



NSA Bethesda

Installation Master Plan

Naval District Washington

NAVAL FACILITIES ENGINEERING COMMAND





NSA Bethesda

Installation Master Plan



DRAFT Final

Viewing Note:

This document is intended to be viewed as a printed booklet.
If viewing on screen as a PDF, it is recommended to view as "Two-Up"
with the option to "Show cover page during Two-Up" selected under
the Page Display menu.

May 2012

Planning Team Contact Information:

Naval Facilities Engineering Command
Claire Cary, AICP
Navy Technical Representative
301.295.1338
claire.cary@navy.mil

Atkins | Berger Joint Venture
Chad Rinker, RLA, LEED AP
Project Manager, Atkins
703.535.3008
chad.rinker@atkinsglobal.com

Prepared for:



Prepared by:



THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

1.0 Executive Summary	1	3.3 Review Agencies.....	23
1.1 The NSA Bethesda Master Plan 2012 Update	1	3.4 Regional Transportation	24
1.2 Current NSA Bethesda Missions and Visions	2	3.4.1 Regional Roadway Network	24
1.2.1 Walter Reed National Military Medical Center Bethesda	2	3.4.2 Regional Public Transportation	24
1.2.2 Uniformed Services University of the Health Sciences .	2	3.5 Regional Utilities	26
1.2.3 Commitment to being a World Class medical facility....	2	3.5.1 Electrical.....	26
1.3 Planning Methodology.....	3	3.5.2 Water	26
1.4 Program Basis.....	4	3.5.3 Sanitary Sewer	26
1.5 Planning Objective	4	3.6 Cultural Assets	27
1.6 Description of the Master Plan Concepts	5	3.6.1 Schools	27
2.0 Overview and Program Requirements.....	7	3.6.2 Public Safety.....	27
2.1 Authorization and Applicability.....	7	3.6.3 Medical Facilities	27
2.3 Master Plan Format	8	3.7 Historic Resources.....	27
2.4 Historic Overview and Background.....	9	3.8 Population Trends	28
2.5 NSA Bethesda Organization	10	3.9 Economy and Housing.....	29
2.6 Master Plan Goals and Objectives	11	3.10 Other Relevant Federal Research Facilities	30
2.7 Summary of Program Requirements.....	12	4.0 Existing Conditions.....	31
2.8 Summary of Site Data	13	4.1 Site Overview	32
2.9 Planning Premises and Program	13	4.2 Environmental Conditions.....	33
2.9.1 Population	13	4.2.1 Environmental Conditions: Natural	33
2.9.2 Program Basis.....	14	4.2.2 Environmental Conditions: Operational	48
2.9.3 Security Considerations.....	14	4.3 Functional and Spatial Relationships	54
2.9.4 Transportation and Circulation.....	14	4.3.1 Existing Land Use.....	54
2.10 Relationship to Other Efforts.....	15	4.4 Facilities Assessment.....	58
2.10.1 Accessibility Plan	15	4.4.1 Facilities Use.....	58
2.10.2 Comprehensive Master Plan for the National Capital Region Medical.....	15	4.4.2 Building Inventory	60
2.10.3 Walter Reed National Military Medical Center Bethesda (WRNMMCB) Medical Facilities Master Plan15	15	4.4.3 Building Assessments.....	64
2.10.4 Transportation Management Program.....	15	4.4.4 Building Heights and Massing	66
2.10.5 National Environmental Policy Act	15	4.4.5 Services	66
4.4.6 Landscape Patterns	68	4.4.7 Open Spaces.....	68
4.4.7 Open Spaces.....	68	4.4.8 Recreational Facilities.....	68
4.4.8 Recreational Facilities.....	68	4.4.9 Development Patterns.....	70
4.4.9 Development Patterns.....	70	4.4.10 Views, Landmarks and Wayfinding.....	72
4.4.10 Views, Landmarks and Wayfinding.....	72	4.5 Circulation	74
3.0 Community Context of the Bethesda Campus	17	4.5.1 NSAB Access and Circulation	74
3.1 Location of NSAB.....	18	4.5.2 Intersection Capacity Analysis	76
3.2 Regional Planning Context	20	4.5.3 Truck Access and Circulation Patterns	80
3.2.1 NCPC and The National Capital Region	20	4.5.4 Public Transportation	82
3.2.2 M-NCPPC.....	20	4.5.5 Installation Shuttle Services	84
3.2.3 Community Based Planning	20	4.5.6 Existing Parking on Campus	86
3.2.4 Other Studies	21	4.5.7 Existing Pedestrian and Bicycle Facilities	88

4.6	Utilities Infrastructure.....	94
4.6.1	Electrical.....	94
4.6.2	Communications.....	96
4.6.3	Mechanical.....	96
4.6.4	Natural Gas.....	101
4.6.5	Water.....	102
4.6.6	Sanitary Sewer.....	103
4.6.7	Storm Water.....	104
4.7	Constraints and Opportunities Summary.....	106
4.7.1	Composite Constraints.....	106
4.7.2	Opportunities.....	108
5.0	Master Plan Update for NSAB.....	111
5.1	Participating Offices.....	112
5.2	Planning Process.....	112
5.3	Goals and Objectives.....	113
5.4	Master Development Plan.....	114
5.5	Program Summary.....	116
5.5.1	Short Term Planned Projects.....	118
5.5.2	Long Term Opportunity Areas.....	124
5.5.3	Parking Opportunities.....	129
5.5.4	Utility and Infrastructure Improvements.....	134
5.5.5	Recreation and Open Space Improvements.....	138
5.6	Demolition.....	141
5.7	Phasing.....	142
6.0	Development Guidelines.....	143
6.1	Reference Documents.....	144
6.2	Installation Framework Plans.....	146
6.2.1	Building and Siting Framework.....	146
6.2.2	Pedestrian Framework.....	150
6.2.3	Roadway Framework.....	152
6.2.4	Signage Framework.....	154
6.2.5	Lighting Framework.....	156
6.3	Landscape Guidelines.....	158
6.3.1	Foundation and Courtyard Planting.....	158
6.3.2	Open Space Planting.....	158
6.3.3	Streetscape Planting.....	158
6.3.4	Parking Areas.....	158
6.3.5	Plant Materials.....	158
6.4	Recreation Guidelines.....	159
6.4.1	Recreational and Open Space Types.....	159
6.4.2	Rooftop Vegetation and Recreation.....	162
6.4.3	Universal Accessibility and Recreational Amenities.....	162

List of Figures

Figure 1-1	Master Plan Methodology and Schedule.....	3
Figure 2-1	Base Population.....	13
Figure 3-1	Regional Map.....	18
Figure 3-2	National Capitol Region as Defined by NCPC.....	20
Figure 3-3	Montgomery County Community Planning Areas.....	21
Figure 3-4	Montgomery County Master Plans Map.....	22
Figure 3-5	Regional Transportation Map.....	24
Figure 3-6	Percent Minority Population 2000-2009.....	29
Figure 3-7	Unemployment Rate 2007-2010.....	29
Figure 3-8	Median Sales Housing Prices (all types).....	29
Figure 4-1	Site Overview Aerial.....	32
Figure 4-2	Slope Analysis Map.....	34
Figure 4-3	Soils Profile Map.....	36
Figure 4-4	Hydrology Map.....	38
Figure 4-5	Vegetation and Woodlands Map.....	40
Figure 4-6	Historic Buildings Map.....	44
Figure 4-7	Cultural Resources Map.....	46
Figure 4-8	Encroachment and Noise Diagram.....	48
Figure 4-9	AT/FP Standoff Map.....	50
Figure 4-10	Airspace Restrictions Map.....	52
Figure 4-11	2011 Existing LandUse Map.....	54
Figure 4-12	Regionally Integrated Master Program (RIMP) 2035 Model Base.....	57
Figure 4-13	Distribution by Facility Classes.....	58
Figure 4-14	Facility Use Map.....	58
Figure 4-15	Physical Quality Rating Map.....	64
Figure 4-16	Building Heights Map.....	66
Figure 4-17	Open Space and Recreation Map.....	68
Figure 4-18	Development Patterns Diagram.....	70
Figure 4-19	Views, Nodes and Landmarks.....	72
Figure 4-20	Access and Circulation.....	74

Figure 4-21 AM Peak Hour Traffic Conditions	76	Figure 5-10 Future Utilities and Infrastructure Development Plan..	134
Figure 4-22 PM Peak Hour Traffic Conditions.....	78	134
Figure 4-23 Heavy Vehicle Traffic Trend at Nsab February - March 2007	80	Figure 5-11 Recreation and Open Space Development Plan	138
Figure 4-24 Existing Loading Docks and Delivery Routes	81	Figure 6-1 Major Building Setbacks.....	146
Figure 4-25 Public Transportation Map	83	Figure 6-3 Section A-Recommended Building Envelope for Northwest Campus Area- View Toward East.....	148
Figure 4-26 Shuttle Service Routes Map	84	Figure 6-4 Section B- Recommended Building Envelope for Southwest Campus Area- View Toward East.....	148
Figure 4-27 Parking Locations Diagram September 2011	86	Figure 6-5 Section C- Recommended Building Envelope for Northeast Campus Area- View Toward East.....	149
Figure 4-28 Existing Pedestrian Facilities	88	Figure 6-6 Section D- Recommended Building Envelope for Southeast Campus Area- View Toward East.....	149
Figure 4-29 Sidewalks, Buffers and Deficiencies	90	Figure 6-7 Pedestrian Circulation Framework Plan	150
Figure 4-30 Bicycle Pathways, Facilities and Volumes.....	92	Figure 6-8 Roadway Framework Plan.....	152
Figure 4-31 Electrical System Diagram.....	95	Figure 6-9 Signage Framework Plan	154
Figure 4-32 Communication System Diagram.....	96	Figure 6-10 Lighting Framework Plan.....	156
Figure 4-33 CATV System Diagram	97		
Figure 4-34 Chilled Water Distribution Diagram	98		
Figure 4-35 Steam Distribution Diagram.....	99		
Figure 4-36 Natural Gas Distribution Diagram	101		
Figure 4-37 Potable Water Distribution Diagram.....	102		
Figure 4-38 Sanitary System Diagram	104		
Figure 4-39 Storm water System Diagram	105		
Figure 4-40 Composite Constraints Diagram	106		
Figure 4-41 Development/Redevelopment Opportunity Areas Diagram.....	108		
Figure 5-1 Future Land Use Plan	114		
Figure 5-2 Future Building Development Plan	118		
Figure 5-3 Industrial/Warehouse Area Reconfiguration	125		
Figure 5-4 Building 50 Site Concept Diagram.....	126		
Figure 5-5 Building 50 Site Section.....	127		
Figure 5-6 Satellite Pharmacy Concept Diagram.....	128		
Figure 5-7 H Lot Parking Garage Concept Diagram	130		
Figure 5-8 Taylor Road Facilities Concept Diagram	131		
Figure 5-9 N Lot Parking Garage Concept Diagram.....	132		

List of Tables

Table 2-1 Base Population	13
Table 3-1 Population Totals in Montgomery County and Neighboring Counties	28
Table 4-1 Historic District Contributing Structures.....	44
Table 4-2 Facility Type Distribution	60
Table 4-3 NSAB Building Inventory.....	60
Table 4-4 Physical Quality Ratings Summary.....	64
Table 4-5 Existing AM Levels of Service Results	76
Table 4-6 Existing PM Levels of Service Results	78
Table 4-7 Truck Traffic Percentage - Adjacent Roadways	80
Table 4-8 Existing Sidewalks Condition Summary	88
Table 5-1 Program Summary.....	117
Table 5-2 Potential Demolition List	141
Table 6-1 Recreation Location Matrix	161



1.0 Executive Summary

1.1 The NSA Bethesda Master Plan 2012 Update

The most recent approved Master Plan for NSA Bethesda was completed in 2008 while the Installation was under the command of the National Naval Medical Center (NNMC). The purpose of the plan was to address anticipated development, primarily expansion of services that were the result of the Base Realignment and Closure (BRAC) 2005 requirements. The BRAC process was a congressionally authorized independent review and analysis of Department of Defense (DoD) installations to be closed or realigned. In 2010, Base operations were transferred from NNMC to Naval Support Activity Bethesda (NSAB) as part of the Naval Installations Command's (CNIC) goal to acquire and provide support for the bases of all Naval medical centers. BRAC 2005 requirements realigned tertiary care and additional activities from Walter Reed Army Medical Center (WRAMC) to the former NNMC. The new center became Walter Reed National Military Medical Center Bethesda (WRNMMCB) in September 2011. The substantial completion of BRAC construction and the transfer of operations to NSAB present an opportunity to reevaluate the Master Plan for the entire installation.

The purpose of this Master Plan is to provide an Installation-wide plan from the perspective of NSAB that covers all tenants. The goal is to improve Installation facilities, standards and quality of life. This Master Plan brings the existing 2008 NNMC Master Plan up to date and uses post-BRAC-construction conditions as the starting point with a time-frame of 10 years. In addition, this plan seeks to bring the Installation in line with the Regionally Integrated Master Program (RIMP) 2.0 Model Base Plan and the Naval District Washington's 2035 vision; therefore, this Master Plan will use 2035 as a long-term goal.

A master plan is intended to be a framework for physical development of an installation, so that development results in consistent and appropriate physical appearance and functions. A master plan is a high-level document that provides the guiding framework for future projects, area plans and further studies. Further studies that will be required for projects within this Master Plan include a Transportation Management Program (TMP) and National Environmental Policy Act (NEPA) documentation.

This Master Plan provides a logical basis and framework for anticipated development throughout the campus considering existing constraints and opportunities. Based on input provided by tenants and users at the Installation, the Master Plan examines strategies for accommodating changes in missions, increasing efficiency of the Installation and improving support for the primary (health care delivery and medical education) and secondary supporting missions. As is natural for any long-term planning document, the actual program is dependent on many variables and some of the anticipated growth may not materialize as anticipated; however, the Master Plan provides the framework to ensure orderly growth where it does occur.

1.2 Current NSA Bethesda Missions and Visions

The following statement is taken from the Commander's Intent- Mission, Vision, Culture and Norms in early 2011.

"Since its inception, Bethesda has led military medicine in the areas of medical care, research and education, yet we are now in the midst of transformational change on this Installation. With the establishment of NSA Bethesda we are moving forward with the new order embracing, the future, yet we will never forget the rich legacy of our largest tenant, National Naval Medical Center. The legacy that the National Naval Medical Center brings to bear is unmatched and we will never forget what it has done for the installation.

"In a number of months the National Naval Medical Center will become the Walter Reed National Military Medical Center Bethesda. Understanding the role of a Navy installation in this joint environment is critical to our ability to achieve success. As with any Navy installation, our mission is to "tactically execute efficient and effective shore installation management services and programs in support of mission commanders to enable combat readiness for fleet, fighter and family." In simple language our sole reason to exist is to support our tenant commands in their pursuit of excellence in patient care, medical research and education. It is important that we support not only those who work at the commands, the staff, but also those who use the commands as well: patients and students."

Source: www.cnmc.navy.mil/Bethesda/About/MissionAndVision

1.2.1 Walter Reed National Military Medical Center Bethesda

The realignment of NNMCMC and WRAMC to form the Walter Reed National Military Medical Center Bethesda (WRNMMCB), established a shared, clear vision for the future. Delivered by Maj Gen Kenneth L. Farmer Jr. and Rear Admiral Adam M. Robinson (NNMCMC) and approved in June 2006, this vision is still strong and supported by the current commanders, the president of USUHS and the 79th Medical Wing commanders at Joint Base Andrews-Naval Air Facility Washington (JBA-NAFW) and is as follows:

"We envision and are committed to one integrated health system that leverages the assets of all DoD health care treatment facilities in the National Capital Area (NCA). The tri-service WRNMMCB will be a worldwide military referral center and together with the Uniformed Services University of Health Sciences (USUHS) will represent the core of the integrated health system. All tri-service facilities in the NCA and USUHS will serve as a premier academic medical system focused on delivering the highest quality care, distinguished health professional education, and exemplary clinical and translational research."

1.2.2 Uniformed Services University of the Health Sciences

The mission of The Uniformed Services University of the Health Sciences (USUHS) is as follows:

"The Uniformed Services University is the Nation's federal health sciences university and is committed to excellence in military medicine and public health during peace and war. We provide the Nation with health professionals dedicated to career service in the Department of Defense and the United States Public Health Service and with scientists who serve the common good."

"We serve the uniformed services and the Nation as an outstanding academic health sciences center with a worldwide perspective for education, research, service and consultation; we are unique in relating these activities to military medicine, disaster medicine and military medical readiness."

1.2.3 Commitment to being a World Class medical facility

The National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2010 called for the development of a Comprehensive Master Plan to provide sufficient world class military medical facilities and an integrated system of healthcare delivery for the National Capital Region (NCR). In the FY09 NDAA, Congress recognized the construction of WRNMMCB (and the new Fort Belvoir Community Hospital) as an opportunity to provide such facilities, and defined world-class as "incorporating the best practices of the premier private health facilities in the country as well as the collaborative input of military healthcare professionals into a design that supports the unique needs of military personnel and their families." The National Capital Region Base Realignment and Closure (BRAC) Health Systems Advisory Subcommittee (HSAS) prepared a report in May of 2009 further elaborating the definition of a world-class medical facility. This report, "Achieving World Class: An independent review of the Design Plans for the Walter Reed National Military Medical Center Bethesda and the Fort Belvoir Community Hospital," elaborates the definition, provides rationale and presents recommendations for achieving distinction as a world-class medical facility.

While the full definition of a world-class medical facility is complex, it can be briefly summarized as a facility "where the best of the art and science of medicine come together in a focused effort to meet the needs of the patient by providing the best in physical, mental, social and spiritual care."

Sources: "Achieving World Class: An independent review of the Design Plans for the Walter Reed National Military Medical Center Bethesda and the Fort Belvoir Community Hospital, HSAS, 2009"; NDAA for FY 2009; NDAA for FY 2010.

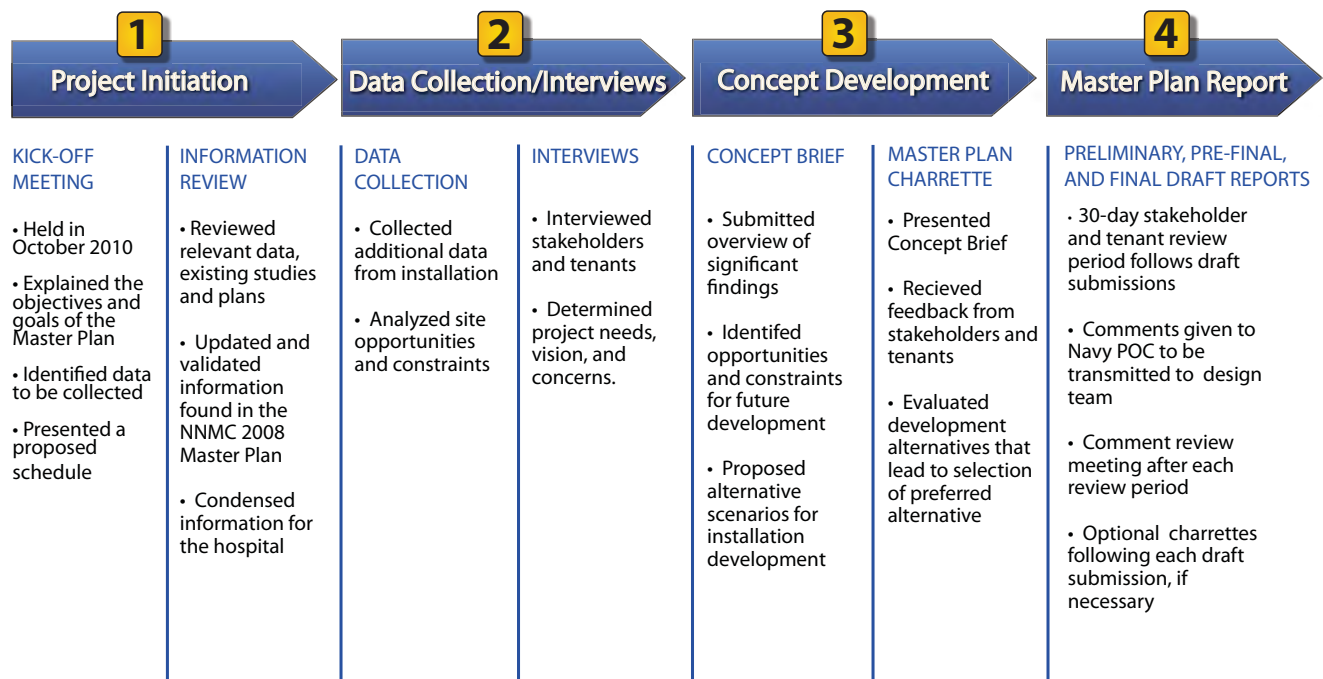


FIGURE 1-1 MASTER PLAN METHODOLOGY AND SCHEDULE

1.3 Planning Methodology

This Master Plan focuses on requirements projected over the next 10 years. It supports the continued mission of WRNMMCB and its goal to achieve World Class distinction. The Master Plan also accommodates anticipated growth of tenants such as USUHS, as well as the necessary growth associated with the transfer of operations to NSAB.

The Master Plan Update process kicked-off in October 2010. The planning team conducted a review of relevant data, existing studies and plans to validate and update the information found in the 2008 NNMC Master Plan, and to begin to develop a program of development options. The planning team conducted interviews with stakeholders and tenants on the Installation to determine their project needs, vision and concerns. The research and interviews culminated in a concept brief which provided an overview of the significant findings and identified opportunities and constraints that impact future development. Development scenarios proposed in the concept brief were evaluated by tenants and stakeholders during a series of charrettes. This feedback informed the development of a preferred alternative as the basis of this Master Plan.

The Master Plan is a living document and must be updated periodically to capture the inevitable changes of such a large and dynamic organization. Because of its location within the National Capital Area (NCA), the Master Plan is also reviewed by the National Capital Planning Commission (NCPC) which requires periodic reviews and updates.

The growth and demolition projected in the Master Plan is based on the best information available through government facility and programming channels. However, there are many factors that could change these assumptions, including policy changes, funding streams, political environment and many others. The Master Plan provides an organized framework for the anticipated development that is flexible enough to adapt to these inevitable changes.

1.4 Program Basis

Whereas the previous 2008 Master Plan focused primarily on accommodating growth due to BRAC requirements, the 2012 Master Plan focuses on improving the quality of life, standards and facilities at NSAB. This master plan attempts to meet this goal of installation improvement by outlining a combination of short term planned projects and long term opportunities that address inefficiencies, improve accessibility, and provide the flexibility to accommodate future mission changes.

The short term planned projects are generally projects of a known scope that address specific plans, goals or challenges in the near term. These include several projects from the previous master plan which have not yet been implemented, as well as current and future renovation and construction projects. Specific projects included in this Master Plan represent an expansion of core mission functions, including the development of a World Class medical facility, a University expansion and renovation to support the world class mandate for collaboration between USUHS with WRNMMCB, and continued development of support facilities for fleet and family. Rationale for the proposed expansion and renovation of USUHS can be further explained in the 2010 USU CIRB and CONOPS Reports.

Long term opportunities identify areas, facilities or strategies that are not currently planned, but which should be recognized as part of the larger Installation improvement context. Because the ability to expand and incorporate new mission and technology is a core component of World Class recognition, this Master Plan also includes guidelines for potential development areas that may be programmed as future needs become clear.

Estimates of BRAC-related growth over the past few years indicate that the population of NSA Bethesda will have grown to 11,686 personnel in 2011 and is expected to grow to 12,611 by 2022. The growth of medical missions is expected to level off after September 2011, while growth in mission support personnel is mostly expected in the short term. Short and long-term growth in education personnel reflect the evolving research- and training-driven mission of USUHS. Projected population increases are discussed further in Section 2 of this document.

1.5 Planning Objective

Objectives for this Master Plan carry over from the 2008 NNMC Master Plan and are expanded to support NSAB and its mission to provide tenants with “efficient and effective shore installation management services and programs in support of mission commanders to enable combat readiness for fleet, fighter and family.” These objectives include:

- Create an environment that meets the needs and enhances the experience of the Installation’s primary missions.
- Provide a land use master plan that accommodates anticipated growth and is flexible enough to remain viable as scopes of specific projects are developed and changed.
- Maintain and enhance the aspects of security, both for the overall Installation and individual projects.
- Recognize positive features in the built and natural environment and maintain and enhance those features.
- Preserve the historic character, cultural value and natural resources of the campus.
- Facilitate an accessible, walkable campus, with clustered functions and a robust pedestrian network.
- Provide compatibility with the surrounding neighbors by maintaining buffers on the perimeter as required.

These planning objectives are in conformance with the Comprehensive Plan for the National Capital Region.

The shared vision for the campus is clear; the Medical Mission, including medical care, research and education, is the core purpose of the campus’ being.

In any long-term plan, flexibility for future change is critical. A master plan is a living document that should be updated on a routine basis as requirements, programs and priorities inevitably change.

Federal guidelines sets minimum standards for security of all DoD inhabited facilities. Known as Anti-Terrorism/Force Protection (AT/FP), these standards are documented in UFC 4-010-01 Oct 2003 (rev Jan 2007), DoD Minimum Antiterrorism Standards for Buildings, and must be considered in any planning effort. These standards represent a significant commitment by DoD to seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live. Security requirements will have major impacts on the overall design as structures are built or renovated.

Good stewardship requires planning efforts to maintain the existing built environment through the life of the facilities. Respect for the natural environment and enhancement of both the built and natural environments are part of the planning effort.

A key objective, particularly on a campus with such significant history as Bethesda, is recognition and preservation of the historic and natural cultural resources. The National Naval Medical Center Integrated Cultural Resource Management Plans (ICRMP), 2009 was consulted for established recognition of these resources in the planning process.

A successful campus evokes a sense of community, is pedestrian friendly or “walkable” and has organized functional groupings with well established wayfinding to provide easy access for users. The planning effort looked at ways to improve the safety and desire for individuals to walk on and to the campus. Density, functional groupings, wayfinding and streetscape are all tools to be addressed that encourage the objectives of a walkable campus environment. This planning objective also addresses the overall goal of incorporating features that enhance green design features and support LEED (Leadership in Energy and Environmental Design) and sustainability initiatives.

A variety of land uses are adjacent to the campus perimeter. It is paramount that the planning efforts within the campus recognize and be compatible with these land uses and mitigate negative impacts to surrounding neighbors.

1.6 Description of the Master Plan Concepts

This Master Plan addresses the same planning issues as previous NMMC Master Plans, but from the perspective of NSAB. The broad land use patterns established in previous plans will continue to guide future development. Growth of each land use is directed to occur in areas adjacent to the existing land use to allow for the most natural integration and expansion of new missions or programs.

The program for this Master Plan is based on anticipated development after the completion of 2005 BRAC projects. These requirements are at various stages in development. The majority of these are currently funded short range projects anticipated to be built within the next five years, while others are non-programmed long range projects, looking at development opportunities to 2022. Some requirements may never be executed or may be modified as funding and priorities change. All of the projects are subject to change during the design process.

The two largest tenants on the installation are the Medical Center and the University. The Medical Center will continue to be located within the medical hub at the west side of campus and is planned to rebuild the core of the complex as part of its mandate to be a world-class facility referenced in Section 1.2.3. Two opportunities for future mission expansion are proposed to the north and south of the existing medical center complex. USUHS will expand within the eastern side of campus adjacent to its existing complex across South Palmer Road. Research functions of AFRRRI remain in its existing location, as does the central utility core.

The north side of the Installation will be reinforced as the residential area for Bachelor Enlisted Quarters (BEQs), single family dwellings and Warrior Transition Units. Community and family support uses will intensify within the existing “comfort zone” in the south.

Recreation and green space is an essential part of a campus as a healing environment and the natural resources of the stream and eastern woodlands and recreational fields will be enhanced. The northeast corner currently houses the back-of-house storage and support and is a prime area for efficient future growth of those functions that do not directly serve patient care and educational missions.

Utilities improvements are currently planned to meet the increased demand due to construction through 2013. Beyond that, additional capacity will be needed and opportunities have been identified for potential new utilities plant buildings. A major concern for utilities upgrades is the ability to form loops to allow continuous service to the rest of the system during times of localized disruption. The goal of stormwater management for future development will be to retain and treat stormwater pollutants as close to the source as possible, with the secondary goal of recharging as much stormwater as possible into the ground on site.

Other long-term opportunity areas are identified that will improve the overall circulation and function of the Installation. This plan provides options for an additional north-south connection that will alleviate congestion and vehicular conflicts in the very tight utility core of the campus by providing an additional connection between North Palmer Road and Stoney Lake Road. Another opportunity lies in the redevelopment of the site of Building 50. Reference Chapter 5 for further detail on these opportunity areas.

THIS PAGE INTENTIONALLY LEFT BLANK



2.0 Overview and Program Requirements

This chapter includes authorization and contractual information, including the general purpose and scope of the Master Plan. It also includes historical and organizational background information, identifies the planning approach to include goals and objectives, summarizes the requirements and discusses the relationship of the update to other related efforts.

2.1 Authorization and Applicability

This Master Plan has been created for the use of NSA Bethesda to ensure the logical development of the Installation's facilities and infrastructure to provide the necessary support to its tenants in their pursuit of excellence in patient care, medical research and education.

This 2012 NSAB Master Plan was contracted through Naval Facilities Engineering Command (NAVFAC) Washington under an Indefinite Quantity A/E Contract N40080-10-D-0301.

2.2 Purpose and Scope of the NSA Bethesda Master Plan

The purpose of this project is to create a master plan from the perspective of the Navy for the entirety of NSAB that includes all tenants.

This Master Plan is intended to be a framework for physical development to address the mission functionality, open space, landscaping, site amenities, transportation, parking, sustainability, utilities, encroachment, renovation and new construction projects. Therefore it is important to have a plan to guide these activities consistent with one vision and program to ensure that, as developed, they result in consistent and appropriate physical appearance and functions. The plan shall also integrate the requirements of the primary tenants.

2.3 Master Plan Format

This Master Plan includes six chapters:

Chapter 1 - Executive Summary.

Chapter 2 - Program Requirements. This chapter includes authorization and contractual information and the general purpose and scope of the Master Plan. It also includes historical and organizational background, identifies the planning approach to include goals and objectives, summarizes the requirements and discusses the relationship of the update to other related efforts.

Chapter 3 - Community Context. This chapter includes regional and local information, local historic resources and the relationship of the campus to adjacent communities. It describes review organizations and those interested in the process from a community perspective.

Chapter 4 - Existing Conditions at NSAB. This chapter discusses the constraints and opportunities that have an effect on the use of and potential development of the campus. This analysis begins with a description of the existing natural and built features at NSAB, functional considerations of land use, tenants and physical characteristics of existing development that helps guide the future form of the campus. This chapter also includes a discussion of the existing pedestrian and vehicular circulation, utilities and infrastructure.

Chapter 5 - Master Plan Development. This includes future development of the campus with summaries of the anticipated growth and proposed direction in terms of land use for that development. This section also identifies opportunity areas for future development that maintain flexibility to accommodate future changes in mission or program. Guidance for the form and overall function of development is given for these areas so that development will be consistent with the overall plan when the program is determined. Refinements will continue to occur throughout the design processes, but this chapter provides a general development direction.

Chapter 6 - Development Guidelines. This section establishes general framework plans for building organization and siting, circulation, site elements and landscape. Recommendations for the future development of recreation are also addressed.

2.4 Historic Overview and Background

National Naval Medical Center (NNMC)

The history of the present location for NSA Bethesda began in 1938 when Congress appropriated funds for the purchase of land for a new Naval Medical Center. The site was selected by President Franklin D. Roosevelt on July 5th of that year. He selected the site, a 250 acre farm on one of the older land-grant parcels in Maryland, because of the spring-fed pond that reminded him of the Biblical reference to the Pool of Bethesda, a place of healing. He not only selected the site, but President Roosevelt also initiated the idea for the building design. He had been impressed with the design of the Lincoln, Nebraska state capitol building and sketched an elevation and ground plan of what he envisioned for the Naval Medical Command in 1937. From these sketches, and under the close supervision of the noted architect Paul Philippe Cret, evolved the 20-story high rise tower symbolic of NNMC with dramatic vertical lines in art deco style. Ground was broken for the tower on June 29, 1939. President Roosevelt laid the cornerstone for the new structure on November 11, 1940. On February 5, 1942, the Naval Medical Command, National Capital Region (NMCNCR) was commissioned. It was dedicated by President Roosevelt on August 13, 1942, the 100th anniversary of the Bureau of Medicine and Surgery.

The original pond that led to the site selection is still located directly in front of the tower and has been christened Lake Eleanor in honor of Mrs. Roosevelt.

The original Medical Center included a Naval Hospital with 1,200 beds, the Naval Medical School, the Naval Dental School and the Naval Medical Research Institute.

During World War II, numerous temporary facilities were constructed to meet the immediate health care needs of up to 2,500 sailors and marines. Since that time, there have been significant changes as the mission of the medical center has expanded.

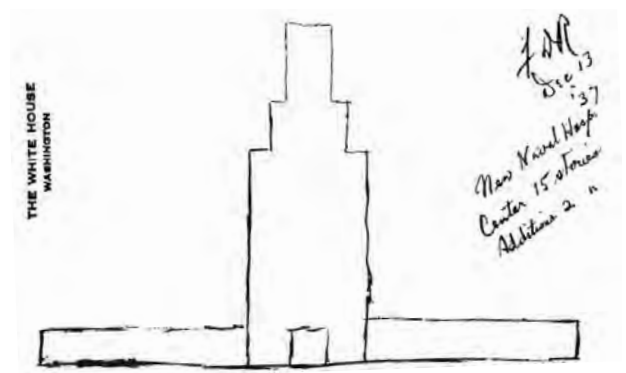
The campus continued to grow with the establishment of the Naval School of Hospital Administration in 1945, the Navy Toxicology Unit of the Armed Forces Radiobiology Research Institute in 1961, the Naval Medical Data Services Center in 1965, and the Naval Medical Research and Development Command in 1974.

In August of 1960, Buildings 7 and 8 were added to the east side of the original tower to provide 258 beds and replaced the temporary wards.

In 1973 the mission grew to provide coordinated dispensary healthcare services as an integral element of the Naval Regional Healthcare System, bringing all the health facilities within the Naval District of Washington under the Medical Center Commander.



President Roosevelt (left) visits the site of NSA Bethesda in 1938
Source: www.bethesda.med.navy.mil



FDR's concept sketch of the Bethesda Naval Hospital
Source: Navy Bureau of Medicine and Surgery Library and Archives



NSA Bethesda under construction in the early 1940's
Source: www.historylink101.com

To meet this mission growth, in the mid 70's an extensive construction program began. Building 9, a large three story outpatient facility and Building 10, a seven story 500 bed inpatient tower, were constructed to the south of the original facilities adding more than 880,000 square feet (SF) to the Medical Center. In the late 70's, two multi-level parking garages were constructed east of the medical buildings for staff and visitors.

In 2005 Congress passed the Base Relocation and Closure act, calling for the merger of NMMC and WRAMC, to into WRNMMCB. This spurred a wave of growth that was expected to add 2,500 personnel and double the amount of patients and visitors to the Base to almost 1 million per year. To accommodate the new joint mission of WRNMMCB, a new outpatient clinic, inpatient clinic and two parking garages were constructed. A new barracks building was constructed on the northern edge of campus to house the arriving population of Wounded Warriors from WRAMC. Building 17 was expanded to include a new fitness center and garage and the National Intrepid Center of Excellence was established to research and treat traumatic brain injuries (TBI) and Post Traumatic Stress Disorder. Three new Fisher Houses were built to house the families of those receiving care at the hospital. Security and circulation improvements included renovations of each gate, relocation of the commercial vehicle inspection facility and the widening of the perimeter road to alleviate truck congestion through the core of the campus.



Navy nurses drill near the Naval Medical Center Tower, circa 1944
Source: www.DCmilitary.com

The strong history of the campus was recognized when the original hospital tower was added to the Registry of Historical Places by the U.S. Department of the Interior in 1977. Other structures have historic significance as well and a historic district on campus is recognized by the Maryland Historic Trust.

Uniformed Services University of Health Sciences (USUHS)

Following the victorious end of World War II, the Department of Defense (DoD) discharged more than a million men and women, including many physicians who, having met their civic responsibilities, returned to their public and private practices. This massive departure left the armed forces with a dwindling medical corps. Debate and discussion regarding the establishment of a federally run medical school continued in Congress and the DoD for many years. By 1970, the military could no longer rely on conscripts to provide medical care to the nation's soldiers and families.

In 1972, Congressman F. Edward Hebert championed what he called a "West Point for doctors," and with the backing of Secretary of Defense Melvin Laird and congressional leaders, succeeded in passing legislation that created USUHS.

In 1973 a site selection committee chose the current site of the USUHS as a permanent home. As the numbers of students grew, so too did the scope of the university mission; most notably, to include a Graduate School of Nursing, which utilizes international perspectives on leadership, education and research, while simultaneously equipping the military health system with a corps of advanced practice nurses, uniquely skilled to take on a diverse range of challenges and succeed in any environment.

Looking ahead, USUHS is engaged in an ambitious plan to become the core academic health center of the new WRNMMCB. The integration plan will harness USUHS's distinguished health education to create a stronger, more effective military medical system.

Source: www.usuhs.mil/usuhs/usuhistory.html

2.5 NSA Bethesda Organization

Naval Support Activity (NSA) Bethesda was created in August 2009 through a Memorandum of Agreement signed by National Naval Medical Center Commander Rear Admiral Matthew Nathan and Naval District Washington Commander Rear Admiral P.J. Lorge. The Memorandum realigned the command of the campus with the base management model used throughout the Navy and created a command structure separate from that of the medical center.

Per the memorandum, NSA Bethesda established initial operating capacity in October 2009 and became fully operational in October 2010.

Source: The Journal, NSA Bethesda

NSA Bethesda supports the hospital mission of WRNMMCB, through an Installation Support Agreement, to provide patients with a seamless and robust network of recovery and support services that align with the newly defined world-class standard.

NSA Bethesda supports the following tenant commands:

- Walter Reed National Military Medical Center Bethesda (WRNMMCB)
- Uniformed Services University of the Health Sciences (USUHS)
- Naval Medical Research Center (NMRC)
- Navy Medicine National Capital Region (NCA)
- Navy Medicine MPT&E Command (NM MPT&EC)
- Navy Exchange Command (NEXCOM) with Navy Exchange (NEX) and Navy Lodge
- Joint Task Force National Capital Region Medical (JTF CapMed)
- Naval Dosimetry Center (NDC)
- Navy-Marine Corps Relief Society
- Navy Medical Inspector General Office (IG)
- Veterans Affairs (VA)
- Fisher House Foundation
- American Red Cross
- Personnel Support Activity Detachment (PSD)
- Medical Evaluation and Treatment Unit (METU)
- Naval Criminal Investigation Service (NCIS)
- Navy Federal Credit Union (NFCU)
- Navy Medical Support Command (NMSC)
- National Intrepid Center of Excellence (NICoE)

Source: www.cnmc.navy.mil/Bethesda/About/TenantCommands/

2.6 Master Plan Goals and Objectives

The history of Master Planning efforts at NSAB reflects the changing mission and circumstances of the Installation throughout the years. The focus of the 1990 NNMCM Master Plan was a reorganization of existing medical facilities to better utilize the existing space and identify sites for proposed new construction throughout the campus. The most recent approved Master Plan was completed in 2008 for NNMCM. The 2008 Master Plan maintained the established functional relationships of the 1990 Master plan and focused on accommodating the realignment of WRAMC and BRAC growth.

The 2012 Master Plan addresses the same planning issues as previous NNMCM Master Plans, but from an NSAB perspective. The broad land use patterns established in previous plans will continue to guide future development. The two largest tenants on the installation are the medical center, which will continue to be located within the medical core at the west side of campus, and USUHS, which will expand within the eastern side of campus. Research functions of Armed Forces Radiobiology Research Institute (AFRRI) remain in its existing location, as does the central utility core. The north side of the Installation will be reinforced as the residential area for Bachelor Enlisted Quarters (BEQs), single family dwellings and Warrior Transition Units. Community and family support uses will intensify within the existing “comfort zone” in the south. Recreation and green space is an essential part of a campus as a healing environment and the natural resources of the stream and eastern woodlands and recreational fields will be enhanced. The northeast corner currently houses the back-of-house storage and support and is a prime area for efficient future growth of those functions that do not directly serve patient care and educational missions.

A goal of this master plan is to improve the quality of life, standards and facilities at NSA Bethesda. Additionally, the plan seeks efficiencies of operations to help improve the overall function of the post-BRAC NSA Bethesda campus. As the BRAC construction ends, it will be important for the Installation to have in place a vision that goes beyond congressionally mandated growth and incorporates the values of sustainability and high-performance buildings and landscapes as promoted by current and future federal initiatives.

The arrival of Wounded Warriors from Walter Reed Army Medical Center has created a new reality for this campus. The planning team that created this master plan takes very seriously the commitment to provide an accessible healing environment, not just for the Wounded Warriors who will receive care here, but for all of those who live, work and recreate here. A goal of this plan is to guide improvements in organization, circulation and wayfinding that will make the campus more accessible. The plan also strives to preserve and enhance the natural beauty of the campus and improve the availability of spaces and activities that promote the good health of all people at NSA Bethesda.

Finally, while this Master Plan looks forward, it is also important that the plan maintains a commitment to preserve an understanding of the significant history of the campus and its components. Like the previous plans, this plan will keep the historic tower as the architectural focus of the campus. Proposed development will not compete with the tower, but will enhance its prominence as the icon for NSAB.

2.7 Summary of Program Requirements

The program for growth at NSA Bethesda is summarized in the following table. The program is based on anticipated development after the completion of 2005 BRAC projects. These requirements are at various stages in development. The majority of these are currently funded short range projects anticipated to be built within the next five years, while others are non-programmed long range projects, looking at development opportunities to 2022. Some requirements may never be executed or may be modified as funding and priorities change. All of the projects are subject to change during the design process. Project details and descriptions can be found in Chapter 5, Section 5.5. The assumptions shown below are for planning purposes only.

The following is the current list of the requirements identified for the Master Plan:

Building Projects

- Medical Building C
 - Demolition of Buildings 2,4,6,7 and 8
 - Building C development
 - Renovation of existing hospital center
- Medical Building C Underground Parking
- USUHS Education and Research Building
 - new construction (Building F)
 - Renovation of existing USU buildings
 - Parking Structure
- Wounded Warrior Barracks Sanctuary Hall and Parking Garage
 - Barracks and two-bedroom suites
 - Parking garage (with two stories below grade)
 - Demolition of Building 141
- Uniformed Services Organization (USO)
- Child Development Center (CDC) Development
- Public Private Venture (PPV) Housing
 - New Townhouse Units

- Navy Lodge Expansion
- Helipad expansion
- Wounded Warrior Area Plan Improvements

Landscape projects

- University Entry enhancement
- Tower Entry enhancement
- North Palmer Road enhancement
- Quadrangle open space
- Stoney Creek Trail improvements
- Active Recreation Area improvements
- Sport Courts
- Wounded Warrior Area Plan Improvements

Utilities Projects

- Cooling Tower Upgrade
- Electrical Capacity Upgrade
- New Central Utility Plant building
 - 2 new chillers
 - Emergency generators
- Condensate return line replacement
- Backup water supply

Opportunity Areas

- Industrial/Warehouse area redevelopment
- North-South roadway connection options
- G-Lot area medical expansion
- Building 50 site redevelopment
- Buildings 54 & 55 replacement
- Building 26 AT/FP renovation
- Satellite Pharmacy relocation
- Kiss and Ride
- Building 13 renovation
- Building 20 renovation

Parking Opportunities

- N-Lot garage
- H-Lot garage
- Building 53 site parking expansion
- Industrial area parking garage

2.8 Summary of Site Data

NSA Bethesda occupies approximately 243 acres. The Installation has approximately 6,630,000 SF of facility space. Recent construction accommodates the growth in missions and personnel that was the result of the BRAC program, and for practical purposes, Installation facilities are “full.” Future growth will need to consider construction of new space or moving tenants off of NSAB.

2.9 Planning Premises and Program

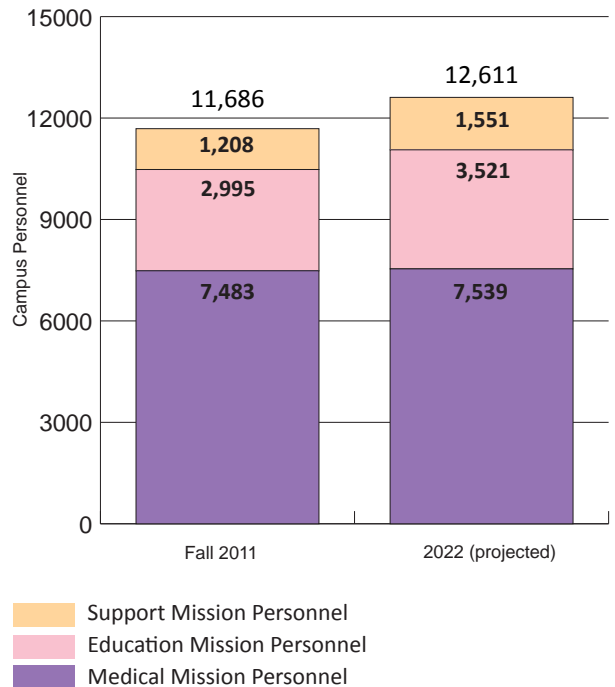
2.9.1 Population

Estimates of BRAC-related growth over the past few years indicate that the population of NSAB has grown to 11,686 personnel in 2011 and is expected to grow to 12,611 by 2022. This growth was projected from Interviews conducted during the preparation of this master plan along with surveys conducted by the Installation. The Installation accepted an estimated 981,000 patients and visitors over the past year. Since the completion of the integration of the Army missions from WRAMC, the growth in medical missions is largely expected to level off. Population growth in education reflects the evolving, research- and teaching-driven mission of USUHS, which projects an increase in faculty and class size, and the relocation of personnel from off-base leased space. Growth in support of mission personnel is mostly expected in the short term as a new NEX facility and administrative support for the recently formed NSA Bethesda command come fully on-line. Refer to Table 2-1 and Figure 2-1 for an overview of population numbers for each Installation mission.

TABLE 2-1 BASE POPULATION

Fall 2011	2022	Installation Mission
7,483	7,539	Medical Mission
2,995	3,521	Education Mission
1,208	1,551	Support Mission
11,686	12,611	TOTAL PERSONNEL

FIGURE 2-1 BASE POPULATION



2.9.2 Program Basis

This master plan attempts to meet this goal of Installation improvement by outlining a combination of short-term planned projects and long-term opportunities that address inefficiencies, improve accessibility, and provide the flexibility to accommodate future mission changes.

The short-term planned projects are generally projects of known scope that address specific plans, goals or challenges in the next several years. These include projects from the previous master plan which have not yet been implemented, as well as renovation and construction projects. Specific projects included in this Master Plan represent an expansion of core mission functions, including the development of a World Class hospital facility, a University expansion and renovation to support world-class mandate for collaboration between USUHS with WRNMMCB, and continued development of support facilities for fleet and family.

Long term opportunities identify areas, facilities, and strategies that are not currently planned, but which should be recognized as part of the larger Installation improvement context. Because the ability to expand and incorporate new mission and technology is a core component of World Class recognition, this Master Plan also includes guidelines for potential development areas that may be programmed as future needs become clear.

Short-term planned projects and long-term opportunity areas reflect the anticipated personnel changes described in Section 2.9.1.

2.9.3 Security Considerations

One of the critical planning premises at NSAB is security. Perimeter security, gate access queues, vehicle inspection areas, setback requirements from the Installation perimeter, roads and parking all must be considered in planning for proposed development. Anti-terrorism and Force Protection requirements as established in UFC 4-010-01 October 2003 (revised January 2007), DoD Minimum Antiterrorism Standards for Buildings are an important basis for security considerations.

2.9.4 Transportation and Circulation

Transportation access and circulation is an important component of the Master Plan. Key planning principles which support the campus transportation-land use relationships and form the basis for master plan transportation recommendations include the following:

- The vast majority of roads at NSA Bethesda cannot be widened to accommodate additional traffic. Growth on campus will occur in concert with the existing road system and strategies for alternative forms of access.
- The construction of new surface parking lots is discouraged. Where possible, structured parking will be provided in areas of future development, which may contribute to the preservation and increase of open, green space on campus.
- Impacts of future growth on the surrounding communities will be mitigated to the maximum extent possible.
- Shuttle services within the campus will continue to be expanded as development increases.
- A robust, universally accessible pedestrian network will be established within the campus and will connect to the community through the planned gate improvements.
- A Transportation Management Program (TMP) will be completed based on this Master Plan and will be integrated in the development of the campus.

2.10 Relationship to Other Efforts

2.10.1 Accessibility Plan

In support of NSAB's vital role in the care of Wounded Warriors and general goal of providing a universally accessible campus for its tenants, an Accessibility Plan was completed in April 2011. This study identified and quantified challenges to accessibility, developed a strategy for implementing universal accessibility and provided recommendations for establishing accessible routes and zones within the campus. Recommendations from the Accessibility Plan will be incorporated into the overall circulation framework and improvement plans of the Master Plan. The Master Plan may also provide recommendations for pedestrian facilities not associated with the accessible routes on campus. However, the Accessibility Plan should be accepted as the guiding document for implementation of accessible routes.

2.10.2 Comprehensive Master Plan for the National Capital Region Medical

The Comprehensive Master Plan for the National Capital Region Medical (CMP-NCRM) is a road map to achieve the "world-class" attributes defined in the National Defense Authorization Act (NDAA) for FY2010, that were not part of BRAC.

The Comprehensive Master Plan for WRNMMCB is composed of and integrated with, a number of sub-plans including the Healthcare Requirements Plan, the USUHS Master Plan and Technology Master Plan, the Wounded Warrior Management Plan, the Lodging Master Plan, the Transportation Management Program, the WRNMMCB Medical Facilities Master Plan and the subject of this report, the Installation Master Plan.

2.10.3 Walter Reed National Military Medical Center Bethesda (WRNMMCB) Medical Facilities Master Plan

The WRNMMCB Medical Facilities Master Plan is an undertaking by the Joint Task Force National Capital Region Medical (JTF CapMed) as part of the CMP-NRCM that specifically addresses the achievement of world-class attributes for medical facilities. This plan will be integrated with the 2011 NSAB Master Plan.

The WRNMMCB Medical Facilities Master Plan specifically calls for the demolition of Buildings 2, 3, 6, 7 and 8 within the next ten years. These buildings will be replaced by a new medical facility, Building C. The plan also calls for construction of a 500-space underground parking garage west of Building 1, the construction of a pedestrian circulation connector between Building A and Building 9, and the long term (10-16 year) renovation and reconfiguration of Buildings 9 and 10.

2.10.4 Transportation Management Program

A Transportation Management Program is required in compliance with federal standards established by the National Capital Planning Commission (NCPC) and documented in the General Services Administration (GSA) Federal Agency Transportation Management Program Handbook (2008). The requirements stipulate that federal agencies with Master Plan projects resulting in over 500 employees should prepare and effectively implement a TMP approved by NCPC.

The most recent TMP developed for NSA Bethesda is included in the 2008 NNMC Master Plan. A TMP update is not included in this 2012 Master Plan. A TMP update will be produced at a later date, based on the recommendations of this Master Plan.

2.10.5 National Environmental Policy Act

As Federal Actions, development projects at NSA Bethesda are subject to the National Environmental Policy Act (NEPA) process. The NEPA process provides a systematic and interdisciplinary approach to planning and decision-making by ensuring that the potential impacts of an action on the human and natural environment are identified before decision-makers act on a proposal. The projects identified in this Master Plan will be analyzed under the NEPA, as appropriate, prior to implementation.

THIS PAGE INTENTIONALLY LEFT BLANK














3.0 Community Context of the Bethesda Campus

This chapter discusses local and regional history and resources, and the relationship of NSAB to the county and adjacent communities. It summarizes the regional planning process and initiatives within the NSAB area. This chapter also describes review organizations and those interested in the process from a community perspective.

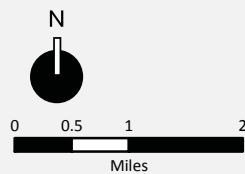
3.1 Location of NSAB

NSAB is located at 8901 Rockville Pike, Bethesda MD (Figure 3-1). This is in Montgomery County, approximately one mile north of downtown Bethesda along Rockville Pike (also known as Wisconsin Avenue and MD Route 355). The Installation is accessible from Rockville Pike and from Jones Bridge Road.

FIGURE 3-1 REGIONAL MAP

-  Military Location
-  Airport
-  Interstate
-  Major Highway
-  Minor Highway
-  County Boundary
-  Water Bodies
-  River
-  Maryland
-  District of Columbia
-  Virginia

Sources: ESRI Data & Maps, 2008
PBS&J, 2011



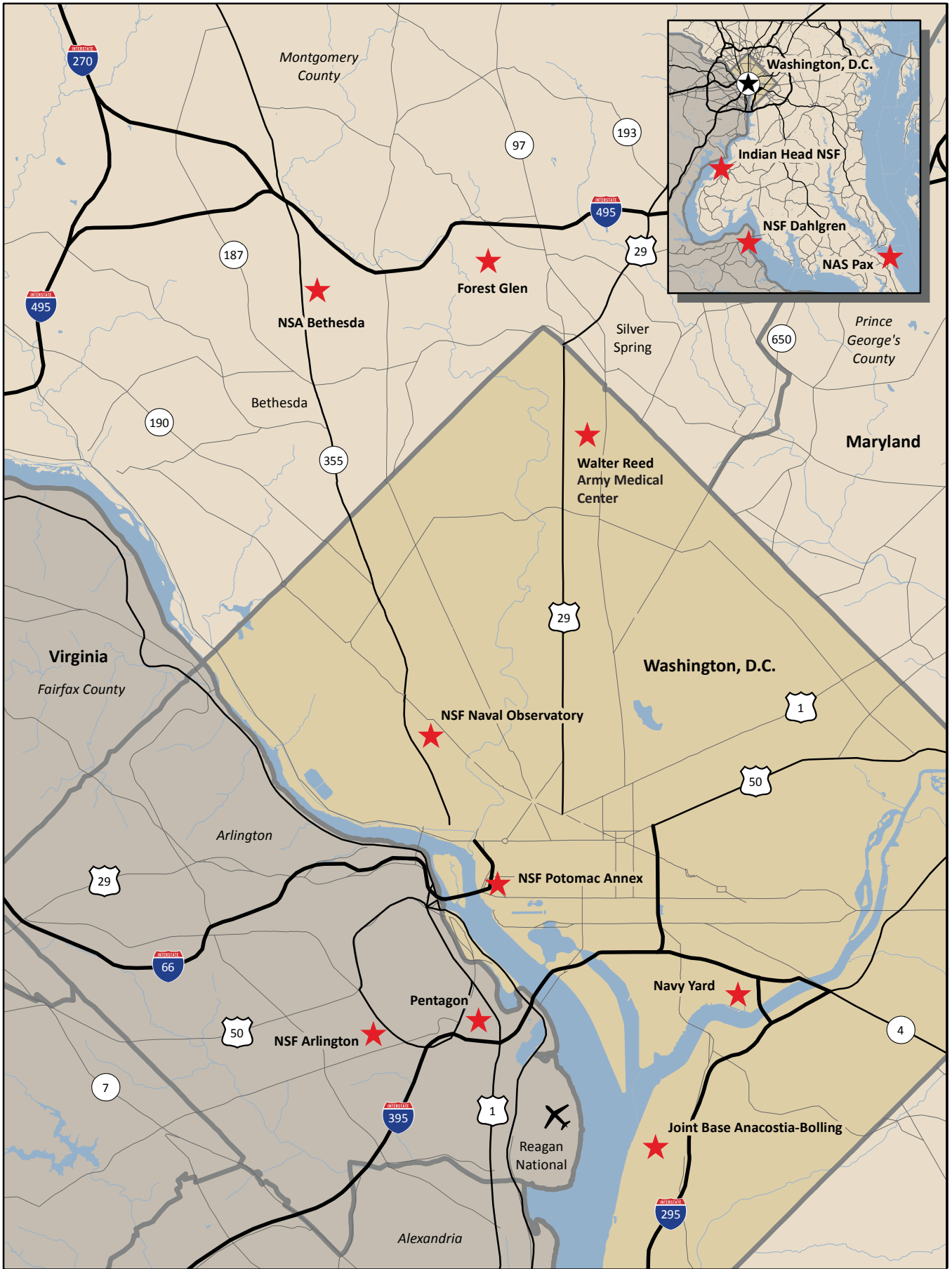




FIGURE 3-2 NATIONAL CAPITOL REGION AS DEFINED BY NCPC

Source: National Capital Planning Commission, 2011; ESRI Data & Maps, 2008

3.2 Regional Planning Context

3.2.1 NCPC and The National Capital Region

The National Capital Planning Commission (NCPC) is the central federal planning agency for the Federal Government in the National Capital Region (NCR) created to preserve the region's important historical and natural features. For Federal Planning purposes, the NCR (Figure 3-2) makes up the regional context of NSAB, which is defined as the following jurisdictions (and inclusive municipalities):

- The District of Columbia
- Montgomery County
- Prince George's County
- Arlington County
- Fairfax County
- Loudoun County
- Prince William County
- City of Falls Church
- City of Alexandria
- City of Fairfax
- City of Manassas

3.2.2 M-NCPPC

The Maryland-National Capital Park and Planning Commission (M-NCPPC) is a bi-county agency which, in addition to other parks and recreation duties, provides land use planning for the physical development of Prince George's and Montgomery Counties. M-NCPPC operates through two planning boards appointed by the county governments. In Montgomery County, the 5-member Planning Board is largely responsible for setting land use, protecting parkland resources, and for recommending to the County Council which sites receive historic designations.

Source: www.mncppc.org, www.montgomeryplanningboard.org

3.2.3 Community Based Planning

The Montgomery County Planning Department has divided the county into 37 community based planning areas (see Figure 3-3), each of which has a master plan that creates a comprehensive view of land-use trends and future development. NSAB is within the South Central Transit Corridor planning area. More specifically, the Installation lies within the Bethesda-Chevy Chase/North Bethesda/ Friendship Heights Community-Planning Area, which is bounded by Rock Creek on the east, the City of Rockville on the north, Western Avenue and the Potomac River to the south, and I-270 and I-495 to the west (See Figure 3-4). The Bethesda-Chevy Chase

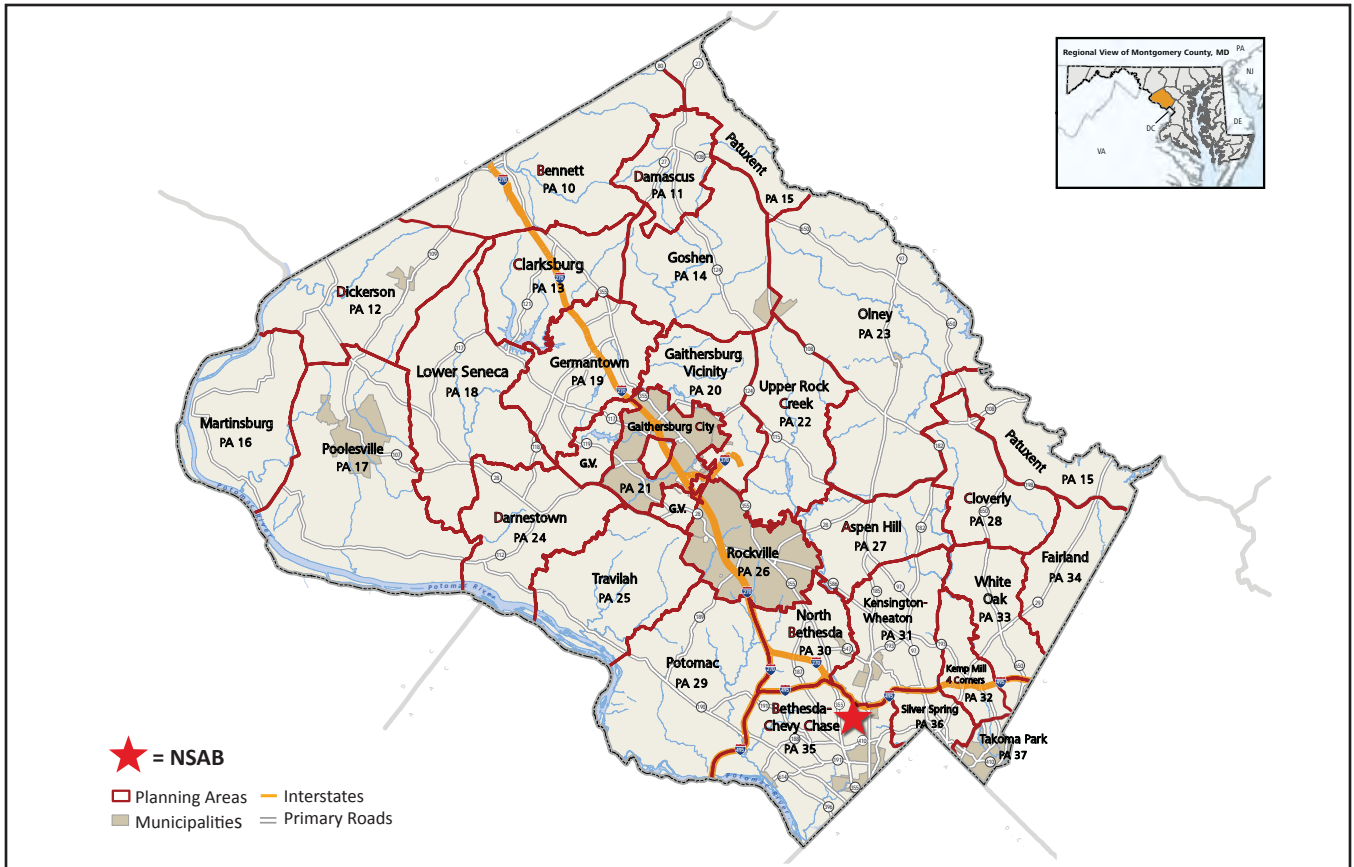


FIGURE 3-3 MONTGOMERY COUNTY COMMUNITY PLANNING AREAS

Source: Montgomery County Planning Department

(B-CC) Planning Area Master Plan encompasses the area around NSAB and was last amended in 1990.

The 1990 B-CC Master Plan notes that any actions at the Installation should be assessed for impacts to surrounding communities. It also recognizes the importance of considering provisions for pedestrian safety. In particular, it highlights a concern for the Rockville Pike crosswalk at Gate 2 and the Medical Center Metrorail Station. An improved Metro connection on the east side of Rockville Pike is currently scheduled. The Plan also recommends landscape buffers between NSAB and the adjacent residential communities, as well as the maintaining of the open space character of the site along Stoney Creek. Seven goals and objectives were established in the B-CC Master Plan.

- Perpetuate and enhance the high quality of life which exists in the Bethesda-Chevy Chase Planning Area.
- Achieve a level of future employment development that is in balance with a high quality of life and the transportation capacity of the Planning Area.
- Provide for a balanced housing supply so that persons of varying income levels, age, backgrounds and household characteristics may find suitable housing appropriate to their needs.

- Protect the high quality residential communities throughout the Planning Area, as well as the services and environmental qualities that enhance the area.
- Achieve a significant shift of new travel from auto use to mass transit and other mobility alternatives.
- Protect natural resources and environmental qualities of the Planning Area.
- Contribute to a strong sense of community and help reinforce community cohesion.

The 1990 B-CC Master Plan does not recommend any changes in the zoning surrounding NSAB. It identifies the desire to retain the residential character.

3.2.4 Other Studies

An additional regional study which encompasses the area of NSAB is the MD355/I-270 Technology Corridor Study. This study “looks broadly at Montgomery County’s most-traveled corridor, identifying strategies to unify and improve the 27-mile swath connecting Bethesda to Clarksburg. The study recommends clustering technology industries, increasing mobility along the corridor by putting people closer to Metro, train and interconnecting bike trails and improving the look of MD 355 (Rockville Pike).”

Source: www.montgomeryplanning.org

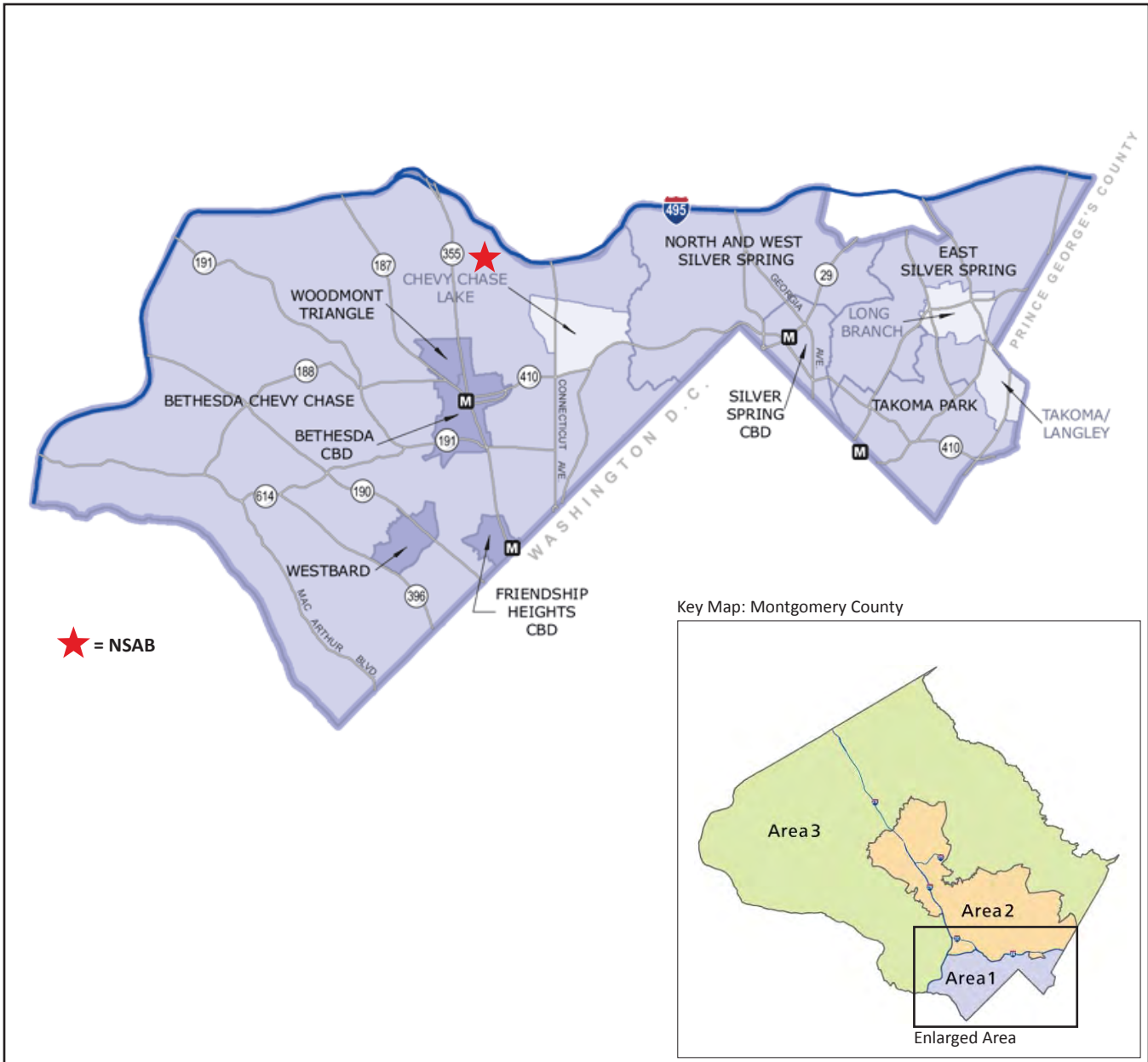


FIGURE 3-4 MONTGOMERY COUNTY MASTER PLANS MAP

Source: Montgomery County Planning Department

The MD355/I-270 study identifies NIH/NSAB as a Center of Technology within the corridor, with a close association with the Bethesda Central Business District. The study makes a specific recommendation to improved the pedestrian access from the Metro to the Hospital. (This is addressed by the Rockville Pike crossing project). General guidance given is to strengthen the multi-modal connections between housing, jobs, and recreational and public facilities.

A regional policy which may have an impact on development at NSAB is the 2009-2011 Growth Policy. Montgomery County’s Growth Policy “guides the timing of development and the provision of adequate public services. The growth policy implements a 1973 law, the Adequate Public Facilities Ordinance, which directs development to areas where public

services are in place.” County planners drafting the 2009-2011 Growth Policy are rethinking how the County manages growth, looking beyond basing it just on congestion relief and school capacity. Instead, the drafters of the policy will focus on ways to enhance quality of place in Montgomery County’s communities. Montgomery County’s “Growing Smarter” initiative means respecting the natural environment in the design of buildings, spaces and streets to create great places with better connections.

Source: www.montgomeryplanning.org

The Washington Metropolitan Area Transit Authority (WMATA) completed a study in 2010 that examined bicycle and pedestrian access to Metrorail stations. By 2030, Metro ridership is expected to grow 42 percent. The study suggests that accommodating more walking and bicycling access trips will enable Metro Station to realize increases in ridership in the most cost effective manner possible, since parking will increasingly be in limited supply. The study establishes a systemwide goal of tripling the bike access mode share by 2020 (from 0.7 percent in 2007 to 2.1 percent in 2020) and quintupling the bike access mode share by 2030 (from 0.7 percent in 2007 to 3.5 percent in 2030). Currently the Medical Center Metro stop has the highest AM peak bicycle access rate in the entire system, accounting for 7.1 percent of all arrivals. The study proposes adding additional covered bike racks at the station, as well as secure bike storage.

3.3 Review Agencies

NSAB has always had strong, on-going relationships with federal, regional, and local planning agencies and the community. These relationships were critical during the planning and construction of BRAC projects and will continue to be important in this growing and ever-changing region. This section discusses the community and federal agencies which hold interest and play a role in the development of NSAB and all of which have had the opportunity to participate in the planning process as required by the National Environmental Policy Act.

NCPC is the federal government's planning agency for the District of Columbia and surrounding counties. The Commission provides overall planning guidance for federal projects within the region. It oversees long range planning. NCPC reviews both the EIS and the Master Plan efforts and will assist in resolution of any planning issues between local and Federal agencies. They will also continue to be involved in the development of individual projects as they are implemented on the Bethesda campus.

M-NCPPC is a bi-county agency of Montgomery and Prince George's Counties. Each county has an appointed planning board which is the official planning agency for the respective county. Members of each County serve on the Commission and act jointly on matters that affect both counties. The Montgomery County Department of Planning forecasts population, jobs and housing for the County. In between each National Census, the Department of Planning conducts a survey of households to update forecasts and identify changes anticipated in the County. The Montgomery County Planning Board has no authority over federal installations within its jurisdiction; however, they participate and provide input as requested.

The Metropolitan Washington Council of Governments (COG) is composed of 21 local governments as well as area members of the Maryland and Virginia legislatures. It is an independent regional organization that is actively involved in broad reaching issues affecting over 4,000,000 people and over 3,000 square miles. It provides a focus for developing responses to such regional issues as the environment, affordable housing, economic development, human services, population growth, safety and transportation. COG is an information resource for planning actions coordinating planning policies for land use, transportation and the environment.

Associated with COG, the National Capital Regional Transportation Planning Board (TPB) was established in 1965 in response to legislation that required a "continuing, comprehensive and coordinated" transportation process in every urban area in the United States with a population over 50,000. Today it is the regional forum and advocacy for transportation planning. Members include representatives of local governments, state agencies, Maryland and Virginia General Assemblies and Washington Metropolitan Area Transit Authority. TPB has a formalized public involvement process that allows for comment prior to taking action. TPB's planning area covers the District of Columbia and surrounding jurisdictions, including Montgomery County.

The Maryland Historical Trust is a state agency dedicated to preserving and interpreting the legacy of Maryland's past. The Trust is an agency of the Maryland Department of Planning and serves as Maryland's State Historic Preservation Office (SHPO) pursuant to the National Historic Preservation Act of 1966. State and federal historic preservation laws require government agencies to consider the effects of their projects on historic and archaeological resources through a consultation process known as "Section 106" review. The historic preservation review process does not prescribe an outcome, but the consultative and deliberative process helps ensure compliance with relevant laws and promotes the appropriate stewardship of Maryland's heritage resources.

3.4 Regional Transportation

3.4.1 Regional Roadway Network

Rockville Pike (MD 355) is classified as a Major Highway by the County. It runs north-south along the western edge of the campus, connecting Washington, DC to the south and the City of Frederick, Maryland to the north. This roadway also provides connections to other regional areas via an interchange with I-270 and I-495 and intersections with major east-west arterials north and south of the campus. MD 355 is therefore a major regional and commuter route. It is also a main artery for several bus routes operated by WMATA and the Montgomery County Transit (MTA) Ride-On systems.

Jones Bridge Road is classified, by the County, as an Arterial Road between Rockville Pike and Jones Mill Road. It runs east-west along the southern edge of NSAB and intersects with Connecticut Avenue (MD 185) to the east.

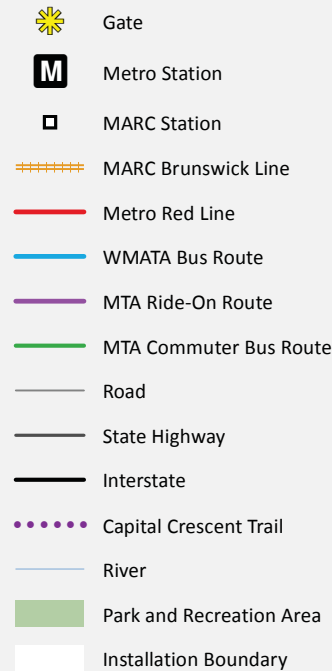
3.4.2 Regional Public Transportation

NSAB is well served by public transportation facilities. The campus is located at the Medical Center Metrorail Station on the Red Line. The station is also a major stop / transfer point for several WMATA and MTA Ride-On bus routes.

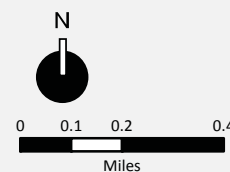
MTA regional transit in the area of NSAB mainly serves to bring commuters to the Red Line of the Metro system, where commuters would then proceed via Metro to the Medical Center Station at NSAB. The Maryland Area Regional Commuter (MARC) Commuter bus route 991 runs through the I-70/I-270 corridor from Hagerstown to the Shady Grove Metro station. The MARC commuter bus also stops at the Rock Spring Business Park near the junction of I-270 and I-495. The MARC Commuter Rail stops at the Rockville Metro station.

Heavy rail commuter service is available via the MARC "Brunswick" line. Trains originate from Martinsburg in West Virginia, or Brunswick and Frederick in Maryland, and travel to Union Station in Washington, D.C. in the AM hours with reverse movements occurring in the evening. MARC currently operates nine (9) trains inbound to Washington in the morning and ten (10) trains outbound in the evening. All trains stop in Rockville where a connection can be made to the Metro Red Line.

FIGURE 3-5 REGIONAL TRANSPORTATION MAP



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
ESRI Data & Maps, 2008
DC GIS, 2007
Maryland State Highway Administration, 2008
Montgomery County Department of Transportation, 2010





The WMATA Bus routes serving the campus are as follows:

- Route J1 provides rush hour only service between the Silver Spring and Medical Center Metro Stations via Jones Bridge Road.
- Routes J2 and J3 offer westbound and eastbound through service between the Silver Spring Metro Station and Montgomery Mall with intermediate stops in the Bethesda Central Business District (CBD) and at the Medical Center Metro Station.
- Routes J7 and J9 comprise the “I-270 Express”. They run between the Lake Forest Transit Center Station and the Bethesda Metro Station.
- There are six (6) MTA Ride-On Routes serving the Medical Center Metro Station. These are as follows:
 - Route 30 is a local collector route that circles through the neighborhoods before terminating at the Bethesda Metro Station.
 - Route 33 and 34 provide rush hour only service to Wheaton Plaza from several areas through the Medical Center Metro Station.
 - Route 42 provides service to Friendship Heights via Woodmont and Rockville Pike through the Medical Center Metro Station.
 - Route 46 connects NNMC with Rockville via Rockville Pike and primarily serves as a feeder to the Metro Stations along this route.
 - Route 70 is an express service running between the Germantown Milestone park-and-ride lot and Bethesda through the Medical Center Metro Station.

The County also operates a specialized transportation service, Call ‘N’ Ride, for the elderly and persons with disabilities. This is a taxi voucher program for the low-income members of these groups. In addition, the Montgomery County Department of Transportation administers the State-funded Medicaid transportation Program, providing service to State-certified Medicaid recipients.

3.5 Regional Utilities

3.5.1 Electrical

The local power utility is Potomac Electric Power Company (PEPCO). PEPCO feeds NSAB from two substations. The Medical Center’s primary power is supplied from Woodmont substation 80, and USUHS is fed from PEPCO’s NIH substation 167.

From the Woodmont substation 80, four underground PEPCO 13.8 KV feeders enter the campus near the intersection of South Wood Road and Rockville Pike. These feeders terminate in a large underground switchgear vault #243 located between Buildings 1 and 9. This primary switchgear vault #243 feeds about 85% of the campus.

From the NIH substation 167, there are two 13.8 KV primary feeders which enter the campus near the intersection of Grier Road and Jones Bridge Road. There is a 2-way normally open primary feeder connection between the Medical Center and USUHS that is controlled by PEPCO and can be used for emergency primary power backup. For more information on the electrical system at NSAB, see Section 4.6.

3.5.2 Water

Washington Suburban Sanitary Commission (WSSC) supplies water to NSAB. Water is delivered to the campus by way of four (4) interconnections with WSSC’s system. Distribution of the water on the campus is accomplished through a network of water mains varying in size from 6 to 12 inches. Service is pumping is provided from the WSSC distribution system without pressure reduction. There are no pumping stations or water storage tanks located on campus. The water supply pressure varies on average between approximately 65 and 80 psi. Water quality is considered good.

3.5.3 Sanitary Sewer

Sanitary sewage is collected by the campus’s gravity sewer system and delivered to the WSSC’s main sewage lines for treatment at the Blue Plains Advanced Wastewater Treatment Plant located in southeast Washington, DC.

The most recent investigation of sanitary sewer capacity was completed in 2006. The investigation indicated that the capacity of the WSSC system was adequate for proposed master plan expansions at that time. The capacity of the WSSC system needs to be verified based on the recommendations of this 2012 Master Plan.

3.6 Cultural Assets

The Bethesda area is a mature community rich in public places, parks, recreational areas and cultural assets as described in this section.

3.6.1 Schools

Montgomery County has the largest public school system in Maryland. Countywide, the Montgomery County Public School (MCPS) system has 130 elementary schools, 38 middle schools, 25 high schools and 7 special schools. The area of NSAB is in the 3rd District of the MCPS which is made up of 3 school clusters: Bethesda-Chevy Chase, Walt Whitman and Walter Johnson. Within these three clusters there are eighteen elementary schools, four middle schools and three high schools.

In addition to the public school districts, there are several private schools in the area. There are 4 private high schools and 10 private middle or elementary schools in the area. The Stone Ridge School of the Sacred Heart is a preparatory girls' school directly north of the NSAB campus.

There are several colleges and institutions of higher learning in the area. Located directly on NSAB is the Uniformed Services University of the Health Sciences, the Uniformed Services Medical and Nursing School. The American College of Cardiology and the Foundation for Advanced Education in the Sciences are both located on Old Georgetown Road north of NSAB. The Howard Hughes Medical Institute (HHMI) is on Jones Bridge Road in Chevy Chase. Part of HHMI, the Mary Woodard Lasker Center is located on NIH where medical students are able to work in an area of research. Also within the region are Johns Hopkins University and the University of Maryland in Baltimore, Marymount University in Arlington, VA and Montgomery College in Rockville, MD. There are twelve colleges and universities in Washington DC. These include include Howard University, American University, Catholic University of America, Georgetown University and George Washington University.

3.6.2 Public Safety

NSAB maintains its own fire department and military police, comprised of both military personnel and contracted services. In addition to NSAB safety personnel, the installation has working relationships and agreements for assistance with the National Institute of Health, the Montgomery County Fire and Rescue Department, the Montgomery County Police Department, and other state and local agencies including the U.S. Federal Protective Services and the FBI.

3.6.3 Medical Facilities

In addition to tenants at NSAB, there are several medical resources within the vicinity. The National Institute of Health Clinic Center and Suburban Hospital on Old Georgetown Road are both in the immediate area. Shady Grove Adventist Hospital in Rockville and Holy Cross Hospital in Silver Spring are also in the vicinity.

The Bethesda Hospital's Emergency Preparedness Partnership was established in 2004 and is a collaboration between NIH, Suburban Hospital, and NSAB whose mission is to respond to local, regional and national emergencies in the NCA. Due to the proximity of these three healthcare organizations and through this partnership there is a desire to create an underground network or an overpass to assist with potential emergency movement across Rockville Pike between the three sites. This underground network is not addressed as a potential project within this Master Plan.

3.7 Historic Resources

There are a number of historic resources within the Bethesda-Chevy Chase Planning Area. Montgomery County's Master Plan for Historic Preservation (1979) and the Historic Preservation Ordinance of Montgomery County are designed to protect and preserve the county's historic and architectural heritage. Building 1, Bethesda Tower is the only site on NSAB listed on the County's Master Plan for Historic Preservation.

NSAB shares a boundary with one locally designated Historic District. The Hawkins Lane Historic District is a historic street and houses adjacent to the eastern boundary of NSAB at Jones Bridge Road. Hawkins lane was an enclave of free African Americans established in the 1800s. It has been preserved in a rural character with an unpaved road and fifteen historic residences. Preservation of the mature wooded area on NSAB property adjacent to this historic district is vital for preserving and respecting the character of this historic kinship community.

Source: M-NCPPC

TABLE 3-1 POPULATION TOTALS IN MONTGOMERY COUNTY AND NEIGHBORING COUNTIES

Area	Population		Change 2000 to 2010	
	2000	2010	Number	Percent
MARYLAND	5,296,486	5,773,552	477,066	9.0
Montgomery County	873,341	971,777	98,436	11.3
Prince George's County	801,515	863,420	61,905	7.7
Baltimore County	754,292	805,029	50,737	6.7
Anne Arundel County	489,656	537,656	48,000	9.8
Howard County	247,842	287,085	39,243	15.8
Frederick County	195,277	233,385	38,108	19.5
VIRGINIA	7,078,515	8,001,024	922,509	13.0
Fairfax County	969,749	1,081,726	111,977	11.5
Prince William County	280,813	402,002	121,189	43.2
Loudoun County	169,599	312,311	142,712	84.1
Arlington County	189,453	207,627	18,174	9.6

Source: Montgomery County Planning Website
 U.S. Census Bureau, Census 2000 Redistricting Data (Public Law 94-171) Summary File, Table PL1 and 2010 Census Redistricting Data (Public Law 94-171) Summary File, Table P1.

3.8 Population Trends

As of the 2010 US Census, the population of Montgomery County is estimated to be 971,777 people, up about 100,000 people or 11.3 percent since the year 2000 (Table 3-1). The 2010 Census revealed that Montgomery County's population grew more diverse between 2000 and 2010. For the first time the County is a majority-minority county, with 50.7 percent of residents identifying themselves as Black or African American, Hispanic or Latino, Asian or Pacific Islander, or an ethnicity other than non-Hispanic White (Figure 3-6). The population is forecast to grow by 198,400 people (+21%) and 98,000 households (+27%) between 2010 and 2040. Household size is expected to revert to the national trend at 2.51 persons per household by 2040.

Montgomery County ranks first among large counties nationwide in educational attainment, with 29 percent of residents having earned an advanced degree. In Council District 1, where NSAB is located, more than half (54 percent) of adults have earned an advanced degree.

Median incomes have risen nearly 32 percent over the past decade. Montgomery County ranks fourth in the Washington DC Metropolitan Area and tenth nationwide in median household income. Council District 1 is the most affluent of the five Council Districts, with a median household income of \$128,655.

While incomes have risen over the past decade, housing costs have also climbed. The percentage of homeowners who spent more than 30 percent of their income on housing costs increased from 22 percent in 2000 to 33 percent in 2008. For renters, the share of cost-burdened households rose from 35 percent in 2000 to 51 percent in 2008.

Source: Montgomery County planning website

3.9 Economy and Housing

In January 2010, there were 510,000 jobs in Montgomery County. County unemployment peaked in June 2009 at 5.7 percent—the highest rate in 19 years. Unemployment fell to 5.1 percent in April 2010, less than the national rate of 9.9 percent and lowest among Maryland counties. In 2009, 166,460 jobs, or 33 percent of all jobs in the County, were located in Council District 1, which puts it second in the county as a job destination. District 1 accounts for the largest share (32 percent) of employers Countywide, with 10,682 job establishments. Refer to Figure 3-7.

Office lease rates in the County are the fourth highest in the region and range from \$18 to \$42 per square foot (with the highest generally occurring in District 1). Between 2008 and 2009, office vacancies rose from 10.5 percent to 12.9 percent, which corresponded to a three percent drop in average office lease rates from \$29.79 to \$28.68. Montgomery County ranks third among metropolitan region counties in the amount of existing office space.

The 2009 median sales price of a single-family detached house was \$460,000—a 14 percent decline from the previous year (District 1 had only a seven percent decline in median price). However 2009 levels are still well above the 2000 median sales prices for single-family detached homes (28%), townhouses (43%) and condominiums (83%) (Figure 3-8). District 1 had the highest median price for condominiums (\$339,000), townhouses (\$580,000), and single-family detached houses (\$800,000).

The Montgomery County Planning Department has pointed out that housing prices alone do not determine the true cost of living in a given location. Factoring in transportation costs gives a more accurate picture of the overall affordability of an area. A longer commute and greater auto-dependency for everyday living can offset apparent affordability of a home located farther from urban centers. Bethesda and North Bethesda are relatively urbanized, Metro-accessible areas with the lower than average transportation costs.

Of the five Council Districts, District 1, has the largest share of land zoned for residential (63%), the highest level of consumer spending and an overwhelming share (34%) of the total assessed value of commercial and residential properties in the County. District 1 is second in terms of the share of residential and commercial space in the development pipeline.

Source: Montgomery County Planning Department, "Montgomery County Snapshot", July 2010.

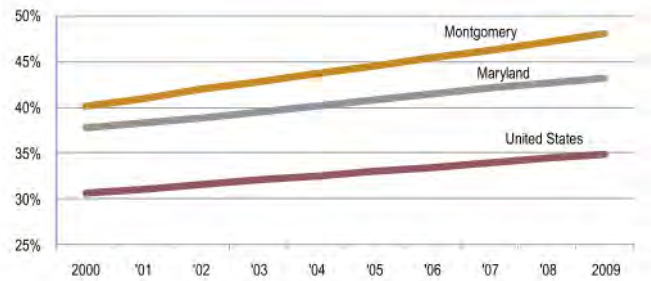


FIGURE 3-6 PERCENT MINORITY POPULATION 2000-2009

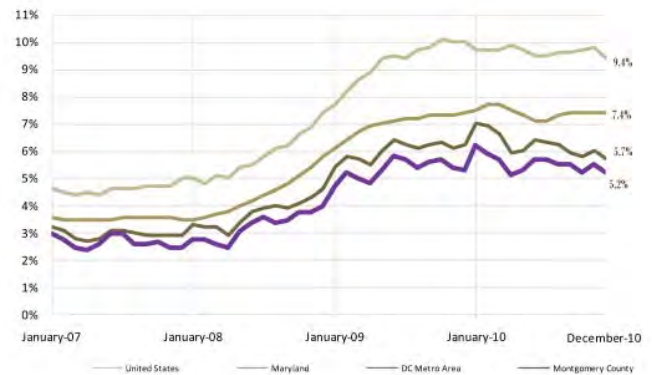


FIGURE 3-7 UNEMPLOYMENT RATE 2007-2010

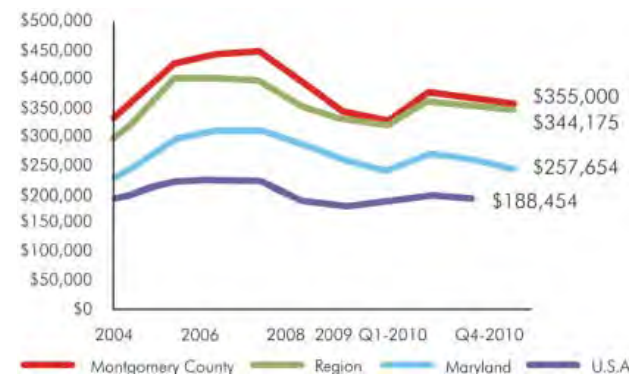


FIGURE 3-8 MEDIAN SALES HOUSING PRICES (ALL TYPES)

Source: www.montgomeryplanning.org, 2011
Prepared by: Montgomery County Planning Department, 2010



National Institute of Health (NIH), Bethesda
Source: NIH Commonfund Website



Forest Glen Annex, Silver Spring
Source: www.flickr.com

3.10 Other Relevant Federal Research Facilities

Other significant federal research institutions in the Washington DC area include:

National Institutes of Health (NIH), NSAB's neighbor across Rockville Pike. NIH is a component of the US Department of Health and Human Services and is a focal point for federal government biomedical research. The NIH is composed of several institutes and centers that either conduct or support scientific research.

The Forest Glen Annex is located in Silver Spring, MD. This support and research area is home of the Walter Reed Army Institute of Research and Naval Medical Research Institute. Community support activities at Forest Glen include a child development center, commissary, arts and crafts, and Fisher House.

Other federal research agencies in the DC area that do not specifically focus on medical research include the Department of Energy, The National Institute of Standards and Technology, the Naval Surface Warfare Center, the US Army Research Laboratory, the National Aeronautics and Space Administration Goddard Flight Center, and Naval Research Laboratory.



4.0 Existing Conditions

This chapter discusses the constraints and opportunities that have an effect on the potential use and development of the NSAB campus. This analysis includes a description of the existing natural and built features, functional considerations of land use and tenants, and physical characteristics of existing development. This chapter also includes a discussion of the existing pedestrian and vehicular circulation conditions, and a description of existing utilities and infrastructure.

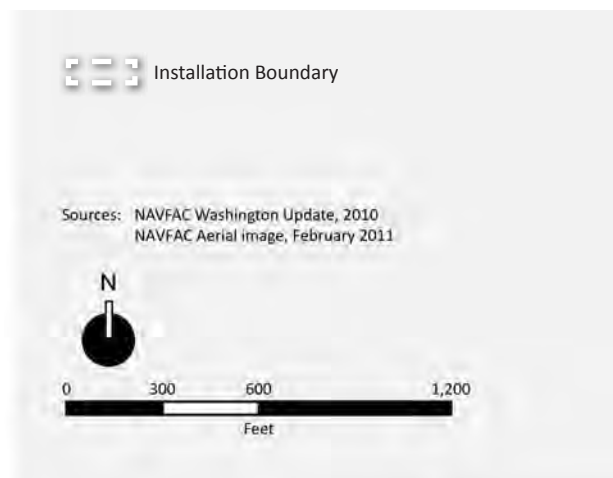


FIGURE 4-1 SITE OVERVIEW AERIAL

4.1 Site Overview

The NSAB campus is approximately 243 acres bound on the west by Rockville Pike, to the northeast by I-495 and to the south by Jones Bridge Road. The land uses in the immediate area are the National Institutes of Health main campus to the west, Stoney Ridge School of the Sacred Heart and residential housing to the north, Rock Creek Park and North Chevy Chase Park to the east, and Columbia Country Club and residential housing to the south.

The campus is situated on rolling to hilly topography with significant areas of mature trees that provide a buffer for adjoining land uses. A forested area along the campus around Stoney Creek and its 100-year floodplain bisects the campus



from southwest to northeast. The steepest slopes and most varied land forms are the result of the natural erosion over time related to the stream and its tributaries. The area around the stream is a major organizational feature on the campus, presenting both a pleasing natural environment and a significant barrier between the south and north halves of the campus. Much of the non-forested land area has been developed in an urban condition.

4.2 Environmental Conditions

Environmental conditions describe the tangible or ambient conditions within the site area that have an effect on the development or activities that may occur. Environmental conditions are separated into three categories: Natural, Cultural and Operational. Natural conditions include landforms, water, air, vegetation and other non-man made attributes. Cultural conditions include elements of the built environment that have historic, archaeological, or other cultural value. Operational conditions include other man-made conditions within the landscape that are the result of previous or ongoing operations at NSAB.

4.2.1 Environmental Conditions: Natural

Natural areas have an important role at NSAB. Due to the nature of activities and functions that take place at the hospital, the campus has become a place of healing its residents. Natural areas can enhance the healing environment of the campus and support evidence-based design. This environment provides for a rich context for the integration of healthcare designs that create environments that are therapeutic, supportive of family involvement and restorative for workers under stress.

Climate

NSAB is located in west-central Maryland at 39°00' N latitude and 77°09' W longitude, within the temperate continental climate of the United States. Located between the warmer south and cooler north, the area can be both hot and humid in the summer and also receive heavy snowstorms in the winter. Hot summer weather and high humidity due to the dominance of maritime tropical air combine to form showers and thunderstorms common in the summer months. The fall season is generally mild and warm while winters range from mild to stormy with relatively cold temperatures. Spring is the nicest time of year for the area with low humidity and temperatures on the rise.

The mean annual temperature is 57° F. Monthly mean temperatures vary little throughout the summer, where most days stay in the 70's and the winter season which generally sees temperatures in the 30's. However, they are quite variable through the transition seasons of fall and spring. The normal high in January is 43° F and the normal low is 27° F. The hottest month is July with a normal high of 88° F and the normal low of 70° F. Temperature variations between night and day tend to be fairly limited during summer with

a difference that can reach 18° F. Variation between day and night during the winter months is less with an average difference of 16° F.

Typically, the highest average relative humidity occurs in the early morning hours and drops during the day as the temperatures increase in the afternoon. The highest humidity is predictably in the summer months from June to August.

The average annual precipitation, which is measured at Ronald Reagan Washington National Airport, is just over 39 inches. Rainfall is fairly evenly distributed throughout the year with the wettest month of the year being May with an average rainfall of 3.82 inches. Historically, February and April are slightly drier months. Winters typically see approximately 15 inches of snowfall, typically with slightly more in February than other winter months.

Topography

Topography is one of the most prominent natural features on campus, which poses significant limitations to development. In the western central portion of the campus, the area occupied by the hospital is flat to gently sloping. From here the topographic relief breaks to the west towards Rockville Pike and to the east towards Stoney Creek. See Figure 4-2 for the location of the steepest slopes. It varies from rolling hills to significantly steep terrain. Areas with slopes greater than 15 percent are generally found around the stream corridor and in woodland areas. Another area of relatively moderate slopes is along Taylor Road and the Flag Officer's quarters. The northeast section of campus along Stoney Creek is the lowest area on campus at an elevation of 210 feet above sea level. There is a 120 foot change in elevation from the low point to the high point. The high point is in the southwest section of campus at the intersection of Rockville Pike and Jones Bridge Road at approximately 330 feet in elevation. A significant part of the campus drains to Stoney Creek from the southwest to the northeast. The area between Rockville Pike and the western face of Building 1 flows to the Northwest. A small area to the north of the Flag Officer's housing drains to the north.

Geology and Soils

There are no unique geological features within the NSAB campus.

The installation is located in the Upland Section of the Piedmont Plateau physiographic province. The Piedmont Plateau Province, between the Coastal Plain and the Catoctin Mountain where the Blue Ridge Province begins, is composed of hard, crystalline igneous and metamorphic rock. The bedrock in the eastern Upland Section consists of schist, gneiss, gabbro and other highly metamorphosed sedimentary and igneous rocks of probable volcanic origin. In several places these rocks have been intruded by granitic plutons and pegmatites (Maryland Department of Natural Resources).

The eastern half of the campus is underlain by the rocks of the Sykesville Formation. These meta-sedimentary rocks were originally deposited as sediments, but have been transformed by high heat and pressure into crystalline rocks. The western half of the campus is underlain by younger rocks that represent an igneous intrusion in the Skyesville Formation (NNMC DINRMP).

Surface deposits within the NSAB campus are made up of a combination of urban land and native soils. Urban lands represent more than 50 percent of the campus and are generally found in developed areas. The surface and subsurface layers of each of the native soils are silt loam in texture.

Silt loams are generally well to excessively drained and are suitable for construction if located on relatively flat topography. However, these soils are subject to moderate to severe erosion hazards when slopes are greater than eight percent. The Stoney Creek stream corridor and woodland areas are examples of this erodible condition.

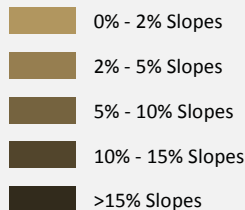
The silt loam nature of the surface soils along with steep slopes in some areas will result in special requirements for construction activities. Sediment from construction activities can damage storm systems and degrade receiving creeks. Once clays and silts are mobilized by the erosion process, they cannot be removed from the storm water without extended length detention, retention or chemical treatment. As a result, extensive erosion control measures along with effective sediment traps will be required for most projects within the campus.

The five specific silt loam soil profiles on campus include, Gaila, Glenelg, Brinklow-Blocktown, Glenville and Baile series. The Glenelg series is the most prevalent, occupying almost 50 percent of the land area. See Soils Profile Map, Figure 4-3.

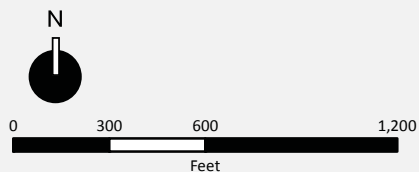
Soils of the Gaila and Glenelg series are very deep and well drained, with depth to a root restrictive layer greater than 60 inches. Water movement in the most restrictive layer is moderately high. Shrink/swell potential is low. This soil is not flooded, nor ponded. There is no zone of water saturation within a depth of 72 inches. Differences between the Gaila and Glenelg manifest in the available water and organic matter content. For Gaila, available water to a depth of 60 inches is “moderate,” while for Glenelg soils the available water is characterized as “high.” Organic matter content in the surface horizon of Glenelg soils is about two percent (USDA, 2007).

The Gaila and Glenelg soils generally do not limit development. Gaila soils with a depth greater than six feet to bedrock may be particularly well suited for underground development.

FIGURE 4-2 SLOPE ANALYSIS MAP



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIR, 2009





The Brinklow-Blocktown series consists of shallow to moderately deep, well drained soils with moderately slow to moderate permeability. The natural drainage class for Brinklow-Blocktown soils is well drained, the soil is not flooded, nor ponded, and there is no zone of water saturation within a depth of 72 inches. Minor differences exist between the components' depth to bedrock, water movement and shrink swell potential. The Brinklow component's depth to a root restrictive layer (in this case, lithic bedrock) is 20 to 40 inches. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink/swell potential is moderate. Organic matter content in the surface horizon is about two percent. The Blocktown component's depth to a root restrictive layer (paralithic bedrock) is only 10 to 20 inches. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink/swell potential is low (USDA, 2007).

The Brinklow-Blocktown soils are generally located along the steep slopes of the stream valley. This soil is highly erodible with very shallow bedrock, best suited for preservation as forest cover. Development is discouraged due to the cost of mitigating erosion and other soil challenges.














The Glenville component's depth to a root restrictive layer is 60 to 99 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink/swell potential is low. This soil is not flooded, nor ponded. Organic matter content in the surface horizon is about three percent (USDA, 2007).

The Baile series consists of very deep, poorly drained, moderately low to moderately high saturated hydraulic conductivity, soils on upland depressions and footslopes. Depth to a root restrictive layer is greater than 60 inches. Water movement in most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink/swell potential is low. This soil is not flooded nor ponded; it meets hydric criteria. Organic matter content in the surface horizon is about two percent (USDA, 2007).

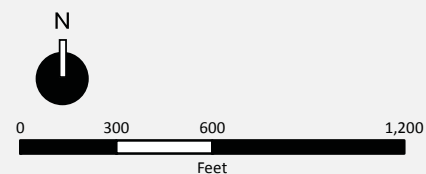
The Glenville and Baile series are not well suited for development due to poor drainage and association with Stoney Creek.

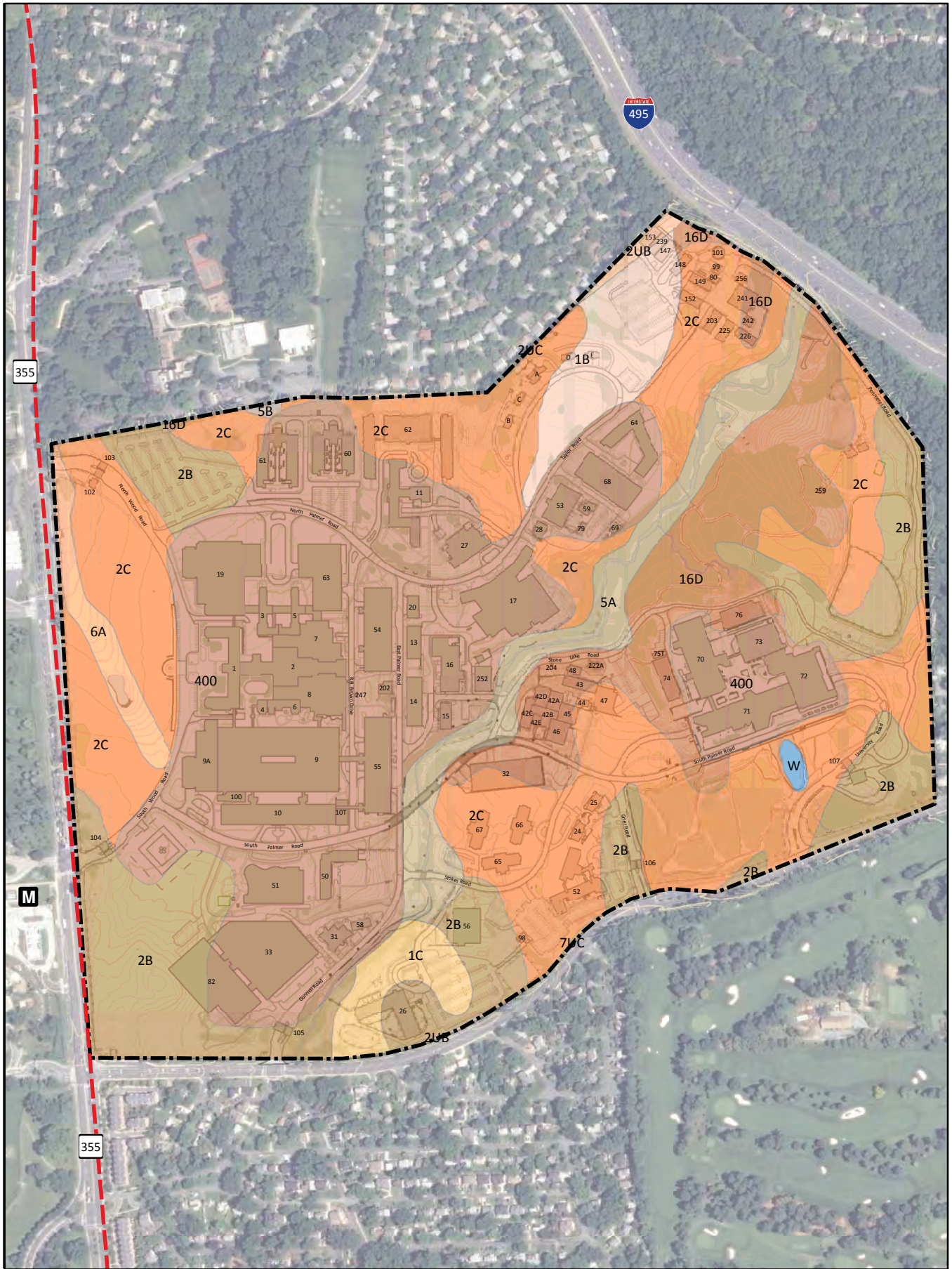
No known area or areas of contaminated soil have been identified on the campus.

FIGURE 4-3 SOILS PROFILE MAP

	16D	Brinklow/Blocktown Silt Loams (15-25% slopes)
	1B	Gaila Silt Loam (3-8% slopes)
	1C	Gaila Silt Loam (8-15% slopes)
	2B	Glenelg Silt Loam (3-8% slopes)
	2C	Glenelg Silt Loam (8-15% slopes)
	2UB	Glenelg/Urban Land Complex (0-8% slopes)
	2UC	Glenelg/Urban Land Complex (8-15% slopes)
	400	Urban Land
	5A	Glenville Silt Loam (0-3% slopes)
	5B	Glenville Silt Loam (3-8% slopes)
	6A	Baile Silt Loam (0-3% slopes)
	7UC	Gaila/Urban Land Complex (8-15% slopes)
	W	Water

Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009
 Soil Survey Geographic (SSURGO), 2007





Water Resources

Surface water, ground water, flood plains, wetlands and watersheds are all examples of water resources to be considered on NSAB (Figure 4-4).

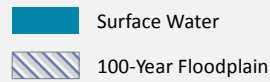
There are several areas of surface water on the campus including eight ponds, which are used mostly for storm water management. Lake Eleanor is a spring fed pond located in front of Building 1 within the historically protected view area. University Pond, south of the USUHS campus, is fed primarily from off-campus runoff. An in-stream pond along Stoney Creek, located within the recreational area in the northeastern portion of the campus is effective at removing sediments but is not part of the storm water management plan. Five other ponds, located near Buildings 61, 62, 17, 52 and 26, provide areas of retention for campus runoff. Development should be avoided within these existing ponds.

Ground Water and Flood Plains

In general, there are significant quantities of ground water that occur in the igneous and sedimentary rocks of the Piedmont Province. Movement of water through these rocks is restricted but water is extracted through fractures, saprolites and topographically low areas. Based on surveys the depth of ground water varies from 20 to 50 feet below the surface. No developed part of the campus is within a 100-year floodplain according to FEMA, Flood Insurance Rate Map, Montgomery Co., Maryland, panel 175 of 200, dated August 1, 1984. However, while it does not meet the requirements of a floodplain for FEMA purposes, Stoney Creek does have a 100 year floodplain. While undefined, the extent of this floodplain is constrained by the steep topography along the creek. While these steep slopes limit construction opportunities near the creek, they create pleasing variations of land form, enhancing the creek as a unique and natural feature that should be maintained for recreation, walking paths and opportunities to highlight nature.

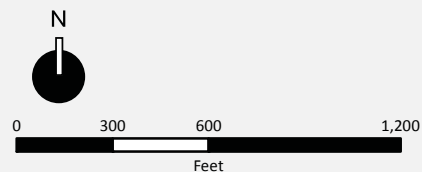
The Stoney Creek Condition Assessment Report, dated March 19, 2010, identifies several stream bank erosion issues on campus due to increased stormwater flow over the last few years. It contains evaluations of existing conditions, alternatives for stabilizing or repairing deficiencies, and prioritized recommendations for preventing further deterioration. According to the assessment report, the long term solution to Stoney Creek's continued degradation lies in effective stormwater management controls. It is recommended that a long term solution for Stoney Creek is considered to address the stormwater issue comprehensively, rather than solely relying on continuing repairs and stabilization measures, as part of the campus expansion.

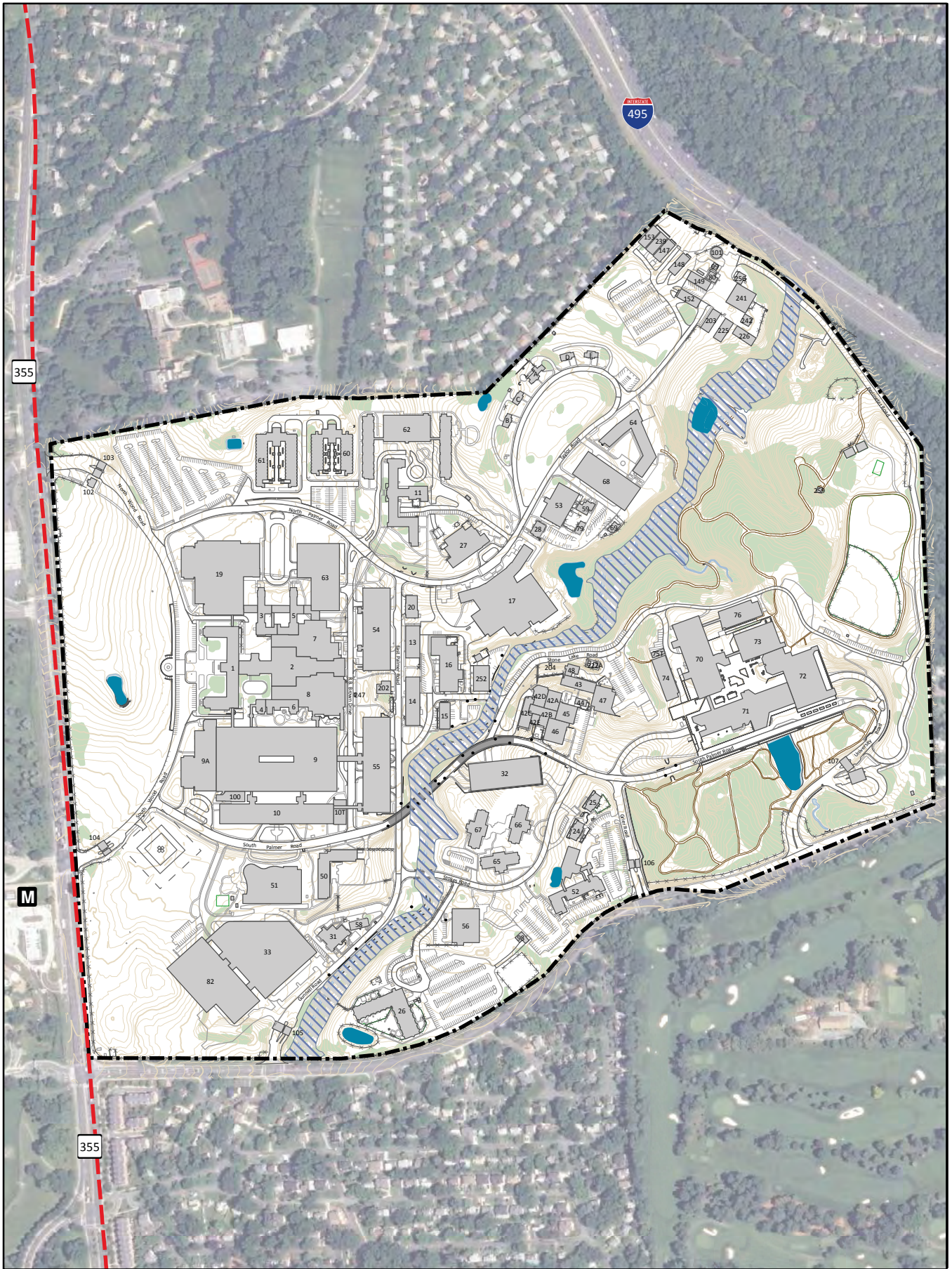
FIGURE 4-4 HYDROLOGY MAP



Note: The floodplain shown is approximate and drawn within the banks of the creek. Limits are for planning purposes only and should be verified through additional studies for verification.

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





Wetlands

According to the Clean Water Act, wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marches, bogs and similar areas. Although there are no designated wetlands at NSAB, there are areas along the tributaries of Stoney Creek that are considered potential wetlands in the installation's Draft Integrated Natural Resources Plan. Definitions of wetlands vary by source. Wetlands in Maryland are protected by the Non-tidal Wetlands Protection Program (NNMC DINRMP, and MDE).

The campus is located within the Lower Rock Creek Watershed of Montgomery County which is designated as a restoration area. Efforts are being made to comprehensively examine and address stormwater retrofit, stream restoration and habitat improvement opportunities. Several tributaries have been extensively piped or channelized, but many areas of natural stream channel remain which may provide opportunities for habitat improvement. NSAB is participating in efforts to improve the area of Stoney Creek and tributaries on the campus that feed into the Rock Creek Watershed and eventually discharge into the Potomac River.

4.2.1.4 Vegetation and Habitat



The existing landscape of NSAB consists of woodland stands found primarily on the eastern half of the campus where they buffer the adjacent residential neighborhoods, and formal plantings found around developed areas. The forested areas are both constraints and opportunities in that they provide pleasant natural areas on campus that should be preserved. In some cases, such as the north boundary and a portion along Jones Bridge Road, they provide a desirable buffer between adjoining residential land uses.

The largest woodland areas at NSAB are located in the area north and south of the USUHS campus and along the tributaries of Stoney Creek. The Draft Integrated Natural Resources Management Plan identified six woodland areas on NSAB (Figure 4-5) and provides a thorough analysis of species found in each area. Detailed information is available in the Management Plan or the EIS.

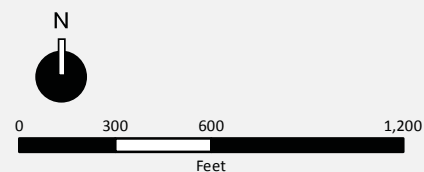
Formal planting areas include building landscapes, street trees and parking lot plantings. Plantings located around the developed portion of the campus appear to be in good health despite the urban character of the campus. In some cases, the existing landscapes adjacent to the buildings are in violation of current AT/FP unobstructed space requirements and should be considered for modification as new projects are considered.

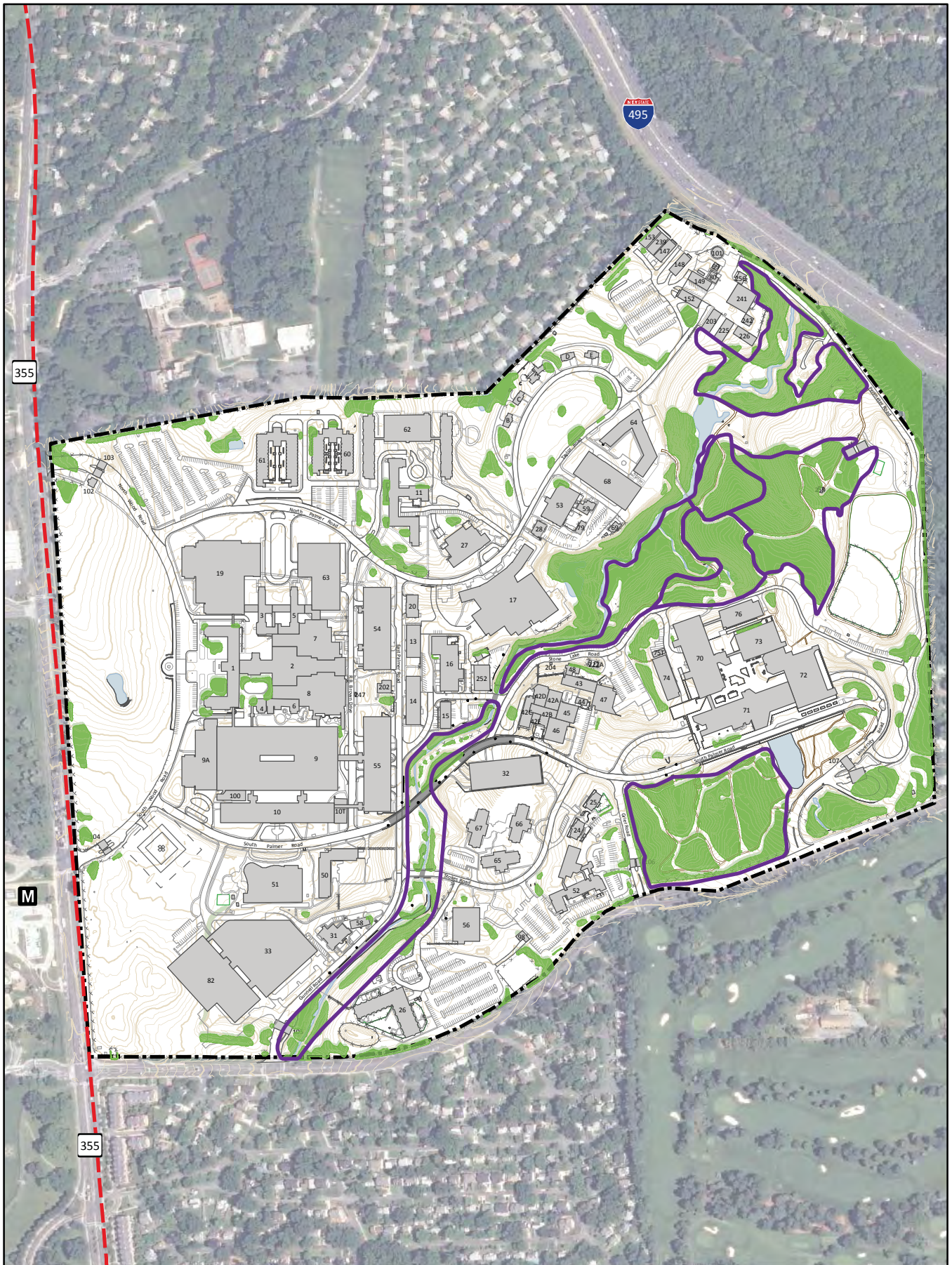
The groundcover in the formal planting areas is mainly lawn and foundation plantings while woodland areas have been allowed to accumulate fallen leaves creating a natural groundcover.

FIGURE 4-5 VEGETATION AND WOODLANDS MAP

-  Woodland Areas
-  Woodland Type Boundaries (BRAC EIS)

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





The natural areas on NSAB provide habitat for several wildlife species. The hardwood forest hosts deer, opossums, squirrels, raccoons, skunks, foxes, as well as a variety of bird and reptile species. Additionally, shrub and low level vegetation provides habitat for mice, meadow voles and shrews, as well as the bird sand reptiles. A complete list of the wildlife identified during surveys of NSAB can be found in the Draft Integrated Natural Resources Management Plan. These surveys did not identify any endangered species on the campus.

Maryland's Department of Natural Resources identified three species of birds with habitats on NSAB that are of Maryland State Special Concern, including: the great blue heron; red-shouldered hawk; and the eastern bluebird.

Air Quality

The Washington, D.C. region including Montgomery County, exceeds ozone and fine particulate (PM2.5) pollution limits as established by the National Ambient Air Quality Standards (NAAQS). Ozone is a harmful air pollutant created when sunlight interacts with certain air pollutants, such as hydrocarbons.

As a result, the Metropolitan Washington Air Quality Committee (MWAQC) developed air quality plans, or State Implementation Plans (SIPs), for ozone and PM2.5 to address air pollution. These SIPs present air quality data that demonstrate how the region will meet the federal standard for ozone. The SIPs go beyond Clean Air Act requirements in an effort to achieve further reductions in fine particle pollution. The SIPs were approved in March 2008 and submitted to the EPA; however, the EPA has not taken action on either SIP because a SIP control measure, the Clean Air Interstate Rule (CAIR), was remanded back to EPA. As a result, that measure will need to be replaced. EPA's proposed Transport Rule will replace CAIR (MWCOG).

NSAB's power plant is the largest producer of emissions for point sources on Base. This (change to energy) power plant has five boilers, 15 large emergency generators and 16 small emergency generators that provide emergency power to the campus. The power plant (Building 16) was originally constructed to burn heavy bunker oils that produced high concentrations of sulfur oxides, oxides of nitrogen and suspended particulates. The plant has since been converted to natural gas, which produces significantly less air pollutants and uses No. 2 fuel oil as backup for periods when natural gas is unavailable.

The campus triggers a Title V Permitting requirement in Montgomery County and monitors for NOx, SOx, PM10, CO, VOC, Hazardous Air Pollutants (HAPS), and Greenhouse Gas (GHG). Additional sources of air pollutants include auto and truck emissions. Vehicular traffic are considered a significant source of air pollution (carbon monoxide) in the greater Washington D.C. region as well as on NSAB. As emission technology has evolved, this source of pollution has decreased and should continue to into the future.

4.2.2 Environmental Conditions: Cultural

Cultural conditions include those elements of the built environment that have some historic, archaeological or cultural significance. Generally these conditions present opportunities to build on a tradition or existing character of the site and may constrain use in deference to preservation or study of a significant building, site, or landscape.

Historic Resources

Description of NMMC Bethesda

The following capsule summarizes the description and significance of NSAB as a historic property, and is taken from the tab for "National Register properties in Maryland" on the Maryland Historic Trust's website, www.mht.maryland.gov.

"The Medical Center was constructed in 1939-42 on a 264-acre site on Rockville Pike opposite the National Institutes of Health. The original building consists of a 20-story central tower rising above a series of interconnecting three- and four-story pavilions. The modernistic building is characterized by a strictly formal bilateral frontality and is sited on a bluff overlooking Rockville Pike to the west. The grounds are used as a golf course and planted with native trees which screen the low pavilion and emphasize the soaring, sculptural qualities of the tower. The main block of the building consists of the tower with its flanking L-shaped pavilions to the north and south as well as a central connector to the east which leads to the minor pavilions at the rear of the complex."

"Construction is of reinforced concrete and structural steel clad in concrete panels faced with quartz, which together with the bronze sashed and serpentine spandrelled stacked fenestration creates the major decorative effect. The pavilions seem to act as a base for the tower. The development of detail, proportions and rhythm here is sensitive and restrained, subordinated to the volumetric concerns of the composition.

"The Medical Center was built during the early years of World War II to house the U.S. Navy's principal center for the practice and dissemination of medicine related to the needs of the naval service. The importance which the government attached to this center for education and research in naval medicine is reflected in the evolution of the complex's design which proceeded from rough plan and elevation sketches by Franklin D. Roosevelt on White House Stationery to an in-house Bureau of Yards and Docks design effort executed under the close supervision of the noted private consulting architect, Paul Philippe Cret. The 20-story tower block with its two L-shaped wings enveloping a lawn that slopes down toward Rockville Pike on the east constitutes a landmark of the Bethesda area in the physical sense of the word.

"In 1878 the navy established the school for medical officers and in 1902 the school moved into the Naval Observatory in Washington. Gradually a complex developed which included a hospital, various medical schools and a medical library. In 1937 Congress acted to fund construction of a new medical

center and Franklin D. Roosevelt selected the site. Significant medical research at Bethesda includes the acrylic eye, grafting techniques of bone and blood vessels, radioactive treatment of bone tumors, facsimile limbs and a wide variety of other surgical, medical and psychiatric techniques.”

The Baseline List of Historic Resources

The Navy carries out a Cultural Resources Management Program to implement NHPA and other related laws at its shore installations. In response to Section 110 of NHPA, NSAB has been the subject of several professional historical architectural surveys and archeological investigations to inventory the Installation for NRHP eligible resources. These surveys establish the “status of knowledge” of Bethesda’s historic properties. However, the baseline is not static. As previously unevaluated buildings move closer in age to the National Register program’s usual minimum threshold of 50 years old, they become potentially eligible and need to be evaluated.

The Central Tower Block or Building 1 was nominated and placed on the National Register in 1978. In 1998 a far more comprehensive survey of the 29 buildings on the Installation that had by then attained an age of 50 years or older was commissioned by the Navy. The survey, prepared on NRHP forms by the consultant firm Robinson and Associates, found 18 structures (including Building 1 and the flagpole designated as Building 30) and one landscape feature to be NRHP eligible as contributors to a “Historic District.” A boundary was then drawn around the area to create a formal historic district on campus (see Figure 4-6). The official “Areas of Significance” were listed as Architecture, Health/Medicine and World War II, and the “Period of Significance” as 1940-1945. Although the district was not officially nominated to the NRHP, these findings were accepted by a letter from the Maryland State Historic Preservation Officer dated November 16, 1998.

The Navy’s own cultural resource management tool, customized to each installation, is the Integrated Cultural Resources Management Plan or ICRMP. The National Naval Medical Center, Bethesda, Maryland, ICRMP 2009-2013 of May, 2009 incorporated the existing survey data but also identified a list of 21 buildings constructed before 1963 that needed to be evaluated for the NRHP and four post-1963 buildings that should be looked at for Cold War period significance.

In fact, the enormous changes that have been wrought by BRAC and other massive construction projects at NSAB have greatly altered the landscape of the Installation. Some historic buildings, such as Building 12, 18 and 21 have had to be demolished to clear sites for new construction. Other non historic buildings such as 49, 139, 141 and 155 have been, or shortly will be, demolished. The boundaries of the Historic District drawn thirteen years ago may no longer make sense and will need to be reevaluated. In both the 1998 draft nomination and the recent ICRMP, uncertainty about the current integrity of landscape features other than the Front Lawn - such as the characteristic winding paths and looping roads - was expressed.

Historic District

Currently the Historic District consists of the original Central Tower Block with its distinguished architectural design, materials, austere detailing and prominent setting at the top of a knoll with a broad lawn, small lake and flagpole on the down slope to Rockville Pike, plus the remnants of a larger 1940’s hospital complex designed by Paul Cret and the Navy’s Bureau of Yards and Docks. Certain other landscaping and site planning features of the Historic District survive such as sections of looping roads, the rolling topography and trees which break up the density of the complex, the loop of Colonial Revival style houses along a half-circle shaped green and the Beaux Art style ramifying wings of Buildings 3 and 5 embedded in newer construction. In reality, however, there have been so many major alterations to the NSAB complex, first in the 1970’s and then in the recent BRAC era, that the continued integrity of a cohesive historic district seems questionable. Many buildings including Building 1 (hospital to administration) have undergone complete changes in use. Few interior spaces have escaped more or less continual alteration and none are identified in the historic documentation as character defining features.

The “Significance” section of the 1998 nomination of the NSAB Historic District explored the themes of (1) “History of Naval Medicine and Research” including the histories of tenant commands that have changed their names or been organizationally combined, (2) “United States Naval Hospital Development”, (3) “Naval Medical Research Institute”, now relocated off site, (4) National Naval Dental Center, and (5) “The Architectural Design and Development of the National Naval Medical Center”. However, although the “Description” section of the nomination contains a great deal of document based research on the activities carried out in all the original Cret buildings, no built-in scientific/research instrument or facility was identified as a character defining feature. The boundary justification in the 1998 nomination of the historic district took the inclusion of Cret designed buildings and the exclusion of later ones as its primary criterion (although the site of the much altered and non-contributing Building 28 extended the boundary). In summary, the character defining features of all remaining historic district buildings consist of their materials, scale, architectural style, relation to Cret’s original site plan and (in some cases) landscaped setting.

The Historic District boundaries are irregular in shape but take in approximately a third of the 243 acre Installation toward the west and north. The row of Colonial Revival Flag officers quarters to the northeast of the Installation are the only architectural resources that differ from the Stripped Classicism style of the ensemble.

4.2.2.3 Historic Landscape Resources

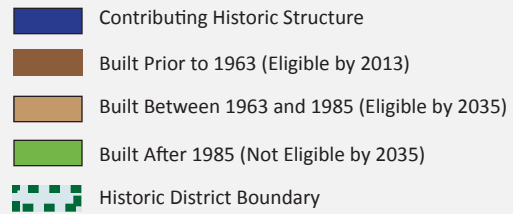
Not as well documented, but of obvious importance is the rolling terrain with mature trees and plantings that characterize the majority of the property. There is an evident transition from the formality and limited planting of the Central Tower Block’s lawn with its terrace and flagpole on axis with the building’s entrance, and an increasingly naturalistic landscape determined by wooded stream valleys further to the east. Further research remains to be done on the significance of NSAB as a “cultural landscape” rather than just a complex of historic buildings.

TABLE 4-1 HISTORIC DISTRICT CONTRIBUTING STRUCTURES

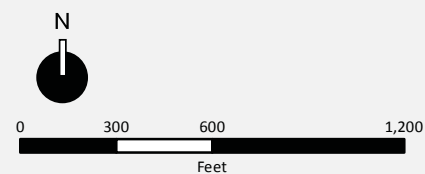
Bldg. No.	Historic Name	Date	National Register Status
1	Main Hospital Tower	1941	Listed in 1977
3	Subsistence and Recreation Wing	1942-43	Contributing to the Historic District
5	Hospital Ward	1942-43	Contributing to the Historic District
11	WAVES Barracks	1941	Contributing to the Historic District
13	Laundry and Garage	1941	Contributing to the Historic District
15	Public Works Shop	1941	Contributing to the Historic District
16	Power Plant	1941	Contributing to the Historic District
17	Naval Medical Research Institute	1941-44	Contributing to the Historic District
20	Firehouse	1944	Contributing to the Historic District
30	Flagpole	1941-42	Contributing to the Historic District
34	Surgeon General’s Quarters	1941	Contributing to the Historic District
35	Officer’s Quarters	1941	Contributing to the Historic District
36	Officer’s Quarters	1941	Contributing to the Historic District
37	Officer’s Quarters	1941	Contributing to the Historic District
38	Officer’s Quarters	1941	Contributing to the Historic District
	Landscape	1941-45	Contributing to the Historic District

Source: NMMC ICRMP, 2009

FIGURE 4-6 HISTORIC BUILDINGS MAP



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009





Archaeological Resources

In general, the potential for archaeological resources at NSAB has been limited by the extensive ground disturbance from farming prior to Navy acquisition and coverage in hardstand and building footprints due to the construction of the hospital complex and later buildings, especially in the western, more developed section of the Installation. In the northeast area of the Installation, the low rising landforms above the streambeds of Stoney Creek and its tributaries have some potential for archaeology.

The first archaeological fieldwork at NSAB was done in 2001 when John Milner Associates carried out an intensive Phase I Archaeological Survey on 36 acres deemed to have moderate to high probability for archaeological resources. Three prehistoric sites were identified, all in the northeastern corner of the campus (18MO555, 18MO556 and 18MO557).





A second Phase I Archaeological Survey was conducted in 2007 by Elizabeth Anderson Comer/Archaeology. This survey consisted of subsurface excavation of 14.3 acres in the southeast area of the campus and revealed five prehistoric archaeological sites (18MO644, 18MO645, 18MO646, 18MO647 and 18MO648) along with a large area of mixed and apparently redeposited historic materials in a disturbed content.

Other inventories and plans include the 1996 Historic and Archaeological Resources Protection (HARP) Plan and most recently the 2009 ICRMP.

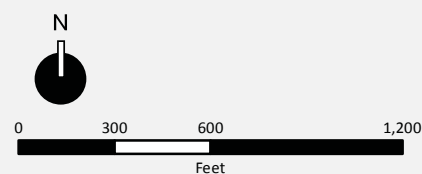
The 1996 HARP represents a collaborative effort between Elizabeth Anderson Corner/Archeology (EAC/A), Robinson and Associates, and Baker and Associates. This study provided a detailed land ownership and a land use history for the parcels later combined into the NSAB campus, and a history of the conception, initial mid-twentieth-century construction, and subsequent late twentieth-century expansion of the NSAB campus itself. The HARP also provided extensive evidence of widespread soil disturbance within most of the campus in the form of historic photographs from the construction of the historic Medical Center core. Based on that level of documented disturbance, subsequent studies have focused on areas outside the historic core as those most likely to retain any potential for in situ archaeological deposits.

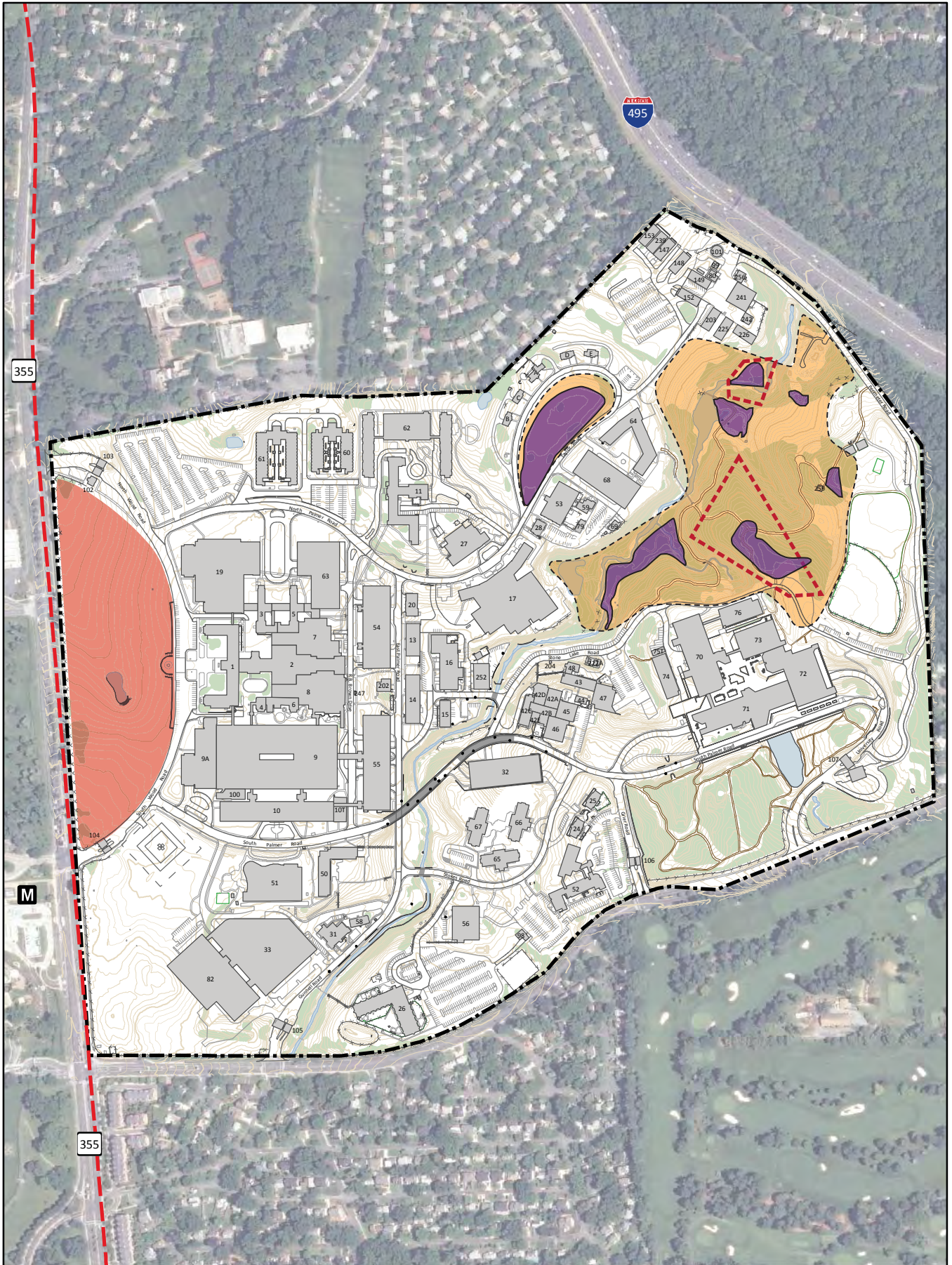
According to the 2009 ICRMP, the SHPO has concurred that archaeological sites in the southeast of the campus (18MO644, 18MO645, 18MO646, 18MO647 and 18MO648) do not meet the criteria for eligibility for listing in the NHPA. No further studies are needed on these sites. However, archaeological sites 18MO555, 18MO556 and 18MO557 need further evaluation to complete Navy's Section 110 responsibilities. A Phase II Evaluation of those three sites is currently scheduled, but no results have been received.

FIGURE 4-7 CULTURAL RESOURCES MAP

-  Avoidance Zone (around potential NHRP eligible site)
-  Archaeological Survey Area
-  Moderate to High Probability Area
-  Historic Lawn and Protected Viewshed

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





4.2.3 Environmental Conditions: Operational

Encroachment and Noise

NSAB is located in a highly developed area of Montgomery County. As a result, there is both internally- and externally-generated noise.

Major external sources of noise, in approximate order of significance, include I-495 (Capital Beltway Inner Loop), Rockville Pike and Jones Bridge Road. For I-495, with the exception of NSAB maintenance and storage buildings located adjacent to the Interstate, a significant amount of noise is attenuated by the trees along the eastern and northeastern portions of the campus. Rockville Pike is a relatively low speed road compared to I-495 and, as a result, the intensity of the noise is less than I-495. Additionally, the extensive lawn area on the western side of the campus provides a significant set back from the noise source. As a result, a large portion of this noise is attenuated. Noise generated from traffic on Jones Bridge Road to the south is also buffered for the most part by stands of trees and changes in elevation.

Within the campus, there are also noise considerations. This includes the helicopter landing pad, Building 252 (cooling towers) and Building 16 (power plant). The helipad is located in the southwestern portion of the campus adjacent to Gate 2 and located away from major populated areas. The helipad is used for medevac operations, both non-VIP and VIP (including the President of the United States).

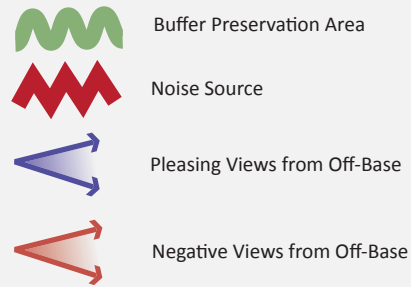
Generally, air traffic volumes are low. Some noise is produced by the power plant located at the center of NSAB. Noise generated from these facilities is shielded from the main medical complex to the west by parking structures and other buildings to the north, south and west by stands of trees, secondary buildings and topography.

Additional variable noise results from day-to-day activities of people using the campus, exterior maintenance and grounds crews.

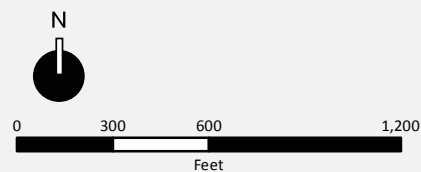
The surrounding land uses are stable and generally built-out. Impacts of encroachment are more likely to be related to the impact of construction at NSAB than on adjacent properties. Planning should seek to minimize the impact of noise and vibration near the perimeter.

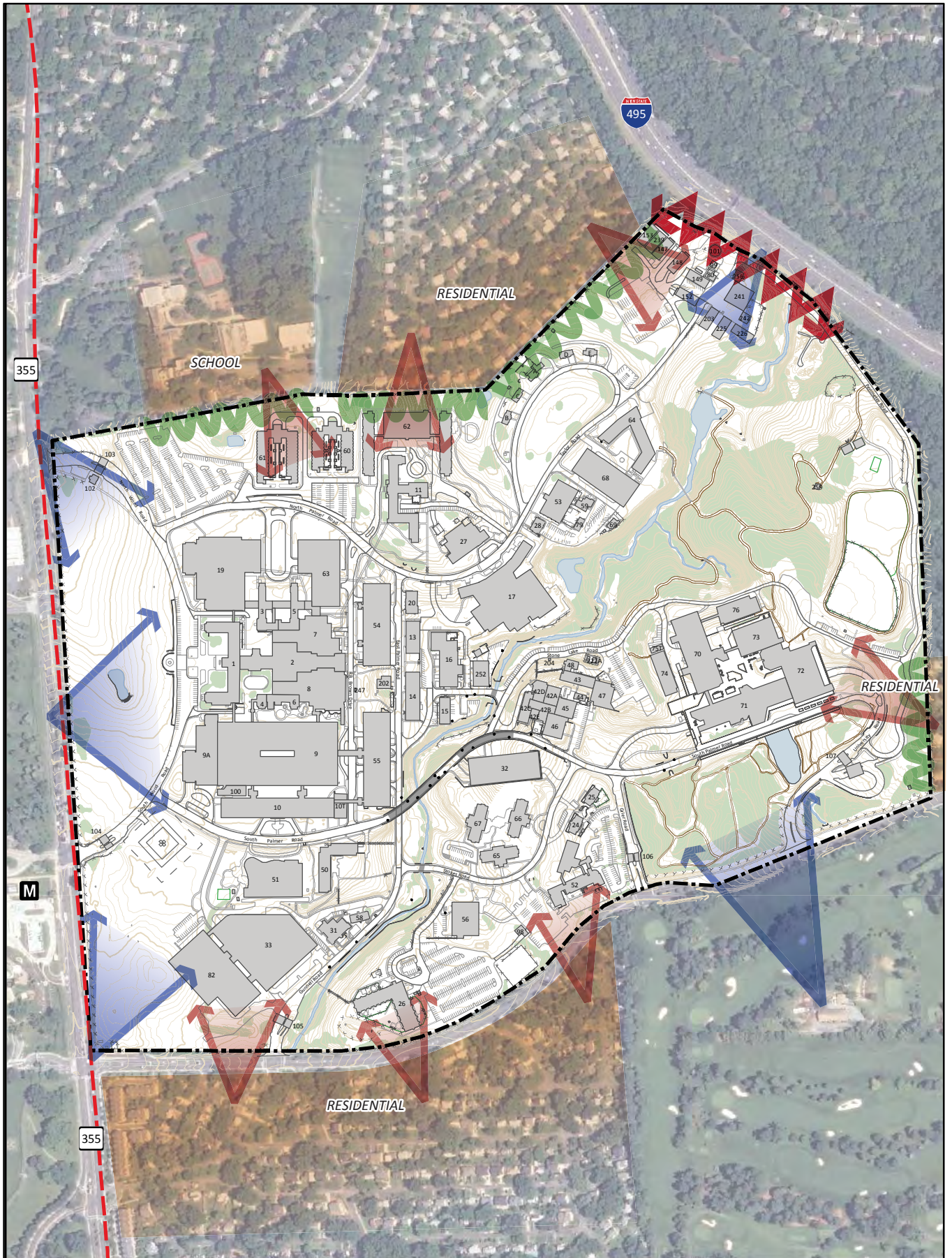
Negative views from off-base residences and schools are mainly associated with taller buildings near the perimeter, such as Buildings 60, 61 and 62. Several houses are very close to Bethesda's perimeter fence and impacts of these taller buildings include, taking away from a neighborhood's visual appeal and shadows cast at certain times of the day. Adequate buffers with large deciduous and evergreen trees should be established and maintained to the extent possible in these areas. There are also pleasing views from off-base, such as the ones established from Rockville Pike to the historic lawn and tower. These views should be preserved.

FIGURE 4-8 ENCROACHMENT AND NOISE DIAGRAM



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





AT/FP

AT/FP criterion as designated in UFC 4-010-01, October 2003 (rev January 2007), DoD Minimum Antiterrorism Standards for Buildings, affects the entire Installation and all future development. The standards in the UFC are very specific based on various situations, but in general, for an installation with a controlled perimeter such as NSAB, this criterion requires new conventional construction with occupancies greater than 50 people to maintain an 82' setback from all roads and parking. Construction of facilities with a lower occupancy require a 33' setback. Renovation projects must comply with the criteria if the renovation is more than 50% of the building's replacement value. In addition, there is a 148' standoff distance required from the controlled perimeter of the Installation.

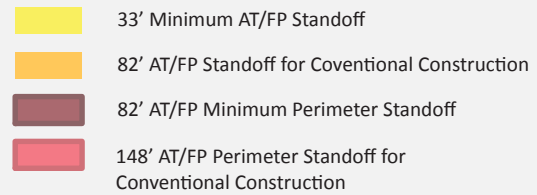
There are provisions in the criteria that allow reduced setbacks with a blast analysis and construction modifications that would be equivalent to the required setbacks. The basis of design for the more recent medical additions and parking structures was approved by security to allow the parking structures to be within 33' of existing structures, rather than the 82' normally required, with the understanding that if the existing structures are renovated in the future by more than 50% of their value, a blast analysis must be completed to incorporate any required provisions in the renovation. In the case of future construction at NSAB, the same measures may be used due to the significant space challenges facing the Installation.

Solid Wastes

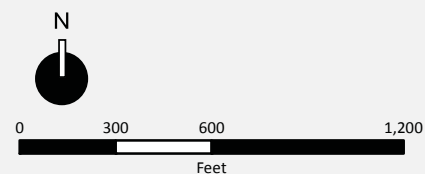
Waste products that are generated at NSAB are classified according to federal and state regulations. NSAB has programs to minimize the waste products generated and strictly adheres to state requirements for disposal. These regulations define procedures for storage, transport and disposal. NSAB Environmental Department is responsible for the program and maintains a certificate registering NSAB with the Montgomery County Fire and Rescue Service.

The campus generates solid waste including various chemicals from research, metal recovery from dental and expired batteries. NSAB also generates medical waste which is contained at the point of origin and labeled in accordance with regulations before being transported. Chemical waste from the hospital is transferred to Building 256, a permitted storage and disposal facility and then picked up and disposed of by contracts through the Defense Reutilization and Marketing Service (DRMS) at Fort Meade. All disposal complies with federal, state and local environmental laws and regulations, including the Resource Conservation Recovery Act (RCRA).

FIGURE 4-9 AT/FP STANDOFF MAP



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009










Other tenants on campus, USUHS and AFRI, have independent contracts to handle their chemical waste. A Regulated Medical Waste (RMW) contractor serves the entire campus. The contractor picks up from the RMW secure location in Building 55 for the hospital complex and from additional tenants at other locations. Medical waste is incinerated off-base. General waste includes waste that does not contain solid or medical waste materials. Office waste, disposable products, food waste, maintenance materials and building materials are included in this category. General waste is collected throughout the campus. Programs to encourage recycling are run through the Environmental office. Recycle containers are located throughout the campus to recover recyclable materials. Private contractors transport this waste off campus.

Airspace

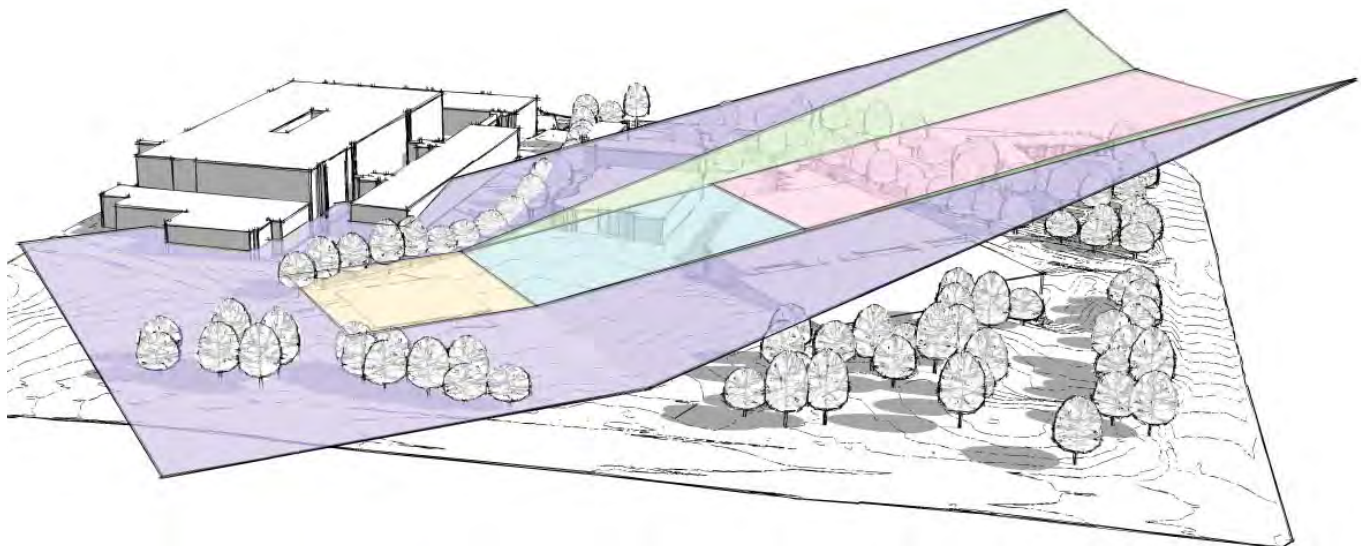
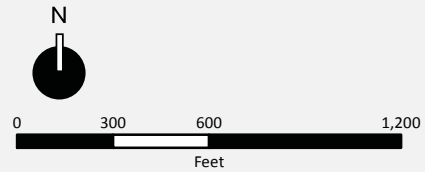
The location of the helipad is driven by its proximity to required medical services. Therefore, it cannot be relocated (Figure 4-10 Airspace Restrictions). Since the helipad is primarily used during the event of a medical emergency, there are specific criteria to protect the airspace surrounding the landing area. The criteria is identified in UFC 3-260-01, November 2002 (and changes May 2006), United Facilities Criteria, Airfield and Heliport Planning and Design. These criteria regulate the size of the primary surface of the helipad, clear zones, approach/departure and transitional surfaces, and the accident potential zone (APZ).

FIGURE 4-10 AIRSPACE RESTRICTIONS MAP

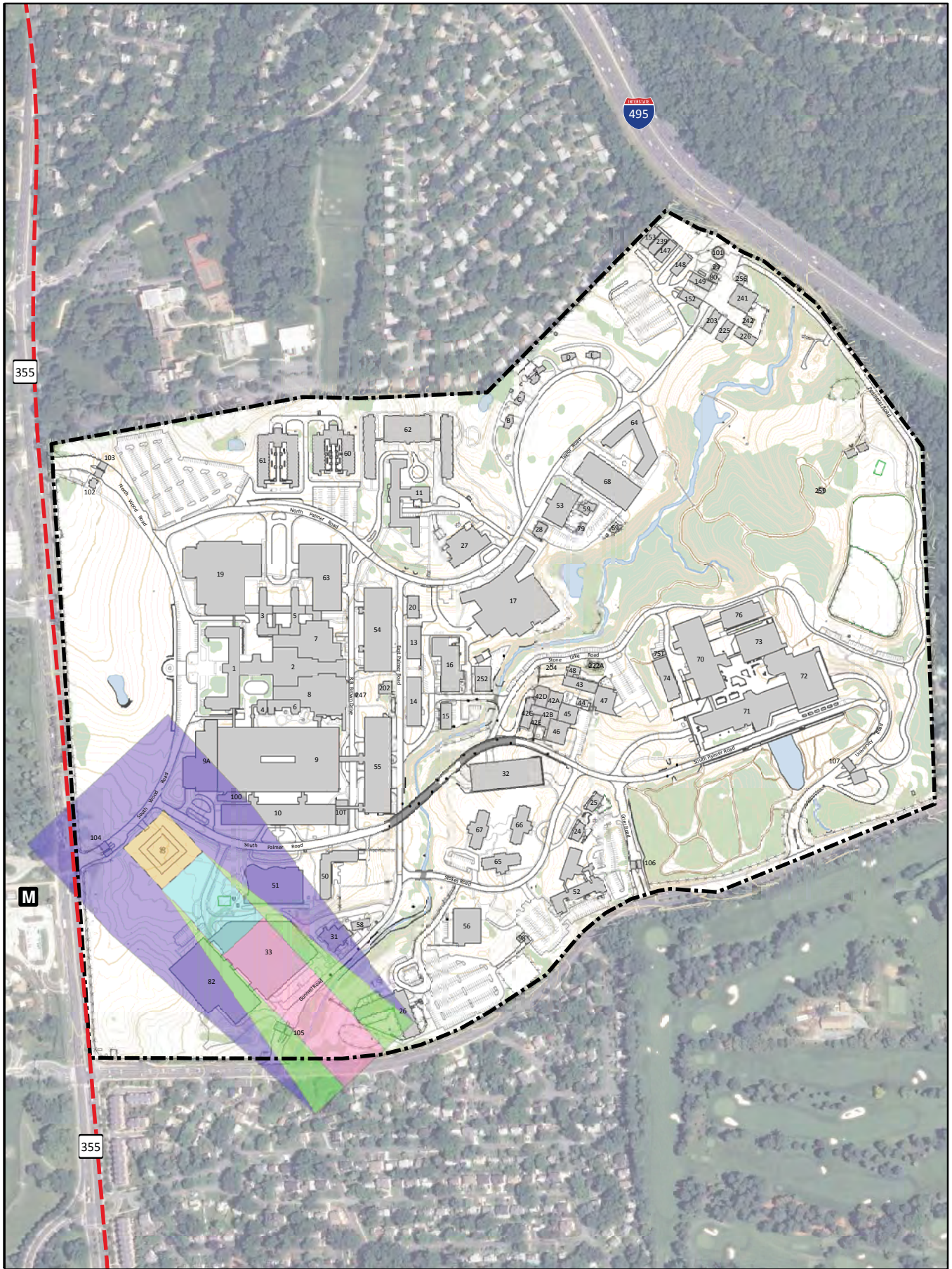
-  Accident Prevention Zone (APZ 1)
-  Approach-Departure Clearance Surface (Slope)
-  Clear Zone
-  Primary Surface
-  Transitional Surface

Note: This map shows the imaginary surfaces for the proposed helipad as shown in Chapter 5 and does not reflect the existing conditions of the current helipad.

Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009



Isometric View of Helipad Restriction Zones



4.3 Functional and Spatial Relationships

4.3.1 Existing Land Use

Land use planning reflects a logical evolution of current functional zones and relationships to reflect both ongoing and projected campus expansion. The following land use categories reflect those used in the Regionally Integrated Master Program (RIMP) 2.0.

The built environment of NSAB consists of approximately 106 buildings, roadways, parking structures and surface parking, walks, and utilities and supporting structures for the medical mission and tenants located on the campus. In general, land uses consist of medical, administrative, housing, community services, support and educational functions. These general functions are broken down further into the following land use categories, illustrated in Figure 4-11.

Medical Support

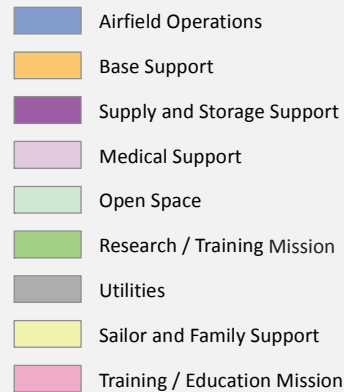
The Medical Support land use area is the “face” of the Installation and includes the Tower (Building 1). The medical core is located in the center of the western portion of the campus and consists of the primary medical functions; including inpatient and outpatient care, clinics and administrative functions. These facilities provide services to a wide-variety of patients external to the Installation. Others with less patient contact are located in outlying facilities surrounding this core.

Within the Medical Support land use area sits Building 1 through 10, 19, 51 and 63. Building 1 serves as a dental clinic and hospital administration; Building 2 through 6 houses personnel support and services; Building 8 includes Optometry, Laser Eye Center, Vision Center of Excellence, Military Readiness & Deployment Health and other administrative offices; Building 9 includes a variety of hospital services, and Building 10 is the hospital nursing tower. The Outpatient and Inpatient facility additions include Buildings 19 and 9A. Also within the Medical Support land use area is the patient parking garage (Building 63) and The National Intrepid Center of Excellence (NICoE) Building (Building 51).

Base Support

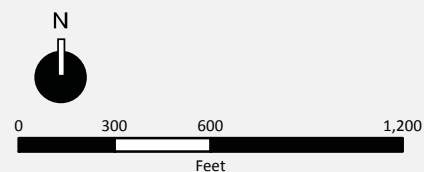
The majority of Base Support facilities are located to the east of the medical core, in the center of campus, however there are a few facilities spread throughout the Installation. The facilities include administrative offices for several base support commands and organizations, surface parking lots, parking structures and security facilities.

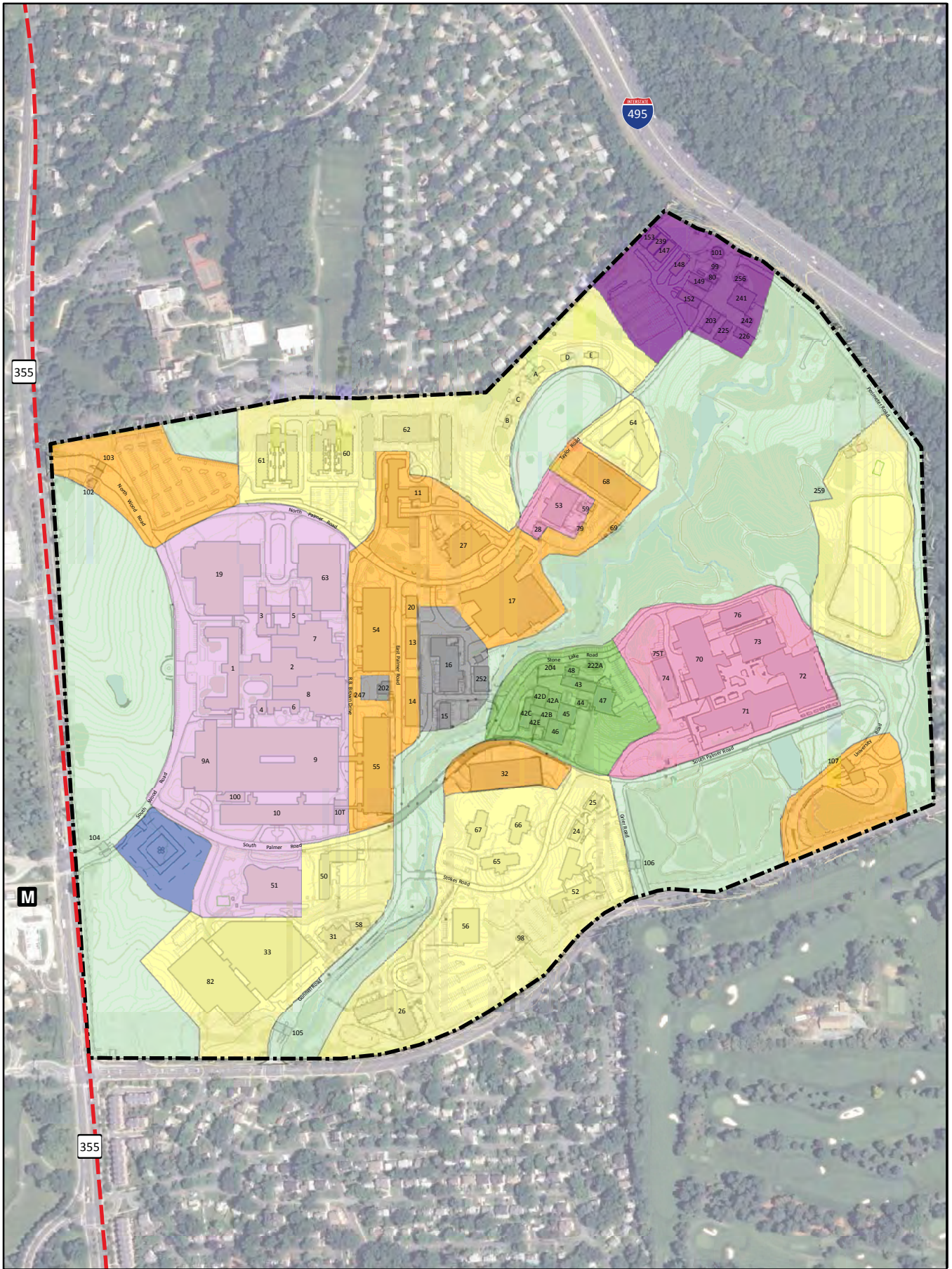
FIGURE 4-11 2011 EXISTING LANDUSE MAP



Note: Land Use categories reflect those used in the RIMP 2.0.

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





Sailor and Family Support

Sailor and Family Support facilities consume the largest amount of land on campus. Located in the northern, southern and eastern edges of campus, this land use consists of a variety of community services, as well as temporary and permanent housing.

The southern side of campus includes both retail and lodging components. The retail cluster is characterized by several suburban style structures, including a fast food restaurant and a gas station. It also includes the NEX (Building 82), a Bowling Center (Building 56), as well as a child development center (Building 26).

Permanent housing is located to the northern half of the campus and consists of Buildings 60, 61, 62 for enlisted quarters and five Senior Officer/Flag single family units.

Temporary housing, in general is located at the southern edge of the campus in the form of the Navy Lodge (Building 52) and the Fisher Houses (Buildings 64, 65 and 67). Building 50 is also considered temporary housing and is used for patients requiring frequent follow up visits that no longer need full time care in a hospital setting. It should be noted that Buildings 50, 60 and 61 can all be used as the need dictates for patients requiring frequent follow up care or permanent party occupants. Recent projects have been initiated to improve the accessibility in these facilities and increase flexibility for these options.

The Sailor and Family Support land use also includes a portion of the eastern campus used for active recreation, including ball fields and a running track.

Training/Education Mission

The primary facilities of USUHS are located in the southeastern portion of the campus. The USUHS complex is comprised of Buildings 70, 71, 72, 73, 74, 75T and 76. In addition to the main complex, Buildings 28, 53, 59 and 79 also house USUHS functions.

Research/Training Mission

The Research/Training land use is comprised of AFRRRI facilities (Buildings 42-48) in the center of the Installation at the intersection of South Palmer Road and Stokes Road. Access to this area is provided on South Palmer Road, and its parking areas and service entries are located at a lower elevation along Stone Lake Road.

Supply and Storage Support

The Supply and Storage Support land use is located in the northeast corner of the Installation and is accessed by Perimeter Road from the south. Perimeter Road is slated to be upgraded to allow for increased truck traffic to the supply area via the Truck Inspection Gate (Gate 5). The supply area is characterized by multiple metal sided and slope-roofed warehouse structures.

Airfield Operations

Airfield Operations land use is limited to the existing helipad, located off the historic lawn just southwest of the medical core.

Utilities

The majority of land use designated for utilities exists in the center of the Installation, east of Rixey Road. This area is characterized by the presence of two large structures: the power plant (Building 16) and the cooling tower (Building 252), as well as several one and two story buildings including 13, 15 and 202.



FIGURE 4-12 REGIONALLY INTEGRATED MASTER PROGRAM (RIMP) 2035 MODEL BASE

RIMP 2035 Model Base Plan

The Regionally Integrated Master Program (RIMP) 2035 Model Base Plan for NSA Bethesda was based on existing land use along with the projected 2035 Navy Shore Vision. The general findings of the plan include:

- Mission land uses are primarily medical/administrative
- Open space associated with environmental constraints (stream) and historic viewshed
- Land uses are compatible with surrounding suburban community

This land use plan established the framework for the following goals of the RIMP 2.0:

- Mission land use to expand slightly, keeping major concentration at the west side (front) of the Installation
- Hospital and university can share facilities (e.g., a conferencing center) to reduce redundancy
- Potential for PPV barracks
- A trail along the stream could provide unstructured recreation, while unused spaces within AT/FP buffers could be used for playing courts where desired
- Parking to be consolidated and built as structures where feasible, and pedestrian connections to be improved
- Creation of walkable campus meeting the needs of multiple users, both affiliated and non-affiliated

4.4 Facilities Assessment

4.4.1 Facilities Use

There are approximately 105 buildings on campus. The DoD uses standard codes to categorize the function of facilities. The series codes (shown in Figure 4-13) indicate the use of building facilities (Class 2 property). Within individual facilities there is often a mix of functional uses. For an overview of the distribution of facility classes using the primary functional use of each facility, refer to Figure 4-14. Additional information on the assignment of category codes can be found in UFC 2-000-05N: Facility Planning for Navy and Marine Corps Shore Installations.

FIGURE 4-13 DISTRIBUTION BY FACILITY CLASSES

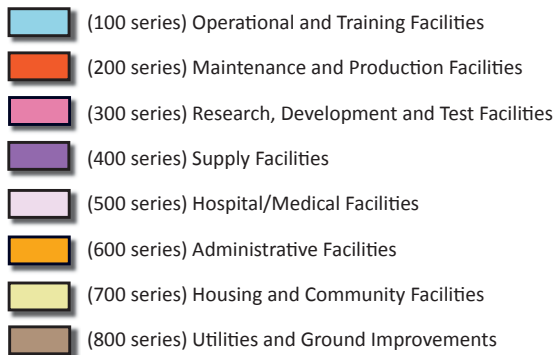
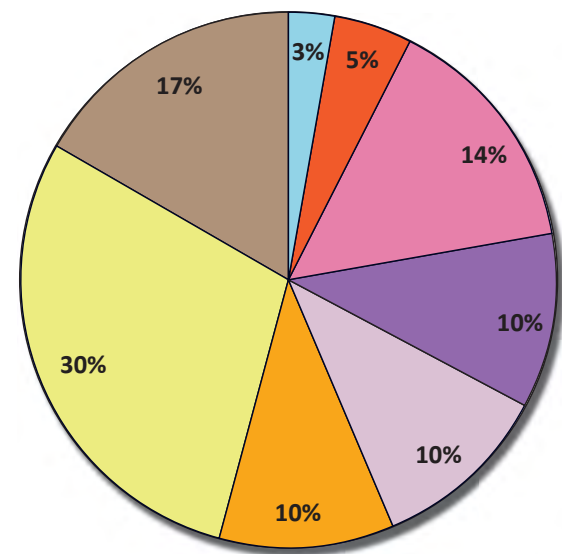
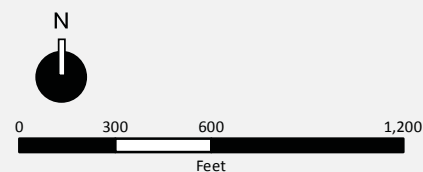
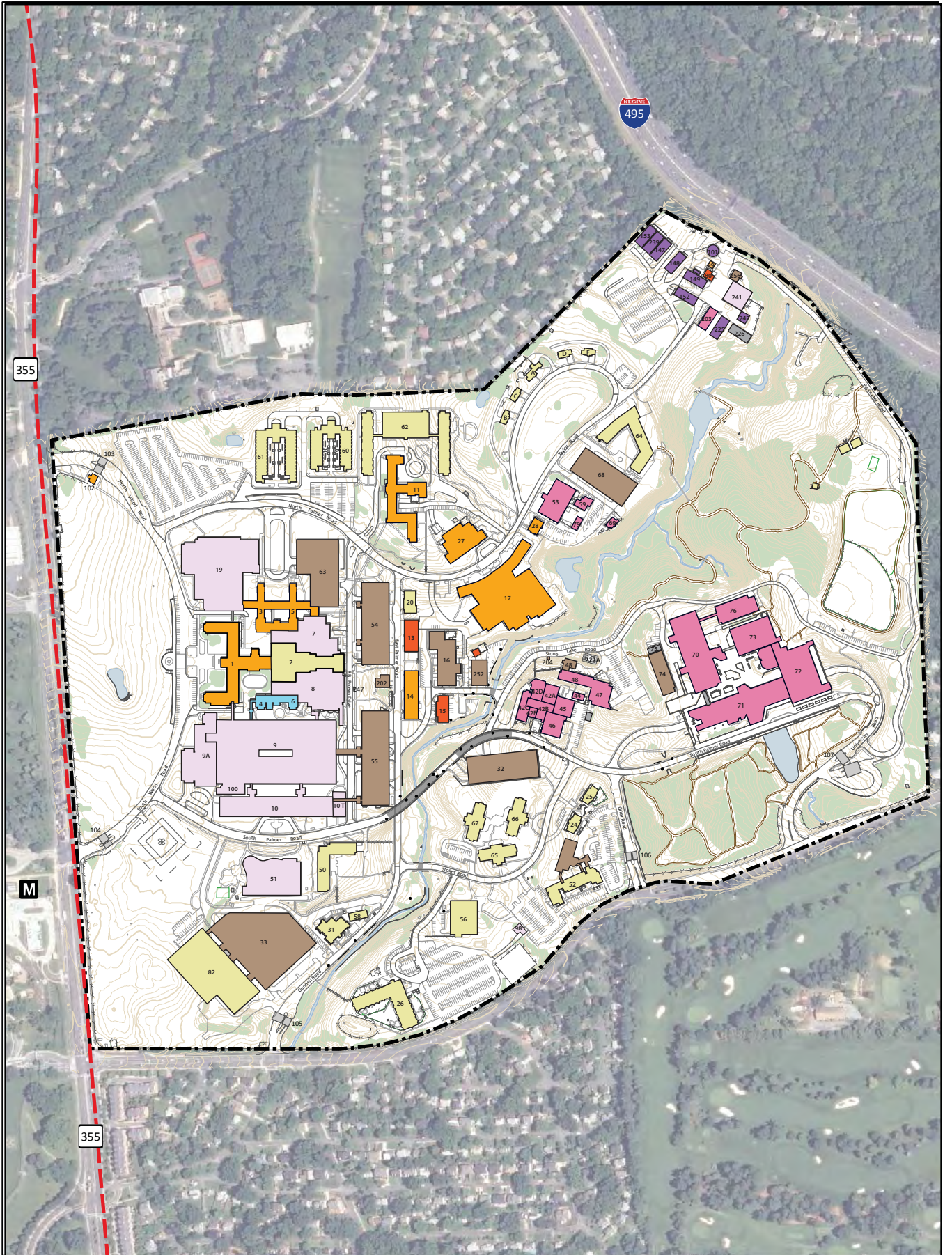


FIGURE 4-14 FACILITY USE MAP



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009





4.4.2 Building Inventory

Based on the building inventory data and the incorporation of recently completed and on-going construction projects, approximately 6.7 million gross square feet (GSF) of building space has been identified on campus. There are fourteen individual buildings that are over 100,000 GSF, not including the three parking structures (Buildings 54, 55 and 63). Buildings 1 through 10, the medical core buildings total approximately 2.25 million GSF which is approximately 34% of the overall campus GSF. Of the 105 total facilities on-base, 87 are permanent, 14 are semi-permanent and 4 are temporary.

Table 4-3 provides facility number, NSAB facility name, area (square feet/SF), date built, primary use category code, physical quality rating and facility type, based on the Installation facility data available. New construction completed in the past year has not been evaluated.

TABLE 4-2 FACILITY TYPE DISTRIBUTION

Facility Type	Number of Facilities	Percent
Permanent	87	83%
Semi-Permanent	14	13%
Temporary	4	4%

Source: NSAB, February 2011

TABLE 4-3 NSAB BUILDING INVENTORY

Bldg. No.	Facility Name	Area (SF)	Prime Use	Date Built	Facility Type
1	ADMINISTRATIVE OFFICES	271790	61010	1941	PERM
2	EXCHANGE / MWR FOOD SVC	110614	74004	1941	PERM
3	ADMINISTRATIVE OFFICE	29874	61010	1943	PERM
4	PHOTOGRAPHIC BUILDING	13445	14160	1941	PERM
5	ADMINISTRATIVE OFFICES	40706	61010	1943	PERM
6	PHOTOGRAPHIC BUILDING	17400	14160	1942	PERM
7	MEDICAL CENTER	83575	51011	1963	PERM
8	MEDICAL CENTER	94839	51011	1963	PERM
9	MEDICAL CENTER	585473	51011	1980	PERM
9A	MEDICAL CENTER-INPAT CARE	157000	51011	2009	PERM
10	MEDICAL CENTER	310707	51011	1980	PERM
11	ADMINISTRATIVE OFFICE	72946	61010	1941	PERM
13	PW MAINTENANCE STORAGE	18144	21977	1941	PERM
14	ADMINISTRATIVE OFFICE	26402	61010	1941	PERM
15	PUBLIC WORKS SHOP	11232	21910	1944	PERM

Bldg. No.	Facility Name	Area (SF)	Prime Use	Date Built	Facility Type
16	HEATING PLANT BUILDING	47744	82109	1941	PERM
17	ADMINISTRATIVE OFFICES	418319	60110		PERM
19	MEDICAL CENTER-OUTPAT CARE	533000	51011		PERM
20	FIRE STATION	5265	73010	1944	PERM
24	FISHER HOUSE	5074	74020	1991	PERM
25	FISHER HOUSE II	5074	74020	1994	PERM
26	CHILD DEVELOPMENT CENTER	22720	74074	1-Jul-95	PERM
27	ADMINISTRATIVE OFFICE	54800	61010	1-Jul-90	PERM
28	ADMINISTRATIVE OFFICE	5796	61010	1-Jul-52	PERM
31	INSTALLATION REST (MWR)	9057	74026	1-Jul-96	PERM
32	PARKING BUILDING	387,877	73080		PERM
33	NAVY EXCHANGE GARAGE	192,000	73080		PERM
42	AFRRI REACTOR LAB	60555	61010	1-Jul-62	PERM
43	AFRRI RAD EFFECTS LABORATORY	22477	31021	1-Jul-62	PERM
44	AFRRI MODULATOR BLDG	1404	31021	1-Jul-62	PERM
45	LABORATORY & SUPPORT FAC	21372	31021	1-Jul-67	PERM
46	LAB AND TECH SUPPORT BLDG	36136	61010	1-Jul-70	PERM
47	ANIMAL RESEARCH BLDG AFRRI	32940	31021	1-Jul-80	PERM
48	RAD/WASTE HANDLING	3824	83139	1-Jul-88	PERM
49	RDT&E STORAGE LAB	364	31915	1-Jul-80	PERM
50	BEQ E1/E4	49896	72111	1-Jul-68	PERM
51	NICoE	80000	51011		PERM
52	TEMPORARY LODGING NVY LDG	33019	74020	1-Jul-71	PERM
53	ENVIRONMENTAL HEALTH EFFECTS	35209	31027	1-Jul-76	PERM
54	PARKING BUILDING	330040	73080	1-Jul-77	PERM
55	PARKING BUILDING	386107	73080	1-Jul-80	PERM
56	BOWLING CENTER	18215	74040	1-Jul-79	PERM
58	EXCHGE AUTO REPAIR STA	2720	74030	1-Jul-79	PERM
59	USUHS ENVIRONMENTAL LABORATORY	5036	31027	1-Jul-89	PERM
60	BEQ E1/E4	114536	72111	1-Jul-86	PERM
61	BEQ/PARKING BUILDING	141053	73080	1-Jul-93	PERM
62	BEQ	293,145	72121		PERM

Bldg. No.	Facility Name	Area (SF)	Prime Use	Date Built	Facility Type
63	PATIENT PARKING GARAGE	334813	73080	1-Feb-10	PERM
65	FISHER HOUSE III	5333	33019		PERM
66	FISHER HOUSE IV	5333	33019		PERM
67	FISHER HOUSE V	5333	33019		PERM
69	ANIMAL APPLICATIONS LAB	1344	31029	1-Jul-91	SEMI
70	USUHS BUILDING A	311099	31031	1-Jul-78	PERM
71	USUHS BUILDING B & GARAGE	282955	31031	1-Jul-80	PERM
72	USUHS BUILDING C	287080	31031	1-Jul-80	PERM
73	USUHS BUILDING D	189935	73080	1-Jul-80	PERM
74	USUHS STORAGE FACILITY	12768	44110	1-Jul-89	PERM
76	USUHS BUILDING E-NURSING SCHL	55000	17120		PERM
79	USUHS ENVIRONMENTAL LABORATORY	960	31027	1-Jul-94	SEMI
80	PUBLIC WORKS SHOP	1064	21910	1-Jul-90	PERM
82	NAVY EXCHANGE RETAIL STORE	150,000	74001		PERM
98	SATELLITE PHARMACY	1312	51011		PERM
99	FILLING STATION	1023	12310	1-Jul-97	PERM
101	PAVMT/GRNDS EQUIP SHED	1962	21920	1-Jul-90	SEMI
102	VISITOR CENTER (GATE 1)				PERM
103	GATE 1				PERM
104	GATE 2				PERM
105	GATE 3				PERM
106	GATE 4				PERM
107	GATE 5				PERM
141	ADMINISTRATIVE OFFICE	42063	61010	1-Jul-44	SEMI
142	HOSPITAL	600	51010	1-Jul-96	TEMP
147	GENERAL PURP WAREHOUSE	4000	44110	1-Jul-49	SEMI
148	GENERAL PURP WAREHOUSE	4040	44110	1-Jul-49	SEMI
149	PAVMT/GRDS EQUIP SHED	4040	21920	1-Jul-49	SEMI
152	GENERAL PURP WAREHOUSE	4000	44110	1-Jul-51	SEMI
153	GENERAL PURP WAREHOUSE	4000	44110	1-Jul-51	SEMI
174	GENERAL STORAGE SHED	1008	44135	1-Jul-50	PERM
188	FALLOUT SHELTER	1225	73065	1-Jul-62	PERM

Bldg. No.	Facility Name	Area (SF)	Prime Use	Date Built	Facility Type
202	SWITCHG STA/SECT DIST CIRC	3900	81330	1-Jul-62	PERM
203	RDT&E STORAGE LAB	4000	31915	1-Jul-64	SEMI
204	RADIOACTV WASTE HANDL BLDG	121	83139	1-Jul-62	PERM
219	RDT&E STORAGE LAB	70	31915	1-Jul-45	PERM
225	PAVMT/GRNDS EQUIP SHED	4040	21920	1-Jul-68	TEMP
239	GENERAL PURP WAREHOUSE	4000	44110	1-Jul-73	PERM
241	MEDICAL LABORATORY	9500	53020	1-Jul-75	SEMI
242	MWR READY STOR	1600	74077	1-Jul-76	SEMI
244	UTILITY TUNNEL-BLDG 54 TO 55	138	89046	1-Jul-42	PERM
245	UTIL TUNNEL BLDG 16&2 -#007	373	89046	1-Jul-40	PERM
246	UTILITY TUNNEL BLDGS 16,55,7	516	89046	1-Jul-80	PERM
247	MISC PERS WEATHER SHLT SOUTH	91	73066	1-Jul-77	PERM
248	MISC PERS WEATHER SHLTR EAST	91	73066	1-Jul-77	PERM
252	COOLING SYS PLANT BLDG	10584	82610	1-Jul-77	PERM
254	WATER DISTRIBTN BLDG, PTBL	150	84209	1-Jul-83	PERM
255	WATER DISTRIBTN BLDG, PTBL	204	84209	1-Jul-79	PERM
256	HAZARDOUS WSTE STOR & TRNSFR	1169	83141	1-Jul-75	SEMI
257	RECREATION PAVILLION	1386	74078	1-Jul-80	PERM
258	RECREATION PAVILLION	1386	74078	1-Jul-80	PERM
259	PUBLIC TOILET	361	73075	1-Jul-80	PERM
311	STANDBY GENERATOR PLANT	2128	81160	1-Jul-80	PERM
10T	PEDIATRIC SWING SPACE	6656	55010	3-Mar-08	TEMP
252-A	PW MAINTENANCE STORAGE	870	21977	1-Jul-92	PERM
254-A	WATER DISTRIBTN BLDG, PTBL	204	84209	1-Jul-92	PERM
A	FUND HSG,PRE 1950,O7/O10	5613	71144	1-Jul-41	PERM
B	FUND HSG,PRE 1950,O7/O10	4415	71144	1-Jul-41	PERM
C	FUND HSG,PRE 1950,O-6	4270	71143	1-Jul-41	PERM
D	FUND HSG,PRE 1950,O-6	4415	71143	1-Jul-41	PERM
E	FUND HSG,PRE 1950,O-6	4270	71143	1-Jul-41	PERM
F	FUND HSG,1950/69,O-4,O-5	1632	71132	1-Jul-50	PERM
G	FUND HSG,1950/69,O-4,O-5	1683	71132	1-Jul-50	PERM
H	FUND HSG,1950/69,O-4,O-5	1785	71132	1-Jul-50	PERM

Source: NSAB, February 2011

4.4.3 Building Assessments

All of the buildings on campus were evaluated and given an overall assessment rating ranging from poor to good (Table 4-4). However, it should be noted that new construction within the past year has not been evaluated and is not included in this assessment. The evaluations were based on observation only and did not include destructive testing or detailed analysis. Apparent structural integrity, condition of finishes, condition of mechanical and electrical systems, obvious code issues and accessibility, were considered in the evaluations.

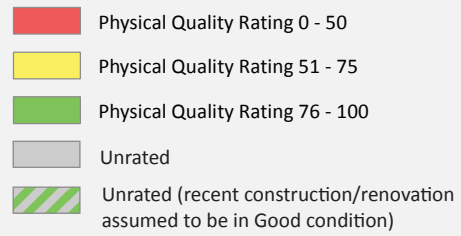
Of the 86 rated buildings, the majority are considered in good condition with a physical quality rating of 76 or better. Only 13% are considered in poor condition and the remaining 12% are in fair condition.

TABLE 4-4 PHYSICAL QUALITY RATINGS SUMMARY

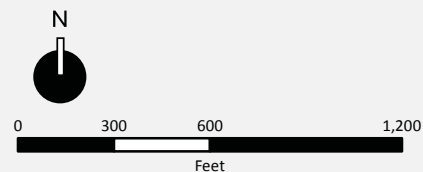
Rating	Number of Facilities	Percent
Poor (0-50)	11	13%
Fair (51-75) <i>Table to be provided in next submission.</i>		12%
Good (76-100)	65	75%
Total Facilities Rated:	86	100%

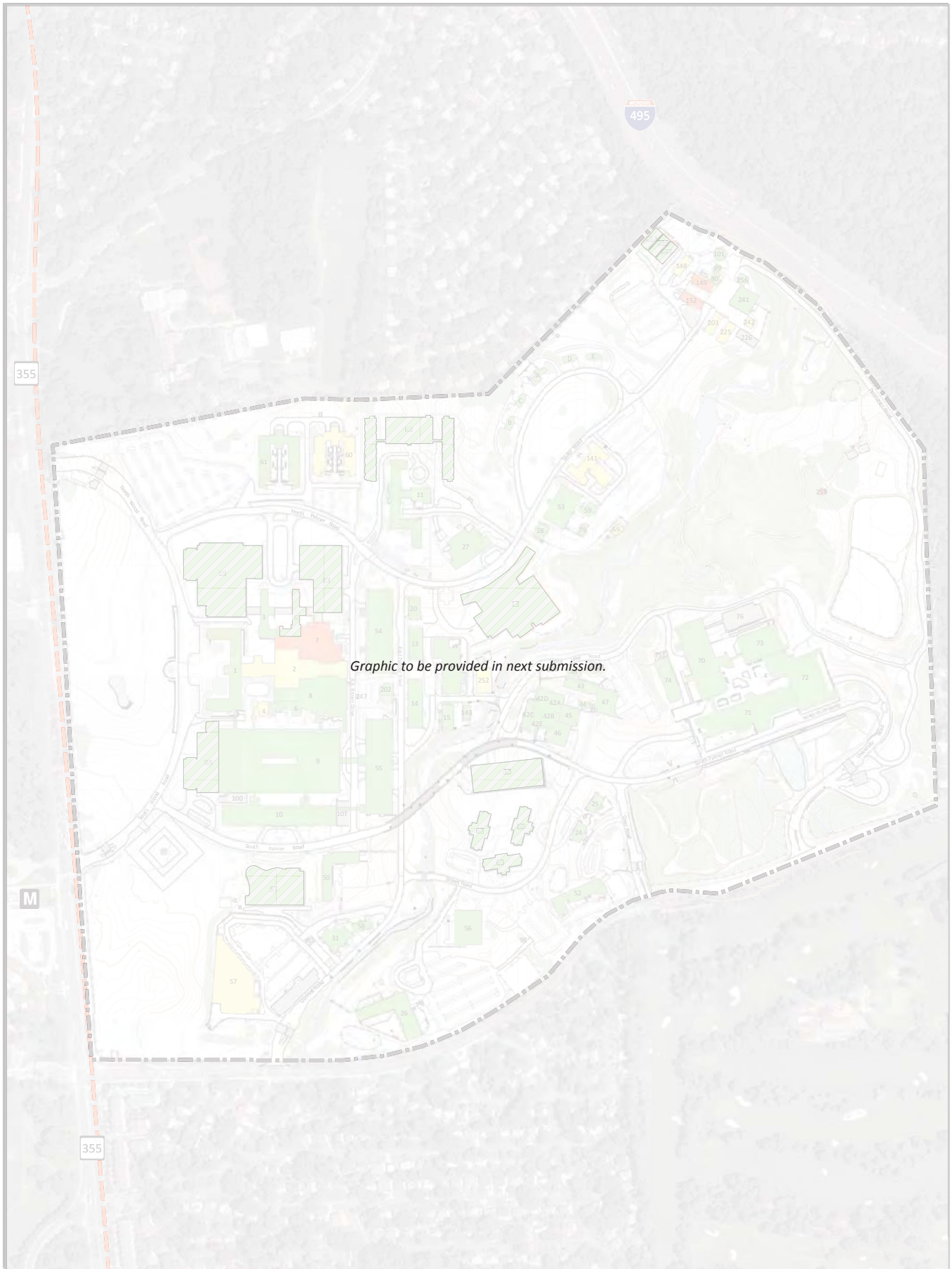
Source: NSAB, February 2011

FIGURE 4-15 PHYSICAL QUALITY RATING MAP



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009





Graphic to be provided in next submission.

4.4.4 Building Heights and Massing

Building heights on campus range from one story and as little as eight feet above grade for some very small storage buildings to 20 stories and 264 feet for the historic tower, Building 1 (Figure 4-16). It was intended that no building come close to the height of the tower. This original plan has been maintained with Building 10 and Building 62, the recently built BEQ Barracks, as the next highest structures at approximately 116 and 90 feet respectively. Other buildings in the medical core of the campus, Buildings 2 through 10, range from 48 to 72 feet in height. The three parking decks adjacent to the core of medical buildings, Buildings 63, 54 and 55 are approximately 75 feet. The USUHS buildings all are approximately 50' to 60' in height and are the next highest identifiable cluster on campus.

Excluding Building 62, the medical core and USUHS are the only other areas of significant height on campus and represent the two largest building mass clusters. In general, building heights and massing are reduced toward the perimeter of the campus. However, as in the case with Building 62, campus space constraints will inevitably push future development closer to the perimeter, making height and adequate buffering important considerations for building and site design.

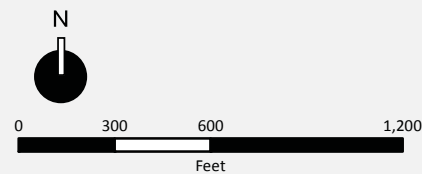
4.4.5 Services

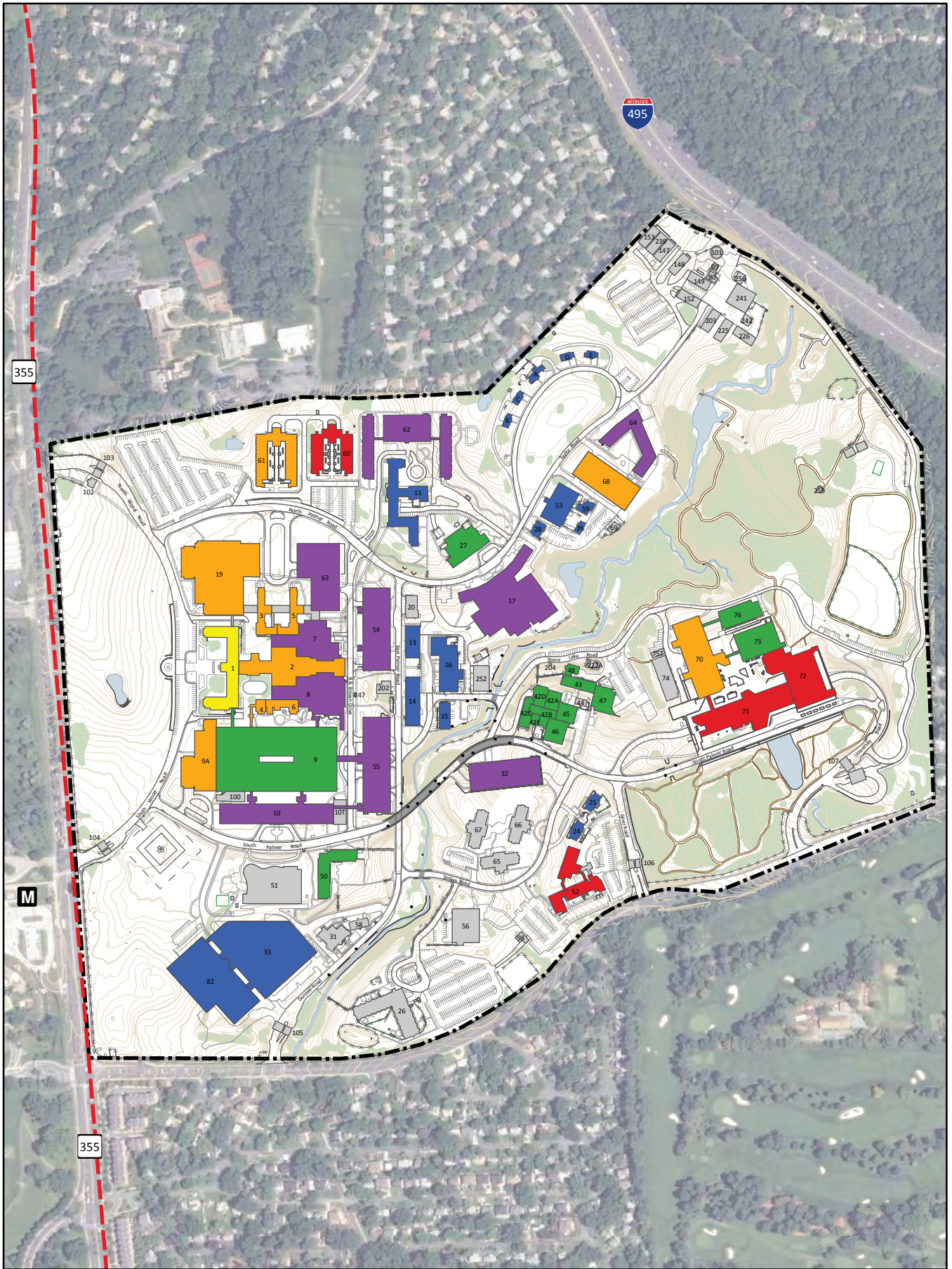
Amenity services available for employees, patients and staff are conveniently located. A selection of eateries are located on "Main Street" (Building 2) central to the medical core with additional options located in the bowling alley, Warrior Cafe, The Galley and the USUHS cafeteria. Vendors and snack machines are located throughout the campus. A McDonald's fast food restaurant is located next to the Navy Exchange (NEX). The NEX provides a very large retail operation and personalized services to include Optical Shop, Barbershop, Laundry and Dry Cleaning, Tailor, QuickMart, Package Store, Uniform Shop, Flower Shop, as well as printing, film developing, UPS shipping and other services. A Child Care Center is available for active duty military personnel assigned to the Washington metropolitan area and civilian employees on a space available basis. Full financial services are available through the Navy Federal Credit Union (NFCU) located on Main Street during normal business hours and 24 hour ATMs are available on Main Street and at the NEX. Postal operations are provided by the United States Postal Service located on Main Street.

FIGURE 4-16 BUILDING HEIGHTS MAP



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





4.4.6 Landscape Patterns

The landscape patterns of the campus can be simplified into two categories: man-made and natural. The man-made landscape pattern is most easily described as areas where development has removed the native landscape and replaced it with a more formal landscape. Because of the age of the campus many of the plantings have matured and appear to be natural to the site. The man-made landscape pattern can be seen in the protected visual area of Building 1, along streets and parking areas, and adjacent to buildings. The steeply sloping topography in some areas of the campus allows for native trees to remain inside the man-made landscape, adjacent to Stoney Creek and the landscape buffers at the perimeter of the campus.

The 2010 Installation Appearance Plan (IAP) identifies five categories of open space and establishes goals and objectives for each category, shown in Figure 4-17. It is the goal of this Master Plan to maintain these areas as identified in the IAP.

4.4.7 Open Spaces

The most recognizable open space on the Bethesda campus is the front lawn of Building 1. This front lawn is a more passive space used for viewing or individual activities, since security prefers this area remains unpopulated. Most often outdoor spaces on campus are courtyards defined by building edges. Some of these courtyards are easily accessible, well defined and have landscape and other amenities to attract visitors. Other courtyards are not accessible, seem too confined and are difficult to maintain. Several open spaces exist on the east side of the campus. One of the only designated open spaces for active recreation is east of the USUHS complex where the baseball field and running track are located. North and south of the USUHS complex are large woodland areas that contain asphalt walking trails which are heavily used for active and passive activity.

4.4.8 Recreational Facilities

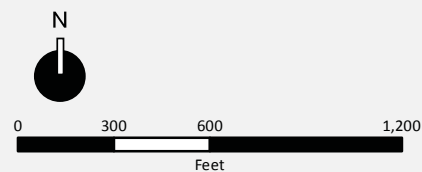
Recreational activities are continuing to grow in importance on campus in support of the Installation's primary mission. There are multiple indoor recreation facilities throughout the campus. A bowling center is available with 20 lanes. A new fitness center in Building 17 was recently constructed and houses state-of-the-art equipment, The Liberty Zone in Building 11 features an enlisted club that provides movies, billiards and other indoor recreational opportunities. In addition to the campus recreation, the MWR information center arranges for recreational trips and activities off campus. Some additional small fitness rooms are located within various buildings for employees.

There are limited opportunities for active outdoor recreation. The only designated outdoor recreation area includes a ballfield, a running track and some open areas for impromptu activities. More passive recreation areas exist throughout campus along wooded trails, in the form of picnic shelters and plazas to sit and enjoy outdoor spaces.

FIGURE 4-17 OPEN SPACE AND RECREATION MAP



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





4.4.9 Development Patterns

The development patterns on the campus are varied. Overall, the front (west side) of the campus follows a grid, consisting of formal building arrangements. The east side of the campus has a less formal development pattern and is more organic in nature, responding to the natural course of Stoney Creek and the surrounding topography.

On the west side of campus, the tower and the earlier structures are formal and symmetrical, with the focus and apex of the symmetry in line with the Building 1. The open lawn preserved in the front Building 1 opens the view to this formality and symmetry that identifies the campus and as such is part of the protected historical view shed. Even the logistics and plant facilities directly related to the medical core follow the orthogonal grid created by these structures. Although built in different phases, later additions, such as Buildings 9A, 10, 19 and 63 were designed and built sensitive to the symmetry and orthogonal organization of the original campus. It is important that future development in the Master Plan maintain and improve this key element.

While there is no formal grid on the east side of campus, the facilities are still organized into clustered groupings. The groupings are functionally aligned and often have independent focuses within individual building clusters.

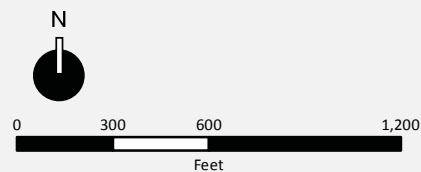
The community and administrative cluster towards the center and south end of the campus is a large grouping of services in itself but also has small clusters within its boundaries. Within this cluster, lodging is located at the east end, retail at the west end with other community services in between.

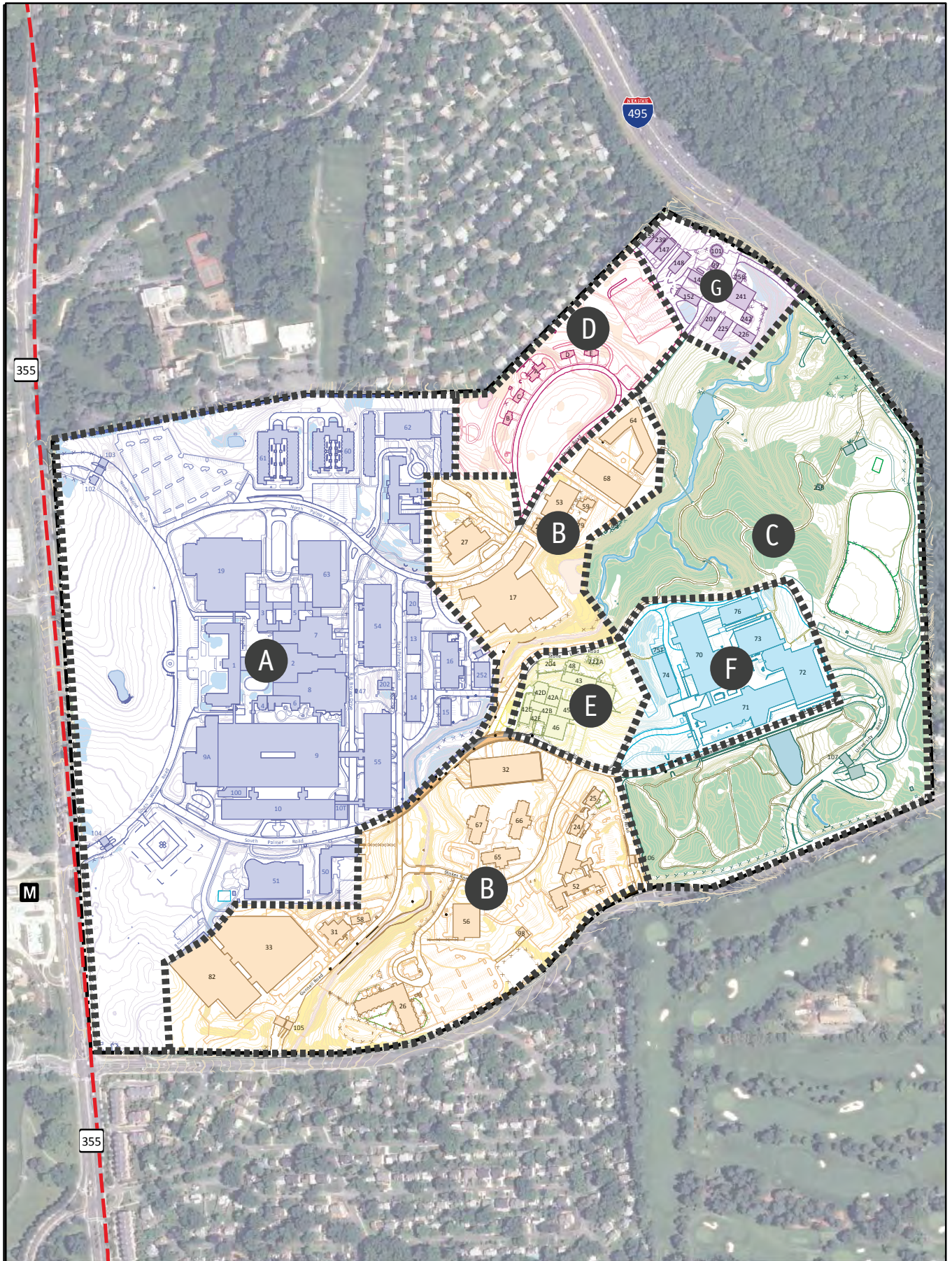
USUHS, for example, has a well defined courtyard and pedestrian system linking the buildings within the cluster and creating an internal focus. A similar but smaller scale concept applies to the residential housing in Buildings 60, 61 and 62. The flag officer housing area constitute another distinctive cluster with a focus on the open area providing a buffer for these historic facilities. AFRRRI is another cluster sharing a common purpose that is comprised of multiple buildings and additions over the years. Overall, the campus patterns do not relate to any particular elements or grids in the surrounding areas or established in the community, with one exception. The dominant axes created by the original structures are very strong and the east west axis in particular aligns with the Central Administration Building of the National Institutes of Health, west of the NSAB.

FIGURE 4-18 DEVELOPMENT PATTERNS DIAGRAM

- A Medical Core
- B Community and Administrative
- C Recreation and Open Space
- D Flag Officer Housing
- E AFRRRI
- F USUHS
- G Industrial/Warehouse

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009



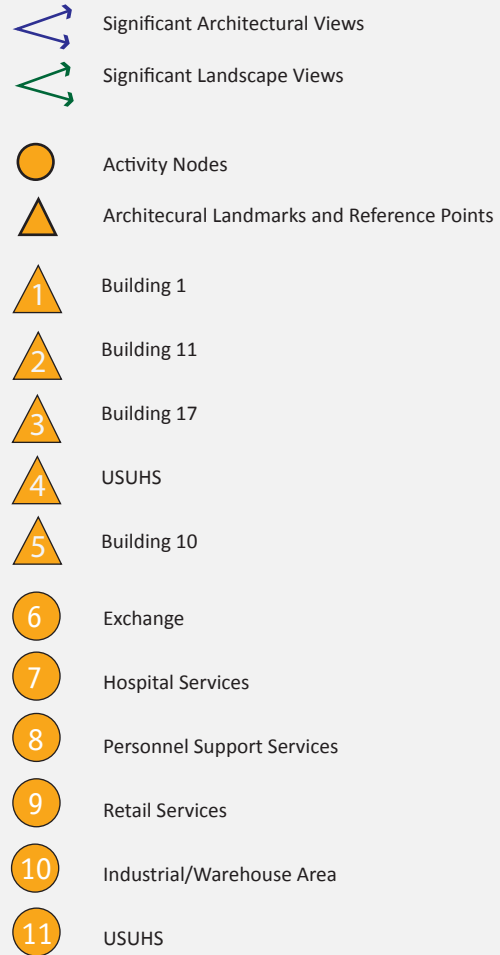


4.4.10 Views, Landmarks and Wayfinding

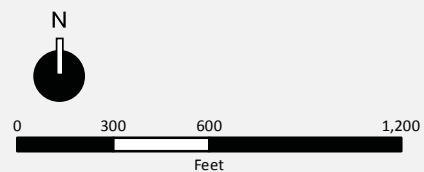
Views to the campus vary and are intentionally limited or emphasized based on the locations (Figure 4-19). The view of the most prominent feature on the campus, Building 1, is emphasized. The view from Rockville Pike of the historic structure is protected based on its listing in the National Register and ensures the open area in front of Building 1 will remain. It is by far the most recognized view of the NSAB campus.

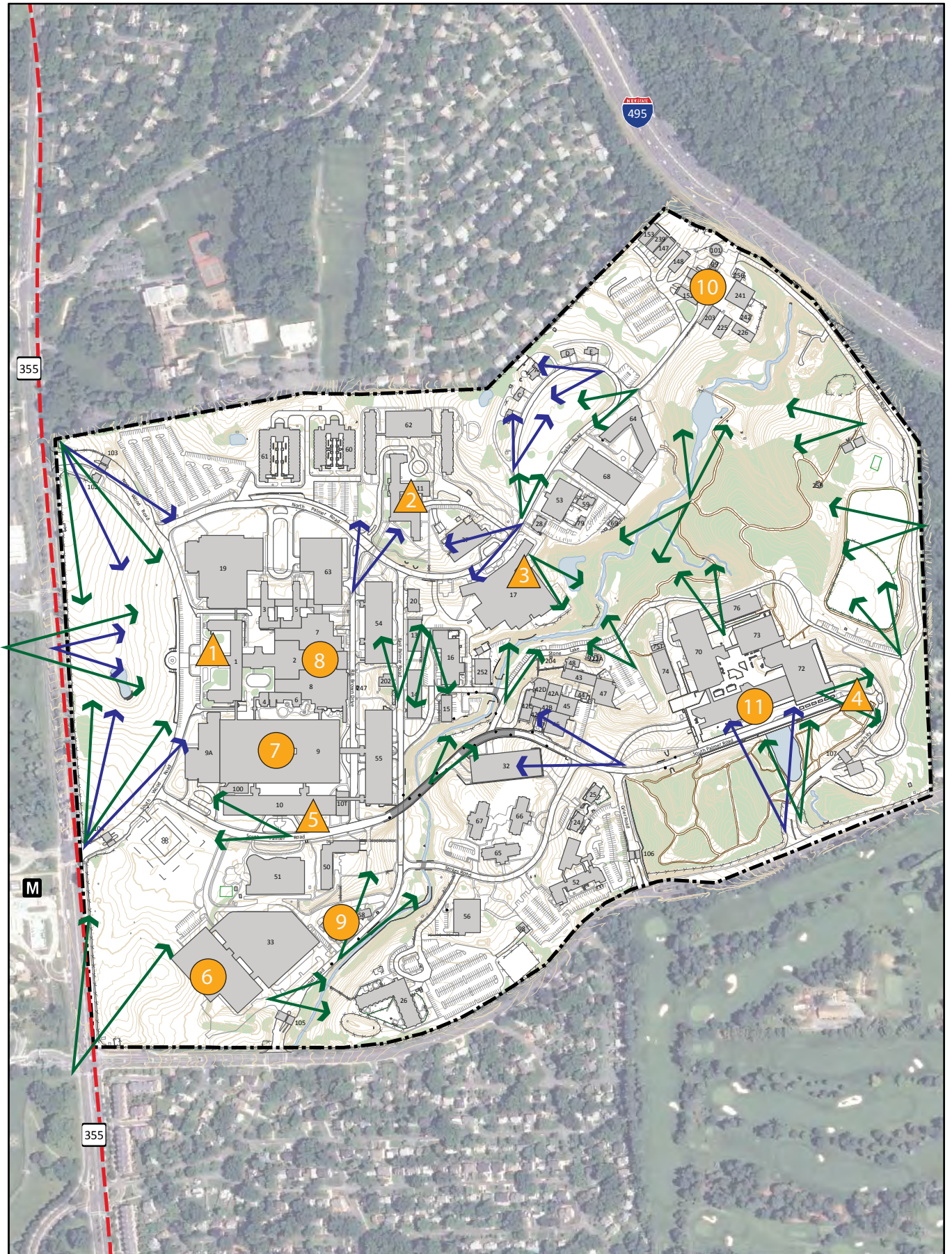
Other views to the campus are limited due to the natural topography and landscape buffers of the campus. The natural landscape in the north, east and south of the USUHS complex provides adequate buffering to the adjacent land uses and limits views of the campus. The area adjacent to the corner of Jones Bridge Road and Rockville Pike, has significant topography and landscape that also limits the view of the campus from this perspective. Access routes and gate locations on the perimeter give open views to the campus as well as some developed areas without landscape buffers close to the perimeter such as the south edge by the Child Development Center and Navy Lodge. Within the campus, the same protected view to the tower provides a vista from the tower to the front lawn. Topography and buildings limit the views internally to other area of the campus.

FIGURE 4-19 VIEWS, NODES AND LANDMARKS



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009





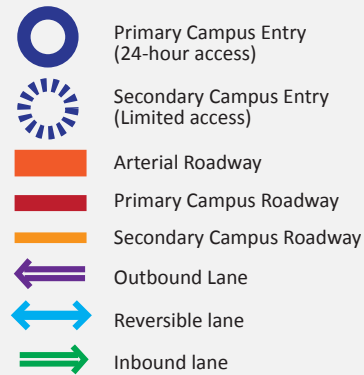
4.5 Circulation

4.5.1 NSAB Access and Circulation

There are five entrances to NSAB, two from Rockville Pike and three from Jones Bridge Road (Figure 4-20). Upgrades to each of the gates are completed or are underway. As a result, each gate will have a sidewalk and will allow bicycle and pedestrian traffic. Vehicular conditions will include the following:

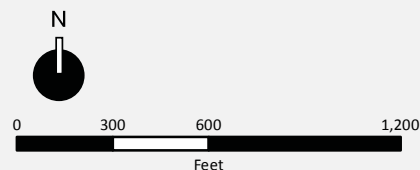
- The North Gate (Gate 1) is accessed from Rockville Pike and is configured with four lanes. One lane each is dedicated to inbound and outbound traffic, while the two center lanes are reversible. The North Gate serves as the main vehicle gate to the Installation and operates from 5:00 am - 7:00 pm Monday through Friday. The new Pass and ID office is also located at this gate.
- The South Gate (Gate 2) is located at the South Wood Road intersection along Rockville Pike. It is the main pedestrian entrance to the campus and is located across Rockville Pike from the NIH South Drive entrance and the Medical Center Metro Station. The South Gate is open to pedestrians 24/7. Vehicle access is periodic, and closes when there is activity related to the use of the adjacent heliport facility. The entrance consists of three lanes. One lane each is dedicated to inbound and outbound traffic, while the third (center) lane is reversible.
- The Navy Exchange Gate (Gate 3) is located at the Gunnell Road intersection along Jones Bridge Road. The gate will operate with two lanes in each direction. No lanes will be reversible. It is open 5:00 am - 7:00 pm Monday through Friday. The gate is closed at all other times including weekends and holidays.
- Navy Lodge Gate (Gate 4) is located at the Grier Road intersection along Jones Bridge Road. This gate will have one inbound lane and two outbound lanes. The right outbound lane will be right turn only and the left outbound lane will be left turn only. The gate is closed nights, weekends and holidays.
- USUHS Gate (Gate 5) is located at the University Road intersection along Jones Bridge Road. This gate is the location of a new commercial vehicle inspection facility. All commercial traffic to NSAB must use this gate. The gate will have one inbound lane and one outbound lane, which will widen into two outbound lanes as it approaches Jones Bridge Road. Hours of operation after the completion of the commercial vehicle inspection facility are not yet known, but currently the USUHS Gate is closed nights, weekends and holidays.

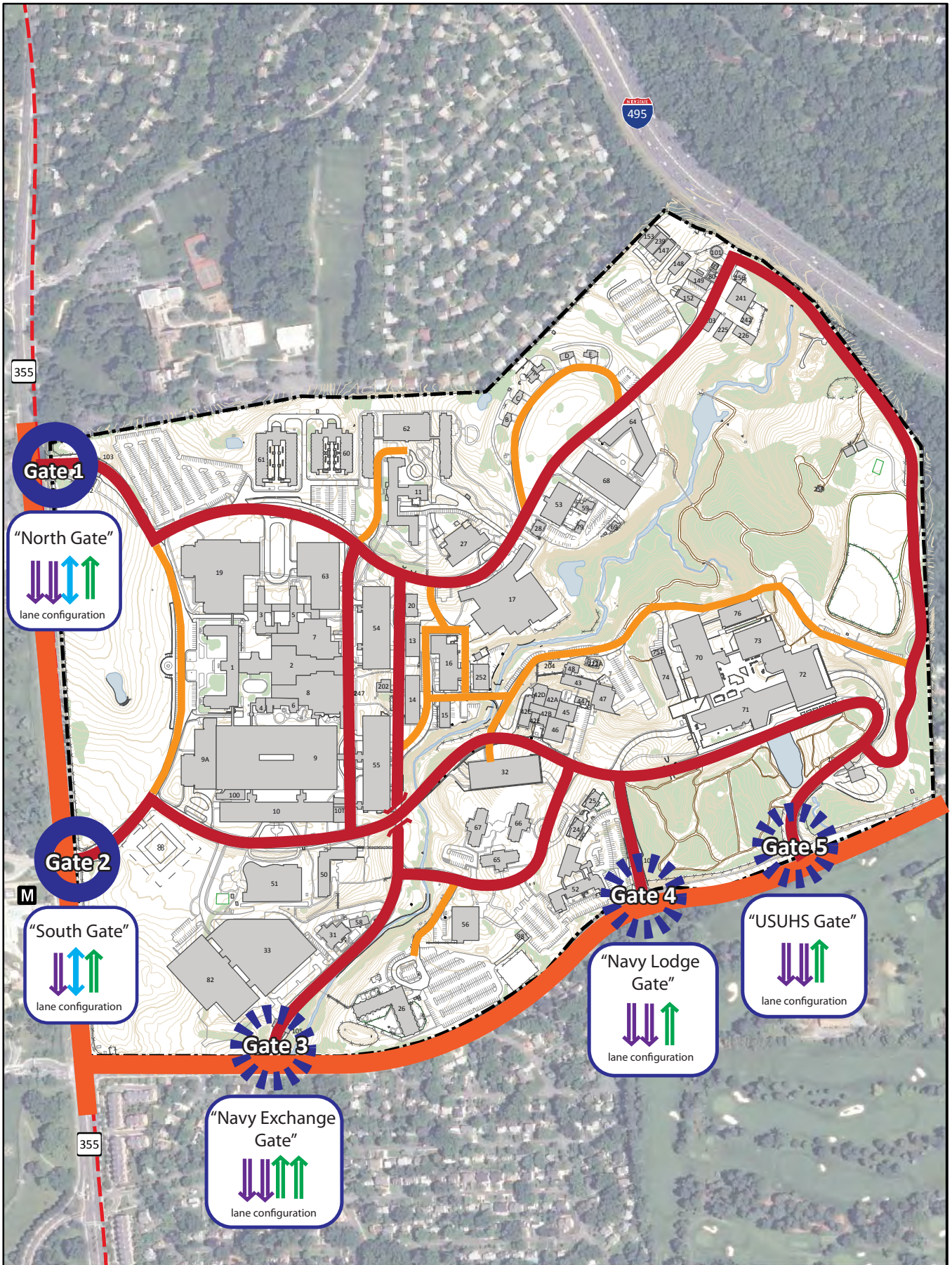
FIGURE 4-20 ACCESS AND CIRCULATION



Source: 2008 NNMC Master Plan

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





Traffic counts, vehicle occupancy and vehicle classification counts were taken at all five gates in October 2011 as part of the Transportation Master Plan. While the vast majority of vehicles entering the campus are privately owned vehicles, the survey was conducted at the five gates to determine the number of other vehicles that enter the site. The results of these counts are summarized below. The peaks traffic at the gates (Gate Peaks) were observed to arrive and depart earlier than the peak hour in the area (or the System Peak). The Gate Peak Hours are 6:00 am - 7:00 am and 3:45 - 4:45 pm while the System Peak Hours are 7:45 am - 8:45 am and 4:45 pm - 5:45 pm.

4.5.2 Intersection Capacity Analysis

To assess the existing traffic situation along the external perimeter roadways and within the campus, the capacity of 17 external and 12 internal intersections were evaluated in terms of level of service. This study was conducted by Gorove /Slade in November 2011. Level of Service (LOS) qualitatively measures operational conditions within a traffic stream or at an intersection. It reflects a drivers and other roadway user’s perception of conditions and comfort when using a particular roadway. Principal considerations are factors such as speed and travel time, delay and freedom of maneuver, traffic interruptions, comfort, convenience and safety. LOS results of the capacity analyses are presented in Tables 4-5 and 4-6. Results are also illustrated in Figures 4-21 and 4-22 for the AM and PM peak hours, respectively.

External Intersections (AM peak hours)

The majority of external intersections a part of the study area operate at acceptable levels during AM peak hours. However, the following intersections are operating with an unacceptable delay during AM peak hours:

- Rockville Pike & Grosvenor Lane
- Rockville Pike & Pooks Hill Road
- Rockville Pike & Cedar Lane
- Jones Bridge Road & University Drive
- Jones Bridge Road & Connecticut Avenue

Internal Intersections (AM peak hours)

Each of the 12 internal study intersections evaluated now operate at acceptable levels of service during AM peak periods.

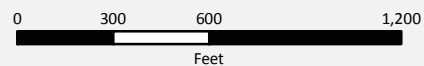
FIGURE 4-21 AM PEAK HOUR TRAFFIC CONDITIONS

TABLE 4-5 EXISTING AM LEVELS OF SERVICE RESULTS

Intersection Locations	AM Peak LOS
<i>Table to be provided in next submission.</i>	

Source: The Louis Berger Group, Inc., 2011.

Sources: NAVFAC - Washington update by PBS&J, 2008
 ESRI - Streetmap USA, 2005
 NAVFAC - Washington Update, 2010



Graphic to be provided in next submission.

External Intersections (PM peak hours)

The majority of external intersections a part of the study area operate at acceptable levels during the PM peak hours. However, the following intersections are operating with an unacceptable delay during PM peak hours:

- Rockville Pike & Grosvenor Lane
- Rockville Pike & Cedar Lane
- Jones Bridge Road & Connecticut Avenue
- Jones Bridge Road & Manor Drive

Internal Intersections (PM peak hours)

Each of the 12 internal study intersections evaluated now operate at acceptable levels of service during PM peak periods. The only exception is the intersection of Robert Brown Drive at the American Garage entrance and at the staff parking garage entrance. This is primarily due to the heavy pedestrian volume at this location. A large number of pedestrians walk past these intersections during these hours which causes significant delays in traffic.

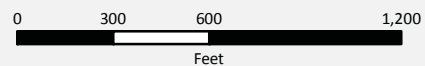
FIGURE 4-22 PM PEAK HOUR TRAFFIC CONDITIONS

TABLE 4-6 EXISTING PM LEVELS OF SERVICE RESULTS

Intersection Locations	PM Peak LOS
<i>Table to be provided in next submission.</i>	

Source: The Louis Berger Group, Inc., 2011.

Sources: NAVFAC - Washington update by PBS&J, 2008
 ESRI - Streetmap USA, 2005
 NAVFAC - Washington Update, 2010



Graphic to be provided in next submission.

4.5.3 Truck Access and Circulation Patterns

Truck deliveries to NSAB involve primarily mail trucks (UPS, USPS), 18-wheel trucks (beverages, supplies, etc.), box trucks (bread, medical supplies, etc.), fuel trucks (gasoline, heating oil) and construction vehicles (dump trucks). NSAB receives an average of 84 commercial vehicles per day and 44% of which arrive between 10:00 am to 2:00 PM.

All trucks are required to enter through Gate 5, and will be directed to Perimeter Road. All gates are used by trucks leaving the campus. The bridge over the USUHS garage does not support commercial truck traffic. It supports emergency vehicle traffic only.

The main loading dock destinations within the campus are located at Buildings 54 / 55. Figure 4-24 Existing Loading Docks and Delivery Routes shows all loading dock locations and the associated truck routes.

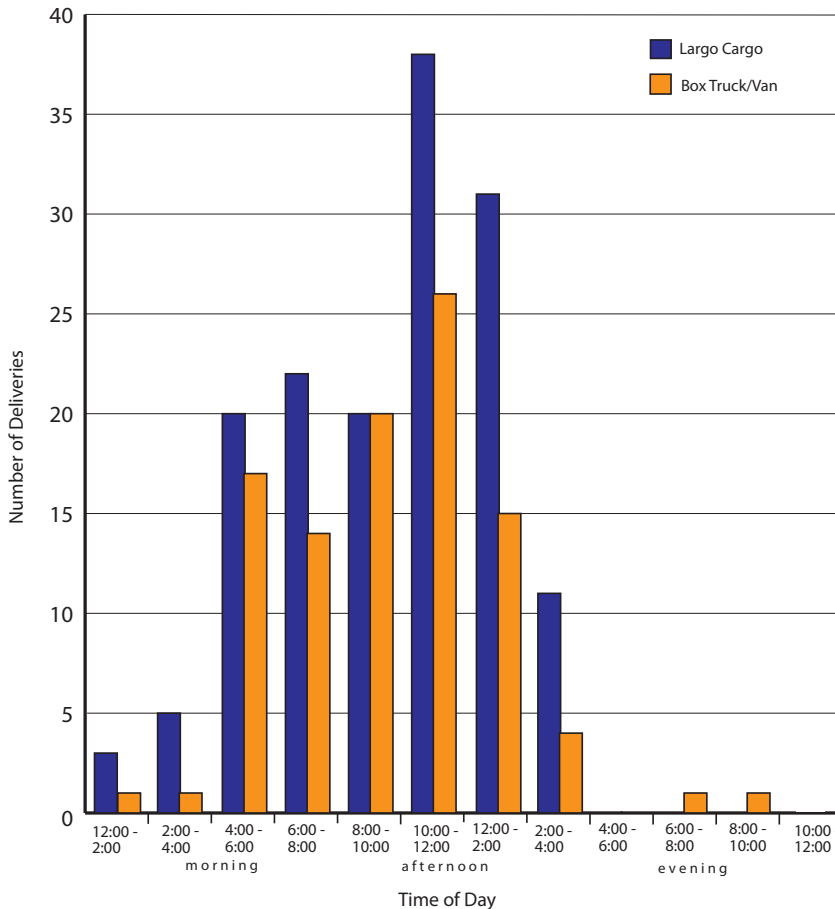
The roadways surrounding NSAB are also major truck routes. G/SA collected volume classification counts from State Highway Administration (SHA) traffic count library and conducted its own automatic traffic recorder counts in June 2007. The truck percentages on the roadways surrounding NSAB are shown in Table 4-7. The data shows that trucks constitute a significant proportion of the peak hour traffic on the adjacent roadways.

TABLE 4-7 TRUCK TRAFFIC PERCENTAGE - ADJACENT ROADWAYS

Location	AM Peak Hour (%)	PM Peak Hour (%)
Rockville Rike NB (0.1 miles north of Jones Bridge Road)*	18.8	11.6
Rockville Rike SB (0.1 miles north of Jones Bridge Road)*	15.3	12.8
Rockville Pike NB (0.1 miles north of I-495)*	12.5	9.5
Rockville Pike SB (0.1 miles north of I-495)*	11.8	8.7
Jones Bridge Road EB (between Gunnell and Grier Road)**	24.4	24.4
Jones Bridge Road WB (between Gunnell and Grier Road)**	20.9	18.4
I-495 EB (0.2 miles east of MD 355)*	20.5	16.7
I-495 WB (0.2 miles east of MD 355)*	20.7	22.8

Source: * State Highway Administration (SHA) Traffic Count Data, Year 2006
 ** G/SA ATR Data, June, 2007.

FIGURE 4-23 HEAVY VEHICLE TRAFFIC TREND AT NSAB FEBRUARY - MARCH 2007



Source: 2008 NNMC Master Plan

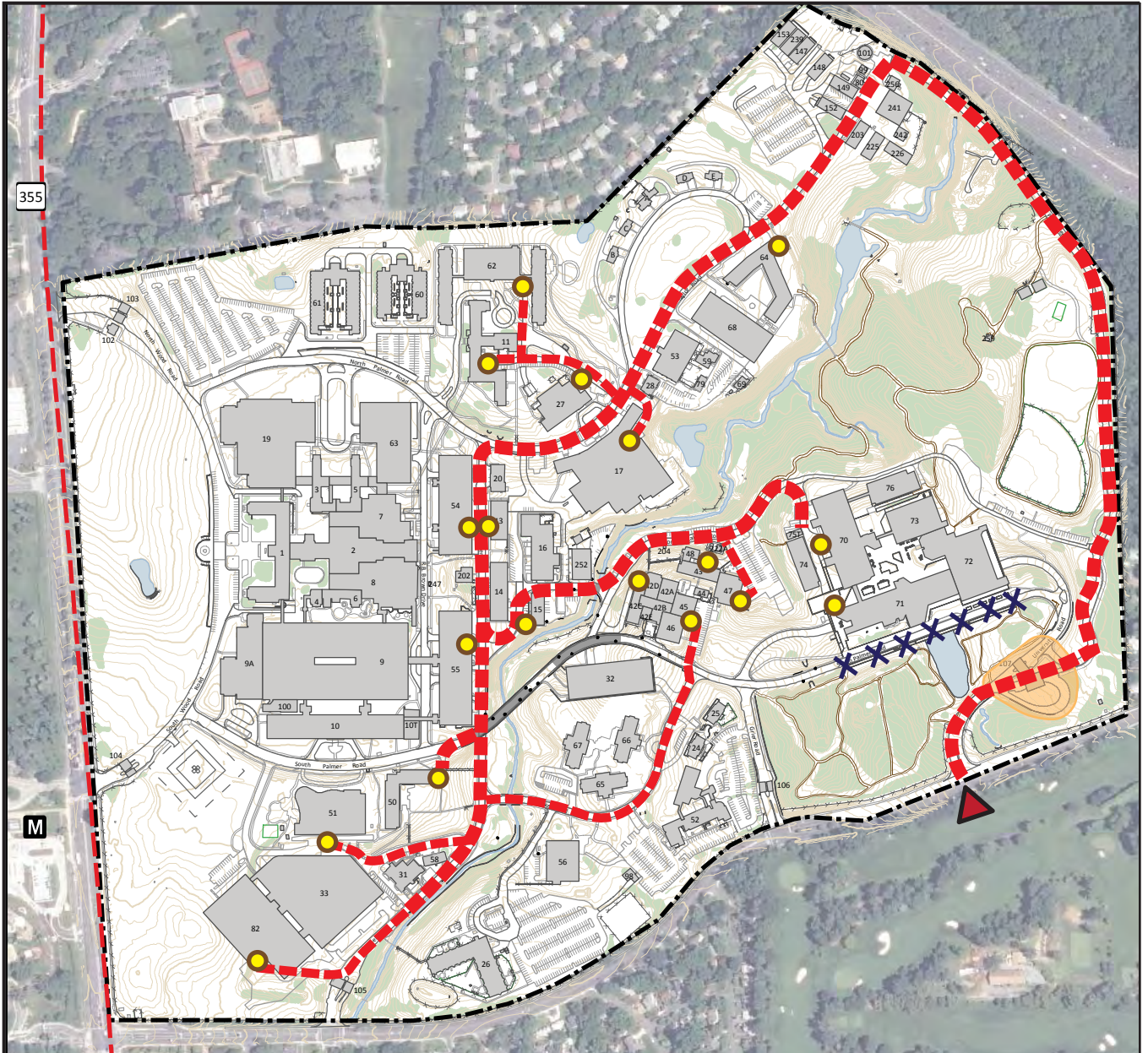
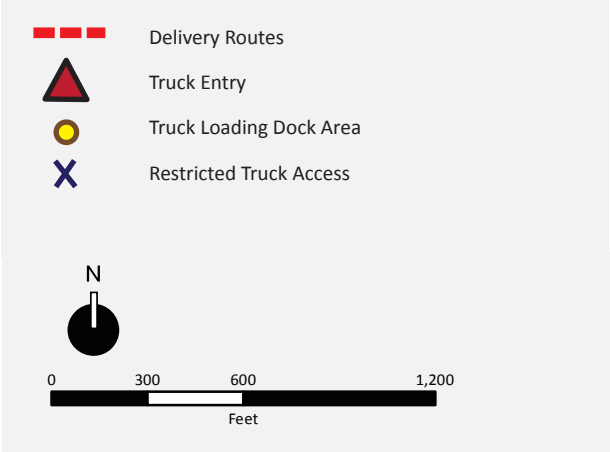


FIGURE 4-24 EXISTING LOADING DOCKS AND DELIVERY ROUTES



4.5.4 Public Transportation

NSAB is served by public transportation facilities as shown in Figure 4-25. The campus is located at the Medical Center Metrorail Station on the WMATA Red Line. The station is also a major stop and transfer point for several WMATA Metrobus and Montgomery County (MTA) Ride-On bus routes.

The Medical Center Metro Station opens at 5:00 am on weekdays and at 7:00 am on weekends. It closes at 12:00 am from Sunday through Thursday and at 3:00 am on Friday and Saturday. The trains operate with headways of 3 to 6 minutes during the peak weekday morning and afternoon periods and with headways of 6 to 15 minutes during the weekday off-peak periods. The average number of weekday entries at this station is 5,255. On average there are 425 entries and 1,040 exits in the AM peak hour and 920 entries and 270 exits during the PM peak hour respectively.

WMATA Metrobus routes serving NSAB include:

- Route J1 which provides rush hour only service between the Silver Spring and NIH / Medical Center Metro stations via Jones Bridge Road. Headways are 30 minutes.
- Routes J2 and J3 offer through service between the Silver Spring Metro Station and the Montgomery Mall with intermediate stops in the Bethesda Central Business District (CBD) and at the Medical Center Metrorail Station. These routes operate with 7-minute headways during peak hours and 20-minute headways during off-peak hours.

Metrobuses traveling westbound along these routes have 453 boardings (entries) and 322 alightings (exits) each weekday at Medical Center Metro Station while eastbound routes have 285 boardings and 381 alightings.

- The J7 and J9 routes are two new lines that comprise the "I-270 Express". Metrobuses along these routes travel between the Lake Forest Transit Center Station and the Bethesda Metro Station.

Metrobuses travelling westbound along these routes have 8 boardings and 141 alightings each weekday at Medical Center Metro Station while eastbound routes have 134 boardings and 13 alightings.

There are six (6) Montgomery County (MTA) Ride-On routes serving the Medical Center Metro Station, including:

- Route 30 is a local collector route that circles through the neighborhoods before terminating at the Bethesda Metro Station. There are 140 northbound alightings and 106 southbound boardings each weekday at Medical Center Metro Station.
- Routes 33 and 34 provide rush hour only service to

Wheaton Plaza from several areas through the Medical Center Metro Station. Route 33 northbound has 39 alightings and 46 boardings while the southbound route has 64 alightings and 9 boardings each weekday at Medical Center Metro Station. Route 34 northbound has 239 alightings and 39 boardings while southbound it has 241 alightings and 27 boardings each weekday at Medical Center Metro Station.

- Route 42 provides service to Friendship Heights via Woodmont and Rockville Pike. There are 135 northbound alightings and 152 southbound boardings each weekday at Medical Center Metro Station.
- Route 46 connects NSAB with Rockville via Rockville Pike, with 20-minute headways. Buses travelling along this route primarily serve as a feeder to Metro stations along this route. There are 317 northbound boardings and 302 southbound alightings each weekday at Medical Center Metro Station.
- Route 70 offers express service running between the Germantown Milestone park-and-ride lot and Bethesda through the Medical Center Metro Station. There are 202 northbound boardings and 9 alightings and 177 southbound alightings each weekday at Medical Center Metro Station.

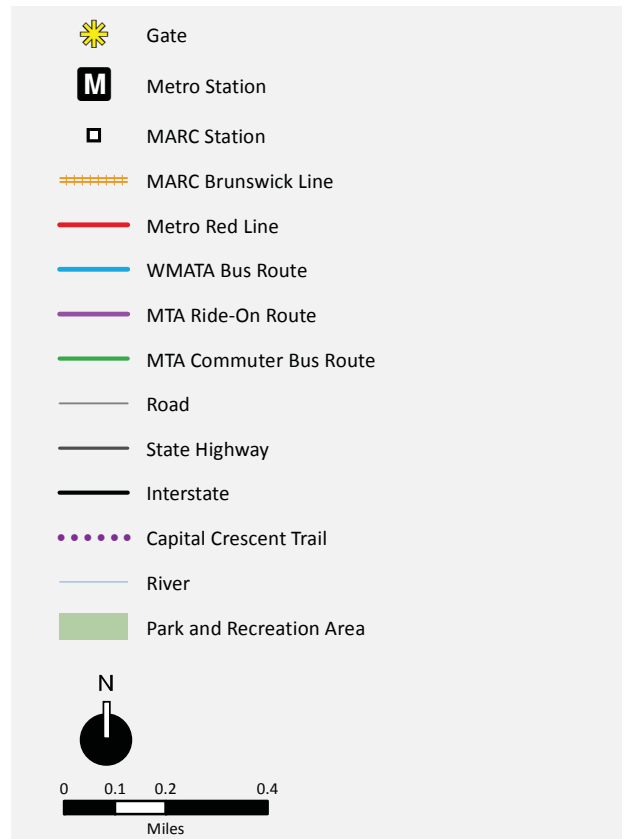
The total daily boardings and alightings at Medical Center Metro Station for these Ride-On bus routes are 1,098 and 1,131, respectively.

Heavy rail commuter service is available via the Maryland Area Rail Commuter (MARC) Brunswick line. Trains originate from Martinsburg, West Virginia or Brunswick and Frederick, Maryland and travel to Union Station in Washington, D.C. in the morning hours with reverse movements in the evening. MARC currently operates nine (9) trains inbound to Washington, D.C. in the morning and ten (10) trains outbound in the evening. All trains stop in Rockville, which is approximately six miles north of NSAB. A connection to the Metro Red Line can be made from the Rockville Station.

Distribution of Metro Fare Cards and Smart Benefits are provided to military and civilian employees under the Mass Transit Fringe Benefit (MTFB) program, which allows qualified Federal employees to purchase public transit passes or enroll in specified ridership options to be paid for with pre-tax wages. They can be used towards expenses incurred when riding any mass transit option to and from work such as the WMATA Metro and Metrobus, MARC train and registered van pools. As part of H.R. 4853, the Middle Class Tax Relief Act, Congress approved limits for transit benefits with the maximum value of \$120 per employee. Approximately 1,187 NSAB employees and 1,500 WRNMMCB employees collected Metrocheks during the first quarter of 2008.



FIGURE 4-25 PUBLIC TRANSPORTATION MAP



4.5.5 Installation Shuttle Services

The following information is presented for weekdays when NSAB shuttle buses are in operation. Data presented in this section was obtained from NSAB personnel. Average weekday ridership data was collected over a three-month period, April through June 2010. Shuttle routes are demonstrated in Figure 4-26.

It should be noted that frequency of shuttle service has been noted as a concern during stakeholder interviews and should be evaluated further.

NSAB operates a shuttle system that is primarily divided into two parts. The first, the Metro shuttle offers non-stop service from 5:30 am to 6:30 PM between the Medical Center, Metro Station and Building 10. Due to the length of the route and non-stop service, it has a quick turnaround and high frequency. Average weekday ridership along this route includes 42 visitors and 162 staff for a total of 204 daily passengers.

The second part of the NSAB shuttle service includes the campus shuttle. The Green and Red Line shuttles cover both the northern and southern parts of NSAB with a common transfer point at Building 10. Shuttles for these routes run during the morning peak period, from 5:30 am to 9:00 am and during the afternoon peak period from 2:45 PM to 6:00 PM.






The Green Line shuttle runs along South Palmer Drive, branches out at Robert Brown Drive, joins onto Taylor Road and continues towards the Research Institute to loop around the Navy Call Center and Health Services Building, before retracing its path back to South Palmer Drive, from where it branches out to Stokes Road before returning back to the starting point. Average weekday ridership is 54 passengers.

The Red Line shuttle runs primarily along South Palmer Drive, branches out on Stokes Road, loops around the Child Development Center and returns back to South Palmer Drive and continues down to loop around the USUHS underground garage. Average weekday ridership is 75 passengers.

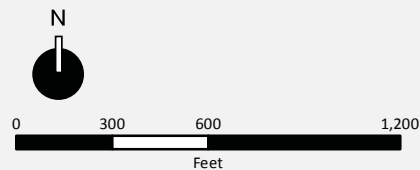
The Blue Line shuttle, which runs all day between the hours of 5:30 am and 6:30 PM, travels from Building 10 to the NEX. Average weekday ridership along this route is 104 passengers.

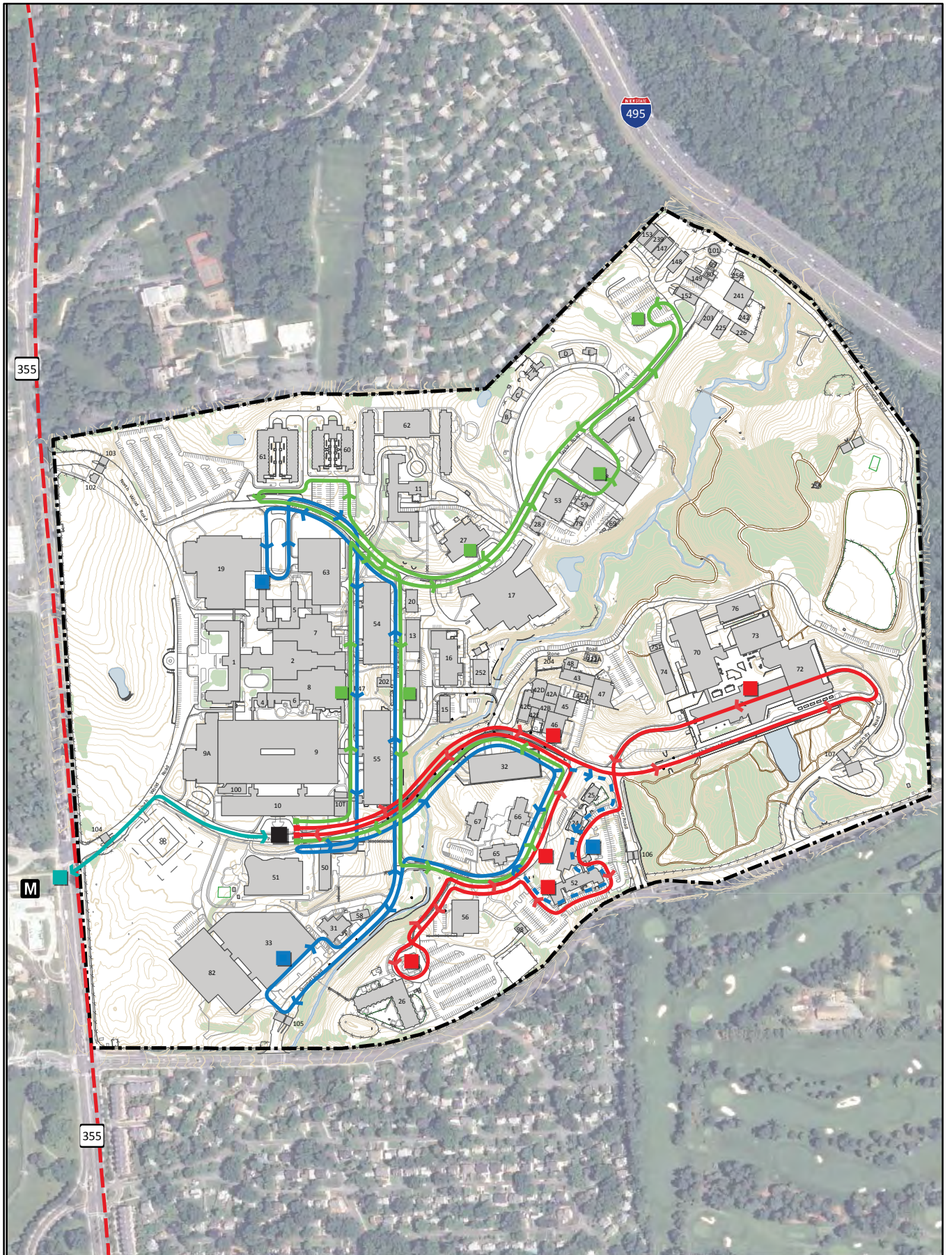
NSAB is also accessed by shuttle bus services operated by other Department of Defense (DoD) agencies. These include Annapolis Naval Station, NAS Pax River Naval Air Station and Quantico MCB. These shuttle bus services are intended for designated official use to support the mission.

FIGURE 4-26 SHUTTLE SERVICE ROUTES MAP

-  Blue Line (5:30 AM - 6:30 PM)
-  Green Line (5:30 - 9:00 AM, 2:45 - 6:30 PM)
-  Red Line (5:30 - 9:00 AM, 2:45 - 6:30 PM)
-  Metro Line (5:30 AM - 6:30 PM)
-  Shuttle Stops

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009








4.5.6 Existing Parking on Campus

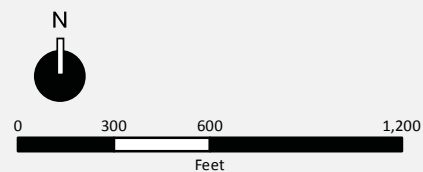
A parking inventory and occupancy survey was conducted as part of 2011 NSAB Traffic Study, which examines existing and future performance of the transportation network, including parking. This study considered growth from BRAC actions as well as several other growth actions implemented as of September 2011. While data from this study is not yet available, inclusion of prior parking conditions data in this section would not provide an accurate portrayal of the parking situation at NSAB. As a result, this section will be updated with information from the current study, when completed, as well as with data and findings from the Environmental Impact Statement (EIS), which will examine growth actions proposed in the master plan update.

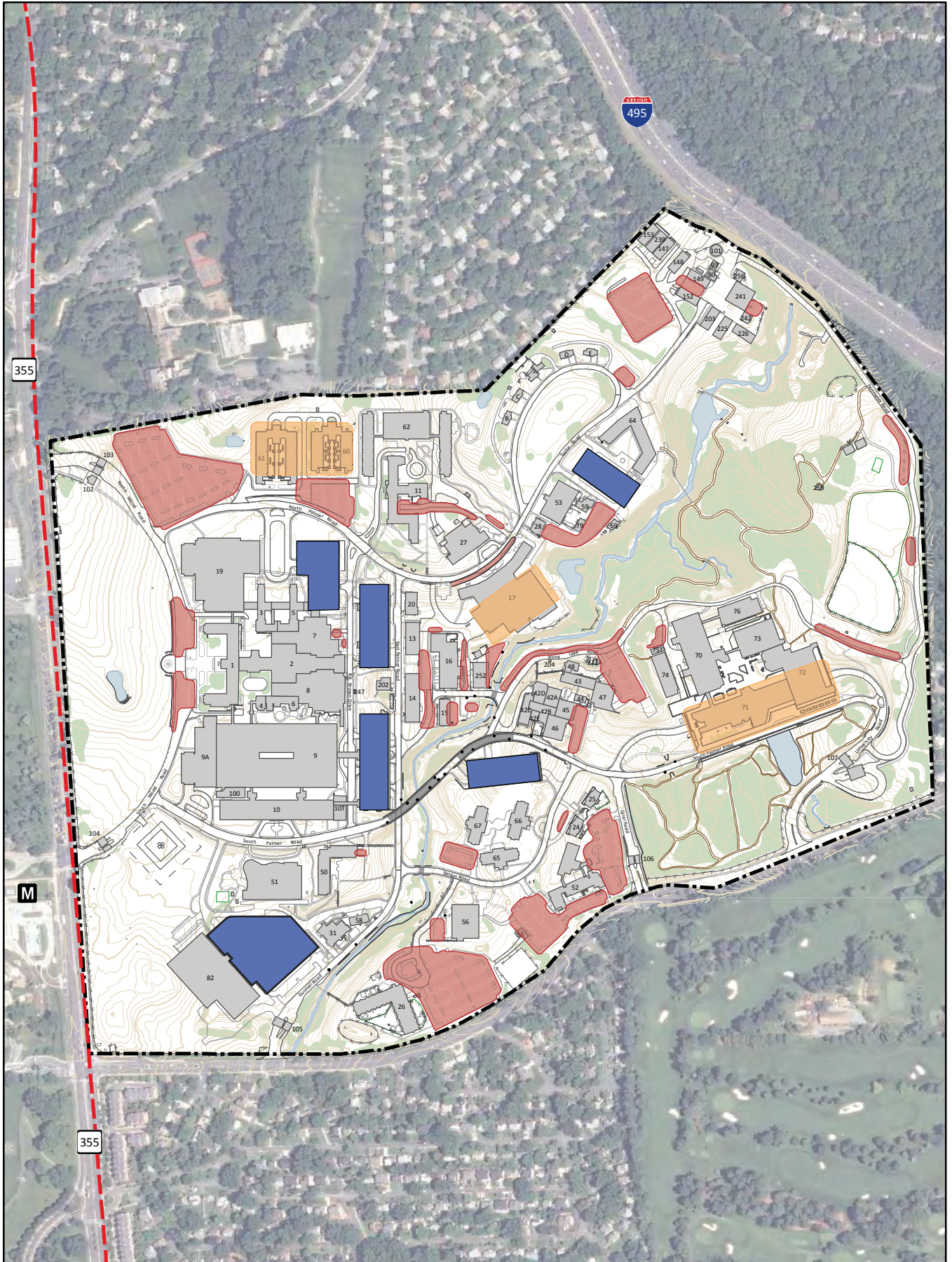
Figure 4-27 shows parking locations, by type, at NSAB.

**FIGURE 4-27 PARKING LOCATIONS DIAGRAM
SEPTEMBER 2011**

-  Surface Parking Lot
-  Structured Parking Under Building
-  Standalone Structured Parking

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





4.5.7 Existing Pedestrian and Bicycle Facilities

An assessment of pedestrian and bicycle facilities and services along study area roadways providing direct access to NSAB was undertaken. The inventory and evaluation found most of the facilities to be in good condition, function efficiently, provide for a high level of user safety, and are in compliance with the standards of the County and the American Association of State Highway and Transportation Officials (AASHTO).

The main NSAB pedestrian/bicycle access points and circulation routes occur along Rockville Pike between Cedar Lane and Jones Bridge Road, and Jones Bridge Road between Rockville Pike and Connecticut Avenue. Pedestrian and bicycle activity is greatest in the vicinity of the Medical Center Metro Station. Table 4-8 presents a detailed inventory of existing sidewalk, crosswalk and pedestrian-related signage conditions along these sections.

Notable deficiencies along MD 355 and Jones Bridge Road, in the vicinity of NSAB, include narrow sidewalks without adequate buffer separation from adjacent traffic, utility poles obstructing pedestrian movements, lack of “zebra” or conventional pattern striping at some major intersections, poorly marked crosswalks, and lack of crosswalks at side streets and NSAB entrances. Pedestrian-related signage is in good condition and well placed along all these routes.

FIGURE 4-28 EXISTING PEDESTRIAN FACILITIES

Source: 2011 NSAB Traffic Study - First Draft

- Pedestrian Pathway/ Sidewalk
- Crosswalk with Curb Ramp
- Crosswalk without Curb Ramp
- Pedestrian Vehicle Conflict

Sources: NAVFAC - Washington update by PBS&J, 2008
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009

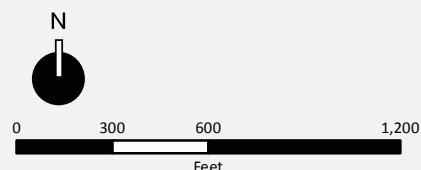


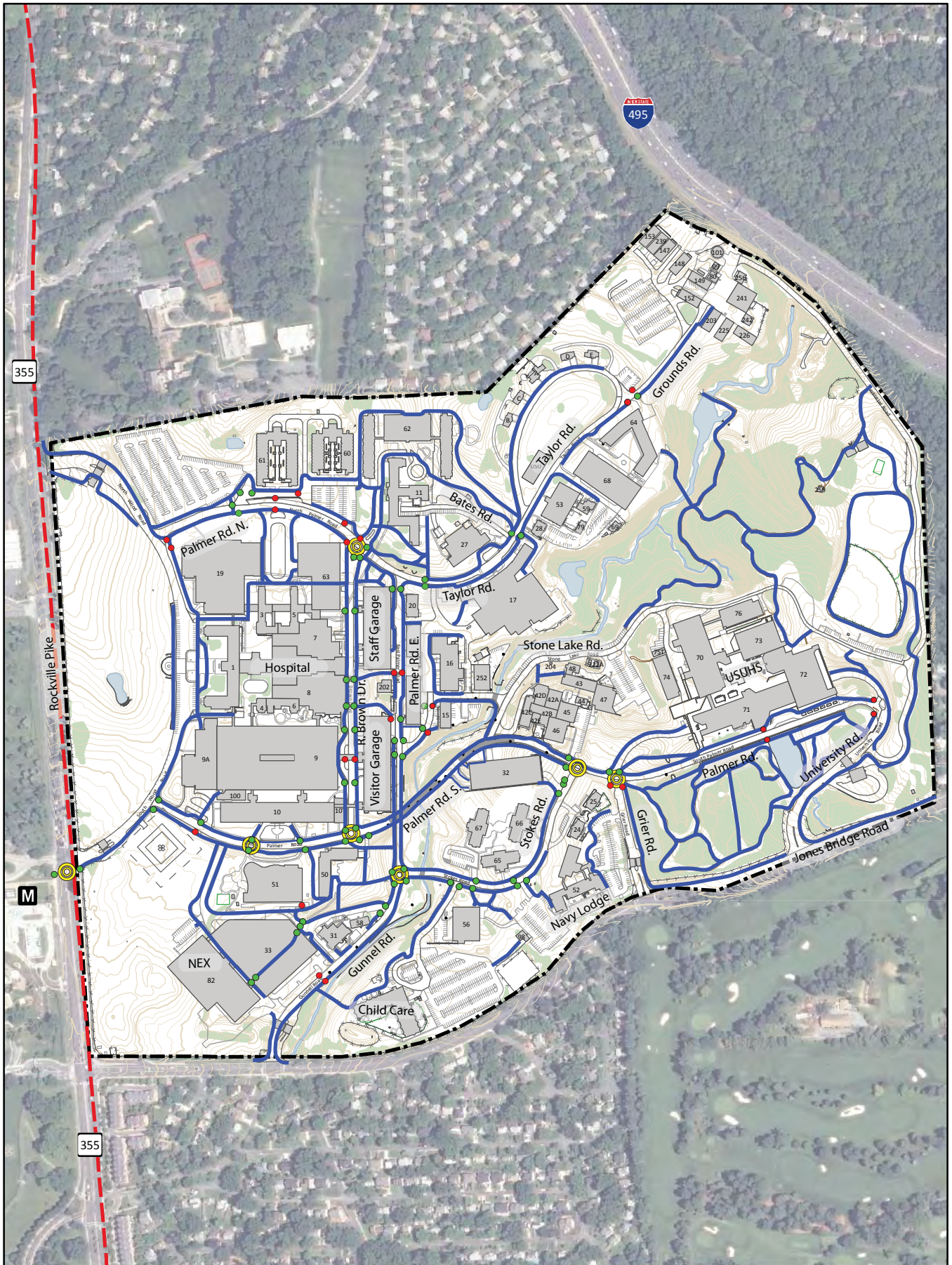
TABLE 4-8 EXISTING SIDEWALKS CONDITION SUMMARY

Roadway Segment	Width	General Condition	Buffer	SIDEWALKS			Pedestrian-related Signage Condition
				ADA Compliant	ADA Compliant Intersection Curb Ramps	Crossing Markings	
Rockville Pike (between Jones Bridge Road and Cedar Lane)	Fair (8' west side; 3' – 5' east side)	Fair (good west side; poor east side)	Good west side; poor east side	Fair (grade issues on west side; effective sidewalk width mostly under 5' with utility poles obstructing pedestrian ROW on east side)	Fair (curb-ramps face crossing on west side; ramps on east side face center and are poorly maintained)	Fair (mostly “zebra” striped along west side; poorly marked crosswalk on east side of Jones Bridge Road at Rockville Pike; lack of “zebra” striping on Cedar Lane at Rockville Pike; NSAB entrances lack crosswalk striping)	Good
Jones Bridge Road (between Connecticut Avenue and Rockville Pike)	Good (8' – 10')	Good	Fair (no buffer between Connecticut Avenue and Montrose Driveway)	Good	Good	Fair (crosswalks at Connecticut Avenue and Jones Bridge Road lack “zebra” striping; side streets lack marked sidewalks)	Good

Source: G / SA Field Survey

* Both FHWA and the Institute of Transportation Engineers (ITE) recommend a minimum width of 5 feet for a sidewalk or walkway. However, the NSAB Accessibility Plan recommends a minimum width of 6 feet for sidewalks and walkways at NSAB to allow comfortable passage of two wheelchairs.

** According to the FHWA, a buffer zone of 4 to 6 feet is desirable and should be provided to separate pedestrians from the street.







Various campus land use types are connected by a network of sidewalks, crosswalks and other pedestrian amenities. Figures 4-28. Existing Pedestrian Facilities demonstrates pedestrian pathways and facilities as identified in the 2011 Accessibility Plan. The study found there to be deficiencies in pedestrian facilities throughout NSAB, including missing or narrow sidewalks, crosswalks without curb ramps and intersections with conflicting pedestrian and vehicular movements that might warrant installation of additional traffic control or traffic calming devices (Figure 4-29 Sidewalks, Buffers and Deficiencies). There are notable inconsistencies in pedestrian and other signage throughout NSAB. For example, some crosswalks are preceded by stop bars and stop signs while some are not. Additionally, the message on pedestrian crossing caution signs varies throughout the campus.

The NSAB Accessibility Plan also identified deficiencies such as slopes that exceeded the threshold for accessible routes, inaccessible or problematic building entrances, and non-conforming railings. The Accessibility Plan provides recommendations for addressing all accessibility deficiencies.

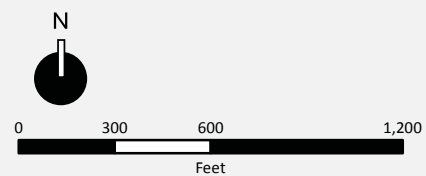
FIGURE 4-29 SIDEWALKS, BUFFERS AND DEFICIENCIES

Source: 2011 NSAB Traffic Study - First Draft

-  Buffer
-  Approximate Sidewalk Width
-  Approximate Buffer Width
-  Narrow Sidewalk

*Sidewalk conditions are existing as of November 2010. Construction completed during the summer of 2011 is not reflected. As-built conditions should be verified as projects or additional planning studies move forward.








Sources: NAVFAC - Washington update by PBS&J, 2008
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009



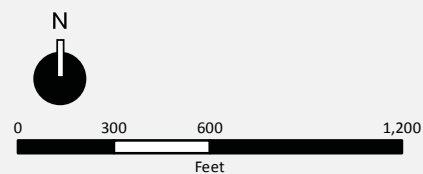
Bicycle counts were conducted as part of the 2012 NSAB Traffic Study at the same 20 intersections identified in section 4.6.1. Counts were conducted during both the AM and PM peak periods. The main bicycle paths within the campus were identified based on these counts. Figures 4-30 demonstrates the busiest bicycle pathways and intersection volumes within the campus and those areas with bicycle parking.

FIGURE 4-30 BICYCLE PATHWAYS, FACILITIES AND VOLUMES

Source: 2011 NSAB Traffic Study - First Draft

-  Primary Pathway
-  Secondary Pathway
-  AM/ Mid-day/ PM Peak Hour Intersection Bicycle Volumes
-  Multiuse Trail
-  Bike Parking
-  High Utilization Bike Parking
-  Amount of Bike Parking (approximate)

Sources: NAVFAC - Washington update by PBS&J, 2008
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009



4.6 Utilities Infrastructure

The following utilities information is updated from the 2008 NNMC Master Plan. Diagrams in this section reflect the status as of Spring 2011. Because of the ongoing construction and changes to infrastructure, the status and capacity of utilities infrastructure is in a state of flux.

4.6.1 Electrical

Each of the four 13.8 Kilovolts (KV) feeders from the Woodmont substation 80 terminates onto a Cutler Hammer 2000 amp switchgear lineup. According to PEPCO the four feeders have a total capacity of 35 MegaVolt-amperes (MVA). The feeders have the following PEPCO identification numbers: 14846, 14847, 14848 and 14849. PEPCO's highest recorded peak power demand on these feeders is approximately 24.46 MVA with a normal load of approximately 22 MVA. Therefore, the primary feeders from the Woodmont substation are operating at 70% of load capacity. These four switchgear lineups are interconnected into a ring bus configuration so that in the event of a single feeder failure, all the switchgear remains on-line. The 2000 amp switchgear serves the original 1200 amp FPE switchgear and has four dedicated circuits to bldgs 9A(2 each) and 19(2 ea). The vault and the original switchgear was installed in the mid 1970's as part of the building 9 & 10 construction project. There are 17 primary feeders from the FPE 1200 amp switchgear. The 17 feeders supply primary power to various distribution switchgear locations throughout the campus. Four primary feeders supply Buildings 1 and 2. One of the primary feeders that serve Building 2 is tapped to feed Buildings 4 and 6. One feeder supplies Buildings 3 and 5. Two feeders supply Buildings 9 and 10. The remaining feeders exit the underground vault #243 at the north wall of the vault and travel through a utility tunnel system until they exit the rear of Building 2 where they basically begin to fan out to distribute primary power to buildings throughout the campus, with four feeders being dedicated to Building 16, the power plant.

The two feeders from the NIH substation 167 terminate at switchgear in the Uniformed Services University of the Health Sciences (USUHS) complex. The USUHS switchgear serves both USUHS and AFRRRI. The feeders have the following PEPCO identification numbers: 14117 and 14118. According to the PEPCO the highest recorded peak power demand on these feeders is approximately 4.22MVA with a normal load of approximately 3 MVA. They have a capacity of 12.5MVA so they are operating at 22% of load capacity.

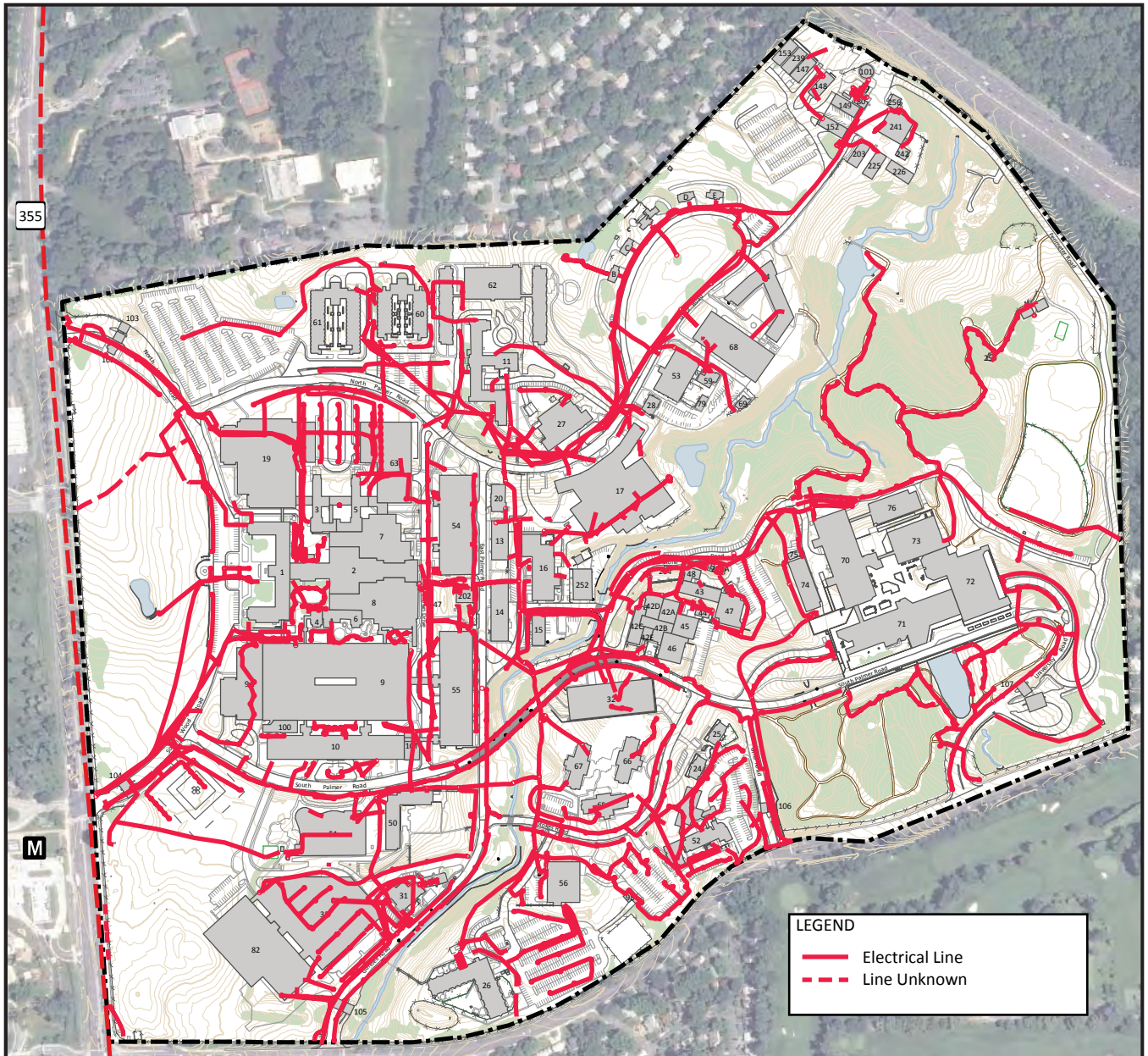


FIGURE 4-31 ELECTRICAL SYSTEM DIAGRAM
 Source: NNMC 2003 Compiled Utilities Plan

These two feeders serving USUHS are interconnected with the feeds at the medical center’s vault #243. This is 2-way emergency (normally-open) interconnection such that in the event that Medical Center experiences a failure on all Woodmont substation power feeds the USUHS feeds can be used as partial backup, in turn, if USUHS experiences a failure on their NIH substation 167 feeds, the Medical Center’s feeds can be used as a partial backup to USUHS. PEPCO has complete control over the operation of tying the two facilities together if necessary.

Most of the on-campus building transformers, outside primary switchgear and underground primary cabling, were replaced in a utility upgrade project that began in 1998 and was substantially completed by 2002.

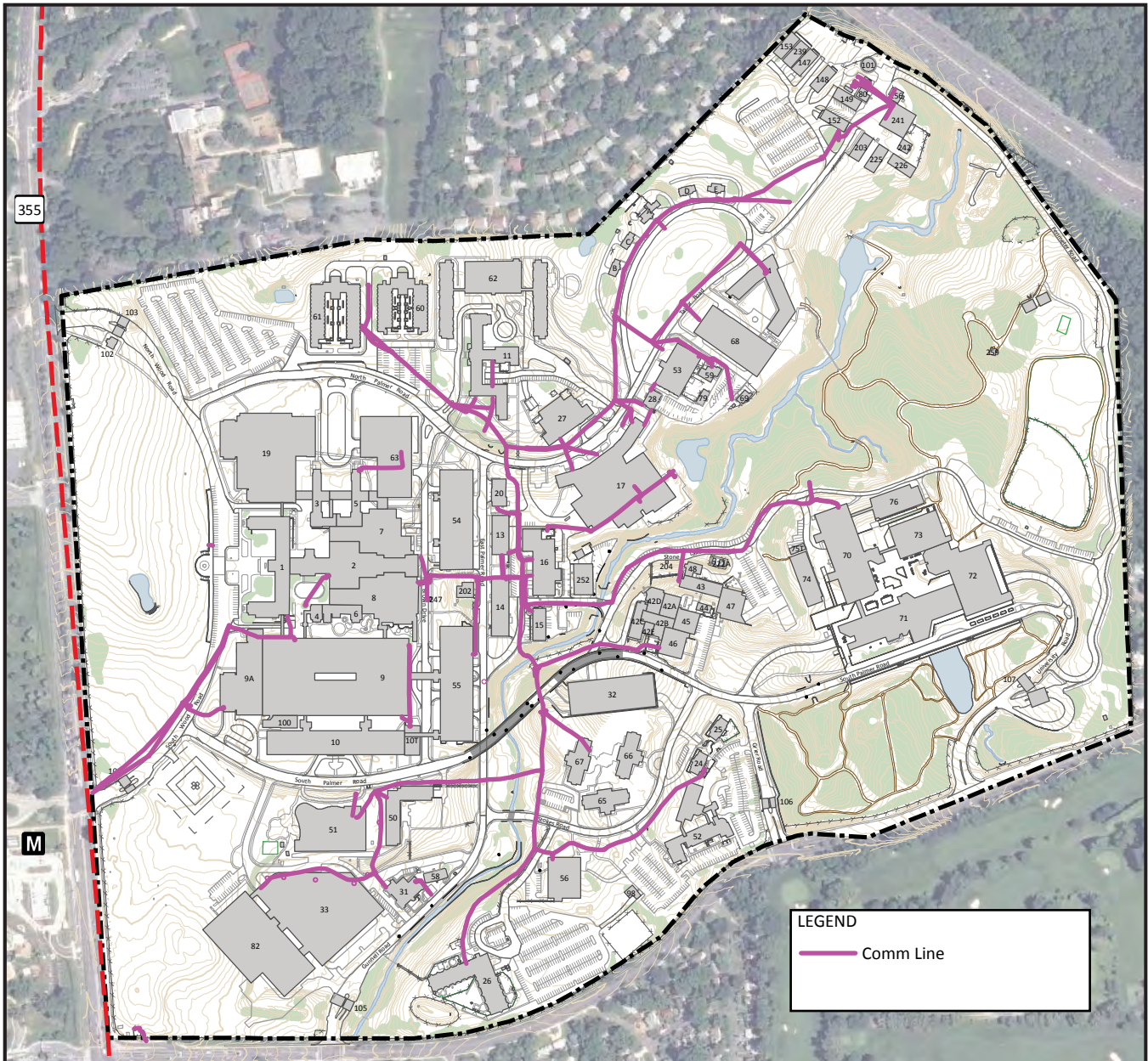


FIGURE 4-32 COMMUNICATION SYSTEM DIAGRAM
 Source: NNMC 2003 Compiled Utilities Plan

4.6.2 Communications

NSAB has a Nortel CS1000M (originally installed in 2001) Private Branch Exchange (PBX) with a Nortel CallPilot (installed in 2008) voice mail system. The PBX is served from a Verizon central office via twenty T-1 circuits, has approximately 6,000 ports in use and has the capacity of 10,000 ports.

The Medical Center’s data systems are based in the main computer room located in the Information Technology (Building 11).

The existing communications ductbank and manhole system throughout the campus is in fair overall condition.

Fire Alarm signals are reported to the Fire Station (Building 20) via telephone to the Signal Communications Vision 21 monitoring system.

4.6.3 Mechanical

Many of the buildings on the NSAB campus are provided with heating and cooling from the power plant (Building 16). The plant consists of multiple water chilling units and steam boilers. All pumps, controls, water treatment systems, equipment and piping systems for the operation of heating and cooling are located in Building 16. In addition to the central utilities, several buildings are provided with individual cooling and heating equipment.

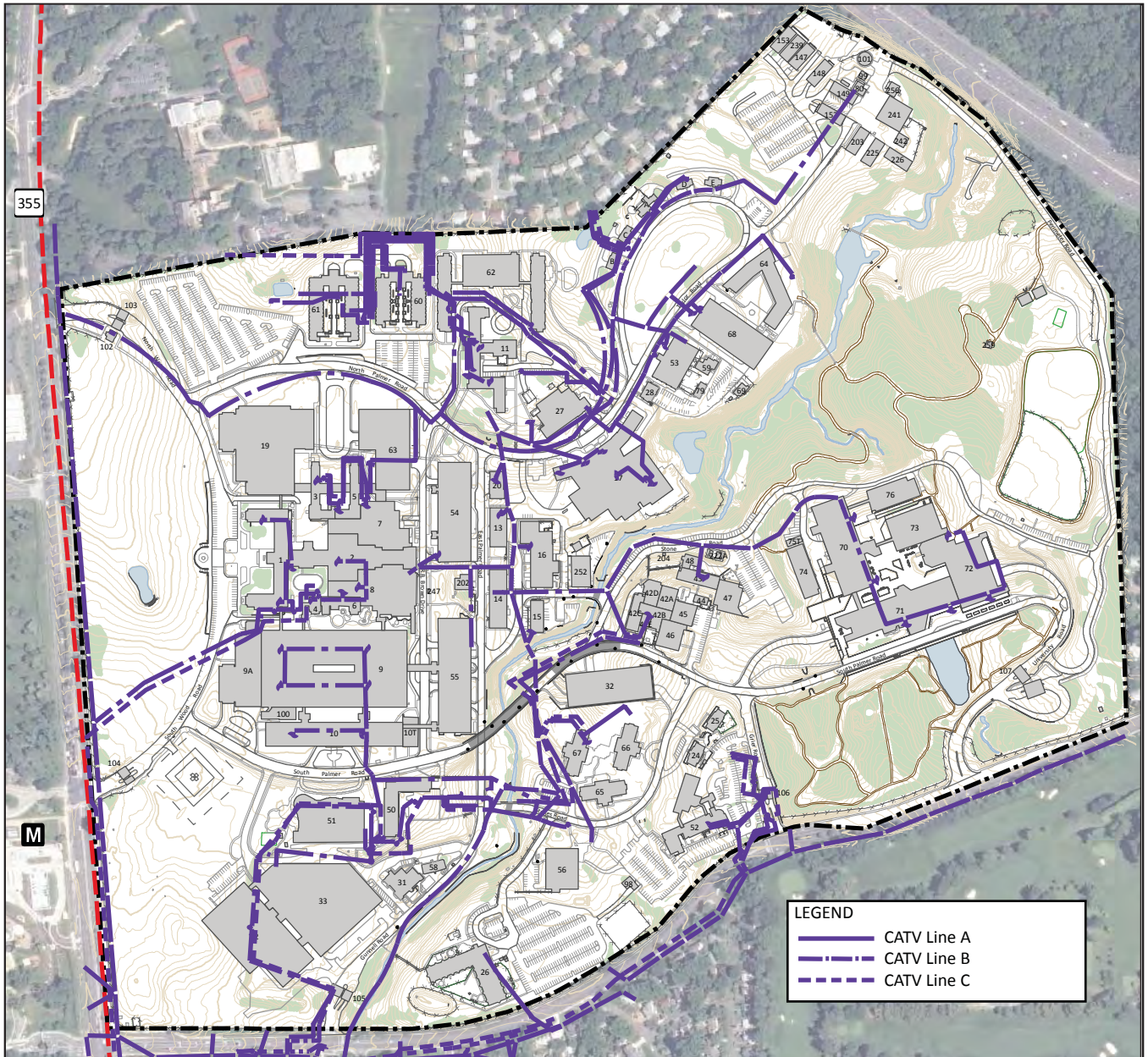


FIGURE 4-33 CATV SYSTEM DIAGRAM

Source: NNMC 2003 Compiled Utilities Plan

Central Cooling:

The power plant incorporates nine (9) centrifugal water chilling units rated at approximately 1,500 tons of cooling each. In addition to the water chilling units, there is one (1) gas fired absorption water chilling unit in the plant that is currently out of service. Condenser water from the chillers is piped to a three cell cooling tower located to the southeast of the plant. The tower has been designed to accept the addition of a fourth cell to increase capacity. The current plant cooling load can be met with the operation of seven of the nine water chilling units. Two of the 1,500 ton chillers are held in reserve as back up systems for the medical complex and can be brought on-line if any of the active chillers fail. There is room for the chilled water plant to expand by removing the

absorption unit and installing an additional centrifugal water chilling unit and adding an additional cell to the cooling tower.

Chilled Water Distribution:

A network of tunnels and direct bury chilled water supply and return piping provides chilled water from the power plant to many of the buildings. Most of the loads currently connected to the chilled water loop are associated directly with the Medical Center. However, assorted other buildings throughout the campus are also connected to the plant. There are five main chilled water lines exiting the plant to groups of buildings.

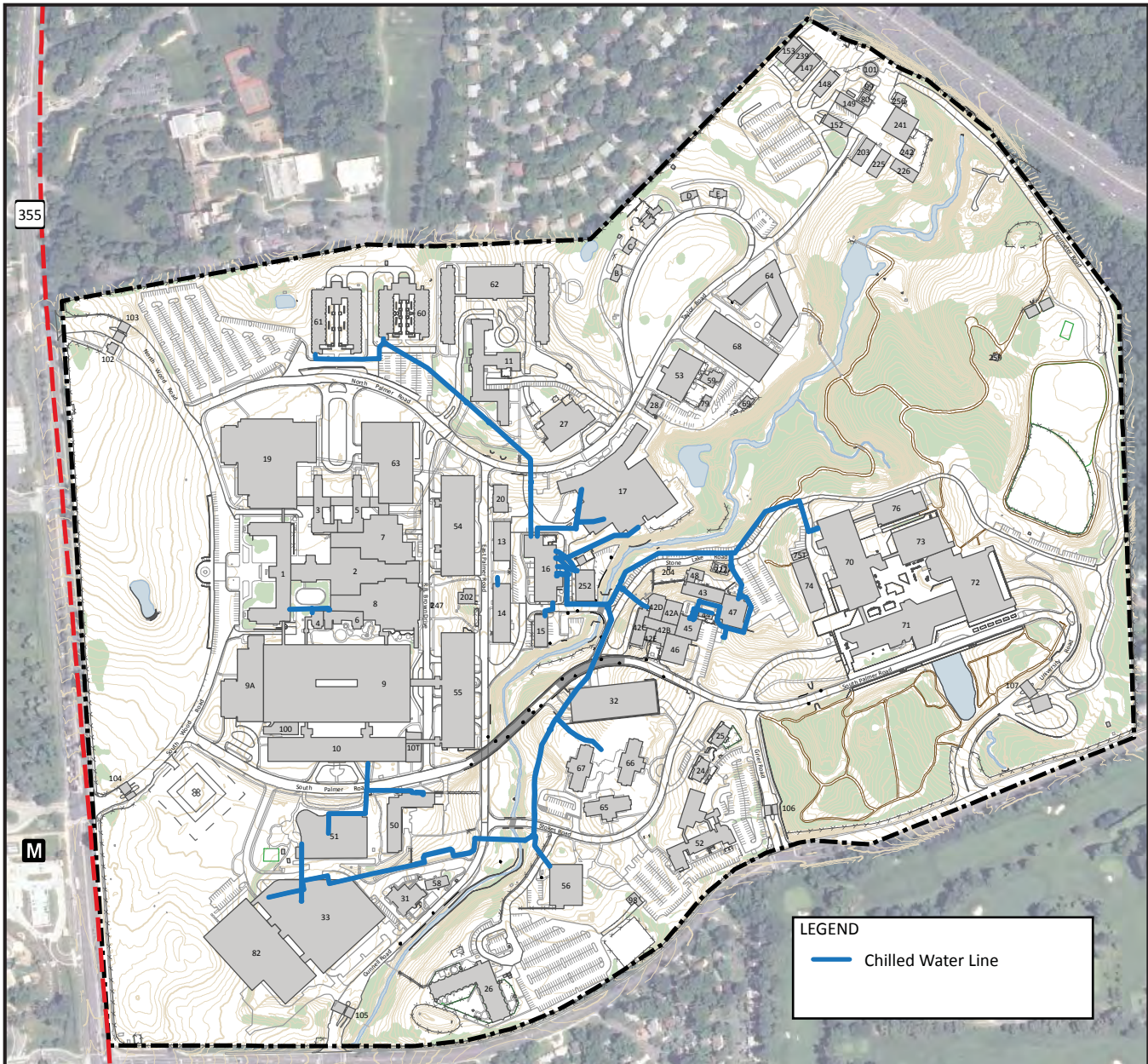


FIGURE 4-34 CHILLED WATER DISTRIBUTION DIAGRAM
 Source: NNMC 2003 Compiled Utilities Plan

The first loop exits the plant through a tunnel and serves the hospital and supporting buildings. The buildings connected to this pipe loop are Medical Center buildings 1-10, along with Buildings 14 (facilities management), 50 (BEQ), and 54 and 55 (parking deck with admin spaces). Buildings 1-10 and 54 are served directly from the chilled water lines in the tunnel between the plant and the Medical Center. Building 55 is served from chilled water lines in a tunnel branching off of the main utility tunnel to the Medical Center. Building 50 is served through a 5-inch direct buried chilled water line, originating from the main chilled water loop in Building 10. Building 14 is

served from a 4-inch direct buried chilled water line branching off of the main chilled water line in the tunnel serving the Medical Center.

The second chilled water loop extends to the north to include Buildings 11, 60 and 61. This chilled water loop is a direct buried 10-inch chilled water pipe. After branching off to serve Building 11, the line size is reduced to 8 inches.

The third and fourth loops extend to the northeast and included buildings that were demolished to make way for the construction of the Building 17 addition. The fifth loop serves the AFRR complex, USUHS Complex, Building 56 and

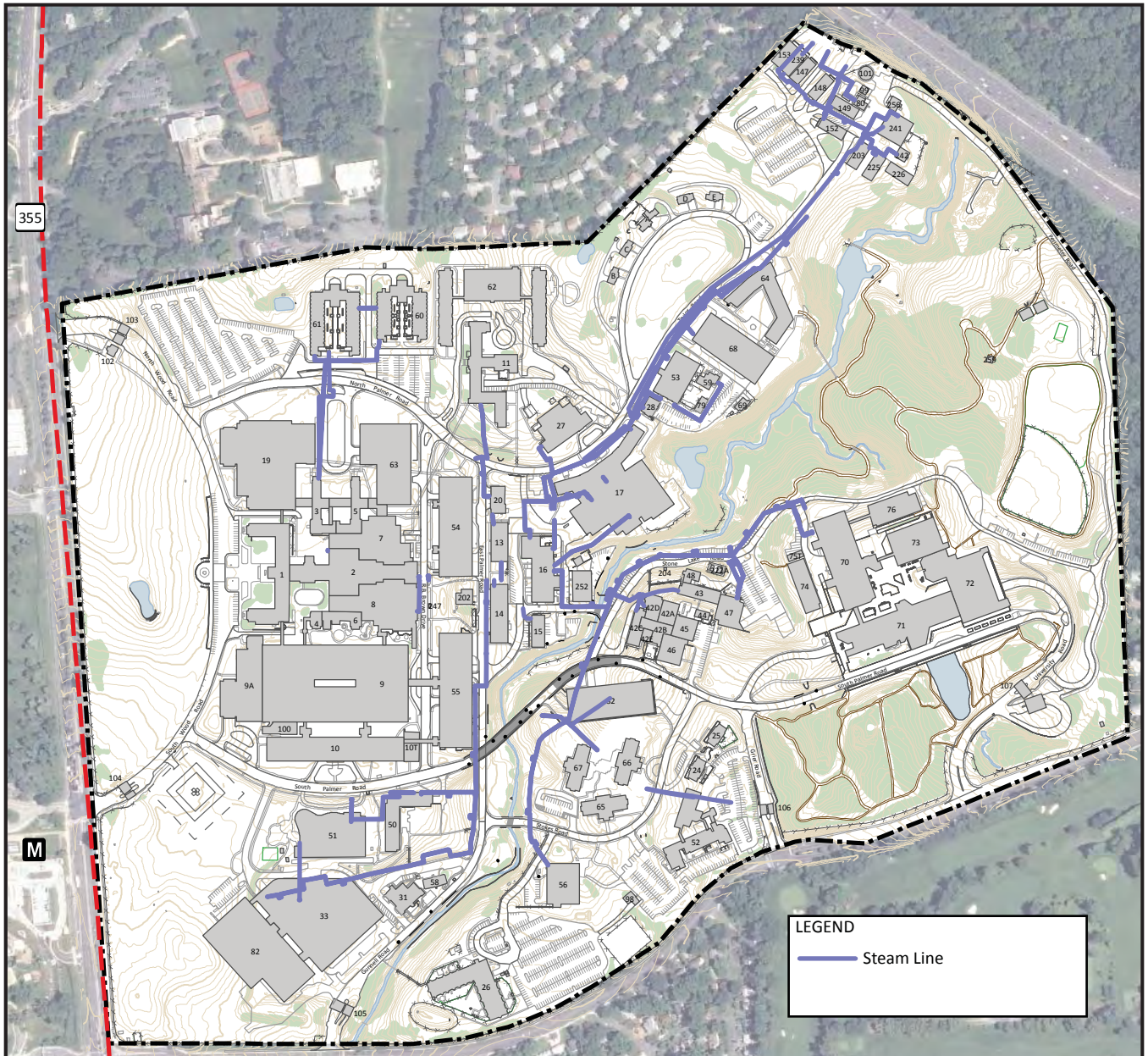


FIGURE 4-35 STEAM DISTRIBUTION DIAGRAM
 Source: NNMC 2003 Compiled Utilities Plan

82. This loop originates at the power plant as a 24-inch direct bury pipe. Near the cooling towers, the loop branches to the north as an 18 inch pipe and to the south as a 10-inch pipe. The north branch provides a 10-inch and a 6-inch take off to AFRR1 with the 18-inch line continuing to USUHS. The south branch of the 24-inch main consists of a 10-inch pipe. This line provides a 6-inch line to Building 58 and a 8-inch line to Building 57.

In all, there are approximately 40 buildings on the NSAB campus connected to the power plant. Of those buildings, several are currently unoccupied and impose no load on the current operation of the plant.

In 2010, A Chilled Water Distribution Pipe Line System Study was performed to determine whether the existing system would have sufficient capacities to support BRAC and other construction by 2015. Building 16 currently has nine functional chillers. Currently a minimum of two chillers operate in the winter and a maximum of six chillers operate in the summer. As a result of the study, five projects have been identified: projects one and two replace Chiller-1A and Chiller-9 with new 1,500 ton electric chillers; the pumping flow and head within and outside Building 16 should be reduced further at part load, eliminated the need for energy-wasting pressure reducing valves that are being install in three buildings; replace failing PVC distribution piping to Building 61, increasing the pipe size from 6 inches to 8 inches; and test the ability of the valves in the chilled water and condenser water headers to close properly.

Central Heating:

The Installation's central heating is distributed from the power plant. There are four (4) high pressure steam boilers. Each boiler has a capacity of approximately 30,000 pounds of steam per hour, giving the plant a total capacity of 120,000 pounds of steam per hour. Current operation and loads require that only three of the four boilers be on-line to meet the campus heating loads. The fourth boiler is used as a stand-by boiler. There is space in Building 16 for additional equipment. This space is where a fifth boiler was removed. Condensate return pumps, de-aerators, feed water heaters and chemical treatment systems are located near the boilers within Building 16.

Steam and Condensate Distribution:

A system of underground steam and condensate return lines are routed from the central heating plant to most non-single dwelling facilities on the NSAB campus. Steam and condensate lines exit Building 16 in multiple directions, serving different areas of the campus. In general, the steam utilities serving the larger buildings provide domestic heat along with the energy source to generate domestic hot water.

Major steam and condensate lines exit through a utility tunnel from Building 16 to the Medical Center complex. The buildings that are connected to this steam line are buildings 1-10, 54 and 55. A 3-inch steam line and 2-inch condensate return line branches from the main and continues to the south to serve Buildings 50 and 57. These buildings are served by 3-inch steam lines and 2-inch condensate return lines. Another set of steam and condensate return lines (size unknown) exits Building 3 and extends to Buildings 60 and 61. Additionally, a set of steam and condensate lines branches from the utility tunnel to serve Buildings 13, 20 and 11. These lines run through Buildings 13 and 20, and proceed underground to Building 11.

The second steam main (5-inch steam and 3-inch condensate return) exits from the north side Building 16 and continues underground to other support buildings, including Buildings 17, (17A, 17B), 27, 28, 53, 59, 80, 139, 141, 147, 148, 149, 152, 153, 154, 155, 203, 225, 241, 242, 256 and 239. This is the longest of all of the underground steam mains and is supported by several steam man holes for connections and expansion loops.

The third steam and condensate main consists of a buried 5-inch steam and 2-1/2-inch condensate return lines, departing from the east side of the power plant and travels to Building 21.

The fourth steam and condensate main (10-inch steam and 5-inch condensate returns) also exits underground on the east side of Building 16. It continues toward the cooling tower where it branches to the north as an 8-inch steam and 4-inch condensate return line, and south as a 4-inch steam line and 2-inch condensate return line. The north branch continues to the east to serve AFRRRI and the USUHS. The south branch of the main continues to serve Buildings 56.

In 2010, Steam and Condensate Distribution System Study was performed to determine whether the existing system would have sufficient capacities to support BRAC and other construction planned by 2015. A minimum of one boiler operates during the summer and a maximum of three operate during the winter. As a result of the study, eight projects have been identified. These projects include: replacing leaking condensate piping from Building 3; replacing failing 5-inch gravity condensate and 4-inch pumped condensate line piping in the north tunnel, and the failing 6-inch pumped condensate in Building 16; replacing leaking condensate piping and steam piping from the north tunnel through Buildings 13 and 20 to Building 11; replacing leaking condensate piping and steam piping from steam manhole to Buildings 148, 149, 152, 241, and 256; replacing steam and condensate piping to Building 50; proving active cathodic protection to the roads and grounds piping between Building 16 to steam manholes; replacing steam and condensate pipe from Building 16 to Building 15; and providing a parallel 6-inch pump condensate header to the condensate receivers and a parallel 5-inch pumped condensate main to the mezzanine within Building 16.

To accommodate additional load requirements by 2015, the majority of improvements will be connected to Building 16, and the additional load will be equivalent to 3.5 boilers.

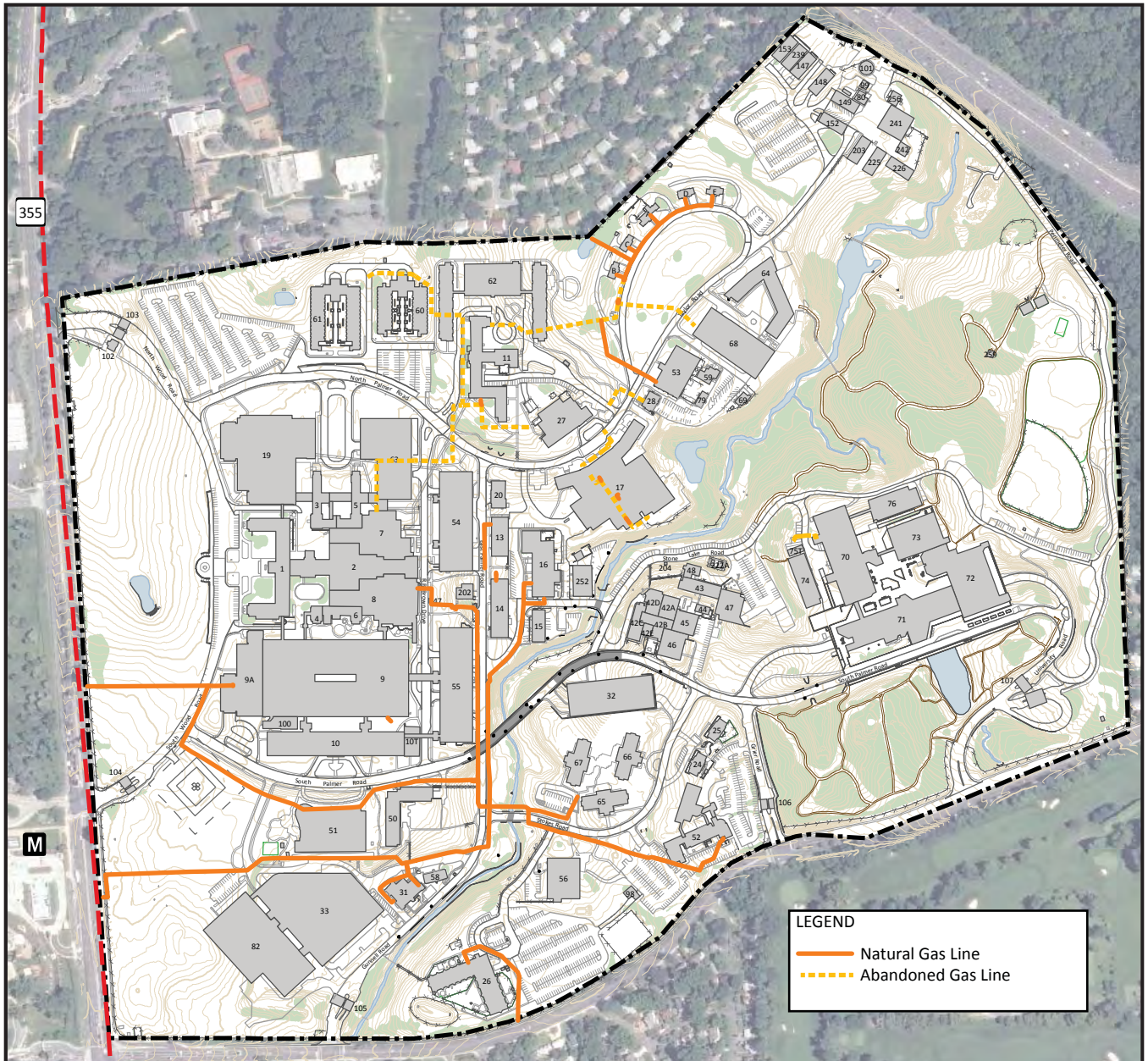


FIGURE 4-36 NATURAL GAS DISTRIBUTION DIAGRAM

Source: NNMC 2003 Compiled Utilities Plan

4.6.4 Natural Gas

Natural gas is supplied by Washington Gas and is available on the campus. The existing energy plant supplies gas by way of a dedicated 8-inch, 50 pounds per square inch (psi) gas main. No other users are connected to this main. The gas supply is provided on an interruptible basis. As a result, the energy plant has fuel oil back up should the gas supply be interrupted. A separate 6-inch, 20 psi gas main supplies the hospital and a limited number of smaller users. Gas volume and pressure are considered adequate for current and future needs.

Independent and small low pressure gas distribution systems from Washington Gas provide gas service to the existing flag officer residential area in the north and the Child Development Center in the south. While adequate for the existing residential area, the capacity of this system is limited and would not be adequate for significant additional loads.

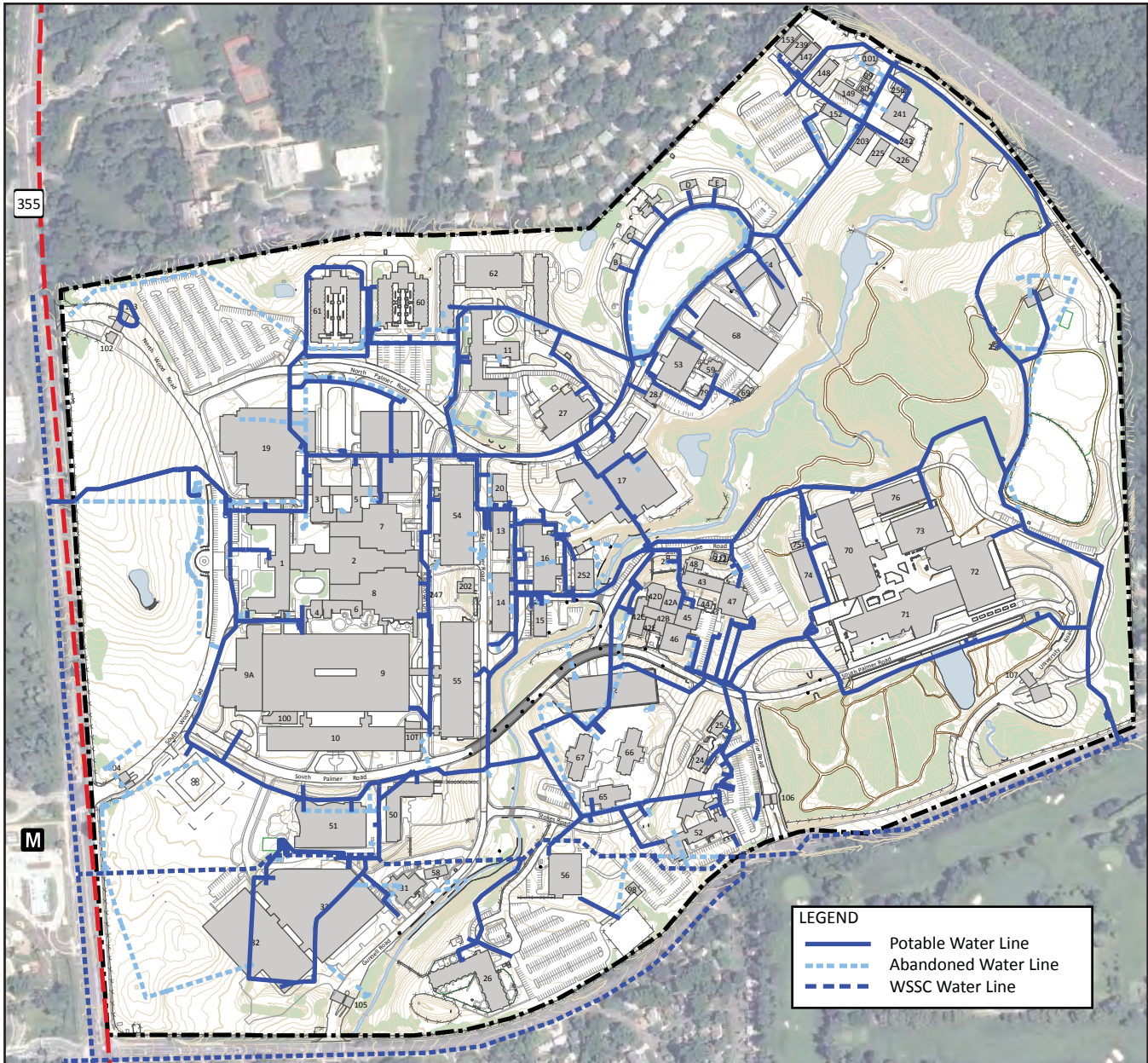


FIGURE 4-37 POTABLE WATER DISTRIBUTION DIAGRAM
 Source: NNMC 2003 Compiled Utilities Plan

4.6.5 Water

System Description

Water for NSAB is provided by Washington Suburban Sanitary Commission (WSSC). In 2010 the average daily water demand was 617,000 gallons per day (gpd) and the average daily demand rate was 428 gallons per minute (gpm). The average daily demand per person is approximately 66.2 gallons per day (gpd) per capita.

The supply lines in the area are 10-inch and 12-inch lines and there are four metered connections to NSAB, two from the west and two from the south. The campus is isolated from WSSC's mains with reduced pressure backflow preventers (RPBP). With the exception of the AFRR complex, the campus's water system is in turn isolated from the individual buildings with RPBPs. For the protection of the water system and all the users of the system, the AFRR complex should be retrofitted with a RPBP.

A section of water main was removed south of Building 51 (NICoE) during the demolition of Building 12. Replacing this connection would increase pressure and capacity in this area.

Plans are in development for four backup water tanks that will be used for non-potable systems, including cooling towers and backup fire protection supply.

Capacity Studies

Currently ongoing (as of early 2011) the *Study of Potable Water and Sanitary Sewer Systems* analyzes existing systems and determines their limitations in the future. Generally, the water lines are aging and in disrepair. The study shows an analysis of which pipes need replacement. In 2005, there were upgrades to some of the systems; however these repairs never reached the east side of the Installation, which limits capacity for existing and future expansions.

Prior to the ongoing study, an attempt was made to verify the capacity of the campus water system. On December 5 and 6, 2006, a limited study was conducted. Pressure recorderd where installed across the campus and individual fire hydrants were open and closed one at a time. The flow rate for the specific hydrant was recorded, while the pressure recorders captured the system's response. Each fire hydrant was allowed to flow for approximately 15 minutes to allow time for the campus distribution system to reestablish pressure equilibrium. After the conclusion of the flow tests, the pressure recorders were left in place for a total of 24-hours to capture a full campus pressure cycle. It should be noted that the specific test locations and flow parameters were established to develop and measure the system's response to specific stresses, and do not meet the requirements of NFPA 291. This does not imply that the system or hydrants are not in compliance; only that the flow tests do not conform.

As a result of the 2006 study, a simplified model of the campus water distribution network was developed from utility maps. The distribution model was simplified by deleting pipelines less than 6 inches in diameter and, where possible, grouping individual buildings into demand nodes. Heastad Method's WaterCAD software was used for the modeling. The data collected in the field was downloaded to the modeling software package. In addition, to develop average daily demands for the campus, master water meter readings were obtained from WSSC. The roughness coefficients, pipe sizes and valve statuses were then adjusted in order to replicate the results recorded in the field. Anticipated fire demands were obtained from the campus and were used to stress test the model. Results from the modeling should be used with caution given the limited time that data was collected (24-hours), assumptions concerning distribution system pipe sizes and routing, valve status (open or closed) and valve locations. Therefore, results of this water model should not be used in place of design-specific hydrant flow tests complying with NFPA 291.

Despite the limitations, the model indicated that the campus water distribution system was adequate for the future demands anticipated with the facilities proposed in the 2008 Master Plan. In the event increased capacity is required, there are adequate looped lines in the area to provide additional supply to the campus.

4.6.6 Sanitary Sewer

Sanitary sewage is collected by the campus's gravity sewer system and delivered to the WSSC's mains at 22 known locations throughout the campus. WSSC's mains run though the approximate center of campus flowing from southwest to northeast along Stoney Creek. There are approximately 20,000 linear feet of gravity sewer lines and force mains between 4 and 18 inches in diameter, approximately 100 service laterals and 50 manholes. There are approximately 13,000 linear feet of WSSC gravity sewer lines on-site.

During a site investigation conducted on December 6 and 7, 2006 visual estimates of system capacity were made at key points along the WSSC's mains and at critical points on the campus system. The time chosen for these observations roughly corresponded with the expected peak daily flow for the campus. A spread sheet model was developed from these estimates. The results of this modeling indicated that the capacity of the WSSC system was adequate for proposed master plan expansions at that time.

Findings from The Sanitary Sewer Evaluation Study completed in 2010 determined that a significant portion of the manholes and sewer line segments have structural deficiencies that could eventually allow inflow and/or restrict the flow of wastewater. Specific results can be found in that study or in the currently ongoing Study of Potable Water and Sanitary Sewer Systems.

The capacity of the WSSC system needs to be verified based on the recommendations of this Master Plan.

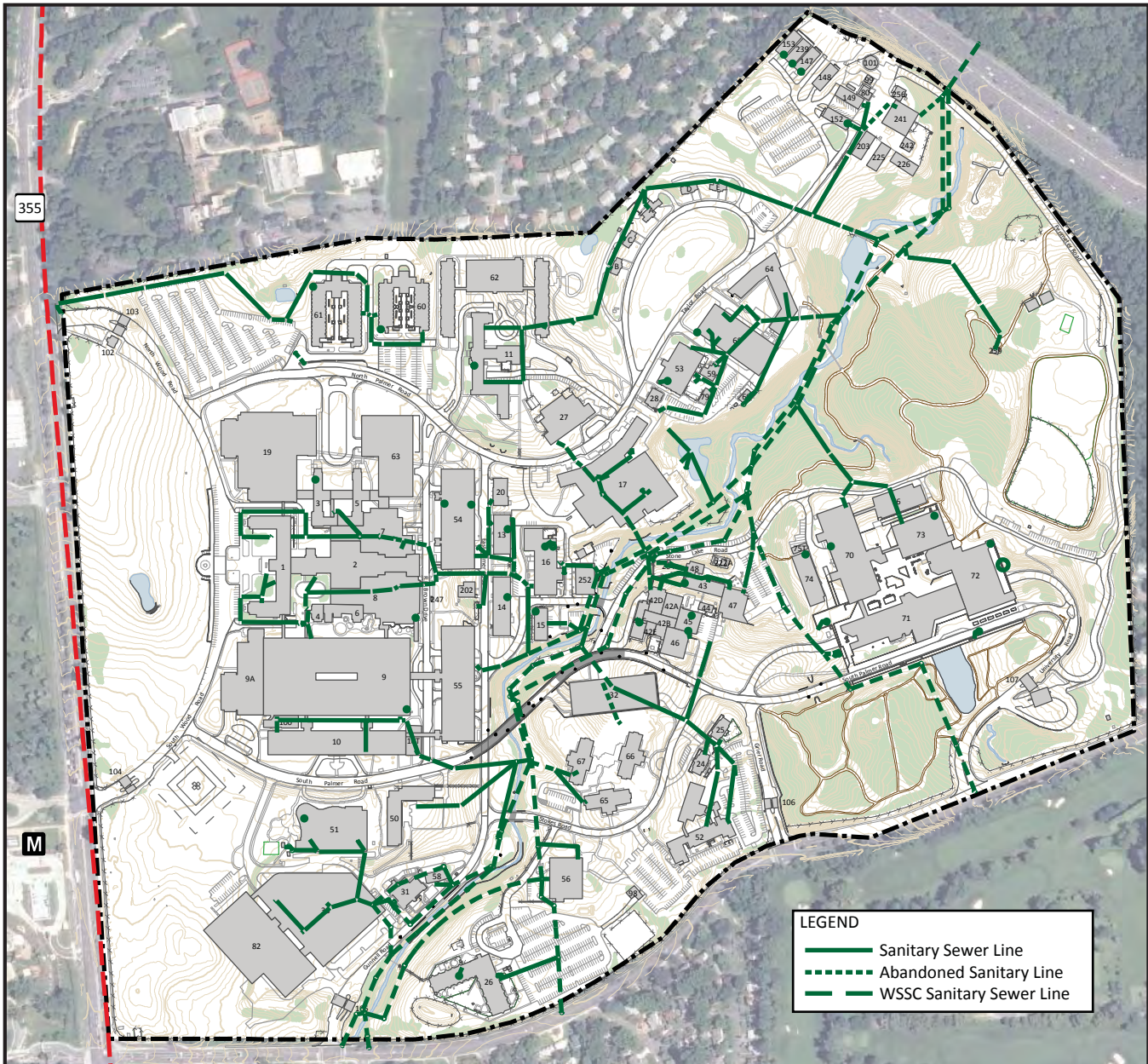


FIGURE 4-38 SANITARY SYSTEM DIAGRAM

Source: NNMC 2003 Compiled Utilities Plan

4.6.7 Storm Water

Storm water from the campus is conveyed by a series of systems that discharge into the tributaries of Stoney Creek on NSAB property, then to Rock Creek and eventually into the Potomac River (Figure 4-39, Existing Storm Water Systems Diagram). Information obtained from an earlier study indicates that most of the existing storm system is designed for 10-year storm events. According to Perkiomen Watershed Conservancy (PWC) there have been no reports of significant flooding during normal rainfall events.

The NSAB campus does not have a category exemption from storm water management requirements but does have a Storm Water Pollution Prevention Plan (SWPPP) in place. NSAB is responsible for maintaining two NPDES permits (a State Discharge Permit and a General Discharge Permit) and tracking sediment and erosion control compliance. As a result, all future projects will be required to comply with Maryland Stormwater Management Guidelines (MSMG). These guidelines establish minimum storm water quality standards and maximum storm water discharges from a given site. Projects that will be impacted are new construction over 5,000 SF of disturbed area and redevelopment of existing impervious areas of 5,000 SF and more. For redevelopment projects, MSMG requires a net reduction of 20 percent of the existing

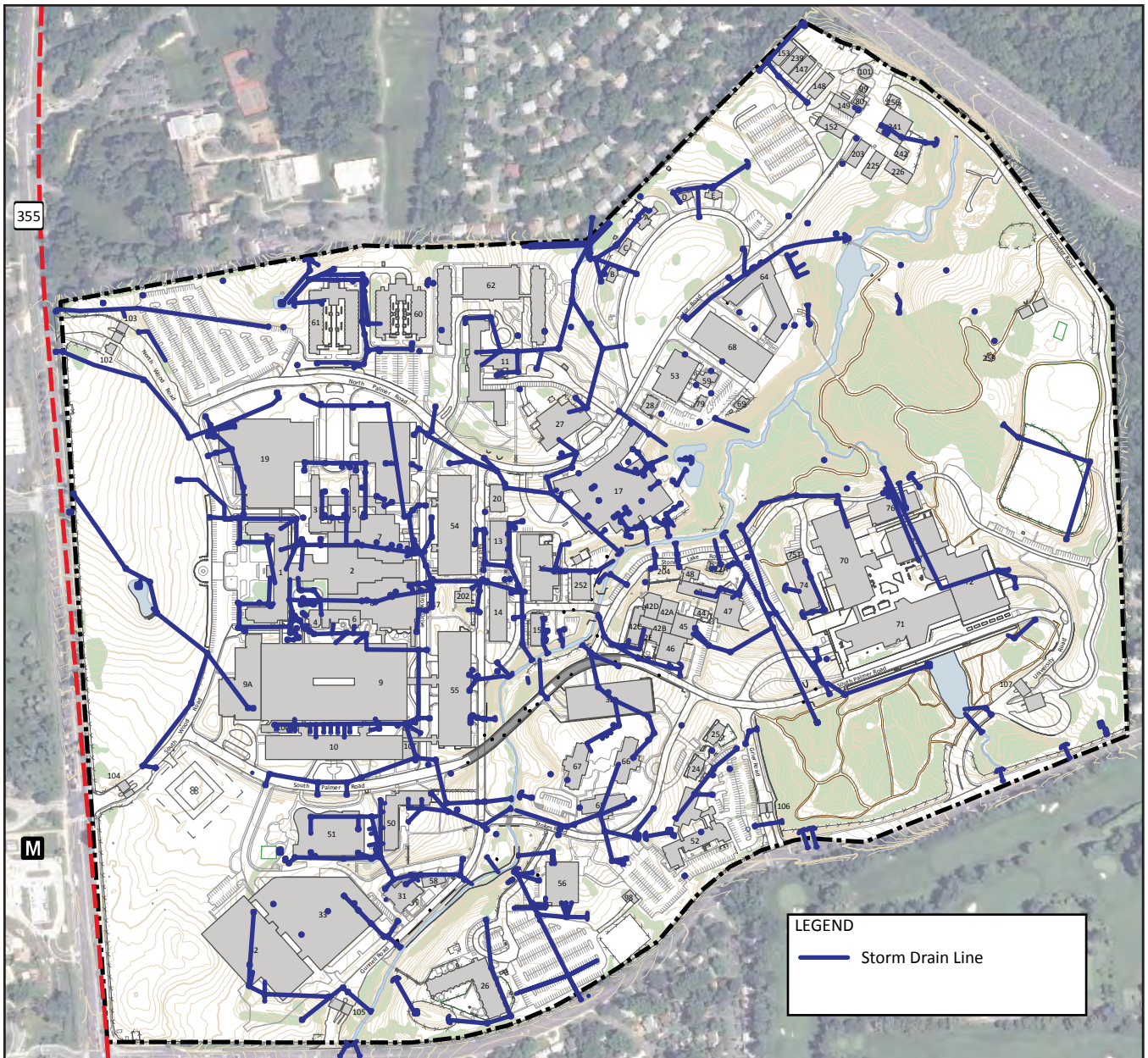


FIGURE 4-39 STORM WATER SYSTEM DIAGRAM
 Source: NNMC 2003 Compiled Utilities Plan

impervious area. Given that some areas of the campus are highly developed, the land area required for the treatment of storm water for quality and quantity may be difficult to obtain without expensive subsurface structures, such as detention piping, vaults, etc.

Stoney Creek is the receiving stream for much of the runoff from the NSAB campus. In the past, storm water discharge to this creek has caused erosion near the points of discharge from the respective storm systems. Stream bank damage has occurred due to the increased storm water runoff from impervious areas within the campus. As discussed above, current MSMGs address both new development and redevelopment. As a result, as new construction and redevelopment occur, the creek's environmental condition will improve.

The Installation is currently planning a storm water study. New storm water regulations require the implementation of low impact development storm water solutions. The purpose is to minimize impervious footprint, protect natural vegetation, extend time of concentration, filter and infiltrate, and store and reuse runoff. Examples of possible techniques are bioretention, dry wells, filter/buffer strips, swales (grass, infiltration, wet), rain barrels, cisterns, and infiltration trenches.

4.7 Constraints and Opportunities Summary

Development at NSAB must successfully resolve many planning issues that influence the growth and evolution of the Installation over time. This section summarizes those issues as either Constraints or Opportunities. Constraints represent those elements of the natural or built environment that restricts development in some way, or presents challenges that make development more risky, costly, or time consuming. Constraints are not insurmountable, however areas with few constraints are favored for more short-term future development. Opportunity areas are reflective of a functional or environmental benefit that positively guides development within those areas.

4.7.1 Composite Constraints

Site constraints at NSAB include steep slopes, AT/FP setbacks, poor soils, existing woodlands, the Stoney Creek corridor, archeological sites, and historic zones and viewsheds. Constraints are described in this section and are illustrated as a composite area in Figure 4-40. The shaded areas represent those areas with significant constraint to development. While development is still possible in these areas, the site conditions present challenges to development that will need to be addressed during design and construction. If development needs to occur, it is encouraged in the non-shaded areas of the site in order to minimize environmental, cultural and operational impacts.

The following constraints contribute to the shaded areas within Figure 4-40.

Natural Environment

Areas with slopes greater than 15 percent are generally found around the stream corridor and in woodland areas. Development in these areas should be limited. Possible complications from construction within areas of steep slopes include increased cost for slope stabilization, retaining walls, and increased environmental impact from erosion and sedimentation. In addition to topographic constraints, development should be avoided where Brinklow-Blocktown soils and Glenville or Baile soil series are found due to their high erodibility and wet conditions, respectively.

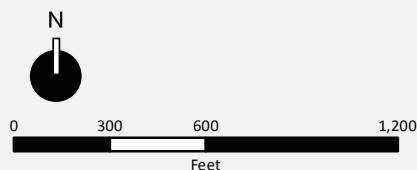
While NSAB is not subject to any Forest Conservation Areas, existing plans indicate that NSAB shall strive to comply with the principles of mitigation and protection. While no areas are designated as “critical habitat,” there are five transient bird species of concern that may be present. These include the American Robin, European Starling, Cardinal, Mourning Dove, and Canada Goose. Disturbance of mature woodlands requires consultation with United States Fish and Wildlife Service (USFWS).

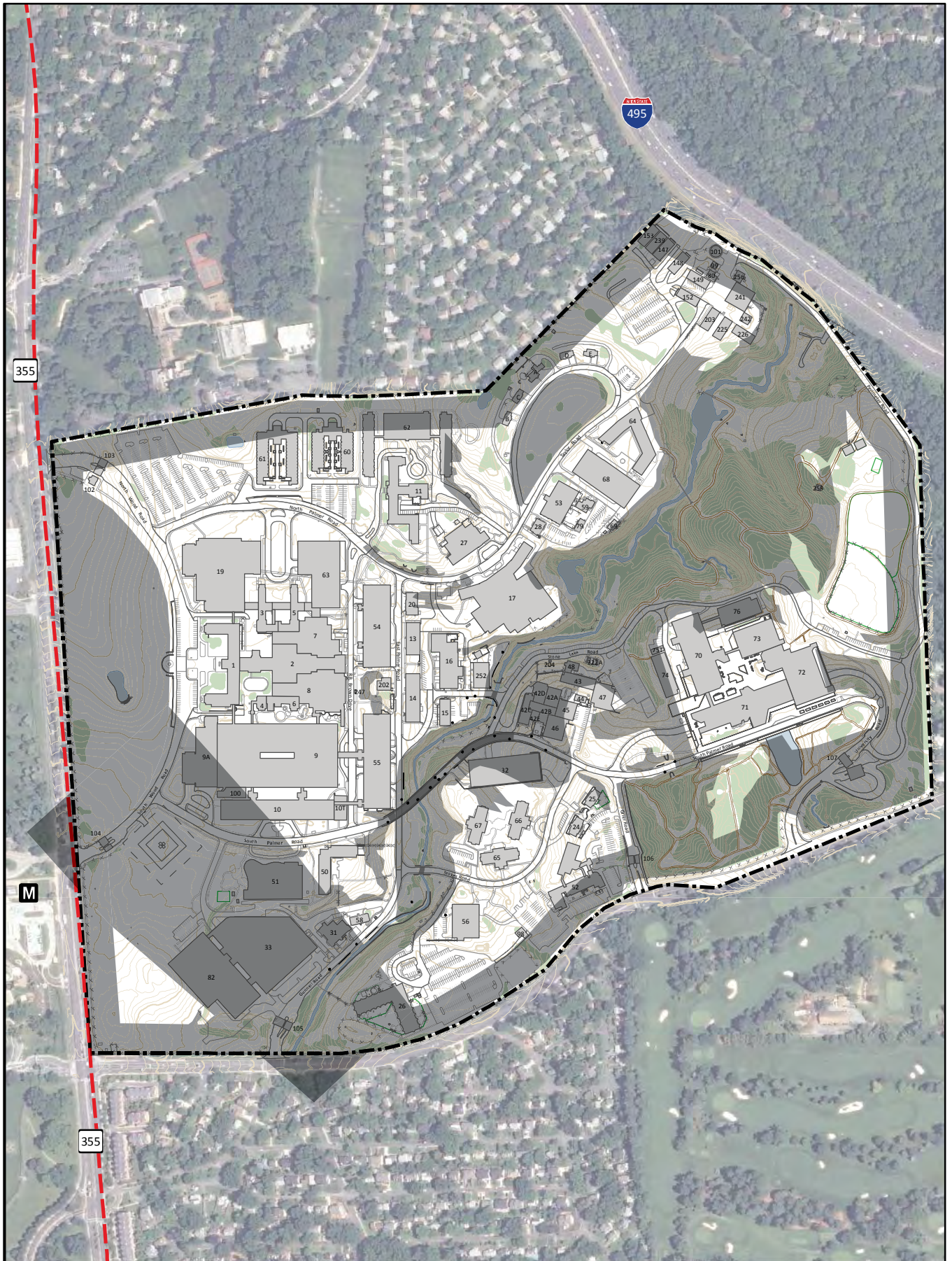
Although there are no delineated wetlands on campus, there are floodplain areas and several ponds. No development should occur within these areas.

FIGURE 4-40 COMPOSITE CONSTRAINTS DIAGRAM

 Natural and Man-Made Constraints Area

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





Built Environment

There are several constraints within the built environment of NSAB. The most restrictive are the historically significant structures and spaces, the helicopter approach zone and the Antiterrorism/Force Protection (AT/FP) standoff areas.

The lawn in front of the Building 1 is a protected landscape due to its historic relationship to the tower and the protected views from Rockville Pike. Archaeological sites within the wooded areas in the eastern portion of campus and the lawn in front of the Flag Housing are also protected areas where development is discouraged. In general, archaeological sites should be avoided, but if necessary may be developed pending additional archaeological surveys. The helicopter approach zone is located to the southwest of Building 10. The airspace of the approach from the south is restrictive in terms of the height of any structure allowed within these zones. The airspace restrictions are detailed in UFC 3-260-01. AT/FP standoff requirements are designated in UFC 4-010-01. These requirements apply to all new construction and renovations amounting to more than 50% of the building's replacement value. A 148-foot setback from the controlled perimeter is required for all primary gathering buildings of conventional construction, though a 82-foot minimum setback may be allowed with appropriate construction modifications and blast analysis. Inside the controlled perimeter, standoff distances are reduced to 82 feet and 33 feet from roads and parking, subject to the same construction and analysis criteria.

4.7.2 Opportunities

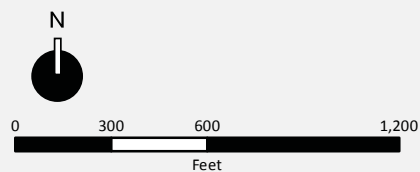
Some of the man-made opportunities should capitalize on the positive features already established on campus in terms of the well-defined functional zones, and expand within these areas as required to maintain efficient operations. Opportunities exist to improve vehicular and pedestrian circulation, while building upon existing assets and traffic patterns already established. Where economically feasible, there are opportunities to renovate facilities that have been identified as contributing to the historical significance of the campus. Another opportunity presents itself in the constraint of the AT/FP setbacks. These setbacks can help maintain an open-campus feel and provide areas that can enhance the natural environment, including walkways, bike paths and cluster areas for low plantings and seating.

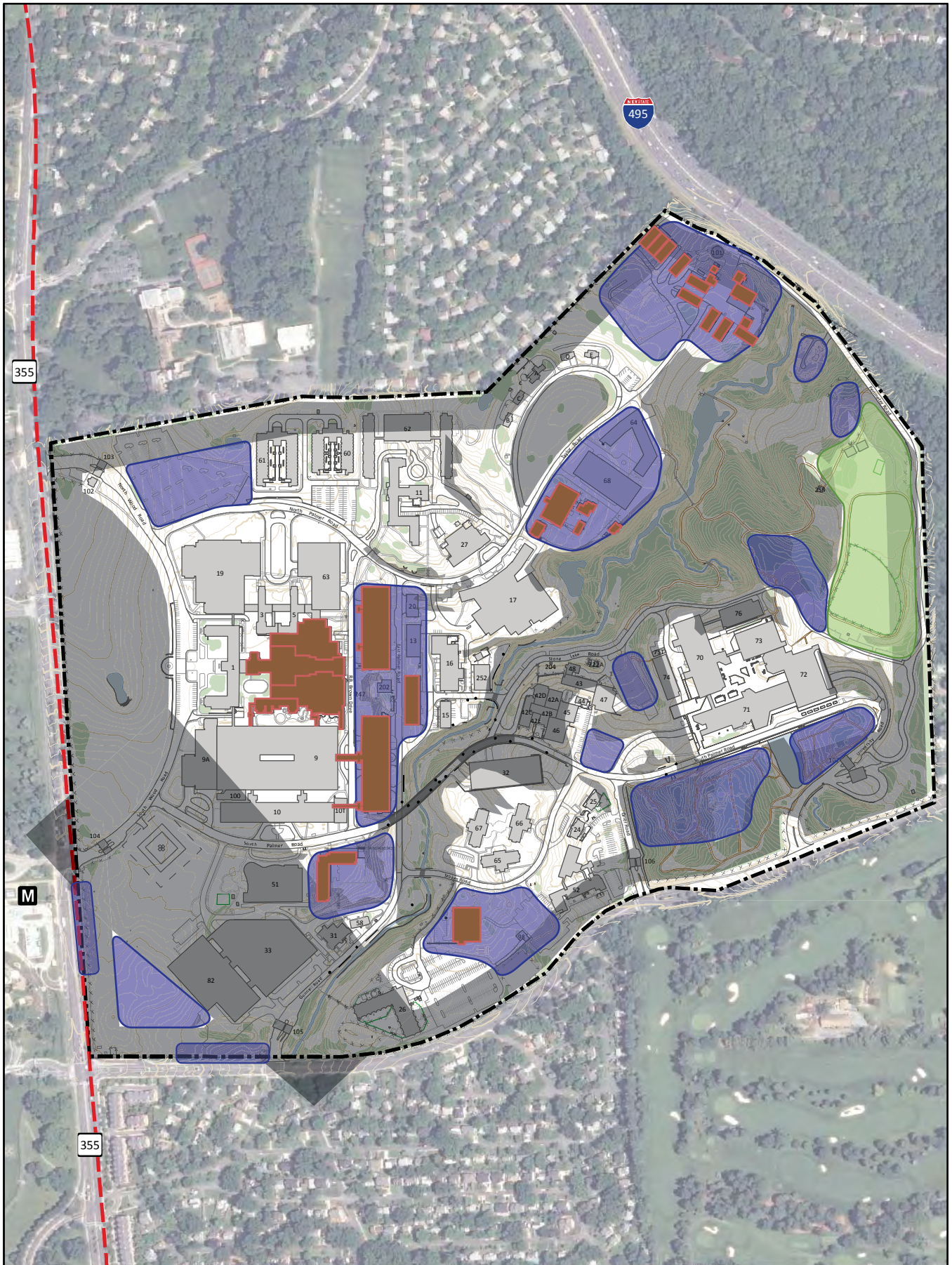
Figure 4-41 highlights the areas with development or redevelopment potential based on existing site constraints, planned projects, and current and future requirements. Generally, these areas are without significant constraints and free of intense development. However, the condition, age or an incompatible use of a facility may make it a candidate for demolition within the scope of this Master Plan. Potential demolition candidates open up an opportunity to redevelop a site in a more appropriate, efficient and sustainable way. Combined with the program basis, the opportunity areas identified in Figure 4-41 form the basis for proposed development plan Chapter 5.

FIGURE 4-41 DEVELOPMENT/REDEVELOPMENT OPPORTUNITY AREAS DIAGRAM



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





THIS PAGE INTENTIONALLY LEFT BLANK



5.0 Master Plan Update for NSAB

This chapter outlines the plan for future development of the NSAB campus over the next 10 years. Anticipated development includes expansion of existing facilities, replacement of aging facilities, demolition of obsolete facilities and construction of new facilities due to mission expansion. The plan also provides guidance for potential development areas where the program is not yet known, which will ensure that unanticipated mission expansion is incorporated into the Master Plan in a manner consistent with the overall recommendations.

This Master Plan was developed during a time of much construction and change on the Installation due to the implementation of BRAC 2005 recommendations and related projects. While these efforts may be ongoing, they have been treated as existing conditions in this 2012 Master Plan. The base map for this Master Plan represents the projected condition of the Installation as of January 2012, based on available planning information. Due to adjustments made during construction, this may not necessarily represent the as-built condition of these projects.

The program of future development includes only those projects expected to be completed after this report has been finalized. Refinements to the Plan are inevitable as conditions continue to change, however, this chapter provides the general direction for future development.

5.1 Participating Offices

The goal of this Master Plan is to serve as a document for NSAB to guide development across the entire Installation. Therefore it was essential to include all tenant commands in the preparation of this Master Plan. The following agencies were involved in interviews, charrettes and/or review of draft reports of the Master Plan.

- Naval Support Activity Bethesda (NSAB)
- Morale, Welfare and Recreation (Fleet & Family / MWR)
- Fire / Security Office
- Safety Office
- Naval Facilities Engineering Command (NAVFAC)
- National Naval Medical Center (NNMC)
- National Intrepid Center of Excellence (NICoE)
- Navy Medicine National Capital Area (NAVMEDNCA)
- Navy Lodge
- Naval Criminal Investigative Service (NCIS)
- Uniformed Services University of Health Sciences (USUHS)
- American Red Cross
- United Service Organizations (USO)
- Navy-Marine Corps Relief Society (NMCRS)
- Joint Task Force National Capital Region Medical (JTF CAPMED)
- Officer In Charge of Construction (OICC) Bethesda
- Navy Medicine Manpower Personnel Training & Education Command (NMPT&E)
- Human Resources Office – Washington, Bethesda Satellite (HRO-W)
- Armed Forces Radiobiological Research Institute (AFRRI)
- Navy Exchange (NEX)
- Naval Dosimetry Center (NDC)
- Navy Medical Inspector General Office (MED IG)
- United States Coast Guard (USCG)
- Fisher House
- National Capitol Region Armed Services Blood Bank Center (ASBBC)
- Navy Medical Support Command (NMSC)
- Public Affairs Office (PAO)

5.2 Planning Process

This 2012 Master Plan provides a development guide for NSAB through 2022. This plan includes all BRAC-directed development. The process for this Master Plan was a year-long, multi-step approach and involved participation by multiple groups throughout its development.

The Master Plan process kicked-off in October 2010. The planning team conducted a review of relevant data, existing studies, and plans to validate and update the information found in the 2008 NNMC Master Plan and to begin to develop a program of development options. Over the course of several weeks, the planning team conducted interviews with stakeholders and tenants on the Installation to determine their project needs, vision and concerns.

The research and interviews culminated in a concept brief which provided an overview of the significant findings, and identified opportunities and constraints that impact future development. The concept brief was used as the basis for a master plan charrette, during which the various stakeholders evaluated proposed development alternatives. Feedback from the charrette and a follow-up charrette led to the development of a preferred alternative. The preferred alternative is further refined in this Master Plan.

Public involvement is an important part of the development of a Master Plan. The preliminary draft report was shared with regional review agencies to begin the public involvement process. Submission of the draft report served as the kick-off for the development of the Environmental Impact Statement.

5.3 Goals and Objectives

A Master Plan is intended to be a framework for physical development of the Installation so that development results in consistent and appropriate physical appearance and functions. A master plan is a high-level document that provides the guiding framework for future projects, area plans and further studies. Further studies that will be required for projects within this Plan include a Transportation Management Program (TMP) and National Environmental Protection Act (NEPA) documentation.

The goal of the NSAB Master Plan is to provide an Installation-wide document that includes all tenants. This Plan brings the existing 2008 NNMC Master Plan up to date and uses post-BRAC construction conditions as the starting point. The time-frame of this master plan is approximately 10 years and it seeks to bring the Installation in-line with RIMP 2.0 and the Navy's 2035 vision.

Objectives for this Master Plan are carried over from the 2008 NNMC Master Plan and are expanded to support NSAB and its mission to provide tenants with "efficient and effective shore installation management services and programs in support of mission commanders to enable combat readiness for fleet, fighter and family." These objectives include:

- Create an environment that meets the needs and enhances the experience of the Installation's primary missions.
- Provide a land use master plan to accommodate anticipated growth that is flexible enough to remain viable as scopes of specific projects are developed.
- Maintain and enhance the aspects of security, both for the overall Installation and individual projects.
- Recognized positive features in the built and natural environment, and maintain and enhance those features.
- Preserve the historic character, cultural value and natural resources of the campus.
- Facilitate an accessible, walkable campus, with clustered functions and a robust pedestrian network.
- Provide compatibility with the surrounding neighbors by maintaining buffers on the perimeter as required.
- Achieve LEED Silver certification on all new building construction in compliance with Executive Order 13423.

5.4 Master Development Plan

2008 Master Plan Update

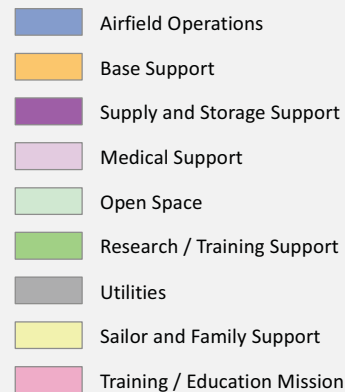
The 2008 NNMC Master Plan included several projects beyond BRAC requirements, some of which have been completed. Some are still needed but the specific requirements have changed, while others are no longer valid. Completed or near completed projects include the Outpatient Care Medical Addition (Building 19); Inpatient Care Medical Addition (Building 9A); Patient Care Garage (Building 63); three Fisher Houses (Building 65-67); Multi-Purpose Garage (Building 32); Bachelor Enlisted Quarters for Wounded Warriors (Building 62); Navy Exchange (Building 82); and The Warrior Transition Unit Support Complex (Building 17).

2012 Master Plan

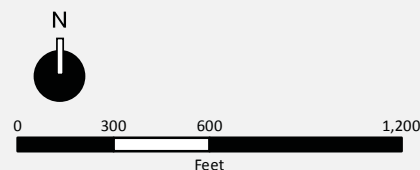
This Master Plan validates projects that are still needed and revises them based on current requirements, identified by the government and NSAB, as well as identifying new projects. Land use planning reflects a logical evolution of current functional zones and relationships to reflect both ongoing and projected campus expansion. Figure 5-1 illustrates this future land use overview and Figure 5-2 establishes the framework for future building development.

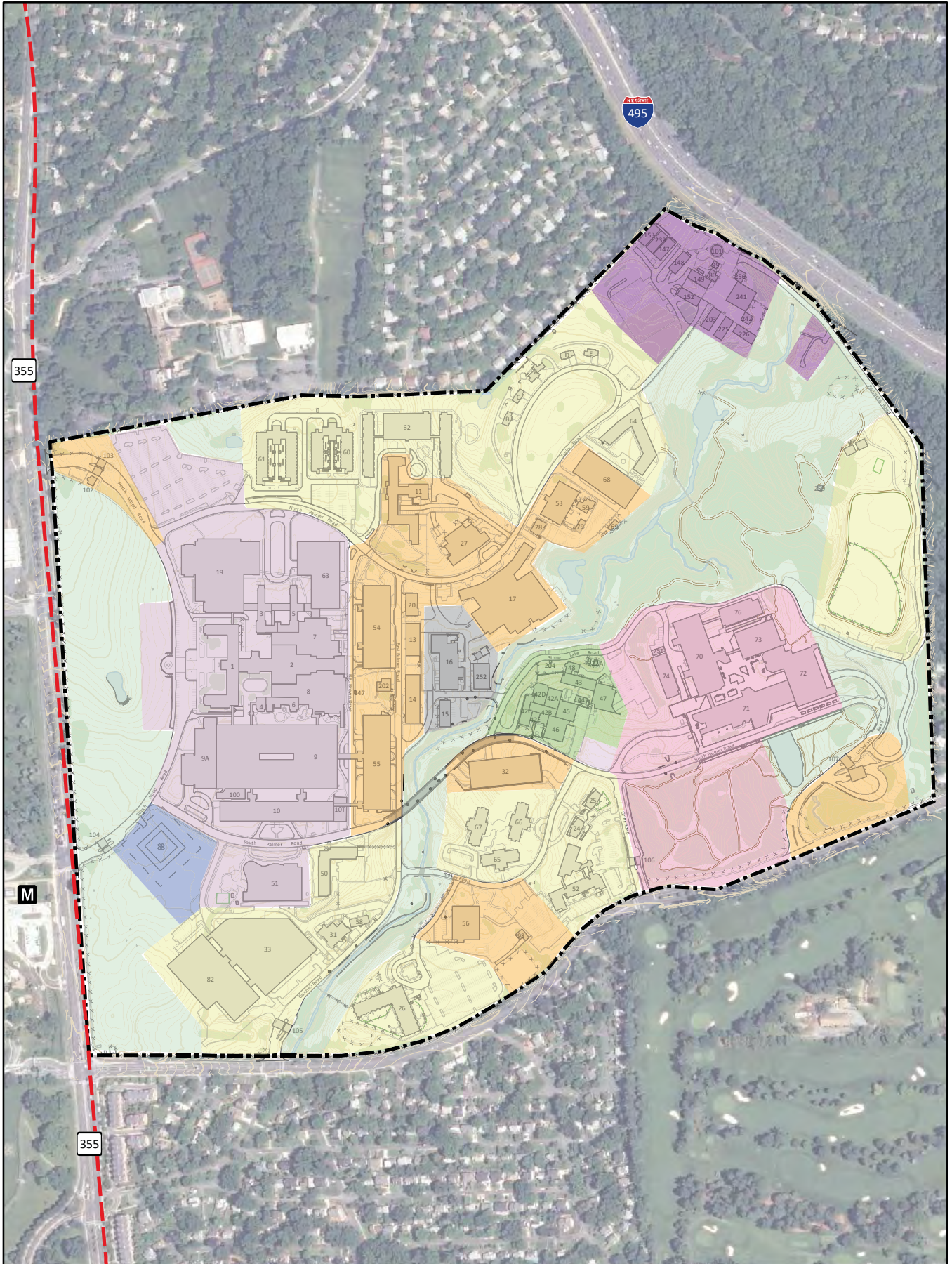
This Master Plan's landscape plan follows the recommendations and guidelines established by 2010 Installation Appearance Plan (IAP). These guidelines were taken into consideration during open space and recreation programming. Proposed path and trail improvements follow the recommendations of the 2011 NSAB Accessibility Plan.

FIGURE 5-1 FUTURE LAND USE PLAN



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





5.5 Program Summary

The program for development at NSAB is summarized in Table 5-1. The project numbers in the table correspond to the numbers located on the Future Development Plan (Figure 5-2). These requirements are at various stages in development, with the majority being short term planned projects anticipated to be built within the next five years, while others are long term opportunities, looking at potential development through 2022. Some requirements may never be executed or may be modified as funding and priorities change. All of the projects are subject to change during the design process. The assumptions shown are for planning purposes only.

TABLE 5-1 PROGRAM SUMMARY

Project Name	SQ FT Requirements	Structure Footprint	Assumed Stories
Short Term Planned Projects			
WRNMMCB Medical Facility Building "C"	573,000	113,000	5
WRNMMCB Medical Facility Renovations	120,000		
WRNMMCB Medical Facility Underground Parking	225,000		
USUHS Building "F"	341,151		
UHUHS Renovations	39,000		
Sanctuary Hall	139,285	19,900	7
Sanctuary Hall Garage	132,000	33,000	4
New Child Development Center	34,291	34,291	1
New 24/7 Child Care Facility	5,262	5,262	1
Renovation of Hourly Drop-off Center	9,484	7,295	1
USO	20,700	12,000	1-2
Public Private Venture (PPV) Housing	6,900	2,300	2-3
Building 13 Renovation	18,000	9,000	2
Navy Lodge Expansion	62,812	8,973	7
Rockville Pike Pedestrian Crossing			
Helipad Renovation	22,500		
Building 20 Renovation (Community Use)	5,265	5,265	1-2
Long Term Opportunity Areas			
Industrial/Warehouse Area Redevelopment with Fire Station	42,000		
Kiss and Ride			
Building 54 & 55 Replacement	720,000		
Building 50 Site Redevelopment			
G-Lot Medical Expansion			
Building 26 AT/FP Renovation			
Satellite Pharmacy	1,312	1,312	1
H-Lot Garage			
Taylor Road Facilities			
N-Lot Garage			

5.5.1 Short Term Planned Projects

The following are short term planned projects. Project number does not imply priority, but rather their location in Figure 5-2.

-1- WRNMMCB Medical Facility Building “C” and Underground Parking

The Phase 2 Report of the 2010 Medical Facilities Master Plan focused on the long range departmental space needs that are anticipated for services to be housed within WRNMMCB facilities after the completion of the BRAC relocations. The space needs for each department and service were determined based on their current space assignments plus a factor added for estimated growth for the next 10 years where appropriate. The report identified a departmental level space program requirement of 573,000 gross square feet (GSF) of new construction. This includes approximately 120,000 GSF of demolition and in-kind replacement, 120,000 GSF of displaced units to be relocated to new facilities and 117,588 GSF of new program space.

Phased projects associated with this facility include:

- Demolition of Buildings 2,4,6,7 and 8 – 325,356 GSF
- Construction of a central spine for the new Medical Building C
- Renovations- 120,000 GSF
- Construction of Building C- 573,000 GSF
- Underground Parking- 500 spaces

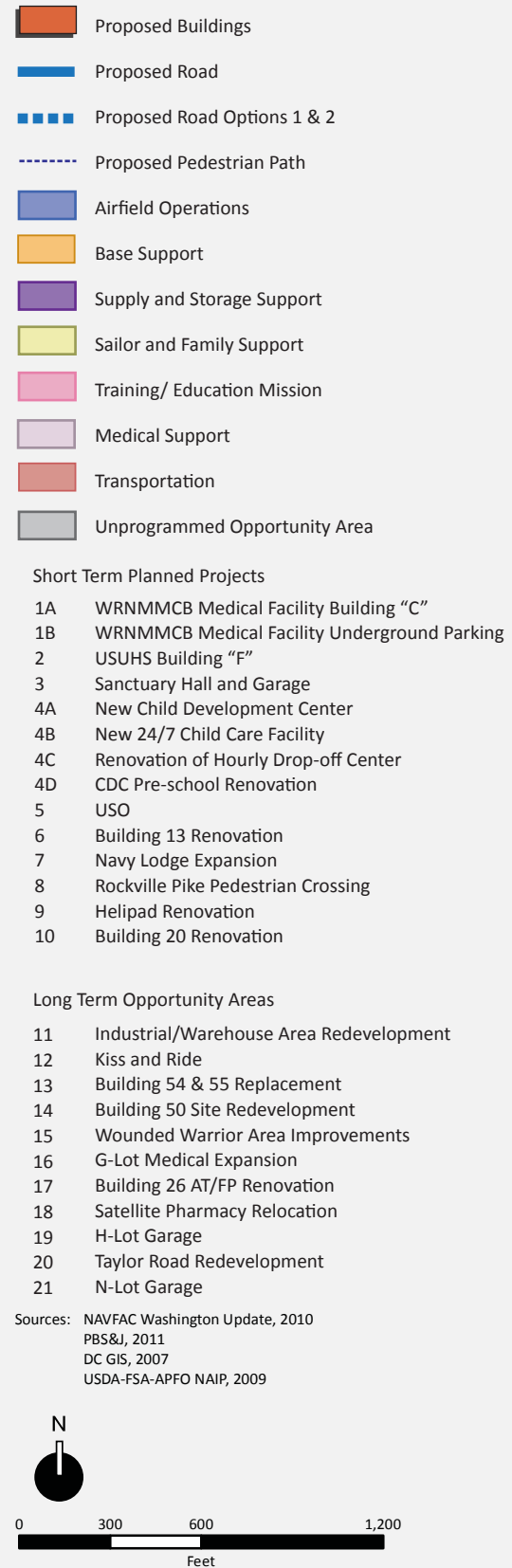
Not included on the map is 250,000 SF of remaining medical facilities renovations apart of the Medical Facilities Master Plan. These renovations will take place in Buildings 1-10.

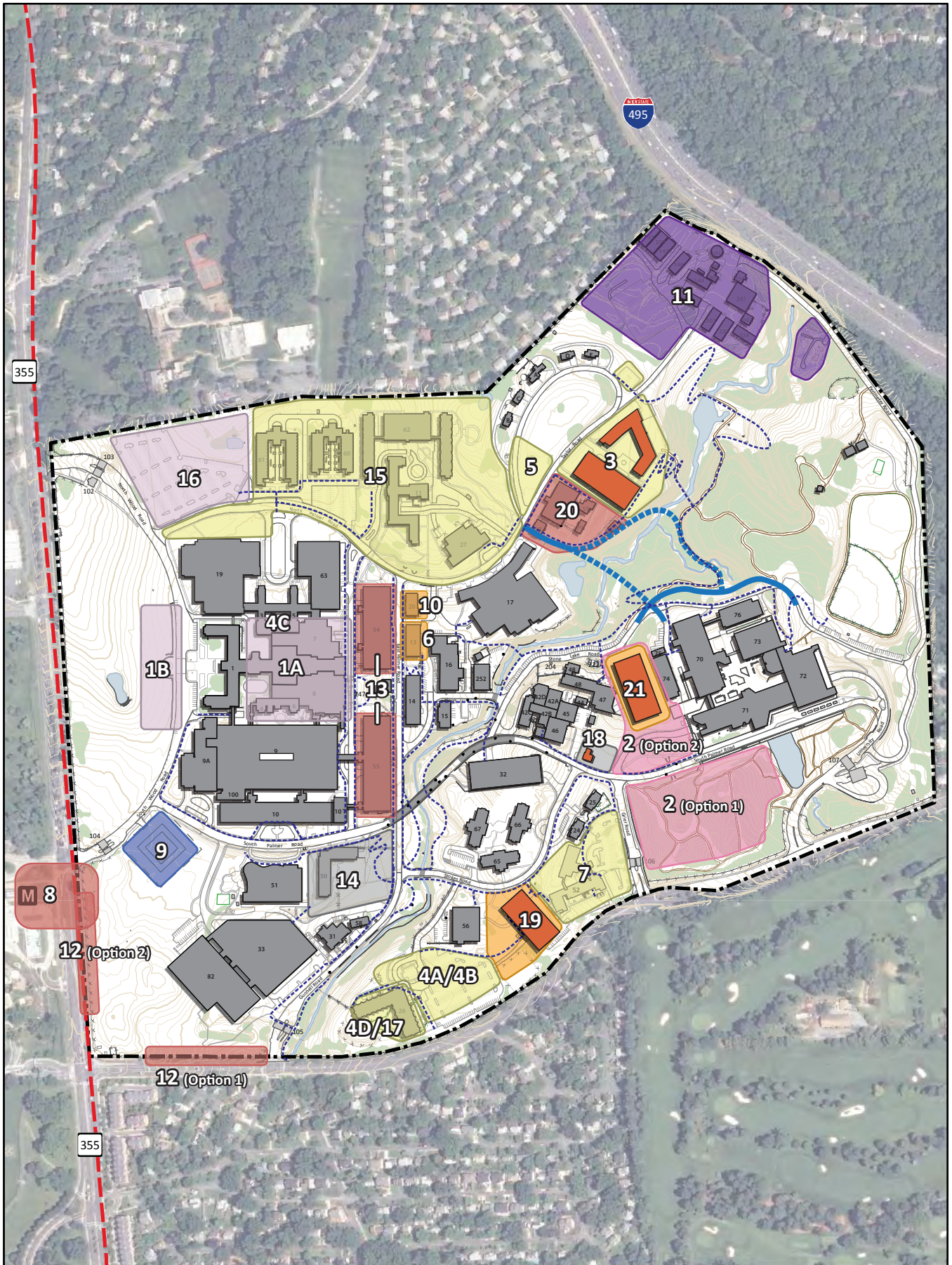
-2- USUHS Building “F”

The Uniformed Services University of the Health Sciences (USUHS) complex consists of over one million GSF. This area includes five buildings with academic, administrative and research functions. Some USUHS facilities are dispersed in additional buildings or portions of buildings, including Buildings 1, 9, 28, 53, 59, and 79.

The Master Plan for WRNMMCB was directed to include the integration of USUHS as a collaborative entity to augment WRNMMCB in its strategic efforts for achieving world-class recognition. This, along with findings from the CONOPS that revealed USUHS has a significant shortfall of available space which limits current and future operations, has substantiated the need for the construction of a new 341,151 square foot multi-story research and education facility. USUHS concepts also envision a 144,000 SF parking structure to accommodate 400 parking spaces. It is recommended that parking for the USUHS project be integrated into the structure for Building F. If provided, special provisions for parking below the occupied floors would have to meet AT/FP criteria. The topography of the area in front of the UHUHS campus would allow for parking under the structure to be below street level but have

FIGURE 5-2 FUTURE BUILDING DEVELOPMENT PLAN







Artist's rendering of proposed Sanctuary Hall and Parking Garage

Source: Transient Wounded Warrior Lodging and Parking Structure Graphic Package, prepared by SmithGroup and URS, S-2 Submittal-Vol. 2 , 17 December 2010

access to daylight. The topography also can be an advantage to keeping the above grade occupied floors at a compatible scale to the surrounding area by minimizing the height visible from key views.

Alternative structured parking may be provided in the area of N-Lot as described in Section 5.5.3.

Separate from this project, the Installation Appearance Plan (IAP) calls for improvements to the entrance to USUHS along University Road. That project is described later in the IAP projects section. Design of this entrance feature should be coordinated with the design and implementation of the USUHS Building F project.

-3- Sanctuary Hall and Parking Garage

This project includes construction of a new Wounded Warrior Barracks (Sanctuary Hall) Building 64. The building is planned to accommodate 100 two-bedroom hotel-style suites to house wounded warriors and their care-giving family members. This housing model is loosely based on a modified Navy 2+0 room concept for BEQ housing. Sanctuary Hall is proposed as 139,285 GSF, to be built to LEED Silver standards.

Parking requirements include maintaining the 272 existing spaces that would be displaced by construction to provide approximately 144 new parking spaces for the Wounded Warrior Barracks. Parking would be provided as a mix of surface and structured parking, however a 5-story, 470-space, parking garage (with 2 stories below grade), would provide the majority of the parking.

-4- Child Development Center

The additional personnel from BRAC and BRAC-related projects brings with them additional children and an increased demand for Child Development Center (CDC) services. The estimated total number of children at NSAB is projected to be 668. Existing daycare facilities are not adequate to support this many children so the following CDC projects are proposed.

- 4A: New Child Development Center (300 children) will be built near the CDC. This will be a standard facility of 34,291 GSF.
- 4A: New 20-child 24/7 care residence. This 5,262 GSF “residential home” structure will be able to accept children at any time of day or night and will be built near the new CDC.
- 4C: Renovation of the Hourly Drop-Off Center, currently 9,484 GSF in Buildings 3/5 will be addressed as part of the construction of the new Medical Center (Building C). This drop-off center will satisfy the needs of the hospital and will benefit from the location within the hospital complex.
- 4D: Existing CDC Renovation will address space issues in the current daycare center, adding a 24-child preschool room to maximize occupancy.

-5- USO

The USO building will be a destination for recreation and support for military personnel at NSAB. The building is under design and the final program of the building is unknown. Existing concepts show the building with outdoor gathering spaces, a drop-off area and a small lot with six parking spaces. The location shown in Figure 5-2 is suggested, however the final location of this project is subject to change as the program is developed.

-6- Building 13 Renovation

Building 13 is currently underutilized as shops and storage. Renovation of this space will provide approximately 18,000 SF suitable for office or administrative space. An alternative option for this space may include a consolidation of Public Works Department (PWD) functions.



Navy Lodge Expansion
 Source: Navy Lodge Expansion Site Concept, prepared by NEXCOM, 2010

-7- Navy Lodge Expansion

The Navy Lodge has a planned expansion project which includes a new 7-story lodging structure (62,812 SF) to be constructed adjacent to the existing 6-story Navy Lodge (Building 52). Supporting facilities include new surface parking to serve the lodge addition, and improvements to the existing parking to meet current AT/FP standoff distances.

The existing storm water pond will need to be improved to accommodate the increase in impervious area.

The existing lodge provides 125 parking spaces. The total required parking after the expansion will be 185 spaces. Reconfigured surface parking will provide 95 spaces. Approximately 35 spaces within the adjacent "H" lot will be required to serve the lodge patrons. This project will require relocation of some of the existing Fisher House parking to the Multi-Use Parking Structure (MUPS).

-8- Rockville Pike Pedestrian Crossing

This project consists of a shallow pedestrian tunnel under Rockville Pike connecting the east side of Rockville Pike at South Wood Road to the Medical Center Metro Station. Designs also call for deep elevators on the east side of Rockville Pike that connect to the Metro platform.

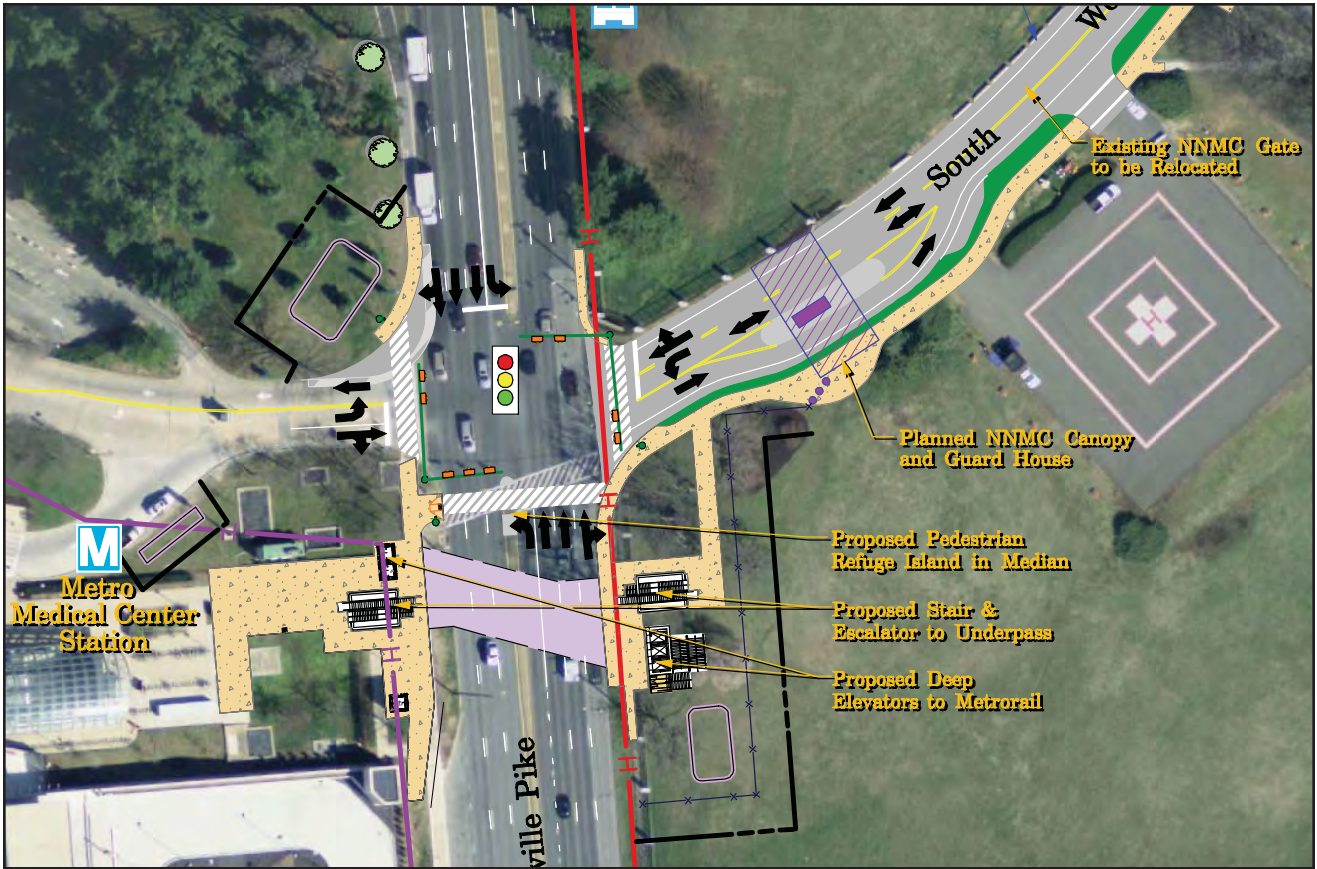
This project is included in this Master Plan for coordination purposes only. The Navy is not responsible for the project and it has a separate NEPA document.

-9- Helipad Renovation

The existing helipad will be reconfigured and expanded according to Option 3 in the NAVFAC Study Report dated 6 August 2010. The renovation will add 13,500 square feet of bituminous pavement and will require significant grading in order to level the new primary surface area. A new retaining wall will be required along South Palmer Road and numerous trees that penetrate the helipad's primary surfaces will need to be removed.

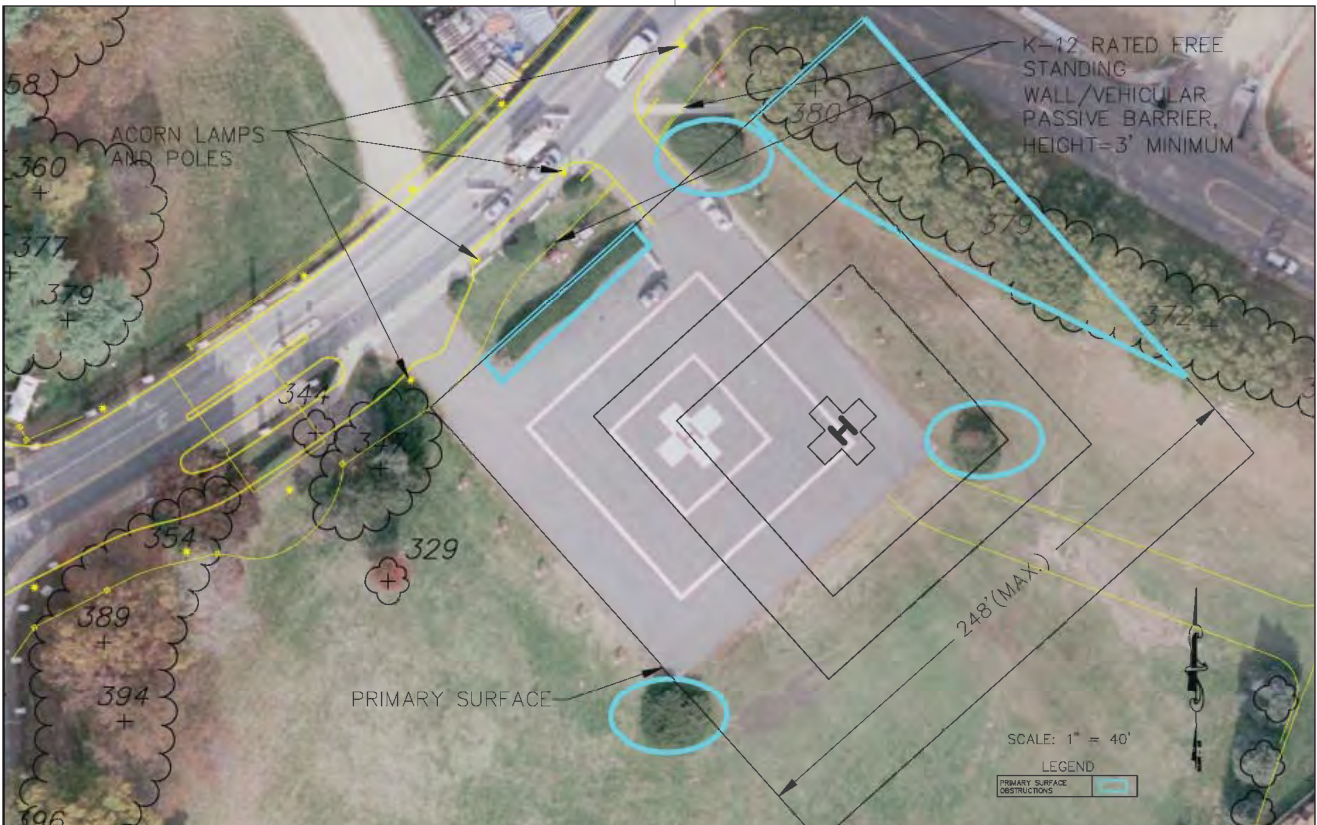
-10- Building 20 Renovation

The existing fire station located in Building 20 is proposed for relocation and expansion as current facilities do not meet the station's needs and requirements. Renovation of Building 20 is proposed for community uses such as woodworking shops, commissary services, or indoor recreation/social opportunities.



Rockville Pike Crossing Pedestrian Concept

Source: Montgomery County Department of Transportation, ARDS summary 9/24/2011



Helipad Renovation Concept

Source: NAVFAC Washington, plans by L.R. Kimball & Woods-Peacock Consultants

5.5.2 Long Term Opportunity Areas

Although not programmed, the following are long range opportunities for development based on current and projected requirements.

-11- Industrial/ Warehouse Area Redevelopment and Fire Station

The existing industrial and warehouse area is currently developed in a decentralized arrangement of modular warehouse buildings (each approximately 4,000 SF) and several other specialized buildings used for storage and some lab and administrative space.

Because of its relatively low density, accessibility via both North Palmer Road and Perimeter Road and lack of adjacent neighbors, this area presents an opportunity for more intense development and efficient use of land. By consolidating the warehouse space and outdoor storage area, additional land will be available for more intensive development of parking and administrative uses that do not require close proximity to the Medical Center.

Currently, nine warehouses (temporary admin space) provide approximately 36,000 SF of storage, the Armed Services Blood Bank Center occupies over 6,000 SF and the remainder of the buildings provide approximately 6,000 SF of additional space.

A new consolidated 40,000 SF warehouse facility would allow for the consolidation of existing warehouse space and could accommodate an anticipated need for an additional 2,000 SF of future growth. This warehouse should also provide space for storage relocated from Buildings 13 and 143 (See Figure 5-3).

Approximately 25,000 SF of outdoor storage area can be located north of the proposed PPV housing in the former Z-Lot. This outdoor storage would need to be appropriately screened from neighboring residents, and every attempt should be made to preserve existing vegetation along the edges of this area. Possible uses for this outdoor storage area are emergency and security equipment storage, emergency vehicle storage, blood bank and other tenant-special vehicle storage, and other typical maintenance uses. This area would replace the several smaller storage and laydown areas across the Installation.

Consolidation of the warehouse space would allow for the redevelopment of the area between Grounds Road and Stoney Creek as a hub for a new Fire Station, administrative functions, lab and offices for tenants that do not require close proximity to the Medical Center. The Fire Station building is projected to be a two-story, three company Firehouse that may accommodate up to 44 staff.

A new parking garage may be built on the north side of Grounds Road, as discussed in Section 5.5.3 that would provide required parking for administration and general parking for the Installation.

Regular shuttle access is strongly recommended to support a higher density of development in this area.

-12- Kiss and Ride

A Kiss and Ride facility would address several community and security issues related to transportation to NSAB.

- A kiss and ride outside the gates would allow car pool commuters to be dropped off near the Medical Center, without having to enter the secured perimeter of the Installation.
- This would allow northbound commuters on Rockville Pike to use a kiss and ride without having to make a left turn into the Metro station kiss and ride.
- This would also address a community concern leading to the desire for a kiss and ride facility.

There are two potential locations for this facility. The first is located south of the proposed Rockville Pike Pedestrian Crossing Project and the second location is southwest of the new NEX along Jones Bridge Road. One of these locations should be reserved for a future kiss and ride facility, if funded.

The kiss and ride is included in this Master Plan for coordination purposes only. The Navy is not responsible for the kiss and ride project and it will have a separate NEPA document.

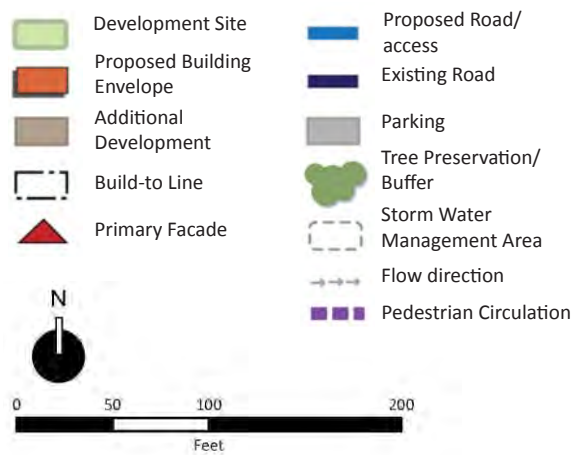
-13- Buildings 54 & 55

These garages are nearing the end of their useful life and require substantial annual investment and repair. As part of this long range plan, these buildings are recommended to be demolished and replaced. Replacement buildings should preserve the sky-bridge connections to Buildings 9 and 10 and should seek to implement additional connections to America Garage (Building 63) and the future Medical Center Building "C".

The demolition of Buildings 54 and 55 will remove 765 and 975 spaces from the available supply. Garage projects discussed in Section 5.5.3 can serve as swing space during the rebuilding of each garage. Because of this, it may be beneficial to redevelop Buildings 54 and 55 prior to other long range projects.



FIGURE 5-3 INDUSTRIAL/WAREHOUSE AREA RECONFIGURATION



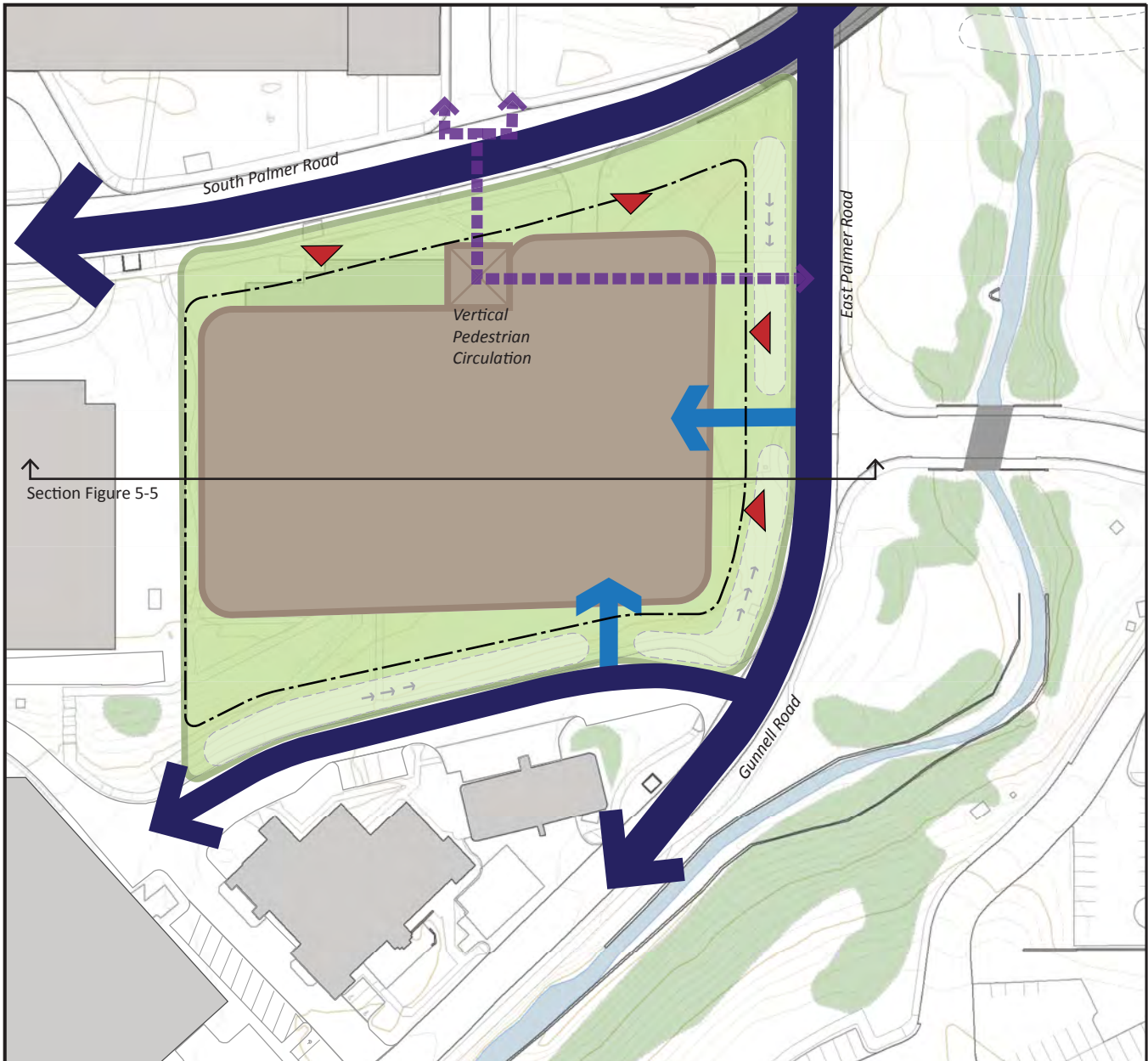
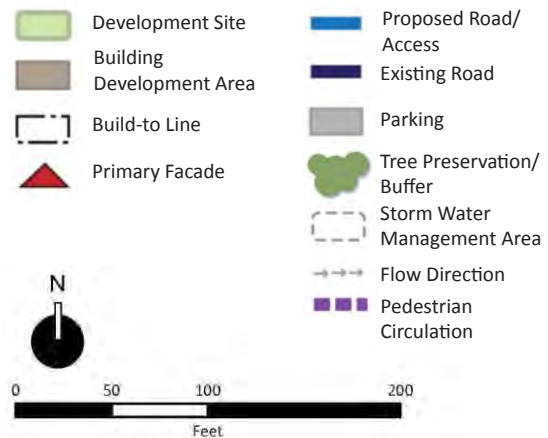


FIGURE 5-4 BUILDING 50 SITE CONCEPT DIAGRAM

-14- Building 50 Site

Building 50, Mercy Hall, is a residential building used for housing Wounded Warriors receiving care at the Medical Center. Although it was recently renovated, the building will be 50 years old in 2018 and is a candidate for redevelopment as a way to improve both the use of the site and the circulation through it.

This site is at a prominent location inside the main visitors gate. It is at the southern terminus of Brown Drive, which is the primary north-south pedestrian route through the core of the Installation. The site is also the western terminus of Stokes Road, the primary ADA accessible route through the southern portion of the campus (The grade of the bridge on



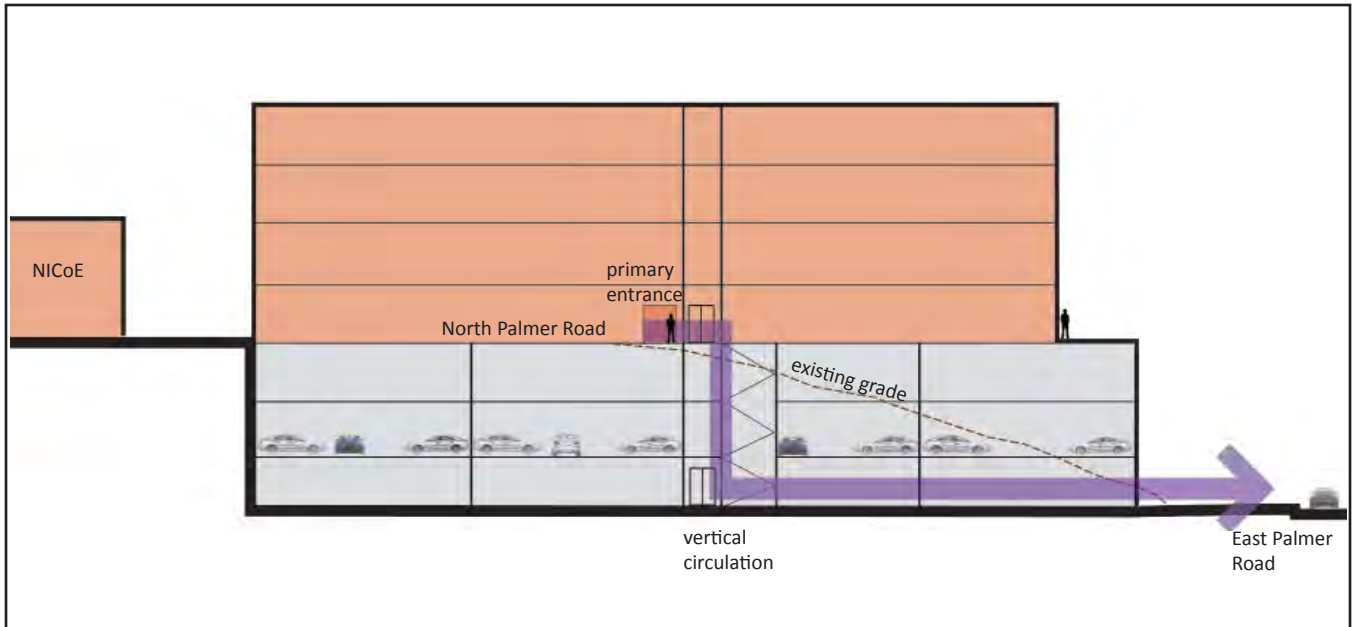


FIGURE 5-5 BUILDING 50 SITE SECTION

South Palmer Road is too steep to be considered an accessible route). The eastern edge of the site addresses Gunnell Road, the main thoroughfare for accessing the community support facilities in the southern part of the campus. There is approximately 30 feet of vertical drop across the site and paths through the site, rely on a series of stairs and ramps which are not the most desirable solutions for pedestrians, especially Wounded Warriors with mobility challenges.

The site of Building 50 is the nexus of the primary pedestrian routes connecting the residential uses of the north campus, through the Medical Center, to the community functions and visitor housing of the southern campus. Redevelopment of this site presents an opportunity to upgrade an aging building while improving the circulation along this primary pedestrian route (see Figure 5-4).

Programming of this site includes two to three levels of parking built into the slope and accessed from Gunnell Road and East Palmer Road. This orientation of vehicular access is convenient from Gate 3, East Palmer Road and Stokes Road. Vehicular north-south traffic on East Palmer Road would now be separated from the north-south pedestrian traffic along Brown Drive.

At upper levels, new lodging or mission support use will address South Palmer Road at ground level and be oriented to the Medical Center. Setbacks should be consistent with NICoE and architectural character should enhance the gateway effect created by NICoE and Building 10.

Vertical pedestrian circulation should be provided through the site with stairs, elevators, or other conveyance through the garage to connect Brown Drive to Stokes Road (see Figure 5-5). A mission support use such as medical expansion, may allow

for better vertical circulation for pedestrians. If developed as lodging, the sloped site allows for ground level access, perfect for universal accessibility to all areas of the building.

The program for this site is not yet fixed and may be developed as future requirements are known. Because this area is also near the hub of shuttle service, and the site is internal to the campus with no impact on neighbors or viewsheds to the tower, the intensity of development may be increased beyond that of the existing Building 50. By building parking into the slope, the facility may take advantage of more of the site area without increasing the overall height, conceivably doubling the facility to 100,000 SF of space. The site, however, is a significant open space that overlooks Stoney Creek across Gunnell Road, so this project should also provide usable green space and a connection to the recreational areas along Stoney Creek.

-15- Wounded Warrior Area Improvements

Several enhancements are proposed for the areas surrounding Building 60, 61, 62, and 11. These improvements are part of the Wounded Warrior Area Plan. The goal of this project to improve the quality of the outdoor environment for Wounded Warriors and their families by improving pedestrian safety and circulation, incorporating new outdoor amenities, and enhancing natural features.

-16- G-Lot Medical Expansion

There are several factors that make G-Lot a good opportunity for future development. As part of the construction for the new Medical Center Building C, the area will be used for temporary swing space for displaced tenants of buildings being demolished. This effort will require utilities to be provided to the site. G-Lot is also easily accessible to the North Gate and near the new in-patient medical uses and patient garage. Additionally, the site is currently covered with impervious surface.

Inherent in the definition of “World Class” is the ability to grow and incorporate new mission and technologies. The area of G-Lot provides an opportunity for future medical expansion that supports the goals of a world-class medical facility.

Constraints of this particular site include the visibility from Rockville Pike and the proximity to the neighboring school. This site is not located within the protected viewshed of the Building 1, however massing of new medical expansion should be carefully planned to be consistent with adjacent Building 19 and 61. On the neighboring school property, a parking lot currently occupies the space immediately adjacent to NSAB, however the design should be sensitive to potential impacts on the neighboring property.

To minimize the above ground building mass and to provide required parking and replacement of existing G-Lot parking, underground parking should be provided as part of any potential permanent development within G-Lot.

-17- Renovation of Existing Child Development Center for AT/FP compliance

Current AT/FP guidelines require occupied buildings using conventional construction to maintain a 148’ standoff from an installation’s controlled perimeter. The current CDC, (Building 26), does not meet this requirement. The proposed development that would increase the capacity of NSAB’s CDC system does not address this issue.

Approximately 7,200 SF of the existing CDC lies within the 148’ standoff area.

Several solutions may be recommended to address this problem:

- Reconfigure the space within the building so the portion of the building in violation of the required setback area is not occupied or is occupied at a very low level (i.e. convert to storage).
- Implement building hardening or landscape methods for mitigating potential threats to building occupants.
- Demolish and rebuild a new facility that meets the AT/FP requirements.
- Maintain the existing condition and re-evaluate the threat to the structure in the context of other potential local and regional targets.

-18- Satellite Pharmacy Relocation

The Satellite Pharmacy, currently located east of the Bowling Center off Stokes Road, is a small facility that has potential to be relocated in the long-term to free up valuable space for larger-scale development. The current Satellite Pharmacy building also does not meet the architectural standards of the IAP. A potential location for the pharmacy is along South Palmer Road adjacent to AFRR1.

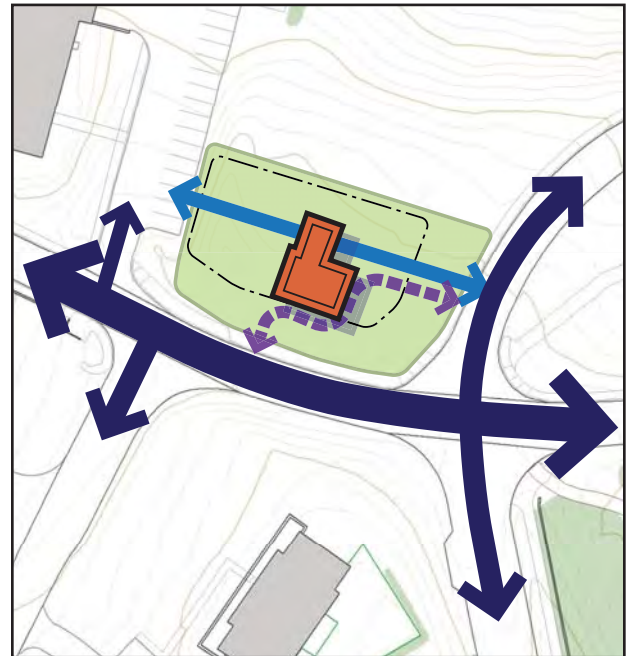


FIGURE 5-6 SATELLITE PHARMACY CONCEPT DIAGRAM



5.5.3 Parking Opportunities

Several opportunities for structured parking at NSAB will help provide parking necessary to support future development. As surface lots are developed as a combination of buildings and open space, the displaced parking and the new requirements need to be accommodated within structured parking. This can happen in several ways:

- Structured parking should be provided as part of new facility construction, preferably underground. This strategy introduces additional cost and AT/FP issues of locating vehicles in a garage under a building. However, this strategy provides the most efficient development of limited land at NSAB.
- Multi-use parking garages can be constructed, preferably in areas already covered with impervious surface, or as part of an effort to upgrade a less-efficiently developed area of the Installation.

In all cases, NSAB should strive to decrease the dependence on automobiles to access the campus through a variety of initiatives, including but not limited to:

- Promoting use of transit and carpooling by supporting infrastructure improvements and subsidies.
- Promoting the use of bicycles by investing in bike-friendly infrastructure, including bike racks and shower facilities in new and existing facilities.
- Support the increase in tele-work.
- Apply business strategies that reduce trips onto the campus, such as mail-order pharmacy service.

The following structured parking opportunities will help meet the parking demands of the proposed future development:

-19- H-Lot garage

A new parking garage with approximately 495 spaces in H-lot will provide accessible parking centralized within the southern half of the campus (see Figure 5-7). This garage may be up to six stories, which is consistent with the height of the adjacent Navy Lodge. This parking garage can fulfill the following requirements:

- 345 spaces for the new CDC and I-Lot parking displaced by CDC construction.
- 35 spaces in existing H-Lot required by the Navy Lodge expansion.
- 90 spaces displaced in H-Lot by the construction of the parking garage.

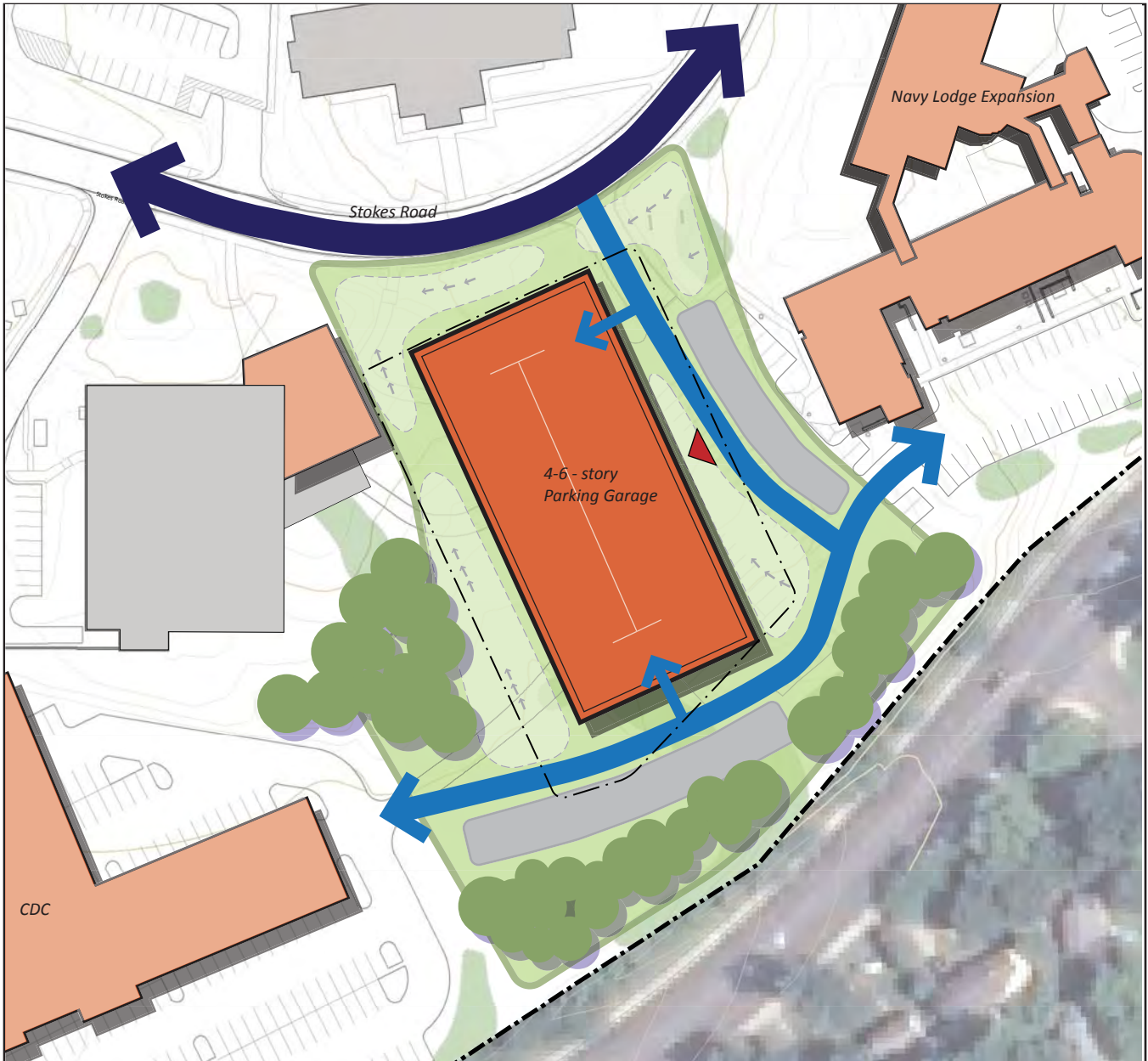


FIGURE 5-7 H LOT PARKING GARAGE CONCEPT DIAGRAM

Construction of this garage conflicts with the existing location for the Satellite Pharmacy. Options for the relocation of the Satellite Pharmacy include:

- Integrate the Satellite Pharmacy into the design of the parking structure and provide any required parking for the Satellite Pharmacy within the garage.
- Relocate the Satellite Pharmacy to the open area along South Palmer Road, east of AFRRRI. Provide required parking as an extension of the existing AFRRRI Parking lot east of Building 46.

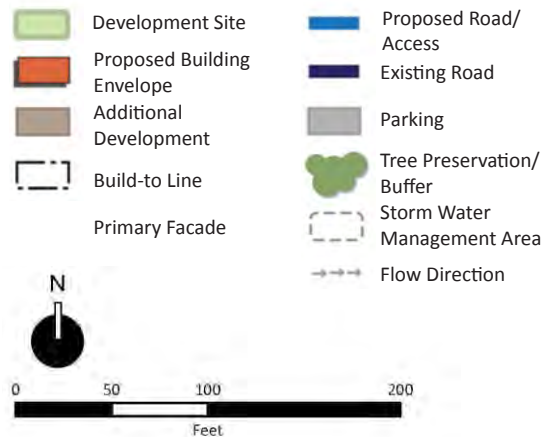




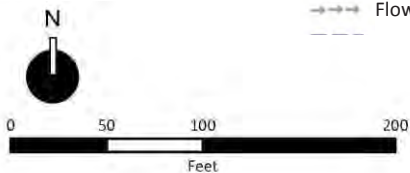
FIGURE 5-8 TAYLOR ROAD FACILITIES CONCEPT DIAGRAM

-20- Taylor Road Facilities

This site, currently occupied by Buildings 53, 28, 79, 59 and 69, is adjacent to the proposed Wounded Warrior Barracks (Sanctuary Hall) and its associated parking garage. This area is planned for an additional 3-story structure and potential utilities expansion (see Figure 5-8). Its size and scale should not exceed that of the garage and architectural character should have a vertical emphasis that complements the façade of Building 17. The structure could serve as a 300 space multi-use garage or as a standalone structure. Final type and use of structure is subject to change as program is developed.

This project requires the demolition of Buildings 53, 28, 79, 59 and 69.

- Development Site
- Proposed Building Envelope
- Additional Development
- Build-to Line
- Primary Facade
- Proposed Road/Access
- Existing Road
- Parking
- Tree Preservation/Buffer
- Storm Water Management Area
- Flow Direction



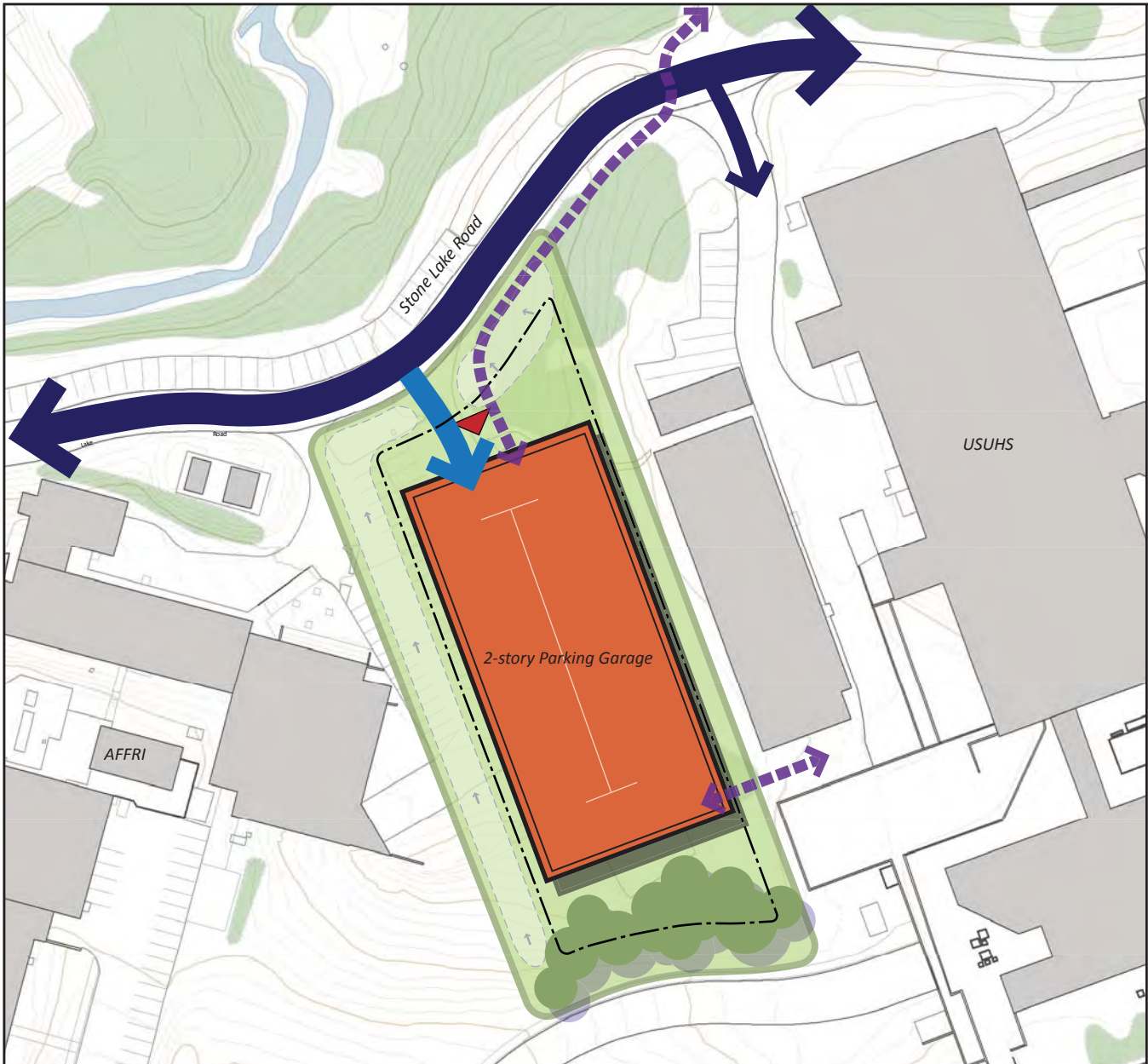
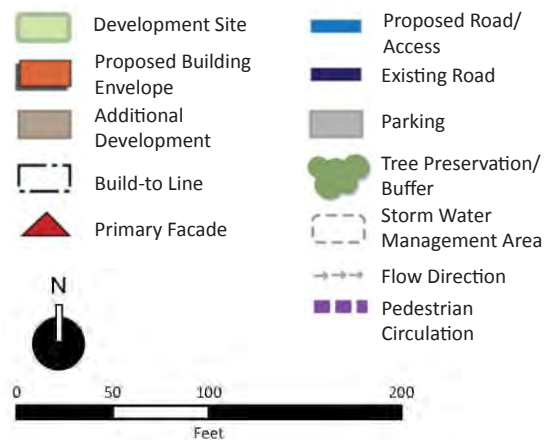


FIGURE 5-9 N LOT PARKING GARAGE CONCEPT DIAGRAM

-21- N-Lot Garage

The area of N-Lot, between AFRI and USUHS, presents an opportunity for structured parking that may be shared by both tenants and help to provide additional parking required by the construction of USUHS Building “F”. A garage in this location will also enhance pedestrian connections from the elevation of South Palmer Road and USUHS courtyards, to the lower elevation of Stone Lake Road and recreational trail access (see Figure 5-9).

A 200-space, two-level structure can provide additional parking, with the top level of parking at the ground elevation of Building 72.



This area has very low horizontal tolerance for fitting a parking garage while respecting AT/FP setbacks. Minimum 33-foot setbacks can be maintained, but Buildings 47, 74 and 75 will need to be evaluated and appropriate measures taken to mitigate the risk due to parking in such close proximity. The garage location may also have a negative impact on fire accessibility to the garage and to Buildings 47, 74 and 75.

Because Stone Lake Road is currently only accessible through the core utility area, it is strongly recommended that a second vehicular access to this garage be implemented as part of this project. The segment of Stone Lake Road which runs parallel to Building 76 should be reconstructed outside of the AT/FP setback area required for the building, allowing traffic from Stoney Lake Road to connect to the Perimeter Road near the recreational ballfields.

A taller garage may also allow an upper level exit to tie into the exit ramp from the existing USUHS garage to the south.

It should be noted that this project location is shared by another opportunity area for USUHS Building "F" (Option 2). The location selection for Building "F" will determine the feasibility of the N-Lot Garage.

-11- Industrial Area Garage

A 400-600 space garage may be included as part of the redevelopment of the Industrial/Warehouse area (Figure 5-3). A garage in this area is accessible to major vehicular routes through campus; North Palmer Road and Perimeter Road. This garage helps meet the following program:

- 141 spaces displaced as Z-Lot is developed as PPV housing and as part of the warehouse area reconfiguration.
- Meet the parking requirements of additional administrative support space within the reconfigured warehouse/industrial area.
- Swing space during the replacement of existing garages (Buildings 54 and 55).
- Multi-purpose parking to address parking shortfalls as revealed by a TMP (once completed).

The garage may be up to six-stories. It may be possible to increase the size of this garage, or decrease the height above ground by including levels below grade. The ultimate size will depend on the anticipated program requirements and the results of a traffic analysis in determining the impact of additional traffic in this area. Since roadways generally cannot be expanded on the campus, traffic considerations may be the largest constraint in setting the maximum size of this garage.

A conceptual layout of this parking garage is shown in the Industrial/Warehouse Area Redevelopment and Fire Station Concept Diagram (Figure 5-3).

5.5.4 Utility and Infrastructure Improvements

To support future development, NSAB requires significant upgrades and capacity increases to the existing utility systems. Proposed projects are shown on Figure 5-10. Several utility studies are underway and the recommendations of each should be considered and incorporated into this Master Plan. In general, utilities and infrastructure improvements shall precede the development that they will support. See Section 5.7 for more information about phasing of projects with respect to utilities.

Utility Improvements

The following utility improvements have been proposed as priority projects to accommodate the increased demand due to short range construction projects. These utilities projects are expected to meet the capacity requirements for projects up to and including fiscal year 2013.

- WRNMMCB Building “C” and associated parking garage (minus the load associated with demolished Buildings 2,4,6,7 and 8)
- Sanctuary Hall (Building 64) and associated parking garage.
- Navy Lodge Expansion
- New CDC, drop-off center and 24/7 care center

Other projects proposed in this Master Plan, such as USUHS Building “F”, the USO, PPV Housing and renovation or construction of other buildings not listed above will result in additional capacity requirements above and beyond those provided in the proposed utility projects. Additional areas for potential utility expansion are discussed later.

-U1- Cooling Tower Upgrade

This project consists of rebuilding the three existing cooling towers and adding one new cell to Building 16. The existing three cooling towers will be demolished and rebuilt to provide a total 39,000 gpm capacity. These towers will be built on top of the existing concrete foundation structure. A fourth concrete foundation and tower will be constructed north of the existing Building 252 to provide an additional 13,000 gpm capacity.

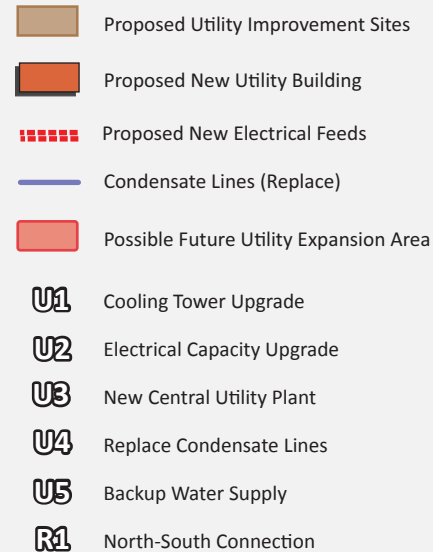
-U2- Electrical Capacity Upgrade

This project consists of adding new electric feeders from the Woodmont substation (located across Rockville Pike) to vault 243 (between Buildings 1 and 9) with the potential for capacity upgrades by PEPCO at the Woodmont substation.

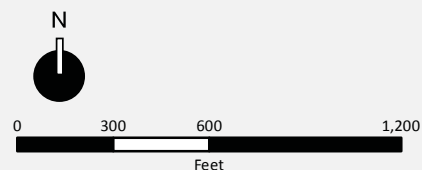
Additional capacity from the Woodmont substation would require off-Base improvements by PEPCO. While this is not within the scope of this plan, these capacity improvements will be necessary as part of the overall capacity upgrades for the Installation.

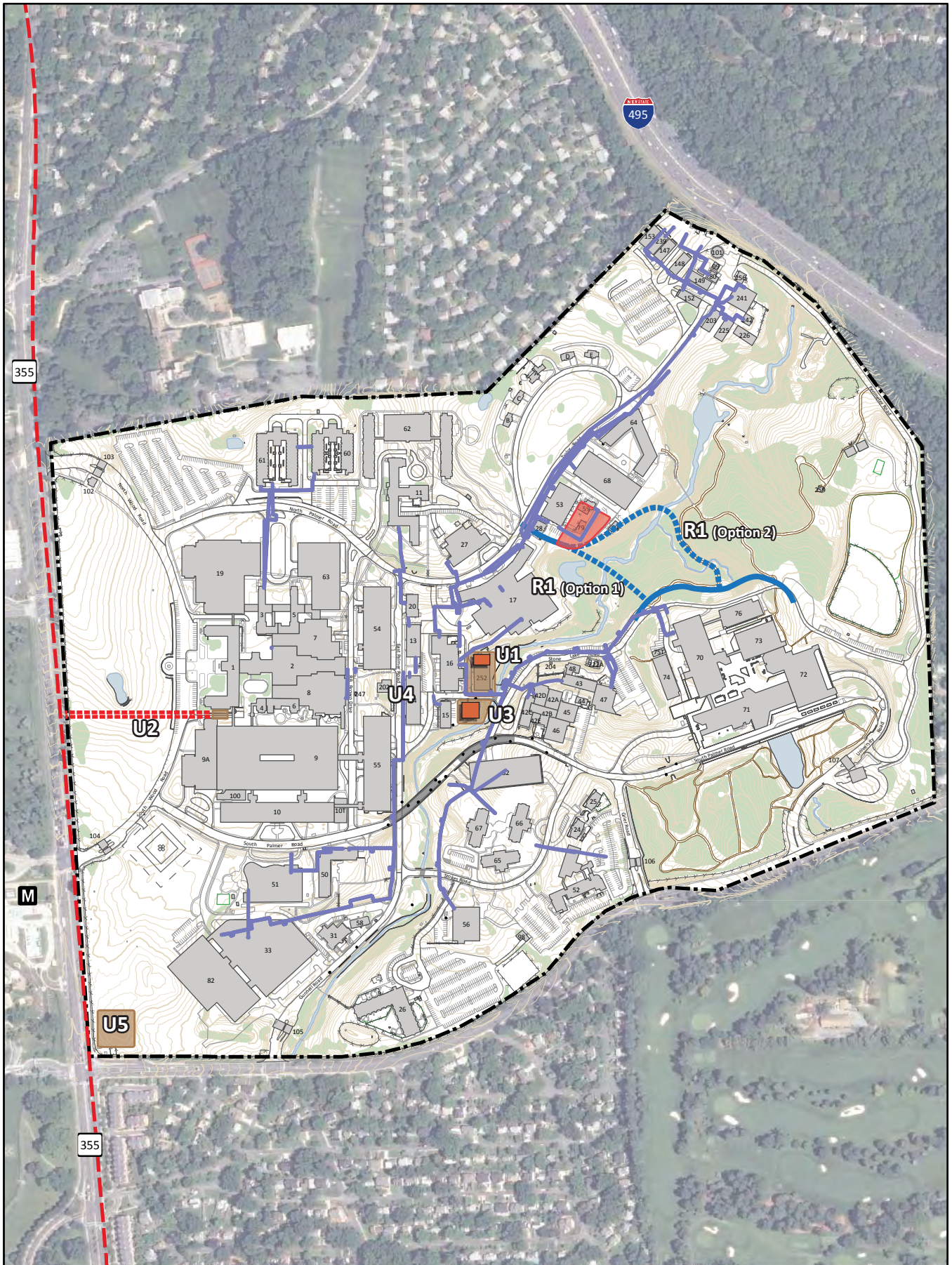
Power distribution to the Medical Center, CDC, Sanctuary Hall and other projects will be installed as necessary.

FIGURE 5-10 FUTURE UTILITIES AND INFRASTRUCTURE DEVELOPMENT PLAN



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009





-U3- New Central Utility Plant

This project consists of the construction of a new two-story 13,000 GSF building in the area of existing Building 143. This new building will house two new electric chillers, each with a capacity of approximately 1,400 tons. The new utility building will also house standby generators to support the chillers for the critical area chilled water.

A 24-inch condenser water piping connection will be installed connecting the new building to the existing cooling tower. A cross tie of 20-inch chilled water supply and return piping will be provided between the existing power plant (Building 16) and the new chilled water plant to provide flexibility in operation. Other piping improvements and fuel oil storage will be included as necessary.

Final chiller capacity of the connected load is expected to be 12,300 tons as a result of construction through 2013.

This project requires the demolition of Building 143, an approximately 2,000 SF storage building. Storage will be relocated to the warehouse area.

-U4- Replace condensate return lines

NSAB uses a central steam plant system. This project is an Installation-wide replacement of deteriorating condensate return lines. This includes condensate lines which are direct-buried, as well as lines within tunnels.

Existing present maximum load equals about 120,000 lbs/hr. The final capacity of connected load in 2013 is anticipated to be 160,000 lbs/hr, which is within the existing maximum capacity of 300,000 lbs/hr. No expansion is currently planned, however capacity of future construction beyond 2013 should be evaluated.

-U5- Backup Water Supply

This project consists of a 200,000 gallon reservoir to provide a backup water supply for the chillers and cooling towers in the case of a disruption in municipal supply. This backup supply will be provided with four 50,000 gallon carbon coated steel water storage tanks. Located underground, these tanks will be located at the southwest corner of the Installation near the intersection of Jones Bridge Road and Rockville Pike.

Additional utilities infrastructure improvements

These projects include upgrades to Installation infrastructure that are not necessarily related to expanding capacity for anticipated construction. These improvements represent technology updates and efficiency improvements that increase the overall sustainability of operations.

- Replace existing analog building system controls with a DDC system.
- IT infrastructure improvements: Install a new backbone/ring.
- Install additional substations in the new central utility plant.
- Add plate and frame heat exchangers to provide more energy efficient winter chilled water operation.
- Reconnect water line that was removed during the demolition of Building 12 (south of the current NICoE building). Replacement of this line will increase the pressure and capacity in this area.
- Install Reverse Pressure Backflow Preventer for AFRR Complex.
- Implement the recommendations of the ongoing study of potable water and sanitary sewer systems when completed. This study will identify aging water lines in need of repair or replacement, and manholes and sewer line segments with structural deficiencies which will need to be addressed.
- Potentially add a new water supply connection from Jones Bridge Road in the area of the proposed CDC (near Building 26). This connection, if implemented, would increase the overall capacity of the system.
- Potentially add a new electrical feeder from Jones Bridge Road in the area of the proposed CDC (near Building 26). This connection, if implemented, would increase the overall capacity of the system.
- Conduct a study to confirm the capacity of the sanitary sewer system with WSSC. The study should develop recommendations for any needed system improvements to accommodate future development.

Road Improvements

-R1- Proposed North-South Connection

It is recommended that an additional north-south road be constructed, bridging Stoney Creek, to connect North Palmer Road and Stone Lake Road. This road connection will alleviate existing circulation issues, including bottlenecks and dead ends. In addition, this connection will also provide:

- A second means of egress from the MUPS, AFRR1 and USUHS without going through the central utility area.
- A direct pedestrian connection between the recreation areas and the housing area (Buildings 60, 61 & 62 and Sanctuary Hall)

There are two proposed options for north-south road connections. Both would tie into North Palmer Road where Building 28 is located. The first option would take a more direct south route crossing Stoney Creek, while the second option curves to the east and then crosses Stoney Creek near an existing pedestrian bridge.

These proposed connections also have various stream crossing and archaeological constraints which would need to be addressed prior to implementation.

A proposed "Center" connection is proposed for both options and rebuilds Stone Lake Road at a greater distance from the Nursing School building, re-establishing the east-west vehicle connection on the north side of USUHS. This connection would have the benefit of allowing truck loading access to USUHS without passing through the congested utility area at the center of campus. Construction of this road will have significant impacts on potential wetlands and woodland areas.

5.5.5 Recreation and Open Space Improvements

The preservation and enhancement of recreation and open space is essential to the success of the Master Plan. Recreational spaces, whether active or passive, promote health and fitness, provide active duty personnel opportunities to meet their physical training requirements, and foster a sense of shared community space that builds cohesion and pride among groups. Open space contributes to the organizational framework of the Installation as buffers between incompatible uses, as focal areas among related structures, and as iconic landscapes that help shape the identity of the Installation. Integration of green open spaces into the infrastructure and building systems can have positive functional benefits such as reducing polluting runoff through storm water management and infiltration, and reducing energy use of buildings with green roofs. Access to natural spaces and recreational activities is a key component of the vision of NSAB as a healing environment.

The Recreation and Open Space Development Plan (Figure 5-11) provides a framework for major programmed improvements in areas dedicated these functions. Many opportunities exist for integrating recreation and open space in areas outside of those highlighted in Figure 5-10, and this plan should not be construed to restrict the inclusion of these spaces in other areas. Guidance for integrating recreation and open space into all areas of the Installation can be found in Chapter 6.

IAP Improvement Projects

A series of open space improvements are defined in the Installation Appearance Plan (IAP). These improvements primarily address aesthetic and functional enhancements for high-profile areas of the Installation. These projects include improvements to the landscape, improved access to open space areas, and in some cases, additional furnishing and programming within open space areas. Reference the IAP for further information on the concept and intent of these projects.

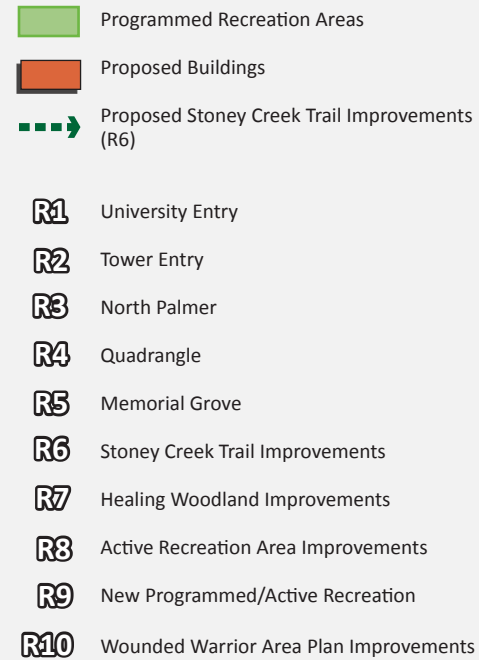
-R1- University Entry Project

- Landscape improvements to the University’s main entrance.
- Consideration should also be given for improved accessibility of the recreational trails in this area to connect the new Perimeter Road trail to the recreational trails south of South Palmer Road.

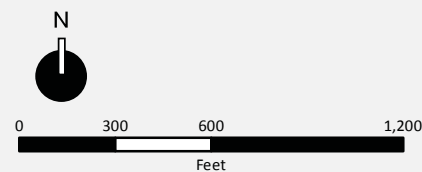
-R2- Tower Entry

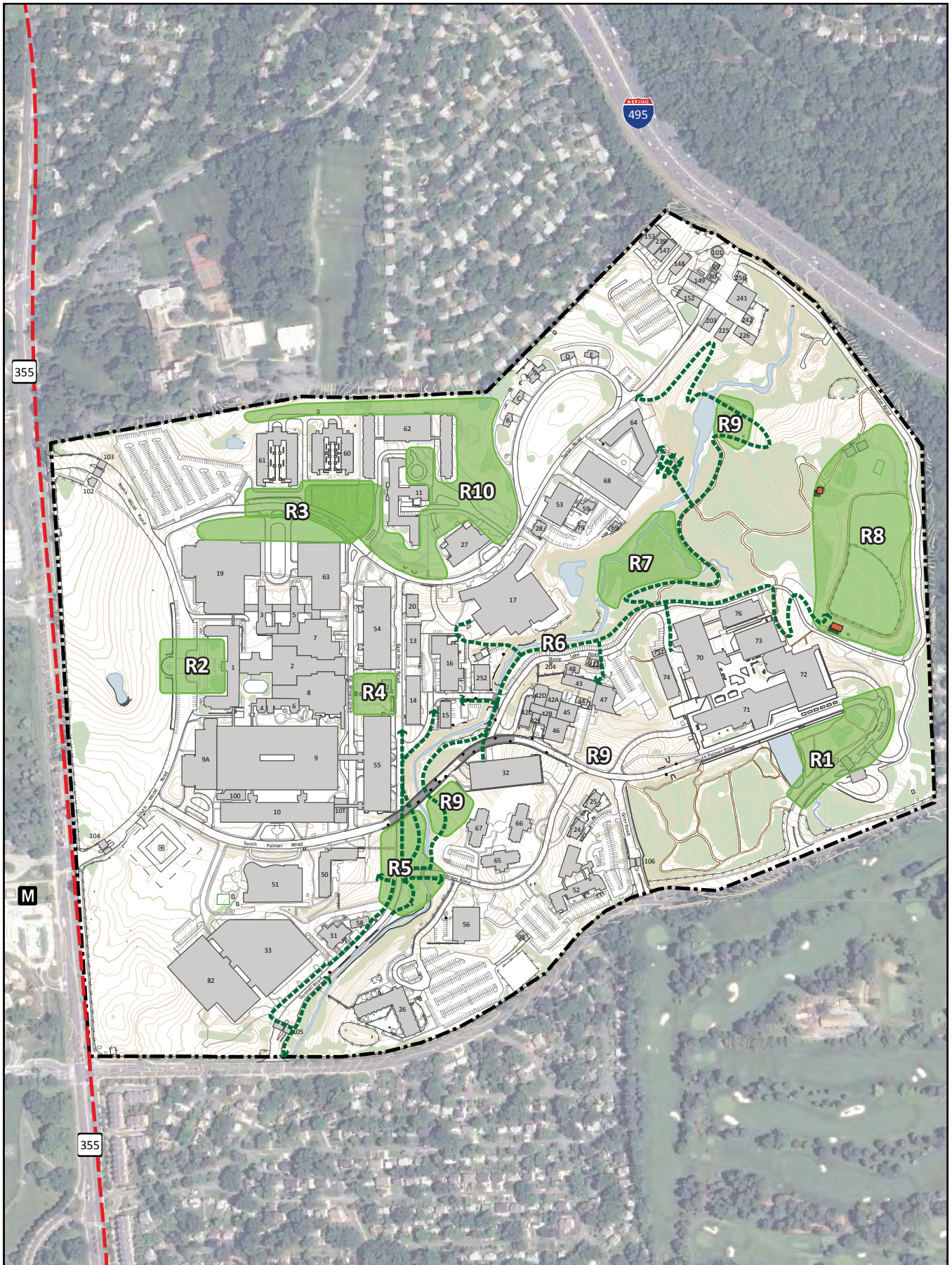
- Landscape, paving, and site furnishings improvements to the flagpole and entrance plaza to Building 1.
- The flagpole and Building 1 are contributing elements to the Historic District of NSAB; refer to the Secretary of the Interior’s Standards for Rehabilitating Historic Buildings for additional guidance.

FIGURE 5-11 RECREATION AND OPEN SPACE DEVELOPMENT PLAN



Sources: NAVFAC Washington Update, 2010
 PBS&J, 2011
 DC GIS, 2007
 USDA-FSA-APFO NAIP, 2009







Quadrangle Conceptual Site Plan
Source: 2010 Installation Appearance Plan



Memorial Grove Conceptual Site Plan
Source: 2010 Installation Appearance Plan

-R3- North Palmer

- Landscape improvements as defined in the IAP.
- This area is also a targeted project in the 2011 NSAB Accessibility Plan. Pedestrian connections shall be implemented as defined in the Accessibility Plan.

-R4- Quadrangle

- This project proposes to create a green plaza accessible from Brown Drive through a series of retaining walls, fill and green roofs over Building 202, as described in the IAP.
- This area is included in a targeted project in the 2011 Accessibility Plan. Design of the plaza should incorporate the intent of accessibility improvements defined in the Accessibility Plan.

-R5- Memorial Grove

- Landscape improvements, open space programming, trail improvements, and a focal pavilion as described in the IAP.
- Circulation in this area shall include accessible connections between the Stoney Creek trail system and ADA accessible routes to South Palmer Road/Brown Drive and Stokes Road.

Other Recreational Improvement Projects

In addition to open space improvements described in the IAP, the following improvements are proposed for dedicated recreational areas.

-R6- Stoney Creek Trail Improvements

- Integrate existing trails and activity nodes in the eastern half of the Installation (including the new USO Building, Sanctuary Hall, Building 17 and USUHS), with a new trail system along Stoney Creek.
- Refer to the 2011 Accessibility Plan for proposed alignments for accessible trails within the stream valley corridor.

-R7- Healing Woodland

- Passive recreational area at the heart of the campus focused on restorative spaces and landscapes.
- Possible location for memorial or remembrance sites and elements.

-R8- Active Recreation Area Improvements

- Amenities will include restroom facilities , accessible parking, new lighting, fitness trail upgrades and sport courts.
- Suggested program elements include additional sport courts (tennis, basketball) at the north end of the site.
- Hard surface courts, restrooms, trails and parking shall be universally accessible.

-R9- New Programmed/Active Recreation Areas

- Three areas have been identified for additional programmed or active recreational use.
- Refer to Chapter 6 for guidelines for potential uses.

-R10- Wounded Warrior Area Plan Improvements

- Proposed outdoor enhancements include:
 - Passive and active recreation spaces
 - Outdoor eating areas and activity/social nodes
 - Water features, plantings, street trees and outdoor artwork
 - Enhanced pedestrian connections

5.6 Demolition

The following buildings are to be demolished as part of the development projects proposed in this Master Plan. A total of approximately 1.49 million GSF of building space has been identified for demolition.

TABLE 5-2 POTENTIAL DEMOLITION LIST

Bldg. No.	Facility Name	SQ FT	Primary Use	Physical Quality Rating	Construction Type
2	EXCHANGE / MWR FOOD SVC	11,0614	74004	72	PERM
4	PHOTOGRAPHIC BUILDING	13,445	14160	59	PERM
6	PHOTOGRAPHIC BUILDING	17,400	14160	85	PERM
7	MEDICAL CENTER	83,575	51011	40	PERM
8	MEDICAL CENTER	94,839	51011	78	PERM
28	ADMINISTRATIVE OFFICE	5,796	61010	96	PERM
50	BEQ E1/E4	49,896	72111	98	PERM
53	ENVIRONMENTAL HEALTH EFFECTS	35,209	31027	92	PERM
54	PARKING BUILDING	3,30,040	73080	89	PERM
55	PARKING BUILDING	386,107	73080	80	PERM
59	USUHS ENVIRONMENTAL LABORATORY	5,036	31027	92	PERM
69	ANIMAL APPLICATIONS LAB	1,344	31029	64	SEMI
79	USUHS ENVIRONMENTAL LABORATORY	960	31027	84	SEMI
80	PUBLIC WORKS SHOP	1,064	21910	100	PERM
99	FILLING STATION	1,023	12310	82	PERM
101	PAVMT/GRNDS EQUIP SHED	1,962	21920	100	SEMI
141	ADMINISTRATIVE OFFICE	42,063	61010	74	SEMI
143	PW MAINTENANCE STORAGE	1,848	21977	84	SEMI
147	GENERAL PURP WAREHOUSE	4,000	44110	0	SEMI
148	GENERAL PURP WAREHOUSE	4,040	44110	58	SEMI
149	PAVMT/GRDS EQUIP SHED	4,040	21920	0	SEMI
152	GENERAL PURP WAREHOUSE	4,000	44110	47	SEMI
153	GENERAL PURP WAREHOUSE	4,000	44110	0	SEMI
203	RDT&E STORAGE LAB	4,000	31915	52	SEMI
225	PAVMT/GRNDS EQUIP SHED	4,040	21920	72	TEMP
226	MISC STORAGE FACILITY	4,000			SEMI
239	GENERAL PURP WAREHOUSE	4,000	44110	0	PERM
241	MEDICAL LABORATORY	9,500	53020	88	SEMI
242	MWR READY STOR	1,600	74077	75	SEMI
256	HAZARDOUS WSTE STOR & TRNSFR	1,169	83141	100	SEMI

5.7 Phasing

There are several factors which influence the phased implementation of this Master Plan. Perhaps most restrictive is the available electrical capacity. The availability of land for construction and parking are also limiting factors which will be addressed in this section. A detailed phasing of each project will evolve as program requirements are developed. In general there are three phases within this Plan.

The first phase includes several building and utility projects to improve the operations of NSAB following the completion of BRAC projects. These projects are currently in planning stages. Information regarding these projects is derived from a MILCON 1391 in progress, which anticipates the development through FY2013:

- Cooling Tower Upgrade (U1)
- Electrical Capacity Upgrade (U2)
- New Central Utility Plant (U3)
- Condensate Line Replacement (U4)
- Backup Water Supply (U5)
- New WRNMMCB Medical Facility Building “C”
- CDC Additions
- New Sanctuary Hall and Garage

The utility upgrades proposed as part of this phase are adequate to accommodate the new loads from BRAC-related construction and proposed development projects of this phase. However, the utility upgrades do not necessarily meet the needs of additional development projects proposed in this Master Plan. Additional capacity studies need to be completed and additional utility upgrades will be needed for future phases.

The timing of the next phase will be limited by the expansion of utility capacity at NSAB. Additional electrical capacity will likely be required for any development projects resulting in a net increase in demand. Total power consumption for facilities fed via Vault 243 is projected to be 38.6MVA after considering the existing (post-BRAC construction) conditions, the new

WRNMMCB Building “C”, Sanctuary Hall, and the new CDC buildings. The four new feeders proposed will double the available capacity to the site, with a normal capacity of 52MVA of six feeders before the required de-rating defined by PEPCO. (Source: MILCON 1391 documentation by HDR Architecture, 23 November 2010)

The second phase includes projects which are also in design or being considered for construction in the short term, but which are not considered in the first phase utility projects. These projects include:

- New USUHS Building “F” and Garage
- New USO
- Navy Lodge Expansion
- Helipad Expansion
- Public Private Venture (PPV) Housing
- Parking for CDC additions

These projects may require additional utility capacity studies to be completed before the final program and schedule can be determined.

The remainder of projects included in this master plan are longer term projects that are being considered as the need for renovation arises, or as funding or land becomes available. Detailed phasing of these projects is not determined, however the implementation of these projects should follow a general pattern that installs utilities needed to service the projects first. Second, the parking required for the final facility should be planned and provided, as well as any temporary facilities needed to offset displaced facilities during construction. Finally, the facility will be built.

This general timeline for development favors advanced planning of utilities and transportation solutions that combine the projected needs of several projects, and take an Installation-wide view of these systems.



6.0 Development Guidelines

This chapter includes general recommendations aimed at providing a consistent character with respect to campus development as NSAB continues to evolve. Future development of the campus should be aligned with the fundamental goals of the Master Plan. Although some flexibility is necessary in order to implement the Master Plan, the concepts, guidelines, and standards set forth in these Development Guidelines should be considered for all proposed projects and campus maintenance programs. These guidelines recognize the historic prominence of the campus and aim to reconcile those principles with emerging needs while maintaining the character and integrity of the Installation.

The section begins by establishing general framework plans directing building organization, massing and character; circulation, and the placement of site elements for future development. These framework plans are organized in the following categories:

- Building Siting
- Pedestrian Circulation
- Vehicle Circulation
- Signage
- Lighting
- Landscape

This section also includes specific guidelines and development criteria for landscape treatments and the siting of specific recreation types throughout the Installation.

6.1 Reference Documents

There are several internal Navy guidance documents which shape the planning and development of NSAB. The following documents provide specific guidance, details and standards for the development outlined within this Master Plan. These documents include the Integrated Cultural Resources Master Plan (ICRMP) updated in 2009, the NSAB Accessibility Plan completed in 2011, the Installation Appearance Plan (IAP) completed in 2010, and the NSAB Baseline Health Impact Assessment (in progress).

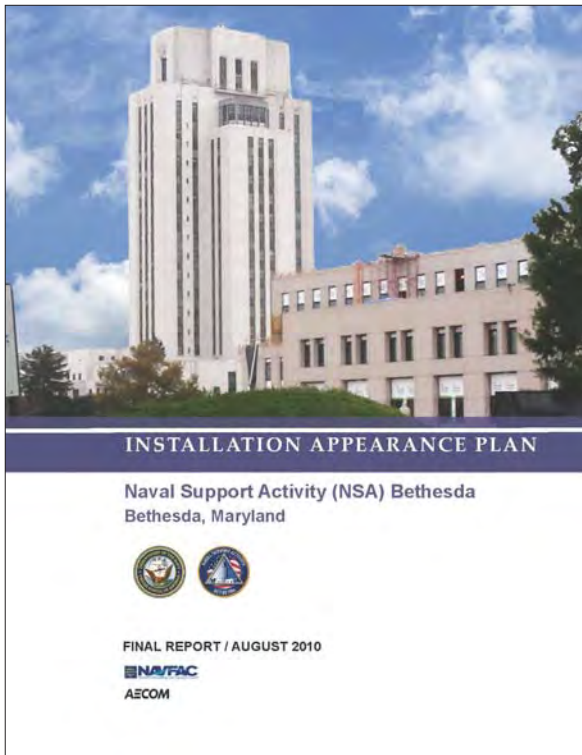
Installation Appearance Plan (IAP)

The IAP provides direction and guidance for designing, developing, and reviewing all physical development (including new construction as well as exterior renovation) at NSAB. The IAP document serves as a resource for planners, architects, landscape architects, and other key personnel as they undertake projects that shape the appearance of the Installation. The IAP contains specific guidance regarding site planning, architecture, landscape architecture (including planting, street furniture and lighting), and signage. The IAP also includes recommended sustainable design strategies and guidance for the integration of sustainable design elements into proposed projects. The IAP presents these sustainable strategies in the context of green rating systems, such as LEED and the sustainable sites initiative.

The IAP supercedes the Base Exterior Architecture Plan (BEAP) which was completed prior to the IAP and, much like the IAP, contains similar recommendations for the beautification of the Installation. Since the IAP is the more current plan and has more detailed recommendations, the IAP shall be used for design guidance at NSAB.

Integrated Cultural Resources Management Plan (ICRMP)

The ICRMP is a compliance and management plan that outlines how the Installation will manage its cultural resources as a part of the basic framework of its operations and missions. It identifies internal processes that may affect cultural resources at NSAB. It recommends strategies for maintaining the resources and complying with Navy, DoD and federal policies. The ICRMP contains treatment norms for the inventory of historic structures.



NSAB Accessibility Plan

The Accessibility Plan serves as a tool that NSAB can use to improve accessibility and life-safety in the exterior environments of the Installation. The Accessibility Plan establishes primary and secondary accessible routes and recommends accessibility improvements along these routes. These recommendations can be met by minor design changes to currently planned projects, appropriate short-term modifications, and longer-term concepts that can be implemented as part of major facility construction projects.

The Accessibility Plan also provides specific guidance for design elements along accessible routes. This includes details of paving, detectable warnings, curb ramps, stairs, ramps, railings, furniture, signage and lighting. Design strategies are also provided for creating a universally accessible environment that goes above and beyond the minimum required ADA facilities. The Accessibility Plan describes strategies for implementing wayfinding signage and signals that accommodate users with vision, hearing and cognitive impairments.

NSAB Baseline Health Impact Assessment

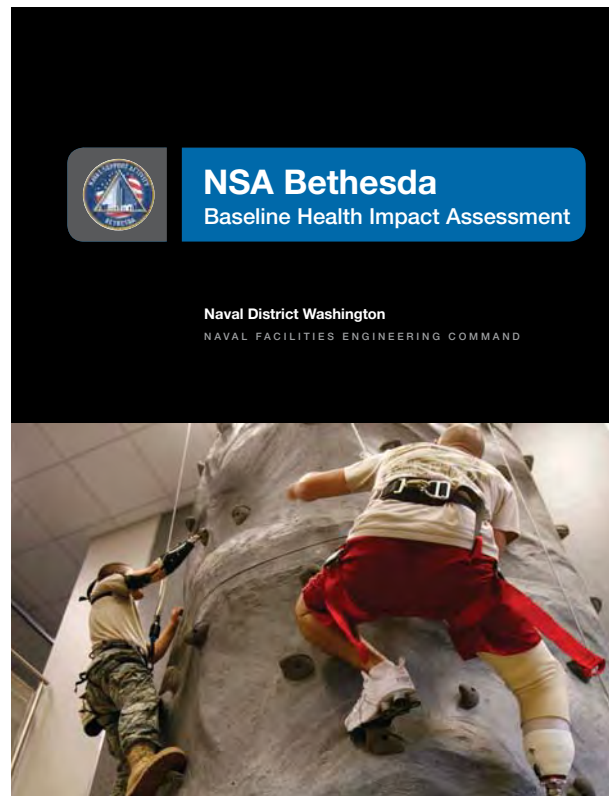
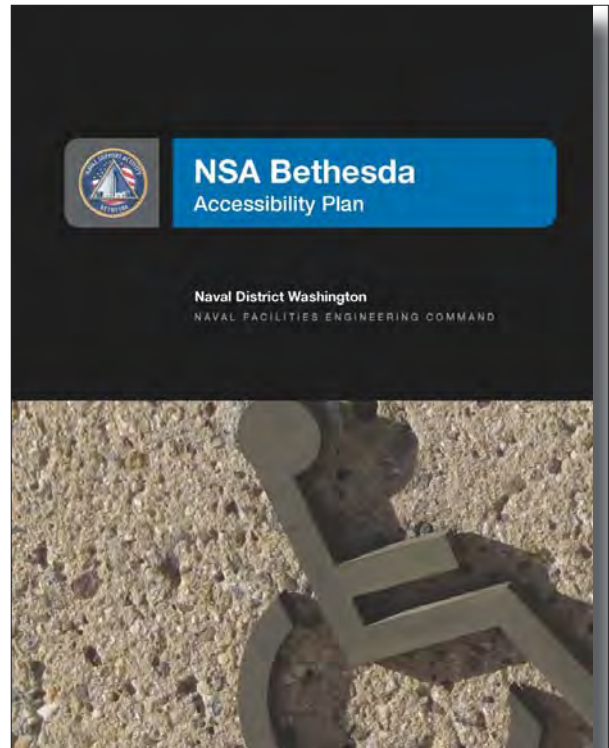
The study examines human health impacts of the NSAB built environment and provides alternatives to reduce negative impacts and promote improved health and well-being for the Installation community. The assessment evaluates six areas that impacts human health: Physical Activity, Food Options, Mental Health, Social Capital, Safety, and Accessibility. The evaluation also includes a Health Capital Improvement Program that identifies projects to be expected over a short and long term time frame. These projects should be considered and incorporated with future development planning within this Master Plan.

This assessment also provides a broad framework of goals and objectives to direct future development planning. These goals should be integrated within the initial steps of planning, built into a process that will ultimately set the stage for all future development.

The Baseline Health Impact Assessment is currently in the process of completion.

Incorporation of Reference Documents

With regard to design issues of accessibility, and for construction details for paving, curb ramps, crosswalks, wayfinding and other design elements along accessible routes, the recommendations of the Accessibility Plan shall be followed. The vision of NSAB as an accessible, healing community depends on the consistent and thorough implementation of the recommendations of the Accessibility Plan. If there is a discrepancy between the recommendations of the Accessibility Plan and the IAP, the intent of the Accessibility Plan shall be implemented.



6.2 Installation Framework Plans

6.2.1 Building and Siting Framework

This section describes the Installation-wide framework regarding the relationship of buildings to roadways and buffers. This section also outlines the general massing and height criteria for the campus.

The setback and height diagrams are intended to present a unified approach to the placement of buildings at NSAB. Site plans for development projects will each respond to the site specific conditions, with guidance from the IAP regarding building placement, parking, and site circulation, and with additional direction given by the Accessibility Plan.

Setbacks

Primary Building Setbacks

Figure 6-1 shows the primary building setbacks for new buildings at NSAB. These setbacks are based on DoD AT/FP guidelines. They aim to provide an efficient use of land, a consistent urban form, and to preserve the quality of open space surrounding buildings.

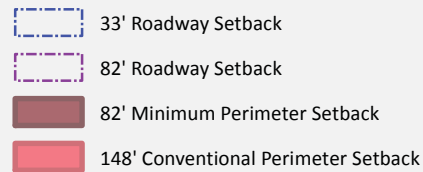
For some areas the plan assumes that building design will incorporate security measures that allow for a reduction of the setback distance below that of conventional construction. Individual standoff requirements of any particular building should be evaluated on a case-by-case basis to determine AT/FP compliance. While AT/FP criteria prevails, certain areas have alternate setback distances proposed based on the siting or existing structures and the likelihood that no new development will encroach into these areas. The primary setbacks are listed below:

- 33' to 82' setback from internal roadways.
- 82'+ from internal roadways for monumental or prominent institutional buildings.
- 82' setback from the secure perimeter for inhabited buildings; 148' setback for primary gathering buildings.

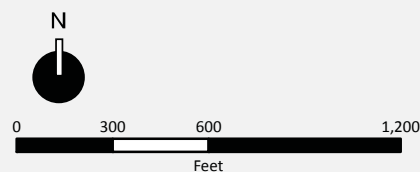
Future development should be mindful of open space surrounding existing and proposed structures. Care should be taken in the planning and design of spaces created by setbacks as to the degree of enclosure with respect to the location of open space on campus. More densely developed areas at the campus core should have an urban courtyard feeling. Spaces opening onto campus perimeter areas should feature a series of spaces that gradually open to larger areas thereby mediating the change in scale to off-property areas. Programmed spaces such as pedestrian avenues and courtyards should be planned to balance shaded areas for use during warmer months with open areas that allow for plenty of natural light to enter adjacent buildings.

It should be noted that the "historic viewshed" located in front of Building 1 shall not be encroached upon and serves as a formal foreground to NSAB.

FIGURE 6-1 MAJOR BUILDING SETBACKS



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





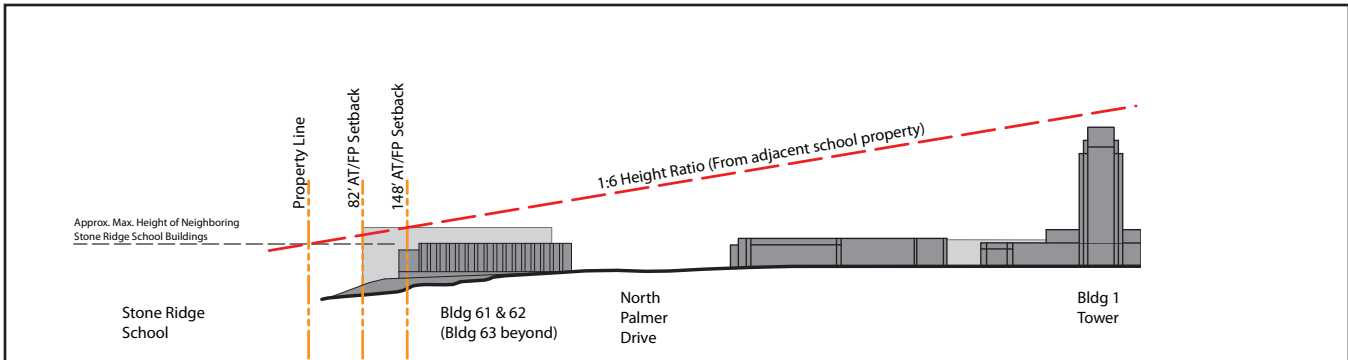


FIGURE 6-3 SECTION A-RECOMMENDED BUILDING ENVELOPE FOR NORTHWEST CAMPUS AREA- VIEW TOWARD EAST

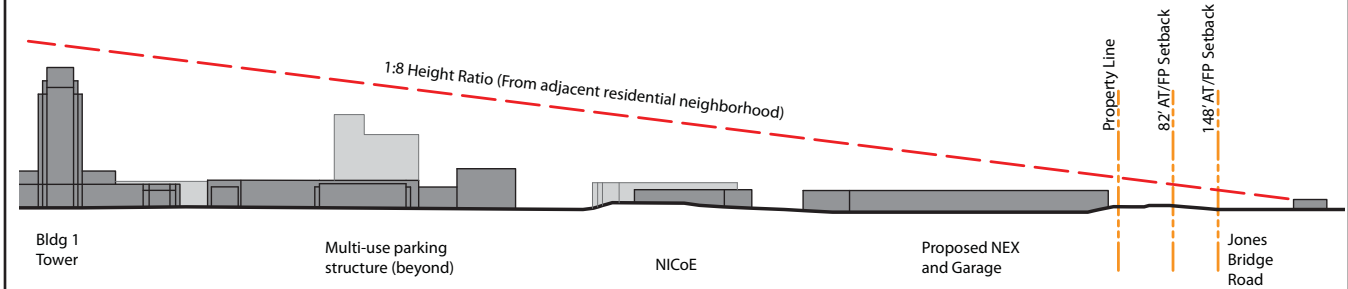


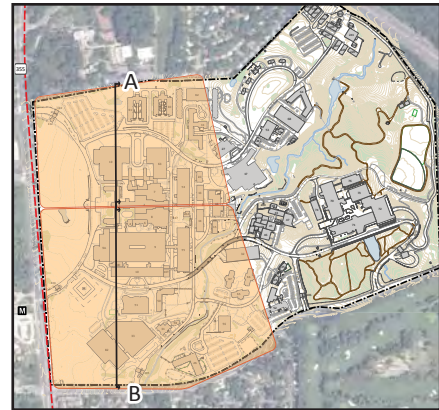
FIGURE 6-4 SECTION B- RECOMMENDED BUILDING ENVELOPE FOR SOUTHWEST CAMPUS AREA- VIEW TOWARD EAST

Note: Recommended building envelopes are intended as guidelines only. Program requirements and site-specific conditions may require modification of these guidelines. It is recommended that all new development be reviewed for compatibility with existing campus planning.

AT/FP Perimeter Buffer Modifications

A 148' AT/FP buffer is required around the campus perimeter for all future primary gathering buildings. In situations where providing such a setback would have a negative impact on the quality or functionality of interior natural areas or facilities, development per upgraded fencing and control systems can supplement the proposed buffer in areas where the 148' AT/FP buffer is compromised by existing structures. Evaluation of existing/potentially renovated structures within this zone should be conducted on a case-by-case basis to determine compliance. As the projects are designed and the sites developed, it is important to maintain the AT/FP setback criteria.

The 148' perimeter AT/FP buffer may be reduced in places where existing structures not scheduled for removal/ replacement are located. However, as noted above, the individual requirements of any particular building located within this zone should be evaluated on a case-by-case basis. In addition to complying with AT/FP requirements the buffer zone attempts to maintain the scale and proportion of the original design intent by providing a mediating space between the surrounding smaller scale residential areas and the more dense areas of the Bethesda campus.



SECTION KEY MAP

Building Heights

An installation-wide approach to building heights benefits the campus in several ways. First, the neighbors of NSAB are primarily residential neighborhoods consisting of two-story homes, so scaling buildings appropriately will achieve the planning objective to maintain compatibility with the surrounding neighborhoods. Second, a consistent approach to building heights can preserve sight lines to key institutions and reinforce the identity of different areas of campus. Finally, the perception of mass and density aids in wayfinding for visitors.

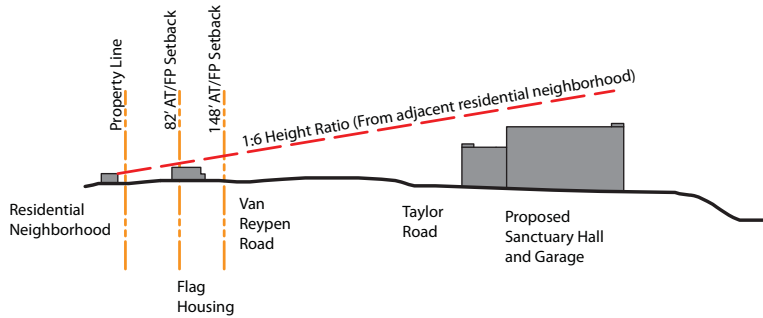


FIGURE 6-5 SECTION C- RECOMMENDED BUILDING ENVELOPE FOR NORTHEAST CAMPUS AREA- VIEW TOWARD EAST



FIGURE 6-6 SECTION D- RECOMMENDED BUILDING ENVELOPE FOR SOUTHEAST CAMPUS AREA- VIEW TOWARD EAST

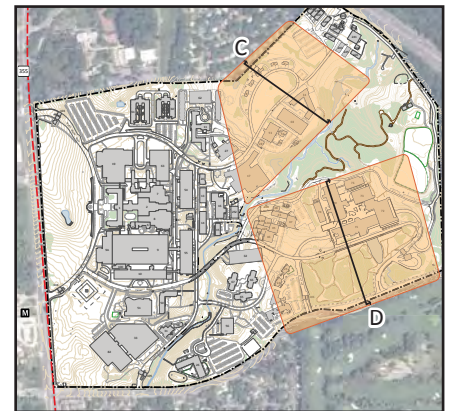
Note: Recommended building envelopes are intended as guidelines only. Program requirements and site-specific conditions may require modification of these guidelines. It is recommended that all new development be reviewed for compatibility with existing campus planning.

The general concept of the campus height plan places the highest buildings toward the center of the campus (hospital and parking garages) and transitions to low buildings toward the perimeter. This approach reinforces the monumentality of the historic tower and core, while mediating the change in scale to the surrounding neighborhoods. Likewise, a greater sense of openness is preserved at the perimeter of NSAB. Figures 6-3 through 6-6 illustrate these ideal spatial relationships and building envelopes for different areas on campus.

Density and Mass

The effect of the campus height plan concept is to place the greatest density and highest buildings at the core of the campus, adjacent the Stoney Creek greenway. This presents an excellent opportunity to integrate the architecture with the natural wooded area. This framework also encourages preservation of the green lawns and wooded buffers at the perimeter, which presents an image of a unified, green campus to the public.

Development plans should strive to maximize the density of developable sites. By maximizing the efficiency of land use, less impervious surface is added to the campus, and more land is available for future growth or open space preservation. Below-grade parking structures are encouraged as part of this strategy. Also, reduced AT/FP standoffs from interior roads (to



SECTION KEY MAP

a minimum of 33 feet) is strongly encouraged to maximize site efficiency and maintain a consistent urban form along primary roads. Designs should include exploration of alternative protection as required by DoD regulations to use a reduced standoff distance.

6.2.2 Pedestrian Framework

To facilitate an accessible, walkable campus, a comprehensive pedestrian framework plan is necessary. Figure 6-7 shows the pedestrian framework for NSA Bethesda, including primary accessible paths between major campus destination areas, and secondary pathways between facilities. Within the context of proposed future development, this plan integrates the overall intent of pedestrian circulation of the IAP with the recommendations of the Accessibility Plan.

Refer Section 3.1 of the Accessibility Plan for the identification and analysis of primary and secondary routes through the campus.

Pedestrian Accessibility

Pedestrian accessibility is crucial in a patient-care environment like NSAB. This includes improving pedestrian access and connections for those with disabilities. The approach for making NSAB an installation accessible to all is clearly defined within the 2011 Accessibility Plan. The plan includes a thorough analysis of major accessibility deficiencies as well as recommendations to correct these deficiencies.



Also, as noted in Chapter 4, The 2012 NSAB Traffic Study revealed deficiencies in pedestrian facilities at multiple locations. The recommendations of the Accessibility Plan address some deficiencies along primary accessible routes. In addition to those renovations, deficiencies noted in the Traffic Study shall be evaluated and corrected as necessary.

Bus shelters which provide access to campus shuttles should be provided at as many stops as is feasible, with priority given to the most-frequently used stops. Bus shelters can double as resting nodes along accessible routes and should be designed accordingly. See Section 4 of the Accessibility Plan for the design of resting nodes.

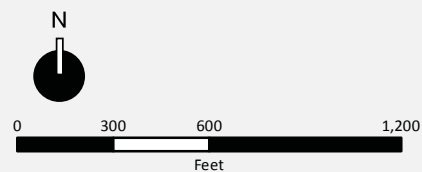
The lighting plan (Figure 6-10) refers to recommended pedestrian lighting throughout the campus.

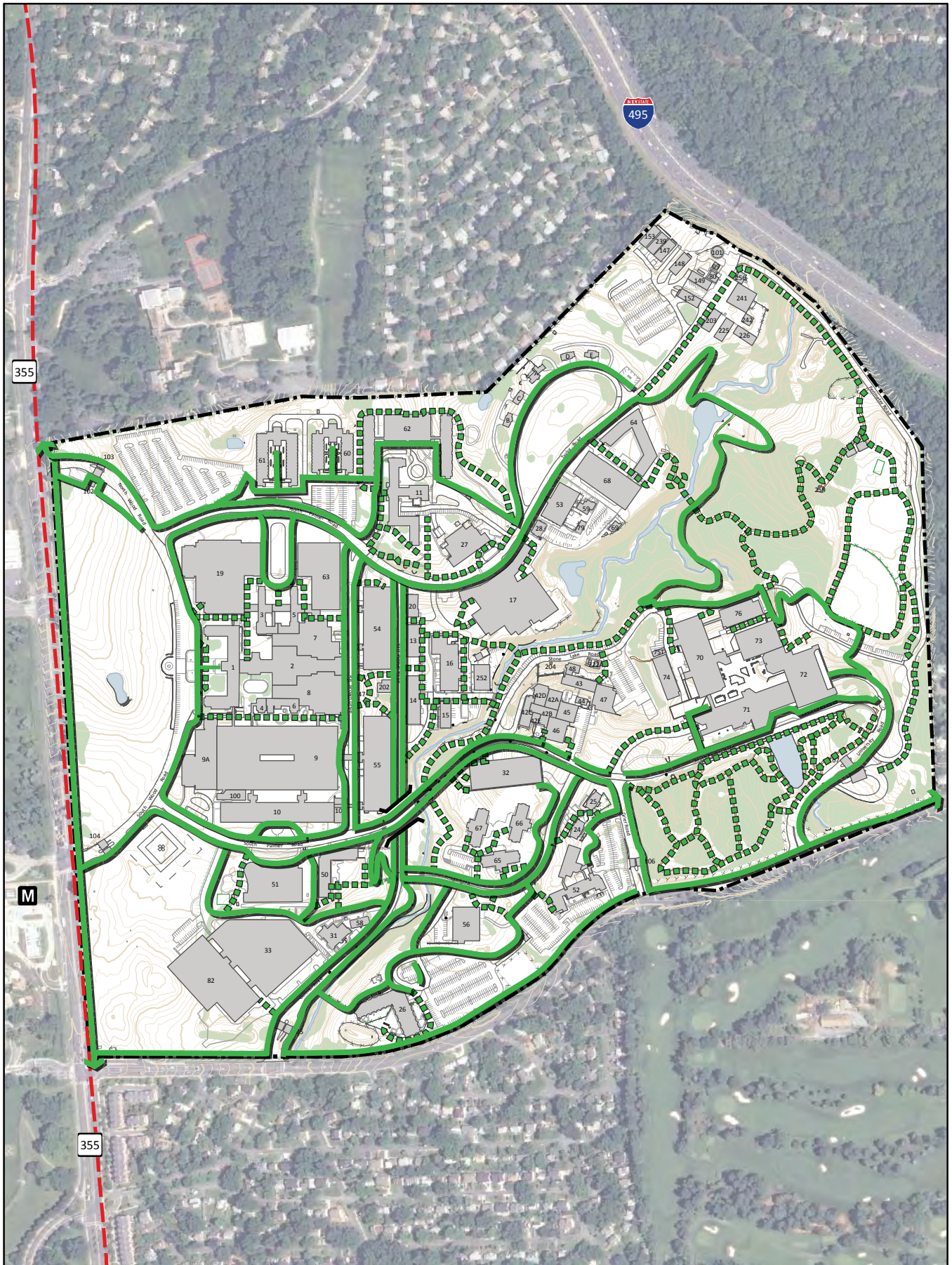
In general crosswalks should be precisely placed in order to facilitate efficient, logical, and accessible movement of pedestrians throughout the campus. Proper placement can contribute to the sequence of entering facilities and complement the architecture in addition to providing for safe movement. Refer to the Accessibility Plan for guidance on the location, materials and markings at crosswalks.

FIGURE 6-7 PEDESTRIAN CIRCULATION FRAMEWORK PLAN

-  Primary Pedestrian Path
-  Secondary Pedestrian Path

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009







6.2.3 Roadway Framework

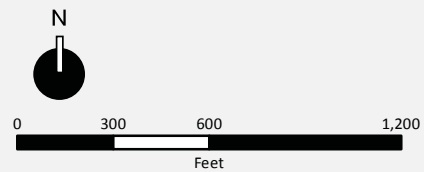
The roadway framework plan maintains the goals and objectives established in the 2008 Master Plan. The overall road hierarchy is preserved with only a few recommendations for road improvements. These optional road crossings over Stony Creek are shown in Figure 6-8. Upon completion, the TMP should be referenced to provide further direction regarding the feasibility of these recommendations. The TMP should also be used to determine any additional roadway improvements necessary in the future.

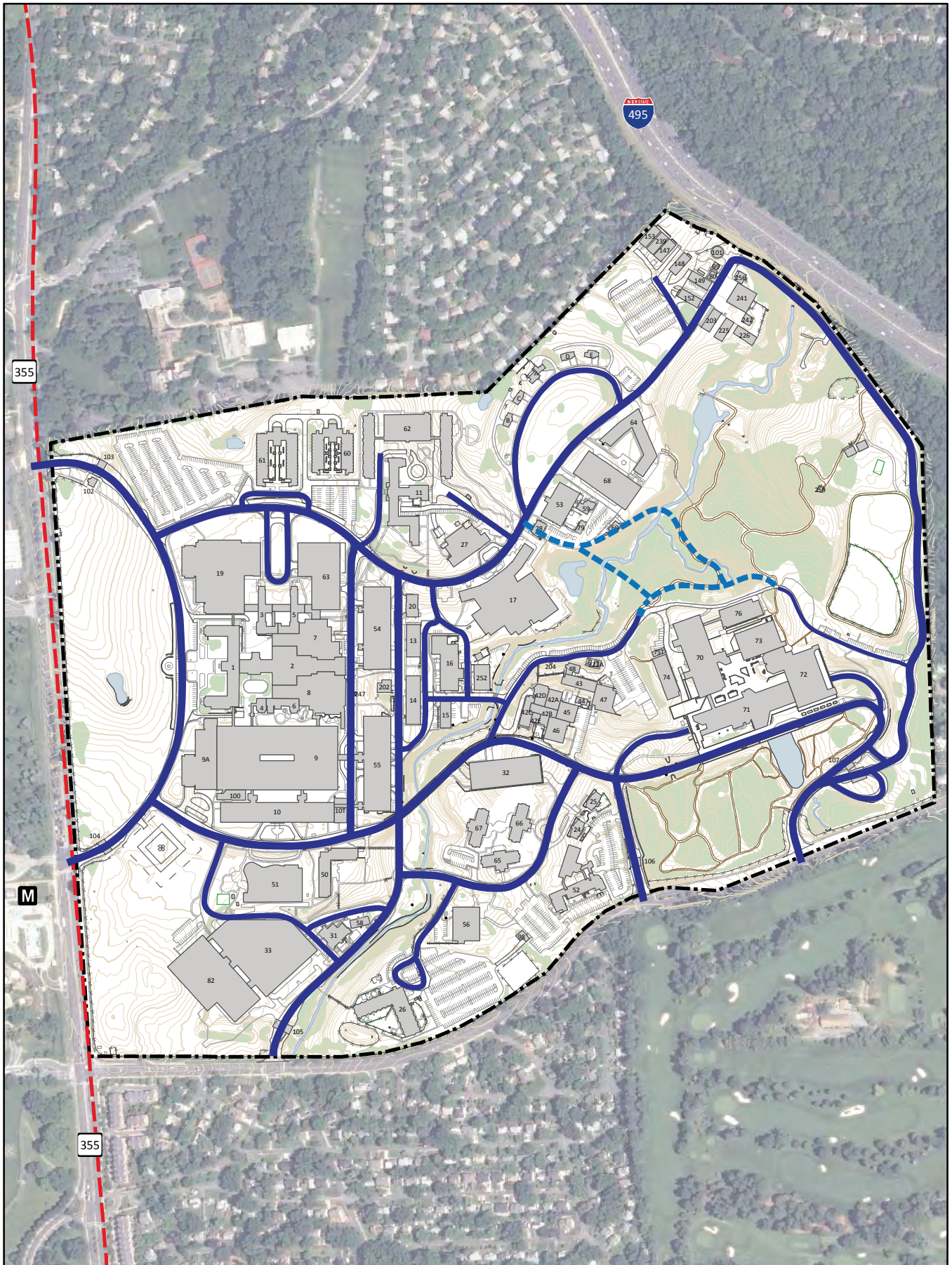
To accommodate and encourage bicycle traffic, rights-of-way and street cross-sections should be updated to incorporate adequate bicycle lanes or shared lane markings. Section 4 of the IAP describes accommodation of bike paths.

FIGURE 6-8 ROADWAY FRAMEWORK PLAN

-  Existing Roadway
-  Proposed Roadway

Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





6.2.4 Signage Framework

The Signage Framework Plan for NSAB seeks to unify signage types into two primary categories: entry signage and directional signage. The two major entries off of Rockville Pike should feature appropriate signage that identifies them as visitor entries. All entrances along Jones Bridge Road should feature secondary entry signage with the entrance to the future commercial vehicle inspection (CVI) entrance clearly indicated.

Within the campus, primary directional signage has been indicated at all major intersections. Loop road signage has also been indicated for North and South Palmer Roads, East Palmer Road and Brown Drive.

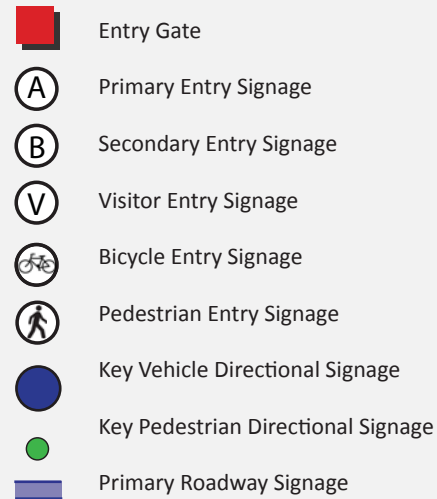
A signage plan was completed for the Installation in the 2008 Master Plan. Since then, the IAP has expanded on this and established a new plan while maintaining these overall goals and objectives:

- Visitor and staff entries should be clearly signed with a prominence denoting the entrance to a major medical institution.
- Key directional signage should be provided at the first major intersection inside each entry for vehicles and pedestrians.
- Key directional signage should also be provided at all major intersections within the major “loop” roads on campus. Loop road signage should be consistent and clearly associated with the major campus thoroughfares.
- Signage should be clearly legible and of a quality appropriate to the NSAB.
- Each signage type should be clearly recognizable and placed in such a way to avoid visual clutter. This practice will allow the signage to function properly as a navigational tool.

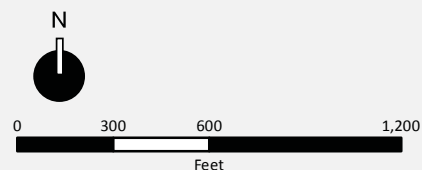
As described above, this Master Plan establishes the high-level approach to signage at NSAB as directed in the 2008 Master Plan. The updated Installation signage plan, along with detailed descriptions on appropriate signage locations, components, and types, including style and color, is included in Chapter 7 of the IAP. The IAP provides a further breakdown of the two main types of signage categories as follows:

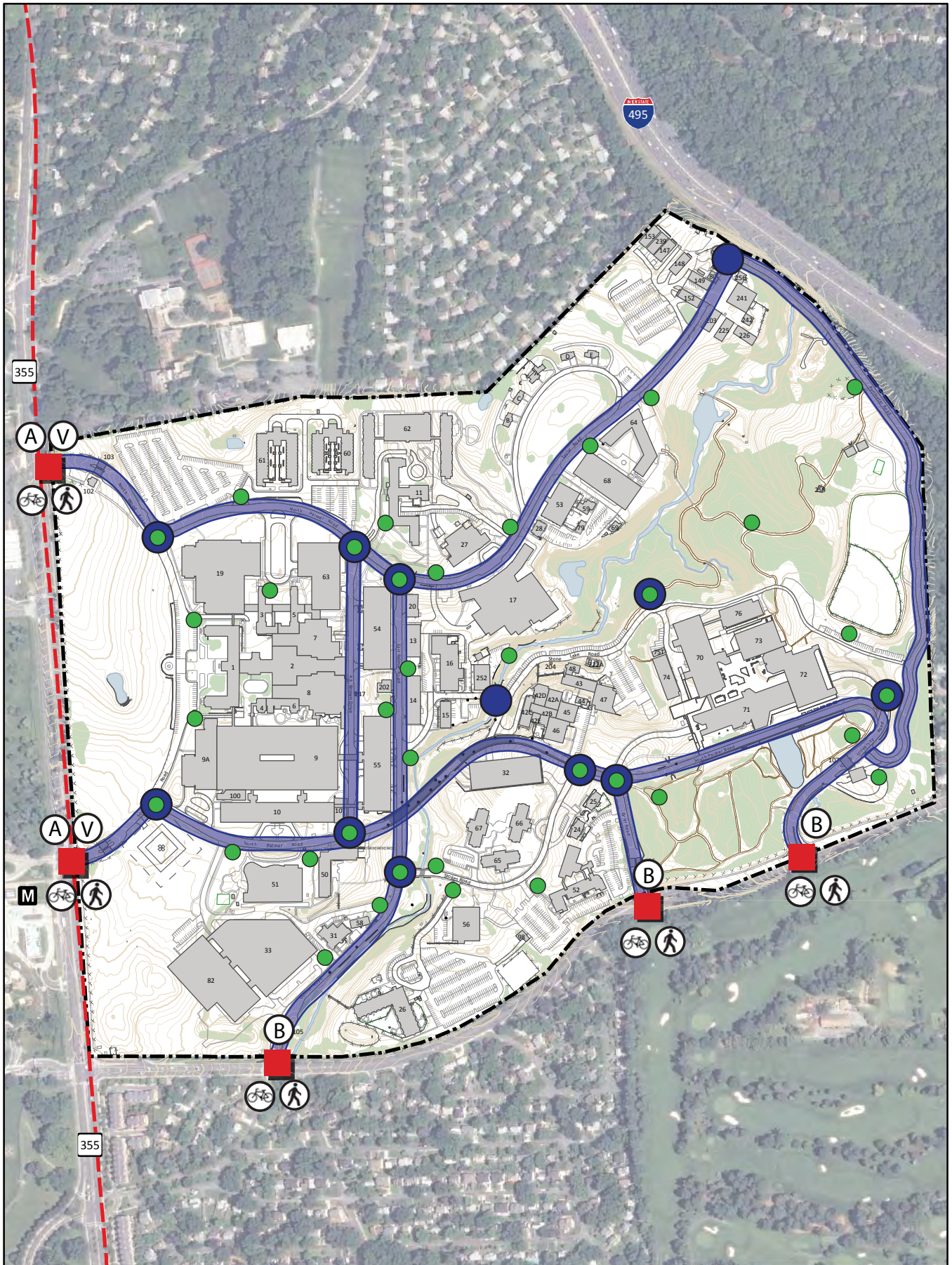
- **Entry Signage:**
 - Site Entry Identifier Signs
- **Directional Signage:**
 - Street Name Identification Signs
 - Vehicular Directional Signs
 - Pedestrian Wayfinding Signs
 - Building-Mounted Identification Signs
 - Freestanding Identification Signs
 - Parking Lot Signs
 - Signage for the visually and cognitively impaired

FIGURE 6-9 SIGNAGE FRAMEWORK PLAN



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





Additional Signage Considerations

It is equally important to consider the incorporation of signage that caters to the visually and cognitively impaired. Refer to Section 3.2 , Improvement Projects, in the Accessibility Plan for the appropriate placement of these types of signage. Further more, details and guidelines for the design of directional guidance pylons can be found on page 187 in Section 3.3 of the Accessibility Plan.

6.2.5 Lighting Framework

Two basic types of lighting should be provided at NSAB: street lighting and pedestrian lighting. In general these guidelines seek to minimize light pollution and to provide a safe and aesthetically pleasing environment within and around the Bethesda campus.

Street Lighting

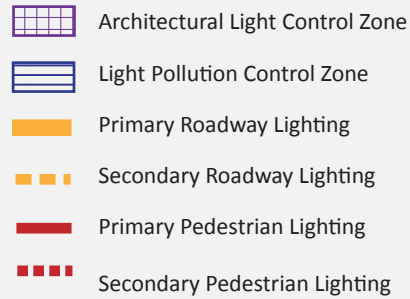
Exterior lighting consists of street lighting and pedestrian lighting with specific lighting control zones indicated in Figure 6-10. Primary entry lighting is limited to the North and South entrances along Rockville Pike. Secondary entry lighting occurs at each entry point along Jones Bridge Road. Primary loop street lighting is located along major thoroughfares such as North and South Palmer Roads, East Palmer Road and Brown Drive. Secondary street lighting occurs along most other roadways and drop-off areas.

Pedestrian Lighting

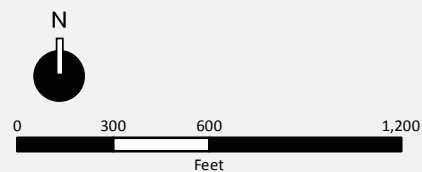
Pedestrian lighting follows similar guidelines with lighting classified by roadway type. An Architectural Light Control Zone has been established along the Wood Road loop in front of the tower and flanking buildings. Lighting within this zone must complement the architecture with respect to form and function. Fixtures within the Building 1 area must be of high quality materials reminiscent of the original fixture designs in this part of the campus. Each lighting type should be clearly distinct in order to reinforce the hierarchy of the campus plan and to unify the campus as a whole. In most perimeter locations at campus boundaries Light Control Zones have been established to minimize light pollution into surrounding areas. A significant portion of the perimeter is surrounded by residential neighborhoods with back yards at the NSAB boundaries. Likewise, these zones seek to establish quality lighting scenarios within the community service areas of campus along Jones Bridge Road.

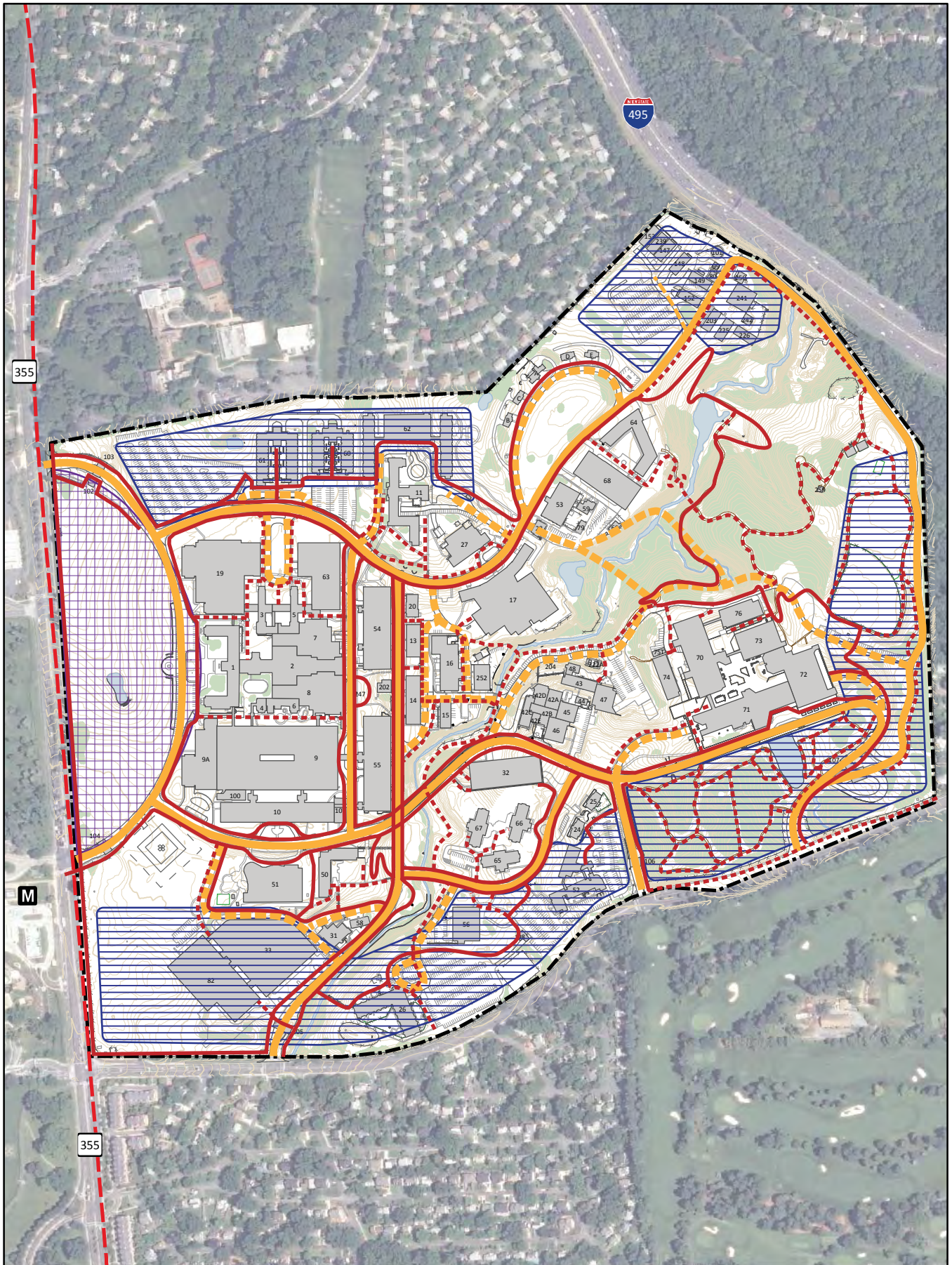
In concert with pedestrian paths and building entries, lighting scenarios in general should clearly indicate entry paths with clear connections made back to major sidewalks or parking areas. For buildings with multiple entries establishing a visible hierarchy of entrances can aid in way finding for staff and visitors. Unless already clearly visible at night, major directional signage should be lighted during the evening to facilitate nighttime way finding.

FIGURE 6-10 LIGHTING FRAMEWORK PLAN



Sources: NAVFAC Washington Update, 2010
PBS&J, 2011
DC GIS, 2007
USDA-FSA-APFO NAIP, 2009





Lighting fixtures for each of the scenarios should be of a single fixture type and should incorporate energy-efficient lamps which require minimal maintenance. Emphasis should be on quality and efficiency of lighting for calculating the proper quantity of light for a particular area. Lighting designs should consider their respective contexts so as to allow them to inform the design and contribute to the space.

Examples of lighting types indicated above can be referenced in Section 5.10 of the IAP.

6.3 Landscape Guidelines

The mature landscape of the Bethesda campus is one of its most positive attributes. The mature trees and plant materials provide a park-like, unifying feature and are a pleasing contrast to the increasingly urban character of the area. The heart of the campus includes industrial and maintenance facilities with little or no buffer between vehicular circulation and pedestrian pathways. Any consideration of base-wide circulation improvements must consider careful improvements to the visual character for the benefit of base patients, visitors, and employees moving through this area.

The IAP establishes landscape design guidelines in Section 5.2 for each functional district and should be used as a general guide to landscape material choices throughout campus.

The following landscape design guidelines apply to the NSAB as a whole:

- Maintain a landscaped buffer at the southern, eastern, and northern perimeters in consideration of the residential and institutional neighbors.
- Utilize trails, pocket parks, and landscaping to contribute to a pleasant environment for the patients and their families.

6.3.1 Foundation and Courtyard Planting

Many studies confirm the positive results of patients interacting with nature during the healing process. These all support Evidence Based Design concepts used extensively in current healthcare design practice. While it is not practical for patients to be transported to the serene heavily wooded areas of the campus to enhance their healing process, the concepts of nature can certainly be brought to the patients.

The existing courtyards located in specific building clusters attempt to incorporate landscaping and extend this natural feature to the built environment. Future goals include improvements in these areas, particularly in the courtyards within the patient core buildings. Many of these courtyards were not designed to encourage people to stay and relax. These areas will be evaluated for the incorporation of

meditative spaces that are comfortable with both areas for solitude and family visits. The spaces should include meandering paths, a variety of landscape and special features such as water elements.

Evidence Based Design encourages consideration of the total visit in the design of the facilities and not just the patient treatment areas. This includes interior waiting areas, reception, and amenities available during their visit, but also extends to the exterior environment. From the patient or visitor's entry on the campus to their departure, the environment is part of the process of healing for families and patients.

6.3.2 Open Space Planting

The Open Space and Recreation Map in Section 4.4.8 of this document shows established landscape patterns throughout the Installation and should be used to direct types of landscape treatment for open space areas. In addition, the IAP addresses the treatment of parks and ceremonial grounds in Section 5.5.

6.3.3 Streetscape Planting

There are opportunities to improve the aesthetic of streetscapes and walkability throughout the campus. This is most important along major pedestrian corridors, such as Brown Drive and North and South Palmer Roads. Minimizing the visual impact of traffic on these roads and discouraging through traffic will enhance walkability. While vehicular access to the parking structures must be maintained, increasing the landscape with shade trees and smaller scale flowering trees by the pedestrian crossings and developing seating clusters with appropriate lighting would extend the courtyard concept and provide continuity from the patient's arrival by vehicle to their check in point.

Refer to Section 2.4.12 of the IAP for the identification of major street trees and recommendations on treatments that will reinforce the existing patterns into a comprehensive plan.

6.3.4 Parking Areas

Refer to Section 5.6 of the IAP for low impact development standards to both existing and new parking areas. Low impact development refers to strategies in the landscape which reduce stormwater runoff, reduce heat island gain, and increase water quality.

6.3.5 Plant Materials

Section 5.7 of the IAP includes recommendations that apply to any new landscape plantings at NSAB. Refer to Table 5.1, Recommended Plant List, for appropriate plant selection.

6.4 Recreation Guidelines

Recreational and open spaces discussed in this section generally include any programmed or improved outdoor area maintained for active or passive recreational use (such as sport fields, courtyards, plazas, and lawn), and generally exclude naturalized or infrastructure areas that are not intended for common use by people (such as wooded buffers, stormwater ponds). This section provides guidance on the types of recreational and open spaces to consider in a site design, and recommendations for siting different recreational and open space uses.

6.4.1 Recreational and Open Space Types

Section 5.5 of the IAP provides guidance and design criteria for typical park spaces at NSAB. To meet the needs and enhance the experience of the Installation's missions, the campus should provide many and various opportunities for recreation and physical activity. Recreational spaces should accommodate a full range of activity from group sports to casual activity, with spaces that can handle large events to places of quiet personal meditation.

Below are recreational amenity and open space types to consider for programmed recreational space and for infill recreational space at NSAB. A quick reference and summary of recommended locations for these types of recreational development is shown in Table 6-1.

Passive Open Space

Lawn

- Open lawn area edged with paved pathway or vegetation.
- Trees may be used to frame views or provide regularly spaced edge.
- Recommended for ceremonial spaces and view corridors to historic buildings and areas where a long, clear view is desirable.
- Not recommended for high-traffic areas. If a lawn area is expected to be heavily used for active sports, consider installing a sports field with proper grading, drainage and maintenance.
- Suitable for fringe areas around sports fields and informal spectator areas slope between 4:1 and 6:1.
- Generally conveys stormwater as a sheet; infiltration is inferior to dedicated bio-retention or vegetated infiltration areas.
- Seating, lighting and furniture may be provided along the edge and at entry and exit points.

Landscaped Area

- Areas which add color, texture, and aroma to a particular view or pathway.
- Not generally a destination on its own, but may be important to establish a sensory character of an area that is passed through, or seen from afar.
- Recommended at focal points such as outside bends and decision points in trails or roadways, or to mark entrances, gateways, or transitions between distinct areas.
- Lighting may be provided if at ground level and is used to highlight the landscape. Seating and other furniture is not provided.

Garden

- Gardens are human-scaled landscapes with a variety of plants which present various colors, textures, aromas and other sensory input to the people within.
- Gardens are destinations which generally support a calm, sometimes contemplative, atmosphere.
- Recommended in areas immediately adjacent to housing or medical spaces where more active or noisy gatherings may be discouraged.
- Not recommended for high-traffic areas, or sites with major pedestrian or vehicular routes running through them.
- Seating other furniture should invite individual and inter-personal interactions (as opposed to larger groups). Lighting should be contained within the garden area.

Wooded Area

- Areas under a canopy of trees which invites passive interactions with the natural environment, generally accessible by paved pathways.
- Recommended for areas along pedestrian routes and recreational paths through existing wooded areas.
- The landscape should focus on a natural multi-layered forest section with ground level, understory, and canopy vegetation.
- For safety and security, vegetation should be cleared between three-feet and seven-feet in height to preserve open sight lines and prevent hiding spaces for potential aggressors.
- Seating and other furniture is provided at regular intervals (see the Accessibility Plan for minimum spacing along paths). Lighting, if provided, should adequately extend into areas surrounding pathways for safety and security.

Semi-Active Gathering Spaces

Pocket Park

- Mix of hardscape and landscape elements that provide sensory interest and amenities to an area, and promote active interaction between people and groups.
- Recommended in courtyards, infill spaces between buildings, where major pedestrian routes intersect, and at wayfinding decision points.
- Suitable as a transition between a building entrance and a more naturalized area, and for accessible areas.
- Not recommended in passive or remote locations where a less intensive, more flexible landscape may be more appropriate.
- Seating and furniture should encourage interaction of people and groups, and may include additional amenities and signage that add sound (i.e. fountains) and visual information to aid in wayfinding.

Plaza

- Open hardscape areas that can accommodate large gatherings and flexible arrangements of uses and events.
- Recommended for ceremonial and high-traffic areas.
- Trees and other landscaping may be used to define spaces within the plaza, reinforce edges and frame views.
- Area lighting should be even, and should be contained within the plaza area. Pedestrian and low-level lighting should reinforce individual elements, pathways or spaces within the plaza.

Picnic/Grill Area

- Recreational area focused on seating and tables for individuals and groups.
- Recommended for areas away from primary building entrances and pathways, and ideally away from portions of buildings where the noise, aromas, and other effects of a grill or picnic area would be discouraged.

Active Programmed Areas

Dog Park

- Fenced area with a soft surface (i.e. decomposed granite or other surface recommended for dog parks) that allows off-leash interaction with dogs.
- Protect the surface from erosion with appropriate containment and drainage around the dog park area.
- Provide separate fenced areas for large and small dogs (over/under 30 lbs.)
- Provide universal accessibility into the dog park to allow users with mobility impairments interaction with service animals.

Soft-surface Sport Areas

- Baseball/Softball fields; Football/Soccer fields; Sand Volleyball courts
- Recommended in level, open, well drained areas.
- When providing sports fields, consider the total experience and needs of active users. Consider providing accessible parking and restroom facilities, shade structures, spectator seating areas, water fountains, and connections to the campus trail system.
- The potential negative impact of field lighting on neighbors should be considered. Area lighting should be contained within the sports fields to the maximum extent possible.

Hard-surface Sport Courts

- Basketball; Tennis; Bocce courts.
- Recommended in already disturbed or paved areas.
- Consider integrating informal hard-surface sport courts in low-traffic paved areas near potential users, such as fire-access roads or infrequently used loading areas. These multi-use spaces increase casual and convenient access to physical activity without adding impervious surface to the campus.

Playground/Tot-lot

- Play areas intended for use by the children, family members and visitors of patients and dependents.
- Recommended only in areas adjacent to family housing areas where a demand for children's activities may be present.
- Not recommended in institutional areas or near BEQ, Officer's Housing or other billeting.
- Not recommended as part of a larger recreation, sport or fitness complex.
- Provide seating for supervision of play areas, shade structures and proximity to accessible restroom facilities.

TABLE 6-1 RECREATION LOCATION MATRIX

	Ceremonial Areas	Residential Areas	Along primary pathways	Near Institutional Building entrances	Outside of quiet interior spaces	Courtyards	Fire roads, low traffic loading and service areas	Front Yard; or AT/FP zone between parking and buildings	Side/Rear yards with blank building facades	Large, flat, well drained, non-wooded sites
Lawn	Green	Green	White	White	Yellow	White	White	Green	White	Green
Landscaped Area	Green	Green	Green	Green	Green	White	White	Green	White	White
Garden	Yellow	Green	White	White	Green	Green	White	Green	White	White
Wooded Area	White	Green	Green	Green	Green	White	White	White	White	White
Pocket Park	White	White	Green	Green	White	Green	White	White	White	White
Plaza	Green	White	Green	Green	White	White	White	White	White	White
Picnic/Grill Area	White	z	White	White	White	White	White	White	Yellow	Green
Dog Park	White	Yellow	White	White	White	White	White	White	Green	Green
Soft Sport Area	White	White	White	White	White	White	White	White	Green	Green
Hard Sport Court	White	Yellow	White	White	White	White	Green	White	Green	Yellow
Playground/Tot Lot	White	y	White	White	White	White	White	White	White	White
Skate Park/Adolescent Play Area	White	y	White	White	White	White	Green	White	Green	White
Climbing Wall	White	White	White	White	White	White	Green	White	Green	White

y= children and adolescent play areas are suitable only near family housing. Not recommended near BEQ, Officer housing, or other non-family housing.

z= picnic areas in residential zones may be restricted to use by the immediate residents, and should discourage large groups from other areas.

Recommended
Acceptable with consideration of users and site specific conditions
Not recommended

Skate Park/Adolescent Play Area

- Activity area with age-appropriate equipment and amenities intended for use by adolescent family members and visitors of patients and dependents.
- Recommended near family housing areas where a demand for adolescent activity areas may be present.
- Adolescent activity areas should be separate from children’s play areas.
- Not recommended in institutional areas or near BEQ, Officer’s Housing or other billeting.
- Not recommended as part of a larger recreation, sport or fitness complex.

Climbing Walls

- Vertical climbing structures or fixtures on existing walls that allow for vertical training, or horizontal “bouldering” at low heights.
- Suitable as part of larger recreational, sport or fitness complex.
- Consider integrating climbing apparatus in low traffic areas and blank side and rear facades of buildings. Creating multi-use spaces increase casual and convenient access to physical activity without adding additional developed area and impervious surfaces to the campus.
- As with any sport facility, provide adequate safety accommodations.

6.4.2 Rooftop Vegetation and Recreation

All flat or gently sloped rooftop areas at NSAB should be considered as an opportunity for a green roof or other roof installation which incorporates green roof elements with other roof-top activities.

Section 8.6.7 of the IAP discusses the benefits and options for a vegetated roof, as well as potential sustainable rating systems credits that may be available for vegetated roofs.

Another alternative that may be considered for flat roofs is the placement of seating areas, “outdoor rooms” which may include shade structures and outdoor appliances, or hard surface sport courts, such as tennis and basketball. A designer should consider the following when choosing whether to implement other activities on a roof in lieu of a vegetated roof.

- The inclusion of hardscape reduces the vegetated area of a roof, with a commensurate reduction in the benefits provided by vegetated roofs. However, this may be preferred if a ground-level site that would otherwise have been paved for a sport court or plaza is preserved in a vegetated state, allows natural infiltration of stormwater, or results in the preservation or planting of canopy trees (which a vegetated roof might not).
- Rooftop courtyard or sport court areas shall be universally accessible, which may require an elevator, or a level threshold from an accessible part of the building into the sport court area.
- Rooftop sport courts require fencing to prevent play objects from leaving the roof. The height and visibility of fences and shade structures must be taken into account with respect to building height limits, sight lines, and architectural guidelines for style and materials.

6.4.3 Universal Accessibility and Recreational Amenities

Because universal access requires nearly level, flat, hard-surfaces, level areas near the housing and destinations for Wounded Warriors may prioritize more active, hard-surface recreational amenities such as pocket parks, hard-surface sport courts, and plazas. Passive, naturalized, and soft surface amenities such as gardens, wooded areas and ballfields may be more suitable for more remote areas of the Installation, or areas with greater slopes. Accessible paths and accommodations must be provided to all recreational facilities, however the design character and ease of achieving universal accessibility may play a role in the designers decision for what type of recreational amenity to provide.



Naval District Washington