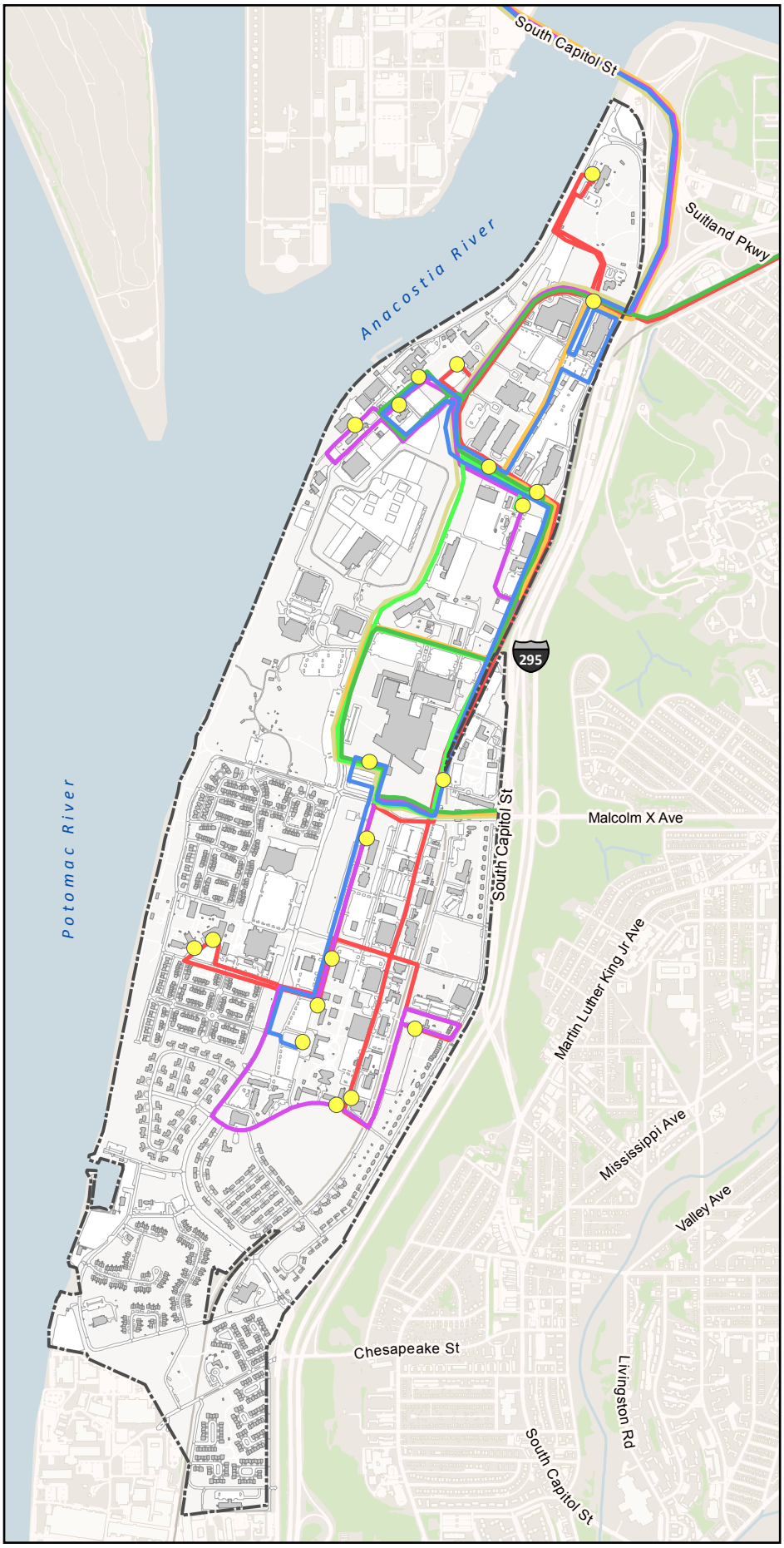
JBAB is served by several shuttle bus routes operated by DIA and the Navy (Map 2-7). These shuttles connect JBAB with other DoD agency offices and Metrorail Stations in the nearby areas. According to DoD regulations, these shuttles are intended for official business travel only and commuters are not allowed to use them.

DoD Shuttle Route No. 11 is between JBAB and the Pentagon. Route No. 12N used to run between JBAB and the WNY, but it was suspended in April 2013 due to reduced budget. The duration of the service suspension will be indefinite barring

MAP 2-7: INTERNAL SHUTTLE SERVICE

- Installation Boundary
- Bus stop
- JBAB Anacostia Metro Route
- DoD Route No. 12N (WNY)
- DoD Route No. 11 (Pentagon)
- DoD Route No. 12 (Langley/Clarendon)
- DIA Anacostia Metro Route
- DIA L'Enfant Metro Route
- DIA Parking Garage Route

Note: Due to reduced budget, Route #12N is suspended as of 12 April 2013. The duration of the service suspension will be indefinite barring passage of further funding authority.



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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passage of further funding authority. There is also a Metro Shuttle service between JBAB and Anacostia Station. Usage of these shuttles is permitted for people with a DoD identification card.

DIA, the largest tenant at JBAB, has shuttle services between the DIA Complex and the Anacostia Metrorail Station, the DIA Complex and the L'Enfant Plaza Metrorail/VRE Station, and DIA Complex and Langley via the Pentagon and Clarendon. DIA identification is typically required to use these shuttle services. DIA also has parking shuttles running within the installation between parking garages and their complex.

Concurrent with this Master Plan Update, NAVFAC initiated a shuttle study "NDW Regional Transportation Analysis, Requirements, and Planning" to provide technical and strategic analytic services to improve shuttle operations in the National Capital Region. Shuttle routes and an associated implementation plan will be explored in greater detail in the shuttle study.

Outside DoD, General Services Administration (GSA) in 2010 reviewed and assessed policies and practices associated with federal agency shuttle systems in the Washington-Baltimore region to address the requirement for an analysis of "Federal Local Transportation Logistics" as set forth in Executive Order 13514 Section 11. A three-phased approach was proposed by GSA to implement its operational recommendations. Phase One would focus on reducing or eliminating underperforming federal shuttle routes; Phase Two would consolidate overlapping and duplicative routes outside of downtown D.C.; and Phase Three would focus on route consolidation in downtown D.C., utilizing shared federal government-wide circulator routes and integrating public transit alternatives into the regional federal transportation system. As JBAB is located across the rivers from downtown D.C. near the South Capitol Street Bridge, JBAB employees will be granted more access to Metrorail and bus systems if the proposed federal government-wide circulator routes can be expanded to JBAB. The Navy will coordinate with GSA to explore new and emerging opportunities for shared shuttle services.

2.3.5 Commuter Ferry and Water Taxi

Over the past few years, there has been increased interest in the possibility of using ferries to shuttle commuters to work along the Potomac River and the Anacostia River. A year-long commuter ferry market analysis is being conducted by the Northern Virginia Regional Commission to examine potential costs, travel directions, schedules, and additional information. A north-bound ferry could allow commuters to avoid traffic on the congested I-95/I-395 and U.S. Route 1 corridors. An east-west bound ferry could allow commuters crossing state lines to cut across the water, instead of traveling over the Woodrow Wilson Bridge or other bridges.

Water taxis are another popular way to travel on the Potomac and Anacostia Rivers. They currently serve Georgetown, Old Town Alexandria, Nationals Park (seasonal), and National Harbor. Plans are proposed to expand water taxi service to Poplar Point and The Yards, which is adjacent to the WNY, and create new routes between several locations in Prince William County.

Should the commuter ferry and water taxi projects proceed, there may be an opportunity for JBAB employees to benefit from the establishment of these services. JBAB is also looking into cooperation with local ferry operators to make use of its convenient water access, providing commuter ferry service among Alexandria, the installation, the WNY, and the Pentagon for installation residents and employees. If the proposed pilot program (Section 4.1) proves feasible, permanent establishment of the commuter ferry will provide significant time-savings for passengers to cross the river, and thus reduce vehicular traffic on the roads. The potential permanent commuter ferry service at JBAB will need a high capacity docking location and a secured waterfront pedestrian gate.

2.3.6 Bicycle Facilities

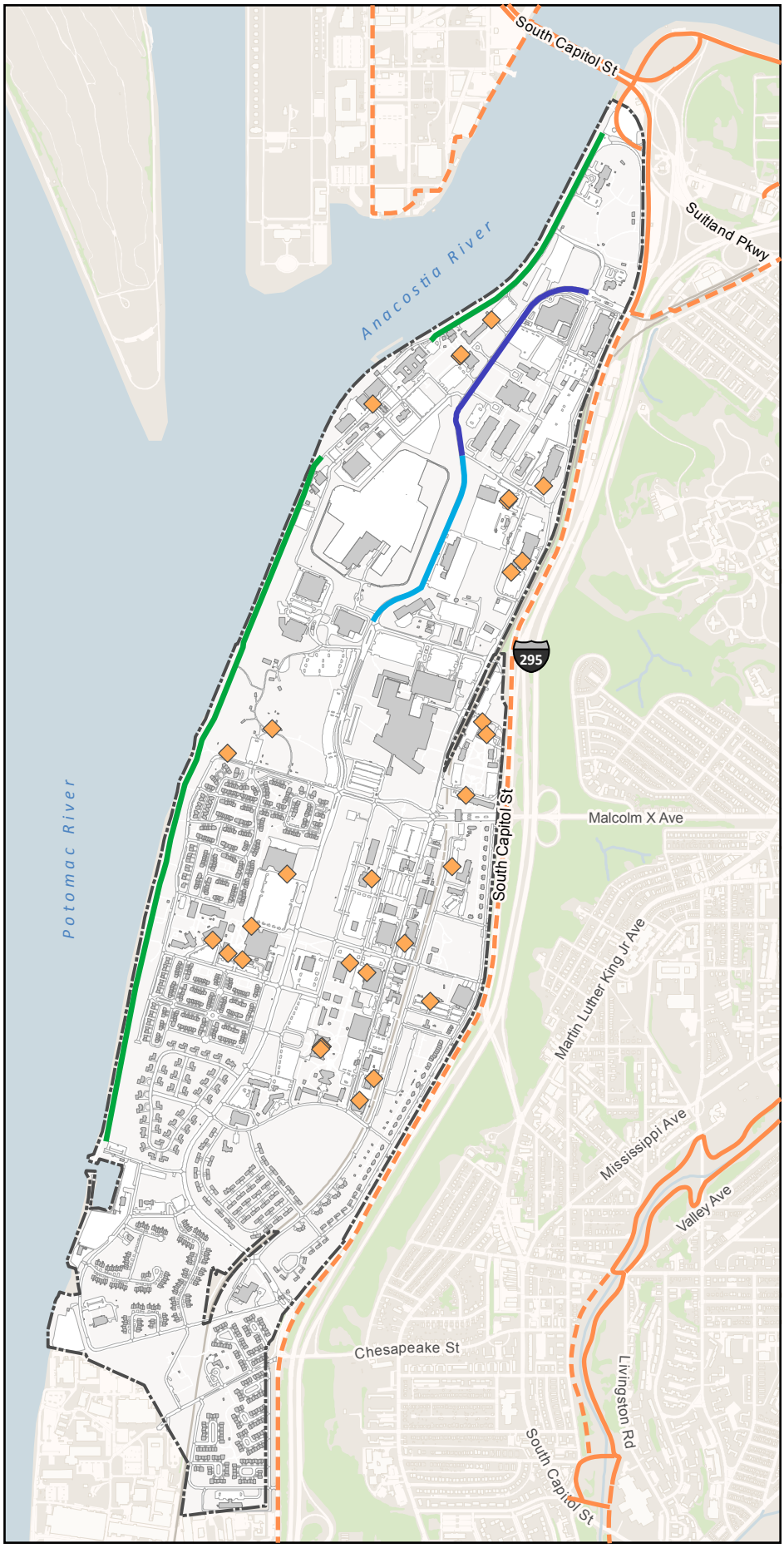
JBAB has installed a number of bicycle racks in different areas of the installation. The dedicated bicycle lanes exist along both sides of Defense Boulevard between Mitscher Road and Thomas Road. Shared bicycle lanes are between Boundary Road and Thomas Road. An eight-foot wide waterfront trail running between Arnold Avenue and the North Gate can also accommodate bicycle activity, but safety concerns exist associated with potential conflicts with walkers, joggers, or runners due to the limited width of the trail. In addition, this trail is not connected at a small segment on the Anacostia side.

As most streets at JBAB do not have dedicated or shared bicycles lanes, JBAB is implementing a comprehensive bicycle route network within the installation to facilitate biking as an alternative mode of transportation.

Most streets at JBAB do not have dedicated or shared bicycle lanes.

MAP 2-8: EXISTING BICYCLE FACILITIES

- Installation Boundary
- Bicycle Rack
- Dedicated Bicycle Lane
- Shared Bicycle Lane
- Waterfront Trail
- Existing Local Off-Street Trail
- Proposed Local Off-Street Trail



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Outside the installation, none of the major roadways have designated bicycle lanes. South Capitol Street is rated as "poor" and Overlook Avenue as well as Malcolm X Avenue is rated as "fair" in terms of traffic conditions present for bicyclists who use them as on-street routes.

An off-street trail runs north from the intersection outside the Firth Sterling Gate along South Capitol Street. In the Poplar Point area the trail splits into two routes – one joins the Anacostia Riverwalk Trail along the riverside, and the other continues northeast across the South Capitol Street Bridge to the area of the Nationals Stadium along Potomac Avenue, connecting to the city's dedicated on-street bicycle lanes. With the planned realignment of the South Capitol Street Bridge, this trail will be redesigned and re-routed to integrate with the new bridge.

Near the Anacostia Metrorail Station, an on-street signed bicycle route runs along Howard Road from east of Martin Luther King, Jr. Avenue to Poplar Point, as well as along Suitland Parkway to the east. In the area south of JBAB, an on-street signed bicycle route runs along Shepherd Parkway connecting to the off-street trail system in Oxon Cove Park in Maryland, which provides a key link to the trail system on the Virginia side via Woodrow Wilson Bridge. Many JBAB employees residing in Virginia bicycle to the installation using this route. The issue is the park and its trails are only open between 8:00 a.m. to 4:30 p.m., so bicycle commuters may not be able to use this route beyond its operating hours.

DDOT is undertaking extensive planning for upgrading its network of bicycle facilities in support of the city's emphasis on multi-modal travel opportunities. Two trail routes are planned outside JBAB according to D.C.'s 2012 Bicycle Map.

- One is the off-street trail between the installation's eastern perimeter and South Capitol Street/Overlook Avenue. It is part of the Anacostia Riverwalk Trail project mentioned in the Planned Transportation Improvement section.
- The other route is a planned off-street trail running between the Firth Sterling Gate and the Anacostia Metrorail Station along Firth Sterling Avenue.

If design and construction move forward, bicycle connectivity in the area would improve, providing JBAB employees and the public more options for transportation.

2.3.7 Pedestrian Facilities

The eight-foot wide waterfront trail running between Arnold Avenue and the North Gate accommodates a variety of passive and recreational uses such as jogging and walking. Pedestrian amenities such as lighting, seating, historical markers, recreational fields, and communal facilities exist near the family housing area. However, the trail is not connected at a small segment on the Anacostia side.

Sidewalk and crosswalk conditions vary throughout the installation. On the Bolling side, sidewalks are provided throughout the residential and administrative areas. While crosswalks exist and are mostly signed, many do not meet Americans with Disabilities Act (ADA) requirements and their treatments are also inconsistent. On the Anacostia side, sidewalks are present in some areas, but they are inconsistent and far less prevalent than those available on the southern side.

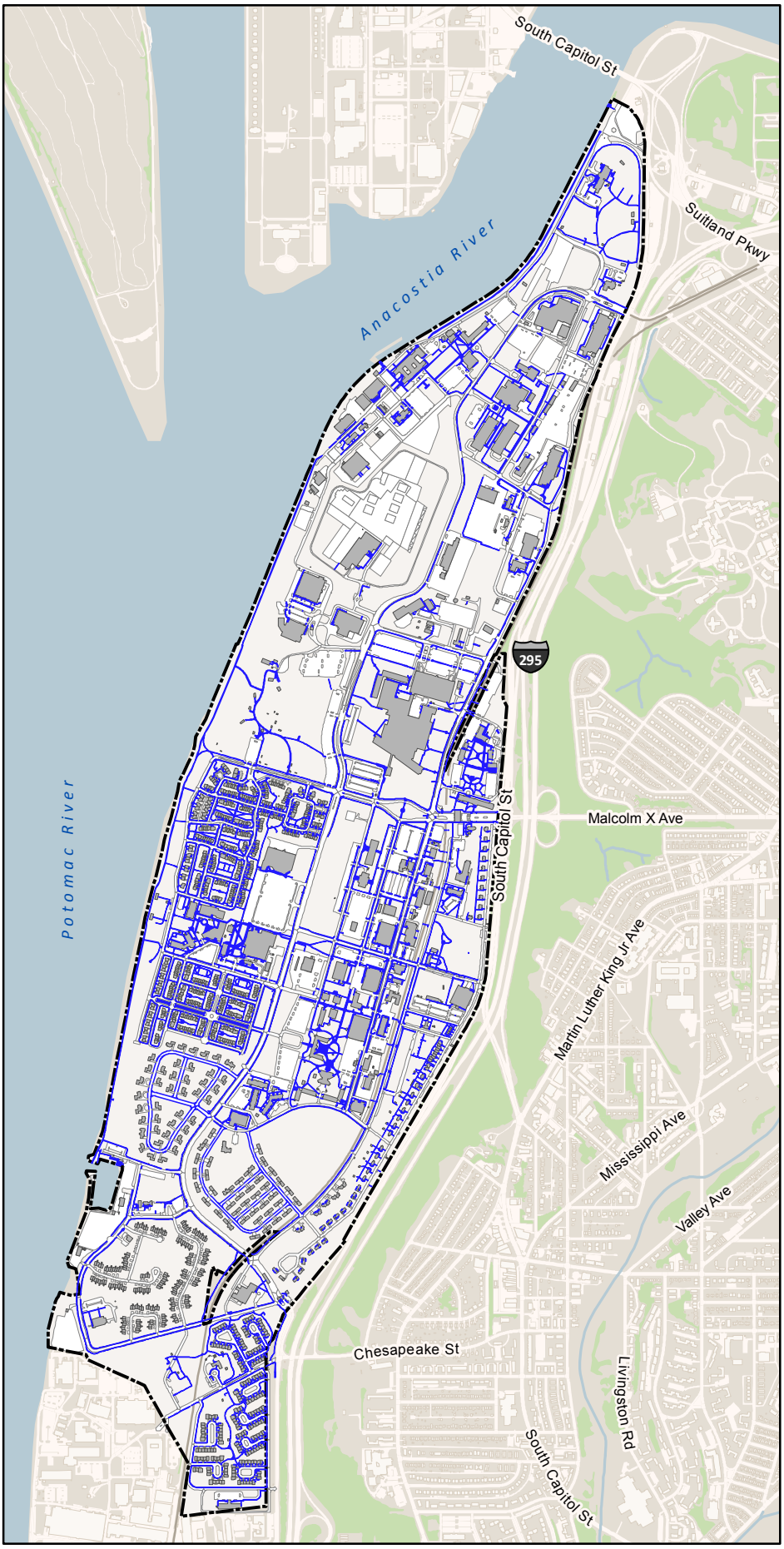
Despite the fact that the Firth Sterling Gate is within 10- to 15- minute walking distance to the Anacostia Metrorail station, the route is not pedestrian friendly. While improvements such as adding street lighting have recently been made along most of Firth Sterling Avenue, the industrial buildings with blank walls and open space near the degraded Barry Farm residential area do not provide an optimal daily commuting route for pedestrians. In addition, the crosswalks at Firth Sterling Avenue and Suitland Parkway are not adequately marked and this intersection is one of the most dangerous intersections in D.C. for pedestrians (USDOT and DDOT 2011). The high crime activity of the area outside the installation is another safety concern for pedestrians. The 2012 Metro Transit Police Department (MTPD) security report indicates that the Anacostia Metrorail Station had the second highest crime rates for all stations in the entire system in 2011.

Sidewalks and crosswalks are provided throughout the residential and administrative areas on the Bolling side

MAP 2-9: EXISTING PEDESTRIAN FACILITIES

Installation Boundary

Existing Sidewalk and Walkways



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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2.4 Existing Natural and Man-made Resources and Constraints

The following sections describe the existing natural and cultural features and operational constraints on JBAB and their implications. Only features with major impacts to planning are considered.

- **Natural Features** include topography, geology, soils, floodplains, surface water, wetlands, stormwater, groundwater, vegetation and wildlife, and air quality.
- **Cultural Resources** include sites, structures, landscapes, or objects of scientific, historic, religious, or ceremonial importance.
- **Operational Constraints** include those posed by mission activities such as Air Installation Compatible Use Zone (AICUZ), hazardous materials and waste, easements, setbacks, Explosive Safety Quantity Distance (ESQD) arcs, and utilities.

Information from prior studies, data maintained by NAVFAC, and field surveys of the site were used to define the baseline features of JBAB.

2.4.1 Natural Features

Topography

The topography of JBAB is relatively flat with no significant topographic features. The southern portion of the installation is considerably higher than the northern portion. Elevations vary from near sea level along the shoreline to more than 60 feet near the southeastern boundary. Slopes vary from less than two percent throughout most of the tract to 25 percent or more along the waterfront due to the presence of an earth levee.

Geology and Soils

The installation is located in the Atlantic Coastal Plain physiographic province, at the confluence of the Potomac and Anacostia Rivers. The geology of the coastal plain is characterized by alternating layers of marine and terrestrial sediments consisting of gravel, sands, silts, and clays deposited on an eroded crystalline basement rock surface.

Most soils on JBAB consist of fill or altered soils classified as Udorthents or Urban Land by the Natural Resources Conservation Service, overlying the sand and gravel of the river floodplain. The fill consists of unconsolidated materials and materials from past excavations and dredging. Altered soils include cuts and fills or disturbed soils of adjacent soil types. Overall, these soils have construction limitations associated with stability. Many existing facilities have experienced settling and separation of the different facility elements. Special foundation design is required for most building loads, which involves additional costs. Other soil series mapped on the installation include Christiana-Urban Land Complex, Dunning, Galestown-Urband Land Complex, Keyport Fine Sandy Loam, Melvin Silt Loam, and Muirkirk.

Surface Water

JBAB is located just south of the confluence between the Anacostia River and the Potomac River, which are both classified as navigable waterways by the U.S. Army Corps of Engineers (USACE). The Anacostia River is a tributary of the Potomac River, which feeds into the Chesapeake Bay and the Atlantic Ocean. At this location, both rivers are tidally-influenced freshwater bodies.

The Anacostia River, due to the predominantly urban character of its watershed, has long been characterized by poor water and sediment quality. South of the 11th Street bridges, the river widens and deepens sufficiently to allow energy to dissipate and remaining fine particulates to settle. This limits the transport of contaminants from the Anacostia into the Potomac River, where water quality generally is less impaired. The Potomac River supplies drinking water to D.C.

There are two permanent surface water bodies in JBAB, a stormwater retention pond north of Building 371 and a small pond west of Building 397. The DIA Complex catchment is an intermittent basin.

Groundwater

Groundwater levels at JBAB vary depending on location, the time of year, precipitation, and other activities that may affect groundwater levels. The water table depth is an average of 10 feet in the northern portion of the installation while the depth of the southern portion is approximately 15 feet. The water table is closer to the surface near the rivers. Ground water movement follows the direction of the rivers.

Floodplain and Flood Hazard

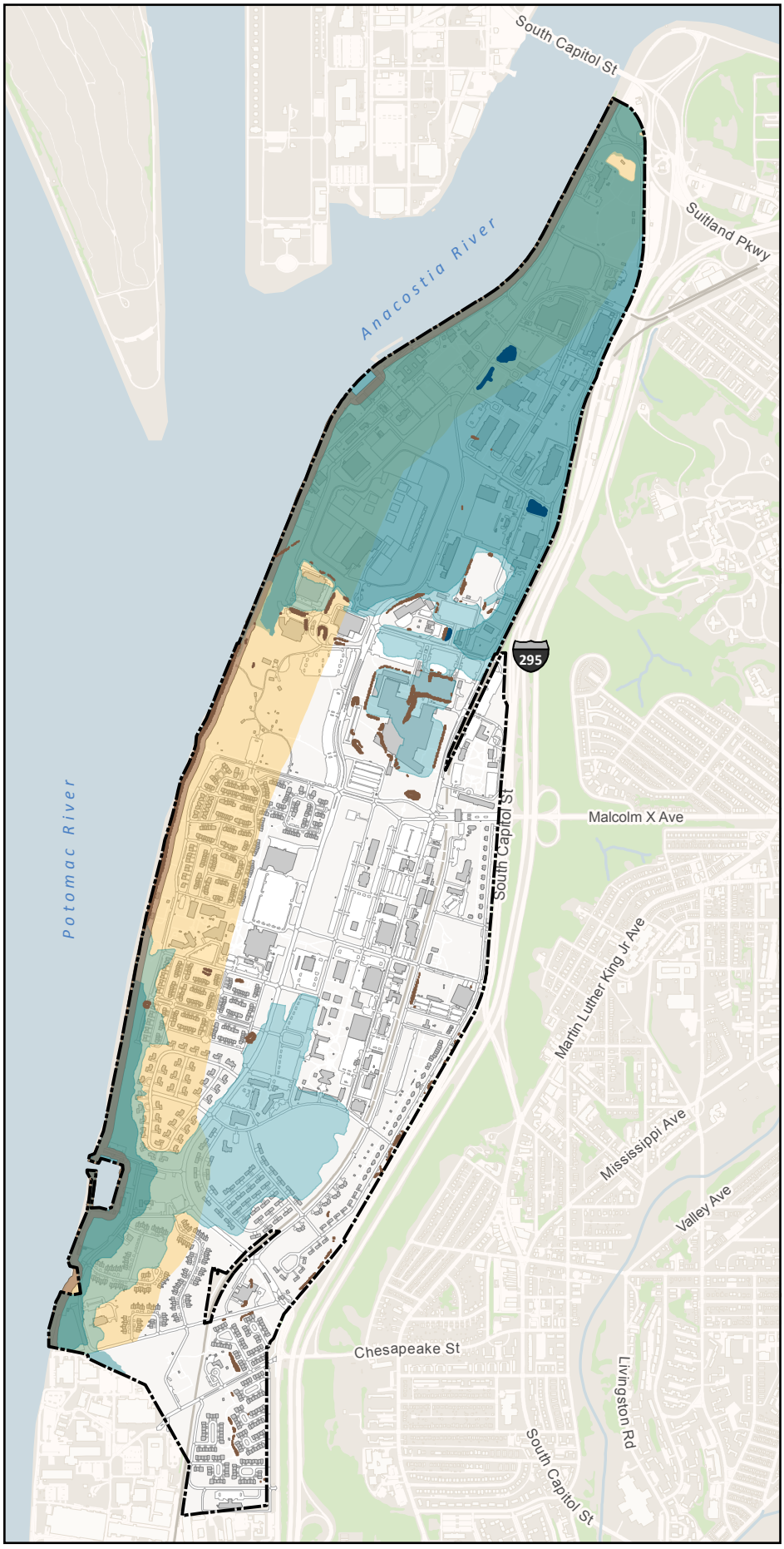
The flooding concern at JBAB is caused by the Anacostia and Potomac Rivers along the shoreline. Both rivers are subject to freshwater flows coming downstream and tidal influences coming upstream from the estuarine Potomac River. Flooding storm surges caused by hurricanes and major storm tidal flooding are the chief causes of flooding in this part of the rivers.

Based on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map 110001 0057C and 110001 0059C published in September 2010, most of the former NSF Anacostia site and the area centered on the marina near the southwestern corner of the installation is within the 100-year floodplain. The fringe areas outside the 100-year floodplain typically lie within the 500-year floodplain.

Flooding following a strong storm event is a well-documented issue at JBAB. It is particularly challenging to the installation's northern side due to its flat topography and sea-level elevation. Flooding on the installation has been controlled by a concrete seawall and earth levee constructed along the installation shoreline. However, sections of the seawall and the concrete levee wall have deteriorated within recent years. The 2012 USACE Final Periodic Inspection report indicated that the Anacostia-Bolling segment of the Washington, D.C.

MAP 2-10: NATURAL FEATURES

- Installation Boundary
- Steep Slopes
- 100 Year Flood Zone
- 500 Year Flood Zone
- Shoreline No Build Area
- Shoreline Critical Area
- Stormwater Drainage Basin



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Anacostia River Flood Risk Management System was rated as *Unacceptable*. According to JBAB Public Works Department, levee and seawall repair is expected to be funded and commenced within the next five years.

The flooding issue is also exacerbated by the installation's inadequate stormwater system. There are ongoing infrastructure improvements to update the stormwater system and correct flood control, but more updates are needed. See Section 2.7 Site Infrastructure for details.

Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. According to the Executive Order and other applicable requirements, JBAB shall develop measures to minimize the impacts and restore and preserve the floodplain, as appropriate. New construction and renovation within the floodplain must meet regulatory criteria to offset the effects of minor and major flooding. Sensitive or mission-critical facilities must be located above the anticipated 100-year flood level.

Wetlands

Review of the National Wetlands Inventory Map shows no wetlands within the boundaries of the installation.

Vegetation and Wildlife

Past development at JBAB has resulted in the loss of most native wildlife and vegetation. There are no protected or endangered species known to occur at JBAB today.

Wildlife is largely limited to species commonly found along urban waterways, such as rats, raccoons, rabbits, squirrels, opossums, crows, doves, seagulls, house sparrows, starlings, song birds, and other avian species.

Vegetation found on the installation includes small landscape plantings surrounding buildings and trees. Most undeveloped areas are covered with grass; trees are relatively few and widely scattered. Prior studies for the installation, such as the 2008 NSF Anacostia Installation Appearance Plan (IAP), recommend native plants for installation-wide landscape enhancement and replacing lawn in certain areas with native vegetation over time. Elimination of exotic species before planting begins is key to implementation of this strategy.

USACE allows only grass to be planted on flood protection levees. This is mostly because tree roots may loosen embankment soils and create seepage paths. Large trees can also place a superimposed load on the relatively unstable embankment, in excess of the ability of the levee material to resist when saturated. Because the total impact of vegetation, such as large trees, on levees continues to be extremely complex, highly variable, and unquantifiable, a well-constructed levee with well-maintained grass cover represents the optimal goal for reducing the uncertainty of the performance of levee systems according to USACE.

Air Quality

JBAB is located within the Metropolitan Washington, D.C. region, which is a marginal non-attainment area for the air pollutant ozone (O_3) according to the 2008 National Ambient Air Quality Standards for ozone and a non-attainment area for particulate matter less than 2.5 microns ($PM_{2.5}$). Additional air pollutants of concern are NOx, SOx, CO, and volatile organic compounds (VOCs). The Air Quality program for JBAB falls under the guidance of the Clean Air Act (40 CFR Part 70). Amendments in 1990 include Title V, which governs JBAB's operating permits. JBAB also complies with mandates from District of Columbia Municipal Regulations Title 20 Chapters 1-10.

Stationary sources of air pollutants on JBAB are emissions from boilers, fuel storage, generators, degreasers (parts washers), refrigerants, paint operations, printing operations, dust collectors, cooling towers, water heaters, air conditioning refrigerant recovery systems, metalwork, and woodwork.

All stationary sources (whether permanent or temporary or government- or contractor-owned) must be reviewed and approved by the JBAB Air Media Manager in the Public Works Environmental Department prior equipment's arrival on base. In some cases the JBAB Air Media Manager will apply for a permit with District Department of Environment (DDOE) and/or the Environmental Protection Agency (EPA). The permitting process takes a minimum of 90 days and can exceed a year, depending on project complexity and the regulating agency's workload. Projects containing stationary sources of air pollutants should engage the JBAB Air Media Manager during initial planning stages. Emissions from vehicles entering and leaving the site would also contribute - as would motor vehicles using the major transportation corridors nearby such as I-295, South Capitol Street, and the Frederick Douglass Memorial Bridge.

As a large federal property located in D.C., JBAB has the responsibility to help tackle the region's non-attainment status through its policies and initiatives to reduce emission sources and encourage renewable energy usage. Executive Order 13514 requires federal agencies establish Fiscal Year (FY) 20 reduction targets for non-operational greenhouse gas (GHG) emissions, measured from a FY 08 baseline. DoD's targeted FY 20 goals are to achieve 34 percent reduction from Scopes 1 and 2 GHG sources and 13.5 percent from Scope 3 sources (see EPA website for definitions of different GHG sources). *Department of Defense Strategic Sustainable Performance Plan FY 12* indicates DoD will achieve its GHG reductions primarily through more efficient facility energy use, reduced fossil fuel use by non-tactical vehicles, increased use of renewable energy, and reduced employee commuting and business air travel. So far DoD has achieved its proposed 2012 reduction for GHG Scopes 1,2, and 3 and is on track to achieve its 2020 targets.

JBAB embraces all air quality goals and requirements established by applicable laws and regulations. The installation has established a task force to develop sustainability goals and objectives to rate and evaluate the installation's performance. A series of strategies have been implemented to reduce air pollutants and GHG emissions resulting from utility generation and vehicle movements, such as increasing renewable energy production by photovoltaic systems, incorporating electric vehicle charging stations, and establishing an installation-wide transportation management program to reduce single occupancy vehicles on roads. JBAB environmental staff routinely collects data and documents air quality to remain compliant with the latest standards and applicable regulations.

In adherence to the initiatives directed by the federal government and DoD, this JBAB Installation Master Plan and its supporting document JBAB TMP address air quality concerns by shaping development patterns and operational policies to encourage less vehicle travel and fuel consumption, enhancing open space and landscape to improve environmental quality, creating a well-connected multi-modal transportation network to reduce mobile emission sources, and encouraging renewable energy projects to lower electricity-generation pollutions. See Chapter 3.0 and JBAB TMP for detailed development strategies and transportation management measures that will be conducive to the installation's air quality improvement.

2.4.2 Cultural Resources

National Historic Preservation Act (NHPA)

The NHPA of 1966 created the NRHP, the official list of the nation's historic places worthy of preservation, and the corresponding State Historic Preservation Offices (SHPO). The passage of the act, which was amended in 1980 and 1992, established a comprehensive program for the identification, evaluation, registration, and treatment of significant cultural resources.

The major portion of the NHPA that applies to JBAB is Section 106, which requires federal agencies to consider the effects federal activities have on significant historic properties that may include archeological sites, buildings, landscapes, structures, and objects.

Archaeological Resources

There are five prehistoric archaeological sites recorded before or during the construction of the new runways for Bolling Field in the 1930s. Four of the sites include prehistoric Native American camps; one contains two prehistoric ossuary pits. However, these sites have not been thoroughly evaluated for eligibility for NRHP listing and their exact location has not been verified through formal archaeological studies. Given that very few surveys have been conducted and that prehistoric sites are likely buried beneath several feet of fill, there exists a possibility that other undetected archaeological sites may be located at JBAB.

Historic Resources

The JBAB property features a long and tenured history serving as military installations. According to the 2010 NDW Installation Cultural Resource Management Plan (ICRMP) and the 2010 Bolling AFB ICRMP, Bolling AFB Historic District was recommended as eligible[1] for NRHP listing in the 1996 ICRMP and the D.C. SHPO concurred with this finding. This district is located at the east side of the former Bolling AFB and includes the original administrative core along Brookley Avenue and two groups of residential quarters along Westover Avenue.

There are 72 contributing resources[2] dating from 1933 to 1945 still existing. They are adding to the historic significance of the Historic District. Buildings 1, 2, 20, 21, 168, and 169 have been determined individually eligible for listing on the NRHP. Table 2-9 summarizes JBAB buildings eligible for NRHP listing. Map 2-11 depicts the locations of known historic resources.

Actions on these cultural resources which involve alterations to the sites, buildings, or landscapes require coordination with historic preservation departments/agencies in compliance with historic preservation laws. Lack of archaeological studies and known culturally sensitive areas slows project implementation. At the time this JBAB Installation Master Plan is being prepared, the Navy also initiated the effort to create an ICRMP for JBAB. This study will build on the 2010 NDW ICRMP and the 2010 Bolling AFB ICRMP and cover all three former sites – NSF Anacostia, Bolling AFB, and Bellevue Housing – as a whole. This ICRMP, however, will not be completed in time for inclusion within this Master Plan.

The Historic Preservation Guidelines in Chapter 3.0 of this document provides broad planning-based historic preservation strategies to retain the integrity of the Historic District to the maximum extent practicable.

For more detailed information about the known historic and archeological resources at JBAB and their management strategies, before the latest JBAB ICRMP is completed, see the 2010 NDW ICRMP and the 2010 Bolling AFB ICRMP.

TABLE 2-8: IDENTIFIED ARCHAEOLOGICAL SITES AT JBAB

Site Number	Site Type	Time Period	NRHP Status
51SW3	Prehistoric Camp	Contact Period	Unevaluated
51SW4	Ossuary	Undetermined	Unevaluated
51SW5	Prehistoric Camp	Undetermined	Unevaluated
51SW6	Prehistoric Camp	Undetermined	Unevaluated
51SW12	Prehistoric Camp	Undetermined	Unevaluated

Source: 2010 NDW ICRMP

[1] To be considered eligible, a property must meet the National Register Criteria for Evaluation. This involves examining the property's age, integrity, and significance.
[2] A building, site, structure, or object adding to the historic significance of a property.

TABLE 2-9: NRHP ELIGIBLE BUILDINGS AT JBAB

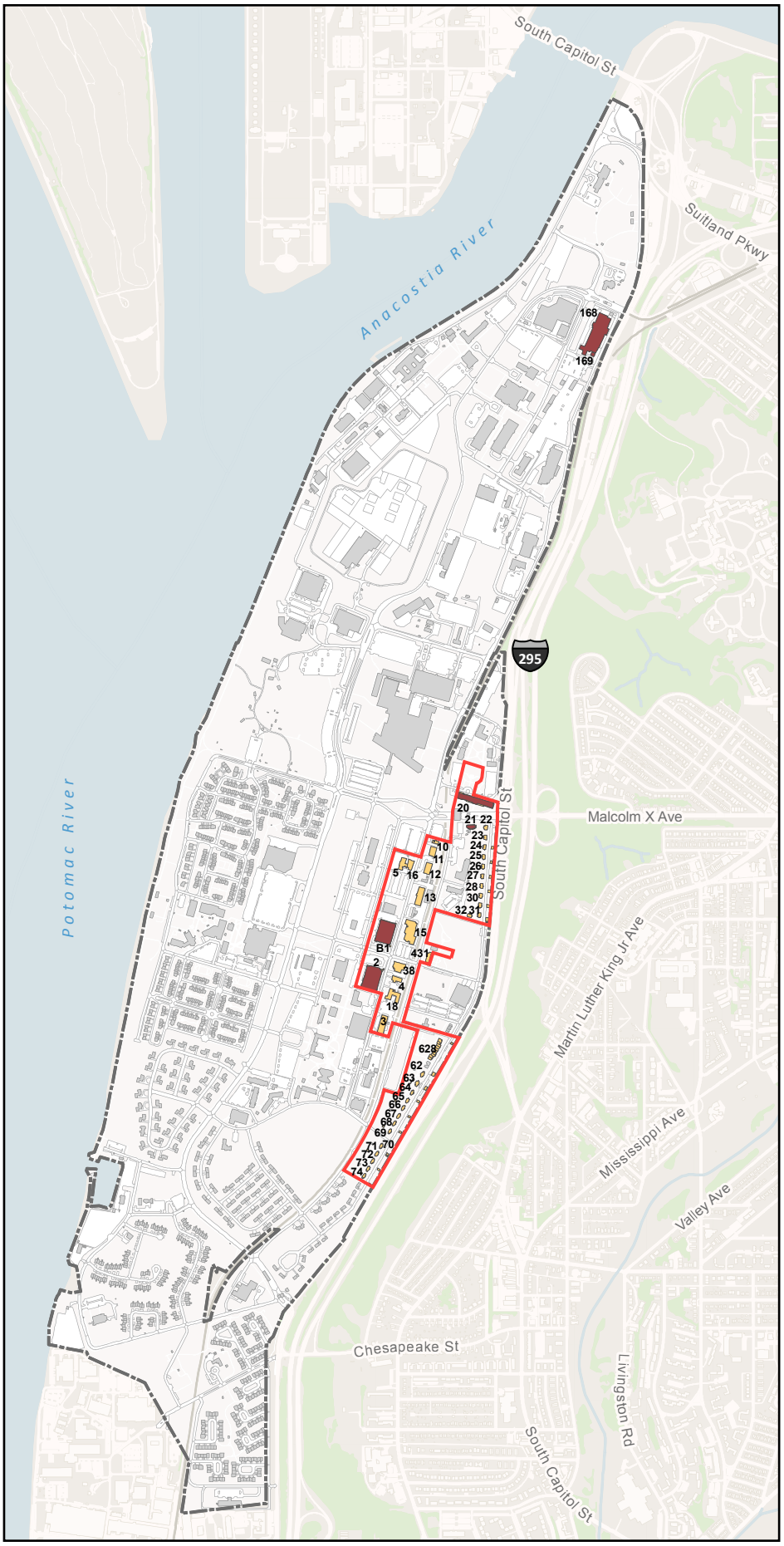
Historic Use	Present Use	Building Number	Year
Hangar 1	USAF Band	1	1939
Hangar 2	Readiness Center	2	1939
Base Garage	Communications	3	1941
Photographic Laboratory	Multi-Administrative	4	1941
Fire Station and Guard House	Fire Station	5	1933
Electrical Substation	Post Office	10	1934
Quartermaster Maintenance Building	Education Center	11	1933
Quartermaster Warehouse	Services Division	12	1933
Air Corps Warehouse	Thrift Store/Family Support Center	13	1933
Post Exchange and Gymnasium	Fitness Center	15	1933
Base Communications	Military Personnel Flight	16	1942
Central Heating Plant	Heating Plant	18	1938
Air Corps Barracks and Parade	11th Wing Headquarters	20	1933
Base Dispensary	Housing Office	21	1933
Non-Commissioned Officers' Quarters	Officers' Quarters	22-28, 30-32	1933
Electrical Substation	Electrical Substation	34	1933
Electrical Substation	Storage	36	1933
Electrical Substation	Storage	37	1943
Commissioned Officers' Quarters	Officers' Quarters	62-74	1933
Naval Media Center	Defense Media Center	168	1943
Heating Plant #2	Heating Plant #2	169	1943
Carport-Officers' Quarters	Carport-Officers' Quarters	402-407	1933
Chapel	Chapel	431	1943
Carport-Officers' Quarters	Carport-Officers' Quarters	605-612	1933
Gazebos	Storage-Officers' Quarters	613-625	1934
Visitor's Quarters	Family Housing	628	1944
Hazardous Storage	Storage	4629	1943
Hazardous Storage	Storage	4683	1943

Sources: 2010 NDW ICRMP and the 2010 Bolling AFB ICRMP.

Hangar 2 is the practice facility for the U.S. Air Force Band

Building 20 is the 11th Wing Headquarters

MAP 2-11: CULTURAL RESOURCES



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
JBAB ICRMP, 2011
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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2.4.3 Visual Resources

The *Parks and Open Space* chapter of NCPC's *Federal Elements* requires "the federal government should:

- Maintain the prominence of the topographic bowl formed by lowland and rim features of the L'Enfant City and environs by controlling the urban and natural skylines in the Anacostia, Florida Avenue, and Arlington County portions of the bowl.
- Preserve the green setting of the Anacostia hills and integrate building masses with, and subordinate to, the natural topography."

JBAB lays on a flat riverfront plain near sea level at the confluence of the Anacostia and Potomac Rivers, across the water from Washington's Historic L'Enfant City and about 200 feet below the rim of the Anacostia hills east of the installation. The clearest views to and from JBAB are mostly afforded from the open spaces on the western and northern edges of the installation. Visual corridors at JBAB are a valuable asset to the character and visual integrity of the site. By incorporating visual analysis into planning and design considerations, future development will minimize negative impacts on important views and settings at the installation and the region.

Views from the Installation

Views from JBAB toward the rivers, D.C., and Virginia can be found at numerous locations throughout the installation. The jogging trail along the levee affords panoramic views of the region. The main views are toward the City of Alexandria and Ronald Reagan Washington National Airport to the west and to Hains Point, East Potomac Park, Fort McNair, and the WNY to the north and northwest. Monuments visible from JBAB include the dome of the Capitol, the Washington Monument, the Jefferson Memorial, the Air Force Memorial, and the National Cathedral.

Views into the Installation

The riverfront plain JBAB sits on is low-lying and flat. The horizontal impression of the installation is mostly interrupted by hangars, the control tower for the HMX-1 operations, and the high-rise Blanchard Barracks. At the distances from which the installation is viewed, most photos required enhancement of the subject facilities in order to identify them.

Indigo Landing (0.8 miles away): Indigo Landing Marina is located directly across the Potomac River from the Bolling side (Figure 2-2). The Naval Research Lab, shoreline housing, Blanchard Barracks, and the DIA building are all visible. However, the pier at the Reagan Washington National Airport (DCA) extends south into the Potomac River, obscuring the clarity of structures to the ground-level viewer.

East Potomac Park (0.5 miles away): JBAB is viewed from one of the most visible locations from this perspective (Figure 2-3). The waterfront buildings, such as the HMX-1 Hangar, Control Tower, and Secret Service facilities are more prominent as they line the horizon. Buildings 91 and 29 are also visible from this point. The DIA facility recedes further from the view.

Buzzard Point (0.2 miles away): The Anacostia side of the installation is readily visible from this location as the shoreline here is close to the opposite side (Figure 2-4). The modernist White House Communications facility forms a contrast with the newer Navy Ceremonial Guard Bachelors Complex, which was influenced by the Georgian Revival style of Enterprise Hall. The hillside between White House Communications and the Barracks is where the new DHS St. Elizabeths campus is being constructed.

Frederick Douglass Memorial Bridge at South Capitol Street (275 feet away): Because this viewpoint is close and from an elevation above the installation's northern seawall and levee, the visual impact is probably the greatest of all the sites (Figure 2-5). The NRHP-eligible Building 168 (Defense Media Center), the North Gate, and the road following the levee are distinctly visible. A large earth berm of about 12 feet in height screens most of the view to the child development center and sports fields. With the planned relocation of the Frederick Douglass Memorial Bridge and a new at-grade traffic circle outside the northern end of the installation, the installation perimeter and nearby facilities will be further exposed to public view.

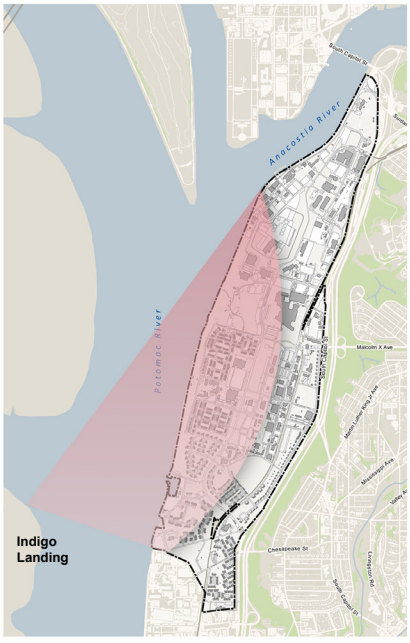
South Capitol Street: This roadway parallels the northeastern installation boundary where the wire perimeter fence allows some installation facilities visible to those passing by. South of the Firth Sterling Gate and Building 168, the fence is accompanied by trees and shrubs, screening most of the installation from public view. Further south, the brick wall along the original Bolling AFB perimeter adds to the screening. However, the upper levels of facilities such as the 11th Wing Headquarters in Building 20 and several historic homes on Westover Avenue are sometimes visible from the roadway.

Malcolm X Avenue: Malcolm X Avenue leads directly to JBAB's Arnold Gate. This roadway features a slightly obstructed view due to the I-295 overpass from the hills above JBAB (See Figure 2-6). Only as one approaches South Capitol Street does the Arnold Gate really become visible. The largest impact to this view on the installation's Arnold Gate will be the proposed modification to the existing I-295/Malcolm X Avenue Interchange, which would result in a larger interchange than the existing in order to accommodate traffic and safety issues. According to the 2012 St. Elizabeths Master Plan Amendment EIS, the I-295/Malcolm X Avenue interchange would have a long-term, indirect, major adverse effect on the setting and visual characteristics of Shepherd Parkway. It will also have indirect visual impacts on the setting and feeling of Bolling AFB Historic District in JBAB, which encompasses the Arnold Gate.

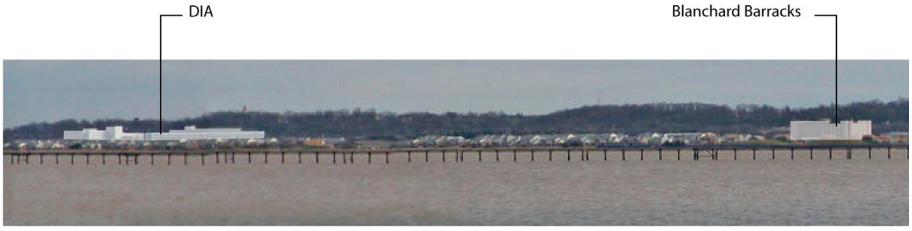
I-295: Similar to South Capitol Street, I-295 offers views of JBAB as it parallels the installation's eastern boundary and sits at a higher elevation. The views are more apparent on southbound lanes. The majority of the installation is visually obstructed by trees, but some buildings such as the 11th Wing Civil Engineering Squadron building, DIA building, Arnold Gate, the Officers Club, Blanchard Barracks, several Westwood Avenue homes, and the Bellevue Housing Complex are momentarily visible through gaps in the tree line.

JBAB offers spectacular waterfront views of Washington, D.C.

FIGURE 2-2: VIEW FROM INDIGO LANDING



Key Map



Central View (2x zoom)

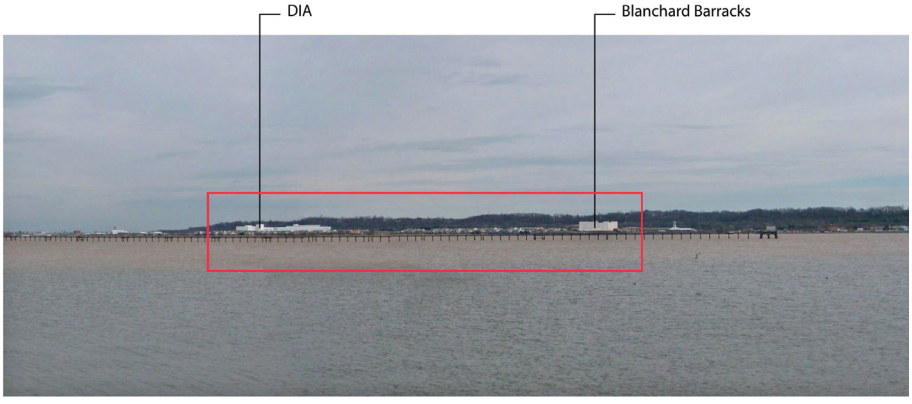
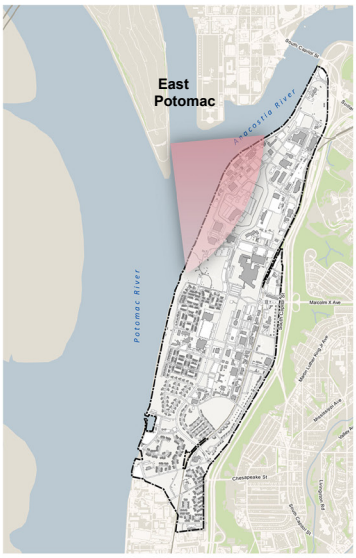


FIGURE 2-3: VIEW FROM EAST POTOMAC PARK



Key Map

Central View (2 x zoom)

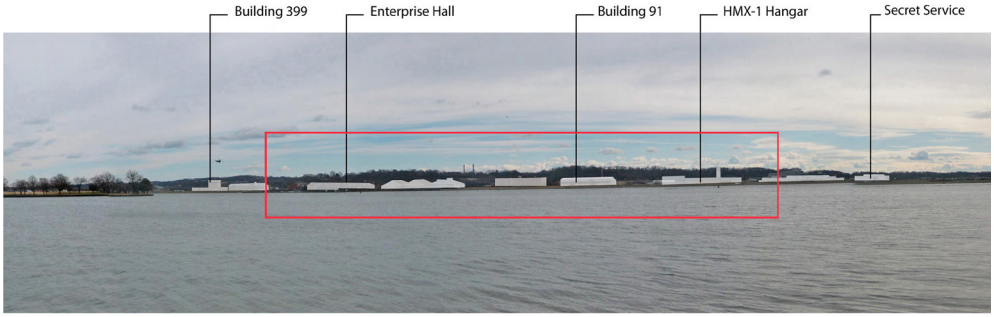
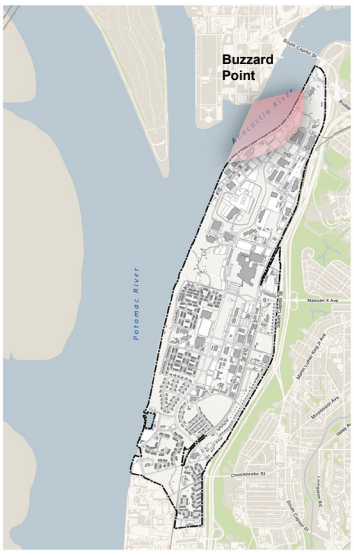


FIGURE 2-4: VIEW FROM BUZZARD POINT



Key Map

Central View (2x zoom)

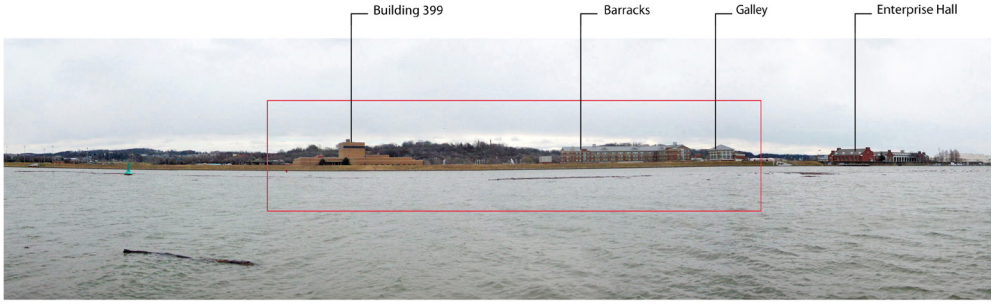
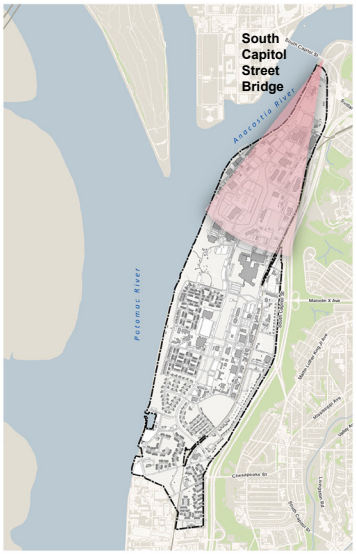


FIGURE 2-5: VIEW FROM FREDERICK DOUGLASS MEMORIAL BRIDGE



Key Map

Central View (2x zoom)

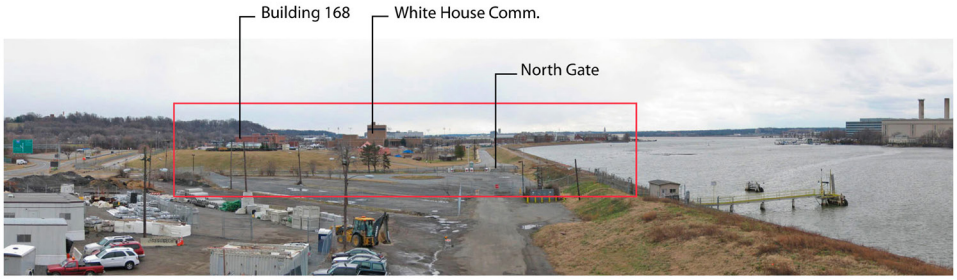
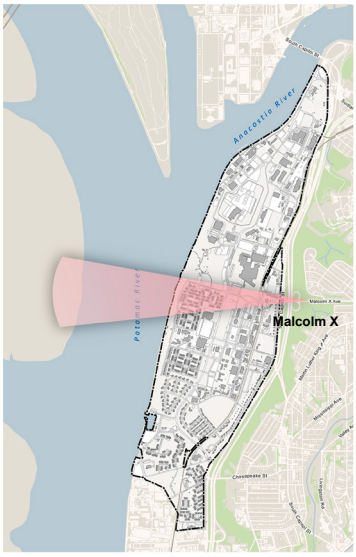


FIGURE 2-6: VIEW FROM MALCOLM X



Key Map

2.4.4 Operational Constraints

Operational constraints are those posed by mission activities. Operational constraints at JBAB (Map 2-12) include Air Installation Compatible Use Zone (AICUZ), Explosive Safety Quantity Distance (ESQD) arcs, fuel storage and pipelines, hazardous materials and waste, easements, and setbacks.

AICUZ and Airfield Clearance

The AICUZ program is used by DoD to ensure compatible land uses are located in the vicinity of installations with airfield operations. The program helps protect mission capability and assist local governments as they protect and promote the health, safety and welfare of the surrounding public. AICUZ scrutinizes building height, noise levels, clear zones and accident protection zones in order to minimize and prevent the effects of incompatible land uses and encroaching development on mission capability and community health and safety.

[redacted]

Firing Fan Associated with Former WNY Battery

A significant portion of the current Anacostia waterfront area was the mud flats within the firing fan of the WNY experimental battery operated in the mid to late 19th century. Ordnance may remain at depths in areas near the water as the land area was created by historic fill of dredge spoil. Unexploded Ordnance (UXO), cannonballs, was found within the subsurface of the Anacostia side during construction projects in 2007 and 2009. The potential of future UXO finds and their remediation pose concerns on future development.

[redacted]

Ammunition and Explosive Storage

[redacted]

Fuel Storage and Pipeline

JBAB is regulated under 40 Code of Federal Regulations (CFR) 112 for fuel oil tanks. Any added fuel storage must be managed in accordance with the Spill Prevention, Control and Countermeasures regulations and JBAB's environmental office must be informed. [redacted]

Hazardous Materials and Waste

Hazardous materials and waste at JBAB are handled, stored, and disposed of in accordance with Resource Conservation and Recovery Act of 1976, 40 CFR Part 260.40 (b), 262.41 (a) (1)-(5), Title 20 D.C. Municipal Regulations Rules 4260-4265 by District Department of the Environment (DDOE), Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1C - Environmental Policy and Organization, and 2012 JBAB Hazardous Waste Management Plan (HWMP). The NAVFAC/ PWD – Environmental Department is responsible for regulatory compliance with all Federal, D.C. and Navy OPNAVINST 5090.1C guidance. The HWMP provides detailed guidance regarding the generation, identification, collection, storage and disposal of hazardous waste at JBAB. [redacted]

The JBAB Hazardous Material Minimization Program is in accordance with Fleet and Industrial Supply Centers, Hazardous Material Control and Management, Federal Acquisition Regulation, Hazardous Material Standard Operation Procedures, OPNAVINST 5100.23G, and Hazardous Material Concept of Operations guidance. The Fleet and Industrial Supply Centers is responsible for carrying out the Navy's Hazardous Material Control and Management Program. The Regional Consolidated Hazardous Material Reutilization Inventory Management Program is responsible for planning, procurement, requisition, receipt, stowage, distribution and use of hazardous materials. [redacted]

Land Restrictions and Restoration Sites

JBAB is investigating and remediating past contaminated sites under the DoD's Environmental Restoration Program (ERP) created in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986. The ERP's initial phase, called the Installation Restoration Program, addresses sites that were contaminated with chemicals and hazardous substances. The second phase, the Munitions Response Program, initiated by the Navy in 2001 and addresses sites with munitions and explosives-related contaminants (excluding operational ranges). The ERP for JBAB is managed by NAVFAC, and decisions made under this program are through a partnering process involving the Navy, Environmental Protection Agency (EPA), and DDOE. JBAB's ERP sites are listed in Table 2-10 and illustrated in Map 2-13. These sites are at various stages of investigation, study, review, or remediation.

Recommended soil excavation procedures at the ERP sites include:

- The Requestor shall notify the JBAB Environmental Restoration Project Manager (RPM) prior to excavating soil at any ERP sites.
- The Requestor shall sample and analyze excavated soil for contaminants based on past operations and current investigations as determined by the RPM.
- The Requestor shall properly stage/store excavated soil at a predetermined site approved by JBAB Public Works Department.
- The Requestor shall dispose of soils above the contaminant threshold at a permitted Treatment, Storage, Disposal Facility.
- The Requestor is to follow the JBAB Hazardous Waste Management procedures and all federal and DDOE guidelines for disposing contaminated soils.

TABLE 2-10: JBAB ENVIRONMENTAL RESTORATION SITES

JBAB Site Name	Former Bolling AFB Site Name	Site Description	Site Open	Site Specific Constraint
AOC-1		Solid Waste and Incinerator Areas, Anacostia	**Yes**	Active site
1A		Building 168 Crawlspace, Anacostia	**Yes**	Active site
2A		Metro Fill & Waterfront Fill Areas, Anacostia	**Yes**	Active site
3A		Athletic Fields, Anacostia	**Yes**	Active site
4B	ST-07	Abandon Gasoline Station	No	No
5B	ST-08	Former Tank Farm	No	No
6B/7B	FT-01/LF-02	Fire Training Area/Northern Landfill	No	No
8B	LF-06	Southwest Corner Landfill	**Yes**	Has a Land Use Implementation Plan to maintain the cap. Any site work to be approved by DDOE.
9B	SS-03	Heat Plant –Building 18	**Yes**	Possibility of petroleum impacted soil
10B	SS-05	Hangar 2 Apron	No	No
11B	SS-09	Former Aircraft Parking Center	No	No breaching of clay layer below perched groundwater
12B	SS-10	Marina North Zone	No	No
13B	SS-11	Marina South Zone	No	No
14B	SS-12	Installation-wide Metals Operable Unit	**Yes**	Active site
15B	SS-13	Potomac River Operable Unit	**Yes**	Active site
16B	SS-14	Buildings 84 & 85	No	Management of debris from asphalt layer below ground
17B	SS-15	Building 53	No	No
18B	SS-16	Building 1002	No	No
19B	SS-17	Building 87	No	No
20B	SS-18	Hangar Zone	No	No
21B	SS-19	Former Liquid Fuel Line Zone	No	No
22B	SS-20	Barracks Zone	No	No
23B	SS-21	Buildings 706, 707 & 708	No	No
24B	SS-22	Spill Zone	No	No
25B	SS-23	AAFES Gasoline Station	No	No
26B	ST-04	Car Care Center	**Yes**	Possibility of petroleum impacted soil

Note: Due to the possible presence of elevated naturally occurring metals plus residual organics-petroleum from installation-wide historic operations, the former Bolling AFB had developed a Land Use Control (LUC) for soil and groundwater at the site of Bolling AFB. The LUC is voluntary and not the result of a Record of Decision. It does not mean that work cannot be done, or groundwater or soil cannot be disturbed. Work just needs to be done in controlled/ approved manner so that potential risk to human health and the environment are managed. There is no current plan to develop a Navy document to replace the voluntary Bolling AFB LUC. However, there is a plan to develop a CERCLA installation-wide LUC as the remedy for the entire site (Site 14B and Site 15B).

MAP 2-13: JBAB ERP SITES

Installation Boundary

Active Site

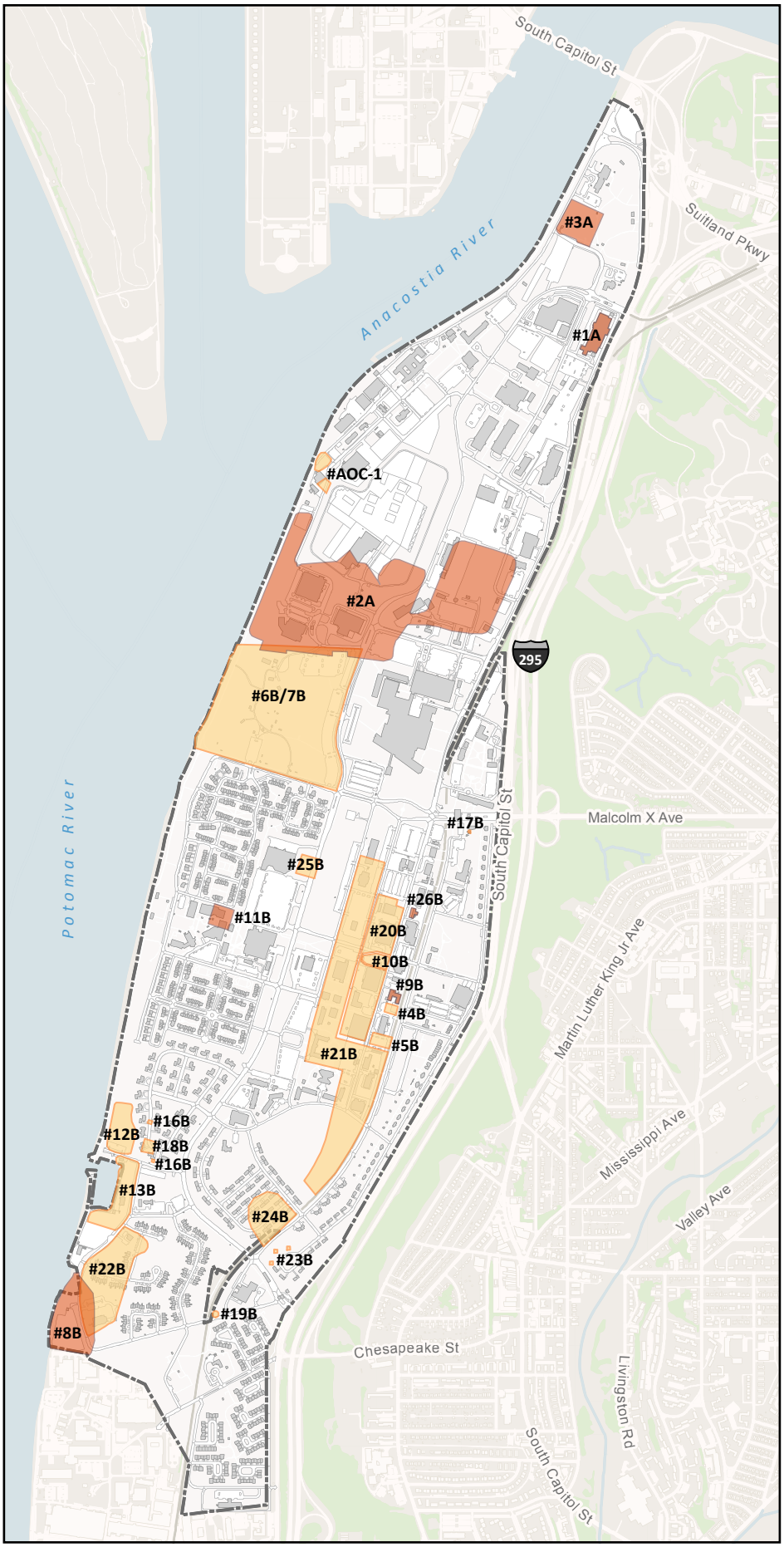
Closed ERP Site or Area of Concern

Active ERP Sites

#1A	Building 168 Crawlspace
#2A	Metro Fill & Waterfront Fill Areas
#3A	Athletic Fields
#8B	Southwst Corner Landfill
#9B	Heat Plant - Bldg 18
#11B	Former Aircraft Parking Center
#14B	Base-wide Metals Operable Unit
#15B	Potomac River Operable Unit
#26B	Car Care Center

Closed ERP Sites and Areas of Concern (AOC'S)

#AOC-1	Solid Waste and Incinerator Areas
#4B	Abandon Gasoline Station
#5B	Former Tank Farm
#6B/7B	Fire Trianing Area/ Northern Landfill
#10B	Hangar 2 apron
#12B	Marina North Zone
#13B	Marina South Zone
#16B	Buildings 84 & 85
#17B	Building 53
#18B	Building 1002
#19B	Building 87
#20B	Hangar Zone
#21B	Forming Liquid Fuel Line Zone
#22B	Barracks Zone
#23B	Buildings 706, 707 & 708
#24B	Spill Zone
#25B	Car Care Center



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
JBAB ICRMP, 2011
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

N

0 500 1,000 2,000
Feet

CSX Parcel and Easement

A CSX railroad runs along the eastern flank of much of the installation, terminating at the Blue Plains Advanced Wastewater Treatment Plant (AWTP). Within JBAB perimeter, CSX owns approximately 3.65 acres of land in fee simple and can use over 7,400 linear feet of railroad easement on base outside its parcels.

Prior to September 11, 2001, the rail line was used to transport chlorine for Blue Plains AWTP. The tracks have not been used since then. The Navy is looking at vacating the easement and purchasing the CSX parcels so that future development at this location will not be impaired.

Anti-Terrorism/Force Protection (AT/FP) and Security

UFC 4-010-01 *DoD Minimum Anti-terrorism Standards for Buildings* establishes minimum construction standards for AT/FP at military installations in order to respond to potential threats posed by terrorists. These standards must be incorporated at JBAB into all new construction and major renovation work funded under MILCON and not exempt from AT/FP requirements.

AT/FP standoff distances are measured from the installation perimeter, or an interior roadway or parking area to an occupied building. The occupancy level, the protection level, and the construction technique of the building are all taken into consideration when determining the required setback. When required distances cannot be achieved, hardening measures should be applied to mitigate the distance deficit. These security enhancements typically will be associated with increased cost. Detailed AT/FP requirements are located in UFC 4-010-01.

Buildings constructed before the AT/FP regulations were established fall under a grandfather clause which excludes them from meeting current AT/FP regulations. However, future development efforts, whenever feasible, need to address these requirements for increased safety and security. [redacted]

Several facilities at JBAB have access restricted to authorized personnel and visitors for mission security. These facilities have additional AT/FP requirements and include outdoor features such as security fences, mass notification systems, external lighting, and intrusion detection systems. Future development in adjacent areas can not impede the fulfillment of their missions and functions.

Installation entry points are another key components in the force protection security program. [redacted]

Noise

The predominant sources of noise at JBAB include on-base military helicopter operations, commercial aircraft operations at DCA across the Potomac River, and vehicular traffic, particularly from South Capitol Street and I-295. Secondary sources of noise include installation traffic and equipment operation.

Helicopter operations at the HMX-1 airfield or the small landing area are sporadic and not a consistent source of noise. While noise from DCA is steady, the installation and nearby neighborhoods are well outside the 65-dBA day-night average level contour, the accepted threshold for incompatibility with residential land uses.

2.4.5 Combined Constraints Analysis

As discussed in the previous sections, natural, cultural, and operational features and requirements can become constraints that limit future growth and development potentials at JBAB. While these constraints are not insurmountable, they present challenges that will need to be addressed before and during development. Map 2-14 categorizes JBAB site into composite areas in three colors based on their development potentials.

The areas in green are ideal for new development or redevelopment because these areas are subject to minimal environmental, cultural, and operational impacts, and therefore are more favored for short-term future development.

The areas in yellow represent sites with constraining features that will present some challenges to new development. While it is possible to develop these areas, proper processes or site mitigation measures will need to be implemented before and/or during the design and construction phases, which makes development in these areas more risky, costly, or time-consuming. Before proposing development in these areas, the value of the existing features and the potential to mitigate the existing constraints should be considered carefully.

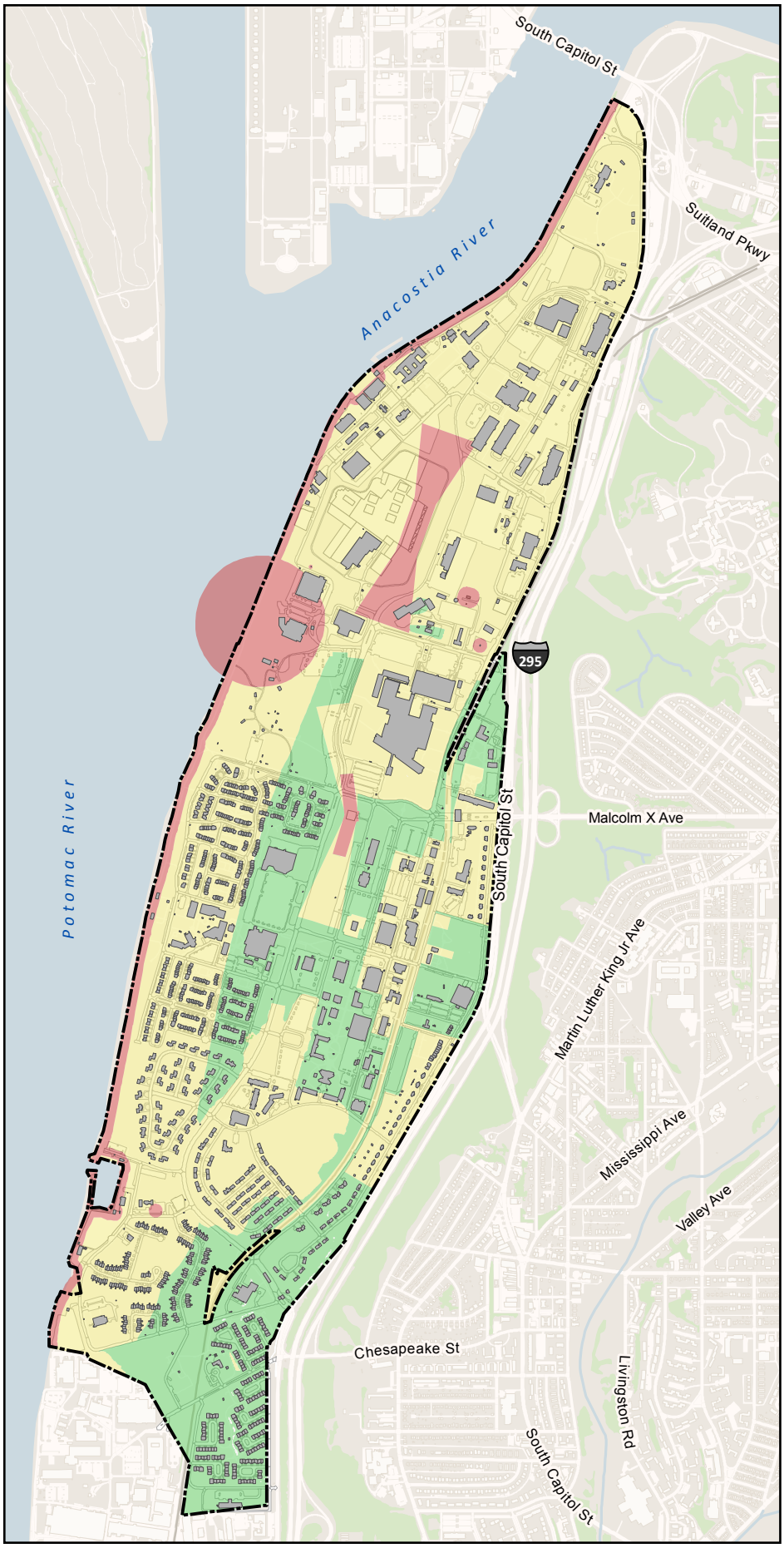
Major areas associated with such constraints at JBAB include floodplains, shoreline critical zones, steep slopes, railroad easements, environmental restriction and restoration sites, and NRHP-eligible historic buildings and historic district and contributing structures.

The areas in red represent sites with significant constraining factors considered difficult or infeasible for new development to occur because development with habitable spaces in these areas is considered life, safety, or health threatening or is prohibited by existing laws, regulations, or mission requirements. Such areas at JBAB include ESQDs, airfield clearance zone, shoreline no-build zone, and required AT/FP setbacks.

MAP 2-14: COMBINED CONSTRAINTS

- Installation Boundary
- Site Ideal for New Development
- Site Requiring Mitigation for New Development
- Site Considered Difficult or Infeasible for New Development

Note: AT/FP standoff distance is determined by a building's occupancy level, protection level, and construction technique. Therefore it has to be analyzed and determined on a site-by site basis.



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

N

0 500 1,000 2,000
Feet

2.5 Site Infrastructure

The property of JBAB consists of the sites of the former NSF Anacostia, Bolling AFB, and Bellevue Housing, each having their own separate utility systems.

On the former NSF Anacostia site, JBAB performs its own maintenance on all utility lines up to the building except for gas, which is maintained by Washington Gas. All utility systems within buildings are maintained by contracts.

On the former Bolling AFB site, JBAB maintains all systems within a facility, but uses privatized water, sewer, and gas mains. The installation does maintain the stormwater system and electrical power lines except in the Bolling Family Housing area, whose utilities are privatized.

Bellevue Housing is also privatized and uses commercial utilities only.

2.5.1 Water Service

Water service at JBAB is provided through two water systems (Map 2-15): one on the former NSF Anacostia side and the other on the former Bolling AFB side. The source of the water provided is from the District of Columbia's Water and Sewer Authority (DC Water).

[redacted]

2.5.2 Sanitary Sewer and Stormwater Service

Sanitary Sewer

Wastewater from JBAB is collected through sanitary sewer lines (Map 2-16) and treated by DC Water at the Blue Plains Advanced Wastewater Treatment Plant (AWTP) prior to discharge into the Potomac River. JBAB is authorized to discharge industrial waste to DC Water through a wastewater discharge permit.

[redacted]

[redacted]

[redacted]

Stormwater

As shown in Map 2-17, stormwater from the Anacostia side is collected into a network of pipes, culverts, inlets, and pump stations that discharge into the Anacostia River at four outfalls. The stormwater system at this part of the installation is operated and maintained by JBAB personnel. Stormwater discharges are covered by an existing National Pollution Discharge Elimination System (NPDES) permit. Three outfalls have undergone extensive renovation in order to help control flooding experienced on base. Extensive work has been done near Buildings 410 and 411. Other drainage, pump house, and outfall renovation improvements have been designed but not funded or executed yet.

The DC Water Blue Plains AWTP, located just south of JBAB, treats wastewater from the installation

[redacted]

According to the DDOE, stormwater runoff is another major source that impacts the water quality of the Anacostia and Potomac Rivers other than Combined Sewer Overflows (CSOs). Stormwater from JBAB drains to the west toward the Potomac River and eventually feeds into the Chesapeake Bay. Executive Order 13508 recognizes the Chesapeake Bay as a national treasure and calls on the federal government to lead a renewed effort to restore and protect the nation's largest estuary and its watershed. D.C.'s Watershed Implementation Plan (WIP) has set up a goal to reduce its nitrogen, phosphorous, and sediment loads by 60 percent by 2017.

Section 438 of the Energy Independence and Security Act (EISA) of 2007 establishes into law new stormwater design requirements for federal development and redevelopment projects. Compliance with EISA 2007 Section 438 is required and development or redevelopment projects that exceed a 5,000 SF footprint must use site planning, design, construction, and maintenance strategies for the property to maintain or restore the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of flow. The definition of pre-development hydrology by the EPA is "the combination of runoff, infiltration, and evapotranspiration rates and volumes that typically existed on a site before human-induced land disturbance occurred (e.g., construction of infrastructure on undeveloped land such as meadows or forests)." Agencies have two options to demonstrate that they are maintaining pre-development hydrology: managing on-site the total volume of rainfall from the 95th percentile storm or managing on-site the total volume of rainfall based on a site-specific hydrologic analysis. According to D.C.'s Phase Two WIP, the architect/engineer (A/E) must comply with local and state requirements for stormwater management and obtain required local approvals for the stormwater management plan. Site plans must meet local and state requirements for controlling sediment and erosion during construction and the A/E must obtain any required regulatory approvals of the sediment and erosion control plan.

Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance (October 5, 2009), directed the EPA to issue EISA Section 438 guidance. EPA reminds DDOE that EISA Section 438 (and EPA Guidance) calls for federal facilities to comply with 1.7 inch on-site retention. Per the Fact Sheet that EPA released with the Permit, the 2011 Permit was informed by Executive Order 13508 (Section 501), which directs federal agencies to implement controls on their own properties. Additionally, the Fact Sheet references Executive Order 13514, which reiterates that the federal agencies implementing new or re-development projects will achieve a 1.7 inch on-site stormwater retention standard. Even though these three measures are not explicitly included in the 2011 Permit, these executive orders direct federal agencies to "lead by example" when it comes to stormwater management.

DoD has also required implementation of EISA Section 438 and the EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under EISA Section 438 using low impact development (LID) techniques in accordance with the policy.

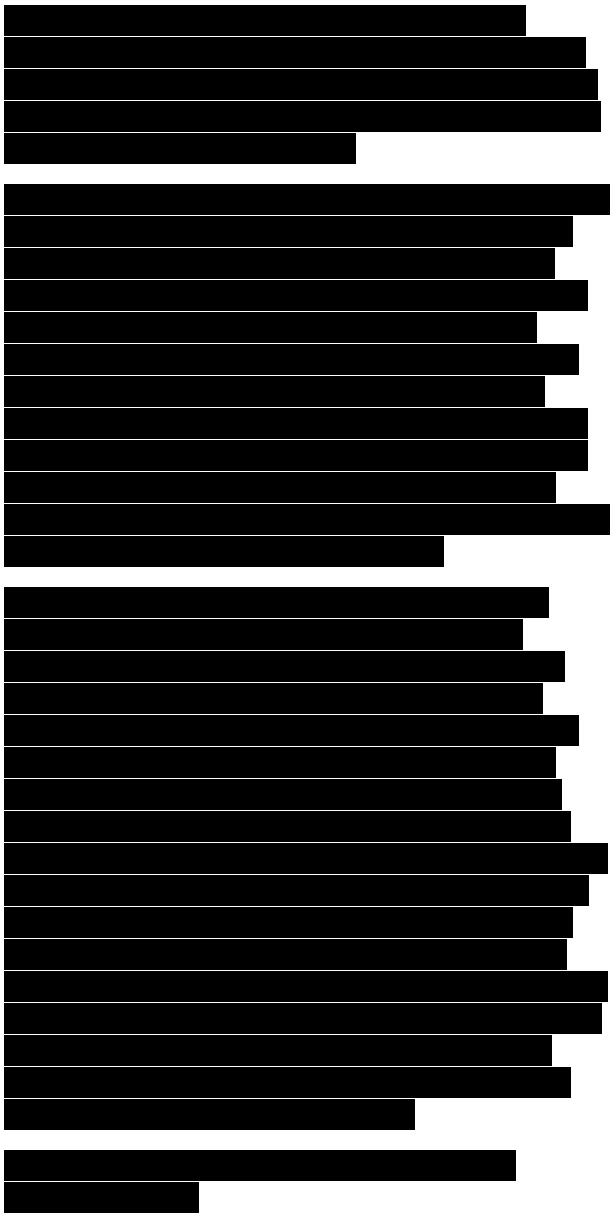
The Navy has taken a service-wide approach in adopting the LID policy for stormwater management at its facilities in compliance with Executive Order 13514, EISA Section 438, and related DoD requirements. The LID policy affects both new construction (projects exceeding $750,000) and renovation (projects costing more than $5 million) at Navy and Marine bases across the country in and after FY 11. Construction projects must imitate a site's pre-development hydrology with design techniques that infiltrate, filter, store, evaporate, or retain runoff close to its source. Any project over 5,000 square feet requires implementation of LID or an explanation to NAVFAC why it will not be included.

To promote stormwater infiltration in order to relieve pressure from the combined sewer system and reduce direct CSOs into the Anacostia and Potomac Rivers, JBAB has incorporated stormwater treatment features in its recent development. Large bioswales and low areas densely planted with plants that tolerate wide fluctuations in water levels have been constructed along Defense Boulevard. Retention areas consisting of primarily lower level turf areas are located around the U.S. Navy Ceremonial Guard Bachelors Complex. The NSMA facility completed in 2011 incorporated LID features in the open space around the facility to reduce untreated runoff to the rivers. JBAB has also installed sand filters, trash scepters, porous pavers, and one green roof in different areas of the installation.

In addition to these steps to handle its stormwater flows, JBAB is required to comply with the NF MILCON Moratorium (September 19, 2010) by the DON. The required actions include recapitalization of existing facilities in lieu of NF MILCON and programming at a minimum a 2:1 equivalent infrastructure reduction for CNIC waived NF MILCON. By consolidation and removal of excess infrastructure, JBAB can reduce the amount of impervious surface in the form of building rooftops and parking lots that contribute to non-point source pollution in its stormwater discharges.

2.5.3 Electrical Power Service

Electrical power service to JBAB is provided by the Potomac Electric Power Company (PEPCO).



2.5.4 Central Heating and Cooling Service

Heating for facilities on the Anacostia side is provided by individual natural gas units in buildings. [redacted]

[redacted]

2.5.5 Telecommunication Service

Telephone service is provided to JBAB by Verizon.

[redacted]

Building 18 provides heating and cooling

[redacted]

2.5.6 Natural Gas Service

Natural gas at JBAB (Map 2-20) is provided by the Washington Gas Light Company. The natural gas system is adequate for the service required.

[redacted]

2.6 Surrounding Land Uses and Road Network

As shown in Figure 2-8, federal and local public uses occupy a majority of the land around JBAB, including St. Elizabeths Campus and Shepherd Parkway to the east, NRL and Blue Plains AWTP to the south, and Anacostia Park to the north across the South Capitol Street corridor.

Several natural and man-made features cut off JBAB from its surrounding land. Aside from the rivers on the west, the NRL campus and Blue Plains AWTP on the south have restricted access to the public. The South Capitol Street/Overlook Avenue/I-295 corridor creates a strong functional and visual break between JBAB and the neighborhoods on higher ground east of I-295 where residential use is predominant. Nearby neighborhoods include the public housing community of Barry Farm, mixed-income residential development of Sheridan Station, and the single family neighborhood of Congress Heights. Commercial, industrial, and institutional uses are scattered throughout the area.

Regional vehicular access to JBAB is provided via I-95, I-295, and I-395 from the north and south, and U.S. 50 and I-66 from the east and the west. The local roadway network provides access from Suitland Parkway, South Capitol Street, Firth Sterling Avenue, Malcolm X Avenue, and Overlook Avenue.

Immediate highway access is provided by I-295, a four- to six-lane freeway running north-south along the eastern perimeter of the installation. It connects the I-95/I-495 freeway system to the south and the I-395/MD 295 freeway system to the north. Immediate local road access is provided by South Capitol Street, a four-lane expressway that parallels I-295. Suitland Parkway, a four-lane arterial, interfaces with the highways adjacent to the northern portion of JBAB and runs eastward to Prince George's County. I-295 and South Capitol Street connect JBAB with downtown Washington, D.C. via the 11th Street Bridge and Frederick Douglass Memorial Bridge, respectively.

2.7 Surrounding Land Development

The Metropolitan Washington Council of Government's (MWCOG's) forecasts for the 2020 and 2035 time frames indicate growth related to employment, households, and population throughout Southwest and Southeast D.C.

DHS Consolidation at St. Elizabeths

The largest federal developments in the vicinity of JBAB occur in St. Elizabeths, which is directly east of the northern potion of JBAB, with I-295 and South Capitol Street traversing in between. Under the current proposal by the GSA, DHS in the NCR will be relocated to and consolidated at the historic campus of the St. Elizabeths Hospital. A minimum critical mass of 4.5 million gross square feet (GSF) of secure office space, plus parking, will be designed at St. Elizabeths to accommodate 14,000 DHS employees including 10,900 on its West Campus and 3,100 on the north parcel of the East Campus. GSA will repair and upgrade the existing infrastructure on a phased basis while developing the campuses.

The West Campus development will consist of the reuse of existing historic buildings with new construction, while the north parcel of the East Campus will be dedicated to a 750,000 GSF new Federal Emergency Management Agency building with 270,000 GSF of structured parking. The entire project is scheduled to complete in 2020.

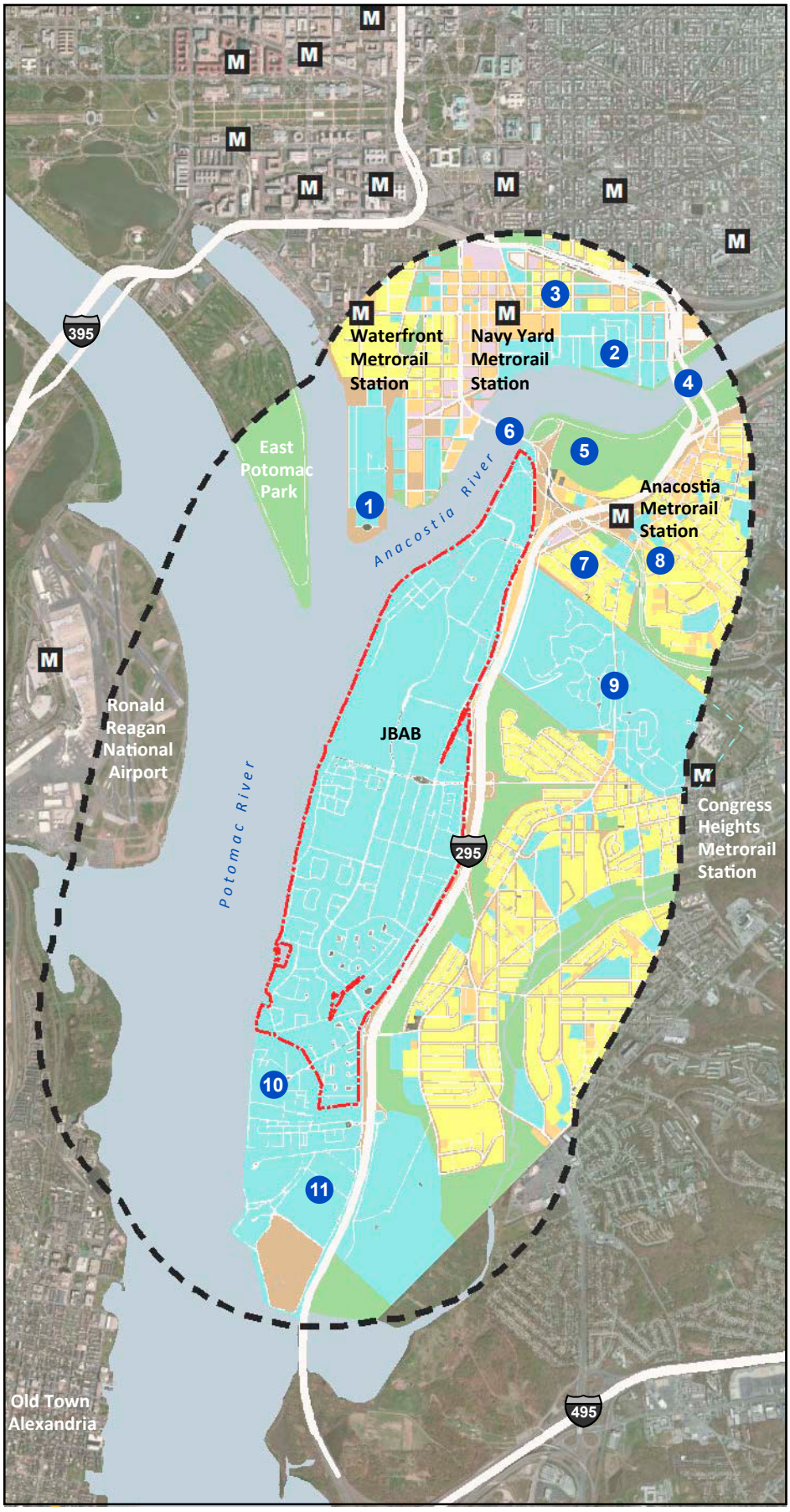
The first stage of this effort is the construction of the U.S. Coast Guard Headquarters (Figure 2-9) at the southeast corner of the West Campus, which overlooks JBAB due to its higher ground elevation. Completed in 2013, the new building features an 11-story office building providing 1.2 million SF for 3,700 employees, a separate central utility plant, and two seven-story parking garages.

The major expected impact resulting from the DHS relocation and consolidation at St. Elizabeths will be on the existing transportation network. Various public and controlled access transportation improvements are planned inside and outside St. Elizabeths to support the DHS redevelopment. Critical improvements to the road network include the modification of I-295/Malcolm X Interchange outside JBAB and the widening of Martin Luther King, Jr. Avenue. The details of these projects are described in Section 2.9 Planned Transportation Improvements.

FIGURE 2-7: RENDERING OF THE U.S. COAST GUARD HEADQUARTERS

Source: 2009 U.S. Coast Guard Headquarters Final Design Submission

FIGURE 2-8: REGIONAL LAND USE



- Roads and Parking
- Water
- Commercial
- Government
- Residential
- Industrial
- Parks and Open Spaces
- Transportation and Utilities
- 1 Mile Radius
- Installation Boundary
- M Metrorail Station

1. Fort McNair
2. Washington Navy Yard
3. Capper/Carrollsburg Redevelopment
4. 11th Street Bridge
5. Poplar Point
6. South Capitol Street Bridge
7. Barry Farm Redevelopment
8. Sheridan Station
9. St. Elizabeths Campus
10. Naval Research Laboratory
11. DC Blue Plains AWTP

Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
DC GIS, 2013
Louis Berger Group, 2013

N

0 0.25 0.5 1
Miles

FIGURE 2-9: ST. ELIZABETHS WEST CAMPUS MASTER PLAN AS OF MARCH 2012

(Source: DHS Headquarters Consolidation at St. Elizabeths Master Plan Amendment, March 2012)

Programmed Development at NRL

NRL bordering JBAB on the south is a 132-acre military installation dedicated to the Navy's full-spectrum multi-disciplinary program of scientific research and advanced technological development.

According to the NRL Master Plan that is undergoing update, over the next five years, population growth at NRL is expected to be two percent annually, resulting in 615 new personnel by 2018. Approximately 350,000 SF of NRL facilities, mostly laboratories, will also be altered, including 108,812 SF of new construction, 117,637 SF of renovations, and 131,673 SF of demolition. Due to the potential DoD budget cuts, the projected population growth and projects at NRL may not happen or may be modified as military funding and priorities change.

Due to NRL's adjacency to JBAB, planning efforts on the JBAB Master Plan have been coordinated with the development of the NRL Master Plan on proposed pedestrian and bicycle circulation, multi-modal transportation, and open spaces. It is worth noting, although sharing with JBAB a perimeter fence and an emergency gate, NRL has more stringent security requirements. Therefore, physical connections between the two installations in the future therefore will be contingent on security approvals and funding.

Other Developments

The Anacostia Waterfront Initiative (AWI) is one of the most ambitious development plans in D.C.'s history. Spanning 30 years and comprising $10 billion worth of investment, the AWI is led by the D.C. government and embraced by 19 regional and federal agency partners through the execution of a Memorandum of Understanding. The AWI vision is to restore and revitalize D.C.'s waterfronts so that widespread access to the Anacostia River and its new parks, recreational, cultural, and residential and commercial centers is possible. Several of the AWI planned projects are near JBAB, mostly northwest to the installation. AWI land development projects near JBAB include Poplar Point and Sheridan Station, which are detailed below. AWI transportation projects, including the South Capitol Street Corridor and Anacostia Riverwalk Trail are detailed in Section 2.9.

Artist's rendering of the AWI vision

In particular, planned residential and mixed-use developments in the vicinity of JBAB contributing to the projected growth in the local area include:

- **St. Elizabeths East Campus**: The District of Columbia will redevelop part of the St. Elizabeths East Campus that is south of the FEMA building. Current plans call for over 4.7 million GSF of mixed-use development, including retail, office and conference space, and educational space. The development will also include residential, office, and community facilities.
- **Barry Farm Redevelopment**: This project will provide 1,100 residential units, 145,000 GSF of retail, a new elementary school, and a recreation center. The redevelopment plan was approved by the D.C. Council in 2006 and planning continues.
- **Sheridan Station**: This project will provide 344 residential units including 65 units of replacement housing for Barry Farm residents. Phase One was completed in 2011 and Phase Two is expected to be complete in 2014.
- **Poplar Point:** The 110-acre site development will include more than 6 million GSF of mixed-use development and 70 acres of waterfront park. The project is undergoing a federal environmental impact analysis and Small Area Planning phase. No definitive plans or schedule are currently available for its redevelopment.
- **Capper/Carrollsburg Housing Redevelopment**: This project redevelops the 23-acre Capper/Carrollsburg public housing area on the north side of the Anacostia River. The community is between the South Capitol Street Bridge corridor and the 11th Street Bridge corridor, both of which connect to Southeast D.C. In total, the project will replace 707 public housing units and provide more than 1,000 other residential units. There will also be 700,000 GSF of office and 50,000 GSF of retail space. Phase One and Two of this project have been completed, providing more than 300 public housing units.

These projects are illustrated in Figure 2-8.

Perspective illustration of the proposed St. Elizabeths East Campus. Source: 2012 St. Elizabeths East Master Plan and Design Guidelines

Perspective illustration of the Sheridan Station neighborhood.

The model of the Capper/Carrollsburg Housing Development. Source: http://www.jdland.com/dc/capper.cfm.

2.8 Local Utility Improvements

One-third of the District of Columbia is served by a combined sewer system, which was developed before 1900 and conveys both sanitary sewage and storm water in one piping system. During periods of significant rainfall, the capacity of a combined sewer may be exceeded. The excess flow, Combined Sewer Overflow, which is a mixture of storm water and sanitary wastes, is discharged directly into the Anacostia River, the Potomac River, or tributary waters. Pollutants, untreated sewage, and potentially harmful substances are present in these discharges. CSOs significantly degrade the water quality of the rivers and the Chesapeake Bay. They also exacerbate potential flooding at JBAB during storm events.

Anacostia River Tunnel Project

The Anacostia River Tunnel Project is one of DC Water's Clean Water Projects, which is designed to capture and provide storage for CSOs being discharged to the Anacostia River. Division A of the project, Blue Pains Tunnel, includes a system of tunnels and diversion sewers for the conveyance and storage of CSOs for treatment at DC Water's Blue Plains AWTP (Figure 2-10). A significant portion of the proposed tunnel is being constructed along JBAB's shoreline, using a 40 feet wide subterranean easement. The project also requires the construction of an overflow structure, diversion structure, and 62-foot diameter drop shaft near the existing ball fields at JBAB. The overflow structure is designed with an overlook platform facing the Potomac River along a new waterfront promenade. This tunnel is scheduled to be complete in August 2015 and it does not limit future development by JBAB.

2.9 Planned Transportation Improvements

The influx of employment and population growth as a result of current and planned development is expected to strain the existing transportation network in the vicinity of JBAB.

WMCOG's 2012 Financially Constrained Long-Range Transportation Plan (CLRP) identifies all regionally significant transportation projects and programs that are planned in the Washington metropolitan area between 2012 and 2040. The projects and programs that go into the CLRP are developed cooperatively by governmental bodies and agencies represented on the National Capital Region Transportation Planning Board. The purpose of these improvements are to provide a more balanced transportation system and improve mobility with better use of multiple modes of transportation.

The planned transportation improvements that are expected to have a potential impact on JBAB and should be included in future planning considerations include:

- **Highway** (Figure 2-11): New 11th Street Bridge project, South Capitol Street corridor improvement, and modification of the I-295/Malcolm X Avenue interchange associated with DHS consolidation at St. Elizabeths.

FIGURE 2-10: ANACOSTIA RIVER TUNNEL PROJECT

(Source: www.dcwater.com)

- **Transit** (Figure 2-12): DC Streetcar's Anacostia Initial Line Segment.
- **Bicycle and Pedestrian Trails:** Potomac Heritage National Scenic Trail (PHNST) and Anacostia Riverwalk Trail. The 2013 Update to the CLRP also indicates DDOT will design and construct a paved bicycle and pedestrian trail along the South Capitol Street from Firth Sterling Avenue to Southern Avenue (Figure 2-13) and reduce the number of lanes from five to four. The projected completion date is 2015.

The CLRP also analyzes how the number of jobs accessible within a 45-minute commute changes as a result of the CLRP and shifts in population and employment characteristics of the region. As illustrated in Figure 2-14 and Figure 2-15, the job accessibility at JBAB will be minimally impacted if using automobile, while using transit the job accessibility within the same amount of commute time will experience moderate loss. According to the 2012 CLRP analysis of all planned transportation projects and programs in the region, the modes by which people choose to travel are not expected to change much over the next three decades. JBAB is one of the few areas in D.C. where average accessibility by transit is projected to decrease due to a potential increase in congestion on roads and transit in the next 30 years. Unless new transit infrastructure, transit services, and high-occupancy vehicle (HOV) lanes are provided near or at JBAB in the next 30 years near or at JBAB in the next 30 years, the current planned regional transportation improvements, which are described below, are insufficient to have great positive impacts on JBAB.

New 11th Street Bridge Project

The 11th Street Bridges are two vital links across the Anacostia River that connect I-295 and the Southeast Freeway (Figure 2-16). As DDOT's largest project to date, this project is replacing two bridges built in the 1960s with three new bridges that separate local and freeway traffic. Phase One is near Substantial Completion as of April 2013. Phase Two will further improve connections between the Southeast/Southwest Freeway and the new 11th Street Bridges, and reconnect local streets on the west side of the Anacostia River. It will also replace the Southeast/Southwest Freeway with an at-grade boulevard between 8th Street, SE and Barney Circle. The entire construction is scheduled to be complete in late 2015. Other key project elements include:

- A new 14-foot wide pedestrian and bicycle path on the local bridge that connects with the Anacostia Riverwalk Trail.
- Drainage and other environmental investments to treat all stormwater within the project area.
- An additional emergency evacuation route.
- New boulevard connections between 11th Street and Pennsylvania Avenue SE.
- Connections to the DC Streetcar network.

FIGURE 2-11: MAJOR HIGHWAY IMPROVEMENTS

(Source: http://www.mwcog.org)

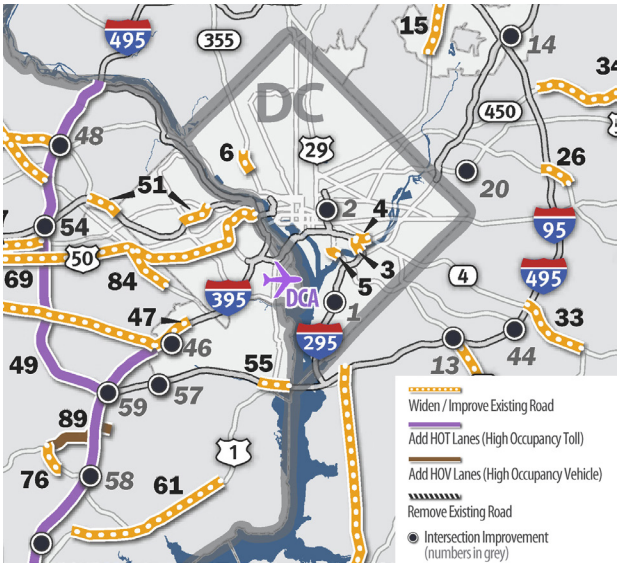


FIGURE 2-12: MAJOR TRANSIT IMPROVEMENTS

(Source: http://www.mwcog.org)

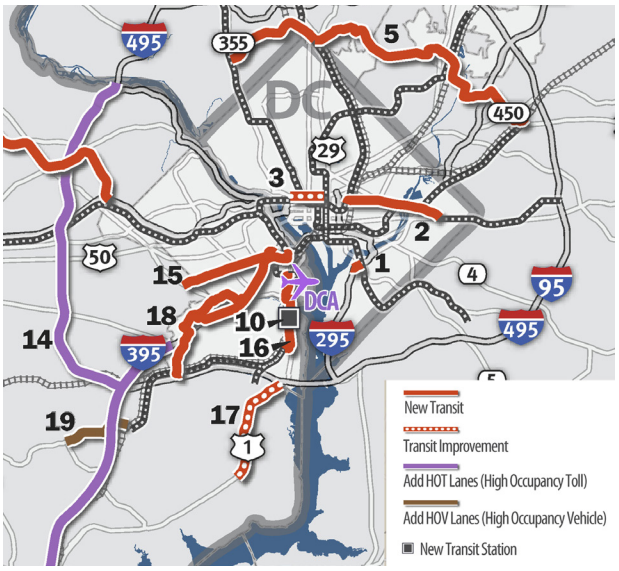


FIGURE 2-13: PROPOSED TRAIL ALIGNMENT ALONG SOUTH CAPITOL STREET

(Source: http://www.mwcog.org)

FIGURE 2-14: CHANGE IN JOB ACCESSIBILITY BY AUTOMOBILE IN 2040

(Source: http://www.mwcog.org)

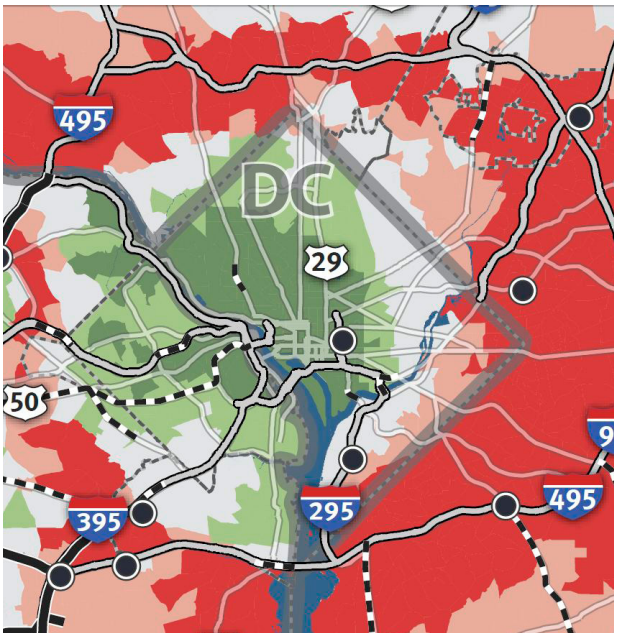
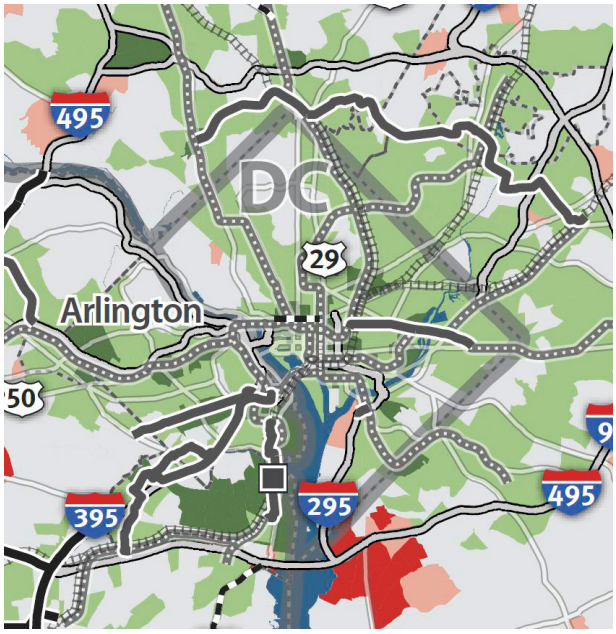


FIGURE 2-15: CHANGE IN JOB ACCESSIBILITY BY TRANSIT IN 2040

(Source: http://www.mwcog.org)



CHANGE IN # OF JOBS WITHIN 45 MINUTES IN 2040 (FOR BOTH MAPS)

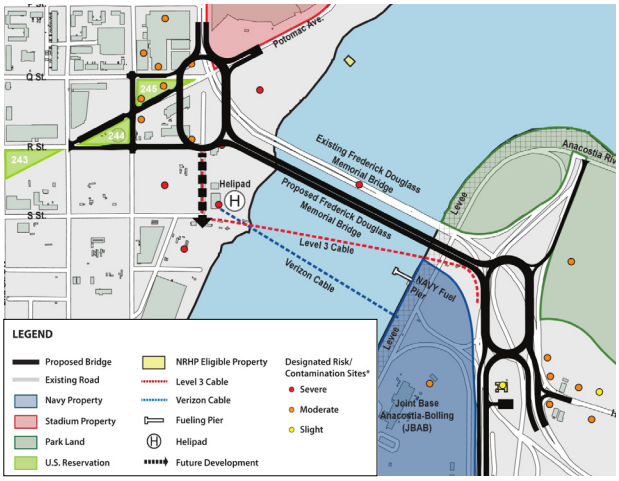
- Significant Loss <-300,000
- Moderate Loss -300,000 to -100,000
- Minimal Impact -100,000 to 100,000
- Moderate Gain 100,000 to 300,000
- Significant Gain > 300,000

FIGURE 2-16: NEW 11TH STREET BRIDGE PROJECT

(Source: http://www.dc.gov)

FIGURE 2-17: SOUTH CAPITOL STREET CORRIDOR ALIGNMENT

(Source: http://www.anacostiawaterfront.org)



South Capitol Street Corridor Improvements

This project will replace the deteriorating South Capitol Street Bridge, also known as the Frederick Douglass Bridge, with a new bridge southwest of the existing. The proposed bridge design will create a new traffic oval outside the northern tip of JBAB (Table 2-3) with pedestrian and bicycle shared-use trails leading to downtown D.C. and several major corridors near JBAB, including Suitland Parkway, Howard Road, and South Capitol Street. The entire project is planned to be complete in late 2018. The Navy is coordinating with DDOT for potential construction of a new commercial entrance for truck access to JBAB.

Improvements for DHS Consolidation at St. Elizabeths

Various transportation management and improvement strategies are proposed in support of the DHS consolidation at St. Elizabeths.

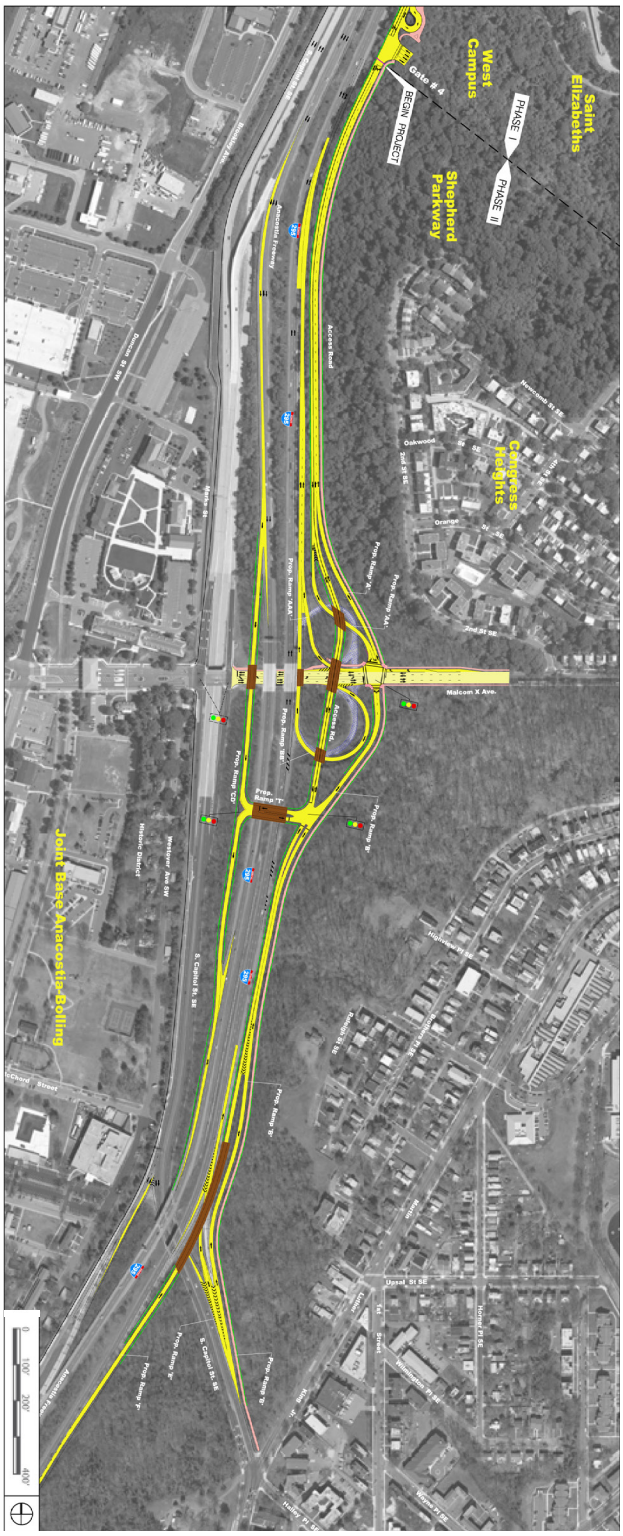
Phase One of the transportation improvement will occur near JBAB's Firth Sterling Gate. Firth Sterling Avenue provides access for motorists and pedestrians traveling between JBAB, the Anacostia Metro Station, and Historic Anacostia. It also provides access to the Barry Farm neighborhood. A three-lane access road with a 10-foot multi-purpose trail is being constructed to connect Gate 4 of the West Campus to Firth Sterling Avenue. Re-configuration of the intersection of Firth Sterling Avenue with the proposed West Campus access road would modify the existing intersection of Firth Sterling Avenue at Barry Road/Stevens Road/Eaton Road. Under this improvement, vehicles moving westbound on Firth Sterling Avenue toward JBAB would be able to make a left turn onto the proposed West Campus access road or continue straight onto Firth Sterling Avenue. The constructed streetcar tracks along Firth Sterling Avenue would not require relocation.

The major improvement for St. Elizabeth that will impact JBAB is the modification to the existing I-295/Malcolm X Avenue interchange, which is part of the West Campus access road Phase Two (Figure 2-18). According to the 2012 St. Elizabeths Master Plan Amendment EIS, improvements to this interchange would create a larger interchange to accommodate the increase of traffic volumes and alteration of traffic patterns outside JBAB's Arnold Gate. The planning for a new interchange started in the third quarter of 2013 and the construction is expected to be done by 2018. DHS is also negotiating with WMATA to extend some existing Metrobus routes to run between St. Elizabeths and the Anacostia Metro Station in order to facilitate the use of public transportation. When the new I-295/Malcolm X interchange is complete, these shuttles will have a loop route running along South Capitol Street passing JBAB. JBAB is concerned about the potentially increased traffic load and higher security risks posed to the Arnold Gate associated with this interchange modification. The Navy is actively working with DDOT and DHS on evaluation and coordination of the proposed interchange design as well as the potential to have shared shuttle services.

Martin Luther King, Jr. Avenue running through the West and East Campuses will also be widened to include turning lanes, pedestrian and bicycle shared sidewalks, buffer areas, and on-street parking with additional crosswalk and traffic signals. This improvement will reduce road congestion and improve the area's pedestrian and bicycle accessibility and mobility.

FIGURE 2-18: PLANNED I-295/MALCOLM X AVENUE INTERCHANGE MODIFICATION

(Source: DHS Headquarters Consolidation at St. Elizabeths Master Plan Amendment, March 2012)



DC Streetcar System

DDOT is developing a city-wide streetcar system with eight lines and a network of 37 miles of tracks. One of the lines, the Anacostia Initial Line Segment, is currently under construction and expected to be fully operational in 2015 or 2016. It will run on Firth Sterling Avenue, providing a connection between JBAB's Firth Sterling Gate and the Anacostia Metrorail Station, and eventually connect to another line running across the 11th Street Bridges leading to downtown D.C. Figure 2-19 illustrates the overall planned streetcar network.

The Navy is partnering with DDOT to facilitate the construction of the streetcar station outside the Firth Sterling Gate. The Navy is also involved in the coordination of an additional future streetcar destination on South Capitol Street (DC Streetcar system Phase Three). Controlled pedestrian gates at JBAB's Main Gate and at the east end of the DIA Access Road are being considered by JBAB to accommodate a future streetcar track extension.

Potomac Heritage National Scenic Trail (PHNST)

The PHNST is a designated National Scenic Trail corridor that includes 836 miles of existing and planned trails and routes in the states of Pennsylvania, Maryland, Virginia and D.C., providing extensive hiking and bicycling opportunities for the region. Figure 2-20 illustrates the PHNST trail segments in the vicinity of JBAB.

Aside from the planned trail along South Capitol Street outside JBAB, the Fort Circle Parks Trail, also known as the Civil War Defenses of Washington Trail, is also a short distance from JBAB (Figure 2-21). This hiker-biker trail connects historic sites that contain earthen fortifications from the Civil War at the outskirts of D.C. with neighboring communities and other destinations. The coordinated efforts among NCPC, D.C. government, and National Park Service (NPS) in creating and improving this extensive trail system can positively affect JBAB by providing new bicycle routes for JBAB employees to commute.

FIGURE 2-19: DC STREETCAR SYSTEM MAP

(Source: http://www.dcstreetcar.com)

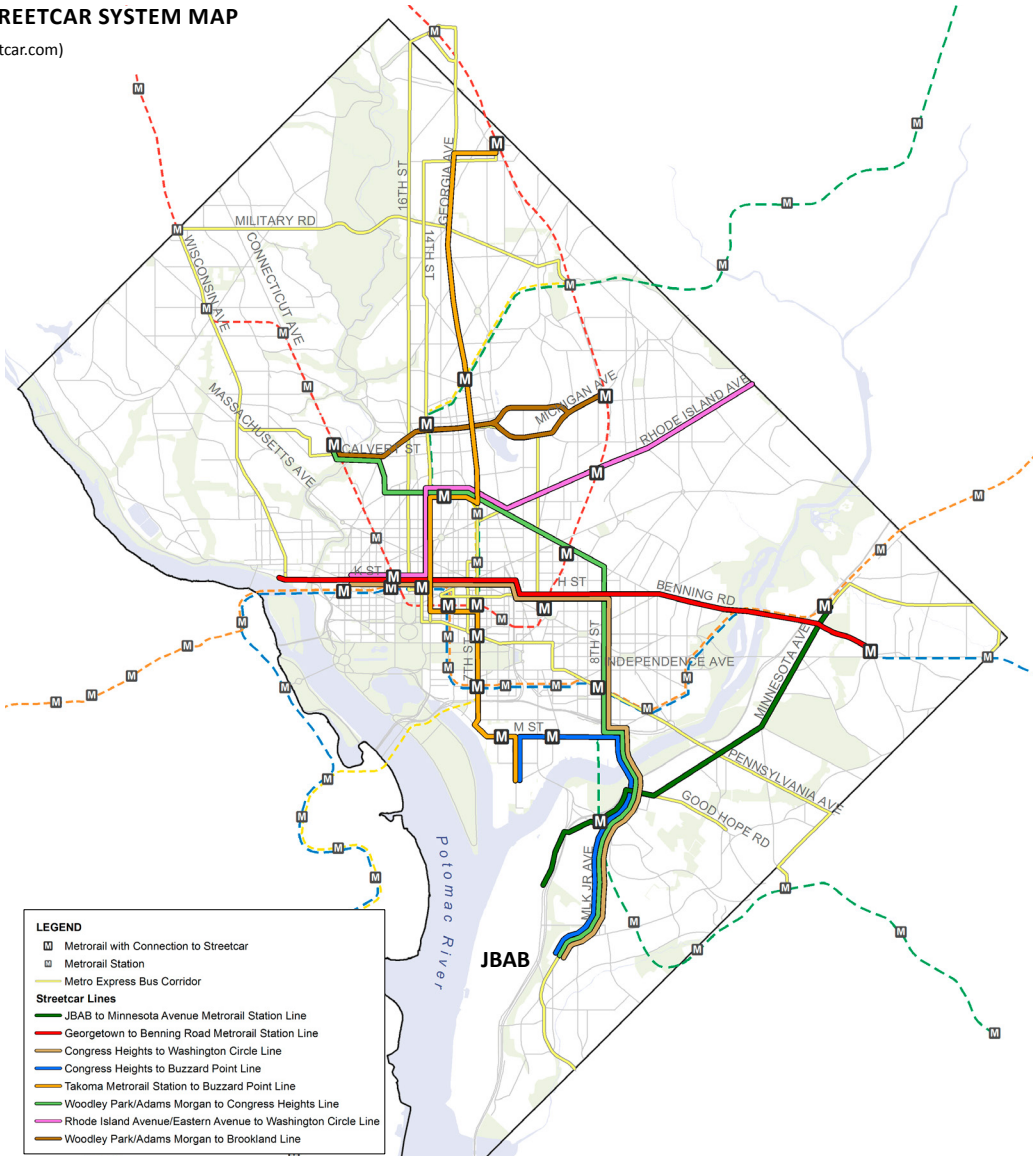
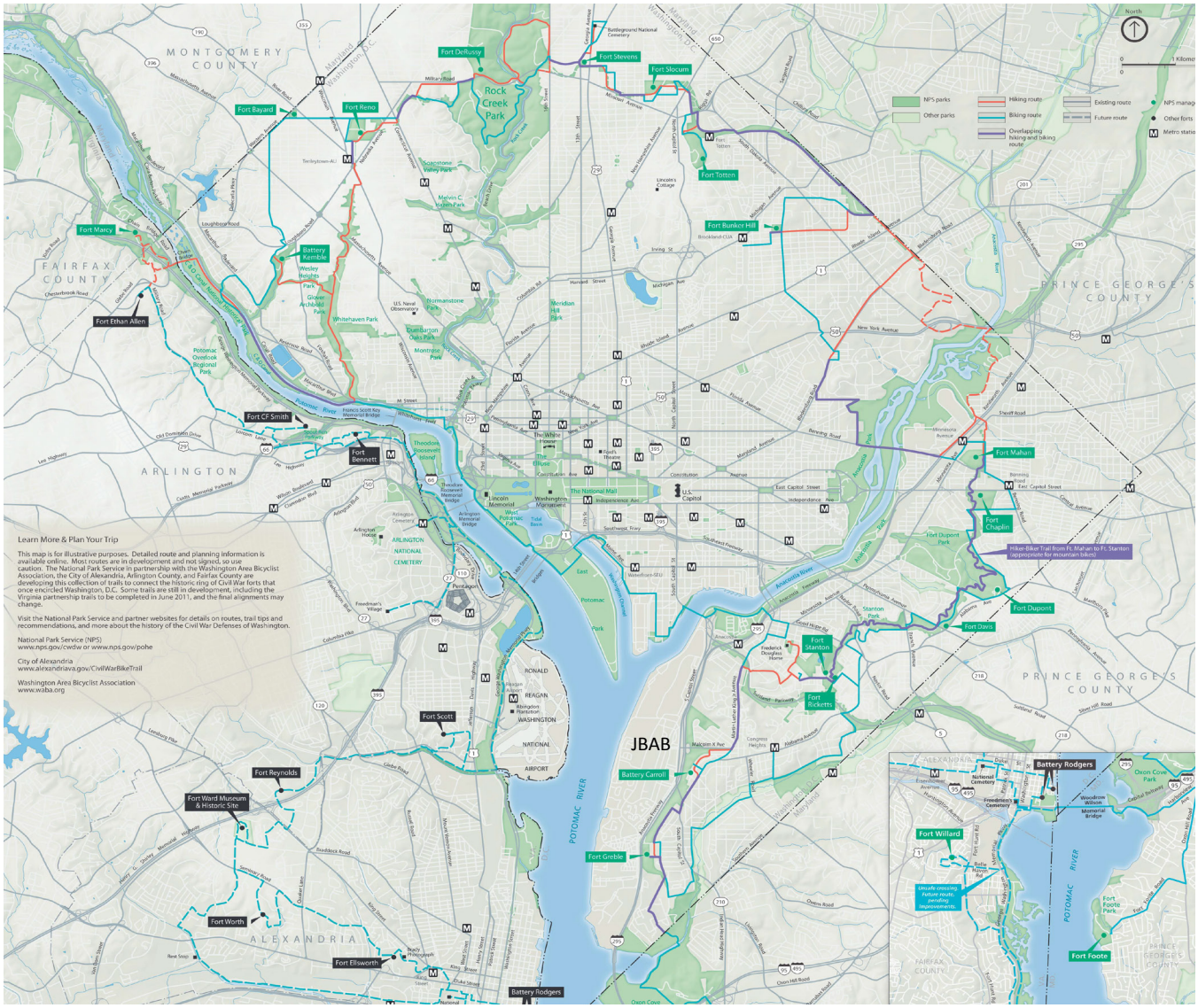


FIGURE 2-20: PHNST TRAIL SYSTEM IN THE VICINITY OF JBAB

(Source: http://www.nps.gov)

FIGURE 2-21: CIVIL WAR DEFENSES OF WASHINGTON TRAIL

(Source: http://www.nps.gov)



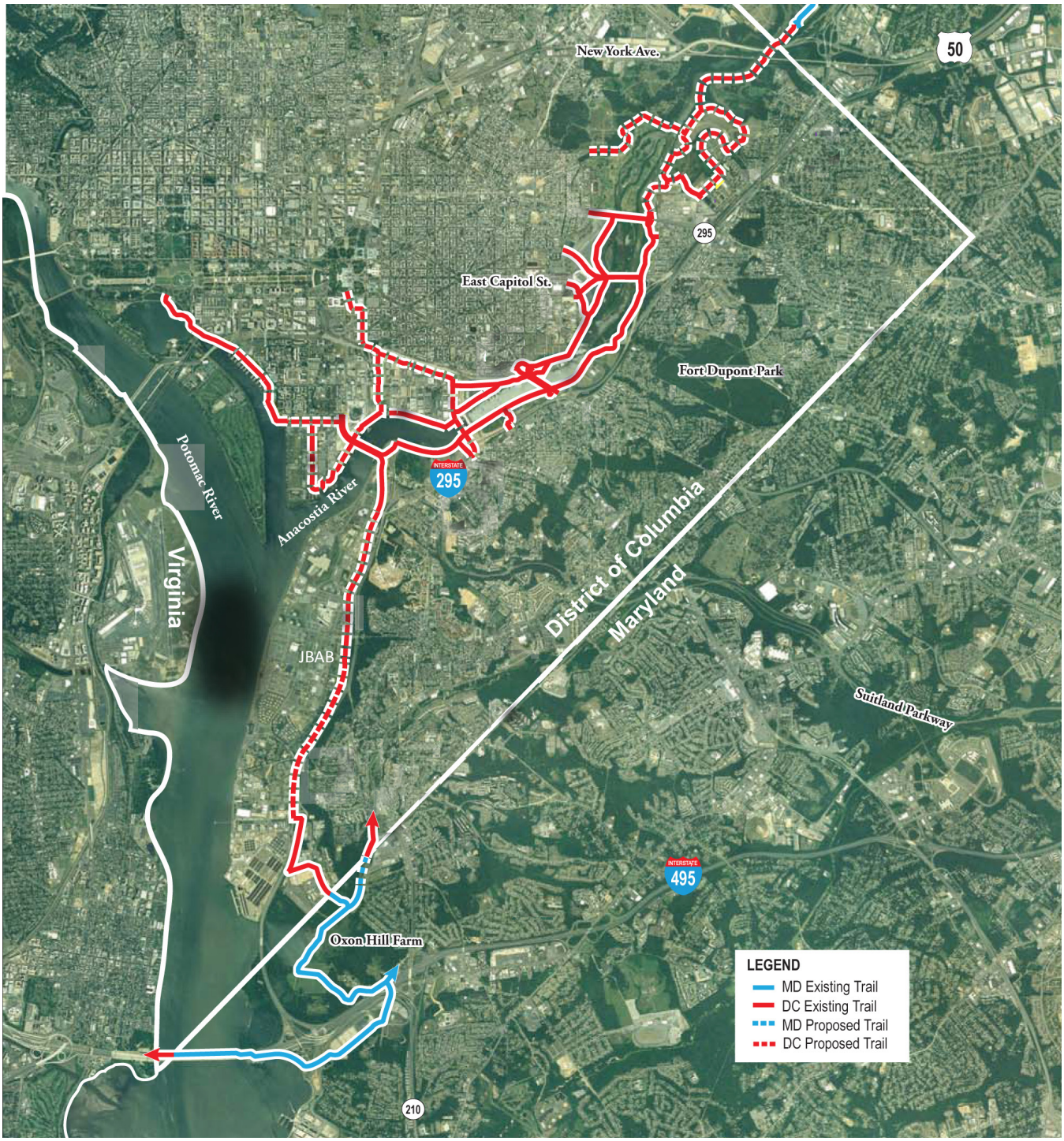
Anacostia Riverwalk Trail

The Anacostia Riverwalk Trail is one of the AWI transportation projects. The planned 20-mile trail spanning on both sides of the Anacostia River is a new recreational amenity and transportation alternative designed for a wide range of users, including cyclists, runner, skaters, and walkers. To date, 12 of the ultimate 20 miles of the Riverwalk Trail are open and heavily used.

As shown in Figure 2-22, a new trail segment is planned along South Capitol Street and Outlook Avenue outside JBAB. Once complete, the trail will create pedestrian and bicycle links to downtown D.C. as well as destinations in Virginia, providing a continuous travel network for the region.

FIGURE 2-22: ANACOSTIA RIVERWALK TRAIL SYSTEM

(Source: http://www.anacostiawaterfront.org)



3.0 Long-Range Framework Plan

3.1 Overview

Effective facility planning and design cannot be achieved on a site-by-site or problem-by-problem basis, but must be based on an installation master plan properly conceived to allow individual challenges to be resolved as part of a total concept.

The Long-Range Framework Plan in this chapter provides a flexible structure to inform future planning and development decisions at JBAB over the next 20 years. It recommends planning initiatives that represent types and locations for development without being tied to specific projects.

The Framework Plan has been prepared in coordination with other local and federal planning initiatives as described in the previous chapter. It takes into consideration the installation's current planning context, such as strong urban growth in the region, urban encroachment on military installations, reduction of defense budget, and the call for sustainable development.

The Framework Plan is made up of a series of interrelated components: Land Use, Circulation, Stormwater Management, Open Space and Recreation, Landscape Design, Architectural Design, Historic Preservation, and Energy Conservation.

Together, these components create a guiding framework that strengthens JBAB's core missions, improves its overall efficiency, and specifies how future development should occur, while allowing for flexibility.

3.2 Planning Vision

The ideas included in the planning vision were developed during the 2010 JBAB master planning process and carried over into this Master Plan.

Vision Statement

As a premier installation providing superior customer service and administrative mission support for DoD activities in the National Capital Region and worldwide, Joint Base Anacostia-Bolling will be a sustainable community with walkable development, enhanced recreational amenities, and protected historic assets linked by park-like corridors and multi-modal transportation networks.

3.3 Master Plan Goals and Objectives

A set of goals and objectives provides the overarching strategies for this Master Plan. Building on the extensive installation stakeholder input and outreach during the 2010 JBAB master planning process, the master planning goals and objectives are carried over and further refined in this update, through close collaboration among the planning team, JBAB Public Works Department, installation leadership, and NAVFAC Washington, to respond to the installation's current operations and to align with DoD and the region's latest development policies and strategies established in UFC 2-100-01 and NCPC's *Comprehensive Plan* currently being updated.

UFC 2-100-01 promotes different strategies for sustainable development, including compact, mixed-use development, infill development, transit-oriented transportation network, LID and stormwater management, resource conservation, and flood control. Through incorporation of these sustainable strategies set forth by UFC 2-100-01 into installation-specific planning goals and objectives, this Master Plan embraces DoD's installation planning philosophy of developing a sustainable platform to support the effective execution of assigned military missions as efficiently as possible.

Encourage mixed-use, compact, pedestrian-oriented development at the installation

Facilitate multi-modal transportation to reduce personal vehicle use

Incorporate LID techniques into landscape design and stormwater management

The *Federal Elements* of the *Comprehensive Plan* developed by NCPC, along with a number of executive orders, existing laws, and policies also supports the planning principles of encouraging sustainable communities, transportation connectivity, historic preservation, waterfront accessibility, and preservation of recreation spaces. The JBAB Master Plan goals and objectives are in concert with the region's development policies identified in the *Federal Elements* of the *Comprehensive Plan* and other federal regulations and mandates.

The planning goals in this section represent the broad physical design directions to ensure the Master Plan is achieving the desired long-term intentions for an efficient and effective installation that offers a high quality of life for its population. Each is addressed by several specific objectives about the types of actions that should be taken to achieve the desired result. The goals and objectives are presented blow.

- **Organize functions to maximize mission effectiveness and efficiency.**
  - Retain the primary functional relationship while refining the existing development pattern and circulation network to favor pedestrian and bicycle travel over vehicular travel.
  - Identify potential development parcels to increase development density, relocate some uses over time as the need for facility investments arise, and consolidate functionally related facilities and activities together to encourage compact development.
  - Develop shared parking lots and, where possible, plan structured parking in conjunction with future development to conserve land resources for future development.
  - Encourage mixed-use, compact, pedestrian-oriented development near future transit hubs and identified development focus areas.
- **Foster multi-modal transportation.**
  - Provide users access to options including commuter ferry, shuttle services, public transit, bicycling, and walking and connect internal transportation network with external routes.
  - Operate internal transit-shuttle service at consistent 15- to 30-minute headways when funding becomes available.
  - Reduce parking inventory to the extent feasible in the short term and manage the installation's parking capacity in line with internal and external improvements and mission requirements over the long term to facilitate multi-modal transportation and reduce personal vehicle use.

- **Integrate sustainable practices into daily operations and future development.**
  - Repair and upgrade installation infrastructure for stormwater management and energy efficiency.
  - Incorporate LID techniques into landscape design and stormwater management
  - Reduce impervious surfaces and development along the waterfront and within the 100-year flood zones over time to minimize flood hazards on the Anacostia side.
  - Incorporate on-site renewable energy production, such as solar power and ground source heat, into building and site design, particularly in the designated Industrial area.
- **Enhance green space and amenities for people who live, work, or visit JBAB.**
  - Create a continuous greenway/open space buffer along the entire waterfront by removing impervious surfaces and development on the Anacostia side within 200 to 300 feet of the shoreline.
  - Rebuild connections between the currently disjointed waterfront trails and establish a network of linear north-south and east-west "park-like" corridors to foster walking, recreation, and connectivity to the waterfront.
  - Implement a tree planting plan to increase the overall tree canopy on base.
  - Enhance installation-wide landscape design to create a cohesive installation appearance.
  - Program and design appropriate recreational uses at the installation
  - Maintain an open space level of service at a minimum of two acres per 1,000 residents.
- **Enhance the long term viability of historic resources to embrace the history of the installation.**
  - Protect and preserve the originality and integrity of the Bolling AFB Historic District.
  - Adaptively reuse existing historic facilities.

Incorporate on-site renewable energy production and energy conservation strategies into building and site design

Enhance waterfront green space and amenities by incorporating new recreational uses and increasing tree canopies

Protect and preserve the originality of integrity of the installation's historic district and adaptively reuse existing historic facilities

3.4 Land Use Framework Plan

3.4.1 Emerging Conditions

The Land Use Framework Plan is adapted from the RIMP and the 2010 JBAB Draft Master Plan to reflect the current planning considerations, emerging conditions, and planned projects internally and externally.

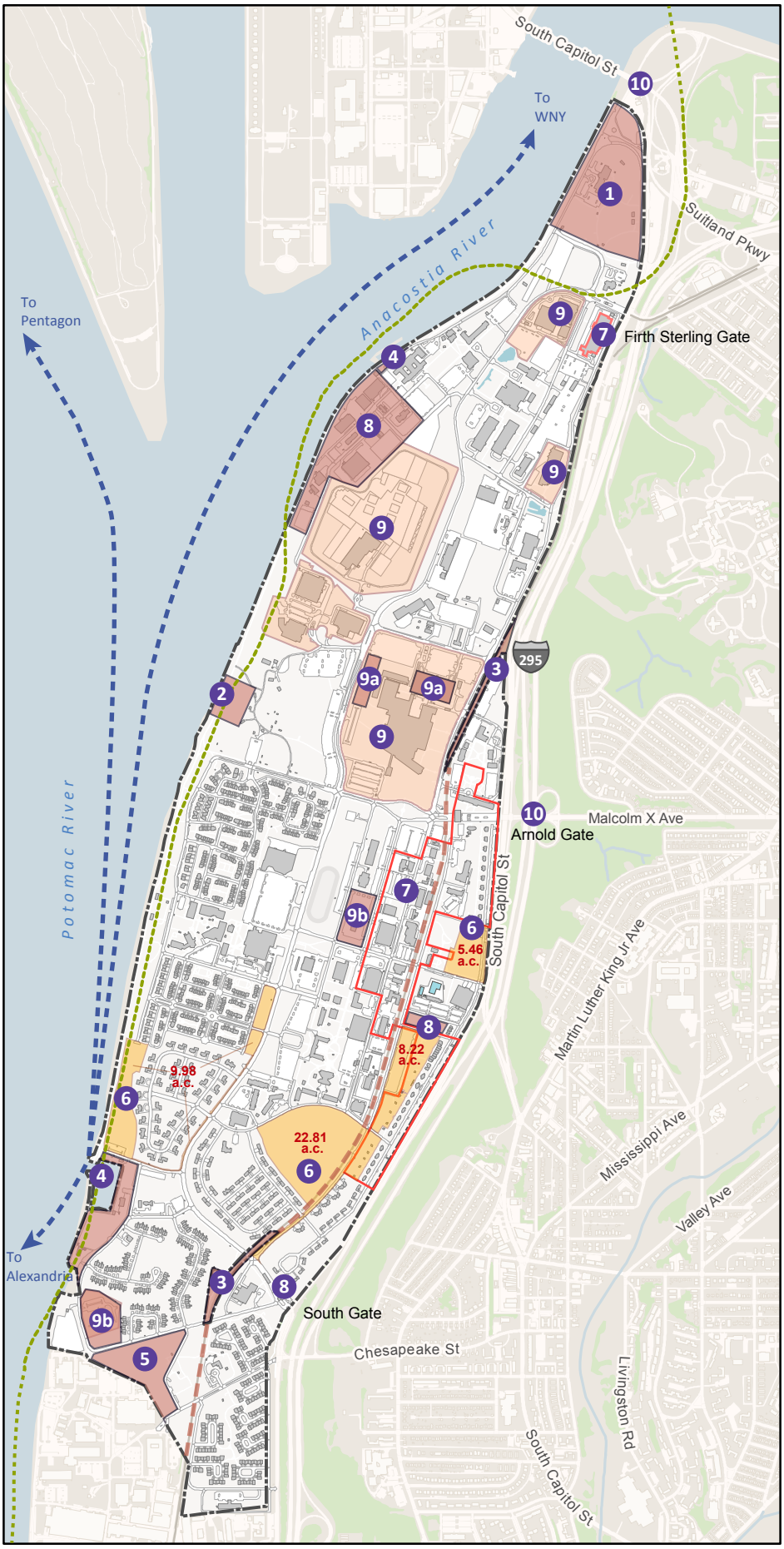
As of February 2014, no significant mission changes or tenant movements are expected to occur at JBAB in the short term. Due to an overall reduction in defense funding, DoD has called for more disciplined use of resources through better business practices and organizational streamlining in the long term. In this context, JBAB's primary land use composition and functional relationship are not expected to change in the foreseeable future, which reflects the envisioned continuation of the current mission functions:

- Family and Bachelor Housing and part of the Base Support functions will stay concentrated on the south side.
- Mission/Administrative, Airfield Operations, Industrial, and some Base Support functions will remain at the installation center and the north side.
- The Open Space/Outdoor Recreation use will be strengthened along the installation's riverfront.

Other emerging land use considerations are indicated in Map 3-1 and explained as follows.

1. JBAB is planning to relocate CDC III to the center of the installation when funds are available so that developable land is available on the north to accommodate a possible mail screening facility and the truck screening functions currently located at the South Gate.
2. DC Water's Anacostia River Tunnel Project being constructed along JBAB's shoreline uses a subterranean easement of 40 feet wide. The project also requires the construction of an overflow structure, diversion structure, and 62-foot diameter drop shaft near the existing ballfields at JBAB. The overflow structure is designed with an waterfront promenade and an overlook platform facing the Potomac River.
3. The Navy would like to acquire the CSX parcel within the JBAB perimeter so that future development at this location will not be impaired.
4. JBAB is looking into cooperation with local ferry operators to make use of its convenient water access, providing commuter ferry service among Alexandria, the installation, and the WNY in a pilot program for installation residents and employees to cross the river. If the pilot proves feasible, the ferry service will include a stop at the Pentagon. The permanent commuter ferry service at JBAB will need a high capacity docking location and a secured waterfront pedestrian gate. The preferred docking area is at the installation marina.
5. JBAB has prepared a Business Plan to construct a Recreational Vehicle (RV) park between the communities of Bellevue Housing and Doolittle Park. The RV park will feature a camp center with office, restrooms, lounge, showers, and laundry. It will be managed as part of the JBAB Outdoor Recreation Program. This project has received Preliminary site approval. Further archeological review is needed.
6. The land where the family housing is located is leased to private entities through Public Private Venture. As of 2013, the land use rights for 46.47 acres of land will be returned to the government and open to new development by JBAB.
7. Buildings individually eligible for NRHP listing and the Bolling AFB Historic District and its contributing structures should be maintained, protected, and preserved following the procedures in the latest ICRMP and in compliance with Section 106 of the NHPA.
8. Buildings 29, 53, 97, 106, 445, 471, 602, 5797, 6001 and Pavilion 38 are slated for demolition when funds are available. Any permanent replacement to be planned in the future will be constructed outside of the 100-year flood zones as illustrated in Map 2-10, which is subject to change depending upon the seawall and levee re-certification by USACE.
9. A number of tenants at JBAB conduct high-level security activities at JBAB within individual restricted access areas. These tenants have different reporting structures and operate independently from the host installation. The known land use and facility changes from these tenants include:
    - 9a. Within the next five years, DIA plans to build a three-level parking structure for 600 vehicles within its restricted access area in order to replace its existing 934-space garage that has significant structural deficiencies.
    - 9b. JADOC personnel will move from trailers near the running track into its new facility at the southern end of the installation in 2013. JADOC has a plan in place to build an addition (Phase Two) to its Phase One facility in the next five to 10 years. However, the project is not currently funded.
10. The new South Capitol Street Bridge would be constructed by 2018 outside the northern tip of the installation. The interchange of I-295 and Malcolm X Avenue will also be modified during the same time frame to better accommodate DHS development at St. Elizabeths. With the new traffic pattern emerging outside the installation, JBAB's gates are also expected to be evaluated for improvements.

MAP 3-1: LAND USE CONSIDERATIONS



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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3.4.2 Developable Area Plan

Although the general land use composition will not change, a finer grain land use analysis suggests that certain parcels at JBAB are more suited for new construction or redevelopment when taking into account all identified development constraints and emerging considerations. These areas are development opportunities that can be evaluated to address specific programmatic needs when a project is identified. Areas that offer opportunities for new construction or redevelopment include:

- Obsolete or temporary structures planned for demolition.
- Scattered or isolated functions that can benefit from consolidation.
- Under-utilized parking areas.
- Undeveloped, level areas in proximity to existing infrastructure and facilities.
- CSX parcels within JBAB perimeter that may be acquired by the Navy.

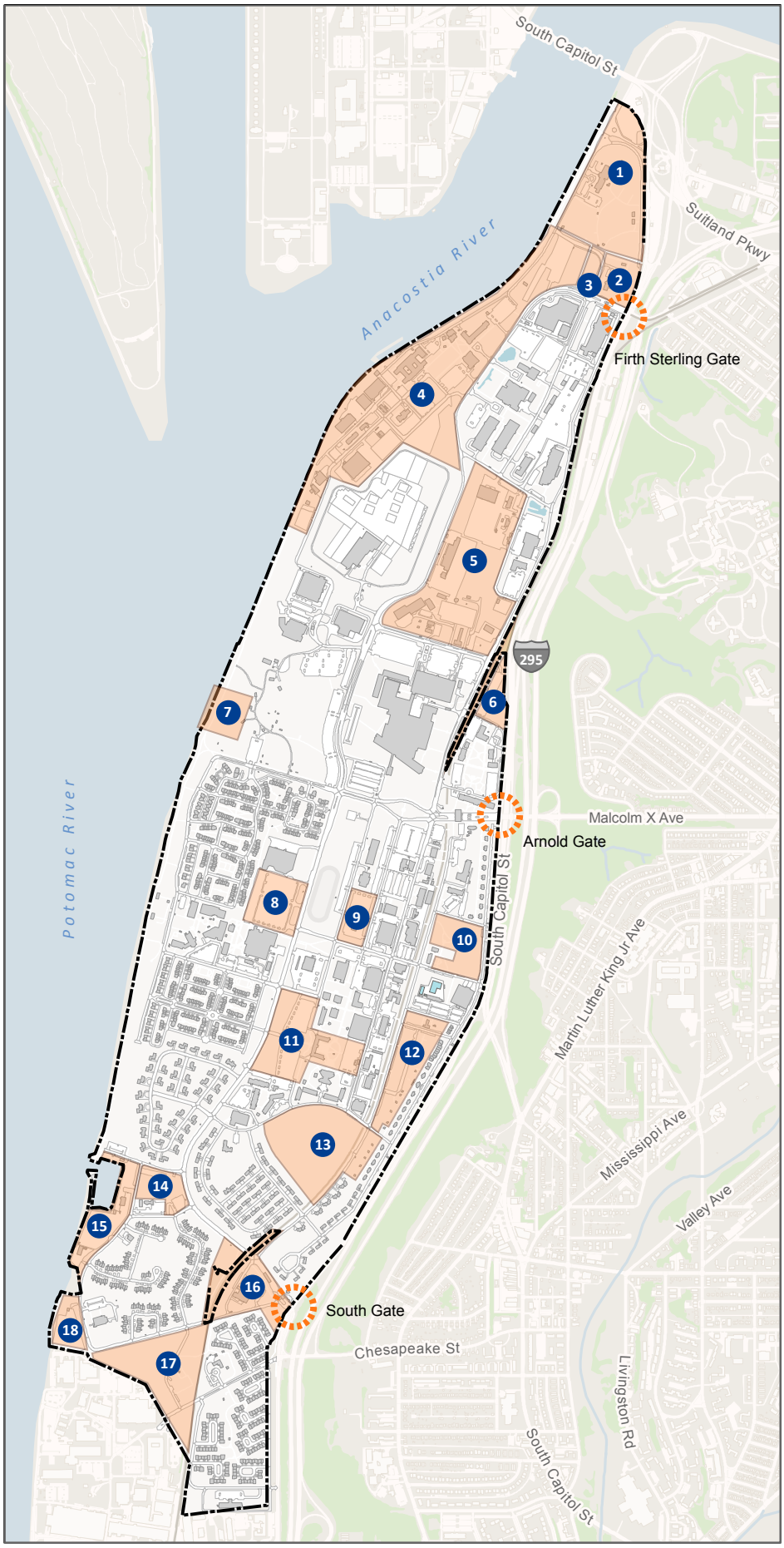
To provide both the short term and long term guidance for future development at JBAB, the Developable Area Plan (Map 3-2) illustrates potential development and redevelopment parcels. A detailed Developable Area Matrix (Table 3-1) is created to note acceptable uses to be considered on each parcel. The intent is not to suggest that all the parcels should be developed; instead, when new projects come forward, the Developable Area Plan and Developable Area Matrix can provide guidance to evaluate these projects in terms of land use and placement, which will help determine the best location for proposed facilities. This process reinforces the long-term land use designations and supports potential growth in the future.

The potential development parcels 1, 2, 3, 4, 5, 15, and 18 are currently located within 100-year floodplain (Figure 2-25). The extent to which these parcels are in the floodplain will be determined by FEMA when the seawall and levee are repaired and recertified by USACE in the future (most likely in five years). Before that, new development in these parcels must be compatible with flooding (such as recreational uses), or encompass buildings to be designed as flood-resistant (such as buildings with no mechanical equipment on the ground floor and the lowest occupied floor outside the 100-year floodplain).

TABLE 3-1: DEVELOPABLE AREA MATRIX

Parcel Number	Recommended Land Use	Factors to Consider
1	Open Space/Outdoor Recreation, Industrial, Base Support — Gate Security Inspection Area	South Capitol Street Bridge by DDOT. Existing North Gate. Floodplain. Land use change approved by Installation Commanding Officer (ICO) in April 2013.
2	Base Support — Firth Sterling Gate Improvement Area	Gate circulation, potential transit hub and security requirement. Floodplain.
3	Base Support — Transit Hub	Firth Sterling Gate circulation and multi-modal transportation in coordination with DC Streetcar stop. Floodplain.
4	Base Support, Mission/Administrative, and Open Space/ Recreation	Facilities slated for demolition and replacement. Functions to be consolidated to the center of the installation. Floodplain. Land use change approved by ICO in April 2013.
5	Industrial	Consolidation of vehicle storage and maintenance facilities. Location for solar panels. Floodplain.
6	Base Support — Transit Hub	Future streetcar stop. CSX railroad easement ownership. Land use change approved by ICO in April 2013.
7	Open Space/Outdoor Recreation	DC Water tunnel project. MWR Amphitheater.
8	Base Support	Customer parking. Additional commercial functions in the future.
9	Base Support, Mission/Administrative	Vacant site after JADOC relocation.
10	Base Support	Bolling AFB Historic District nearby. User right of part of the parcel to be returned to JBAB by private entities.
11	Base Support, Housing, and Mission/Administrative	Deteriorated facility in need of replacement. Installation-wide consolidation of bachelor housing. Land use change approved by ICO in April 2013.
12	Base Support, Housing, Mission/Administrative, Open Space/Outdoor Recreation	Bolling AFB Historic District nearby. Land use right to be returned to JBAB by private entities.
13	Base Support, Housing, Mission/Administrative, Open Space/Outdoor Recreation	Surrounding family housing. Land use change approved by ICO in April 2013. Land use right to be returned to JBAB by private entities.
14	Base Support, Mission/Administrative, Open Space/ Outdoor Recreation	Existing family housing, open space, and Mission/Administrative facilities nearby. Floodplain.
15	Base Support — Transit Hub, Mission/Administrative, Open Space/Outdoor Recreation	Commuter ferry service. Floodplain. Potential memorial opportunity identified in NCPC's Memorials and Museum Master Plan (2001). Land use change approved by ICO in April 2013.
16	Base Support, Open Space/Outdoor Recreation	Family housing nearby, and South Gate and associated security requirements.
17	Open Space/Outdoor Recreation	Existing family housing and Mission/Administrative facilities nearby. Land use change approved by ICO in April 2013.
18	Base Support, Mission/Administrative, Open Space/ Outdoor Recreation	Underground contamination.

MAP 3-2: DEVELOPABLE AREA PLAN



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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3.4.3 Future Land Use Plan

The Future Land Use Plan (Map 3-3) provides a long-term vision for JBAB's development, which will help direct future detailed planning and design efforts. As the current missions and tenants are expected to remain at JBAB in the long term, there will be no changes to most land use areas. However, a few sites, as shown in the Developable Area Plan (Map 3-2), has been identified as where future functions, including Mission/Administrative, Base Support, Housing, Temporary Lodging, and Open Space/Outdoor Recreation, are mostly likely to occur (see Section 2.1 for the definitions of these land use categories). The Future Land Use Plan (Map 3-3) therefore adjusts the Existing Land Use Plan (Map 2-11) to reflect site opportunities for future developments or redevelopments. Major land use changes are detailed as follows.

- **Family and Bachelor Housing:** The housing functions located on the Anacostia side will be relocated and consolidated with housing functions on the Bolling side. In addition, the land use right for 46.47 acres of privatized family housing areas will be returned to the government and open to new development by JBAB.
- **Industrial:** Scattered industrial functions will be consolidated to the major industrial area east of Defense Boulevard.
- **Open Space/Outdoor Recreation:** A 200- to 300-foot continuous greenway/open space buffer will be created along the waterfront and JBAB will keep the open space level of service at a minimum of two acres per 1,000 residents.
- **Mixed Use:** This new land use category can also be called Flex Use. It is created for areas that can be used for a variety of approved functions in the future. Some of these sites are large enough to accommodate a combination of different uses, while some smaller sites are surrounded by more than one type of functions, therefore can be developed into any of the surrounding uses when the need for a specific program arises. This Mixed Use designation allows for flexibility in future development.
  - As the waterfront area on the Anacsotia side has a number of aging facilities and some of them are slated for demolition, the functions currently housed in these facilities will be relocated and consolidated with similar functions at the inland area of the installation over time. The waterfront site will then be open for new uses including a 200 to 300-foot wide continuous greenway/ open space and low density development compatible with all natural and man-made constraints.
  - *Central Development Focus Area:* This overlay district is delineated as the primary area to consolidate bachelor housing, public goods, and commercial services, such as food services and cafeterias, gyms, banks, travel offices, Base Exchange, Commissary, barbershops, open space, indoor and outdoor recreation, CDCs, and similar commercial and support uses. An Area Development Plan will be prepared in the future to further plan and design this area to ensure compact, mixed-use, pedestrian-oriented development.
  - The Navy would like to acquire the CSX parcels within JBAB perimeter, so additional 3.65 acres will be added to the total JBAB land use acreage when compared with the existing land use areas.
  - Three sites will be dedicated to future transit hubs. The site on the south-side of the marina has been identified as a potential waterfront memorial site by the NCPC Memorials and Museums Master Plan (2001). Future development on this site will require coordination between NCPC and the installation.
  - Additional land near the Firth Sterling Gate and South Gate will be reserved for future gate improvements.

Table 3-2 provides a breakdown of land area by future use.

TABLE 3-2: FUTURE LAND USE ACREAGE DISTRIBUTION

Land Use	Total Acreage	% of Total
Airfield Operations	42.80	4.41
Family and Bachelor Housing	213.18	21.98
Industrial/Logistics	55.74	5.75
Mission/Administrative	175.12	18.06
Mixed Use	335.68	34.62
Open Space/Outdoor Recreation	143.36	14.78
Port Operations	0.23	0.02
Temporary Lodging	3.71	0.38
Total	969.65	100

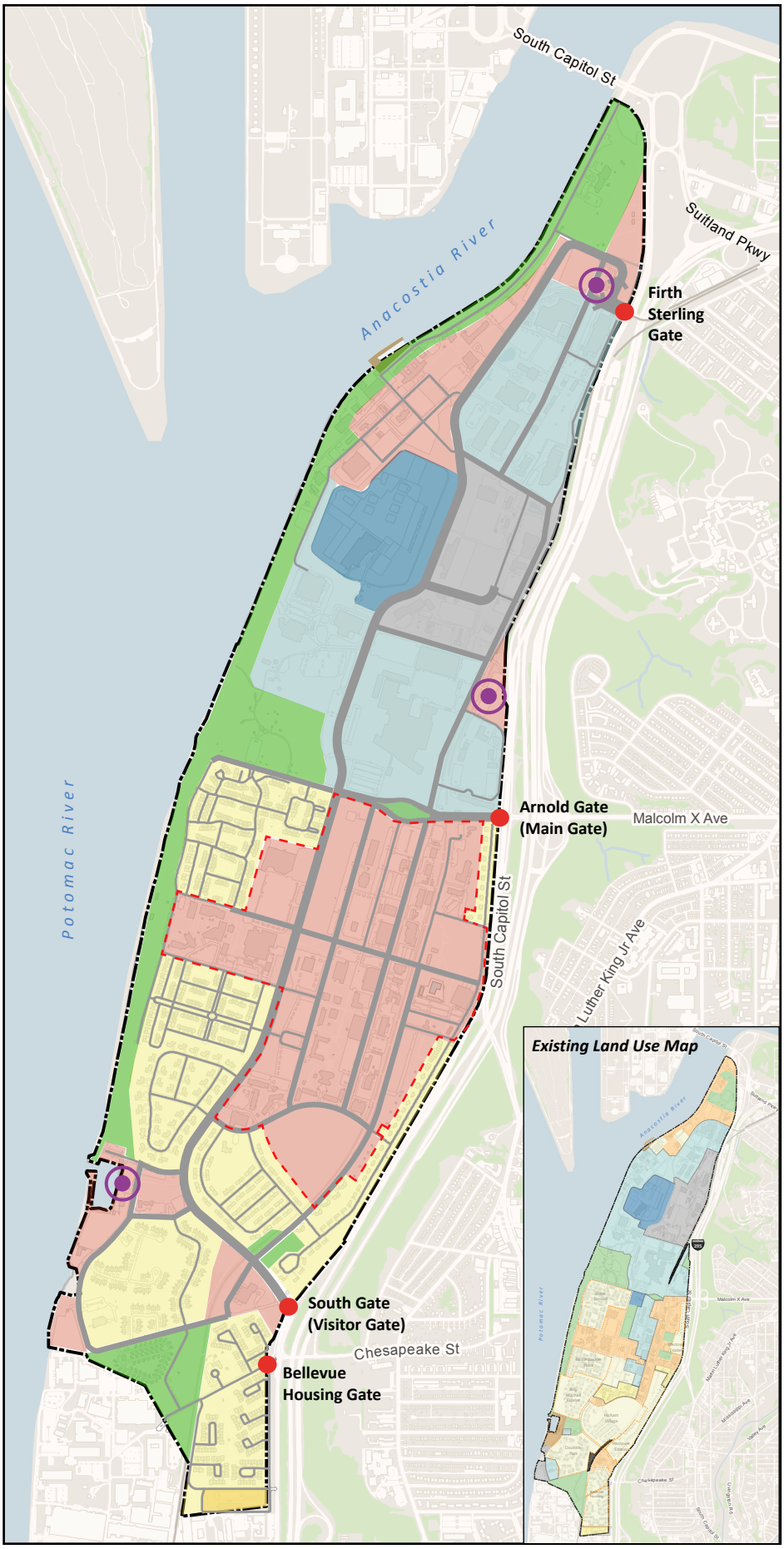
Sources: NAVFAC Washington 2013; Washington, D.C., GIS, 2013; ESRI - StreetMap, 2012.

3.4.4 Future Land Use Recommendations

- In light of the military budget reduction in recent years, the short-term population growth, if it occurs, will be absorbed into existing facilities through strategic moves and efficient reuse of space in compliance with the NF MILCON Moratorium issued by the DON on September 19, 2010.
- Longer-term growth will be accommodated with infill development as a means of increasing density and leveraging existing buildings and infrastructure.
- Existing facilities and operations that are not conforming to the future land use designation will be grandfathered in until they outlive their useful life or purpose, and then be phased out appropriately. Uses that are proposed within these areas but are not related to the designated uses should be evaluated carefully before implementation. Use redevelopment as a catalyst for modernizing aging infrastructure and buildings.
- Existing underutilized parking lots are ideal sites for new development or new parking structures. Encouraging future development on or near underutilized parking areas helps conserve valuable land resources at the installation.

MAP 3-3: FUTURE LAND USE FRAMEWORK

- Installation Boundary
- Airfield Operations
- Family and Bachelor Housing
- Industrial
- Mission/Administrative
- Open Space/Outdoor Recreation
- Port Operations
- Temporary Lodging
- Mixed Use (Flex Use)
- Central Development Focus Area
- Road Network
- Installation Gate
- Transit Hub



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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3.5 Circulation Framework Plan

The circulation system has a significant influence on the physical development of an installation and consequently on its visual character. The goal of the transportation improvements and strategies proposed in this Master Plan is to create a safe, well connected, and easily navigated installation with a variety of transportation alternatives to reduce the installation's reliance on SOVs.

To achieve this goal, the JBAB Installation Master Plan and TMP lay out a series of strategies and recommendations to support the use of on-base transit, shuttle service, and carpool/vanpool ridership. These strategies are tied to physical and policy recommendations that will help reduce car usage, improve other overall sustainability measures of the installation, and meet the long term federal policy goals.

Vehicular Access and Circulation

As discussed in Chapter 2, significant population growth is projected in Southwest and Southeast D.C. in the next 20 years. Multiple land development and transportation improvement projects will occur in the vicinity of JBAB. The Vehicular Access and Circulation Framework Plan (Map 3-4) recognizes the impacts of these projects and proposes the following strategies:

- Improve the installation's interface with local traffic and provide adequate space for improved security.

  1. As the new alignment of the South Capitol Street Bridge will change local traffic route and pattern outside JBAB, future status of the existing North Gate will be evaluated to determine the best course of action. In addition, a majority of warehouses and industrial uses are located within the northern portion of JBAB. To reduce the overall truck traffic throughout the installation and promote a more pedestrian friendly environment, the Master Plan proposes to shift the truck screening facility to the north. A new North Gate may replace the existing to include a dedicated truck inspection area with multiple inspection stations that allow for proper setbacks from existing facilities. The potential location of the new North Gate needs to coordinate with the new South Capitol Street corridor alignment in order to determine the best course of action.

  2. Reconfigure the Firth Sterling Gate to provide adequate on-site space for stacking of vehicles. The new gate configuration will take into account both the internal vehicular circulation and the outside improvements resulting from the new South Capitol Street Bridge and the DHS St. Elizabeths development. This project will not be implemented until the surrounding road construction is complete.

  3. Coordinate with DHS on the specific design of the I-295/Malcolm X interchange while evaluating the needs to improve the Arnold Gate based on the new traffic flow occurring outside the installation during the next five years.

  4. After shifting the truck inspection functions to the north, improve the South Gate to comply with the AT/FP requirements that are not achievable with the current gate configuration. Redesign the circulation routes near the South Gate to reestablish simple, direct, two-way street functions. Two-way traffic will reduce confusion, promote efficiency of travel, and not significantly compromise levels of service for vehicular operations in this area. Further analysis is recommended. This improvement will be contingent on the reconfigurations of the North Gate.

- Strengthen the existing grid road network. The road system at JBAB is based on a loose grid with variations conforming to land constraints. To promote clarity and simplicity for the overall road network, the Vehicular Access and Circulation Framework Plan proposes a few road extensions:

  5. Extend the Firth Sterling Gate access road further west to the local road along the waterfront, which will provide easy and direct access to the waterfront area.

  6. Extend McChord Street further west through the parking area between the Base Exchange and Commissary to the family housing area. The specific design including traffic calming measures will need to be worked out in close coordination with the Base Exchange and Commissary as well as adjacent users. The new corridor would help create a stronger grid network, reduce traffic channelization, and facilitate connection between the waterfront and other areas of the installation.

  7. Extend Thomas Road west to the waterfront pier to facilitate access to potential development on the waterfront.

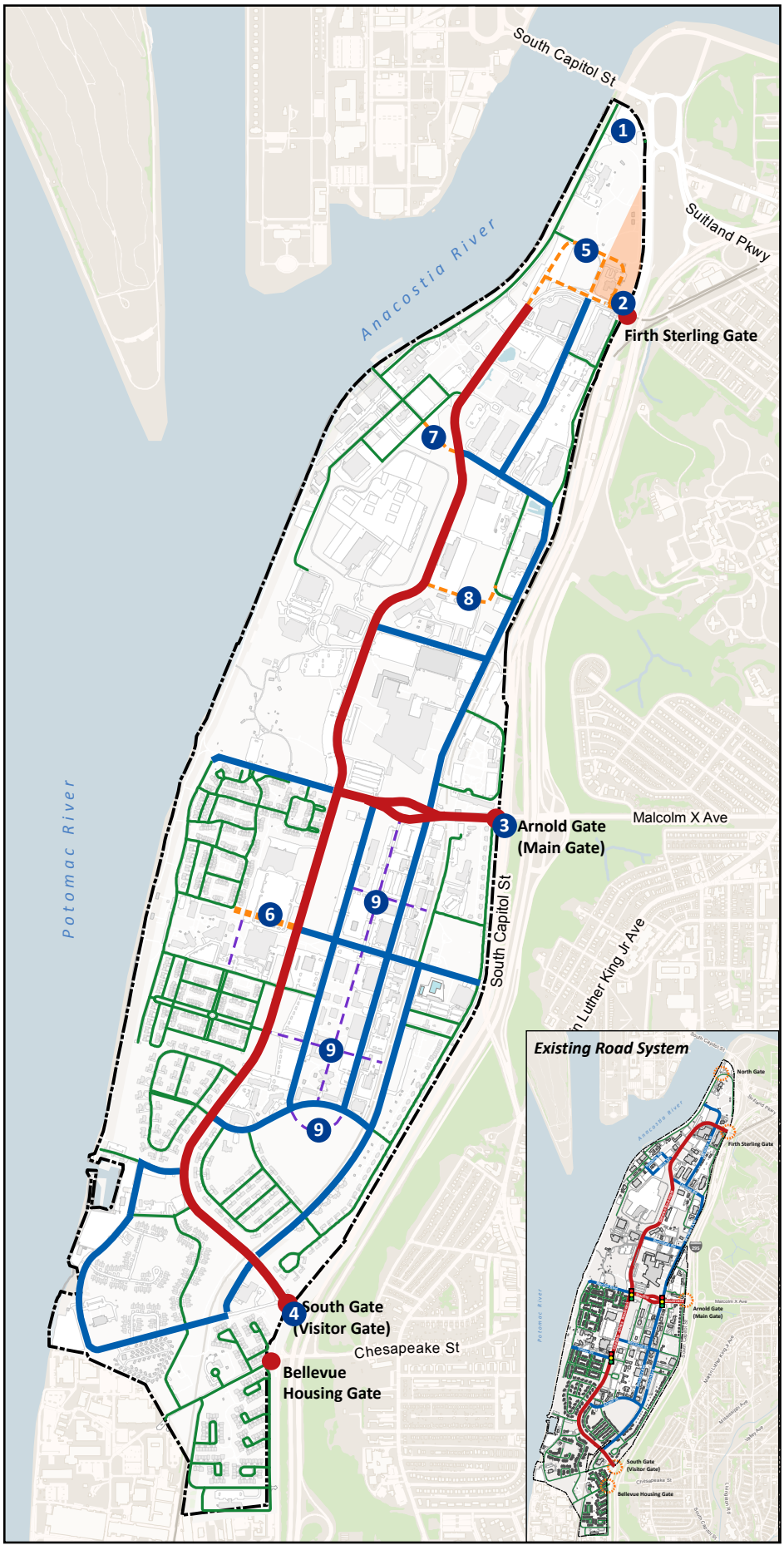
  8. Create an additional access road within the industrial area to facilitate its internal access and development.

- To reduce the negative effects of motor vehicle use at the installation, employ traffic calming measures, such as raised crosswalks, stamped pavement, and bulb-outs, to increase safety and the perception of safety for pedestrians and bicyclists. Traffic circles and roundabouts, when properly located and designed, can also be beneficial in reducing traffic speeds and energy use by traffic signals. A comprehensive traffic analysis is recommended to determine where these measures should be applied.

9. Restrict vehicular access to emergency vehicles only in the corridors that will be dedicated to pedestrian use.

MAP 3-4: VEHICULAR ACCESS AND CIRCULATION FRAMEWORK PLAN

- Installation Boundary
- Primary Road
- Secondary Road
- Local Road
- Future Road
- Corridors Restricted to Emergency Vehicles Only
- Truck Inspection / Security Check Area



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Multi-Modal Circulation

Transportation strategies must go beyond the automobile. JBAB recognizes the need to become less auto-centric and has been coordinating with DDOT, DHS, and local transit service providers for possibilities to expand the installation's multi-modal transportation system. By providing transportation alternatives, JBAB can work toward decreasing the overall total number of vehicle miles traveled, thereby reducing the demand for parking spaces and limiting carbon emissions.

The Multi-modal Circulation Framework Plan (Map 3-5) is based on the following strategies:

- **Ferry Service:** Cooperate with local ferry operators to conduct a pilot program to provide ferry service between JBAB, Alexandria, and the WNY for installation residents and employees. If the proposed pilot program proves feasible, explore the potential to establish and expand permanent ferry service to the Pentagon. Improve the installation marina area to include a high capacity docking location and a secured waterfront pedestrian gate. On-site shuttle service connecting to other areas of the installation will also be provided.
- **DC Streetcar:** DC Streetcar service outside JBAB's Firth Sterling Gate will be operational in the year of 2015 or 2016. In the long term, the Streetcar service will be extended along South Capitol Street with a new stop possibly outside the DIA Complex or the Arnold Gate. JBAB will continue to coordinate with DDOT on the DC Streetcar destination to improve the installation's access to public transit.
- **Metrobus/DC Circulator:** JBAB will coordinate with local bus service providers to bring potential Metrobus or DC Circulator service through the installation. Should these buses operate inside JBAB, a security officer will board all buses upon entry to the installation and allow only Common Access Card card-carrying riders to disembark on the installation. The officer will leave the buses upon exiting the installation. The implementation of this service will be contingent on funding for additional security personnel and bus services. Further study is recommended for detailed security procedures and bus services within the installation.
- **Transit Hubs:** Create transit hubs with expanded infrastructure and ancillary facilities at the Firth Sterling Gate, the parcel east of the DIA Complex, and the installation marina. These transit hubs will accommodate more than one transit choice, such as shuttle bus, ferry, DC Streetcar, bike facilities, and carpool/vanpool drop-off areas. The intent of these transit hubs is to provide a connected network of transit choices within convenient walking distance for transfers or travel.
  - The proposed transit hub at the installation marina will also benefit NRL employees who want to use JBAB's ferry service. A pedestrian turnstile with access only for NRL employees can be installed at NRL's North Gate, which is currently used for emergency purpose only. Since NRL has more stringent security requirements than JBAB, future use and modification of this gate will be determined by NRL.
  - The site on the south-side of the marina has been identified as a potential waterfront memorial site by the NCPC Memorials and Museums Master Plan (2001). Future development on this site will require coordination between NCPC and the installation.
- **Cross-Agency Shuttles:**
  - Coordinate with DHS for a shared shuttle bus service among the Anacostia Metrorail Station, JBAB, and DHS St. Elizabeths campus. DHS is working on an agreement with WMATA to extend some bus routes from the Anacostia Metrorail station to St. Elizabeths West Campus. DHS acknowledges the possibility to include up to two stops adjacent to JBAB in its shuttle loop service. The Master Plan proposes stops outside the Firth Sterling Gate after its reconfiguration and the future transit hub east to the DIA complex. In the future, should these shuttle buses come onto the installation, JBAB would need to implement separate procedures for security checks.
  - Coordinate with GSA to explore new and emerging opportunities in the long term for a shared federal government-wide shuttle service that can grant JBAB employees more access to Metrorail and bus systems.
- **JBAB Shuttle:**
  - Provide an internal installation shuttle service at consistent 15- to 30- minute headways to facilitate internal circulation without private vehicle use. Although there are several DoD operated shuttles providing service from certain locations on JBAB to other areas in the region, these shuttle services within the installation are not frequent and reliable enough to support employee travel on-base. The installation would benefit from a dedicated internal shuttle service network as recommended by the Multi-modal Circulation Framework Plan. The implementation of this service and use of low-emission shuttles will be contingent on funding. Further study is recommended.
  - Seek regional support for a more comprehensive shuttle service for its personnel to nearby Metrorail stations and other NDW installations. NAVFAC has initiated a shuttle study to provide technical and strategic analytic services to improve shuttle operations in the NCR. Shuttle routes and an associated implementation plan will be explored in greater detail in NAVFAC's shuttle study "NDW Regional Transportation Analysis, Requirements, and Planning".
  - If future rounds of BRAC result in significant personnel increase at JBAB, the installation will request BRAC funding for additional shuttle services.

MAP 3-5: MULTI-MODAL CIRCULATION FRAMEWORK PLAN

- Installation Boundary
- Potential Ferry Service Route
- DC Streetcar Route and Stop
- Potential JBAB-DHS Shuttle Bus Route with Stops at Pedestrian Gates
- JBAB Internal Shuttle and Stop
- Future Multi-modal Transit Hub
- Proposed Internal Bike Route
- Multi-Use Trail
- Pedestrian-Only Corridor
- Existing Local Off-Street Trail
- Planned Local Off-Street Trail

Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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- **Bicycle Facilities:** Riding a bicycle is considered to be one of the healthiest and most sustainable modes of transportation. D.C. has promoted safe and convenient bicycle use throughout the city. To increase bicycle use and ensure riders' safety, the Master Plan proposes the following bicycle facility improvements:
  - Create a network of shared bicycle lanes with improved signage and markings. The proposed bicycle route on Map 3-5 would require reduction of 129 on-street parking spaces on Brookley Avenue, Duncan Avenue, and Mitscher Road for adequate road width and travel safety. The bicycle route will also extend to connect with the off-street trail planned by the city along South Capitol Street and along Firth Sterling Avenue as well as the Anacostia riverwalk trail outside the northern tip of the installation.
  - In the long term, improve the waterfront trail to form a continuous multi-use trail along the entire JBAB waterfront that comfortably accommodates both pedestrians and bicyclists.
  - Provide installation population access to bicycle sharing and rental programs to increase mobility on-base and reduce dependence on motor vehicles. Options include establishing an installation-operated bikeshare program or working with DDOT to expand the city's bikeshare program into JBAB.
  - Incorporate bicycle storage facilities into the proposed transit hubs and future new constructions.

Pedestrian Circulation

Walkability is an important indicator of how friendly the built environment is to the people living, visiting, or working in an area. At JBAB, sidewalk and crosswalk conditions vary throughout the installation. Due to the fact that pedestrian improvements can be developed in coordination with planned buildings or as individual improvement projects when they are funded, the Master Plan developed the following guidelines for future improvements:

- Provide continuous sidewalks on both sides of streets; include a planting strip along the curb to physically and psychologically separate pedestrian circulation from vehicular traffic.
- Install traffic calming elements, such as raised crosswalks, stamped pavement, and bump-outs, to address pedestrian safety concerns.
- Create pedestrian-only corridors in the Central Development Focus Area to reduce pedestrian and vehicular conflicts and minimize the needs for AT/FP setbacks. Pedestrian corridors should be separated from vehicular traffic by trees, grass, or medians and are wide enough to accommodate multiple users.
- For multi-use trails that are to be shared by pedestrians and bicyclists, provide separate paths for pedestrians and bicycles along the same corridor if space allows. Walk zones should be clearly marked to reduce pedestrian and bicycle conflicts.
- Create an efficient pedestrian network between buildings and different areas of the installation; reduce potential for worn "shortcut" paths.
- Ensure universally accessible design for all users, including physically impaired or challenged people.
- Take into account the quality of the pedestrian experience. Pedestrian ways should be shaded and include site furnishings such as seating areas, trash receptacles, wayfinding signage, and pedestrian lights at regular intervals.
- Align the pedestrian network with the multi-modal circulation system. JBAB covers an area more than three miles long. Enabling a synergy will help improve and increase use of these networks as well as overall circulation on the installation.

Appendix E.3 provides more detailed information on a variety of transportation efficiency strategies, their application, and benefits.

Parking

The *Transportation Element* of the *Comprehensive Plan* establishes the parking ratio goal for federal facilities located within the "Historic District of Columbia Boundaries" as one parking space for every four employees (1:4). The assumption the parking ratio has been developed around is "This area is well served by transit ... Streets surrounding federal facilities are very walkable... Commercial parking is generally available."

As detailed in Appendix D, the area where JBAB is located, in spite of all the improvements and redevelopment in recent years, is still not adequately served by public transit and bicycle and pedestrian facilities. The overall transit availability and walkability inside and outside the installation are not consistent with the conditions defined in the "Historic District of Columbia Boundaries". A better category that fits the character of this area would be the "suburban area beyond 2,000 feet of Metrorail" that are "poorly served by transportation infrastructure, limiting the commuting options available to federal employees", where an appropriate parking ratio goal is 1:1.5.

An analysis of the 2012 Financially Constrained Long-Range Transportation Plan (CLRP) also indicates, given the limited transit projects planned - only DC Streetcar, no new HOV lanes, no expanded Metro systems - outside the installation by the year of 2040, JBAB commuters in the foreseeable future will not have the access to transit that are expected within the Historic District of Columbia Boundaries. The current CLRP projects are insufficient to dramatically improve

the transit situation for JBAB employees unless other new transit infrastructure, transit services, and HOV lanes become available in the next 30 years.

JBAB recognizes the need to strive for compliance with NCPC's goal to reduce employee parking spaces and reduce SOV trips in the region. However, single-family residential and open space/outdoor recreation are currently the largest land uses at JBAB. The low-density, low-development-intensity community character in the residential area is not expected to change due to land leases extending beyond the time frame of this Master Plan. In addition, about 85 percent of JBAB employees reside outside D.C. If using transit to commute, a majority of these employees would need at least three travel mode changes and possibly more transfers due to lack of convenient access to Metrorail and bus services in the vicinity of JBAB. Driving and then taking public transit between nearby counties or cities and JBAB can easily increase the total travel time by additional 40 to 50 minutes one way, doubling or even tripling the time needed by driving. In this situation, significant parking reduction within JBAB before effective and convenient transit choices become available in its surrounding area could adversely impact the installation's employee retention, work productivity, and mission operations. These issues are particularly detrimental for large tenants conducting high-level mission activities at JBAB.

While JBAB currently meets the 1:1.5 parking ratio that fits the underlying criteria upon which the NCPC parking ratios were based (distance from Metrorail and walking distance/ conditions), the installation as a large federal campus located at the nation's capital is willing to demonstrate both leadership and compliance in sustainability by working to achieve reasonable goals and objectives expected of federal properties.

In light of the drawing down of federal budgets in recent years, the time frame for local transportation improvements, and unforeseen mission requirements in the long term, JBAB proposes **a revised long-term parking ratio goal of 1:2** until transportation alternatives and transit-oriented development outside JBAB meet the condition expected within the "Historic District of Columbia Boundaries".

JBAB is coordinating with other federal and local agencies and stakeholders on different initiatives to improve local transportation. A TMP is also being prepared to encourage employee commuting by modes other than SOV. It is expected as the planned transportation improvements and better transit availability occur in the vicinity of JBAB, private vehicle use associated with the installation will be greatly reduced. In terms of future parking capacity management, JBAB will adopt a phased approach linked to planned improvements over time.

Five-Year Strategies

- Reduce employee parking supply by 10 percent (a total of 833 parking spaces) to achieve a parking ratio 1:1.86. See Map 3-6 on the next page.

  1. Replace the 934-space DIA parking structure, which is structurally deficient, with a new 600-space facility. This will result in a net reduction of 334 spaces.

  2. On-street parking will be limited to clearly marked parallel parking spaces. The proposed shared bicycle lane network would result in a net reduction of 129 on-street parking spaces on Brookley Avenue, Duncan Avenue, and Mitscher Road.

  3. After JADOC moves to its new facility at the southwest corner of the installation, designate its existing trailer office site and nearby 175 parking spaces for maintenance and operational use and evaluate their use when new development occurs on the site.

  4. Designate the 114 parking spaces in Giesboro Park as visitor-only parking for a new waterfront amphitheater.

  5. Replace 12 employee parking spaces with four parklets, which are small mobile urban parks with planters, benches, educational signage, and rain barrels.

  6. Designate 38 employee parking spaces around Buildings 97, 106, and 445, which are slated for demolition, to operational use and removing them when buildings are demolished.

  7. Building 29 will be demolished and replaced on an existing employee parking lot and Building 471 nearby will be also demolished. In total, 31 employee parking spaces will be removed from that area.

- As parking spaces are not always well distributed geographically, therefore the Master Plan recommends a parking inventory study and identification of parking usage rates for each lot so that underused areas can be identified for future removal or shared use with new development. Future development sites located near underused lots (within 1,200 feet walking distance) will be prioritized over sites located further away and near lots with higher utilization rates.

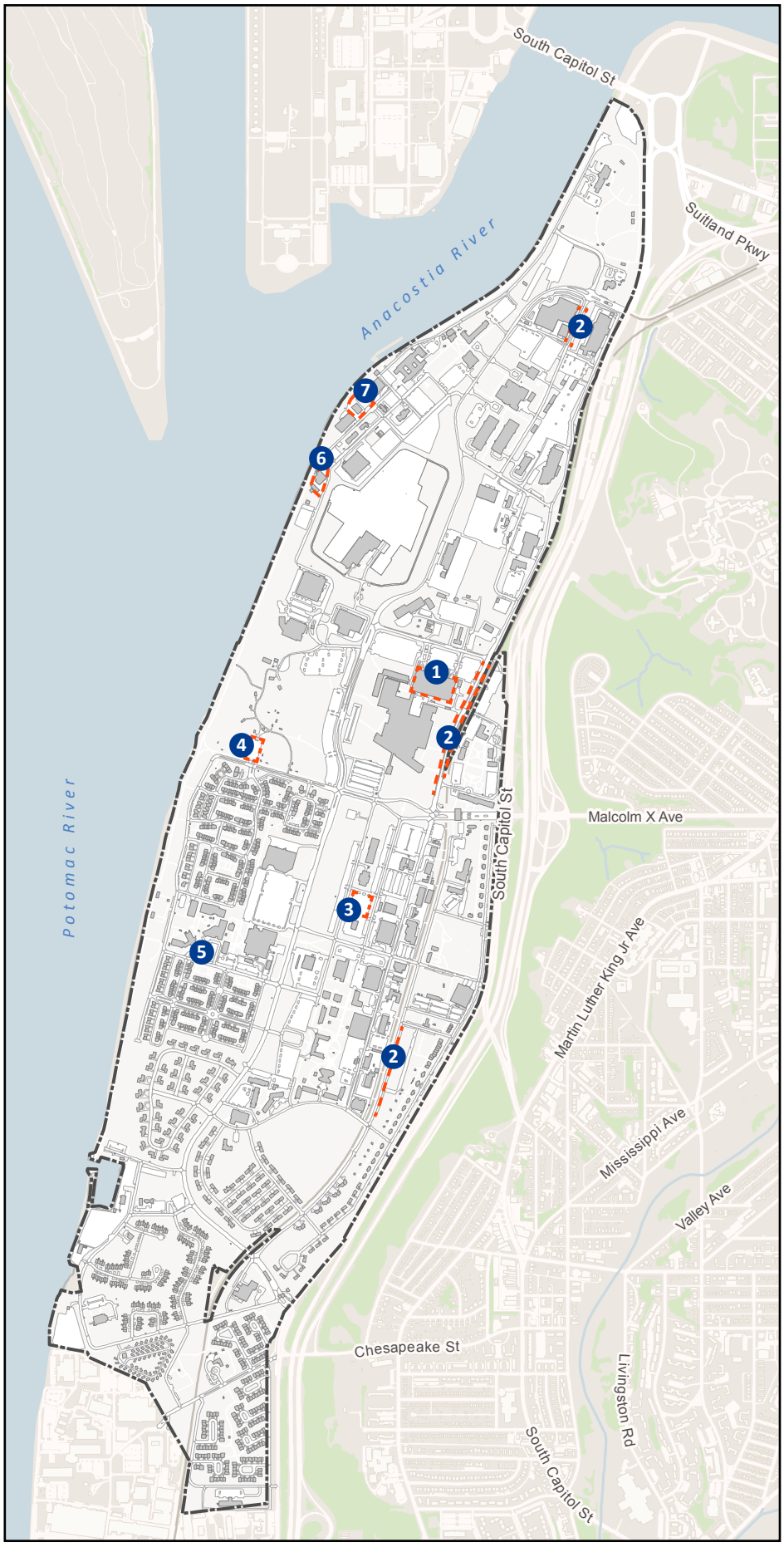
Long-Term Strategies

The long-term parking ratio improvement at JBAB will be based on the overall quality of available transit services and walking distances and conditions inside and outside the installation. Implementation of these strategies will be contingent on funding, mission requirements, and transportation improvement.

MAP 3-6: FIVE-YEAR PARKING REDUCTION AREAS

Installation Boundary

Employee Parking Reduction Area



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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- With the reconfiguration of the Firth Sterling Gate and the creation of three transit hubs near the Firth Sterling Gate, the parcel east of the DIA Complex, and installation marina, the current employee parking on these parcels will be replaced by security facilities, visitor parking, drop-off area, shuttle stops, bike stations, and functions alike.
- Encourage compact development with greater density at the Central Development Focus Area to make the best use of existing parking areas and reduce the needs for on-base vehicle trips. When new projects come to this area, the potential to reduce existing off-street parking areas will also be evaluated to promote a more pedestrian-friendly environment.
- Retrofit existing large parking areas to incorporate LID strategies, such as the area between the Base Exchange and Commissary and the area in front of the Blanchard Barracks. Although these parking lots are not used as employee parking, they are devoid of trees or pedestrian walkways. The Master Plan recommends retrofitting these parking lots when funding is available to reduce impervious surfaces and the overall number of parking spaces.
- The area northwest of the airfield contains a number of buildings slated for demolition. Their associated parking can also be removed when these functions are relocated and consolidated with similar functions. It is expected that the new parking areas can be more efficiently designed for shared use and with LID techniques.
- When new projects come to JBAB in the future, large or underused parking areas will be considered as potential development sites or used as shared parking with new development. Future development sites near these underused lots will also be prioritized over sites located further away or near lots with higher utilization rates.

By managing the installation's parking capacity in line with internal and external improvements, JBAB will continually coordinate with other federal and local agencies and organizations on different transportation initiatives. It is expected that as time goes by, new transit infrastructure, transit services, and HOV lanes will be available to better serve employees working at JBAB. In addition, ferry service and shuttle service may be implemented and/or expanded by DoD and GSA in the future to supplement public transit. Current DoD shuttles are not allowed to serve commuters due to existing regulations and laws; however, public demand and cooperation with lawmakers may make commuter shuttle service possible. Encouraging rideshare will also help achieve a lower ratio of SOV usage, reducing the overall number of vehicles on roads in the long term. The Navy will be working with DHS and other government agencies to lobby for adding HOV lanes on I-295 in the long term. All these efforts will eventually help JBAB achieve the 1:2 parking ratio goal in the long term.

Parking Design Guidelines - Future parking areas planned in conjunction with proposed building projects will be designed and enhanced using the following guidelines:

- Limit on-street parking to parallel parking spaces that include sufficient length and width in accordance with UFC 3-210-02 2-4(a) POV Site Circulation and Parking and UFC 2-100-01 2-6.1 Installation Master Planning.
- Locate parking between and behind buildings so that access to and use of the parking can be shared among neighboring facilities.
- Design access drives and parking spaces with appropriate dimensions to create efficient parking fields. Standard parking spaces should be nine feet by 18 feet with 24-foot drive aisles, yielding a typical parking bay of 60 feet in width. In retrofit projects, remove extraneous asphalt and replace with planting strips.
- Wherever feasible, install permeable pavement for surface lots to infiltrate storm water and eliminate standing water.
- Orient parking bays perpendicular to the facility for vehicular and pedestrian safety. Incorporate pedestrian walkways and crosswalks from parking areas to facility entries or designated pedestrian connections.
- Include bioswales, planting strips, and shade trees along the perimeter and within the interior of surface parking areas to minimize runoff, improve passive cooling, and increase pavement life.

Example of a parking lot designed with permeable pavers and rain garden

Provide continuous internal walkways within parking lots

3.6 Stormwater Management Framework Plan

Executive Order 13514 requires all federal agencies to prepare for the effects of climate change, a process known as climate adaptation. The U.S. Climate Change Science Program examined the potential effects of climate change in the NCR in 2009. Washington, D.C. is particularly vulnerable to threats associated with sea-level rise.

Flooding following a storm event is a well-documented issue at JBAB. It is particularly challenging on the installation's northern side due to its flat topography and sea-level elevation. The flooding issue is also exacerbated by the installation's inadequate stormwater system and deteriorated flood protection seawall and concrete levee wall. Therefore, it is imperative for the installation to implement a variety of stormwater management strategies in order to alleviate potential damage and safety hazards caused by flooding.

The Navy has taken a service-wide approach in adopting the LID policy for stormwater management at its facilities per requirements of Executive Order 13514 and EISA Section 438. JBAB is mandated by laws, executive orders, and other policies to initiate runoff controls, particularly because of its location along the rivers and their direct connection to the Chesapeake Bay.

The Stormwater Management Framework Plan (Map 3-7) in this Master Plan promotes green strategies that address the built environment, improve urban ecology, and protect against natural hazards. Taken collectively, these strategies will ultimately contribute to the long term health of the overall environmental systems at JBAB and help reduce the installation's cost on stormwater management.

The Stormwater Management Framework Plan is based on the following strategies:

- Upgrade aging infrastructure to modernize stormwater sewer and flooding control system.
  1. Continue drainage system repair on the Anacostia side to eliminate safety hazards and mission impacts created by flooding after storm events.
  2. Make every effort to repair the waterfront levee and seawall in five years and maintain them to the proper standards per USACEs' requirements.
- Promote a more integrated natural system with an emphasis on green infrastructure and green technology.
  3. When funds become available, consolidate and relocate existing functions along the waterfront to other locations outside the 100-year floodplain, which is subject to change depending on the levee and seawall repair and re-certification, to avoid potential flood hazards. Demolish pavilion 38 and buildings 29, 53, 97, 106, 445, 471, 5797, and 6001 and eliminate associated surface pavements as planned by the installation. Removal of impervious surfaces along the shoreline, including surface parking and rooftops, will help create a contiguous green space along the waterfront, facilitate stormwater infiltration, contribute to the overall water quality improvements of the Anacostia River and Potomac River, and help reduce the installation's overall cost on stormwater management.
  4. Create green corridors by incorporating LID techniques along streets, particularly Defense Boulevard, Chappie James Boulevard, and MacDill Boulevard, to reduce reliance on conventional stormwater infrastructure and make rainwater an integral and visible part of the landscape. It is worth noting that trees may not be possible within the airfield safety zones, cannonball firing fan, and ESQDs due to height restrictions or potential fire hazards. ERP sites should also be avoided until site remediation is done.
  5. Apply low impact landscape design to open spaces and the perimeter of major buildings to increase the ability to retain and filter stormwater runoff. Give priority to native or adaptive plants.
  6. Retrofit major parking lots and their perimeter areas with LID techniques, such as bioretention areas, bioswales, permeable pavers, and planted islands to better manage runoff and offer filtration capabilities.
  7. For future new facilities with large flat roofs, such as warehouses, storage, or vehicle maintenance facilities, integrate vegetated green roofs into design wherever possible to slow and filter stormwater runoff.
- Compliance with EISA 2007 Section 438 is required. Development or redevelopment projects that exceed a 5,000 SF footprint must use site planning, design, construction, and maintenance strategies for the property to maintain or restore the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of flow. As new development and renovations occur, LID strategies should be incorporated.
- Planning to reuse rainwater in conjunction with new construction or renovations can also help improve stormwater management.

Appendix E.2 provides more detailed information on a variety of stormwater management strategies, their application, and benefits.

MAP 3-7: STORMWATER MANAGEMENT FRAMEWORK

- Installation Boundary
- Area in Need of Stormwater Infrastructure Repair
- 3 Demolition Concentration Area Suitable for Impervious Surface Reduction
- 4 Green Corridor with LID Improvements
- 5 Green Space with LID Improvements
- Approved Planting Focus Area
- 6 Large Impervious Area that Can Incorporate LID Techniques
- 7 Area where Green Roofs Can be Applied
- Relevant Mission and Land Use Restricted Area
- Installation Gate

An example of creating bioretention areas within and at the perimeter of parking lots for stormwater management

Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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3.7 Open Space and Outdoor Recreation Framework Plan

JBAB has a valuable asset in its prime location along the waterfront of the Potomac and Anacostia Rivers. With a broad view of the intersection of the two rivers, a wide expanse of the D.C. metro area is plainly visible.

The shoreline constitutes the major recreational resource at the installation. A waterfront trail, mature tree canopies, playgrounds and ballfields, and expansive green open spaces provide recreation and leisure opportunities for people who live or work at JBAB.

Because the three sites that formed JBAB were developed independently in history, the current open spaces at the installation are not well connected and lack a coordinated park space program to meet the increasingly diverse recreation interests at the installation.

According to the Outdoor Recreation Facility Needs study conducted by JBAB Public Works Department in early 2014, JBAB has significantly exceeded the requirements by the Navy Fitness Program Standards (2012) for softball field, multi-purpose field, tennis court and swimming pool. The excess and overlap in the types of recreation facilities on the three former sites calls for better land use decisions and new recreation options at JBAB.

The Open Space and Recreation Framework Plan (Map 3-8) addresses the installation's emerging considerations and are based on the following strategies:

- Create a cohesive open space network at JBAB to support structured and unstructured outdoor recreation and promote visual and physical connections to the waterfronts.
  - Maintain the installation-wide open space level of service at a minimum of two acres per 1,000 residents.

  1. With the new realignment of the South Capitol Street Bridge in the next five years and the potential reconfiguration of the North Gate and Firth Sterling Gate in the long term, the open area at the northern tip of the installation will benefit from redesign and reprogramming.

  2. Remove barriers for a contiguous waterfront green space by relocating existing waterfront storage and industrial functions and consolidating them with similar functions in the inland area of the installation; and by demolishing obsolete Buildings 29, 53, 97, 106, 445, and 471 and eliminating associated surface pavements as planned by the installation. Program and design appropriate recreational uses compatible with the floodplain.

  3. Rebuild connections between the currently disjointed waterfront trails to create a continuous multi-purpose recreation trail and connect it with the off-street trail planned by the city along South Capitol Street and along Firth Sterling Avenue as well as the Anacostia riverwalk trail outside the northern tip of the installation.

  4. Enhance streetscape design to frame visual corridors to the rivers and establish a network of linear north-south and east-west "park-like" corridors to foster walking, recreation, and connectivity to the waterfront.

- Create new nodes of active use in order to meet the growing needs for additional recreation and event space.

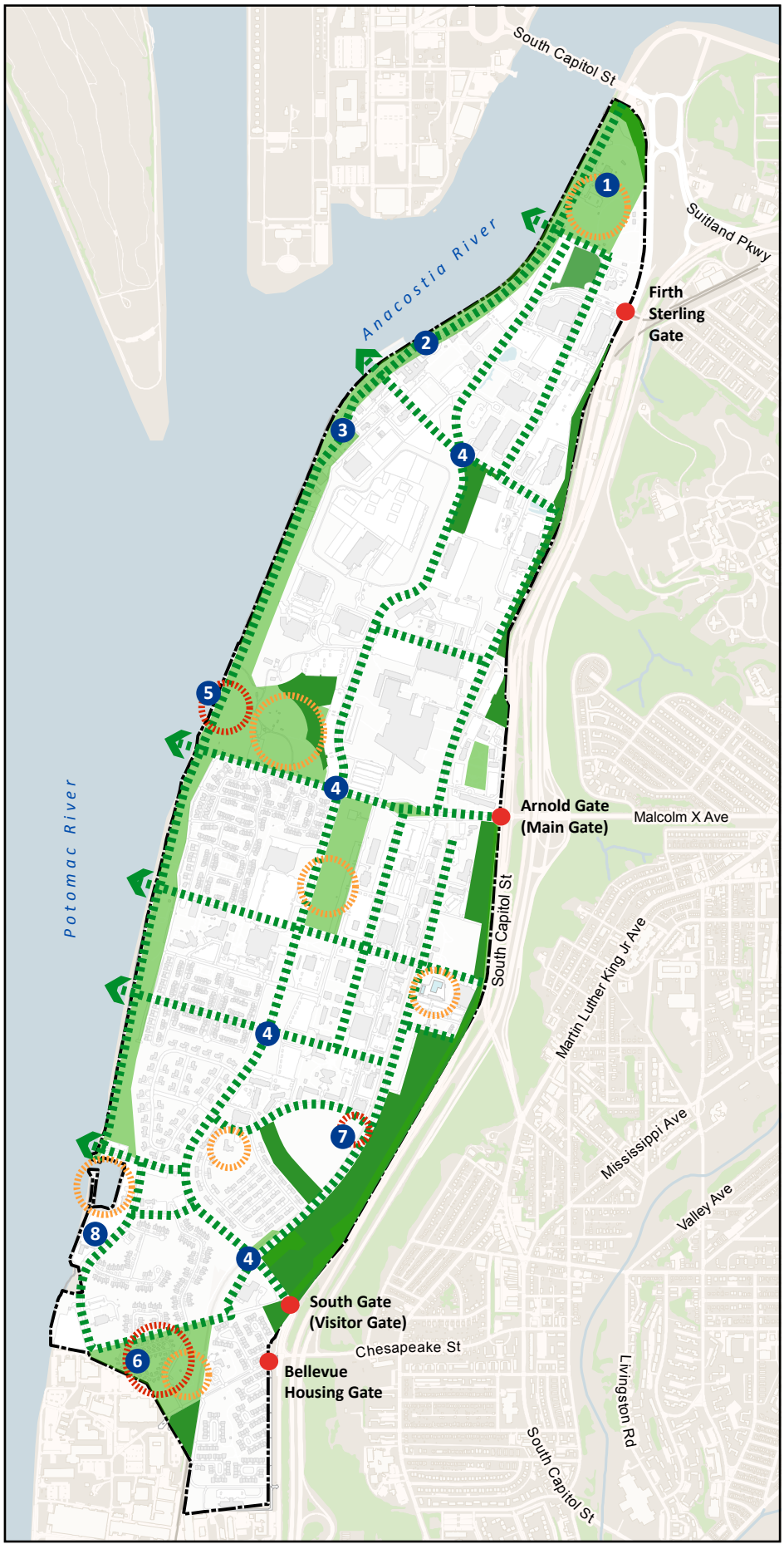
  5. DC Water's Anacostia River Tunnel Project has designed a platform over the stormwater overflow structure to be constructed in Giesboro Park, which is centrally located along the waterfront. While utilitarian in purpose, the platform will be constructed with waterfront amenities in mind. An outdoor venue, such as an amphitheater, will support the use of the platform as a multi-purpose space where people can gather or music events and special ceremonies can be held. Meandering trails, landscape features, and site furnishings should be provided to promote public enjoyment.

  6. Create a recreational vehicle park at the southwestern corner of the installation between the Bolling Family Housing and Bellevue Housing. This site is easily accessible from both the residential communities on-base and the South (Visitor's) Gate, which makes it an ideal location for a new recreational facility serving military personnel and their families.

  7. Create community gardens to foster opportunities for community engagement, education, and support. The Family and Bachelor Housing is the largest land use at JBAB. Community gardening will serve as a valuable recreational activity that contributes to the health and well-being of the community. Community gardens can also engage installation residents in activities focused on the environment, stewardship, and civic responsibility in cooperation with local schools, gardening clubs, and other local organizations. Typical site requirements for community gardens include: The site is about a quarter to one acre in size, generally level and sunny. It should also be accessible yet have some degree of privacy.

  8. The site south of the marina has been identified as a potential waterfront memorial site by the NCPC Memorials and Museums Master Plan (2001). Future development on this site will require coordination between NCPC and the installation.

MAP 3-8: OPEN SPACE/OUTDOOR RECREATION FRAMEWORK PLAN



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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3.8 Landscape Design Framework Plan

The Landscape Design Framework Plan is built on the 2008 NSF Anacostia Installation Appearance Plan (IAP) and establishes an installation-wide design direction rather than prescribing definitive design solutions. A new installation-wide IAP is being developed for JBAB, which, to be completed in September 2014, will provide more detailed guidelines on the appropriate type and placement of landscape elements, such as natural landscape features, man-made landscape features and landscape-related force protection features.

The Landscape Design Framework Plan (Map 3-9) provides general planting guidance for different land use areas rather than prescribing definitive design solutions. The purpose is to provide a simple and cost-effective enhancement to the visual appearance of the installation and improve the physical and psychological well-being of the people who live and work at JBAB.

It is worth noting that trees may not be possible within the airfield safety zones, cannonball firing fan, and ESQDs due to height restrictions or potential fire hazards. ER sites should also be avoided until site remediation is done.

Airfield and Industrial District

All Airfield areas and their associated plantings should conform to the standards set forth in airfield safety regulations. These areas will feature a clean, utilitarian character. Similarly, the Industrial area does not require extensive landscaping either. For facilities associated with the airfield and industrial functions, landscape design should be minimal or only focus on building entries and entry gates.

Family Housing District

The land where family housing is located is leased to private entities. LID landscaping throughout the site as a strategy will be recommended to the developers as an alternative to labor-intensive conventional plantings. Native, low-maintenance plants should be planted in the yards of housing units. Communal rain gardens that feature water-tolerant plants should be located between housing units and/or throughout the housing development. They can capture stormwater, helping control runoff, and improve water quality.

Historic District and Area around Historic Buildings

In the Historic District or near historic buildings, design landscape in a manner respectful of the original character of the historic resources. Existing trees, lawns, and other plantings should be well-maintained. LID techniques such as rain gardens or vegetated bioswales could be tucked into areas between properties or in backyards if these areas experience drainage problems. More formal, symmetrical, and ornamental plantings are appropriate for the Bolling AFB Historic District.

Mission/Administrative District

The landscape of the Mission/Administrative area will be civic in character, symmetrical where appropriate, and monumental in scale to create a dignified and cohesive appearance. While architecture styles will undoubtedly vary, the landscape should act to unify the area in all of its elements. Plant trees in organized lines to frame architectural views, shade streets, and designate major walkways. Provide pedestrian amenities, such as benches, pedestrian lights, and trash receptacles at intervals to encourage pedestrian activity between facilities. Where building perimeter security is a requirement in this area, careful consideration should be given to ensure the seamless integration and compatibility of the barriers.

The use of LID landscaping in this area is important due to the presence of large amount of impervious surfaces in the form of large rooftops and parking lots. Retrofit parking lots or develop new ones with shade trees, planted medians, and bio-infiltration features, such as rain gardens and vegetated bioswales.

Mixed Use District

The Mixed Use Districts encompass areas where future new developments are mostly likely to occur. Such developments may include Mission/Administrative functions and Base Support functions as well as open spaces for recreational use. A large number of facilities associated with these functions provide services for the military and their families. Therefore the landscape design in these areas should encourage pedestrian activity and present smooth transitions from surrounding landscape districts while reflecting the characters of the dominant land use in each district.

The landscape of these areas is to be scaled to create a civilized, but not regimented, environment. Place ornamental trees, shrubs, and ground covers in highly visible common areas to provide seasonal interest and delight; provide shaded seating and furnishings to encourage conversation and get-togethers. LID techniques such as rain gardens or vegetated bioswales can be integrated into large parking areas to reduce stormwater runoff.

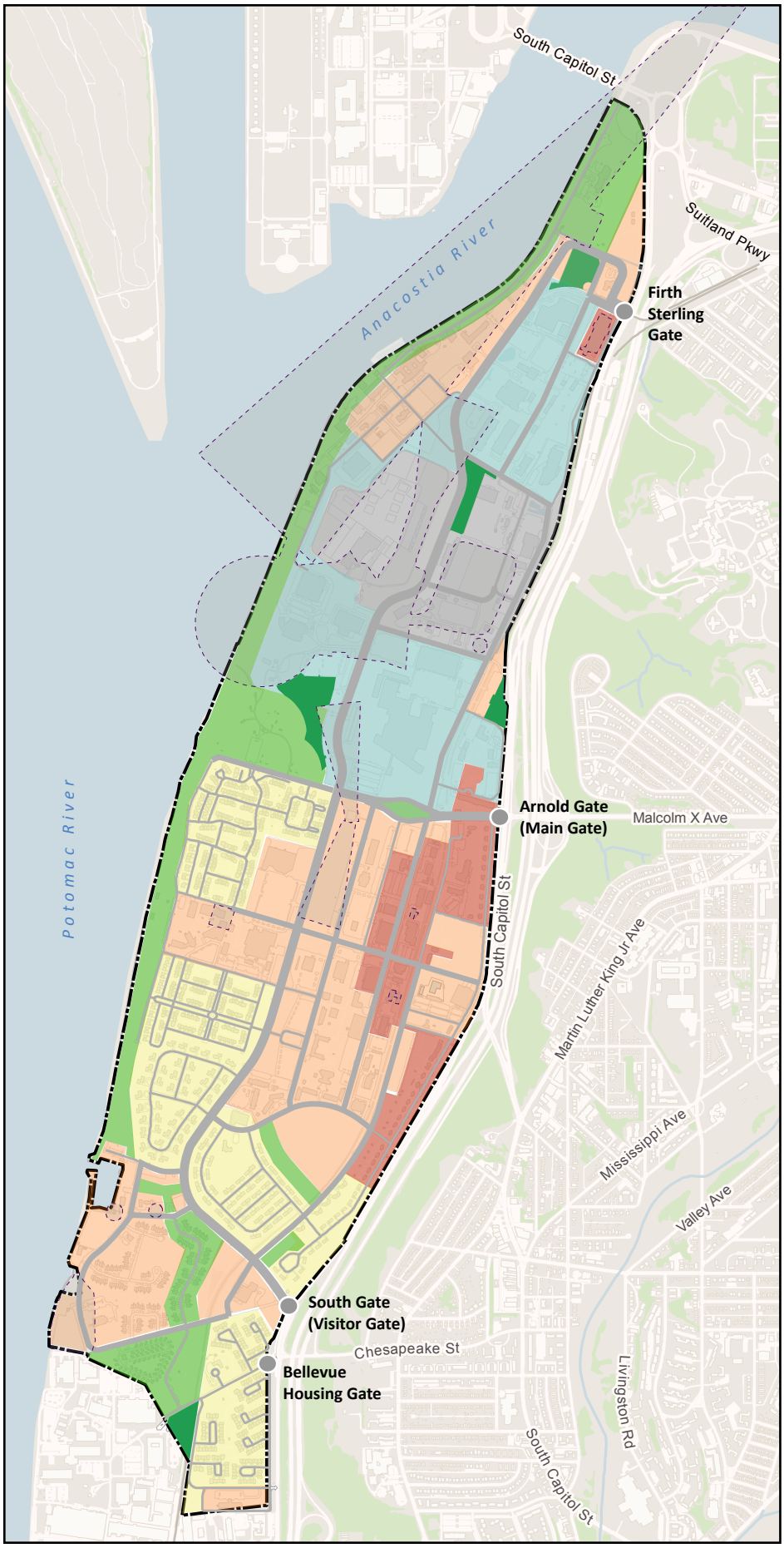
Open Space and Outdoor Recreation Area

The Open Space and Outdoor Recreation area contains green spaces devoted to active and passive recreation, social gathering, and ceremonies and celebrations. The appropriate design response for any landscape improvements is to recognize the existing character and reinforce it. Thus, a formal parade field should be treated with regular, symmetrical plantings, pavements, and light fixtures, while an informal open space may be treated with asymmetrical balance among the landscape elements. Care should be used in selecting screening plants to avoid creating unsafe areas that are not visible to surveillance from adjoining streets.

LID techniques are easily integrated into this area. Rain gardens, vegetated bioswales, and native grasses and flowers can support an informal landscaping treatment, reduce maintenance costs, and help mitigate stormwater runoff. However, as LID techniques often provide wildlife habitat, they should be limited to areas that will not impact the airfield operations.

MAP 3-9: LANDSCAPE FRAMEWORK PLAN

- Installation Boundary
- Airfield and Industrial
- Family Housing
- Historic District and Area Containing Historic Buildings
- Mission/Administrative
- Mixed Use
- Open Space/Outdoor Recreation
- Approved Planting Focus Area
- Road Network
- Installation Gate
- Relevant Mission and Land Use Restricted Area



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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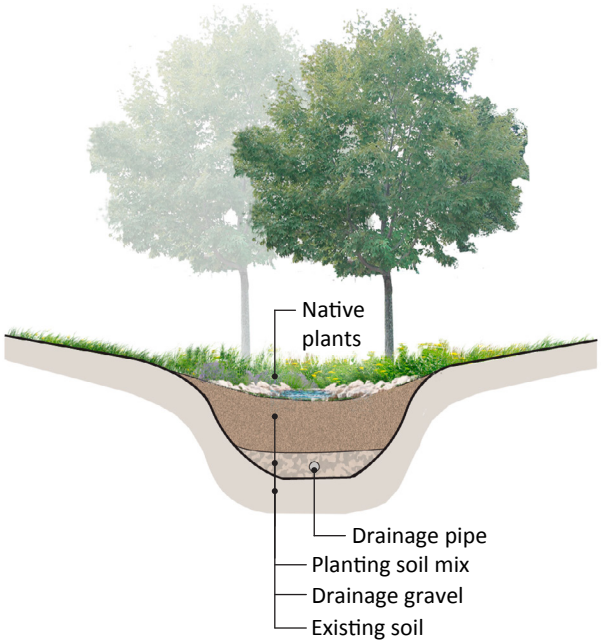
Overall Landscape Design Guidelines:

- Select plants for their ability to perform well in the given soil and with the amount of sun and shade in the area where the plants will be located. Give priorities to native or adaptive plants to regenerate a landscape naturally in balance with the climate and rainfall and reduce the need for irrigation. Non-native plants used on the installation should be non-invasive and present no threat to native flora.
- Implement a tree planting plan in the approved planting focus areas to increase the installation's tree canopy area in the long term.
- Incorporate green infrastructure as a prominent design feature, consisting of bioswales, bioretention, rain gardens, green walls, green roofs, permeable pavings, and other LID measures that will retain, detain, infiltrate, and convey runoff.

FIGURE 3-1: CROSS SECTION OF A BIOSWALE/ BIORETENTION



The major differences between a bioswale and bioretention include:

- whether it is designed as part of the stormwater runoff conveyance system.

- shape and slope.

- landscape scheme.

Bioretention

Bioretention uses a shallow depression planted with vegetation to reduce runoff volume mostly through infiltration and detention. For water quality control, bioretention combines physical filtering and adsorption with biological processes. Bioretention facilities are not typically designed as a conveyance system.

Bioretention facilities can be located in a parking lot, at the center of each parking row and at the edge of the parking lot. They also can be located in existing green areas, treating runoff from surrounding streets, buildings, and parking lots. Bioretention facilities sometimes do not have a subsurface drain.

Bioswale

Bioswales are typically used in residential and commercial developments as well as along roadways as alternatives to, or enhancements of, conventional storm sewers. Bioswales are designed to be part of a conveyance system and have relatively gentle side slopes and shallow flow depths. They are generally not as elaborately landscaped as bioretention systems.

Bioswales remove pollutants from runoff by filtration through grasses and other vegetation and infiltration through soil.

3.9 Architectural Design Guidelines

Individual projects are the "building blocks" of the installation's physical environment. All proposed buildings at JBAB should be sited according to the Future Land Use Plan and programmed and designed using the design guidelines presented in this document and the IAP. The Architectural Design Guidelines in this document aim for the minimum level of control necessary to meet the broad planning goals, while the IAP will provide more detailed guidelines on building envelope design and relevant site planning and force protection standards.

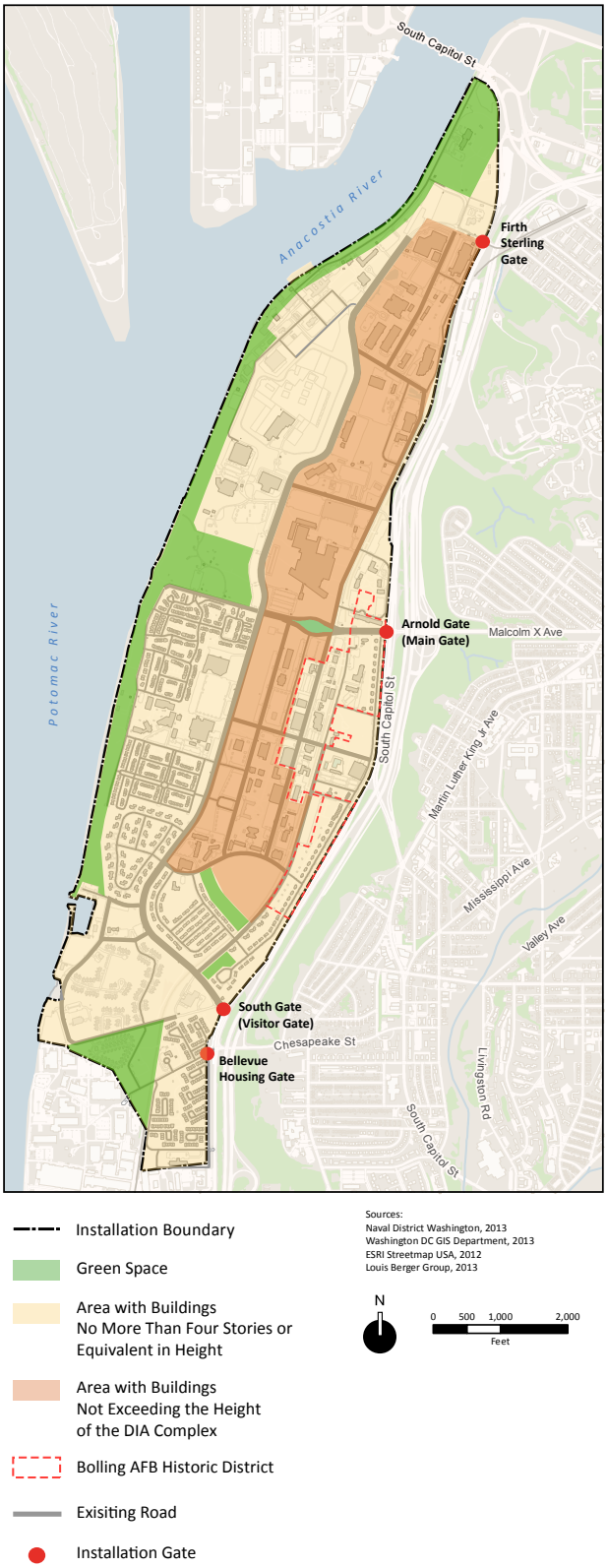
New construction and major renovations at JBAB shall achieve at a minimum the required sustainability design rating per latest applicable federal mandates and Navy regulations. Two square feet of infrastructure reduction are required for every one square foot of new construction per NF MILCON Moratorium issued by the DON on September 19, 2010.

Building Heights

The concept of the Building Heights map (Map 3-10) is that buildings for housing, mission/administrative, and community uses west and north of the Defense Boulevard and Chappie James Boulevard are no more than four stories or equivalent in height, and new facilities east of this major corridor will not exceed the height of the DIA building (six stories) centrally located at the installation. By placing the highest buildings toward the center and the west side of the installation and creating transitions to lower buildings toward the waterfront and family housing areas, this framework will maximize the density of the core mission areas and mediate the change in scale to the surrounding residential neighborhood. A greater sense of openness will also be preserved along the waterfront green space. In addition to the overall framework, the following guidelines need to be applied for future projects:

- Design multi-story buildings, whenever possible, to reduce land consumption and infrastructure and construction costs. Single-story building design is strongly discouraged unless otherwise required by mission functions. By maximizing the efficiency of land use, this approach will limit the creation of new impervious surfaces and preserve more land for future growth and open spaces.
- New construction should be compatible with adjacent building heights to create a cohesive visual relationship. If multi-story construction is planned within or adjacent to the Bolling AFB Historic District or other historic buildings, coordinate with historic preservation departments/ agencies in compliance with historic preservation laws. Avoid design that creates adverse impacts on the original appearance or character of the existing historic resources.
- Prohibit new construction in a height that will be obstructive to the movement of the aircraft operating at JBAB and along the shoreline per applicable regulations.

MAP 3-10: BUILDING HEIGHTS



Relationship between Building Heights and Regional Views

JBAB lays on a flat riverfront plain near sea level at the confluence of the Anacostia and Potomac Rivers. It is about 200 feet below the rim of the Anacostia hills east of the installation. Therefore, the viewsheds to the central City of Washington from vantage points along the ridge line of the Anacostia hills can hardly be blocked by buildings at JBAB when the proposed building height restrictions apply.

Due to JBAB's low ground elevation and the physical barriers around it, concerns resulting from JBAB's building heights about the city's character will be limited to their potential impacts on the panoramic waterfront views. As analyzed in section 2.8.3, at the distances from which the installation is viewed across the rivers, most photos require enhancement of the existing facilities in order to identify them. In addition, the framework plans in this chapter propose a variety of strategies to minimize potential visual impacts resulting from development at JBAB, including creating a continuous greenway/open space buffer along JBAB's waterfront, establishing a guideline to expand the installation's tree canopy, and creating transitions in building heights toward the waterfront. These strategies will further screen the installation's buildings and integrate JBAB with the green backdrop formed by the woodland on the Anacostia hills.

Building Placement and Orientation

- Place new buildings to respond to the arrangement of adjacent buildings and adhere to the delineation of outdoor spaces as described in the Framework Plan. Avoid irregularly inconsistent setbacks along street frontage or within groupings of structures. Preferably, building will be designed with optimal orientation (north - south orientation) for passive solar energy, daylight and natural ventilation.
- New buildings are required to be designed and located per latest AT/FP standards. Use standoff setbacks for generous pathways and landscape treatment.
- Cluster buildings in similar functions to define outdoor spaces and create a campus-like setting.
- Locate and design parking and service areas to have minimum visibility from streets and primary building entries. For multiple project sites or structures, design shared parking behind or beside buildings, with access from secondary roads. For any single project site, the location of parking should not impede other future development envisioned by the Master Plan.

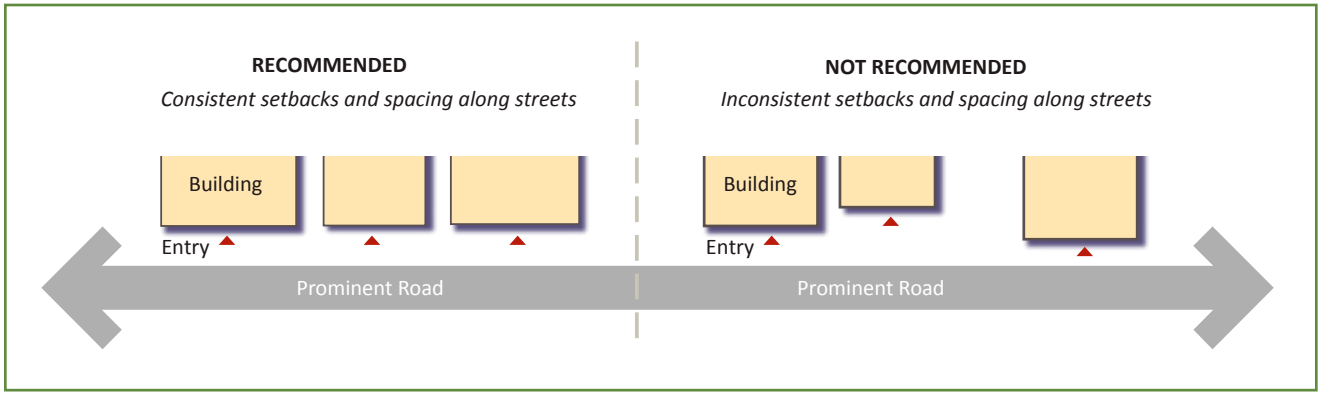
Roof Form

- Existing roof forms such as hipped, gable and flat roofs are permitted options on future buildings. Choose roof forms appropriate for the proposed use and compatible with the roof treatment on context buildings.
- Consider green roofs on existing or new structures when it is cost-effective and structures are physically capable of withstanding the additional load of plants and saturated soil. Historic buildings, however, should be excluded from retrofitting for this purpose.
- Wherever feasible, incorporate on-site renewable energy production (such as solar power) into new building roof designs.

Materials and Color

- The primary material, finish, color, and texture of any new building should fit harmoniously within its setting or neighborhood. Prevalent architectural elements at JBAB (such as red brick, limestone or cast stone trim, white or dark bronze window/door frame, and sloped metal roofs) should be incorporated into new building design.
- Ground floor facades are required to use durable materials to resist pedestrian, vehicular, and grounds maintenance activities.
- The use of sustainable building materials is strongly encouraged for all new constructions. Examples of such materials include those produced locally (within 500 miles), those containing recycled materials, those made from rapidly growing plant materials, and wood products harvested from sustainably managed forests.

FIGURE 3-2: AVOID IRREGULARLY INCONSISTENT STREET SETBACKS



3.10 Historic Preservation

National Historic Preservation Act (NHPA)

The NHPA of 1966 created a comprehensive program for the identification, evaluation, registration, and treatment of significant cultural resources. The major portion of the NHPA that applies to JBAB is Section 106, which requires federal agencies to consider the effects federal activities have on significant historic properties that may include archeological sites, buildings, landscapes, structures, and objects.

The Bolling AFB Historic District at JBAB, as well as several individual buildings within this district and on the Anacostia side, are eligible for NRHP listings. Therefore, for all development projects, JBAB must determine whether the historic properties will be affected by the proposed activities according to the Section 106. If the effects are assessed as adverse, alternatives should be explored to avoid or reduce harm. JBAB also needs to work with D.C. SHPO on appropriate measures to deal with any adverse effects in order to ensure the integrity of historic assets is upheld.

The ICRMP being prepared for JBAB concurrently with this Installation Master Plan will provide guidance for compliance with applicable federal and state regulations regarding the protection of cultural resources, which include historic buildings, districts, and landscapes as well as archaeological sites. The ICRMP will also outline Standard Operating Procedures to ensure compliance with NHPA and identifies key outside agencies JBAB needs to coordinate with regarding historic preservation. Future construction or redevelopment projects should follow the procedures stated in the ICRMP and comply with Section 106 of the NHPA of 1966 as amended.

Historic Preservation Guidelines

To provide a comprehensive historic preservation strategy for JBAB, the master plan seeks to maintain and reinforce the historic character, organization, and sense of hierarchy of the historic district and its building groupings. The guidelines presented below apply to new construction, renovation, and adaptive reuse projects near historic resources and within Bolling AFB Historic District. The purpose of these guidelines is to preserve various historic resources and to retain the integrity of the historic district to the maximum extent practicable.

New Construction and Renovation

- Design new construction to express a sense of continuity with the scale and organization of the historic structures and historic setting. Avoid design that will adversely affect the original appearance or character of the existing historic resources.
- Select materials, finishes, colors, and textures that are compatible with the existing architectural style. Employ the prevalent elements used in historic structures, such as red brick, limestone or cast stone trim, and sloped metal roofs in architectural design.
- Undertake construction, including construction staging, in a manner that avoids damage to historic resources.

Adaptive Reuse

In order to maintain the character of the historic properties, the best use must be identified for each of the eligible buildings. Adaptive reuse is a process by which existing facility vacancies are evaluated for a new use. The evaluation process is meant to be a collaboration with the Public Works Department, whose staff will assist in the best reuse strategies for incoming programs. Understanding the scope and requirements of the incoming program will ensure a thorough site selection process. A preferred course of action can then be derived from an extensive number of options examined during initial siting studies. Final approval can then be made by the Public Works Department, Installation Command, and other stakeholders.

Design criteria to evaluate existing facilities for adaptive reuse include:

- Physical condition and structural integrity of the building.
- Facility dimensions and adaptability to new uses.
- Associated building codes and safety regulations including AT/FP standards.
- Building mechanical systems and utilities.
- Cost benefit analysis for renovation and total life cycle costs versus new construction.
- Adoption of “green” building standards, such as Leadership in Energy and Environmental Design (LEED), as part of the sustainability efforts.

3.11 Energy Conservation

Energy consumption from nonrenewable fossil fuels produces GHG emissions, known to cause global warming and extreme weather events. To curb climate change and its detrimental effects, it is necessary to reduce energy consumption and switch to renewable energy that are carbon-free and do not produce GHG emissions.

Executive Order 13514 requires federal agencies to establish FY 20 reduction targets for non-operational GHG emissions, relative to an FY 08 baseline. It also requires all new federal buildings must be designed to achieve net-zero energy by FY 30, starting in FY 20.

OPNAVINST 4100.5E Shore Energy Management, which issues policy, objectives and guidance, and assign responsibilities for Navy shore energy, states the following goals: by FY 20, reducing installation energy intensity by 50 percent relative to a FY 03 baseline, 50 percent of total Navy energy consumption from alternative sources, 50 percent of Navy installations net-zero, and by FY 15, 50 percent reduction in petroleum use in the commercial vehicle fleet.

So far, JBAB has implemented a series of strategies to contribute to achieving the Navy's energy goals, including increasing solar power production by solar photovoltaics, repairing electrical distribution systems, replacing old generators with high-efficiency ones, installing low-flow fixtures and energy-efficient lighting, installing electric vehicle charging stations, and using fuel-efficient fleet vehicles.

To achieve greater improvements in the future, the Master Plan encourages the following strategies to harness renewable energy sources. The actual implementation will be contingent on funding and a further evaluation of operational impacts and energy return on investment.

- **Solar Photovoltaics:** Install solar photovoltaic systems over selected parking lots and on all new and renovated building roofs.
- **Solar Thermal:** Use solar thermal on both new and renovated buildings, particularly the residential buildings at the installation.
- **Ground Source Heat:** Geothermal electric power is by far the most significant renewable energy source in DoD, accounting for more than three quarters of the Department's renewable energy goal attainment. Incorporate ground source heat technology into new building design whenever feasible.

It is worth noting that due to existing airfield and helicopter operations at JBAB and over its shoreline, the rotor blades of wind turbines cannot reach a height where wind is strong enough to generate sufficient power for its intended use. This has been proved by the existing wind turbines installed on the rooftop of the DIA building. Therefore, renewable energy such as solar power and geothermal energy are recommended instead of wind power.

The Master Plan also proposes to implement energy-efficient techniques, such as integrated district energy systems, high-performance building envelopes, and passive solar design, at different scales to help offset the anticipated energy demands.

At Building Scale:

Rehabilitate, repurpose, infill with new development, or redevelop facilities or sites to improve space efficiency and reduce individual facility's energy intensity. A comprehensive energy use study is recommended at the building scale to assess how existing buildings perform today. The study results can be used to prioritize improvements and provide baseline data to evaluate future improvements.

At District Scale:

- Explore the possibility when funds are available to modernize and expand Building 18, the existing Heat Plant, to provide heating and cooling for more new and renovated facilities at the Central Development Focus Area delineated in the Land Use Framework Plan. Incorporate the adjacent residential areas into the Plant's utility network to balance loads between day and evening use. If enough renewable energy will be produced on-site and the Plant could adapt to using a renewable fuel source in the future, the installation would move closer to achieve zero net energy.
- Study the possibility to establish micro-grid infrastructure generating electricity from renewable sources. These micro-grids can be grouped by land use and connected together with other facilities that might share power and energy. A detailed study is recommended to assess how to phase and finance the installation and operation of the micro-grid infrastructure at JBAB.

At Installation Scale:

- Improve installation-wide utility systems to increase energy efficiency. Given the fact that most utility systems at JBAB are in need of some form of upgrades or improvements in varying degrees of urgency, conduct a comprehensive study on these systems when funds are available. The situation that each of the three former sites of JBAB operates separate utility systems with separate maintenance responsibilities and/or contracted partners is complex and potentially wasteful. As one whole installation, the utility systems and infrastructure present at JBAB need a comprehensive evaluation for immediate adequacy, future capacity, operational efficiency, and physical location. The study should also prioritize utility solutions and outline improved preventative maintenance schedules. Greater efficiency of the systems — both in terms of maximizing their physical longevity and minimizing their environmental impacts — will contribute to the installation's long-term energy efficiency.

4.0 Five-Year Development Program

The Framework Plan in Chapter 3.0 contains strategies to help guide and coordinate complex land use, transportation, stormwater management, open space and outdoor recreation, landscape design, architectural design, historic preservation, and energy conservation to achieve a cohesive development vision at JBAB. The recommendations are anticipated to be planned, funded, and implemented gradually over the next 20 years. Some strategies can be implemented as relatively inexpensive projects and achieved in a few years, while others are more complex and will require detailed planning, significant funding, and time for construction.

For the proposed strategies to be realized in a financially and technically feasible way, this chapter describes projects that are being planned by JBAB and may have 50 percent chance to be funded in the next five years. These projects balance three key considerations:

- Installation priorities — projects deemed to be priorities in response to JBAB's mission accomplishment.
- Sequencing drivers — logistical and timing drivers that determine the pace at which projects can be implemented.
- Capital budget planning — the availability of funding, funding sources, and operating costs.

The projects described in the Five-Year Development Program will serve as the initial step in the implementation of the installation's long-term development vision.

4.1 Transportation Improvements

The transportation improvements that will occur at JBAB in the next five years are described below and illustrated in Map 4-1.

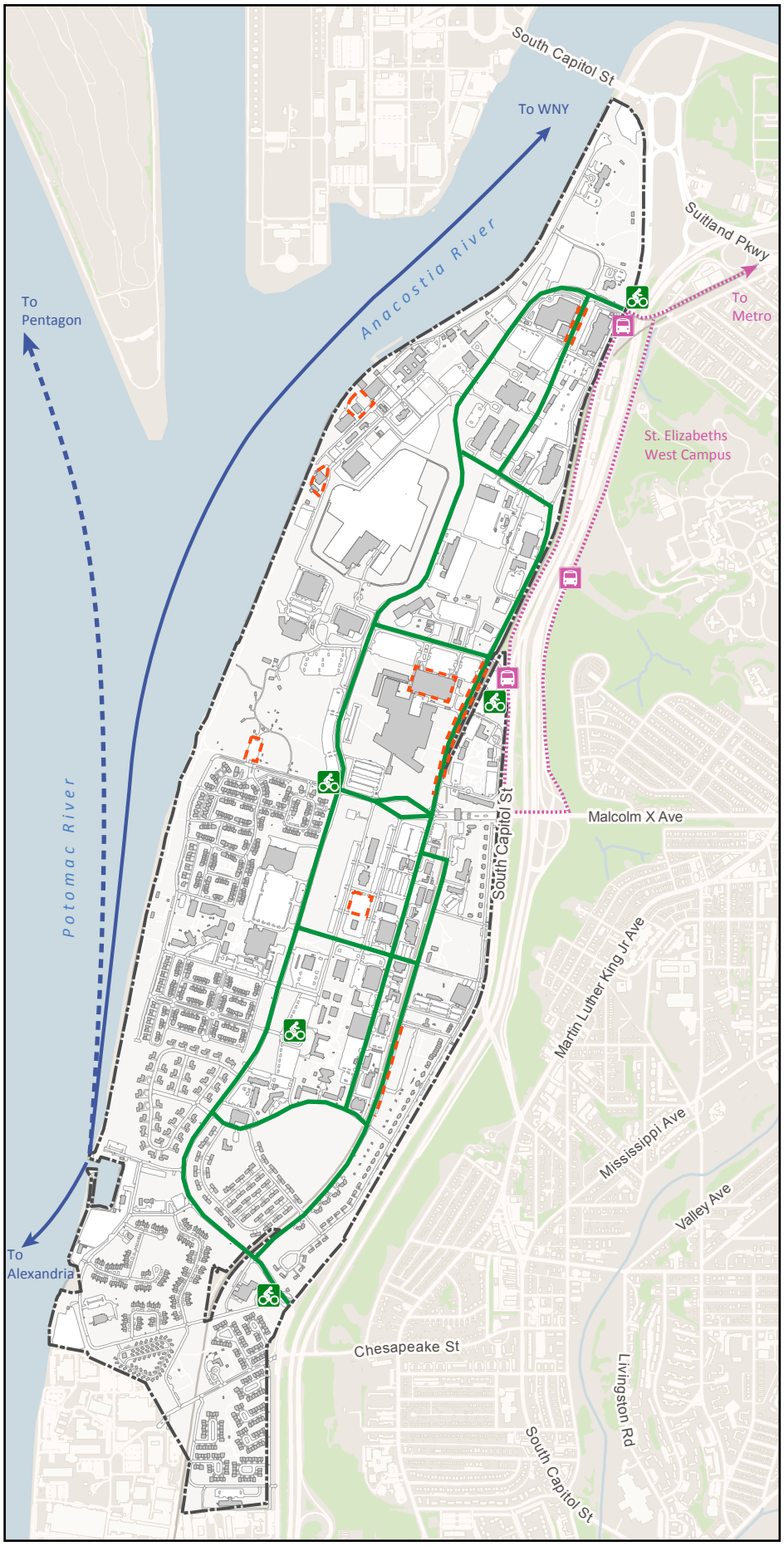
Commuter Ferry: The commuter ferry pilot program will provide ferry service among Alexandria, JBAB, and the WNY for JBAB residents and employees. This establishment will significantly save passengers' time to cross the river and contribute to the reduction of vehicular traffic on the roads.

Shared Bicycle Lane Program: This project will create a network of shared bicycle lanes with improved signage and markings. The proposed bicycle route would require removal of 129 on-street parking spaces on Brookley Avenue, Duncan Avenue, and Mitscher Road for adequate road width and travel safety.

Potential JBAB — DHS St. Elizabeths Shared Shuttle: As of April 2013, DHS is working with WMATA on an agreement to provide shuttle services between the Anacostia Metrorail Station and DHS St. Elizabeths West Campus. A loop route passing JBAB may be implemented when the modification of the I-295/Malcolm X interchange is complete. JBAB will continue its coordination with DHS to include two stops immediately outside JBAB on their service.

MAP 4-1: SUMMARY FUTURE DEVELOPMENT PLAN — FIVE-YEAR TRANSPORTATION IMPROVEMENTS

- Installation Boundary
- Shared Bicycle Lane
- Proposed Bikeshare Station
- Pilot Ferry Service Route
- Potential Commuter Ferry Service Route
- Potential JBAB-DHS Shuttle Bus Route with Stops at Pedestrian Gates
- Employee Parking Reduction Area



Sources:
Naval District Washington, 2013
Washington DC GIS Department, 2013
ESRI Streetmap USA, 2012
Louis Berger Group, 2013

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Employee Parking Reduction: JBAB will reduce employee parking by 10 percent (a total of 833 spaces) to achieve a parking ratio 1:1.86 with the following parking changes:

- Replace the existing 934-space DIA parking structure, which is structurally deficient, with a new 600-space parking structure. This will result in a net decrease of 334 employee parking spaces.
- Limit on-street parking to clearly marked parallel parking spaces. JBAB will convert 187 angled parking spaces on Brookley and Duncan Avenues to 107 parallel spaces and convert 97 perpendicular parking spaces on Mitscher Road to 48 parallel spaces. The total reduction of 129 on-street parking spaces will provide room for the proposed Shared Bicycle Lane Program.
- Designate the 114-space parking lot in the Geisboro Park parking as visitor-only parking for the new MWR waterfront amphitheater (see Waterfront Amphitheater in Section 4.3 for details).
- Convert the existing 175-space JADOC parking and existing trailer office site to maintenance and operational use after JADOC moves to its new facility.
- Replace 12 employee parking spaces with four parklets (see Parklet Pilot Program in Section 4.3 for details).
- Designate the 38 employee parking spaces around Buildings 97, 106, and 445, which are slated for demolition, to operational use and removing them when buildings are demolished.
- Building 29 will be demolished and replaced on an existing employee parking lot, thus removing 31 employee parking spaces (see Building 29 Demolition and Replacement in Section 4.3 for details).

4.2 Repairs

JBAB's repair projects in the next five years are described below and illustrated in Map 4-2.

Anacostia Drainage System Repairs: The drainage system repair project is one of the installation's undertakings to eliminate safety hazards and mission impacts created by potential flooding. This project will remove and repair 11,248 linear feet of drainage pipe then backfill and repair disturbed ground surfaces. The project is planned to be a FY 14 Operations and Maintenance (O&M) project with an estimated cost of $6.4 million, but not funded yet.

Anacostia Levee Repairs: The Anacostia side of JBAB lies behind a flood protection embankment at or near the river tidal elevations. The existing levee is severely deteriorated and it would be likely to fail in the event of a sustained high water situation. If the levee is not maintained to the proper standards per the USACE, it may result in severe safety hazards and negative impacts on mission operations.

This Anacostia Levee Repairs project is an O&M project with an estimated cost of $123.3 million. It is expected to be funded and commenced within the next five years. It will repair and restore the 1,250 linear-foot levee wall. The project entails sinkhole repair behind bulk head wall at toe of levee on the river side, debris and vegetation removal, replacement of wooden stop lots at existing openings in floodwall, repair under seepage along flood wall, provide new steel channels and wooden stop logs at pump station discharge, repair of stonewall bulkhead and concrete floodwall, and sediment and erosion repairs.

Replacement of Hot Temperature Hot Water Generators at the Central Heating Plant: This project will replace two more than 20-year old high temperature hot water generators with new high efficiency ones. The estimated cost is $3,990,000.

4.3 Demolition and Construction

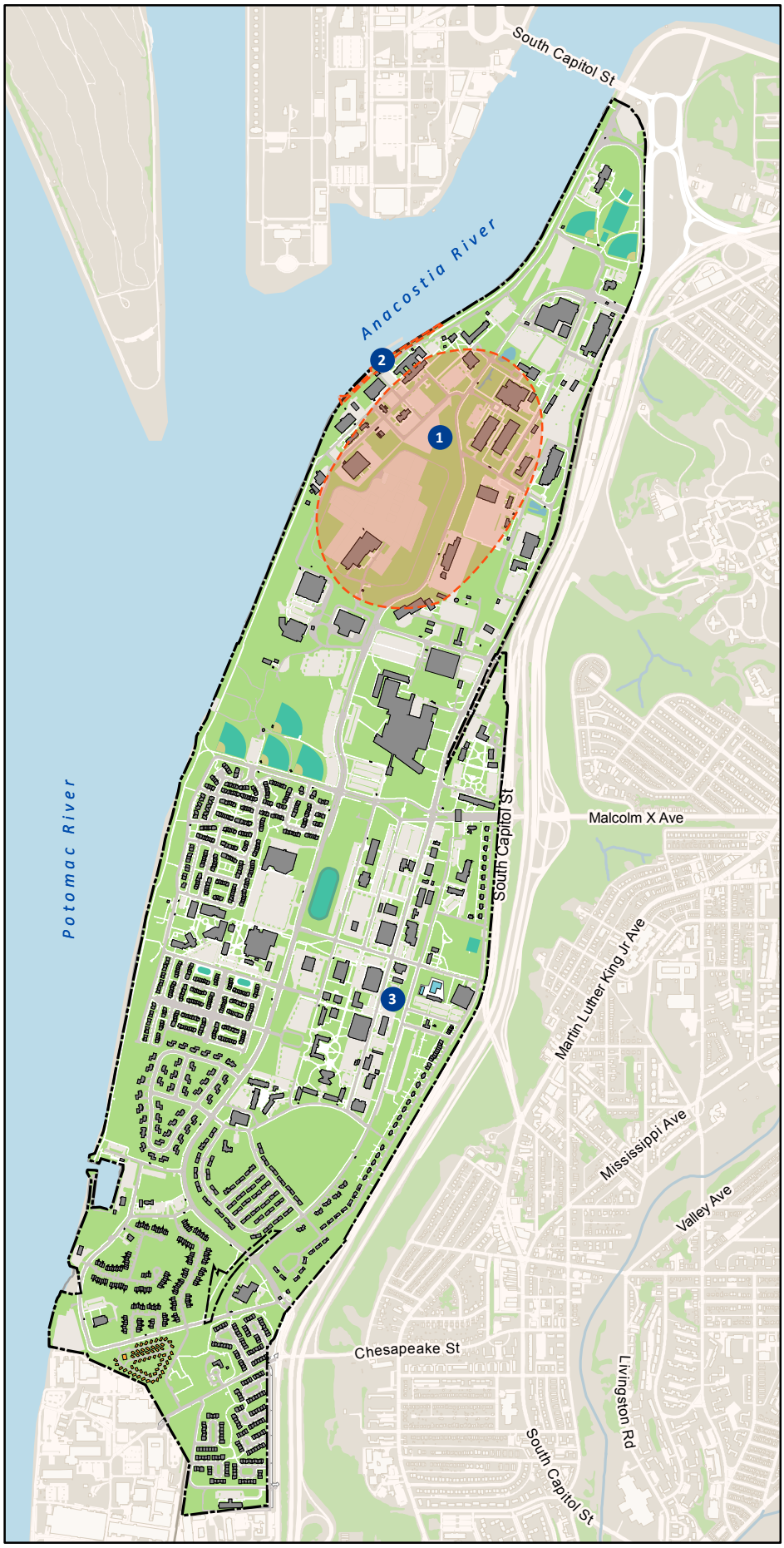
JBAB's facility demolition and construction projects in the next five years are described below and illustrated in Map 4-3. The NF MILCON Moratorium issued by the DON on September 19, 2010 requires to "pursue, as a matter of policy, recapitalization of existing facilities in lieu of NF MILCON." The Moratorium also requires programming "at a minimum a 2:1 equivalent infrastructure reduction for CNIC waived NF MILCON" (i.e. two square feet of demolition for every one square foot of new construction).

Building 29 Demolition and Replacement: The screening operation of the Naval Supply Systems Command Postal Services at JBAB supports all Naval mail in the NCR. The function currently is housed in Building 29, which is a high risk facility for flooding and power loss that could result in mission degradation or total shutdown of mail scanning operations. The project scope includes construction of a 2,000 SF standalone, pre-engineered, fully self-sufficient postal screening facility near the sorting facility Building 94 for functionality, with dedicated utilities and backup power. It also includes demolition of the 12,009 SF Building 29. The project is not funded, but planned to be in the MILCON program with an estimated project cost of $1.4 million.

DIA Parking Garage Demolition and Replacement: A 2007 NAVFAC Facility Study identified significant deficiencies with the structural integrity of the existing DIA parking garage. Other safety issues and code violations are also noted in the study. A new 600-space parking garage will be built on a surface lot north to the existing garage, and the existing 934-space garage will be demolished after the new construction is complete. This project will result in a net reduction of 334 spaces and it has been funded.

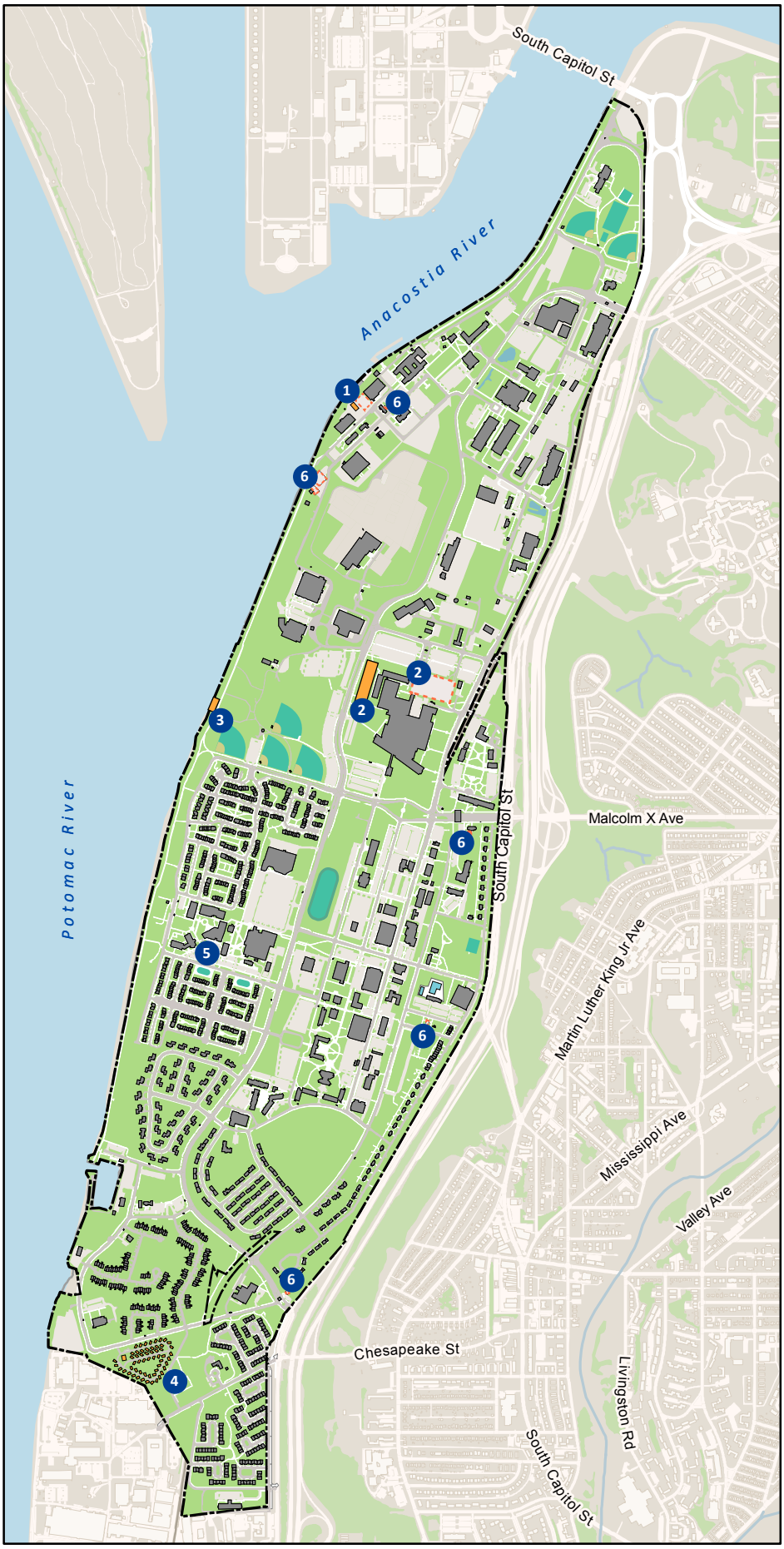
Other Planned Demolitions: As detailed in Chapter 2.0, Buildings 53, 97, 106, 445, 471, 602, 5797, and Pavilion 38 will be demolished when funding becomes available.

MAP 4-2: SUMMARY FUTURE DEVELOPMENT PLAN — FIVE-YEAR REPAIR PROJECTS



MAP 4-3: SUMMARY FUTURE DEVELOPMENT PLAN — FIVE-YEAR DEMOLITION AND CONSTRUCTION PROJECTS

- Installation Boundary
- Water
- Road
- Parking
- Existing Sidewalk
- Green Area
- Athletic Court
- Existing Building
- Proposed New Facility
- Facility to be Demolished
- 1 Building 29 Demolition and Replacement
- 2 DIA Parking Garage Demolition and Replacement
- 3 Waterfront Amphitheater and DC Water Platform
- 4 Recreational Vehicle Park
- 5 Parklet Pilot Program
- 6 Other Demolition Projects



Parklets will be located in a variety of areas close to youth and child development centers, eateries, and other areas needing outdoor opportunities at JBAB

Parklet Pilot Program: The project was funded for FY 13 to design and place four parklets. These small urban parks will be created by replacing several under-utilized parking spaces with planters, benches, educational signage, and rain barrels. The project will use 12 parking spaces, and aid in the installation's stormwater management and reduction of employee parking.

Waterfront Amphitheater: In conjunction with the overlook platform designed for the DC Water's Anacostia River Tunnel Project, an amphitheater centrally located in Giesboro Park on the waterfront is proposed for the JBAB community as an area where large community gatherings, music events, or special ceremonies can be held. The project is not funded yet.

JBAB Recreational Vehicle Park: This 56-site recreational vehicle park will be located at the southern end of the installation between the communities of Bellevue Housing and Doolittle. The proposed park site is a community green space and therefore no demolition is required for construction. The Park will feature a 2,000 SF Camp Center with office, restrooms, lounge, showers, laundry, and 10 parking spaces. The project is not funded yet.

4.4 Master Plan Applicability

4.4.1 Project Funding Process

Individual projects at a military installation are typically pursued either through public-private partnerships or DoD appropriations at the installation level or congressional level. O&M and MILCON programs are two DoD funding sources that support construction, maintenance, or repair projects at JBAB.

O&M funds are normally local or installation-level funds and may be used for the following:

- Construction projects up to $750,000.
- Construction projects up to $1.5 million to address life, health, or safety-threatening deficiencies.
- Maintenance projects.
- Repair projects (congressional notification is required for project over $7.5 million).

The MILCON program supports constructions over $750,000 (or "life, health, or safety" projects over $1.5 million) and require funding appropriated by Congress. The MILCON program typically looks out over a five-year period, approving and funding projects individually. Its project process includes four steps: planning, programming, budgeting, and execution.

4.4.2 Using the Master Plan

The JBAB Installation Master Plan is a consolidated development plan for the installation in the next 20 years. Serving as a general road map for evaluating and making recommendations for future projects, this document is to be integrated into the initial planning and programming process of any facility projects at the installation.

Installation Planning Board (IPB)

According to UFC 2-100-01, every installation shall have an IPB, which will guide the development and maintenance of all components of the Master Plan, and assist in ensuring that the Master Plan addresses all real property requirements for all agencies and activities on the installation and supported area; reflects changes in installation missions and the military community's current or future development plans, with full consideration of, and respect for, regional and local communities.

Currently the planning decisions at JBAB are made by the installation leadership and representatives of the Asset Management. To improve its planning decision-making process, JBAB has set up a goal to create an IPB that will include additional representatives of civil engineering, environmental department, and public works to advise the installation leadership regarding planning decisions. See UFC 2-100-01 Appendix B, Best practices for recommendations for roles, responsibilities, membership and operations of an IPB.

Site Approval Process and Project Review

JBAB PWD will use this Master Plan as a guide for future proposed development. The frameworks established by the Master Plan are to be used as a blueprint when proposed projects are considered in more detail. In adherence to the DoD memorandum issued on May 28, 2013, which has required "all land use, development, and real estate actions on an installation shall conform to its master plan," all proposed new construction and facility improvements will be validated against the Master Plan through the site approval process.

Pursuant NAVFACISNT 11010.45 Regional Planning Instruction for Site Approval Process, a site approval is required for:

- Any project site that will have explosives safety criteria implications associated with ammunitions and explosives.
- Any project that affects or is affected by airfield safety criteria.

- Any project that creates or is proposed to be in an area of electromagnetic illumination or involves electromagnetic transmission.
- Any project that proposes changing the use of a facility.
- Any project that changes or has the potential to change the land use [future land use map] or physical layout of an area.

The site approval process ensures that actions are not performed without adequately considering impacts to the environment, infrastructure, explosives safety, safety (i.e. occupational, community, operational, traffic) and security, anti-terrorism and force protection, and land use planning goals and objectives.

The PWD Community Planner is responsible for initiating the proper review of proposed development and coordinating with the Site Approval Team (made up of Subject Matter Experts). The Site Approval Team is made up of individuals responsible for the review and critique of the proposed action in accordance with their specific area of expertise and mission applicability. Areas of expertise include, but are not limited to cultural and natural resources, air and water compliance requirements, hazardous waste management, facilities design and construction, sediment/erosion control, stormwater management, land use planning, explosives safety, air safety, security, AT/FP, fire and emergency management.

Conditions of approval are to be adopted by the proponent as a basis for a final favorable decision on the development being proposed to ensure consistency with the Installation Master Plan land uses and development standards and to mitigate potential environmental, human health and safety, operational safety, regulatory or other concerns associated with the proposed action.

Master Plan Update

DoD Instruction 4165.70 §6 establishes the requirement that base master plans or comprehensive plans shall be developed for all installations. Such plans shall cover at least a 10-year period and be updated every five years (more often if necessary).

The Master Plan update will be better executed through an Evaluation Appraisal Report (EAR) prepared one year before the update. The EAR will evaluate the installation's success in addressing the goals and objectives. The EAR will:

- Identify major issues for the installation.
- Review past actions in implementing the Master Plan.
- Assess the degree to which the Master Plan's objectives have been achieved.
- Assess both successes and shortcomings of the Master Plan.
- Identify ways in which the Master Plan should be changed.
- Respond to changing conditions and trends affecting the Installation.
- Respond to the need for, and availability of, new data.
- Respond to changes in DoD requirements.
- Respond to regional requirement changes.
- Execute better intergovernmental coordination.

Based on its evaluation, the EAR will suggest how the Master Plan should be revised to reflect changes in DoD and regional requirements and better address the installation's goals and objectives, and changing conditions and trends.

Coordination with NCPC's Comprehensive Plan

The JBAB Installation Master Plan builds on the Navy's regional vision identified in the RIMP and contains a variety of initiatives consistent with the policies in NCPC's Comprehensive Plan that is undergoing a full update. The actual growth and facility projects at JBAB will depend on evolving national policy and budget decisions. This document therefore will be reviewed at least every five years and updated if necessary to ensure compliance with the latest mission requirements and applicable policies. Appropriate maintenance and update of the Master Plan is critical to make the plan a continuing, renewable endeavor.

Per the National Capital Planning Act, NCPC is empowered with review authority over all federal development projects in the region. All individual site and building plan projects at JBAB must be submitted to NCPC for review prior to the preparation of construction plans. When new facility projects come forward, JBAB PWD, in addition to reviewing its conformance with the Installation Master Plan, will coordinate with NAVFAC Washington to ensure alignment of these projects with the policies contained in NCPC's Comprehensive Plan. Other federal stakeholders, with input from the public, may be involved to further define, plan, evaluate, and design specific initiatives. This process will ensure the installation's development is in concert with the region's federal planning and development policies and other applicable requirements.

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Appendix A. Memorandum on Installation Master Planning

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

MAY 2 8 2013

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DIRECTOR, DEFENSE LOGISTICS AGENCY
DIRECTOR, WASHINGTON HEADQUARTERS SERVICES

SUBJECT: Installation Master Planning

Department of Defense (DoD) military installations are invaluable national defense resources that must be planned and developed in a sustainable manner that supports current missions and preserves long-term military capabilities. Fundamental to the effectiveness and sustainability of our installations is the master planning process, which establishes a clear and principled long-range vision for the development of installations that support the Department's defense mission and enrich the communities they serve.

With that goal, the Department recently updated its requirements for the design and content of installation master plans, as detailed in Unified Facilities Criteria (UFC) 2-100-01, "Installation Master Planning." This document reflects a comprehensive approach to developing installations across DoD using planning strategies that reinforce capabilities to support the defense mission, promote quality of life, and enhance sustainability and environmental viability.

The new UFC will accomplish its intended purpose only through clear guidance and strong senior leadership support. To that end, I am issuing the following policy to provide the foundation for effective installation master planning.

- The DoD Component exercising management responsibility over each installation shall develop a master plan that defines opportunities for site development and alternate land use and incorporates the following planning strategies:
    - **Sustainability** allows an installation to meet present mission requirements without compromising its ability to meet future requirements. Sustainability also conserves limited natural resources (including land and fossil fuels) through compact, mixed-use development.
    - **Resource management** preserves and enhances natural, historic, and cultural resources.
    - **Transportation alternatives** provide for pedestrian, bicycle, and transit-friendly communities that allow residents opportunities for regular physical activity and, consequently, healthier lifestyles while decreasing dependence on automobiles.
    - **Defensibility** protects critical infrastructure and incorporates appropriate safeguards to prevent mass casualties in the event of a terrorist attack.

- **Area and network planning** creates identifiable and connected districts based on geographical features, land use patterns, building types, and transportation networks.

- **Form-based planning** guides the scale and character of development, prescribing the size and form of buildings, the patterns of circulation between buildings, and the relationship between buildings and outdoor space.

- **Local and regional coordination** ensures that planning within the installation boundary considers constraints and opportunities beyond the boundary and promotes compatibility with local authorities.

- All land use, development, and real estate actions on an installation shall conform to its master plan.

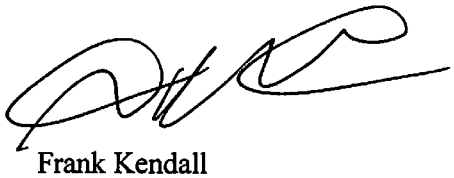
- DoD Components shall establish installation planning boards to review and endorse installation master plans, which shall be approved by a command above the installation level no less frequently than every 5 years.

- For the purpose of keeping plans current and relevant, DoD Components shall maintain a comprehensive list of all installation master plans and their respective completion dates.

- DoD Components shall provide master planning training for key personnel using curricula developed either in-house or through the Army's Master Planning Institute, toward a goal of at least 4 hours of training for installation commanders and 32 hours of training biennially for installation master planners. This training goal comports with the requirement of the American Institute of Certified Planners.

DoD Components shall develop or update all installation master plans in accordance with this policy not later than October 1, 2018. The Deputy Under Secretary of Defense for Installations and Environment shall establish metrics to evaluate the implementation of this policy. This policy will be incorporated into DoD Instruction 4165.70, "Real Property Management."

I appreciate your support of our master planning process and commitment to improving our installations for the long term.



Frank Kendall

Appendix B. JBAB History and Previous Master Plans

JBAB History

Although the history of JBAB as a joint base is relatively short, JBAB's property has been a DoD asset since 1917. Historical highlights of the JBAB tract are:

1917 - The Giesboro Depot of the Army Corps of Engineers and some adjacent area were transferred to the Army Signal Corps for use as a landing field. It was the only military airfield near the United States Capitol at that time, known as the Flying Field at Anacostia. From its beginning, the installation has included Army Air Service (renamed Air Corps in 1926) - the predecessor to today's Air Force and Navy aviation and support elements. Not long after its acquisition by the Army Signal Corps, a portion of land was given to the Navy for testing seaplanes.

1918 - The Flying Field was officially renamed Bolling Field in honor of the first high-ranking air service officer killed in World War I, Colonel Raynal Cawthorn Bolling. The site given to the Navy southwest of the Bolling Field was formally designated as the Naval Air Station Anacostia. Both Bolling Field and Naval Air Station Anacostia became aviation test and evaluation facilities while also providing aviation training.

1930 - The Army decided that Bolling Field was not meeting their increased military aviation needs. About 500 acres of land was purchased to the immediate south; the "new" Bolling Field was constructed where the later Bolling AFB was located.

1935 - The Army turned over the entire establishment of the old Bolling Field to the Navy.

WW II - The installation served as a training and organizational base for personnel and units going overseas. It also served as the aerial gateway to the nation's capital. Hangars, administration buildings, barracks, warehouses, and photography labs were built and nearly 2,000 aviation cadets received their primary flight training there.

1941 - The Air Force's first headquarters was established at the installation as Army Air Forces Headquarters in 1941. It became the Air Force Headquarters with the creation of the United States Air Force in 1947.

1943 - As increased air activity in the vicinity of the installation made experimental flight testing more difficult, the Navy's testing and evaluation center was moved to Patuxent River, Maryland.

1950s - Congested airspace around Ronald Reagan Washington National Airport on the opposite shore of the Potomac River eventually forced most flight operations on base to be relocated to other installations.

1962 - The NAS Anacostia was re-designated as Naval Support Facility Anacostia. In the same year, fixed-wing aircraft operations by the Air Force and the Navy both ceased on base. The only air operations function remaining until today is the Marine Helicopter Squadron One, the Executive Flight Detachment for the President of the United States.

1985 - The installation became the headquarters for all Air Force operations in the National Capital Region.

1987 - Defense Intelligence Agency, one of the largest organizations within the DoD, built its Defense Intelligence Analysis Center (DIAC) at the installation where it moved many of its operations and headquarters.

Before BRAC 2005 - Before joint basing, NSF Anacostia and Bolling AFB, though administratively distinct, were physically continuous and shared a perimeter fence and entry gates. Both installations had broadly similar missions and supported representational activities such as the Navy Ceremonial Guard

and the Air Force Honor Guard. NSF Anacostia and Bolling AFB serviced the country and the world in many capacities, including service with the Military Airlift Command; the headquarters for the Air Force District of Washington; the Air Force 11th Wing; Commander, Naval Installations Command; Naval Media Center (now Defense Media Activity in Fort Meade); and many other military commands and federal agencies. The installation's history also includes the growth and evolution of the U.S. Navy Ceremonial Guard, the U.S. Air Force Band, and the U.S. Air Force Honor Guard.

BRAC 2005 - As a result of the 2005 BRAC, NSF Anacostia and Bolling AFB were merged into one joint base, known as Joint Base Anacostia-Bolling. The transition began with an initial operating capability on January 31, 2010, and reached full operational capability on October 1, 2010.

Previous Master Planning Efforts

Prior to this Master Plan, a number of planning efforts were undertaken on the JBAB site to adapt to the changed mission requirements by the DoD, the Navy, and the Air Force.

The 1972 Bolling Anacostia Master Plan was the first Master Plan for the entire site that was commented favorably by NCPC. The 1989 Bolling Anacostia Master Plan updated the 1972 Plan to accommodate major changes on the tract and on the long-term mission requirements, including the construction of the DIAC, additional requirements for Executive Support and other functions, and the need to retain Bellevue Housing. It is the latest master plan for the JBAB site that was commented favorably by NCPC.

There were also some other master plans prepared during the past 20 years by the Navy or the Air Force, including the 1998 Naval Station Washington Master Plan, the 1998 Bolling AFB General Plan, the 2004 Anacostia Annex Site Development Plan, and the 2008 Bolling AFB Development Plan. These studies, as their names suggested, focused on design and planning for missions either on the Anacostia side or the Bolling side rather than one single jointly-used military installation.

Subsequent to the BRAC 2005 legislation that ordered the unification of the NSF Anacostia and Bolling AFB into one joint base, DoD issued "Supplemental Guidance for Implementing and Operating a Joint Base - Real Property" in April 2008, which directed each of the joint bases to develop a Joint Base Installation Master Plan.

The 2010 JBAB Draft Master Plan was prepared in this context. Phase One of the planning process included existing document review and stakeholder interviews with more than 50 representatives from the Navy, the Air Force, and key tenants on NSF Anacostia and Bolling AFB. A concept workshop was conducted to develop a consensus in planning vision, goals, and objectives as well as alternative possibilities for future physical development. Phase Two of the project continued the interview process and focused on coordination with other government agencies. A workshop was conducted to help define the preferred alternative for a land use and urban design framework.

NCPC reviewed the 2010 JBAB Draft Master Plan. The May 5th, 2011 NCPC Commission Action (NCPC File No. MP55) commented favorably on "the inclusion of development strategies that limit the visual impacts of future base development on surrounding communities, on the Plan's landscaping standards that help preserve the character of existing JBAB neighborhoods, and on the Site Environment/Sustainability chapter, which promotes a wide variety of sustainability-oriented strategies for future base development." The Commission however commented unfavorably on the Plan's proposed employee parking ratio of one parking space for every 2.42 employees (1:2.42), which exceeded NCPC's parking ratio goal of one parking space for every four employees (1:4) for this location, because the 2010 JBAB Transportation Management Plan did not justify why JBAB would not meet the parking ratio goal and the Master Plan Environmental Assessment did not analyze an alternative that met the 1:4 parking ratio. The Commission Action also provided other recommendations and requests for additional information. See Appendix C for the complete NCPC Commission Action on May 5th, 2011 (NCPC File No. MP55).

Appendix C. NCPC Commission Action on 2010 JBAB Draft Master Plan

NCPC File No. MP55

JOINT BASE ANACOSTIA-BOLLING
DRAFT MASTER PLAN

Southeast, Washington, DC

Submitted by United States Department of Defense, Department of the Navy

May 5, 2011

Commission Action Requested

Approval of comments on the draft Master Plan for Joint Base Anacostia-Bolling, pursuant to Public Law 93-166 Section 610(a).

Commission Action

The Commission:

Provides the following comments on the draft Master Plan for Joint Base Anacostia-Bolling, as shown on NCPC Map File No. 84.22(05.14)4332:

Comments favorably on the inclusion of development strategies that limit the visual impacts of future base development on surrounding communities, on the Plan's landscaping standards that help preserve the character of existing Joint Base Anacostia-Bolling neighborhoods, and on the "Site Environment/Sustainability" chapter, which promotes a wide variety of sustainability-oriented strategies for future base development.

Comments unfavorably on the proposed employee parking ratio of 1:2.42, which exceeds the 2004 Comprehensive Plan ratio of 1:4 because the Transportation Management Plan does not justify why Joint Base Anacostia-Bolling will not meet the Comprehensive Plan parking ratio of 1:4 for this location and the master plan environmental assessment does not analyze an alternative that meets the 1:4 parking ratio. The current parking ratio is 1:1.66.

Notes that the Joint Base Anacostia-Bolling Master Plan Environmental Assessment's Cumulative Impacts section is required to consider the cumulative impacts of growing Joint Base Anacostia-Bolling when considered with other planned development, such as that at St Elizabeths and Poplar Point, and that the Joint Base Anacostia-Bolling Master Plan should indicate the level of NEPA review that will be conducted at the project level following completion of the Master Plan, **and encourages** the Navy to work with the Department of Homeland Security and General Services Administration to explore the possibility of developing

and managing a coordinated Transportation Management Plan for Joint Base Anacostia-Bolling and St. Elizabeths.

Recommends that the Joint Base Anacostia-Bolling Master Plan be revised to acknowledge, and the design of the North Administrative Mission Complex should reflect, the possibility of a future realignment of South Capitol Street and the Frederick Douglas Memorial Bridge.

Requests the following additional information in the Final Joint Base Anacostia-Bolling Master Plan, as outlined in NCPC's Master Plan submission guidelines:

- A Transportation Management Program (TMP) with the following additional information:

  (1) a description of existing and projected peak hour traffic by mode, with indicated points of entrance and exit, the number of existing and proposed bicycle spaces, as well as transit routes and stops and pedestrian facilities serving the installation, both on-site and in the nearby area; and a summary of existing and proposed parking by type of assignment (official cars, vanpools, carpools, single-occupant vehicles, handicapped persons, visitors, etc.);
  (2) stated goals and objectives for the TMP, such as trip reduction, mode split changes, or vehicle occupancy rate increases;
  (3) an evaluation of projected transportation impacts resulting from master plan developments and description of potential TMP mitigation measures;
  (4) a description of the process for monitoring and evaluating the achievement of goals and objectives and adjusting TMP strategies; and
  (5) a summary of the relationship of the TMP provisions to transportation management and air quality requirements of local, state and regional agencies, including provisions for working cooperatively with affected agencies to address those requirements.

- A description and analysis of existing and future conditions related to visitor and resident facilities and needs;

- A summary sheet for easy reference providing the following information for both existing conditions and long-range projections:
  (1) total acreage, including a breakdown in acreage of land area by use (for example: office/administrative, training, service);
  (2) total population, including a breakdown by employees and visitors (by shifts), residents, and students, noting peak arrival and departure times;
  (3) building floor area;
  (4) total number of parking spaces; and
  (5) any other useful statistics and facts;

- A cultural resources section that includes: an analysis of the potential effects, if any, that the master plan will have on recognized historic resources both on the installation or in the vicinity; and the status of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, if applicable (Compliance must be completed prior to Commission action.)

NCPC File No. MP55

Recommends that the Department of the Navy in preparing the Joint Base Anacostia-Bolling Master Plan:

- Analyze the specific impacts on the transportation network serving the Joint Base, especially the intersections along Firth Sterling Avenue, that will be created by shifting the truck screening facility to the North Gate and to propose mitigation measures.

- Provide specific estimates of the visitor trips that will be redirected and their impact on the levels of service of intersections along Firth Sterling.

- Analyze the impacts on the transportation network that will result if the Frederick Douglass Bridge is not reconstructed according to the longstanding realignment.

- Analyze the alternative truck access proposed by the District Department of Transportation as part of the Bridge realignment and explain why using the Firth Sterling Gate is a superior approach.

- Analyze the impact of the increased traffic from increased utilization of existing parking and propose mitigation measures.

- Provide an explanation why Joint Base Anacostia-Bolling cannot achieve the 1:4 parking ratio standard that will be achieved at St. Elizabeths.

_____

Deborah B. Young
Secretary to the National Capital Planning Commission

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Appendix D. Analysis for a Revised Parking Ratio Goal

NCPC enforces the *Transportation* element of the *Comprehensive Plan* that provides parking guidelines and goals for federal facilities in the National Capital Region. The most recent Federal TMP guidelines provided by NCPC were developed to reflect the relationship between the location of federal workplaces relative to the Metrorail system, with consideration of the overall quality of available transit services and walking distances and conditions in the region.

JBAB is situated within the "Historic District of Columbia Boundaries" defined by the *Comprehensive Plan* where the employee-to-parking ratio goal set by NCPC is one parking space for every four employees (1:4). However, given the existing conditions described in Chapter 2, the relationship of JBAB to existing transit services and the character of the surrounding area are not consistent with the conditions in the "Historic District of Columbia Boundaries" described in the *Comprehensive Plan* as follows: "This area is well served by transit... Streets surrounding federal facilities are very walkable... Commercial parking is generally available." Instead, a better category that fits this area would be the "suburban area beyond 2,000 feet of Metrorail" that are "poorly served by transportation infrastructure, limiting the commuting options available to federal employees," with a parking ratio goal of 1:1.5. The reasons are summarized below.

Transit Availability

As indicated in the Transportation Management Program, approximately 43 percent of JBAB employees commute from Virginia and 42 percent commute from Maryland. Nevertheless, the three Metrobus routes providing peak-hour service (10- to 20-minute headways) near either the Firth Sterling Gate or the Arnold Gate (Main Gate) mostly serve local areas in Ward 8 and can only reach as far as Ward 7. Two Metrobus routes connect JBAB with Maryland, but their operations are hourly. Regional commuter buses only have two lines for JBAB, both with limited service hours and running frequency, particularly in the morning (i.e. four times by MTA 907 and once by a Virginia commercial bus).

In terms of Metrorail system, the Congress Heights Metrorail Station is about one and a half miles away from the installation's Main Gate (Arnold Gate) and the Anacostia Metrorail Station is about half a mile (approximately 2,800 feet) from the Firth Sterling Gate located near the northern tip of JBAB's three-mile long property. As the *Comprehensive Plan* defines "reasonable walking distance from Metro" as 2,000 feet, which falls between a quarter mile and a half mile, JBAB commuters will need another one or two modes of travel between their workplace and nearby Metrorail stations if they are expected to use transit to commute. Unfortunately, the bus services outside JBAB are sparse and commuters are not allowed to use government shuttles to Metrorail stations or regional activity hubs based on current DoD regulations. These shuttles are intended for official business travel only.

Lack of convenient access to Metrorail and bus services in the vicinity of JBAB means that the majority of the 85 percent JBAB employees living outside D.C., if using transit to commute, need multiple travel mode changes and transfers, including driving to locations with transit systems, taking different Metrorail lines, taking buses, and/or walking unreasonable distances. In addition to all the inconvenience, every transfer can add approximately 10 minutes (including actual transfer plus waiting time). As shown in Table D-1, driving and then taking public transit between JBAB and nearby counties or cities can easily increase the total travel time by additional 40 to 50 minutes one-way, doubling or even tripling the time needed by driving. As a trend well documented in literature, transit usage will decline when commute needs two or more modes of transportation or requires additional commuting time.

WMCOG's 2012 CLRP identifies all regionally significant transportation projects and programs that are planned in the Washington metropolitan area between 2012 and 2040. The only planned transit project that may benefit JBAB is the DC Streetcar's Anacostia Initial Line Segment, which will be operating between the Anacostia Metrorail Station and the Firth Sterling Gate from the year of 2015 or 2016, and may extend further south with another stop near JBAB's Arnold Gate in the future. This new service, however, improves travel convenience more than reducing the overall commute time for JBAB commuters (i.e. walk about 15 minutes between the Anacostia Metrorail Station and the Firth Sterling Gate versus 10-minute transfer/waiting time plus five-minute ride on bus). The total number of transfers people need for their commute may not change as well. In fact, the 2012 CLRP analysis also indicates that JBAB is one of the few areas in D.C. where job accessibility by transit is projected to decrease due to a potential increase in congestion on roads and transit in the next 30 years.

In short, although strong interest in taking public transit exists among JBAB employees according to the 2012 employee transportation survey, the majority of JBAB commuters are not granted the access to transit that would be expected within the "Historic District of Columbia Boundaries" as defined by the *Comprehensive Plan*. The lack of transit service with minimal transfers in the vicinity of JBAB, coupled with the fact that there are no HOV lanes located or planned on the major highway corridor (I-295) in proximity to JBAB to add incentive for rideshare indicates this area falls into the category of "suburban areas beyond 2,000 feet of Metrorail" that are "poorly served by transportation infrastructure".

TABLE D-1: DRIVE VERSUS TRANSIT TIME

Starting Location (Some of the top 10 employee zip codes)	Zip Code	Modes (Drive to nearest transit stop)	# of Trip Segments / Transfers	Transit Time if taking shuttle from L'Enfant (minutes)	Notes for Transit (using L'Enfant stop)	Transit Time (minutes)	Driving Time in Morning Rush Hour (minutes)	Notes for Transit
Waldorf, MD	20603	Drive, Commuter Bus (MD#907), Walk	2 / 1 + Walk	**n/a**	n/a	**69**	**33**	15-minute drive to St. Charles Towne Plaza; 44-minute bus; At least 10-minute walk to worksite on base.
Upper Marlboro, MD	20772	Drive, Metro, Shuttle	3 / 2	**n/a**	n/a	**61**	**32**	22-minute drive to Suitland Metro; 7-minute time for parking and transit to metro; 10-minute metro on Green line; 22-minute shuttle to JBAB
Alexandria, VA	22304	Drive, Metro, Shuttle	3 / 2	**60**	9-minute drive to Van Dorn Metro Station; 7-minute for parking and transit; 22-minute ride on Yellow line to L'Enfant Metro; 22-minute shuttle to JBAB.	**78**	**20**	9-minute drive to Van Dorn Metro Station; 7-minute time for parking and transit; 40-minute on Blue and Green lines to Anacostia Metro; 22-minute shuttle to JBAB
Alexandria, VA	22315	Drive, VRE/ Metro, Shuttle	3 / 2	**70**	10-minute drive to Franconia/Springfield VRE station; 5-minute for parking; 33-minute VRE to L'Enfant; 22-minute shuttle to JBAB.	**86**	**22**	11-minute drive to Franconia-Springfield Metro; 7-minute time for parking and transit to metro; 46-minute ride on Blue line to L'Enfant and Green Line to Anacostia; 22-minute shuttle to JBAB.
Burke, VA	22015	Drive, VRE/ Metro, Shuttle	3 / 2	**75**	15-minute drive to Franconia/Springfield VRE station; 5-minute for parking; 33-minute VRE to L'Enfant; 22-minute shuttle to JBAB.	**91**	**39**	16-minute drive to Franconia-Springfield Metro; 7-minute time for parking and transit to metro; 46-minute ride on Blue line to L'Enfant and Green Line to Anacostia; 22-minute shuttle to JBAB.
Woodbridge, VA	22192	Drive, VRE, Shuttle	3 / 2	**88**	13-minute drive to VRE station in Woodbridge; 5-minute time for parking; 48-minute VRE to L'Enfant; 22-minute shuttle to JBAB.	**86**	**37**	18-minute drive to VRE station in Lorton; 5-minute for parking; 41-minute VRE to L'Enfant; 22-minute shuttle to JBAB.

Assumptions: For Anacostia Metro shuttle and wait time -- assumed a 10-minute wait time due to 20-minute headways and 12-minute shuttle ride.

For L'Enfant Metro shuttle and wait time -- assumed a 7-minute wait time due to 15-minute headways, 10-minute shuttle ride and 5-minute travel on base.

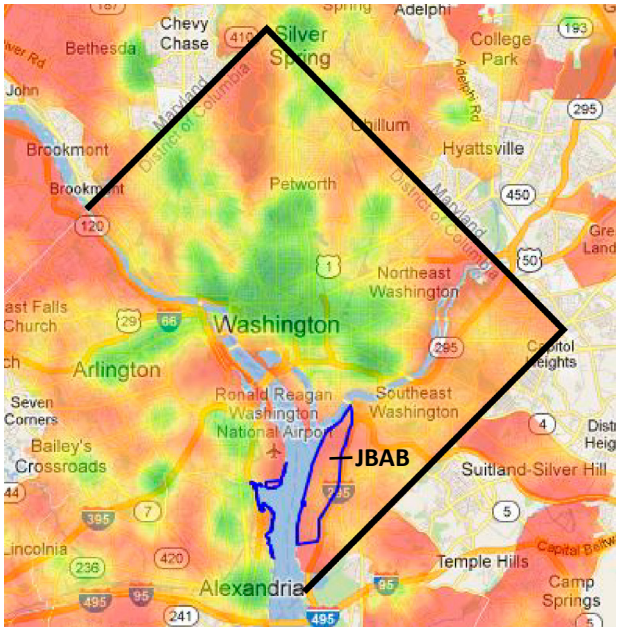
Walkability

JBAB is located in a relatively isolated location in Southwest Washington, D.C. The installation is separated from the surrounding land uses by I-295, a major freeway system serving the city, and by the Potomac and Anacostia Rivers. Both the northern tip of JBAB or the installation's Firth Sterling Gate are located about half a mile (over 2,800 feet) away from the nearest Anacostia Metrorail Station. This distance is 40 percent longer than the 2,000 feet "reasonable walking distance" the 1:4 parking ratio has been developed around.

The poor safety condition at the Anacostia Metrorail Station and nearby neighborhoods is another reason that has understandably discouraged JBAB employees from using Metrorail as a commuting alternative and then walk to the installation. The 2012 Metro Transit Police Department (MTPD) security report indicates that the Anacostia Metrorail Station has the second highest crime rates for all stations in the entire system in 2011. As shown in the walk score map of Washington, D.C. (Figure D-1), the walkability of the area JBAB is located is uncharacteristic of the urban conditions described in the areas within the "Historic District of Columbia Boundaries". This further supports the categorization of JBAB as "suburban area beyond 2,000 feet of Metrorail" with limited commuting options available to federal employees.

In addition, JBAB's property is about three-mile long, more than five times larger than the St. Elizabeths West Campus across I-295. Unlike the St. Elizabeths whose entire campus is within a 10-minute walk, many trips within JBAB are not in a reasonable walking distance. In particular, single-family residential and open space/outdoor recreation are currently the largest land uses at JBAB. The low-density, low-development-intensity suburban community character dominates a significant portion of the installation and is not expected to change due to land leases beyond the time frame of this Master Plan. Due to DoD-wide funding constraints, non-mission critical improvements including shuttle services for business trips will likely be targeted for reductions if military funding is further reduced.

FIGURE D-1: THE "WALK SCORE" AROUND JBAB



(Source: www.walkscore.com)

Regional Transportation Improvement

According to the 2012 CLRP, the only non-highway transportation improvement projects in the vicinity of JBAB by 2040 are two trail projects and the DC Streetcar project. The CLRP analysis of all planned transportation projects and programs in the region also shows the modes by which people choose to travel are not expected to change much over the next three decades. Unless new transit infrastructure, transit services, and HOV lanes are provided in proximity to JBAB in the next 30 years, the current CLRP projects are insufficient to dramatically improve the transit situation for JBAB employees.

Efforts toward Compliance

With a population of 13,811 employees and 8,259 parking spaces, the current parking ratio at JBAB is 1:1.67.

While JBAB currently meets the 1:1.5 parking ratio that fits the underlying criteria on which the NCPC parking ratios were based (distance from Metrorail and walking distance/ conditions), the installation recognizes that federal facilities within Washington, D.C. should strive for a higher mix of alternative modes of transportation to reduce SOV usage. As a large federal campus located at the nation's capital, JBAB is willing to demonstrate both leadership and compliance in sustainability by working to achieve reasonable goals and objectives expected of federal properties.

Given JBAB's unique situation, the installation proposes **a revised long-term parking ratio goal of 1:2** until transportation alternatives and transit-oriented development outside JBAB meet the condition expected within the "Historic District of Columbia Boundaries" (i.e. This area is well served by transit. ... Streets surrounding federal facilities are very walkable...) so that reduction of employee parking inside JBAB will not adversely impact the installation's employee retention, work productivity, and military mission operations.

Within the five-year time frame of this Master Plan, JBAB has set up a goal to reduce employee parking by 10 percent to achieve a parking ratio of 1:1.86 in its efforts to work towards parking compliance. Any additional parking within this time frame will be accompanied by an equal or greater reduction in existing parking.

Due to unforeseen mission requirements in the long term, JBAB's future parking ratio improvement will adopt a phased approach linked to planned improvements over time. By managing the installation's parking capacity in line with internal and external improvements, JBAB will continually coordinate with other federal and local agencies and

organizations on different transportation initiatives. It is expected that as time goes by, new transit infrastructure, transit services, and HOV lanes will be available to better serve employees working in JBAB. In addition, ferry service and shuttle service may be implemented and/or expanded by DoD in the future to supplement public transit. Currently DoD shuttles are not allowed to serve commuters due to existing regulations and laws; however, public demand and cooperation with lawmakers may make commuter shuttle service possible. Encouraging rideshare will also help achieve a lower ratio of SOV usage, reducing the overall number of vehicles on the road in the long term. The Navy will be working with DHS and other government agencies to lobby for adding HOV lanes on I-295 in the long term.

Appendix E. Site Environment and Sustainability

The DoD recognizes the importance of sustainability through directives which emphasize the incorporation of such practices into future installation planning and development.

A number of rating systems measure the level of sustainability of certain strategies and practices. The rating system currently adopted by the DoD is Leadership in Energy and Environmental Design (LEED) New Construction (NC) and Major Renovations, established by the U.S. Green Building Council (USGBC) to measure the sustainability in the design, construction, and operation of buildings. There also is a new system in development to measure sustainable site design, the Sustainable Sites Initiative (SSI). It is a partnership between the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, and the U.S. Botanic Garden, to create and test guidelines and performance benchmarks, as well as the rating system for sustainable landscape and site design. Many strategies called for by these two systems provide a good basis for sustainable design recommendations for JBAB.

This section outlines a number of strategies to support the goals of the LEED rating system and SSI. They increase energy conservation, improve stormwater management and water quality, increase walkability and transportation efficiency, and create a more sustainable JBAB. Each recommended strategy will provide a brief description of the proposed action and its associated benefits. It is worth noting that should these strategies conflict with the anti-terrorism standards set by DoD due to actual conditions on site, AT/FP standards take precedence.

E.1 Energy Conservation Strategies

The implementation of new energy conservation strategies on JBAB will provide the installation both economic and environmental benefits. New sustainable practices will ensure more efficient use of existing energy resources, reduce overall physical operational costs, and enhance the installation's environment. The strategies recommended in this section focus on physical improvements; however, one financing strategy is offered since a lack of funding can act as an obstacle to implementation.

E.1.1 Building and Site Improvements

Buildings

Strategy 1: Site future buildings with optimal orientation for passive solar energy. Buildings that are sited along an east-west axis will maximize daylight provided by the southern sun and minimize heat gain of the western sun.

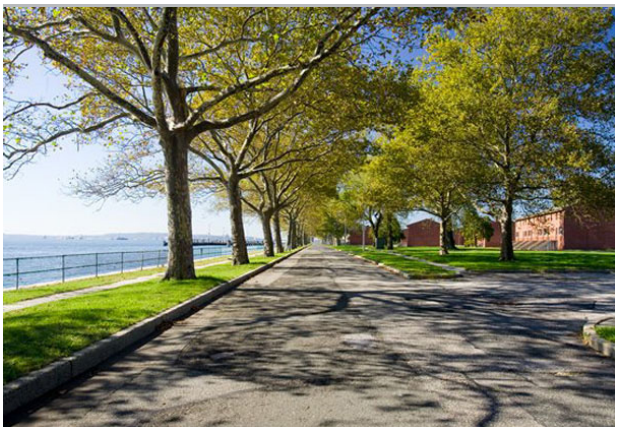
Benefits: Siting buildings with attention to the solar cycle will decrease the demand for electricity to light, heat and cool the building, thereby producing energy cost savings.

Strategy 2: Ensure all installation buildings are sealed and insulated in order to eliminate air drafts as well as to prevent heat loss in the winter and heat gain in the summer.

Benefits: Buildings which are properly sealed and insulated will reduce energy loss, increase heating and cooling efficiency, and lead to cost savings.

The use of cool roof materials helps reduce the solar heat absorbtion of buildings

Installation of solar-powered LED street lights will cut down energy consumption



Planting trees across the base will help reduce heat gain of pavement

Strategy 3: Use cool roofs on installation buildings to improve the efficiency of building heating and cooling. Roofs absorb varying degrees of solar heat depending on the materials used for their construction. On a summer day, traditional roofing materials such as asphalt shingles may result in temperatures that are 70 degrees hotter than "cool roofs". Through the use of light-colored roofing such as a white reflective surface, cool roofs are designed to reflect the sun's energy and therefore lower solar heat absorption.

Benefits: Cool roof materials have a high Solar Reflective Index (SRI), or ability to avoid solar heat absorption. Use of cool roof materials lowers the roof surface temperature and reduces heat transfer to the building, decreases energy costs for cooling the building, and helps lessen the built environment's heat island effect in the summertime.

Strategy 4: Replace all building appliances and equipment with ENERGY STAR qualified energy-efficient models or Federal Energy Management Program (FEMP) designated products.

Examples of such appliances and equipment include:

- Appliances: refrigerators, room air-conditioning units, dishwashers, clothes washers, etc.
- Office equipment: computers, screen displays, printers, fax machines, copiers, water coolers, etc.
- Electronics: DVD players, televisions, battery chargers, cordless phones, etc.
- Other: heating and cooling systems, commercial dishwashers, ovens, etc.

Benefits: The use of ENERGY STAR qualified technologies or FEMP designated products reduces the consumption of energy, lowers energy bills, and helps curtail carbon dioxide emissions.

Lighting

Strategy 1: Retrofit lighting fixtures or light bulbs with light-emitting diode (LED) technology. Employ solar-powered LED technology when possible.

Benefits: LED technology lowers energy consumption and translates into long-term cost savings. LED technology also lasts longer than conventional devices, requiring less maintenance and replacement.

Vegetation

Strategy 1: Implement a comprehensive tree planting strategy across the installation, targeting parking lots, walkways, and the south and west sides of major buildings.

Benefits: Trees in parking areas and along sidewalks will help reduce the heat gain of pavement and its contribution to

the built environment's heat island effect, which can increase demand for building cooling in the summer time. Planting deciduous trees on the south and west sides of major buildings will help shade buildings from summer sun and allow winter sun to penetrate, helping reduce energy costs.

Rainwater Recycling

Strategy 1: Collect rainwater runoff from building rooftops in rain barrels or cisterns and use the water for landscape irrigation. Small rain barrels hold between 50 and 100 gallons of water, whereas cisterns are generally larger and hold more water. Cistern capacity ranges from 100 to 10,000 gallons and can be installed above-ground or below-ground. Cisterns can also connect to automatic irrigation systems.

Benefits: Collecting and using rainwater for irrigation will reduce or eliminate the amount of potable water required for landscape irrigation, which will result in cost savings.

Cool Pavement

Strategy 1: Along the same lines as cool roofs, cool paving materials will reduce paved surface temperatures as well as reduce the transfer of heat to the surrounding area. Lighter-colored materials and porous materials are examples of cool paving materials. They should be used for walkways and parking areas instead of asphalt.

Benefits: Cool paving materials, such as concrete, have a high level of solar reflectance or ability to avoid solar heat absorption. This characteristic reduces the pavement surface temperature and helps lower contributions to the heat island effect, which can increase demand for building cooling in the summer time.

Renewable Energy *

Strategy 1: Incorporate alternative energy production systems into building and site designs to make use of solar power and ground source heat. Solar power can be used to generate electricity on-site through the use of photovoltaic panels, or PVs. Ground source heat utilize the earth's relatively constant temperature under ground to provide heating and cooling for buildings.

Benefits: The use of on-site renewable energy will reduce the overall demand placed on the local electric utility, producing energy cost savings for JBAB. Renewable energy also provides the installation greater independence from fossil fuels and the power grid.

**Due to existing airfield and helicopters operations at JBAB and over its shoreline, the rotor blades of wind turbines cannot reach a height where wind is strong enough to generate sufficient power for its intended use. This has been proved by the existing wind turbines installed on the rooftop of the DIA building. Therefore, renewable energy such as solar power and geothermal energy are recommended instead of wind power.*

The use of cool paving materials will reduce surface temperatures

Installation of PVs will reduce energy consumption and decrease costs

Wind turbines are NOT recommended for renewable energy production at JBAB due to height restrictions and low wind speed in the region

E.1.2 Financing

The lack of available funding can act as an obstacle to the implementation of energy efficiency upgrades.

Strategy 1: Use an Energy Savings Performance Contract (ESPC) to support JBAB's energy efficiency goals without having to shoulder the up-front capital costs or special congressional appropriations. The ESPC is a partnership between the agency customer and an energy services company (ESCO) that will conduct a comprehensive energy audit and identify needed improvements. In consultation with the agency, the ESCO will design and finance the needed improvements. In return, the ESCO guarantees the improvements will generate savings sufficient to pay for the cost of the improvements over the course of the contract. At the end of the contract, any additional savings revert to the agency.

Benefits: Executing an ESPC will help the installation's energy efficiency needs without the added burden of finding the funding to finance the up-front capital costs.

E.2 Stormwater Management Strategies

From its earliest days, the installation has had to grapple with the issues of flooding and drainage, particularly on the Anacostia side. Furthermore, with the Anacostia and Potomac Rivers bordering the installation, JBAB's practices have the potential to impact the health of the waterways through the quality of water discharged to the rivers.

In addition to the conventional stormwater system upgrades, existing LID landscape techniques employed by JBAB include sand filters, trash scepters, porous pavers, bioretention areas, grass swales, and one green roof. Utilization of additional sustainable practices will further decrease the demand placed on existing conventional stormwater infrastructure and its costly expansion, improve the quality of water flowing into the nearby waterways, and help mitigate flooding and standing water issues on the installation. The strategies recommended in this section focus on physical stormwater management improvements.

E.2.1 Building and Site Improvements

Buildings

Strategy 1: Cluster buildings to share parking and loading areas and build vertically rather than horizontally. For buildings requiring a security buffer, AT/FP requirements take precedence.

Benefits: This strategy will make better use of valuable land resources and reduce the amount of impervious pavement in the form of roofs and parking lots. It also reduces stormwater runoff and can improve the overall quality of water.

Installation of a green roof will reduce stormwater runoff and improve water quality

Strategy 2: Retrofit or install vegetated "green" roofs on existing structures or new structures. These structures should be physically capable of withstanding the additional load of plants and saturated soil. However, historic buildings should not be retrofitted. Green roofs are a best management practice and can be accommodated on conventional flat or sloped roofs. The green roofs are covered with a waterproof membrane, soil and vegetation. The intensity of the green roof (intensive, extensive, or semi-intensive) determines the cost and degree of maintenance required.

Intensive green roofs require at least one foot of soil depth, but all types of vegetation may be planted, including trees. Intensive roofs typically require regular maintenance and often include irrigation and drainage systems. Extensive green roofs have a soil depth of one to six inches and generally require less maintenance than intensive roofs. Semi-intensive roofs include a mix of intensive and extensive green roof qualities, shallow planting areas, and some strategically-located, deeply-planted areas.

Benefits: The installation of green roofs will reduce the volume of stormwater runoff produced and increase the water quality of runoff. These benefits translate into major cost savings for JBAB. Furthermore, green roofs may perform a dual service in the form of energy conservation. They reduce energy costs for the heating and cooling of the building and help reduce the building's contribution to the heat island effect.

Parking Lots

Strategy 1: Remove parking areas that are underused or deemed inefficient.

Benefits: This strategy will reduce the amount of impervious surface at JBAB, thereby facilitating water percolation and reducing the amount of stormwater runoff generated by sites.

Vegetation

Strategy 1: Implement a comprehensive landscaping strategy at the installation, targeting parking lots, open spaces, and the perimeter of major buildings. Increase tree canopies in areas that are approved by JBAB Public Works Department. bio-infiltration systems such as vegetated swales and rain gardens with proper trees within or adjacent to parking areas and major buildings, along primary roads, and at the base of disconnected downspouts. These landscape features are designed to treat stormwater runoff on-site; they can effectively manage water from storm events with rainfall up to two inches.

Benefits: Greater use of tree plantings, vegetated swales, and rain gardens at JBAB will help reduce pooling after storm events in areas such as parking lots. It also increases infiltration and improves the water quality of runoff. This strategy will reduce costs through a diminished need for conventional engineered systems in addition to the energy conservation benefits plantings provide, as described in the energy conservation section.

Vegetated bioswales along roadways help manage and treat stormwater runoff

Rainwater Recycling

Strategy 1: Collect rainwater runoff from building rooftops in rain barrels or cisterns and reuse the water for landscape irrigation.

Benefits: Collecting and reusing rainwater will reduce the amount of stormwater runoff generated and present on-site. This benefit is in addition to saving potable water from landscape irrigation, as described in the energy conservation section.

Rain barrels can reduce potable water usage for landscape irrigation

Porous Pavements

Strategy 1: Use porous pavements in lieu of traditional impervious asphalt whenever feasible. Porous pavements are made of materials that absorb stormwater and allow it to seep into the ground due to their design. Concrete and asphalt that are designed with gaps between particles are examples of porous pavers that can be used in parking lots; open grid grass pavers can be used in overflow parking areas. Mulch, gravel, and stone qualify as porous paving and can be used along walking trails.

Benefits: Replacing existing parking lot surfaces and walkways with porous materials will reduce the quantity of stormwater runoff, improve the quality of stormwater runoff, increase groundwater recharge, and reduce the overall cost of stormwater management by lessening the need for conventional system capacity increases and improvements.

Porous pavement in parking areas will reduce the quantity of stormwater runoff

E.3 Transportation Efficiency Strategies

Historically the installation was developed in a piecemeal fashion with an emphasis on developing individual sites in response to the changing mission needs, rather than considering how these project sites cumulatively function together. This has resulted in dependence on the vehicle as the primary mode of transportation to access and move around the installation. To improve site connectivity and facilitate use of alternative modes of transportation while still being capable of adapting to changing mission needs, this section describes strategies focusing on physical improvements and potential funding sources.

E.3.1 Building and Site Improvements

Site Design

Strategy 1: Infill previously developed sites or site new buildings on or adjacent to such sites.

Benefits: Giving preference to previously developed sites will make better use of valuable land resources and existing infrastructure, provide connectivity between facilities, and help retain open space for recreation and conservation, or accommodate future unanticipated facility needs.

Strategy 2: Cluster similar or complementary functions in proximity, and make efficient use of lands through multi-story development.

Benefits: This strategy will encourage pedestrian activity between facilities and reduce people's reliance on personal vehicles to travel within the installation. It also results in health benefits for the individual through an increase in physical activity and environmental benefits through a reduction in vehicle travel and emissions.

Strategy 3: Pursue consolidated, environmentally-friendly parking facilities over small individual parking lots and site them on the periphery of the development in order to encourage pedestrian activity between buildings.

Benefits: This strategy will make better use of valuable land resources, encourage greater pedestrian activity by decreasing convenience parking, and promote a base configuration that rewards those who use alternative forms of transportation more frequently than those who use vehicles. This produces health benefits for the individual through increased physical activity and environmental benefits for the installation and the region through a reduction in vehicle travel and emissions and better utilization of impervious surfaces.

Placing parking on the periphery of development has numerous environmental benefits

Strategy 4: Reserve carpool parking in convenient locations of the parking lots.

Benefits: Providing convenient reserved carpool parking with enforcement will make carpooling a more viable commuter option for workers and encourage installation personnel to use this mode of transportation over the single-occupant vehicle.

Pedestrian Amenities

Strategy 1: Install properly sized, unobstructed, and continuous walkways along streets and between facilities and connect them with the existing pedestrian network. Walkways should range in size from 5 feet to 10 feet, depending on the character of the area and type of uses supported.

Benefits: A continuous walkway network will provide a safe and convenient way for pedestrians to travel throughout the installation. This in turn will enhance installation walkability and provide health benefits to individuals through an increase in physical activity. It will also provide environmental benefits by reducing vehicle travel and emissions.

Public Transit Facilities

Strategy 1: Provide safe and comfortable transit facilities, such as bus shelters, benches, lighting, and trash receptacles at shuttle stops or transit hubs.

Benefits: Providing safe and comfortable transit facilities makes alternative modes of installation transportation a viable option and encourages installation personnel, residents, and visitors to use alternative transportation. This will result in environmental benefits by helping decrease vehicle travel and emissions.

Bicycle Lanes and Bike Storage

Strategy 1: Provide shared bicycle lanes along the length of the primary travel routes at the installation.

Benefits: The designation of shared bicycle lanes will provide bicyclists a safer and convenient route for traveling on the installation. Such an action will result in health and safety benefits for installation residents and personnel who may wish to use such a route. It will also result in environmental benefits by encouraging an alternative form of transportation, thus cutting down on vehicle travel and emissions.

Strategy 2: Provide adequate bicycle storage as recommended in Table E-1 at buildings throughout the installation, especially buildings with large numbers of occupants or high levels of traffic. Provide at least one on-site shower with changing facilities for any new or retrofitable building with at least 100 workers and an additional on-site shower with changing facilities for every 150 workers thereafter.

Benefits: Providing bicycle storage and showers and changing facilities on-site will encourage resident, personnel and visitor use of alternative modes of transportation, minimizing the adverse environmental effects of vehicle travel.

TABLE E-1: RECOMMENDED BICYCLE STORAGE QUANTITIES

Site Type		Quantity
Retail	Employees	10 percent of planned employee occupancy
	Visitors	One space per 5,000 square feet of retail space, but no fewer than four spaces
Non-retail (except housing areas)	Occupants	10 percent of planned occupancy
	Visitors	One space per 10,000 square feet of building space, but no fewer than four spaces
Dormitory or Housing Area	Occupants	30 percent of the planned occupancy
	Visitors	One space per 10 dwelling units, but no fewer than four spaces

Share bicycle lanes will produce environmental benefits for the installation and health benefits for users

Safe and comfortable transit facilities makes alternative transportation a viable option for users

To encourage alternative transit on base, provide bicycle storage at buildings

E.3.2 Financing

Implementing the Master Plan recommendations will require additional studies and strategic investments. The complexities of funding sources and their appropriation on military installations can act as an obstacle to implement some development recommendations, such as multi-story development with mixed-use facilities.

Strategy 1: A combination of partnership among the installation, other public entities, and the private sector offer significant opportunities to potentially leverage resources and coordinate future improvements to achieve a desirable outcome. The Village Commons at Fort Belvoir Army Post and its "Main Street"-style town center have successfully combined the community support uses on the ground floor and other approved uses above through a public and private partnership with Clark Pinnacle Family Communities, LLC. JBAB can use this case as a model to determine if and how such an approach can be adapted to JBAB.

Benefits: The public and private partnership provides a new funding strategy that can help JBAB commit to its vision and take actions to advance the Master Plan recommendations.

Fort Belvoir has an active, pedestrian-friendly town center

The public and private partnership strategy employed by Fort Belvoir helped with the creation of the installation's mixed-use town center