

2011 Andrews | NAF Arbor Plan

Prepared For:



Joint Base Andrews | Naval Air Facility
Washington

Prepared By:



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01

Introduction

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BACKGROUND

The Joint Base Andrews – Naval Air Facility (JBA-NAF) is a 4,300 acre mixed use site in the south central region of Prince Georges County, Maryland. It is five miles south of Washington, D.C. With approximately 16,700 people who live and work on the base. The main base is divided into western and eastern sectors by the airfield which has a north-south orientation. The western portion of the main base contains the majority of the land area, including a large outdoor recreation/golf course facility, all of the community facilities, accompanied and unaccompanied housing and the Malcolm Grow Medical Center. The majority of industrial uses are located on the eastern portion of the Main Base. Both sections house mission and administrative facilities.

In May 1943, Camp Springs Army Airfield became operational on the site of Andrews AFB. The base was later renamed Andrews Field in honor of Lieutenant General Frank M. Andrews. In 1947, Andrews Field became Andrews AFB with the establishment of the Air Force. Since the end of World War II, the facility has been known for its special air mission of transporting senior government and military leaders. By the early 1960's, the Military Air Transport Service's flying mission had been transferred from National Airport to Andrews AFB. This move officially established Andrews AFB as the home of Air Force One. As a result of the 2005 Base Realignment Act Commission (BRAC) Andrews was re-designated Joint Base Andrews - Naval Air Facility (JBA - NFA or JBA). However, the Base remains the primary first stop in the United States for heads of state, foreign dignitaries, heads of religious organizations, and foreign military leaders.

SCOPE

The purpose of this plan is to further the goals outlined in the General Plan Update 01/2010, the Architectural Compatibility Plan 07/2009 (ACP), and UFC 3-201-02 02/2009. The plan will also serve as a tool to assist the Environmental Element of the Civil Engineering Squadron in reinforcing policies laid out in the Integrated Natural Resource Management Plan (INRMP). Namely, the INRMP requires all new construction on base to replant 60% of canopy lost during development. This plan will assist in determining replanting requirements and associated planting areas to address the impacts. The plan is intended to be a significant update to the 2004 Arbor Plan as outlined below:

- Fulfill the intent of the 2007 Integrated Natural Resources Management Plan, applicable laws and DOD best practices
- Update the mapped layer of tree stands using GIS techniques and aerial photography
- Determine approximate acreage changes in JBA-NAF over time using existing GIS/aerial photographic data
- Develop Priority Planting areas for the base including Streetscape Zones, Entryways and Reforestation Areas which conform to the 2010 General Plan Update
- Create easy to follow guidelines which can be used to install and maintain proposed and existing forest stands
- Be written as an enabling tool to address reviews of new construction and forest management plans

The plan identifies Future Priority Planting Areas and Landscape Design Guidelines to guide the preparation of plans and specifications for landscape development over the next 5 - 10 years and accomplish several goals:

- Meet EMS and INRMP objectives in enhancing open space and natural areas
- Help offset the loss of forest stand which has occurred over the past 30 years (approximately 60 percent of these losses returned by implementing this plan)

01

Introduction

- Promote non-fragmented ecological communities and biodiversity while addressing the challenge at an air base of encouraging habitat that is not in conflict with the mission
- Sustain the ecological values and the function of the forested landscape
- Integrate forest management activities with the management of base natural resources and the military mission of JBA-NAF
- Enhance the aesthetic and ecological value of the base where possible

Appropriate landscape planning and landscape maintenance can have a profound effect on the visual environment of a facility and encourage people to achieve their highest productivity and efficiency. Landscape Architecture can also minimize the visual and environmental impacts of development and further enhance and support natural systems that clean pollutants from pavement, rooftops and other impervious surfaces and ameliorates heat gains and heat buildup from these same surfaces.

The proposed planting plans will seek a balance between the following factors, among others:

- Current and future land use
- Airfield clearances
- Utility Corridors
- Recreational opportunities
- Anti-terrorism/Force Protection (AT/FP) requirements

AIRFIELD CLEARANCES

The General Plan Update, January 2010, for Joint Base Andrews – Naval Air Facility section 4.3.3 Operational and Safety Constraints describes guidelines for existing and future developments to be compatible with airfield operations and other mission-related activities. This includes airfield clearances regulations per United Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design. Section 3-15.3 describes criteria for trees within or adjacent to airfield clearance zones:

“Trees that project into the imaginary surfaces must be removed or lowered to a distance below the imaginary surface, as specified in table 3.8. Trees are permitted near an airfield provided that they do not penetrate the imaginary surfaces, the taxiway clearance distance, the apron clearance distance, or instrument procedure Obstacle Identification Surfaces (OIS) as described in the Terminal Instrument Procedures (TERPS) regulations.”

Table 3.8 referenced above shows that trees must be removed or topped to a distance of 3m (10ft) below applicable imaginary surfaces.

To ensure compliance with these regulations, Joint Base Andrews – Naval Air Facility shall perform a tree survey of all trees within or adjacent to airfield clearance zones, as described in the General Plan Update, January 2010, no less than once every (3) three years. Based on the findings of the survey, any trees that extend into restricted distances from airfield clearance zones shall be immediately removed or lowered to allowable distances. All tree removal and/or pruning activities shall be performed per the Design and Maintenance Guidelines contained in this report.

ANTI-TERRORISM/ FORCE PROTECTION REQUIREMENTS

This plan also complies with UFC 4-010-01 DoD Minimum Anti-terrorism Standards for Buildings. The proposed planting suggestions within this plan have been made in accordance with the AT/FP guidelines of Section B -1.2 Standard 2 - Unobstructed Space which states:

“It is assumed that aggressors will not attempt to place explosive devices in areas near buildings where these explosive devices could be visually detected by building occupants observing the area around the building. Therefore, ensure that obstructions within 10 meters (33 feet) of inhabited buildings or portions thereof do not allow for concealment from observation of explosive devices 150 mm (6 inches) or greater in height. This does not preclude the placement of site furnishings or plantings around buildings. It only requires conditions such that any explosive devices placed in that space would be observable by building occupants.”

All proposed planting within this report, as shown in the priority planting area exhibits, shall follow these guidelines.

FROM THE ANDREWS AIR FORCE BASE ARBOR PLAN, 2004 ED.

The Andrews Air Force Base Arbor plan was authored by the 89th Civil Engineer Squadron and published December 2004. The document outlines forest management issues that will optimize benefits from urban landscaping and is compatible with airfield operations. The following is a brief summary of applicable information from the 2004 ed.:

According to Air Force Manual 126-3, the forested lands on the base have been designated as follows:

- Modified Commercial Forestland (MCF)
- Restricted Commercial Forestland (RCF)
- Non-Commercial Forestland (NCF) - Urban Forest Areas fall within this designation

Andrews AFB has been recognized as a Tree City USA by the National Arbor Day Foundation. In order to maintain this status, the Base must meet four standards established by the Foundation and the National Association of State Foresters:

- Establish a Tree Board or Department
- Create a Tree Care Ordinance
- Develop a community Forest Program with an annual budget of at least \$2.00 per capita
- Observe Arbor Day and create a Proclamation

The base has not received Tree City USA status since 2007. The goal will be to reapply for Tree City USA status using information generated in this report.

The Plan also stipulates that an Urban Tree Management Plan will be developed that will provide guidelines for the development, management and maintenance of urban forest resources with the following objectives:

- Ensure the orderly and scientific management of the urban trees to the extent compatible and consistent with the missions of the Air Force
- Protect the real estate investment of the U.S. government from unnecessary depreciation and/or depletion

The following will also be accomplished:

- Conduct an urban tree survey that includes the following:
 - Diameter Breast Height (DBH), form, condition, height, species and latitude and longitude of each tree
 - Tag and number each sampled tree
 - Develop a database and location map for each sampled tree

Comply with state and county regulations concerning conservation and preservation of trees as follows:

- Review all military construction projects for need and status of tree replacement
- Correct deficiencies identified in the review
- Make available to military personnel as firewood trees removed for construction projects
- Replant trees on a 1:1 ratio trees removed on areas less than one acre
- Replant a minimum of 60% of canopy cover removed on areas greater than one acre
- Plant replacement trees prior to existing tree removal. Replacement trees must be native species
2 – 5 inch caliper replaced and arranged in stands similar to those removed

The Plan also identifies for management of flight operations:

- Trees that penetrate the Airfield Clearance Zones have been identified and arranged for removal
- Coordination between the base and other agencies including the National Park Service (NPS) and the US Army Corps of Engineers (USACE) is underway to mitigate tree removal on adjacent properties.
- Some trees which penetrate the Airfield Clear Zone occur along the Historic Suitland Parkway. The base, in coordination with the NPS, is working to meet Federal Aviation Administration (FAA) regulations while preserving the historic parkway.

Finally, the plan identifies factors which threaten the existing forest stands on base. The following items should be noted:

- Wildfire, Insects and Disease are the primary factors threatening forest stands on the base.
- Fires have been minimal and are managed by the Andrews AFB Fire Department with assistance from local volunteer fire departments and the Maryland Forest Service (MFS). A prescribed burning program will be coordinated with AFCEE and the MFS to help

reduce hazardous fuels and the threat of wildfires. A 3 to 5 year rotation will be assumed as a general program.

- Diseases which might threaten the base are detected by the Maryland Forest Service and the Maryland Department of Agriculture. Anthracnose, annosus root rot and oak wilt are the potential diseases which are most probable.
- The insects which most threaten the bases forests are the Gypsy Moth and Southern Pine Beetle. Gypsy Moths defoliate the oaks and can cause a reduction in canopy shade and extensive forested areas. Pine Beetles often attack pine tree stands which are under stress.

HOW TO USE THIS REPORT

This document is designed to be used as a guide to landscape development, reforestation and maintenance of forest resources at Andrews. The Plan has calculated the forest stand loss since 1958 and provides guidance to mitigate these losses. The plan has identified priority planting areas in the form of corridors, gateways and reforestation plans which can help improve urban forestry on crucial portions of the base. As funds become available, each Priority Area can be considered a “shovel-ready” project which can be bid out for construction. This report should serve as the guidelines for where project limits can be defined, what work is to be done there and how the work should be performed.

This Arbor Plan also contains a Plant Material Reference section which provides suggested plant material for use on the base. When implementing the concept plans included in this report, along with any other landscape improvement projects, plant materials should be selected from those listed to best fit growing and design conditions for the specific area. From there, the Design Guidelines section explains the proper way to install, preserve and maintain plant materials. This section also includes Landscape Design Standards that should be followed. These standards update and expand on those previously found in the 07/2009 ACP.

02 Forestry History

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SUMMARY OF HISTORIC FOREST DATA

The Arbor Plan analyzed existing tree cover on the base for the period from 1958 to 2009. The analysis was conducted using aerial photography and GIS imagery. The five time frames analyzed are as follows:

FIGURE 1: 1958 = 1,618 acreage tree cover

FIGURE 2: 1974 = 1,099 acreage tree cover

FIGURE 3: 1990 = 1,073 acreage tree cover

FIGURE 4: 2000 = 1,019 acreage tree cover

FIGURE 5: 2009 = 942 acreage tree cover

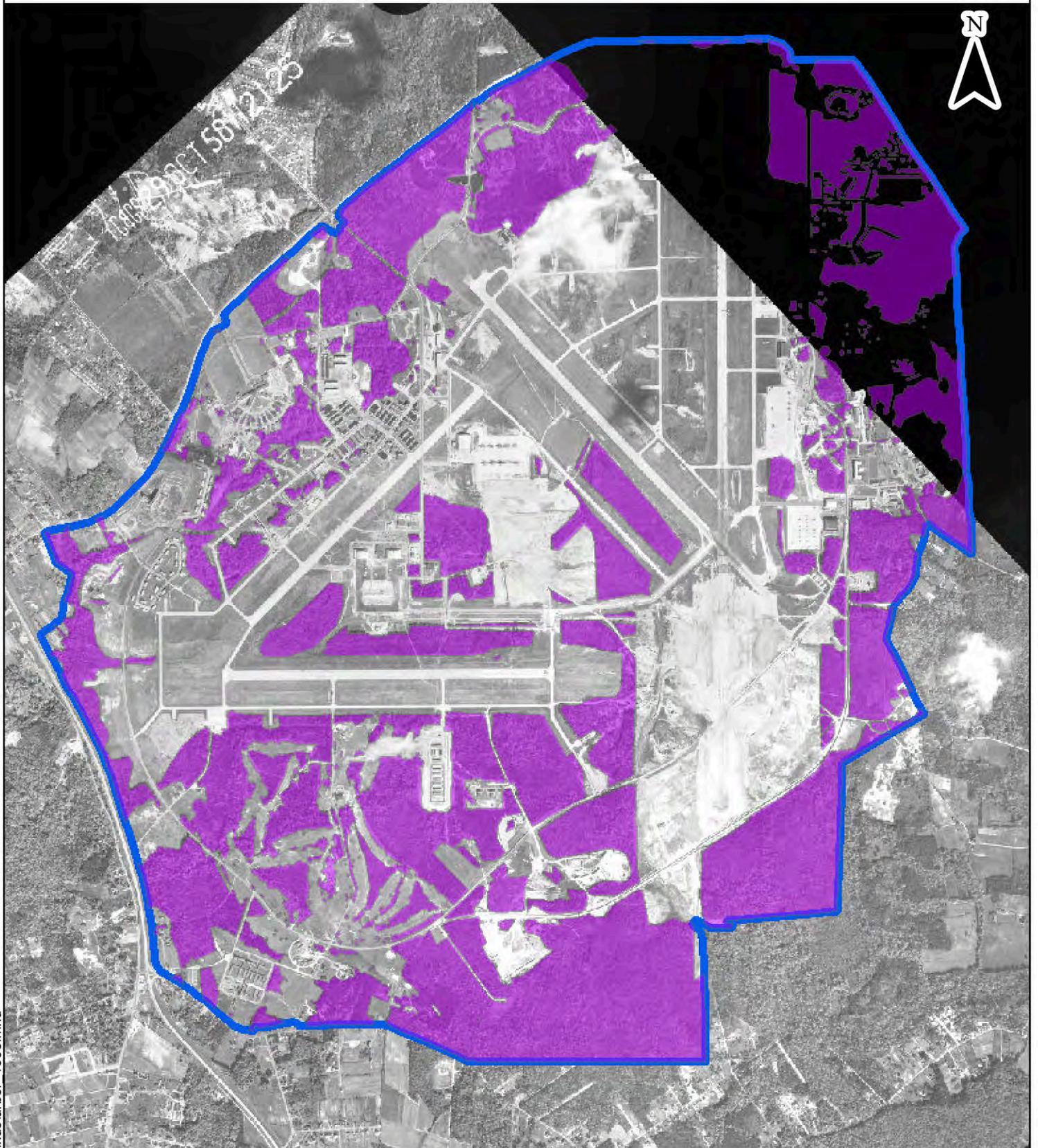
During this 41 year period, the tree cover diminished by approximately 676 acres. Over this time period several development projects led to the reduction in tree cover. Between 1959 and 1974, the base conducted a major airfield re-orientation from a triangular pattern to the current north-south aligned parallel runways to accommodate jet aircraft and reduce the risk to flying operations. Additional hanger space, parking, a subdivision and more industrial space was also added. In addition, the golf course was expanded an additional 18 holes. As a result of these activities, the tree cover lost over this sixteen year period was approximately 519 acres. Between 1974 and 1990, development continued to replace the old cross-wind runway areas of the Western Quadrant of the base. This included the construction of building 5016 and its associated parking areas. The tree cover lost over this sixteen year period as a result of these activities was approximately 26 acres. Between 1990 and 2000, continued infill in high-use areas diminished tree cover. Another 9 hole addition to the golf course was also completed during this time. These developments resulted in the loss of approximately 54 acres. Between 2000 and 2010, development on the base resulted in the loss of approximately 77 acres.

Therefore, the majority of tree cover acreage was lost between 1958 and 1974. Since that time, only 157 acres have been lost. The updated Arbor Plan has identified areas for reforestation and replanting that will help mitigate these losses. The proposed priority planting plans contained in this report alone can return approximately 90 acres of tree coverage back to the base or roughly 60 percent of the loss over the past 30 years (Note: acreage calculation assumes 50 trees per 1/4 acre. See page 117).

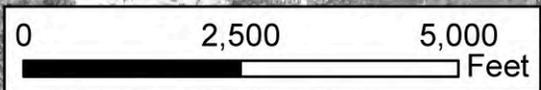
02

Forestry History

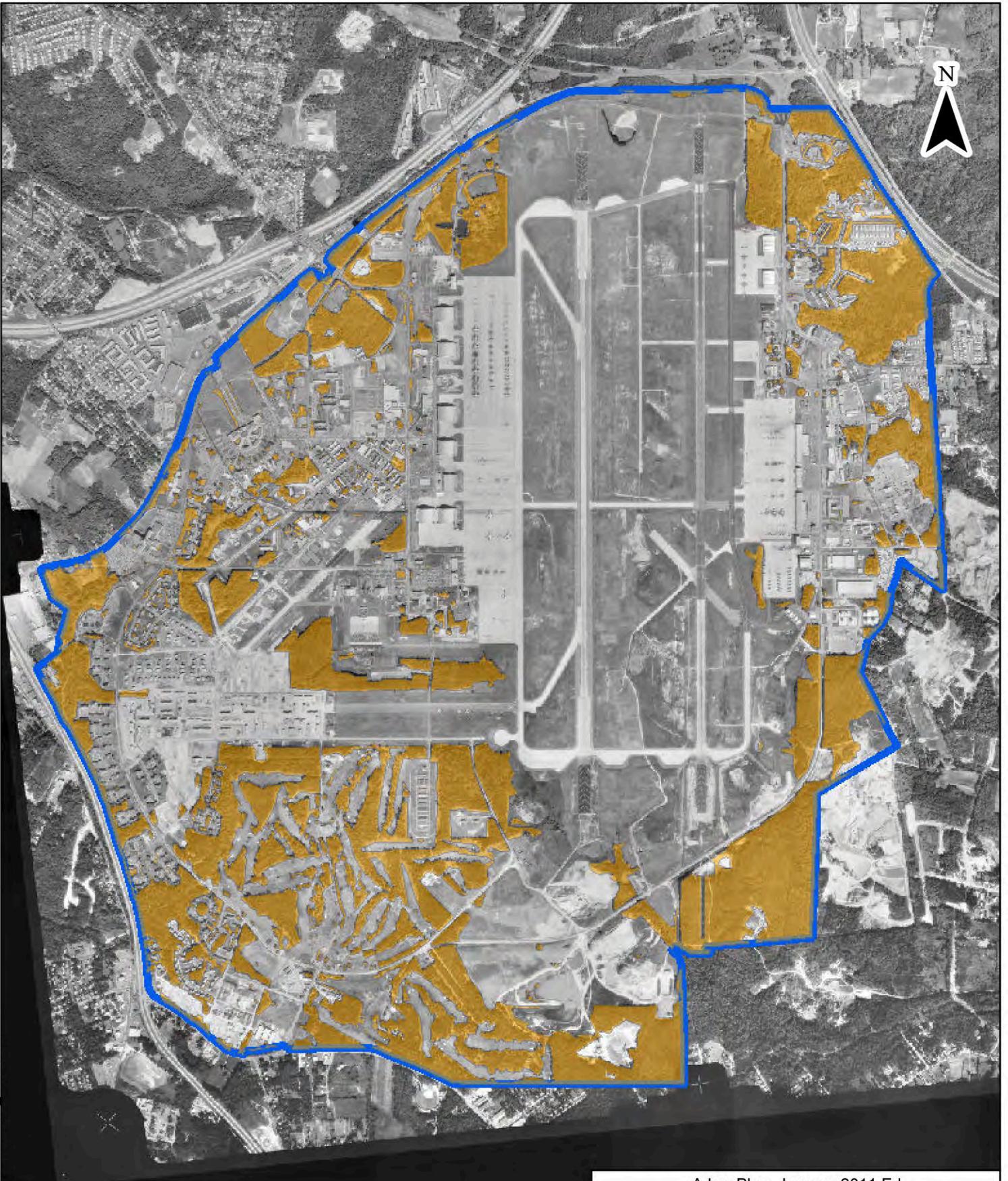
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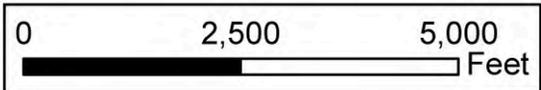
Tree Coverage Acres = 1,618



Arbor Plan, January 2011 Ed.	
Canopy Change Over Time	
Tree Canopy in 1958	
 Joint Base Andrews-NAF Washington, Maryland	 FIGURE NUMBER: 1



Tree Coverage Acres = 1,099



Arbor Plan, January 2011 Ed.

Canopy Change Over Time

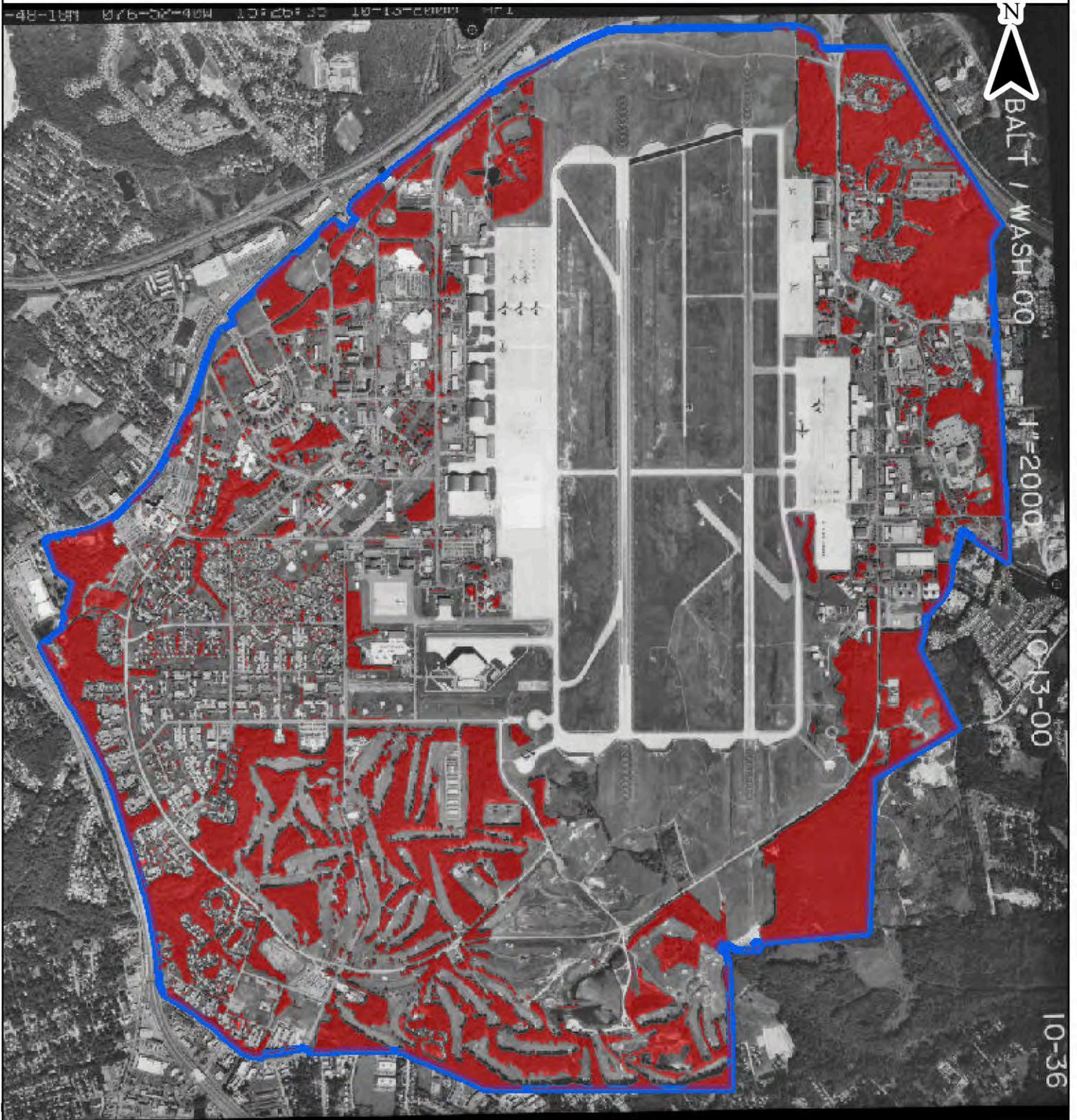
Tree Canopy in 1974



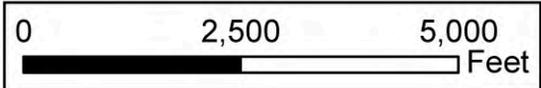
Joint Base Andrews-NAF
Washington, Maryland



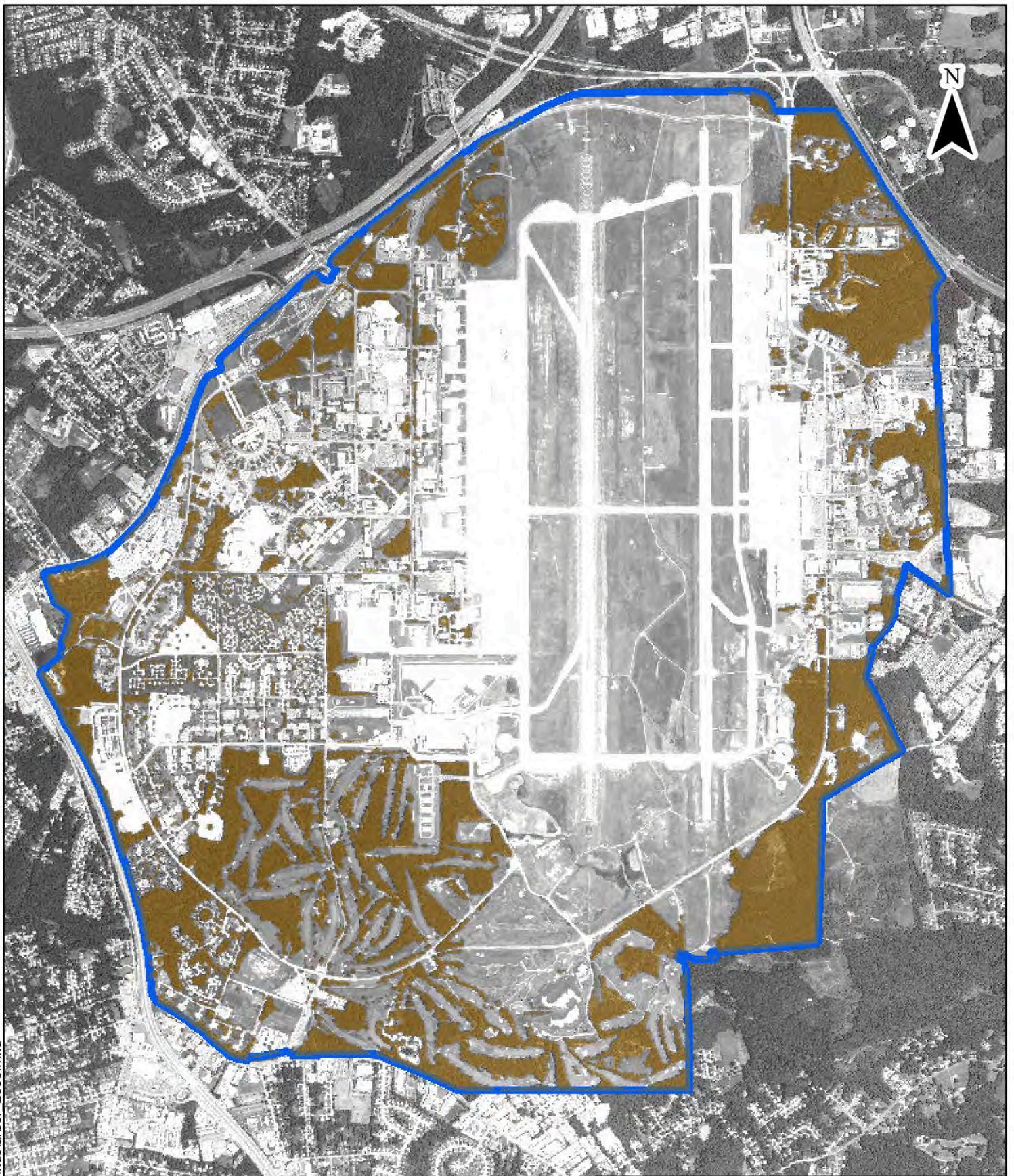
**FIGURE
NUMBER:**
2



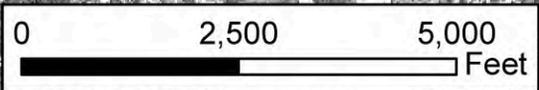
Tree Coverage Acres = 1,019



Arbor Plan, January 2011 Ed.	
Canopy Change Over Time	
Tree Canopy in 2000	
 Joint Base Andrews-NAF Washington, Maryland	 FIGURE NUMBER: 4



Tree Coverage Acres = 942



Arbor Plan, January 2011 Ed.	
Canopy Change Over Time	
Tree Canopy in 2009	
 Joint Base Andrews-NAF Washington, Maryland	 FIGURE NUMBER: 5

03 Priority Areas

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PRIORITY AREAS

The Arbor Plan has identified priority project areas ready for implementation. The three types of projects are:

- A: CORRIDORS
- B: GATEWAYS
- C: REFORESTATION

Corridors are the major roadways on the Base. The first visual introduction to a facility is generally seen from a vehicle. First perceptions are critical to visitors' impression of a facility. Streetscape plantings along the corridor will create an attractive, ecologically sound and safe environment for vehicles and pedestrians on the base. To highlight the entrance/exit points to the various areas on the base, Gateways have been proposed. The Gateways will consist of accent trees arranged in a formal grid to signify passage into a new area. Finally, reforestation areas have been proposed to begin reclamation of the base's forest stands.

The following plans have been developed by merging the existing GIS data with the future improvements proposed in the 2010 General Plan Update. Also included is a partial inventory of existing trees currently on base. The trees have been identified by species, as well as, condition. Each tree has been labeled either good or poor. Good trees are those of desirable species and are in overall good health. The proposed priority planting plans have utilized these trees as part of the future improvements design. Poor Trees are those of undesirable species and / or are in bad health. These trees are recommended for removal. The proposed priority planting plans have assumed their absence and provides replacement suggestions.

Each of the exhibits provides for proposed plantings as well. For reference, each of the proposed species used is included in section 04|Plant Database of this report. There you will find detailed information regarding each species including size, shape, growth requirements and interesting features.

03

Priority Areas

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PRIORITY AREAS

O1

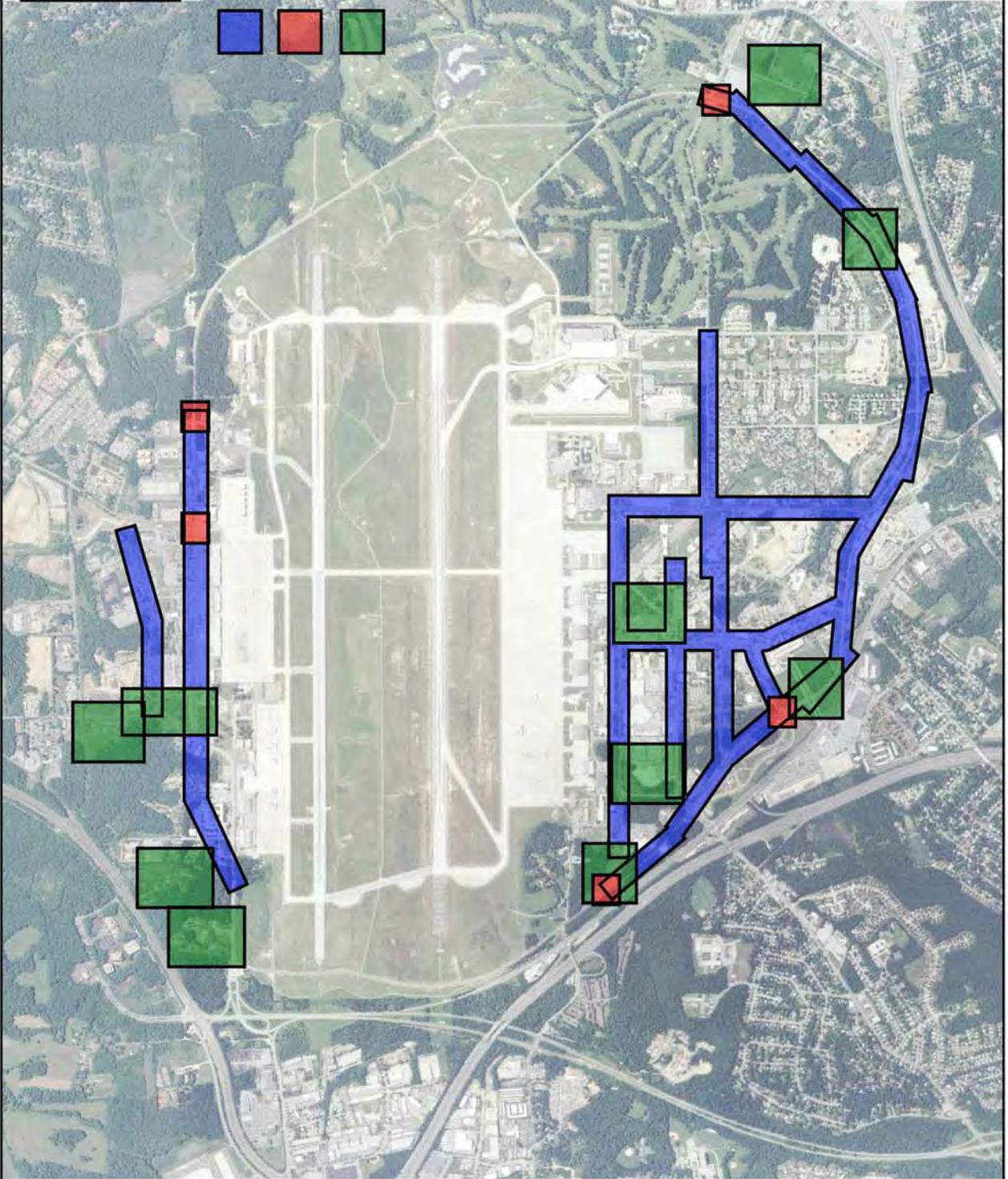
OVERALL MAP

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND

CORRIDOR

GATEWAY

REFORESTATION AREA



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03|A

Corridors

A: CORRIDORS

The Arbor Plan identifies main corridors on the base which shall be considered a priority planting initiative. Nine Corridors have been identified on the Base:

- A1: ARNOLD AVENUE
- A2: MENOHER DRIVE
- A3: BROOKLEY AVENUE
- A4: WEST PERIMETER ROAD
- A5: EAST PERIMETER ROAD
- A6: PENNSYLVANIA AVENUE
- A7: FUTURE D STREET
- A8: FUTURE COLORADO/ VIRGINIA STREET
- A9: FUTURE ALABAMA AVENUE EXTENTION

Planting plans have been developed along each of the above corridors. Streetscape plantings on DOD installations are important because roadways are the primary vantage points from which the installation is viewed and comprehended. A well-planned streetscape system reinforces the circulation system, creates a safer pedestrian and vehicular circulation system and enhances the visual image of the facility. The planting plan for each corridor specifies one street tree species. Using one species, will create a sense of place and identity for each corridor. For further explanation of design standards (i.e.- street tree planting requirements) used within these plans, See the Design Guidelines section of this report.

The total of Street Tree planting recommended on these corridors equates to approximately 9 acres (Note: acreage calculation assumes 50 trees per 1/4 acre. See page 117).

03 | A

Priority Areas | Corridors

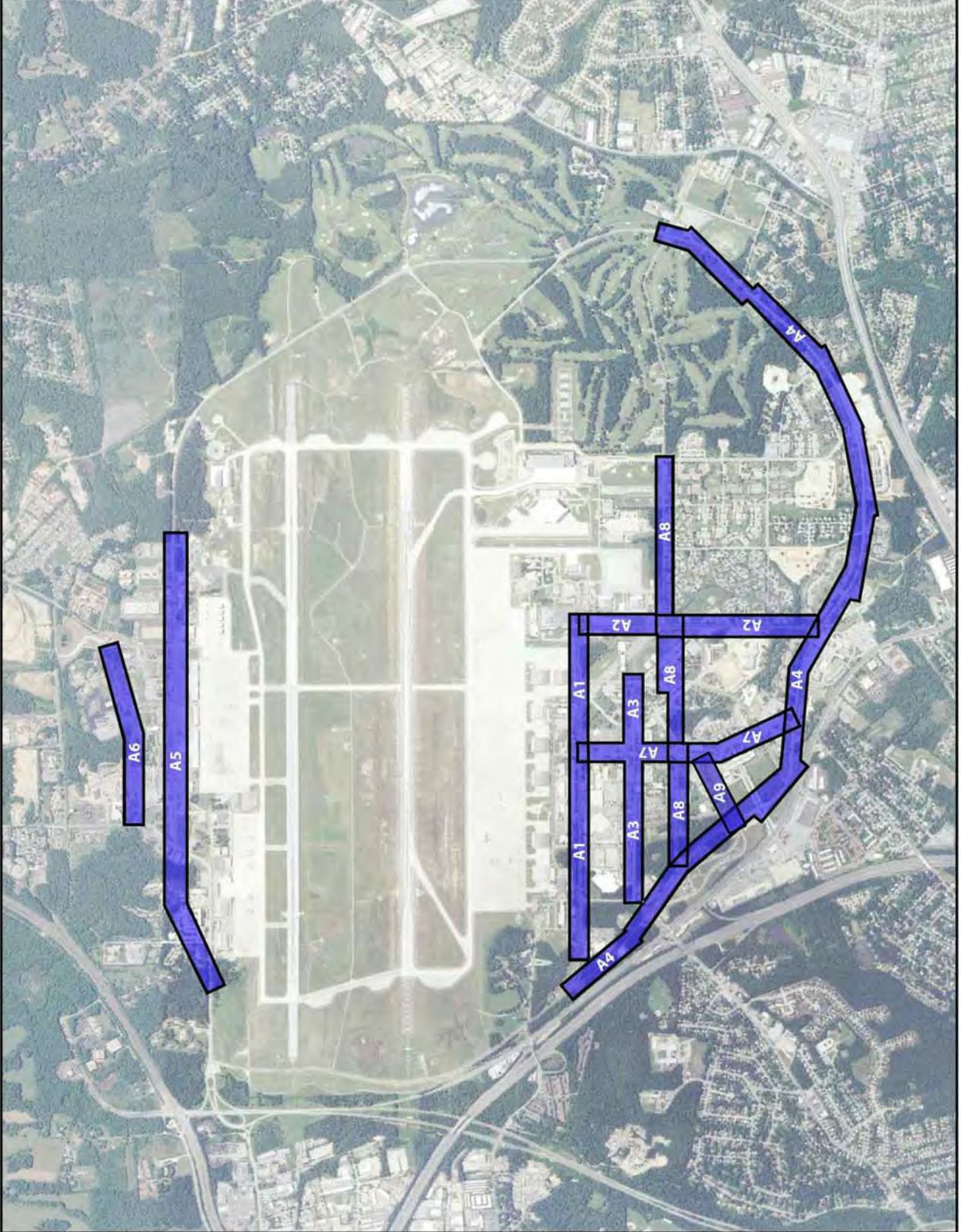
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CORRIDORS

A0

OVERALL MAP

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



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A1: ARNOLD AVENUE

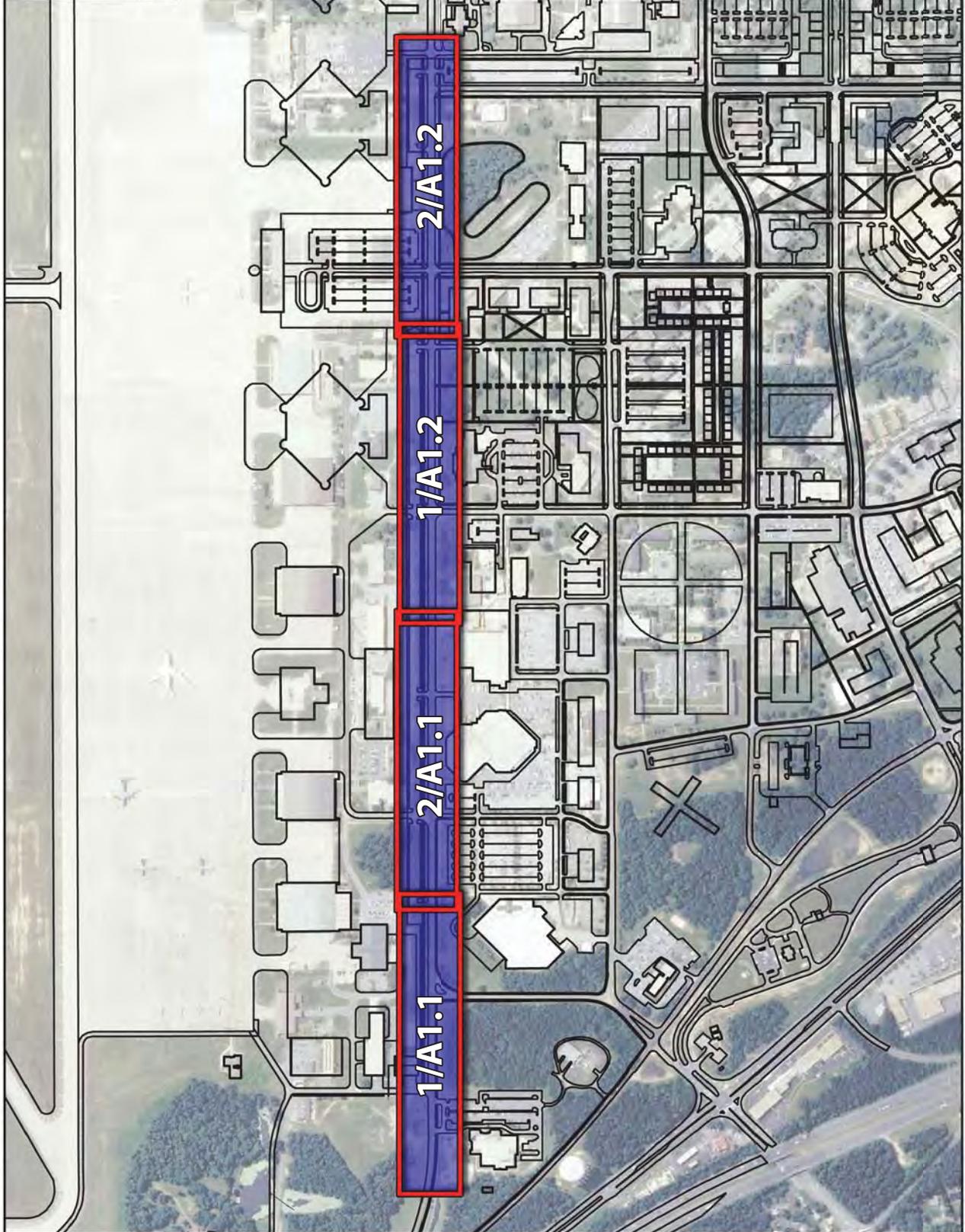
- Arnold Avenue runs north to south along the western edge of the airfield area. This corridor is unique in that it acts as the National Executive Route which transports senior officials, military leaders and foreign diplomats to the airfield. It runs approximately 6,000 linear feet between Westover Drive and Menoher Drive. It has 2 lanes plus left turn lanes, as well as, sidewalks along the eastern and western sides of the road. The sidewalk proposed for the western side will be back of curb. The sidewalk proposed for the eastern side will be approximately 15' back of curb. Several new parking areas are proposed for the eastern side of the road.
- Arnold Avenue should be defined by Willow Oak street trees at 50 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several tree varieties including Maples, Willow Oaks, Bradford Pears, Cherries, and White Pines.
- The existing Bradford Pears and other trees that are in poor shape should be removed.
- Existing plantings identified as in good condition should be preserved and supplemented.
- Reforestation and naturalization plantings should be added to enhance existing forested areas.

CORRIDOR KEY MAP

A1.0

ARNOLD AVENUE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



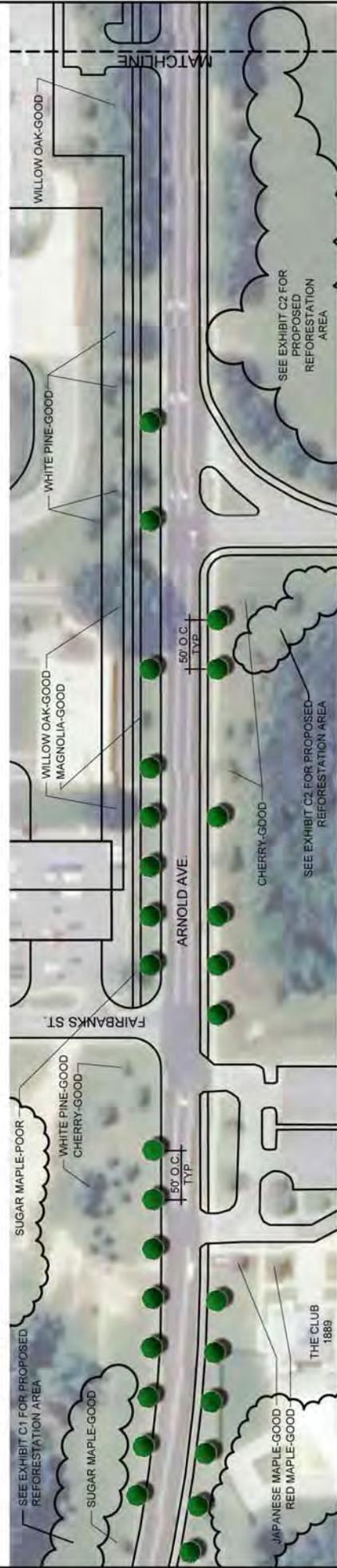
CORRIDOR
A1.1
ARNOLD AVENUE
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND

PROPOSED STREET TREE

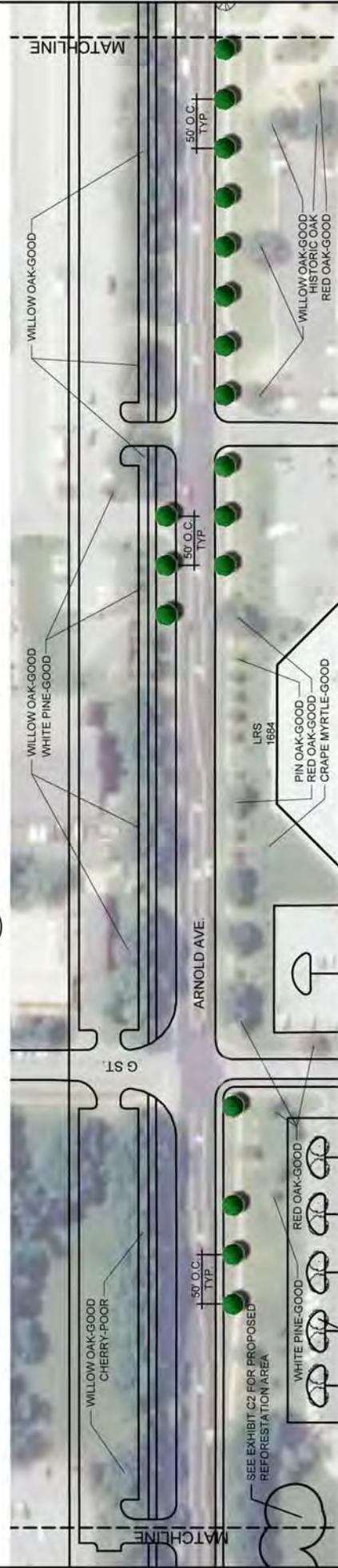
= WILLOW OAK

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.



1 ARNOLD AVENUE - 1 OF 4
 A1.1 PLAN
 NTS



2 ARNOLD AVENUE - 2 OF 4
 A1.1 PLAN
 NTS

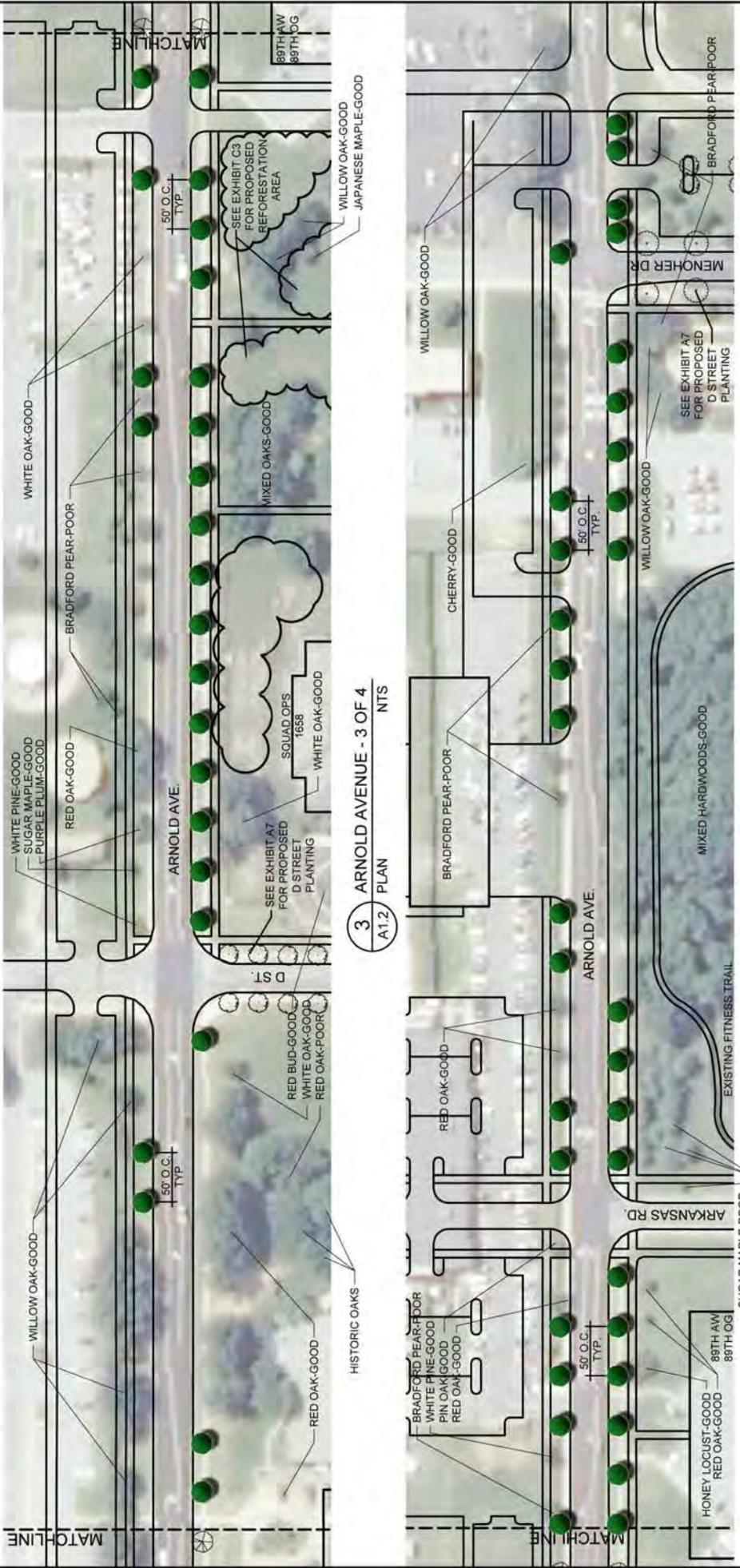
CORRIDOR
A1.2
ARNOLD AVENUE
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

PROPOSED STREET TREE

● = WILLOW OAK



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A2: MENOHER DRIVE

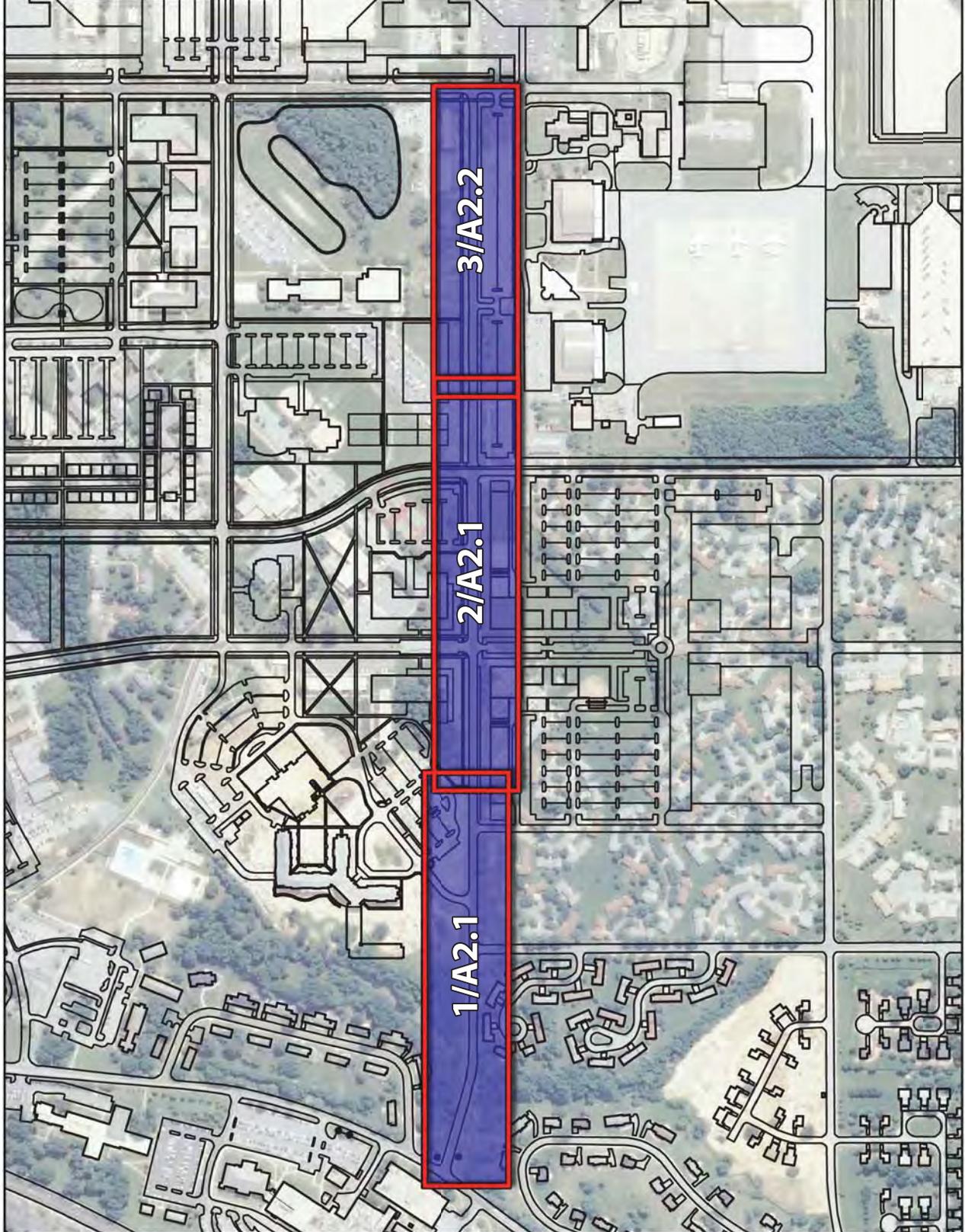
- Menoher Drive runs east to west beginning at Arnold Avenue and ending at West Perimeter Road. It is approximately 3,000 linear feet. It has 2 lanes with sidewalks proposed along both sides of the road. A broad sidewalk/plaza is proposed for the commercial area on the southern side of the road from the roadway adjacent to the area proposed for future housing to Virginia Avenue. On the northern side of the road to Virginia Avenue, a community center and library and education center with associated parking are proposed. Eastward beyond Virginia Avenue, recreation and open space are proposed. The sidewalk proposed along the northern side of the road will be approximately 15' back of curb from the Visiting Quarters eastward of Virginia Avenue. New parking lots are also proposed on both sides of Menoher.
- Menoher Avenue should be defined by Shumard Oak street trees at 50 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears, Grape Myrtles, Lindens, and White Pine.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A2.0

MENOHER DRIVE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



CORRIDOR
A2.1
MENOHER DRIVE
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

PROPOSED STREET TREE

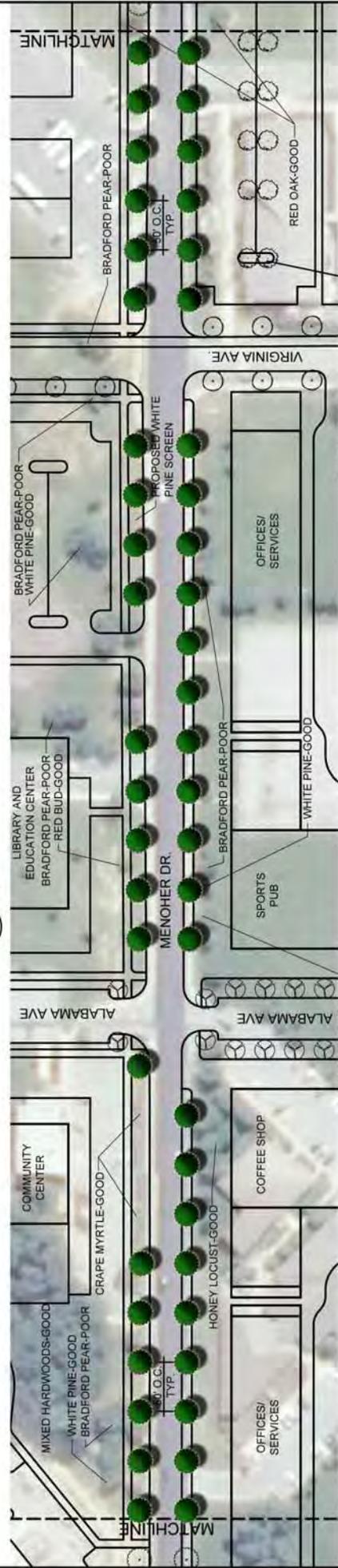
● = SHUMARD OAK



SCALE - 1" = 100'



1 MENOHER DRIVE - 1 OF 3
 A2.1 PLAN NTS



2 MENOHER DRIVE - 2 OF 3
 A2.1 PLAN NTS

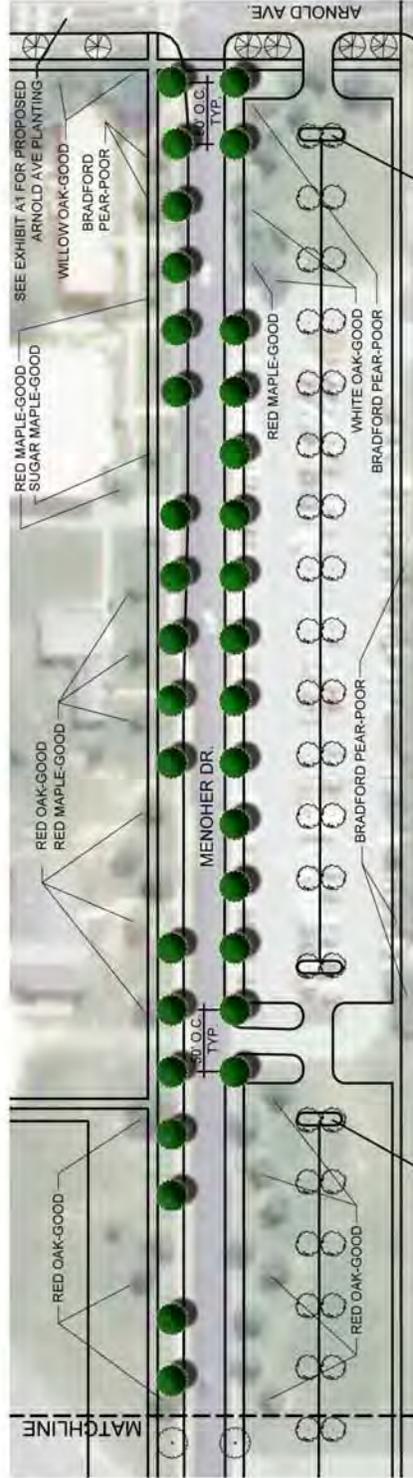
TYPICAL PARKING LOT PLANTING:
 SEE DESIGN GUIDELINES
 SECTION FOR PARKING LOT
 PLANTING GUIDE.

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

PROPOSED STREET TREE

= SHUMARD OAK



3 MENOHER DRIVE - 3 OF 3
 A2.2 PLAN NTS

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A3: BROOKLEY AVENUE

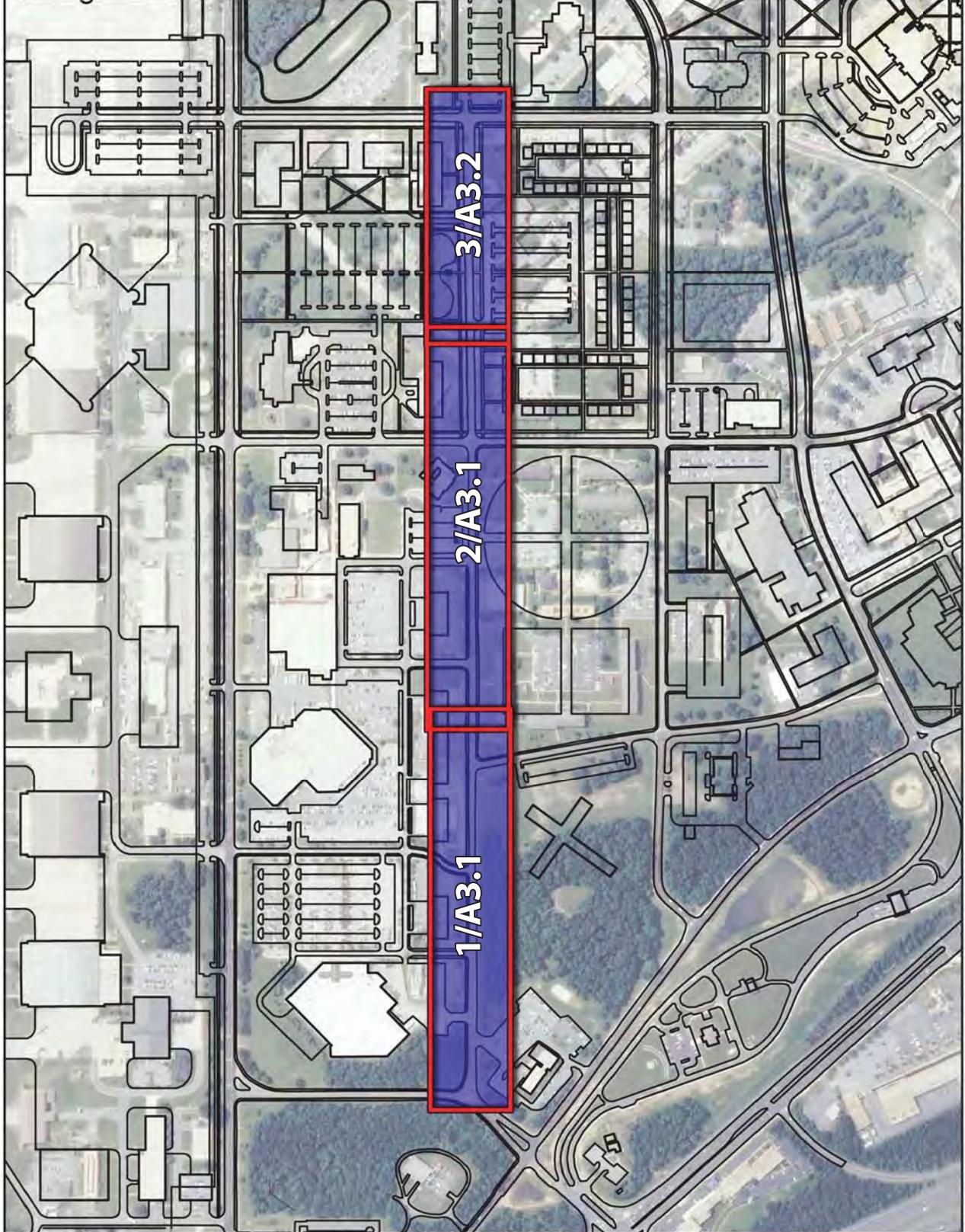
- Brookley Avenue runs north to south. It begins at North Perimeter Road and ends at Arkansas Road after approximately 3,500 linear feet. It has 2 lanes with existing sidewalks and proposed sidewalks along both sides of the road. The sidewalk proposed along the eastern and western side of the road is at the back of curb from North Perimeter Road to D Street and then will be approximately 15' from the back of curb to Arkansas Street. Several existing parking lots will be removed and replaced with buildings. An active recreation area is proposed between F Street and D Street. There is an existing parking lot for the Chapel III building and a proposed parking lot on the western side of the road between D Street and Arkansas Road. A rain garden is also proposed for an area along the eastern side of the road approximately midway between D Street and Arkansas Road.
- Brookley Avenue should be defined by Nuttall Oak street trees at 50 linear feet on center.
- A mixture of white pines have also been added to provide a natural buffer between the airfield and the westside of the Airmen Dorms.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears, Cherries, Sycamores, and White Pine.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A3.0

BROOKLEY AVENUE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND





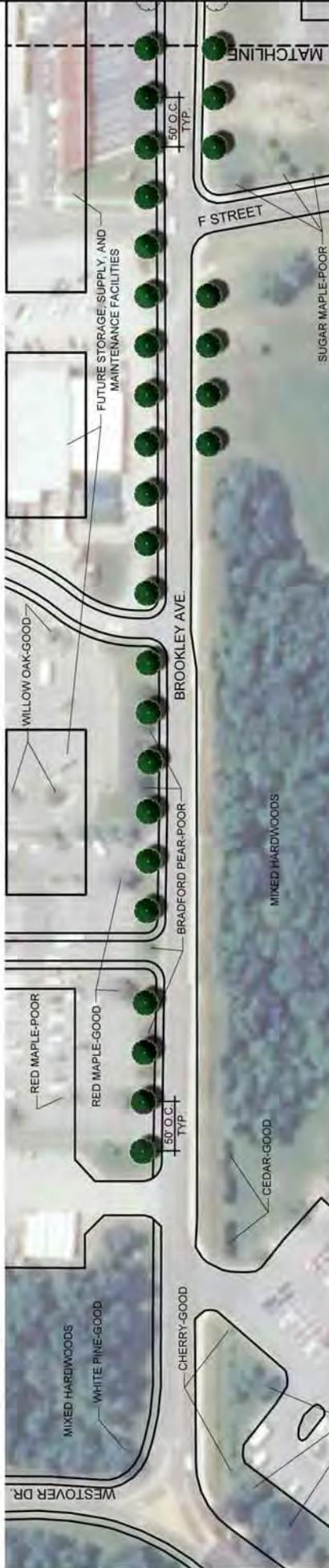
PROPOSED STREET TREE

- = NUTTALL OAK
- = WHITE PINE

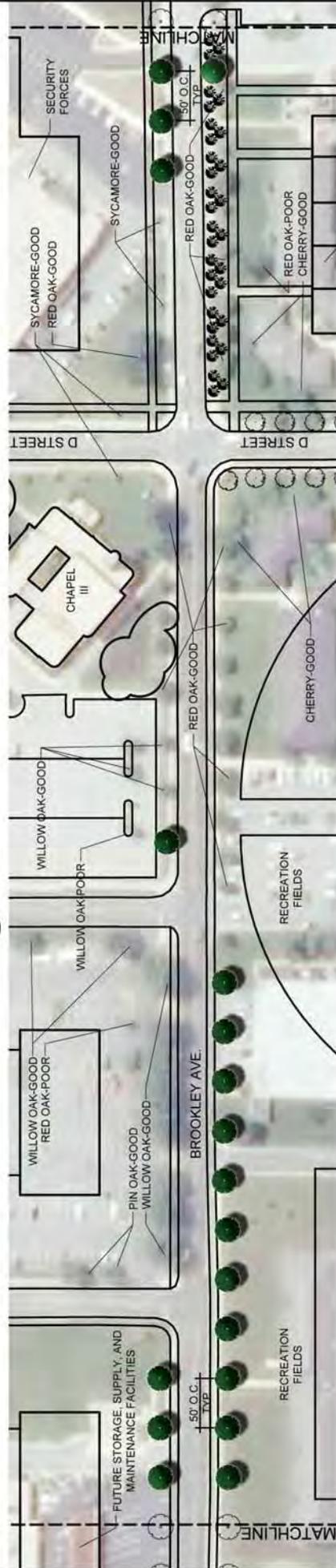
EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A3.1
 BROOKLEY AVENUE
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



1 BROOKLEY AVENUE - 1 OF 3
 A3.1 PLAN
 NTS



2 BROOKLEY AVENUE - 2 OF 3
 A3.1 PLAN
 NTS



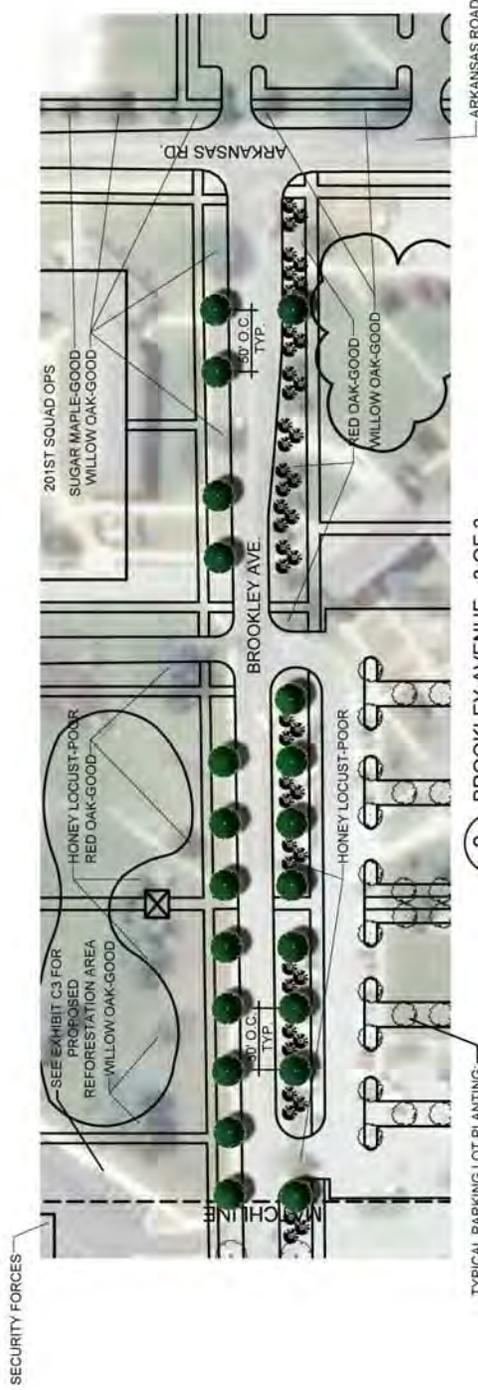
PROPOSED STREET TREE

- = NUTTALL OAK
- = WHITE PINE

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A3.2
 BROOKLEY AVENUE
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



3 BROOKLEY AVENUE - 3 OF 3
 A3.2/ PLAN NTS

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A4: WEST PERIMETER ROAD

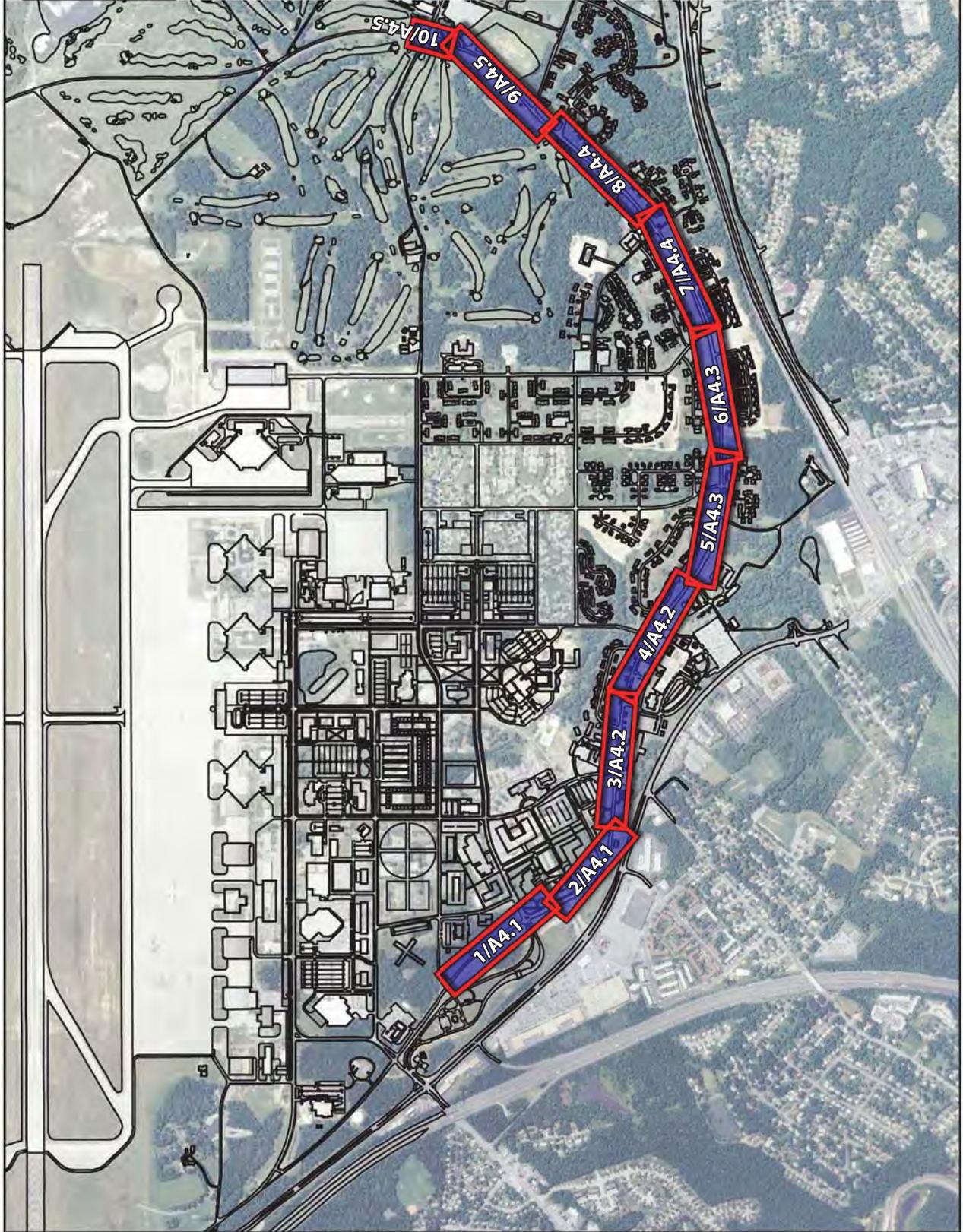
- West Perimeter Road is the outer ring road on the western side of the installation. It runs north/south. It begins as North Perimeter Road and transitions to West Perimeter Road at the Arnold Road intersection and then transitions to South Perimeter Road at the Virginia Avenue intersection and is approximately 16,500 linear feet. It varies between 2 and 4 lanes with left turn lanes. There are existing sidewalks and proposed sidewalks along both sides of the road and the sidewalk is sometimes back of curb and at others 5 to 15' back of curb. West Perimeter is basically an access road with limited ingress and egress points. A few parking lots are visible from the road and some houses back up to the road. In one area, it serves as the front yard of some houses.
- West Perimeter Road Avenue should be primarily defined by Princeton Elm street trees at 50 linear feet on center.
- Due to the extreme length of this corridor however, there are two stretches of road in which the street trees should shift species to compliment existing vegetation. One stretch should be defined by a rotation of White Pines with Littleleaf Linden trees. The other stretch should be defined by Willow Oaks alternating with Red Maples.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears, Lindens, and White Pine. Some of the plant material has been recently installed and others are mature specimens. There are also broad expanses of forested areas composed of mixed hardwoods. Two gateways are located on this road. The first is just south of Maryland Drive and the second is at the intersection of Virginia Avenue.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A4.0

W. PERIMETER RD

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



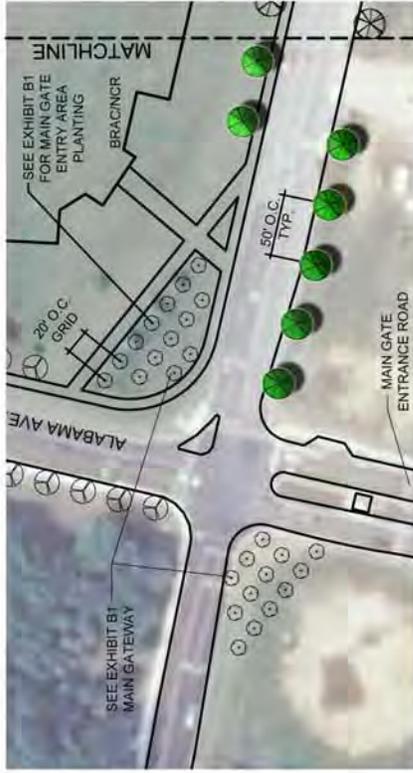
PROPOSED STREET TREE

 = PRINCETON ELM

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A4.1
W. PERIMETER RD
JOINT BASE ANDREWS - NAVAL AIR FACILITY WASHINGTON, MARYLAND



PROPOSED STREET TREES

-  = PRINCETON ELM
-  = RED MAPLE
-  = AMERICAN HOLLY
-  = WILLOW OAK

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A4.2
 W. PERIMETER RD
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



3 WEST PERIMETER ROAD - 3 OF 10
 A4.2 PLAN NTS



4 WEST PERIMETER ROAD - 4 OF 10
 A4.2 PLAN NTS



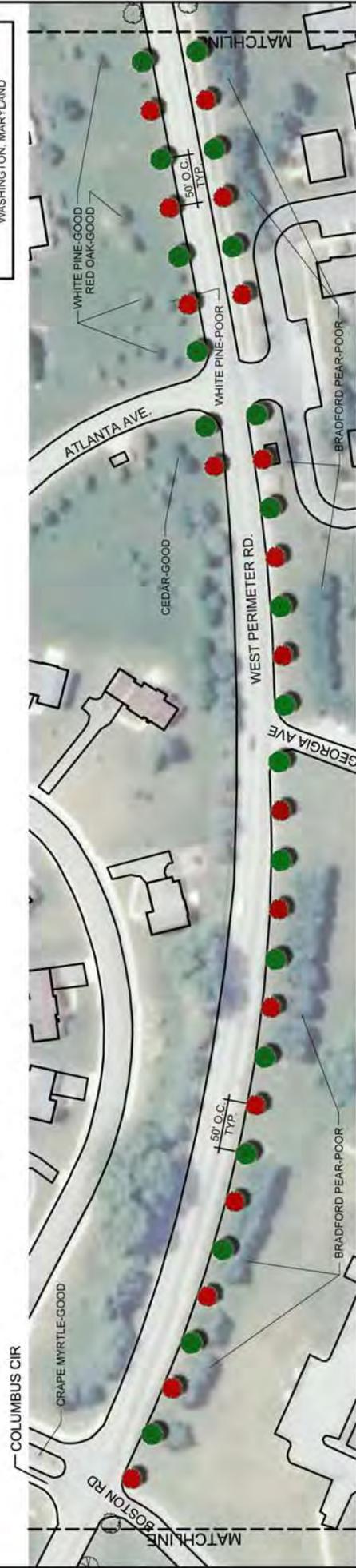
PROPOSED STREET TREES

-  = RED MAPLE
-  = LITTLELEAF LINDEN
-  = WHITE PINE
-  = WILLOW OAK

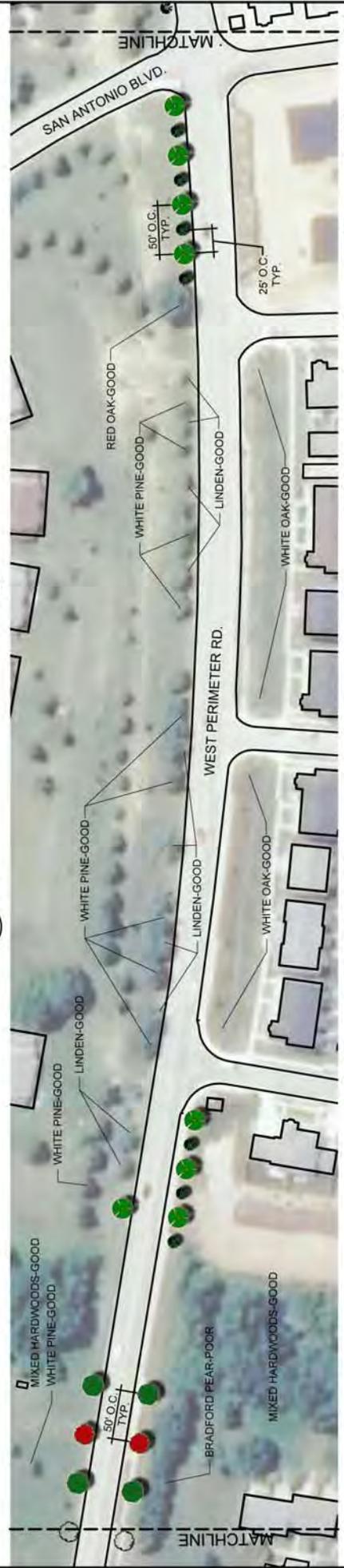
EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A4.3
 W. PERIMETER RD
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



5 WEST PERIMETER ROAD - 5 OF 10
 A4.3 PLAN
 NTS



6 WEST PERIMETER ROAD - 6 OF 10
 A4.3 PLAN
 NTS



PROPOSED STREET TREES

-  = PRINCETON ELM
-  = LITTLELEAF LINDEN
-  = WHITE PINE

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A4.4
 W. PERIMETER RD
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



7 WEST PERIMETER ROAD - 7 OF 10
 A4.4 PLAN
 NTS



8 WEST PERIMETER ROAD - 8 OF 10
 A4.4 PLAN
 NTS



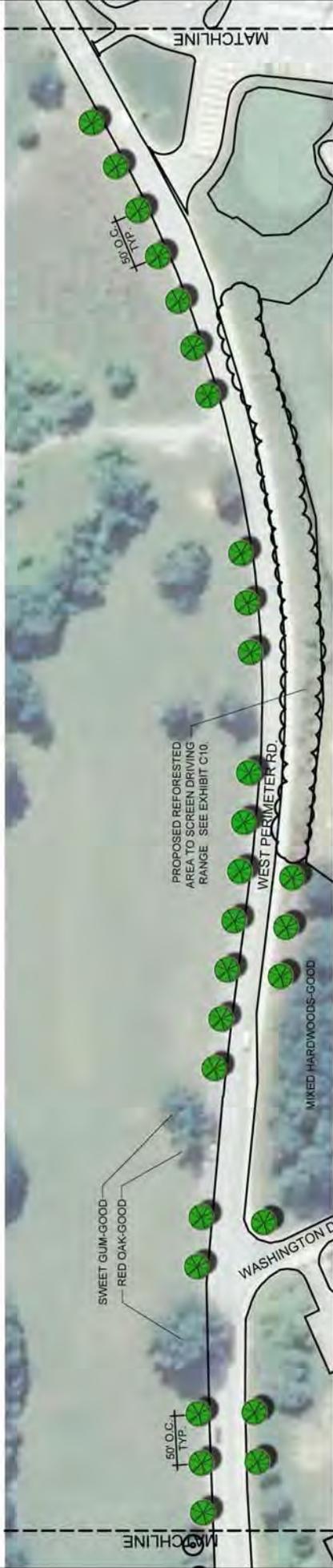
PROPOSED STREET TREES

PRINCETON ELM

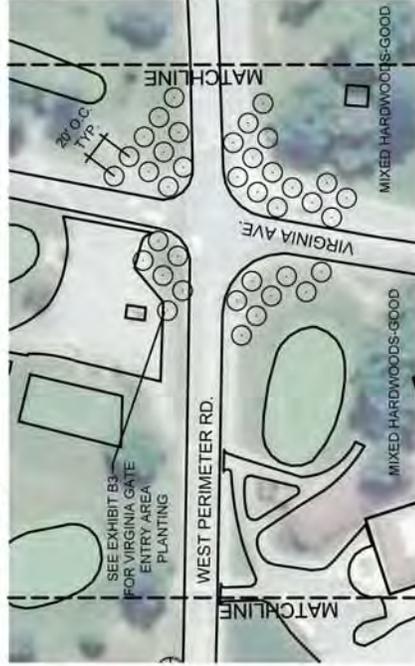
EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A4.5
 W. PERIMETER RD
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



9 WEST PERIMETER ROAD - 9 of 10
 A4.5 / PLAN NTS



10 WEST PERIMETER ROAD - 10 of 10
 A4.5 / PLAN NTS



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A5: EAST PERIMETER ROAD

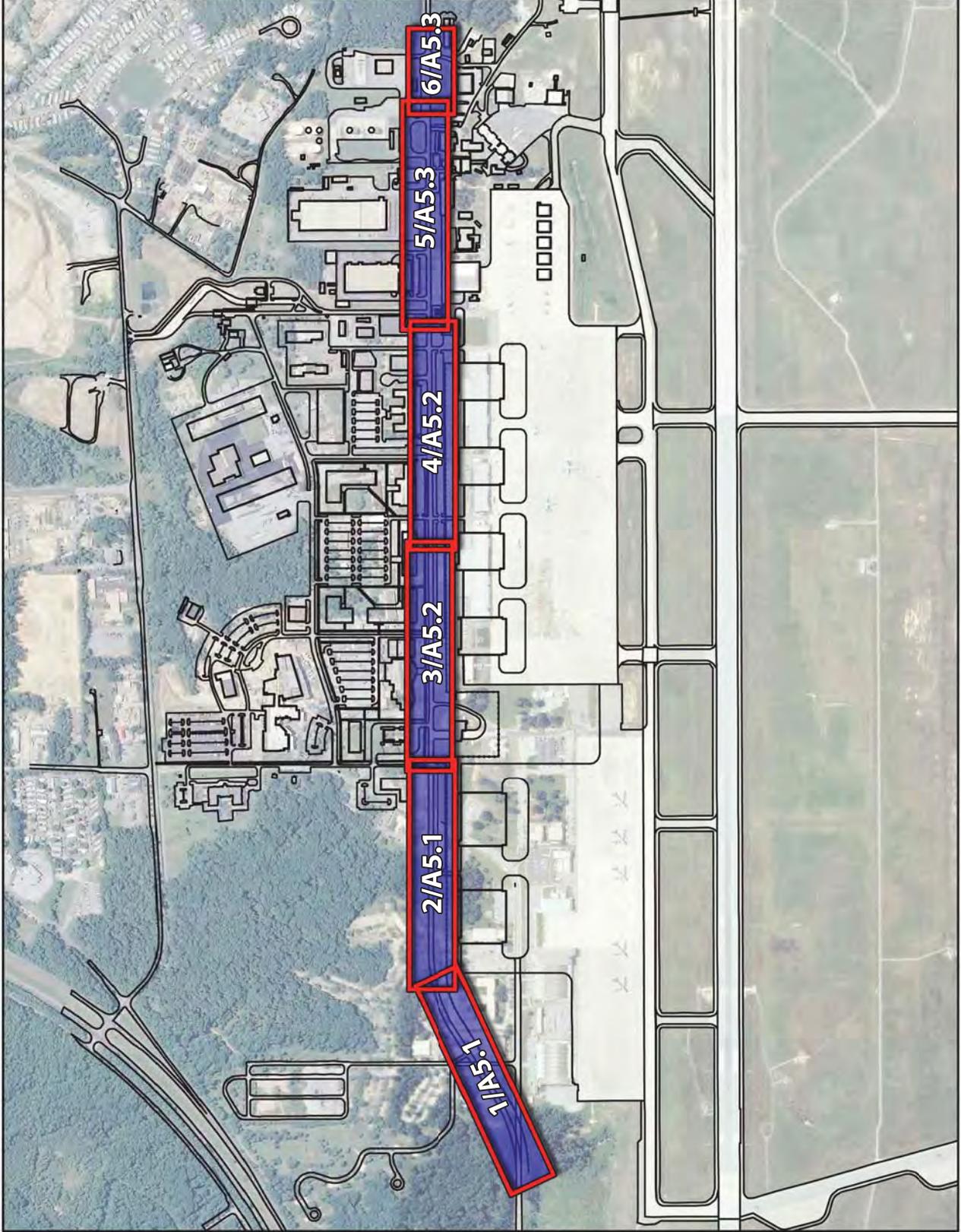
- East Perimeter Road is the outer ring road on the eastern side of the installation. It runs north/south beginning at the north gate and ending at the Virginia Avenue intersection. For the Arbor Plan, the section of road studied begins approximately 1100' north of Warfield Road and ends about 800' south of the North Gate. A portion of the road will be relocated to the east of the existing roadway. Where the road currently bends westward, the roadway will proceed straight through existing developed and forested areas. The study anticipates the new alignment. The portion of East Perimeter Road in the Arbor Plan is approximately 4,600 linear feet. New development consisting of hangers, administrative and headquarters buildings, a fitness center and a commercial building is proposed. There is consolidated parking proposed along the western side of the road outside of Pathfinder fence. There are also several existing parking lots along the eastern side of the road. The road is primarily a 2 lane road with several egress and ingress points.
- East Perimeter Road should be defined by Sugar Maple street trees at 50 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears, Lindens, and White Pine. Some of the plant material has been recently installed and others are mature specimens. There are also broad expanses of forested areas composed of mixed hardwoods. A gateway is located at the intersection of Pearl Harbor.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A5.0

E. PERIMETER RD

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED STREET TREES

● = SUGAR MAPLE

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR

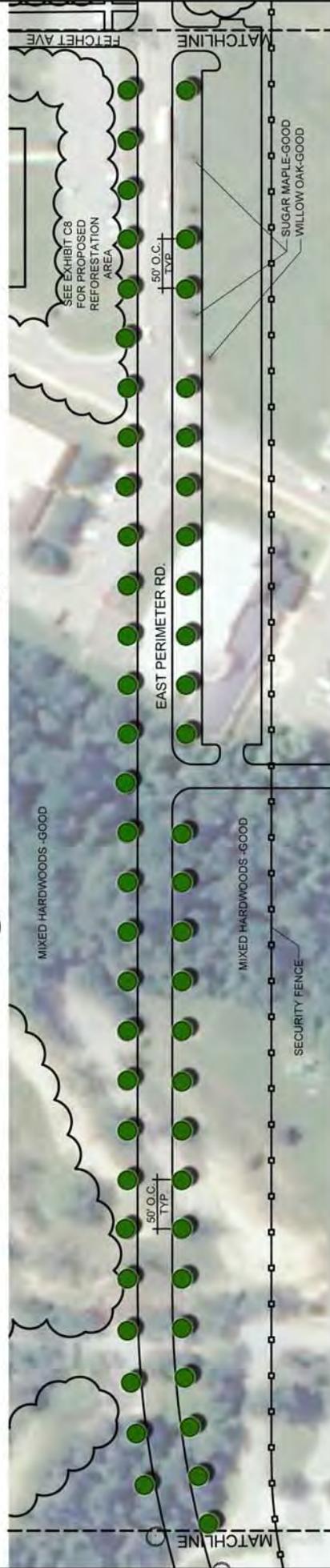
A5.1

E. PERIMETER RD

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



1 EAST PERIMETER ROAD - 1 OF 6
A5.1 PLAN NTS



2 EAST PERIMETER ROAD - 2 OF 6
A5.1 PLAN NTS



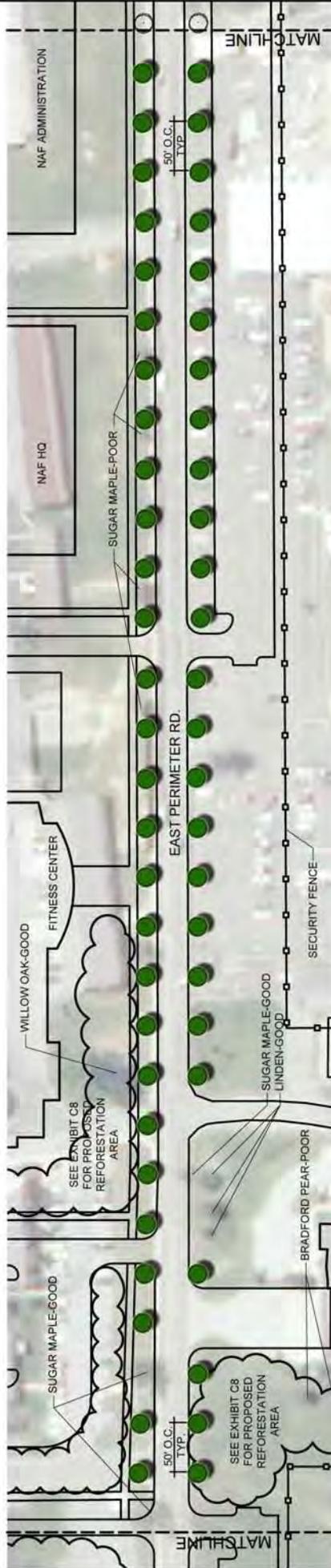
PROPOSED STREET TREES

● = SUGAR MAPLE

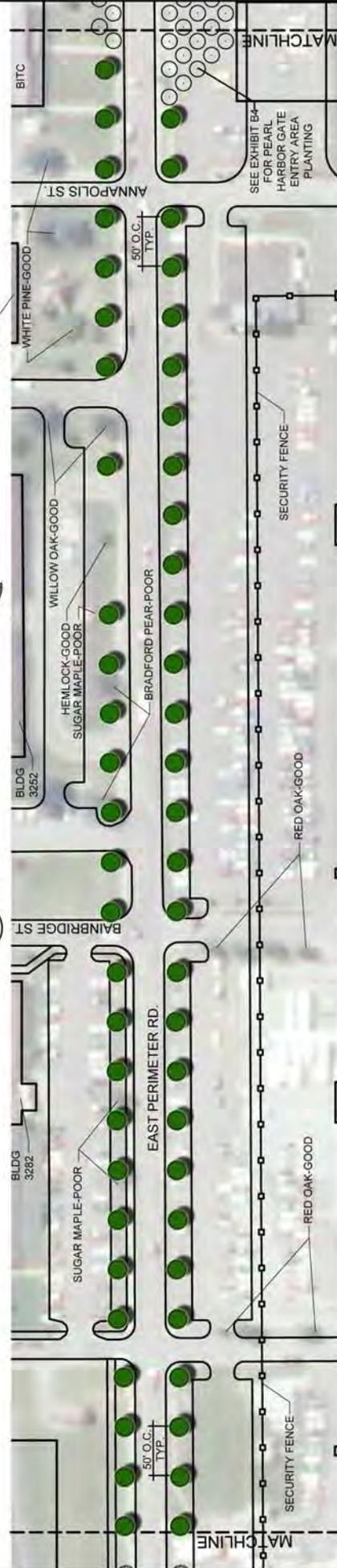
EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A5.2
 E. PERIMETER RD
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



3 EAST PERIMETER ROAD - 3 OF 6
 A5.2 PLAN NTS



4 EAST PERIMETER ROAD - 4 OF 6
 A5.2 PLAN NTS



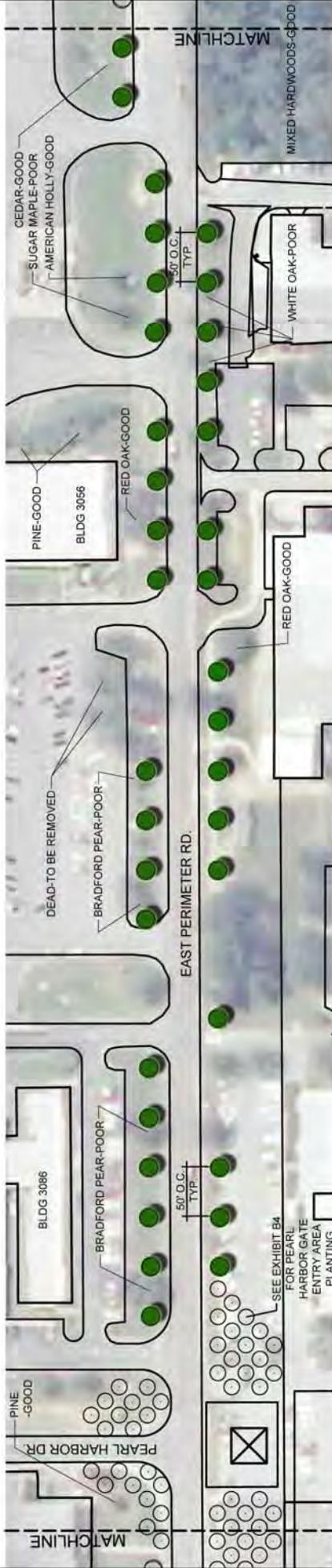
PROPOSED STREET TREES

● = SUGAR MAPLE

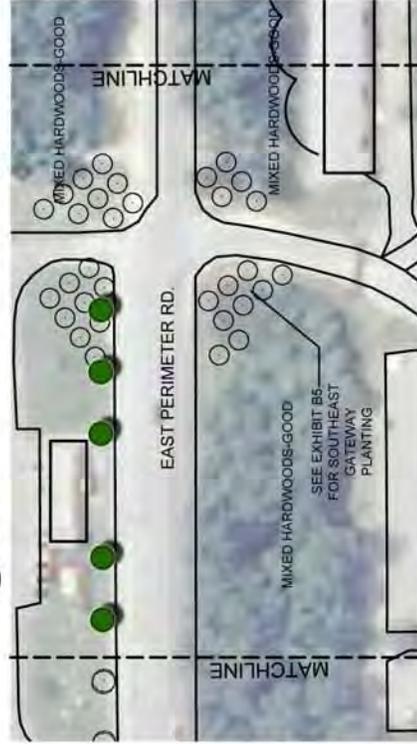
EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A5.3
 E. PERIMETER RD
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



5 EAST PERIMETER ROAD - 5 OF 6
 A5.3 PLAN
 NTS



6 EAST PERIMETER ROAD - 6 OF 6
 A5.3 PLAN
 NTS



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A6: PENNSYLVANIA AVENUE

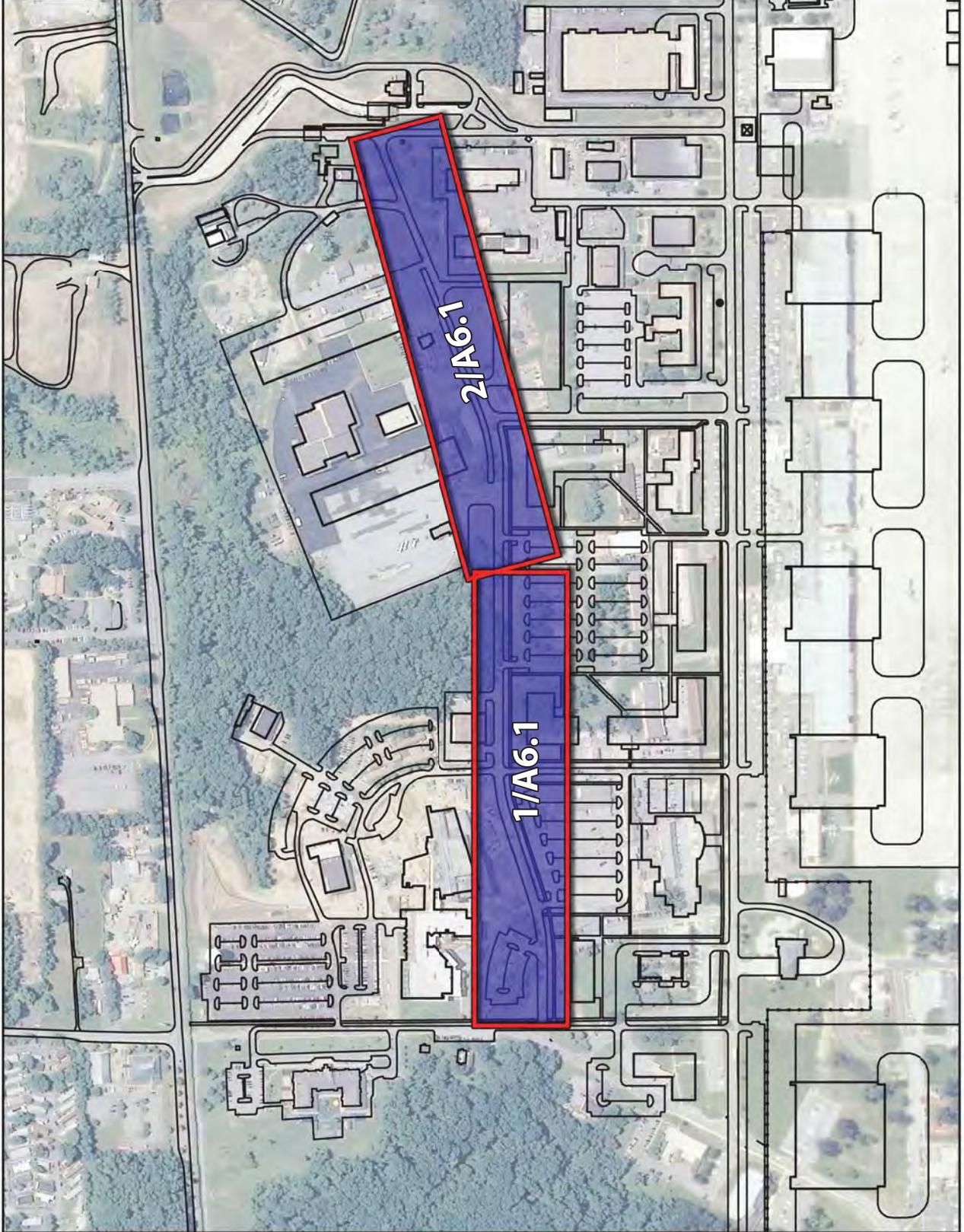
- Pennsylvania Avenue runs north south and begins at the realigned Fetchet Road and runs southward ending at Pearl Harbor. The road is approximately 1,750 linear feet. An industrial complex is proposed for the western side of the road, and 2 large parking areas to serve the future administration and headquarters building on the eastern side of the road are proposed. The road is primarily a 2 lane road with several egress and ingress points. Sidewalks are proposed 15' back of curb on the western side of the street.
- Pennsylvania Avenue should be defined by Honey Locust street trees at 30 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears and White Pine.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A6.0

PENNSYLVANIA AVENUE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED STREET TREES

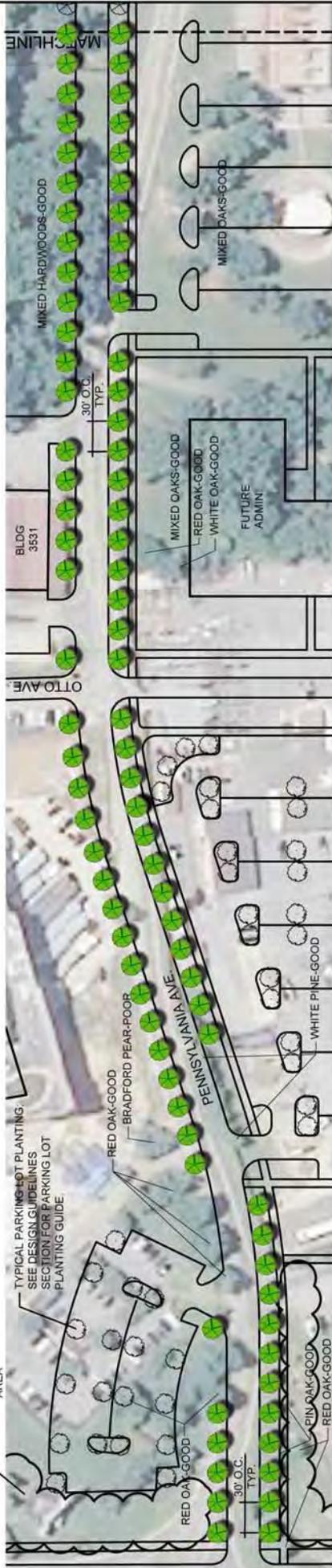
● = HONEY LOCUST

SEE EXHIBIT C8
FOR PROPOSED
REForestation
AREA

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A6.1
PENNSYLVANIA AVENUE
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



1 PENNSYLVANIA AVENUE - 1 OF 2
A6.1 PLAN
NTS



2 PENNSYLVANIA AVENUE - 2 OF 2
A6.1 PLAN
NTS



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A7: FUTURE D STREET

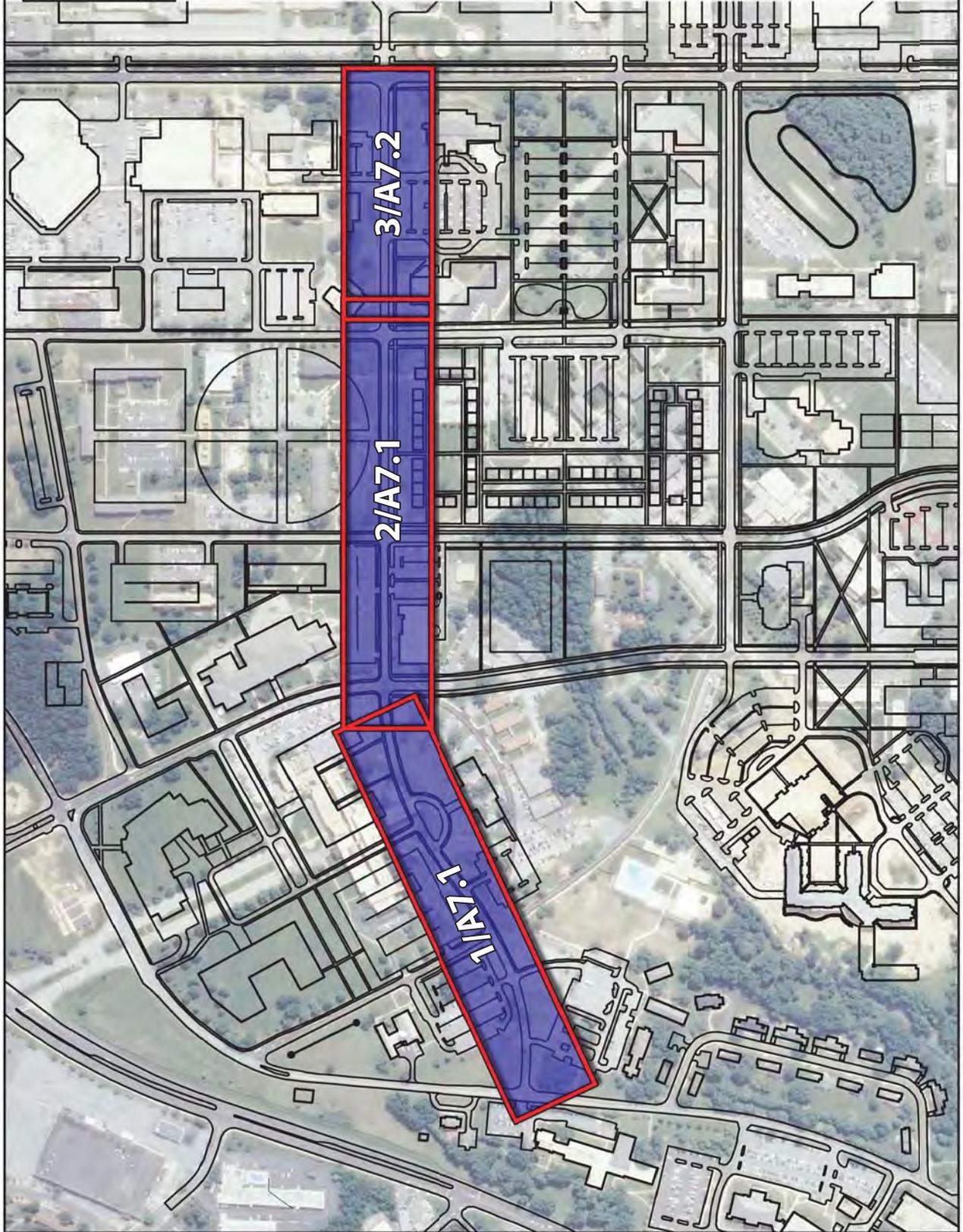
- Future D Street runs east west and begins on the westerly end at North Perimeter Road and ends at Arnold Ave. A portion of the road will be extended to the west to North Perimeter. D Street currently ends at Alabama Avenue. The proposed road veers southward and intersects North Perimeter about 400' south of the existing Chapel. The study anticipates the new alignment. The portion of Road in the Arbor Plan is approximately 2,700 linear feet. Airmen dorms and the 316th Wing of AFDW HQ are proposed on the southern side of the road. A recreation complex, future administrative buildings and a parking deck and are proposed on the northern side. The road is primarily a 2 lane road with several egress and ingress points. Sidewalks are proposed back of curb along the northern side of the road and back of curb to Alabama Street then 15' back of curb for the remainder of the street.
- Future D Street should be defined by Red Maple street trees at 30 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Redbuds, Sycamores and White Pine.
- The existing trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A7.0

FUTURE D STREET

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED STREET TREES

● = RED MAPLE

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR

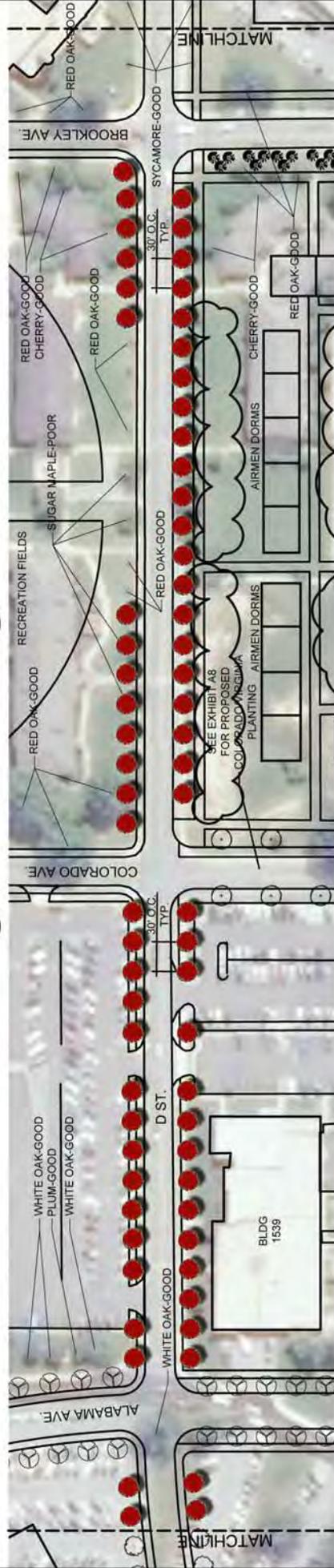
A7.1

FUTURE D STREET

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



1 FUTURE D STREET - 1 OF 3
A7.1 PLAN NTS



2 FUTURE D STREET - 2 OF 3
A7.1 PLAN NTS



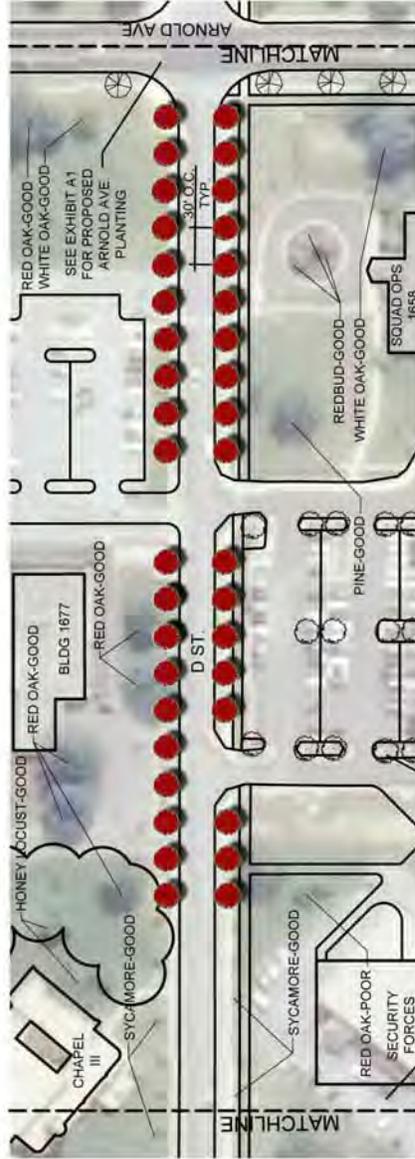
PROPOSED STREET TREE

● = RED MAPLE

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A7.2
FUTURE D STREET
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



3 FUTURE D STREET - 3 OF 3
A7.2 PLAN NTS

TYPICAL PARKING LOT PLANTING:
SEE DESIGN GUIDELINES
SECTION FOR PARKING LOT
PLANTING GUIDE



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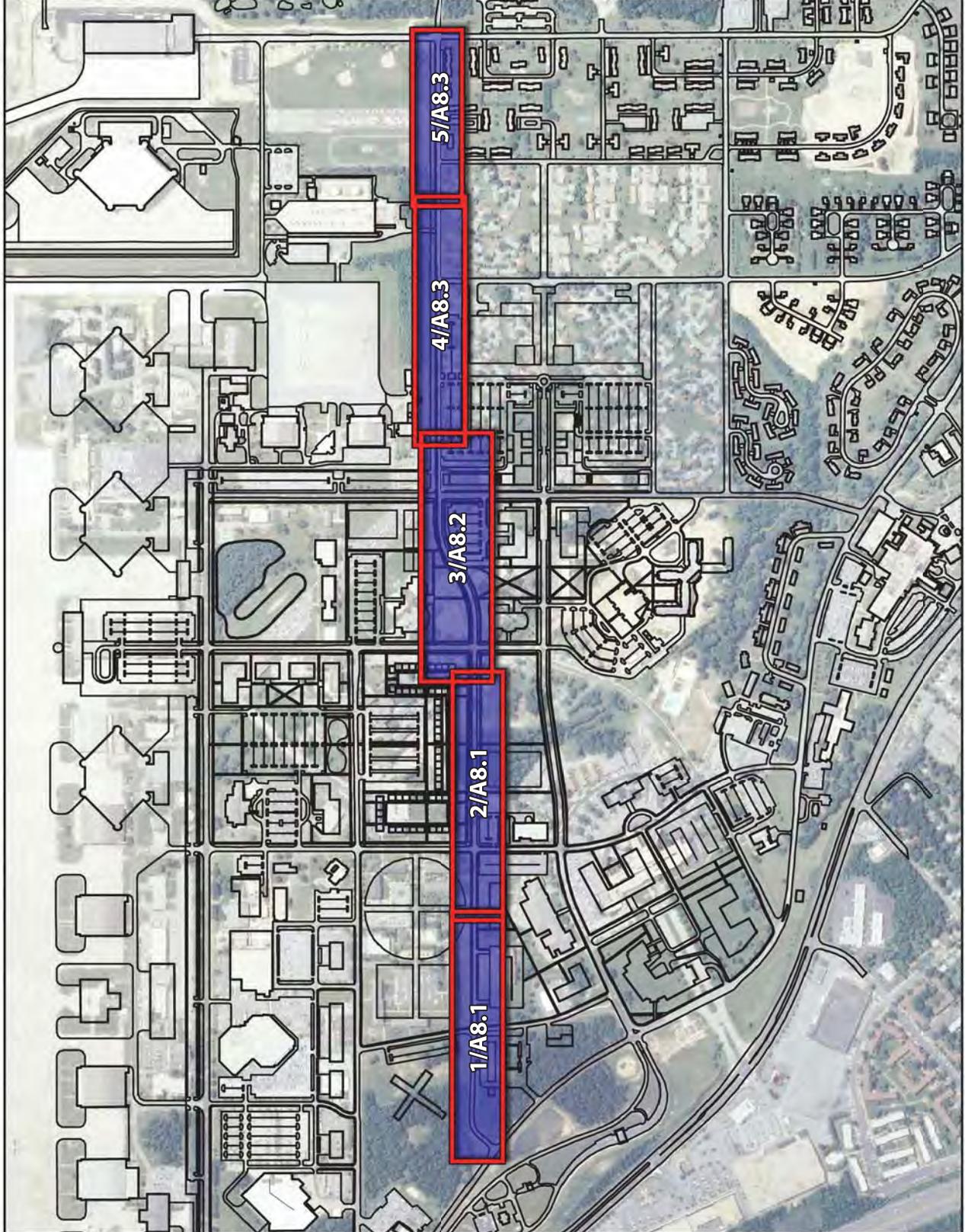
A8: FUTURE COLORADO/ VIRGINIA STREET

- Colorado/Virginia Avenue runs north south. Currently Colorado begins on the north at North Perimeter Road and extends southwards to D Street. At D Street, Colorado Avenue will be extended to the intersection of Menoher and Virginia. Virginia Avenue proceeds southward from this intersection and ends at South Perimeter Road. The study anticipates the new alignment. The portion of Road in the Arbor Plan is approximately 7,000 linear feet. Between F Street and D Street, a parking deck, parking lot and future administration building are proposed on the western side of the road. Recreation fields are proposed on the eastern side of the road. Between D Street and Arkansas Road, there is an existing building and parking lot with a formal lawn and unstructured recreation fields proposed on the western side and airmen dorms are proposed on the eastern side. Between Arkansas and Atlanta Avenue, a Dining Facility, Library and associated parking, a retail complex and commissary with shared parking is proposed for the western side of the street and a fitness center and recreation courts are proposed along the eastern side of the street to Menoher. On the eastern side of the road south of Menoher is the airfield facility.
- Future Colorado/ Virginia Street should be defined by Sycamore street trees at 50 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears, Lindens, American Holly, Chestnuts, and White Pine. Some of the plant material has been recently installed and others are mature specimens. There are forested areas composed of mixed hardwoods.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A8.0

FUTURE COLORADO/VIRGINIA
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED STREET TREES

● = SYCAMORE

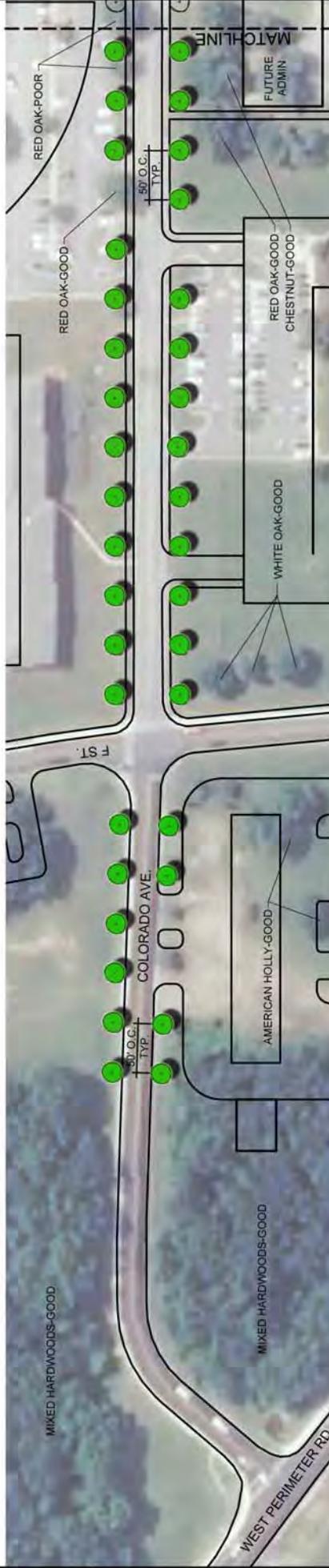
EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

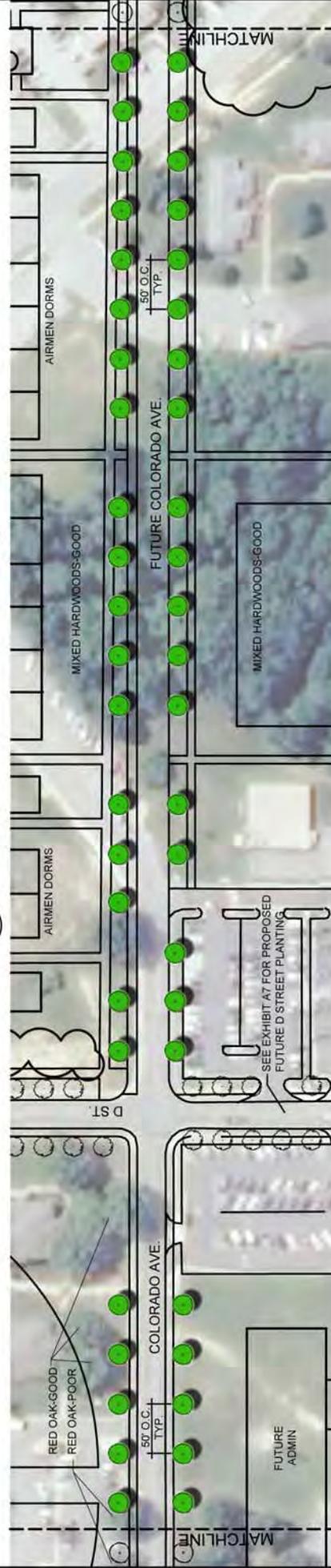
CORRIDOR

A8.1

FUTURE COLORADO/VIRGINIA
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



1 FUTURE COLORADO/VIRGINIA - 1 OF 5
A8.1 PLAN NTS



2 FUTURE COLORADO/VIRGINIA - 2 OF 5
A8.1 PLAN NTS



PROPOSED STREET TREES

● = SYCAMORE

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A8.2
 FUTURE COLORADO/VIRGINIA
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



3 FUTURE COLORADO/VIRGINIA - 3 OF 5
 A8.2 PLAN NTS



PROPOSED STREET TREES

● = SYCAMORE

EXISTING TREE EVALUATION

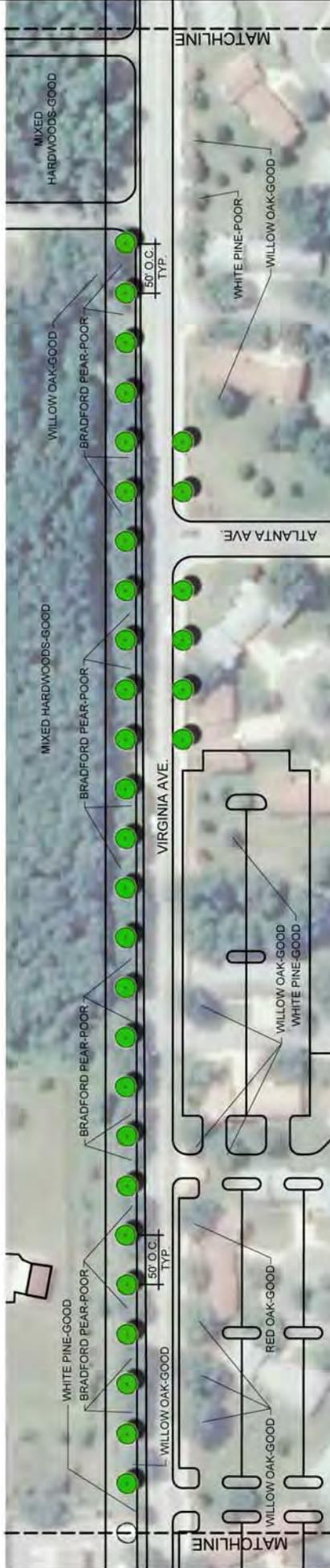
- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR

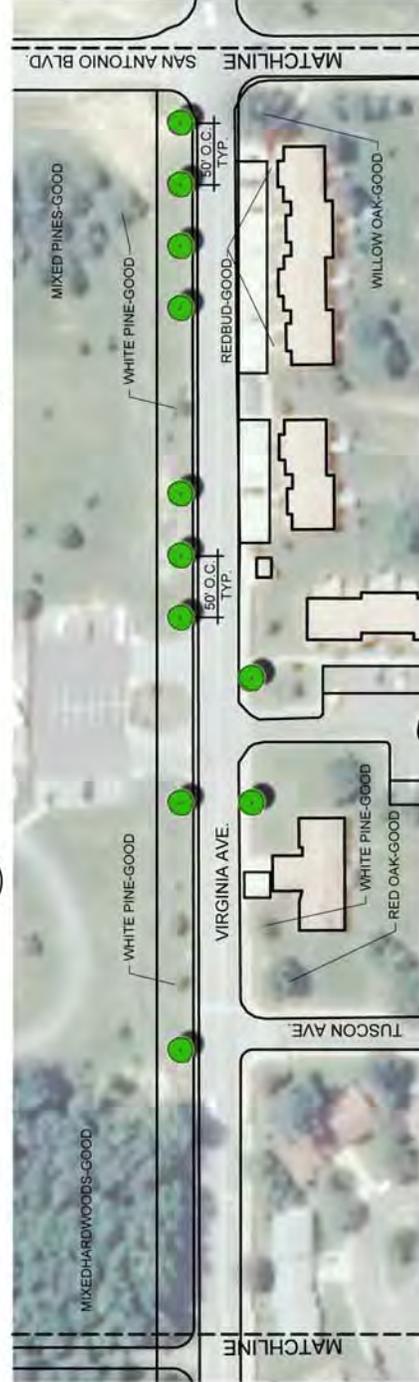
A8.3

FUTURE COLORADO/VIRGINIA

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



4 FUTURE COLORADO/VIRGINIA - 4 OF 5
A8.3 PLAN NTS



5 FUTURE COLORADO/VIRGINIA - 5 OF 5
A8.3 PLAN NTS



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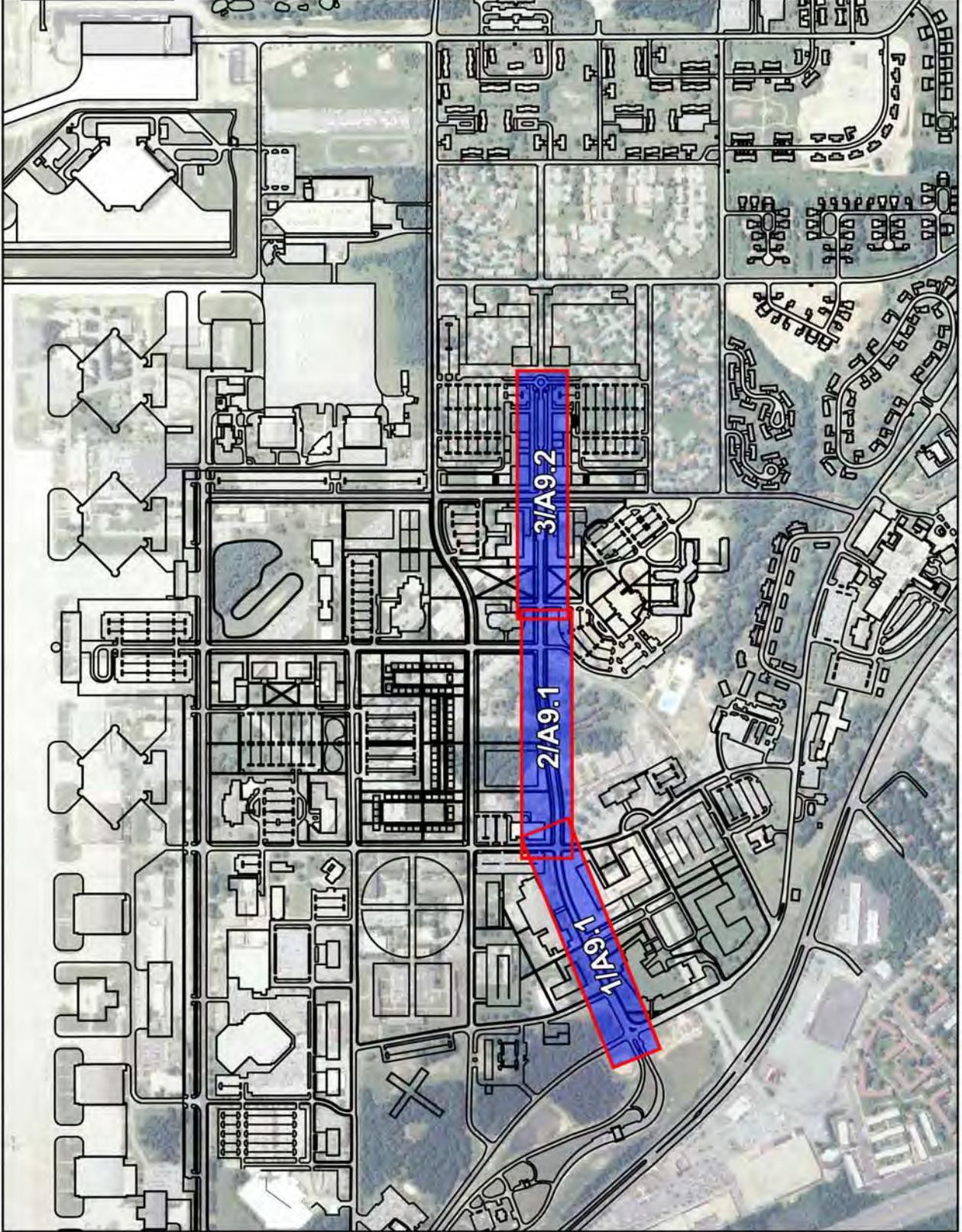
A9: FUTURE ALABAMA AVENUE

- The Future Alabama Avenue will run north south. This new roadway extension will serve as the main street into the base from the Main Entrance Gate. The study anticipates the new alignment. The portion of Road in the Arbor Plan is approximately 4,000 linear feet.
- Future Alabama Avenue should be defined by Littleleaf Linden street trees at 30 linear feet on center.
- To further define this corridor, all parking lots along Arnold Avenue should be screened in accordance with the 07/2009 ACP. For security reasons, this screening should be designed at the groundcover and shrub planting level, not the tree level, to reduce visual impact of parking areas while maintaining site visibility.
- Existing vegetation is comprised of several varieties of plant material including Maples, Oaks, Bradford Pears, Lindens, American Holly, Chestnuts, and White Pine. Some of the plant material has been recently installed and others are mature specimens. There are forested areas composed of mixed hardwoods.
- The existing Bradford Pears and other trees that are in poor shape should be removed.

CORRIDOR KEY MAP

A9.0

FUTURE ALABAMA AVENUE
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED STREET TREE

 = LITTLELEAF LINDEN

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A9.1
 FUTURE ALABAMA AVENUE
 JOINT BASE ANDREWS - NAVAL AIR FACILITY
 WASHINGTON, MARYLAND



1 FUTURE ALABAMA AVENUE - 1 OF 3
 A9.1 PLAN NTS



2 FUTURE ALABAMA AVENUE - 2 OF 3
 A9.1 PLAN NTS



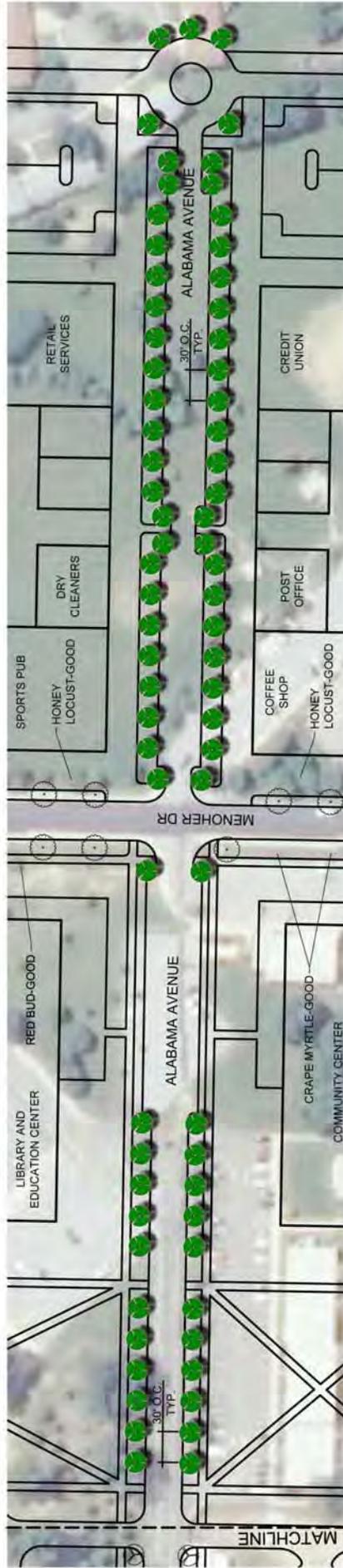
PROPOSED STREET TREE

 = LITTLELEAF LINDEN

EXISTING TREE EVALUATION

- GOOD = TREE IS HEALTHY AND OK TO INCORPORATE INTO FUTURE IMPROVEMENTS.
- POOR = TREE IS EITHER UNHEALTHY OR OF AN UNDESIRABLE SPECIES. TREE SHOULD BE REMOVED.

CORRIDOR
A9.2
FUTURE ALABAMA AVENUE
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



3 FUTURE ALABAMA AVENUE - 3 OF 3
A9.2 PLAN NTS



03|B

Gateways

2011
Andrews | NAF
Arbor
Plan

03 | B

Priority Areas | Gateways

B: GATEWAYS

The gateways are areas that highlight an entry/ exit into the base or a major facility area. Planting at these gateways signal entrance into a different part of the base and are designed to create interest and slow vehicles as they proceed from one area to another. For the Arbor Plan, two primary gateways, one secondary gateway and two tertiary gateways are identified. The five Gateways are as follows:

PRIMARY

B1: MAIN GATEWAY

B2: VIRGINIA GATEWAY

SECONDARY

B3: NORTH PERIMETER | ARNOLD AVENUE GATEWAY

TERTIARY

B4: PEARL HARBOR GATEWAY

B5: SOUTHEAST GATEWAY

The Main Gateway highlights the primary access point into the base. It is located just south of the Main Gate at the intersection of Colorado Avenue and North Perimeter road. In order to distinguish the main gateway from the secondary gateways, a Crape Myrtle grid is used to highlight this area (Note: all other gateways utilize a grid of Cherry Trees). The Crape Myrtles are set on a 20' grid.

The intersection of North Perimeter and Arnold Avenue is a secondary gateway. This gateway is planted with Yoshino Cherries set on a 20' grid. These plantings are supplemented with Sugar Maples planted 50' on center to act as street trees for this area. In addition, areas on the western and eastern side of the road are proposed for reforestation.

The Virginia Gateway is the secondary gateway at the intersection of South Perimeter Road and Virginia Avenue. It is located just North of the Virginia Gate. This gateway is planted with Yoshino Cherries set on a 20' grid.

The Pearl Harbor Gateway is a tertiary gateway at the intersection of Pearl Harbor and East Perimeter Road. It is located approximately 1,200 lf west of the Pearl Harbor Gate. This gateway will help travelers in the industrial area locate the exit on Pearl Harbor Road. This proposed gateway planting utilizes Yoshino Cherries set on a 20' grid.

The Southeast Gateway is a tertiary gateway located to the southeast of the flightline along East Perimeter Road. It highlights an access point to the industrial area. This gateway is planted with Yoshino Cherries set on a 20' grid.

The total value of planting recommended for these Gateways equates to approximately 4 acres (Note: acreage calculation assumes 50 trees per 1/4 acre. See page 117).

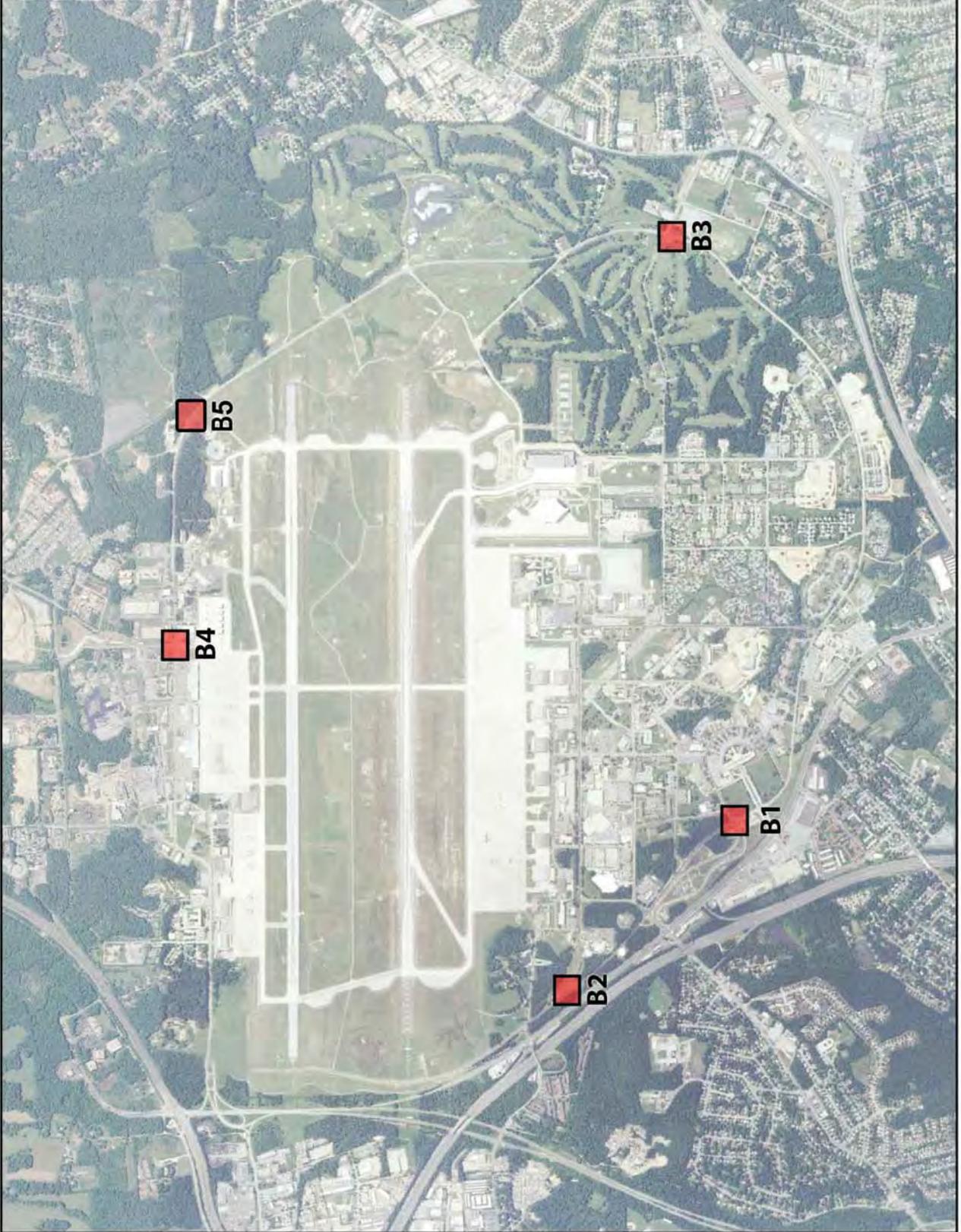
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GATEWAYS

B0

OVERALL MAP

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



GATEWAY

B1

MAIN GATE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND

PROPOSED GATEWAY TREE

= CRAPE MYRTLE



SEE EXHIBIT A4 FOR W.
PERIMETER DR.
PLANTING

CRAPE MYRTLE,
GRID @ 20' O.C.,
TYP.

CRAPE MYRTLE,
GRID @ 20' O.C.,
TYP.

WEST PERIMETER RD.

ALABAMA AVE.

MIXED HARDWOODS-GOOD

BRAC/ NCR



GATEWAY

B2

N. PERIMETER @ ARNOLD

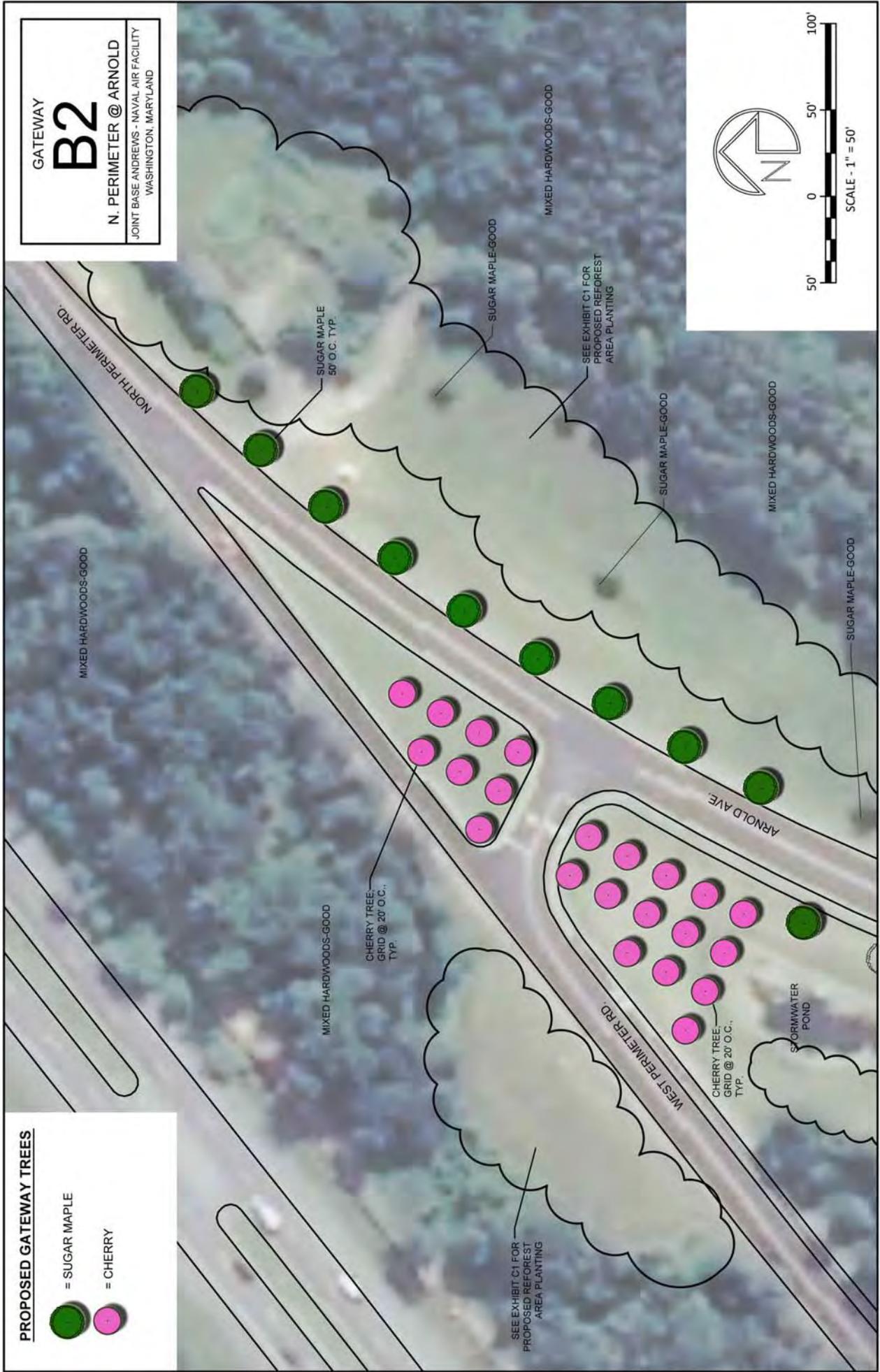
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND

PROPOSED GATEWAY TREES



= SUGAR MAPLE

= CHERRY



NORTH PERIMETER RD.

SUGAR MAPLE
50' O.C. TYP.

SUGAR MAPLE-GOOD

MIXED HARDWOODS-GOOD

SEE EXHIBIT C1 FOR
PROPOSED REFOREST
AREA PLANTING

SUGAR MAPLE-GOOD

MIXED HARDWOODS-GOOD

SUGAR MAPLE-GOOD

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

MIXED HARDWOODS-GOOD

ARNOLD AVE.

WEST PERIMETER RD.

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

STORMWATER
POND

SEE EXHIBIT C1 FOR
PROPOSED REFOREST
AREA PLANTING



GATEWAY

B3

VIRGINIA GATE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED GATEWAY TREE

 = CHERRY

SEE EXHIBIT A4 FOR
WEST PERIMETER
ROAD CORRIDOR
PLANTING

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

OAK-GOOD

MIXED HARDWOODS-GOOD

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

OAK-GOOD

SOUTH PERIMETER RD.

VIRGINIA AVE.

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

MIXED HARDWOODS-GOOD

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

MIXED HARDWOODS-GOOD

GOLF
CLUB HOUSE



GATEWAY

B4

PEARL HARBOR GATE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



WHITE PINE-GOOD

CHERRY TREE:
GRID @ 20' O.C.,
TYP.

PINE-GOOD

PEARL HARBOR DR.

CHERRY TREE:
GRID @ 20' O.C.,
TYP.

SEE EXHIBIT A5 FOR
EAST PERIMETER ROAD
CORRIDOR PLANTING

BRADFORD PEAR-POOR

BLDG
3086

EAST PERIMETER RD.

SEE EXHIBIT A5 FOR
EAST PERIMETER ROAD
CORRIDOR PLANTING

CHERRY TREE:
GRID @ 20' O.C.,
TYP.

CHERRY TREE:
GRID @ 20' O.C.,
TYP.

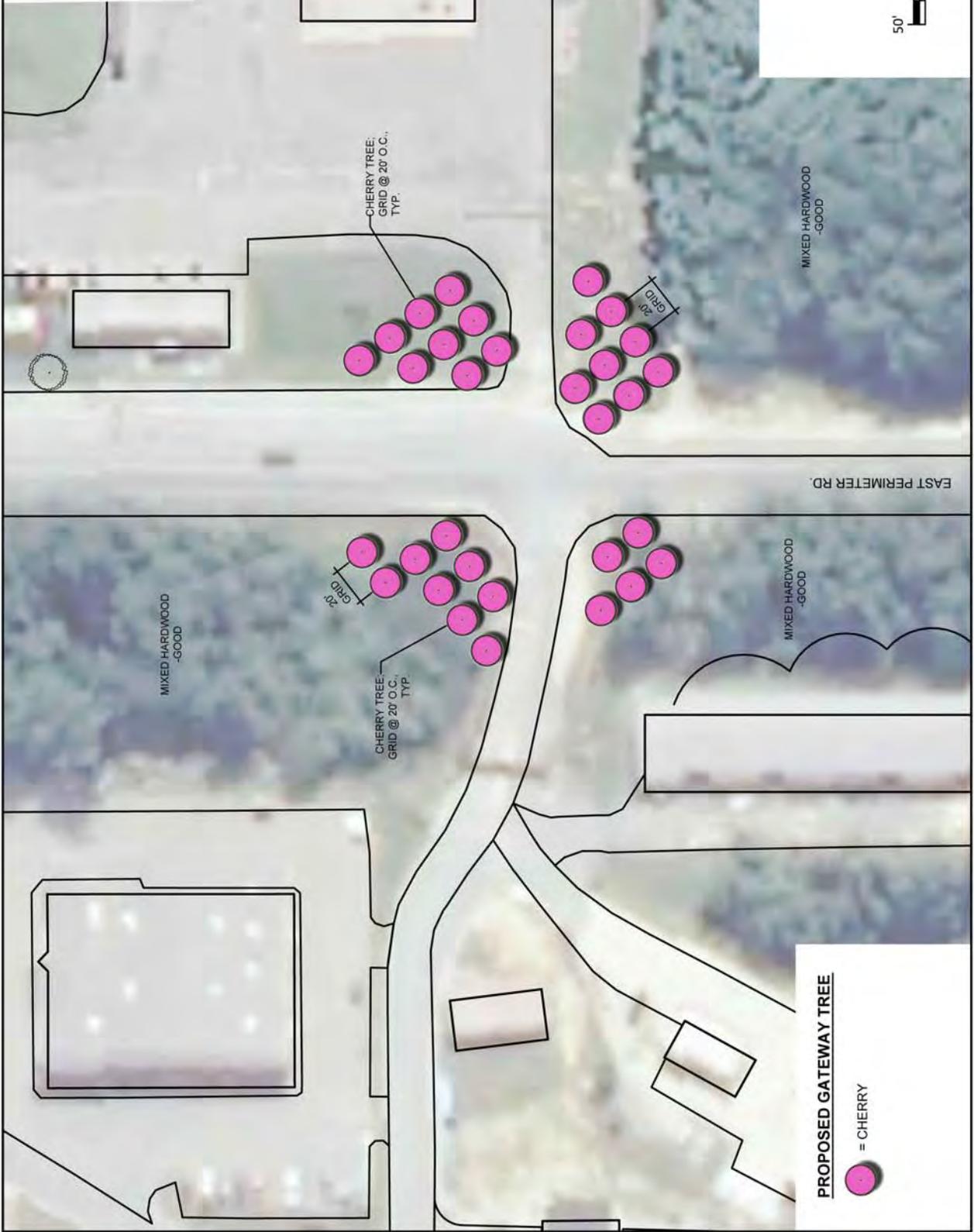
PROPOSED GATEWAY TREE

 = CHERRY



GATEWAY
B5
SOUTHEAST

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



PROPOSED GATEWAY TREE



MIXED HARDWOOD
-GOOD

CHERRY TREE
GRID @ 20' O.C.
TYP.

CHERRY TREE,
GRID @ 20' O.C.,
TYP.

MIXED HARDWOOD
-GOOD

MIXED HARDWOOD
-GOOD

EAST PERIMETER RD.

031C

Reforestation

2011
Andrews | NAF
Arbor
Plan

C: REFORESTATION AREAS

Historically, forests were the predominant land cover on the east coast. Today forested lands in developed areas are known as Urban Forests. Significant tree cover and Urban Forest has been lost on the base since 1958. The value and benefits of an urban forest are as follows:

- Environmental – trees produce oxygen, remove air pollutants, reduce air temperatures, reduce noise attenuation, glares and reflections, save energy, provide shelter from the wind and improve air and water quality
- Economic – trees and forested areas increase the value of real estate
- Aesthetic – trees improve the visual landscape and can create a sense of place

Urban forests are quite different than natural forests. The urban forest on the Base can become the framework of a green infrastructure for Andrews AFB. This infrastructure is composed of natural wooded areas, reforested and naturalized areas, streetscape plantings and trees on private and public property. They must be managed to maximize the benefits. Urban forest management encompasses many components. The most important component is diversity. This includes diversity of species, sizes, structural forms and functions. Native species should be planted in their appropriate environment while the control of invasive plants is crucial. A landscape management plan for the urban forest should be developed that includes the Best Management Practices for an urban forest.

The proposed Reforestation plans in this report emulate a natural process called Old Field Succession. It is the ecological process that occurs on abandoned farm land when a field is no longer harvested and becomes a new habitat for plant species to colonize. Because it is basically bare soil, the habitat is difficult for most plants. There are no trees to provide shade or serve as wind breaks. This environment is first colonized by plants called pioneer species. As the pioneer plants die, the plant litter enriches the soil creating an environment better suited for grasses and shrubs. These plants out compete the pioneer plants and create an environment where trees can grow. The first tree species are primary species and create an environment for the trees that will become the climax forest.

The nature of succession is that as plants begin to grow on a site, they alter the environment creating an environment that allows other plants to grow and the process continues until the final phase of succession, the Climax Forest is established.

The succession process is as follows:

- Pioneer Species
- Grasses and Herbaceous Species
- Primary Tree Species
- Climax Forest

03|C

Priority Areas | Reforestation

The Arbor Plan identifies several priority areas for reforestation and naturalization. The plantings for these areas will mimic old field plant succession, and are designed to accelerate this process by including the secondary and tertiary plants during the initial planting. The planting plan is composed of native plants that follow succession. Because the process of succession does not necessarily evolve in neat, aesthetic stages, evergreen plants are used to screen the area as the plants move to and through the succession process. Behind these plants, mature canopy and understory trees are proposed. This planting process will result in a diverse climax forest. The Arbor Plan priority reforestation exhibits can increase Andrew's urban forest by approximately 76 acres.

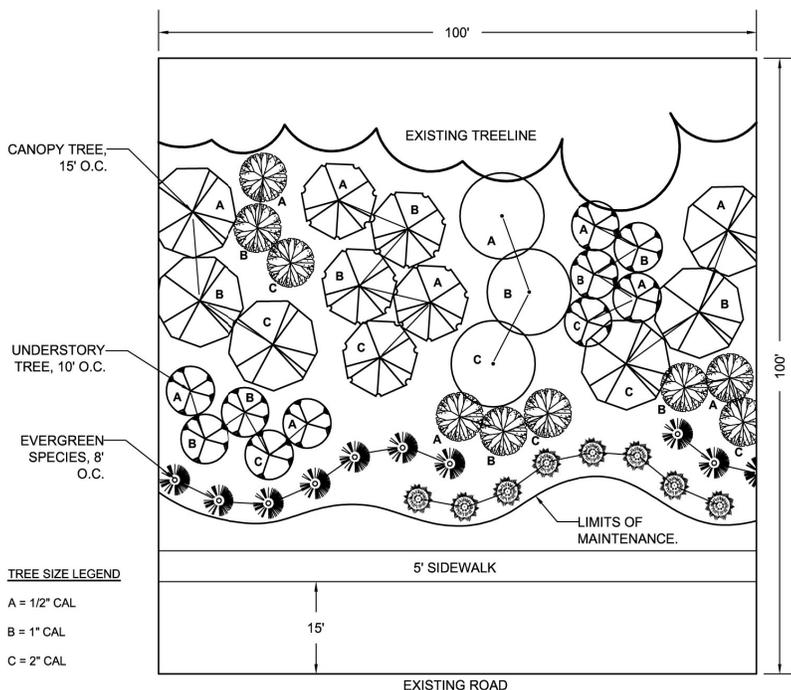


ILLUSTRATION A

Illustration A represents a typical reforestation planting plan. The intent is to mimic nature by planting materials that would typically grow naturally. The ground plane for these areas will not be maintained during grow in and thus, aesthetic needs of the surrounding facility areas should be taken into account. The image shows the range of materials that can help merge the landscape edge into an existing forest area. In situations where the reforested planting does not adjoin an existing forest area, the typical planting shall be adapted to include edge plantings around the perimeter.

The following notes apply to illustration A and should be taken into account when preparing to design a reforested area:

- As priority areas are set for reforestation, the contractor shall select appropriate plants, as shown in illustration A, from the list on page 141. Plants should be selected to gain consistency with existing forested areas adjacent to the proposed planting site.
- Where necessary, evergreens should be planted at the edge to screen the reforested area during the initial "unattractive" years of growth. See page 141 for typical species to be used as evergreen screening material.
- Canopy Trees at edge shall be pioneer species. See page 141 for typical pioneer species.
- Deeper Canopy Trees shall be climax hardwood species. See page 141 for typical climax hardwood species.
- Understory Trees at the edge shall be partial shade to full sun tolerant species. See page 141 for typical understory species to be used for reforestation.
- As per Illustration A, typical Reforestation calculations within this report assume 50 trees per 1/4 acre.

TYPICAL PLANT MATERIALS FOR REFORESTATION

Pioneer Canopy Plant Material

Carya Species – Hickory
Fraxinus pennsylvanica - Green Ash
Liquidambar styraciflua - Sweetgum
Liriodendron tulipifera – Tuliptree
Oxydendron arboretum – Sourwood
Pinus strobus – White Pine
Platanus occidentalis - Sycamore

Climax Hardwood Canopy Plant Material

Acer rubrum – Red Maple
Fagus grandifolia – American Beech
Quercus alba – White Oak
Quercus lyrata – Overcup Oak
Quercus nigra – Water Oak
Quercus shumardii – Shumard Oak
Quercus rubra – Red Oak

Understory Plant Material

Cercis canadensis – Eastern Redbud
Cornus florida – Flowering Dogwood
Cotinus coggygria – Smoketree
Craetagus phaenopyrum – Washington Hawthorne
Halesia Carolina – Carolina Silverbell

Evergreen Plant Material

Ilex opaca – American Holly
Juniperus virginiana – Eastern Redcedar
Pinus strobus – White Pine
Pinus Taeda – Loblolly Pine

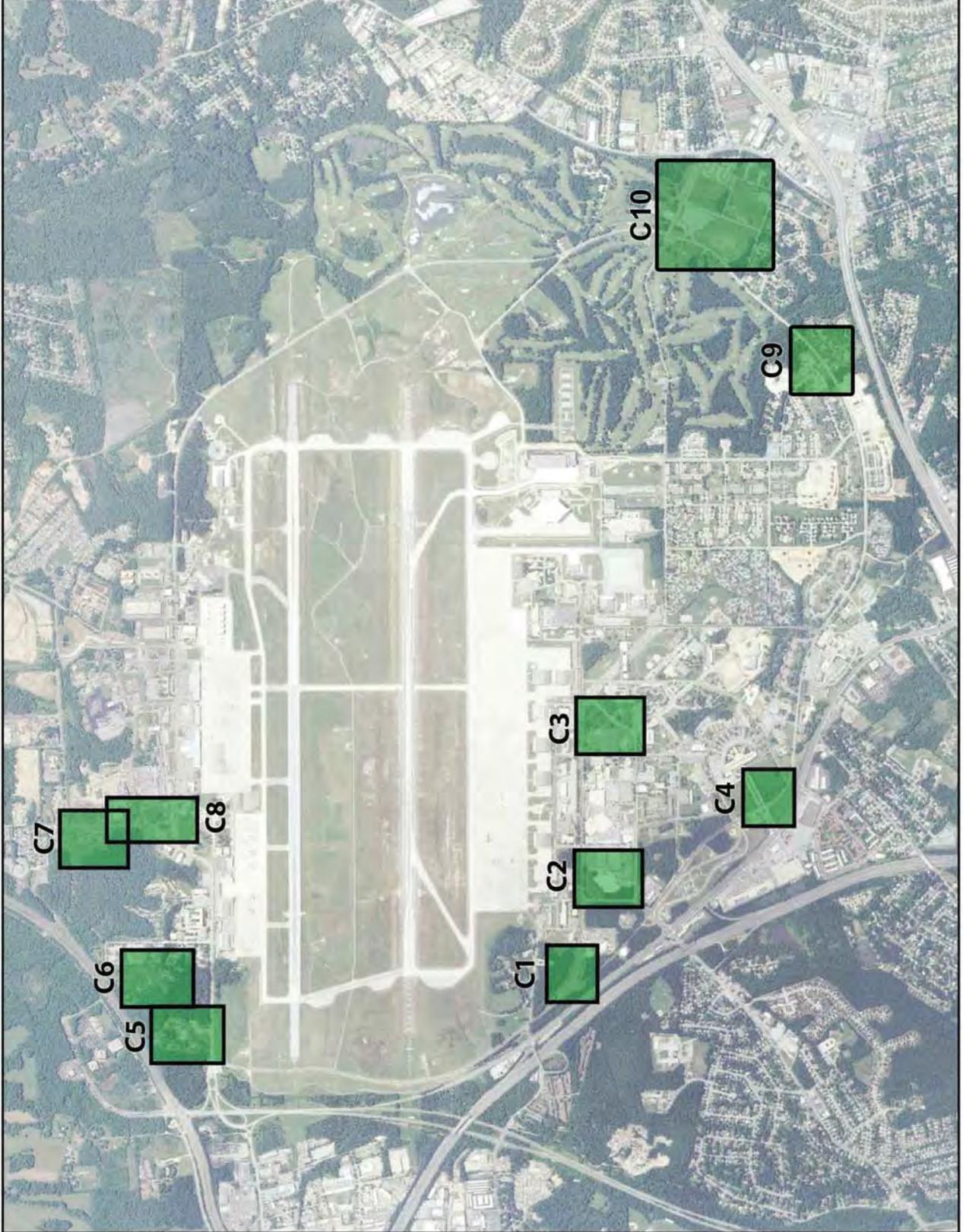
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REFORESTATION AREAS

C0

OVERALL MAP

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND

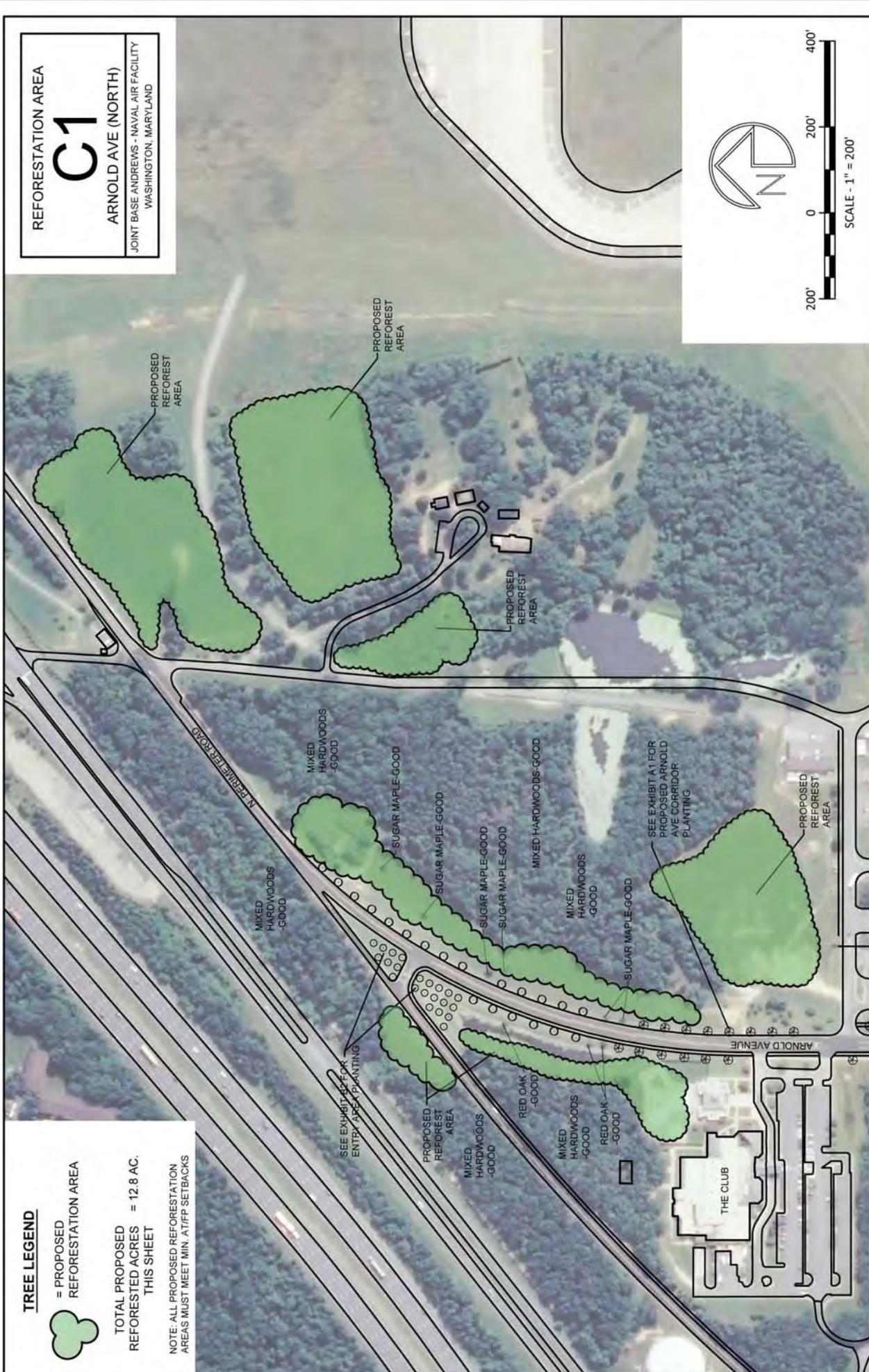


REFORESTATION AREA

C1

ARNOLD AVE (NORTH)

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



TREE LEGEND

 = PROPOSED REFORESTATION AREA

TOTAL PROPOSED REFORESTED ACRES = 12.8 AC. THIS SHEET

NOTE: ALL PROPOSED REFORESTATION AREAS MUST MEET MIN. AT/FP SETBACKS

REFORESTATION AREA

C2

FUTURE BCE SPACE

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND

SEE EXHIBIT A1 FOR
PROPOSED ARNOLD
AVE CORRIDOR
PLANTING

WHITE PINE-GOOD

WILLOW OAK-GOOD

TREE LEGEND

 = RED MAPLE

 = PROPOSED
REFORESTATION AREA

TOTAL PROPOSED
REFORESTED ACRES = 1.6 AC.
THIS SHEET

NOTE: ALL PROPOSED REFORESTATION
AREAS MUST MEET MIN. ATFP SETBACKS



WILLOW OAK-GOOD

WHITE PINE-GOOD

CHERRY-GOOD

PROPOSED
REFOREST
AREA

PROPOSED
REFOREST
AREA

RED OAK-GOOD

WHITE PINE-GOOD

RED OAK-GOOD

CHERRY-POOR

WHITE OAK-GOOD

WHITE OAK-GOOD

WHITE PINE-GOOD

MIXED HARDWOOD-GOOD

WESTOVER DR.

MIXED HARDWOOD-GOOD

BRADFORD PEAR-POOR

CHERRY-GOOD

CEDAR-GOOD

RED MAPLE-POOR

WHITE PINE-POOR

BRADFORD PEAR-POOR

RED MAPLE-GOOD

TYPICAL PARKING LOT PLANTING:
SEE DESIGN GUIDELINES
SECTION FOR PARKING LOT
PLANTING GUIDE

RED OAK-GOOD

BRADFORD PEAR-POOR

BRADFORD PEAR-POOR

BRADFORD PEAR-POOR

BROOKLEY AVE.

SEE EXHIBIT A3 FOR
PROPOSED BROOKLEY
AVE CORRIDOR
PLANTING

WILLOW OAK-GOOD

BRADFORD PEAR-POOR

MIXED HARDWOOD-GOOD

TREE LEGEND



= PROPOSED
REFORESTATION AREA

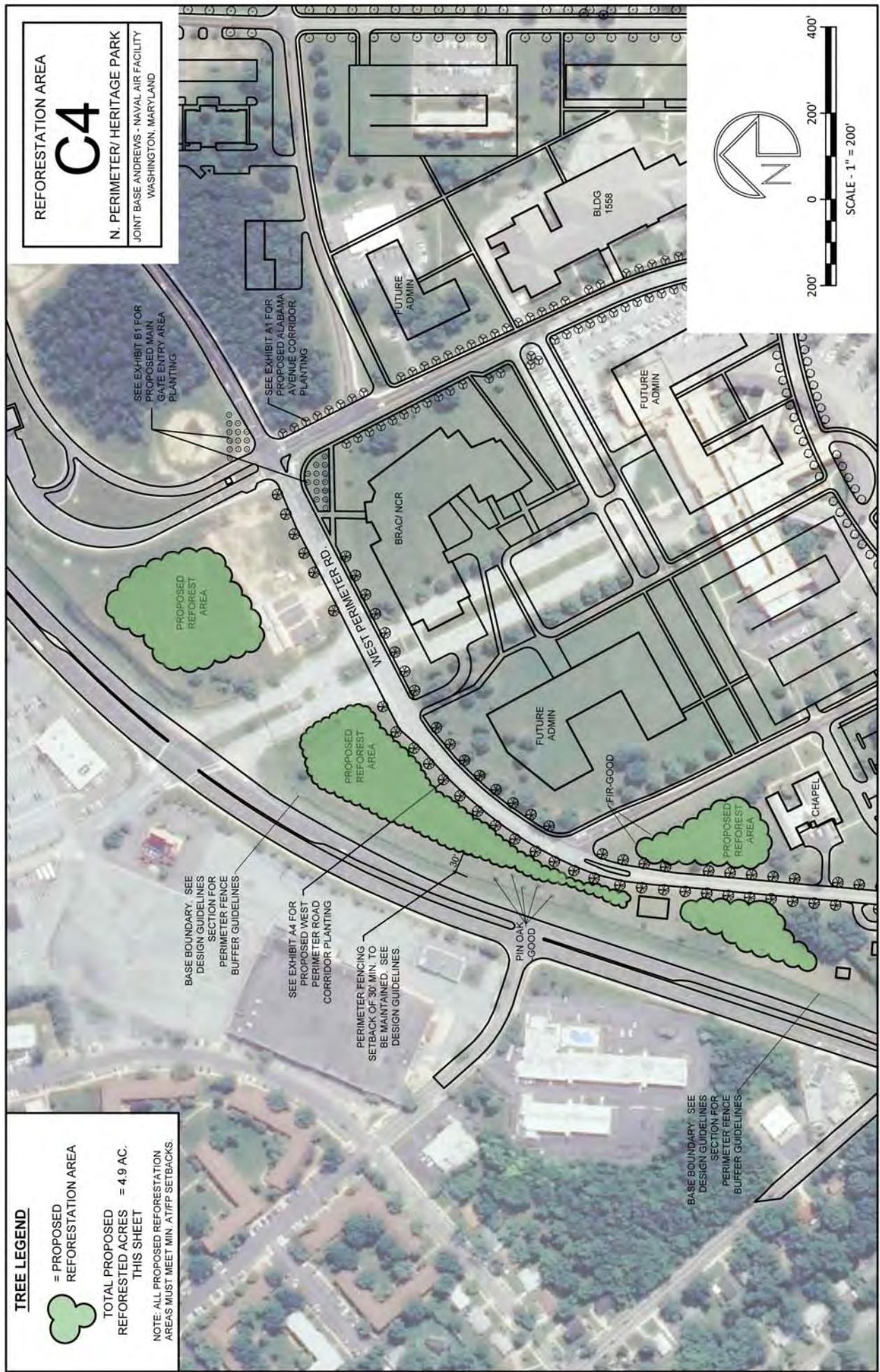
TOTAL PROPOSED
REFORESTED ACRES = 4.9 AC.
THIS SHEET

NOTE: ALL PROPOSED REFORESTATION
AREAS MUST MEET MIN. A/T/FP SETBACKS.

REFORESTATION AREA

C4

N. PERIMETER/ HERITAGE PARK
JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



SEE EXHIBIT B1 FOR
PROPOSED MAIN
GATE ENTRY AREA
PLANTING

SEE EXHIBIT A1 FOR
PROPOSED ALABAMA
AVENUE CORRIDOR
PLANTING

PROPOSED
REFOREST
AREA

PROPOSED
REFOREST
AREA

PROPOSED
REFOREST
AREA

BASE BOUNDARY. SEE
DESIGN GUIDELINES
SECTION FOR
PERIMETER FENCE
BUFFER GUIDELINES

SEE EXHIBIT A4 FOR
PROPOSED WEST
PERIMETER ROAD
CORRIDOR PLANTING

PERIMETER FENCING
SETBACK OF 30' MIN. TO
BE MAINTAINED. SEE
DESIGN GUIDELINES

PIN OAK
GOOD

BASE BOUNDARY. SEE
DESIGN GUIDELINES
SECTION FOR
PERIMETER FENCE
BUFFER GUIDELINES

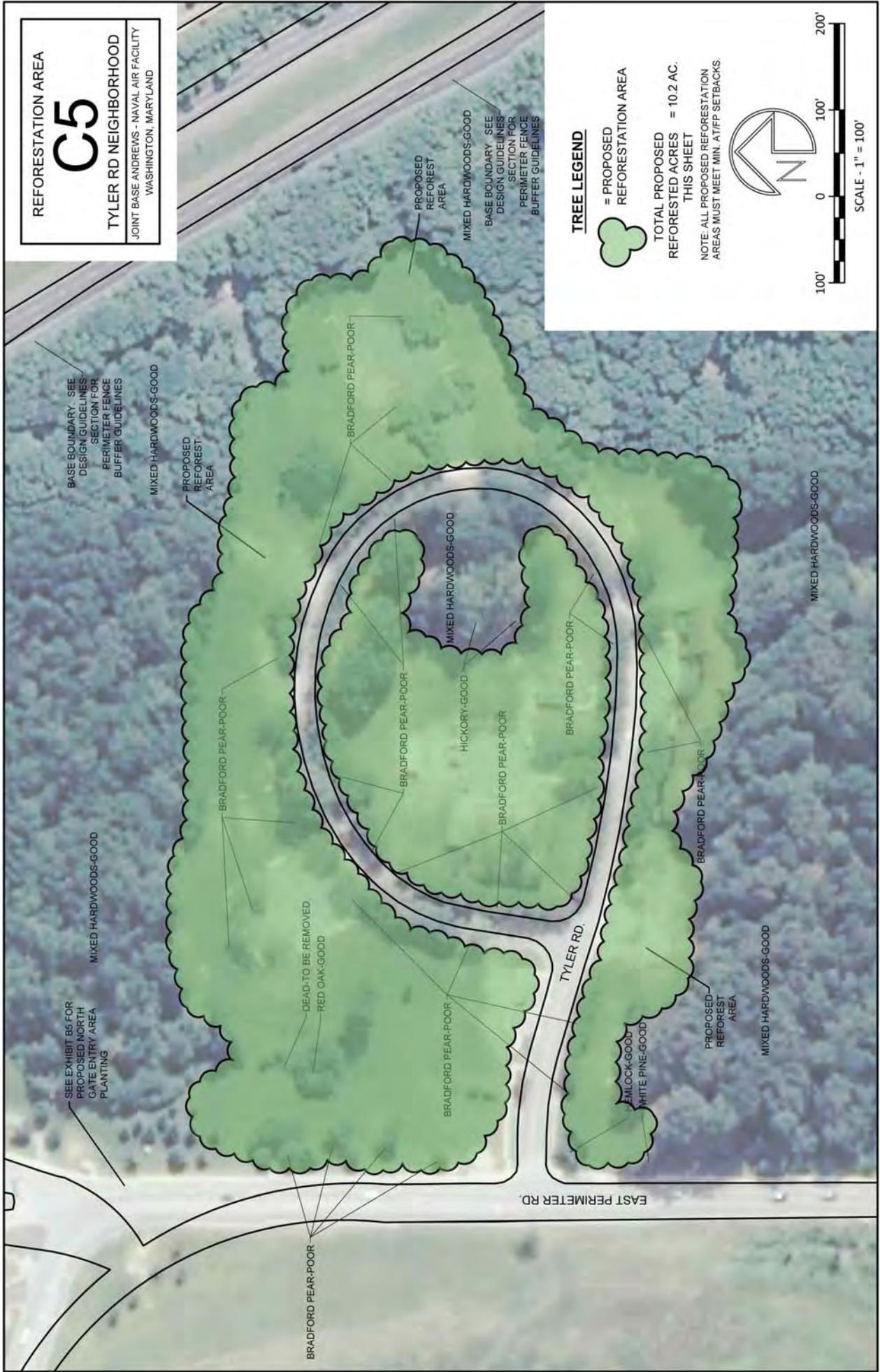


REFORESTATION AREA

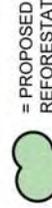
C5

TYLER RD NEIGHBORHOOD

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



TREE LEGEND



= PROPOSED
REFORESTATION AREA

TOTAL PROPOSED
REFORESTED ACRES = 10.2 AC.
THIS SHEET

NOTE: ALL PROPOSED REFORESTATION
AREAS MUST MEET MIN. ATYP SETBACKS.



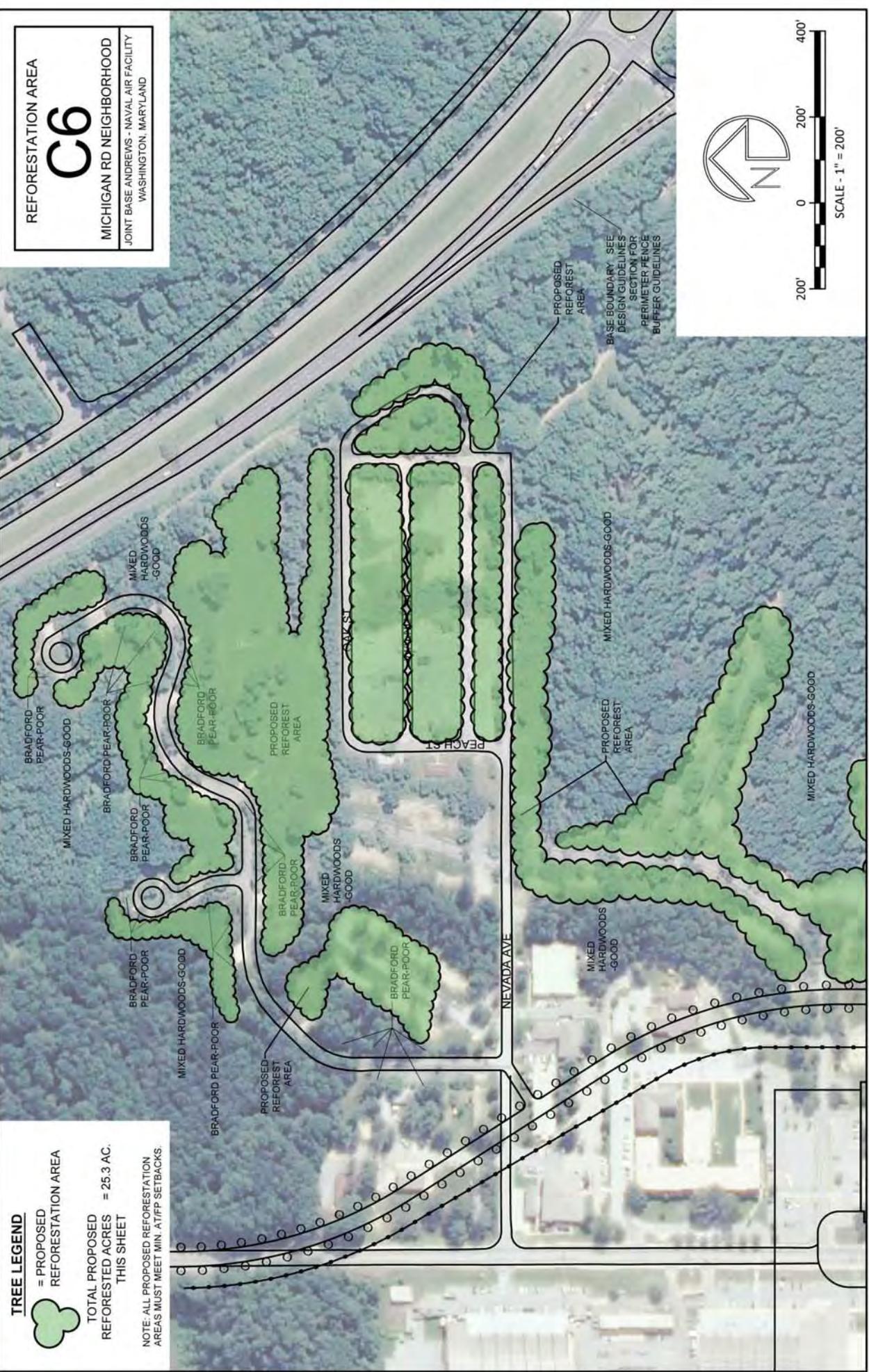
SCALE - 1" = 100'

REFORESTATION AREA

C6

MICHIGAN RD NEIGHBORHOOD

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



TREE LEGEND



= PROPOSED
REFORESTATION AREA

TOTAL PROPOSED
REFORESTED ACRES = 25.3 AC.
THIS SHEET

NOTE: ALL PROPOSED REFORESTATION
AREAS MUST MEET MIN. ATFP SETBACKS.

PROPOSED
REFOREST
AREA
BASE BOUNDARY. SEE
DESIGN GUIDELINES
SECTION FOR
PERIMETER FENCE
BUFFER GUIDELINES

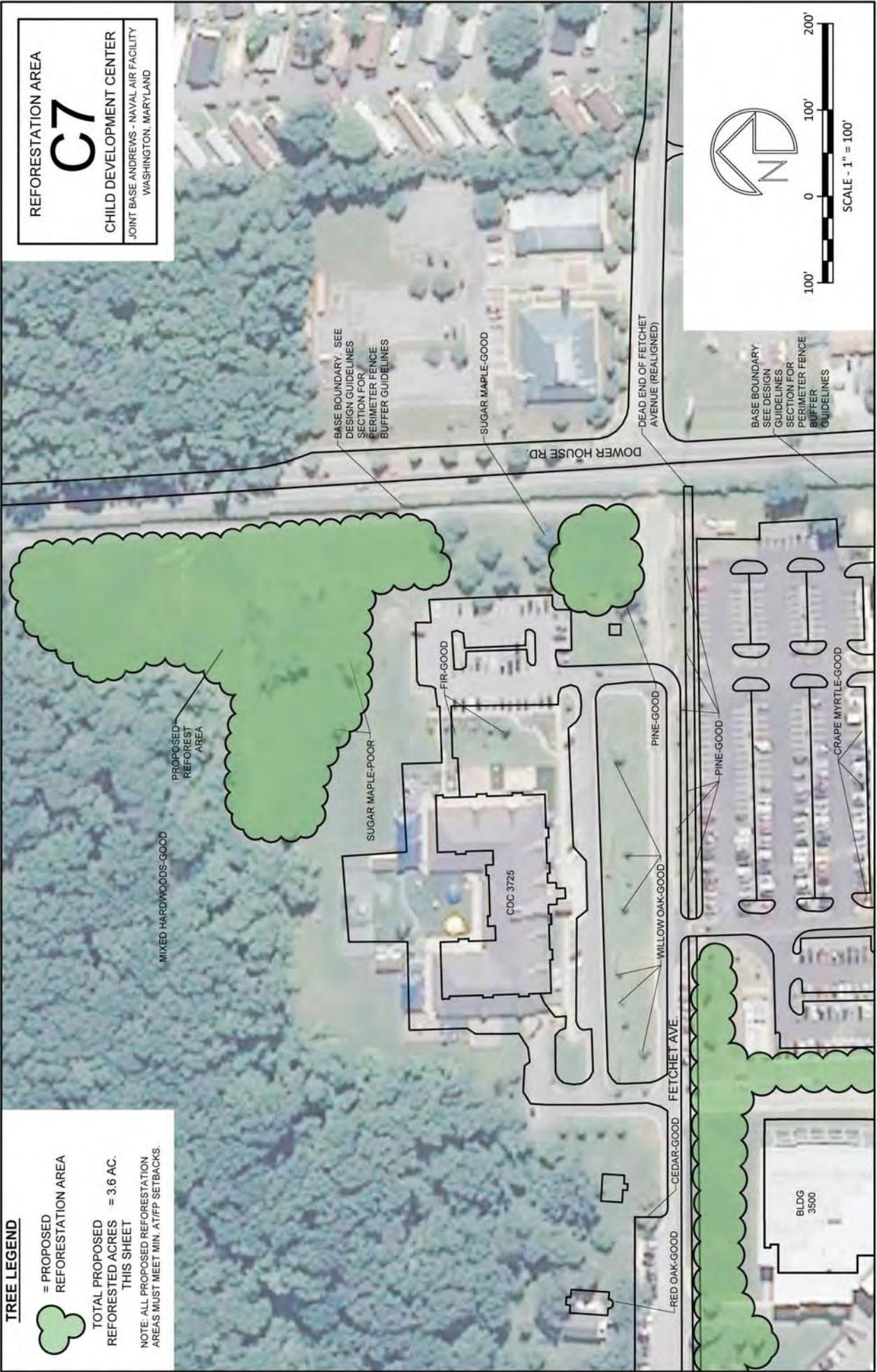


REFORESTATION AREA

C7

CHILD DEVELOPMENT CENTER

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



TREE LEGEND



= PROPOSED
REFORESTATION AREA

TOTAL PROPOSED
REFORESTED ACRES = 3.6 AC.
THIS SHEET

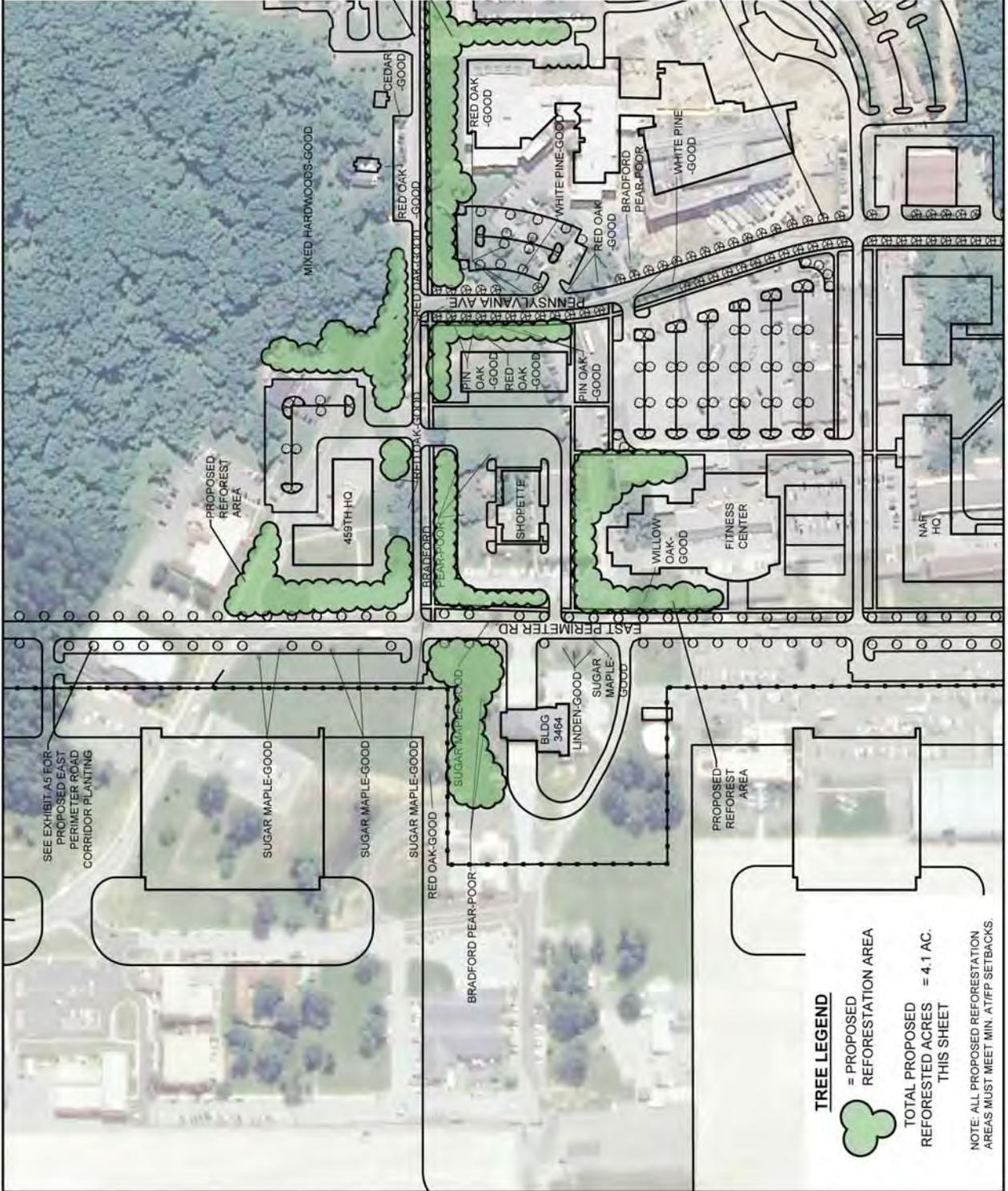
NOTE: ALL PROPOSED REFORESTATION
AREAS MUST MEET MIN. ATFFP SETBACKS.

REFORESTATION AREA

C8

SHOPPETTE/ FOOD COURT

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



SEE EXHIBIT A5 FOR
PROPOSED EAST
PERIMETER ROAD
CORRIDOR PLANTING

PROPOSED
REFOREST
AREA

MIXED HARDWOODS-GOOD

FETCHET AVE.

PROPOSED
REFOREST
AREA

RED OAK
-GOOD

WHITE PINE-GOOD

BRADFORD
PEAR-POOR

WHITE PINE
-GOOD

SEE EXHIBIT A6 FOR
PROPOSED
PENNSYLVANIA AVE
CORRIDOR PLANTING

TREE LEGEND

 = PROPOSED
REFORESTATION AREA

TOTAL PROPOSED
REFORESTED ACRES = 4.1 AC.
THIS SHEET

NOTE: ALL PROPOSED REFORESTATION
AREAS MUST MEET MIN. ATFP SETBACKS.



REFORESTATION AREA

C9

YUMA RD AREA

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



SEE EXHIBIT A4 FOR
PROPOSED WEST
PERIMETER ROAD
CORRIDOR PLANTING

TREE LEGEND

 = PROPOSED REFORESTATION AREA

TOTAL PROPOSED REFORESTED ACRES = 1.5 AC. THIS SHEET

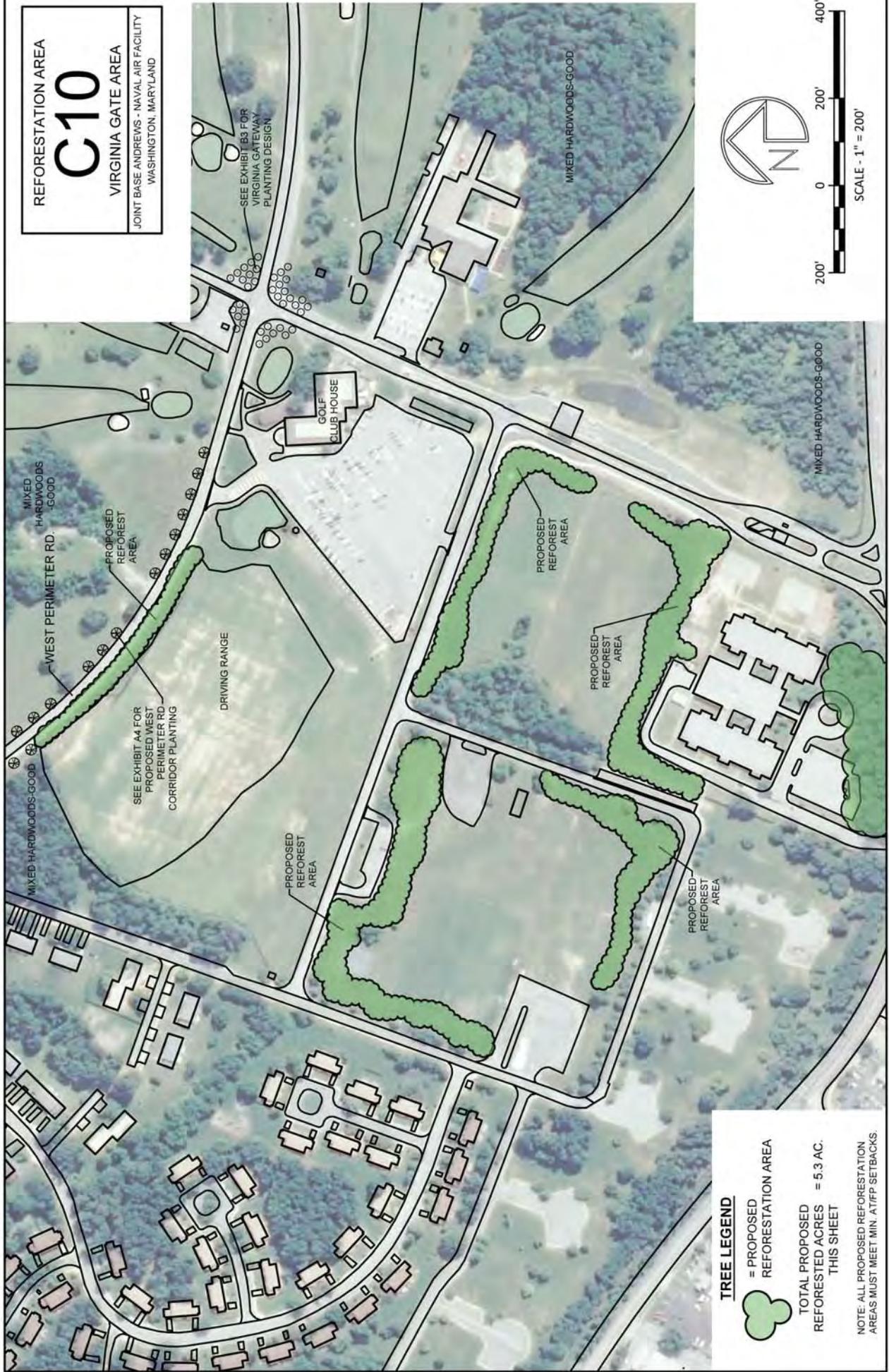
NOTE: ALL PROPOSED REFORESTATION AREAS MUST MEET MIN. AT/FP SETBACKS.

REFORESTATION AREA

C10

VIRGINIA GATE AREA

JOINT BASE ANDREWS - NAVAL AIR FACILITY
WASHINGTON, MARYLAND



TREE LEGEND

 = PROPOSED REFORESTATION AREA

TOTAL PROPOSED REFORESTED ACRES = 5.3 AC. THIS SHEET

NOTE: ALL PROPOSED REFORESTATION AREAS MUST MEET MIN. AT/FP SETBACKS.

04 Plant Database

2011
Andrews | NAF
Arbor
Plan

QUICK REFERENCE PLANTING GUIDE

TREES THAT PRODUCE LITTER (Not be used in highly maintained areas)

Carya Spp.
Liquidambar styraciflua
Magnolia grandiflora
Platanus occidentalis

TREES WITH URBAN TOLERANCES (minimal planting areas)

Betula nigra
Cercis canadensis
Cornus florida
Cornus kousa
Cotinus coggygria
Ginkgo biloba
Halesia Carolina
Ilex cornuta burfordii 'nana'
Ilex x attenuata 'Fosteri'
Ilex x Nellie R. Stevens
Lagerstroemia indica
Pinus strobus

TREES TOLERATING SHADE

Betula nigra
Carpinus betulus
Carya spp.
Cornus florida
Halesia Carolina
Ilex opaca
Ilex x attenuata 'Fosteri'
Magnolia grandiflora
Platanus occidentalis

TREES TOLERANT OF MOIST, LOWLAND SITES

Acer rubrum
Acer saccharum
Betula nigra
Carpinus betulus
Carya ssp.
Cornus florida
Crataegus phaenopyrum
Fagus grandifolia
Fraxinus pennsylvanica
Ginkgo biloba

04

Plant Database

TREES TOLERANT OF MOIST, LOWLAND SITES (CONT.)

Gleditsia triacanthos
Halesia Carolina
Ilex opaca
Juniperus virginiana
Lagerstroemia indica
Liquidambar styraciflua
Quercus phellos
Quercus nigra
Pinus strobus
Pinus taeda
Platanus occidentalis
Quercus alba
Quercus lyrata
Quercus nigra
Quercus nuttalli
Quercus palustris
Quercus phellos
Quercus shumardii
Taxodium distichum
Ulmus Americana 'Princeton'

TREES TOLERANT OF DRY, UPLAND SITES

Acer rubrum
Acer saccharum
Carya ssp.
Cercis canadensis
Cornus florida
Cornus kousa
Cotinus coggygria
Crataegus phaenopyrum
Fagus grandifolia
Fraxinus americana
Ginkgo biloba
Gleditsia triacanthos
Ilex cornuta burfordii 'nana'
Ilex opaca
Ilex x attenuata 'Fosteri'
Ilex x Nellie R. Stevens
Juniperus virginiana
Lagerstroemia indica
Liriodendron tulipifera
Magnolia grandiflora
Magnolia x soulingiana
Magnolia stellata

TREES TOLERANT OF DRY, UPLAND SITES (CONT.)

Oxydendrum arboreum
Pinus strobus
Pinus taeda
Prunus cerasifera
Prunus serrulata 'Kwansen'
Prunus x yedoensis
Quercus alba
Quercus nigra
Quercus nuttalli
Quercus rubra
Taxodium disticum
Ulmus Americana

TREES WITH SPRING INTEREST (MARCH, APRIL, MAY)

Cercis canadensis
Cornus florida
Cornus kousa
Cotinus coggygria
Crataegus phaenopyrum
Fagus grandifolia
Halesia Carolina
Ilex opaca
Lagerstroemia indica
Liquidambar styraciflua
Magnolia x soulangiana
Magnolia stellata
Prunus cerasifera
Prunus serrulata "Kwansen"
Prunus x yedoensis
Taxodium distichum
Viburnum plicatum var. Tomentosum

TREES WITH SUMMER INTEREST (June, July and August)

Lagerstroemia indica
Magnolia grandiflora
Oxydendrum arboretum
Prunus cerasifera

TREES WITH ATTRACTIVE FALL FOLIAGE

Acer rubrum
Acer saccharum
Carpinus betulus
Carya spp.

TREES WITH ATTRACTIVE FALL FOLIAGE (CONT.)

Cercis canadensis
Cornus florida
Cotinus coggygria
Crataegus phaenopyrum
Fagus grandifolia
Fraxinus pennsylvanica
Ginkgo biloba
Halesia Carolina
Lagerstroemia indica
Liquidambar styraciflua
Liriodendron tulipifera
Magnolia stellata
Oxydendrum arboreum
Platanus occidentalis
Prunus cerasifera
Quercus nuttalli
Quercus palustris
Quercus shumardii
Quercus rubra
Taxodium distichum
Tillia cordata
Ulmus Americana 'Princeton'
Viburnum plicatum var. Tomentosum

TREES WITH WINTER INTEREST AND/OR EVERGREEN TREES

Betula nigra
Ginkgo biloba
Gleditsia triacanthos
Ilex spp.
Juniperus virginiana
Lagerstroemia indica
Magnolia grandiflora
Magnolia x soulangiana
Magnolia stellata
Platanus occidentalis
Pinus spp.
Prunus cerasifera
Pseudotsuga menziesii
Tsuga caroliniana
X Cupressocyparis leylandii

TREES THAT ARE NATIVE

Acer rubrum
Acer saccharum
Betula nigra
Carya spp.
Cercis canadensis
Cornus florida
Crataegus phaenopyrum
Fagus grandifolia
Fraxinus pennsylvanica
Gleditsia triacanthos
Halesia carolina
Ilex opaca
Juniperus virginiana
Liquidambar styraciflua
Liriodendron tulipifera
Magnolia grandiflora
Oxydendrum arboreum
Pinus strobus
Pinus taeda
Platanus occidentalis
Quercus alba
Quercus lyrata
Quercus nigra
Quercus palustris
Quercus phellos
Quercus rubra
Quercus shumardii
Taxodium distichum
Tilia cordata
Tsuga caroliniana
Ulmus americana

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PLANT CHARACTERISTICS

Botanical Name: *Acer rubrum*

Common Name: Red Maple

Size: 40-60' Height; 30-50' Spread

Growth Rate: Fast

Culture: Native. Prefers deep, moist, rich soils, shallow rooted

Miscellaneous: Several hybrids available for shape and leaf color; good accent, street tree and tree for reforestation and naturalization



Botanical Name: *Acer saccharum*

Common Name: Sugar Maple

Size: 40-50' Height; 30' Spread

Growth Rate: Moderately-Fast

Culture: Native. Well drained moist soils; full sunlight

Miscellaneous: Upright to Oval Form with dense foliage mass. Considered by many one of the finest autumn coloring trees in the US.



Botanical Name: *Betula nigra*

Common Name: River Birch

Size: 30' x 20' average

Growth Rate: moderately fast

Culture: Native. Thrives in moist, acidic soils but, tolerates most conditions

Miscellaneous: Exfoliating bark, multi-trunked specimen. Use in naturalistic settings



Botanical Name: *Carpinus betulus*
Common Name: European hornbeam
Size: 40-60' Height; 30-40' Spread
Growth Rate: Medium
Culture: Tolerant of most soils
Miscellaneous: Good small tree for understory; tolerates full sun conditions



Botanical Name: *Carya* species
Common Name: Hickory
Size: 50-75' Height; 20-30' Spread
Growth Rate: Fast
Culture: Native. Tolerates most soils
Miscellaneous: Not a tree to plant because it is invasive; naturalizes well and is found in many areas; can be used for naturalization and reforestation



Botanical Name: *Cercis canadensis*
Common Name: Eastern Redbud
Size: 20-30' Height; 20-30' Spread
Growth Rate: Medium
Culture: Native. Tolerant of most soils
Miscellaneous: Good small tree for understory or accent planting; tolerates full sun or light shade; good for naturalization and reforestation; has purple flower that blooms on stem; hybrids for flower and leaf color

Botanical Name: *Cornus florida*
Common Name: Flowering Dogwood
Size: 20-30' Height; 20-30' Spread
Growth Rate: Slow
Culture: Native. Tolerant of most soils
Miscellaneous: Good small tree for understory or accent planting; does better in light shade but tolerates full sun; good for naturalization and reforestation; white flower



Botanical Name: *Cornus kousa*
Common Name: Kousa Dogwood
Size: 20-30' Height; 20-30' Spread
Growth Rate: Slow
Culture: Tolerant of most soils
Miscellaneous: Good small tree for understory or accent planting; tolerates full sun; white flower



Botanical Name: *Cotinus coggygria*
Common Name: Smoketree
Size: 10-15' Height; 10-15' Spread
Growth Rate: Medium
Culture: Native. Tolerant of most soils
Miscellaneous: Good small tree for understory or in massing in naturalized areas; tolerates full sun; white fringe like flower and purple fall color





Botanical Name: *Craetagus phae-nopyrum*

Common Name: Washington Hawthorn

Size: 25-30' Height; 20-25' Spread

Growth Rate: Medium

Culture: Native. Tolerant of most soils

Miscellaneous: Good small tree for accent; tolerates full sun; white flower with red berried in fall; has thorns



Botanical Name: *Fagus grandifolia*

Common Name: American Beech

Size: 50-70' Height; 50-70' Spread

Growth Rate: Slow

Culture: Native. Tolerant of most soils

Miscellaneous: Good tree for accent, street tree or naturalization and reforestation



Botanical Name: *Fraxinus penn-sylvanica*

Common Name: Green Ash

Size: 50-60' Height; 50-70' Spread

Growth Rate: Fast

Culture: Native. Tolerant of most soils

Miscellaneous: Good tree for accent, street tree or naturalization and reforestation; heavy seeder

Botanical Name: *Ginkgo biloba*
Common Name: Ginkgo
Size: 50-60' Height; 50-70' Spread
Growth Rate: Slow
Culture: Tolerant of most soils
Miscellaneous: Good tree for accent, street tree; excellent golden fall color



Botanical Name: *Gleditsia triacanthos* var *inermis*
Common Name: Honey Locust
Size: 60-75' Height; 40-50' Spread
Growth Rate: Fast
Culture: Native. Rich moist soils.
Miscellaneous: Accent tree can be used as a street tree; very lacy canopy



Botanical Name: *Halesia carolina*
Common Name: Carolina silverbell
Size: 30-40' Height; 20-35' Spread
Growth Rate: Medium
Culture: Native. Prefers rich, well drained soils
Miscellaneous: Good tree for naturalization and reforestation; full sun or semi-shade





Botanical Name: *Ilex cornuta burfordii* 'nana'

Common Name: Dwarf Burford Holly

Size: 6-8' Height; 4-6' Spread

Growth Rate: Medium

Culture: Tolerant of most soils; full sun or partial shade

Miscellaneous: Good small shrub for screening or hedges; heavy fruiter; responds well to pruning



Botanical Name: *Ilex opaca*

Common Name: American Holly

Size: 40-50 Height; 20-30' Spread

Growth Rate: Medium

Culture: Native. Tolerates most soils

Miscellaneous: Good accent plant or screen material; tolerates full to partial shade; requires male and female tree for fruiting; many cultivars and hybrids available



Botanical Name: *Ilex x attenuate* 'Fosteri'

Common Name: Foster Holly

Size: 20-30' Height; 8-10' Spread

Growth Rate: Medium

Culture: Native. Tolerant of most soils; prefers semi shaded conditions

Miscellaneous: Hybridized version of *Ilex opaca*; good screening material

Botanical Name: *Ilex x Nellie R. Stevens*

Common Name: Nellie Stevens Holly

Size: 15-25 Height; 10-20' Spread

Growth Rate: Medium

Culture: Tolerant of most soils; full sun or partial shade

Miscellaneous: Small tree or large shrub; good for accent or screening when large area is available



Botanical Name: *Juniperus virginiana*

Common Name: Eastern Redcedar

Size: 20-30' Height; 8-20' Spread

Growth Rate: Fast

Culture: Native. Tolerates most soils

Miscellaneous: Good for screening, accent or naturalizing and reforestation



Botanical Name: *Lagerstroemia indica*

Common Name: Crapemyrtle

Size: 15-20' Height; 10-15' Spread

Growth Rate: Fast

Culture: Tolerant of most soils.

Miscellaneous: Excellent tree for accent and street tree. Tolerates full sun; exfoliating bark with cinnamon colored trunk; heavy flowering tree; numerous hybrids for flower color





Botanical Name: Liquidambar styraciflua
Common Name: Sweetgum
Size: 60-75' Height; 30-40' Spread
Growth Rate: Fast
Culture: Native. Tolerant of most soils.
Miscellaneous: Good tree for naturalization and reforestation; one of the first canopy trees during succession; can be used as street tree; fruit is prickly ball like; heavy seed-er; purple fall color



Botanical Name: Liriodendron tulipifera
Common Name: Tuliptree
Size: 70-90' Height; 35-50' Spread
Growth Rate: Fast
Culture: Native. Tolerant of most soils.
Miscellaneous: Good tree for naturalization and reforestation; one of the first canopy trees during succession; fruit resembles a yellow flower



Botanical Name: Magnolia grandiflora
Common Name: Southern Magnolia
Size: 60-80' Height; 30-50' Spread
Growth Rate: Medium
Culture: Tolerant of most soils.
Miscellaneous: Good tree for screening and accent; can adapt to most environment; leaf drop can be messy; very shallow rooted and difficult to establish lawn under the canopy; number of hybrids for form, foliage and flower

Botanical Name: *Magnolia x soulangeana*

Common Name: Saucer Magnolia

Size: 20-30' Height; 20-30' Spread

Growth Rate: Medium

Culture: Prefers rich, well-drained soils.

Miscellaneous: Accent tree; pink to rose flowers; number of hybrids for flower color



Botanical Name: *Magnolia stellata*

Common Name: Star Magnolia

Size: 15-20' Height; 10-15' Spread

Growth Rate: Medium

Culture: Prefers rich, well-drained soils.

Miscellaneous: Accent tree; white, fragrant flower; number of hybrids for flower color



Botanical Name: *Oxydendrum arboreum*

Common Name: Sourwood

Size: 25-30' Height; 15-20' Spread

Growth Rate: Slow

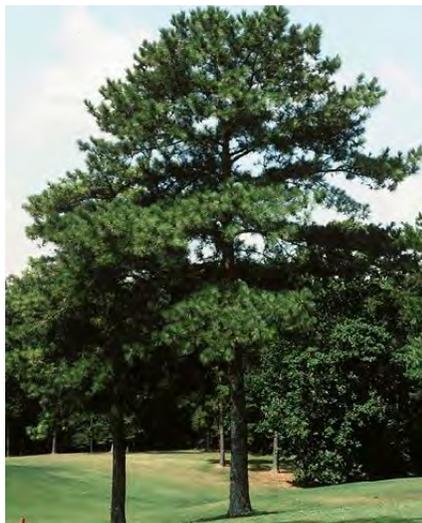
Culture: Native. Tolerant of most soils.

Miscellaneous: Good tree for naturalization and reforestation





Botanical Name: *Pinus strobus*
Common Name: White Pine
Size: 50-80' Height; 20-40' Spread
Growth Rate: Fast
Culture: Native. Tolerates most soils
Miscellaneous: Good for screening, accent or naturalizing and reforestation



Botanical Name: *Pinus taeda*
Common Name: Loblolly Pine
Size: 30-60' Height; 30-40' Spread
Growth Rate: Medium
Culture: Native. Tolerant of most soils; full sun or partial shade
Miscellaneous: Good specimen tree or for naturalizing or reforestation; one of first trees in succession



Botanical Name: *Platanus occidentalis*
Common Name: Sycamore
Size: 75-100' Height; 75-100' Spread
Growth Rate: Rapid
Culture: Native. Prefers deep, moist, rich soils
Miscellaneous: Exfoliating bark with white trunk; large leaves and ball like fruit

Botanical Name: *Prunus cerasifera*
Common Name: Purpleleaf Plum
Size: 15' x 10' average
Growth Rate: Moderate
Culture: Well drained soils in full sun
Miscellaneous: Maroon–purple foliage



Botanical Name: *Prunus serrulata*
'Kwansan'
Common Name: Kwansan Cherry
Size: 25-30' ht.
Growth Rate: Medium
Culture: well-drained soils, full-sun
Miscellaneous: rosy-pink clusters of double flowers

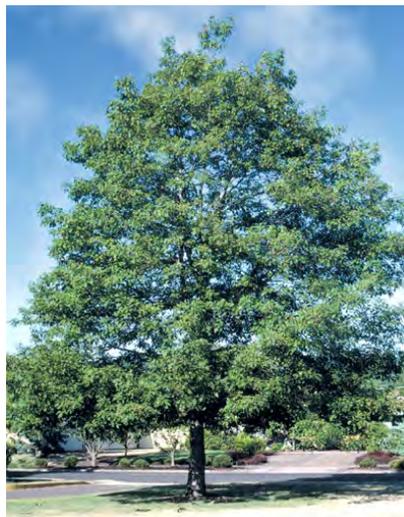


Botanical Name: *Prunus x yedoensis*
Common Name: Yoshina Cherry
Size: 30-40 Height; 20-30' Spread
Growth Rate: Fast
Culture: Tolerates most soils
Miscellaneous: Good accent tree; prolific flowerer; several hybrids for flower and form





Botanical Name: *Pseudotsuga menziessii*
Common Name: Douglas Fir
Size: 40-60' x 15-25' average
Growth Rate: Moderate
Culture: moist, well-drained soils, full sun
Miscellaneous: Erect pyramid great for screening



Botanical Name: *Quercus alba*
Common Name: White Oak
Size: 50-80' Height; 30-40' Spread
Growth Rate: Slow
Culture: Native. Prefers deep, moist, rich soils;
Miscellaneous: Bark is light gray and appears white; good tree for naturalization and reforestation



Botanical Name: *Quercus lyrata*
Common Name: Overcup Oak
Size: 30-50' Height; 30-40' Spread
Growth Rate: Medium
Culture: Native. Prefers deep, moist, rich soils;
Miscellaneous: Good tree for naturalization and reforestation

Botanical Name: *Quercus nigra*
Common Name: Water Oak
Size: 50-80' Height; 30-40' Spread
Growth Rate: Rapid
Culture: Native. Prefers deep, moist, rich soils;
Miscellaneous: Small leaf and limited acorn production; good specimen and street tree and for naturalization and reforestation



Botanical Name: *Quercus nuttallii*
Common Name: Nuttall Oak
Size: 40' x 25' average
Growth Rate: Moderate
Culture: tolerates a wide range of conditions
Miscellaneous: Excellent tree for mass plantings. Highly predictable and consistent in form, similar to pin oak in appearance



Botanical Name: *Quercus palustris*
Common Name: Pin Oak
Size: 60-70' Height; 25-40' Spread
Growth Rate: Rapid
Culture: Native. Prefers deep, moist, rich soils;
Miscellaneous: Widely used tree; good for accent, street tree and naturalization and reforestation





Botanical Name: *Quercus phellos*
Common Name: Willow Oak
Size: 60-80' Height; 30-40' Spread
Growth Rate: Rapid
Culture: Native. Prefers deep, moist, rich soils
Miscellaneous: small leaf and limited acorn production; good specimen and street tree



Botanical Name: *Quercus shumardii*
Common Name: Shumard Oak
Size: 70-75' Height; 40-50' Spread
Growth Rate: Medium
Culture: Native. Prefers deep, moist, rich soils;
Miscellaneous: Good for naturalization and reforestation



Botanical Name: *Quercus rubra*
Common Name: Red Oak
Size: 60-75' Height; 40-50' Spread
Growth Rate: Medium
Culture: Native. Prefers deep, moist, rich soils;
Miscellaneous: Good specimen and street tree and for naturalization and reforestation

Botanical Name: *Taxodium distichum*
Common Name: Bald Cypress
Size: 50' x 25' average
Growth Rate: Fast
Culture: Native. Tolerates a wide range of conditions and wet soils
Miscellaneous: Used to stabilize soils around water



Botanical Name: *Tilia cordata*
Common Name: Littleleaf Linden
Size: 60-70' Height; 30-40' Spread
Growth Rate: Medium
Culture: Native. Tolerant of most soils
Miscellaneous: Good street tree and accent



Botanical Name: *Tsuga caroliniana*
Common Name: Carolina Hemlock
Size: 45-60 Height; 20-25' Spread
Growth Rate: Slow
Culture: Native. Moist, well-drained soils
Miscellaneous: Good for screening, accent or naturalizing and reforestation; should be used in sheltered locations





Botanical Name: *Ulmus Americana* 'Princeton'

Common Name: Princeton Elm

Size: 40-50' Height; 30' Spread

Growth Rate: Moderate

Culture: Native. Prefers moist fertile soils and full sunlight but, tolerates a wide range of conditions

Miscellaneous: Has been used to replace the American Elms which had fallen to disease, appears to withstand the disease



Botanical Name: *Viburnum plicatum* var. *tomentosum*

Common Name: Doublefile Viburnum

Size: 8-10' Height; 10' Spread

Growth Rate: Medium

Culture: Well drained moist soils; full sun or partial shade

Miscellaneous: Good small shrub or tree for flower and horizontal branch habit; resembles Dogwood and can be used as an accent tree or shrub or at the edge of naturalized or reforested areas.



Botanical Name: *X Cupressocyparis leylandii*

Common Name: Leyland Cypress

Size: 30-50' Height; 10-20' Spread

Growth Rate: Medium

Culture: Prefers moist well drained soils; full sun

Miscellaneous: Good screen material or hedge material

05 Design Guidelines

2011
Andrews | NAF
Arbor
Plan

GENERAL INFORMATION

The objectives of landscaping are to improve the physical and psychological well-being of people who live and work within a particular environment. Of primary importance is the preservation and enhancement of existing landscape resources as visual and functional assets, and as contributing factors to the health of the natural environment. While one of the basic reasons for landscaping is to improve visual quality, other fundamental purposes are of a more utilitarian nature.

Every part of a well-designed landscape should perform a designated function. Landscaping shall serve to improve environmental quality. Terracing and planting can be used to control soil erosion; berms, fences, walls, and massed planting can form barriers to abate noise and screen wind and snow; also, plant materials provide shade, reduce glare, and help improve air quality. Landscaping adjacent to a building shall be properly designed to have a significant positive impact on energy conservation.

Landscaping adjacent to vehicular and pedestrian paths shall direct and control traffic flow, reducing the possibility of conflict and eliminating unwanted traffic. Using landscaping to improve visual quality and screen bad views, can have a positive psychological impact on people that improves their sense of well-being. Benefits include increased satisfaction with lifestyle, increased productivity on the job, and a reduction in vandalism. An efficient and attractive military installation helps to draw and retain high-quality personnel.

Objectives for Landscaping:

1. Follow the guidelines and objectives of the General Plan Update Joint Base Andrews, January 2010,
2. Install additional landscape materials in accordance with an overall design plan.
3. Enhance existing tree stands on the installation with deciduous and flowering trees, wildflowers, and shrubs.
4. Install landscape plantings to soften the affects of building features which have a negative impact. Introduce screen plantings to hide undesirable views.
5. Separate districts and define circulation routes by introducing street-tree plantings.
6. Remove undesirable or nuisance plants such as Bradford Pear.
7. Expand on and / or modify The New Street Standards for thoroughfares as outlined in the 07/2009 ACP. Specifically, See Street Tree Plantings and Parking Lot Planting sections.

05

Design Guidelines

PLANT DESIGN

Patterning a designed landscape after plant relationships found in nature creates a graceful bridge between the built and natural environments. Plants found in their natural setting are not positioned accidentally, but are located where they find ideal growing conditions. Studying plant relationships in nature aids in the correct placement of plants in the designed environment.

Illustration A depicts a seasonal old field and the transition to a mature climax forest. The forest edge contains a variety of flowering and fruiting plants that provide year round interest. The succession of plants is stepped back from sedges and grasses to colorful shrubs, understory trees, and tall hardwoods shading a forest floor of ferns and herbaceous plants.



FOREST INTERIOR

FOREST EDGE

OLD FIELD

ILLUSTRATION A

NATURAL PLANT ARRANGEMENT

NATURAL PLANT ARRANGEMENT

A designed landscape, such as the one shown in Illustration B, can capitalize upon the natural arrangement to display a succession of groundcover and flowers, small deciduous shrubs, larger evergreen shrubs, understory trees, and large shade trees. Using the stepped-back configuration found, at the forest edge, the designed landscape makes all sizes of plants available to the viewer. The plants requiring the most sunlight are placed to get the most exposure; those requiring sheltering or heavy shade are protected by mature trees.

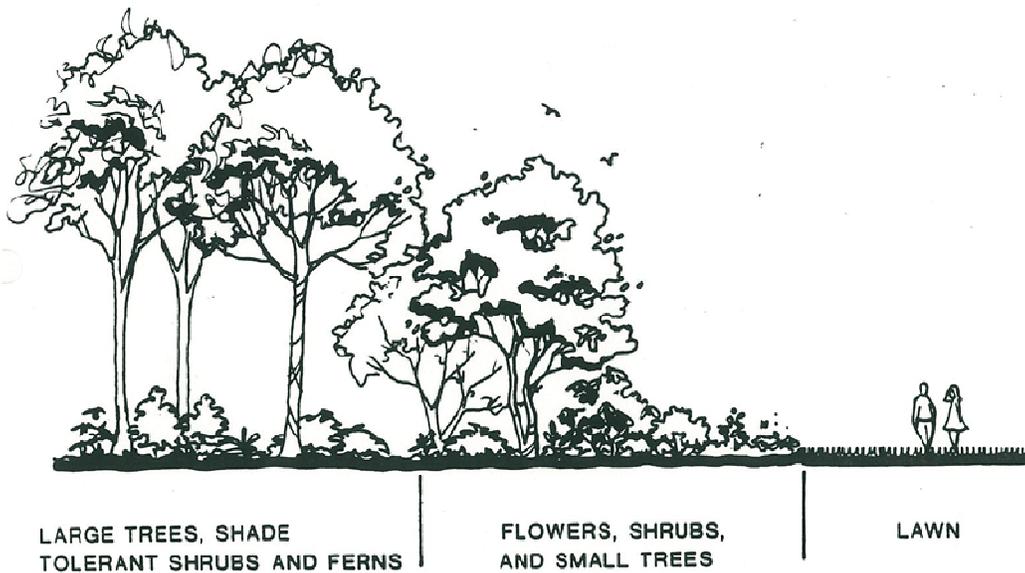
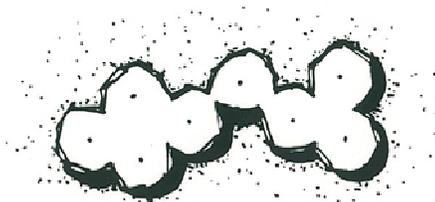


ILLUSTRATION B

PLANTING PATTERNED AFTER NATURE

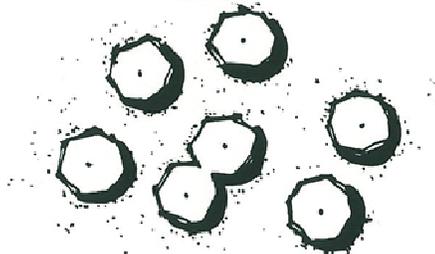
MASSING

Except when used as an accent or focal point, plants usually look better massed than when used alone. When groups of seven or less are used, odd numbers of plants make the most pleasing masses. Groups or clusters of plant materials, should also be visually connected to avoid wasted space between them. Scattered plants or groups cause the composition to appear disjointed, and the small areas between them cause an increase in the amount of maintenance that is necessary.



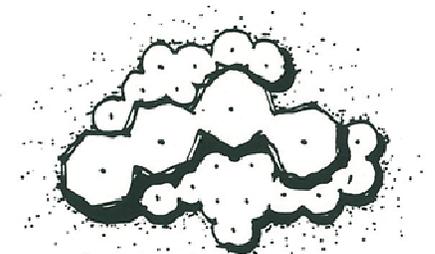
INDIVIDUAL PLANTS IN COMPOSITION ARE
 MASSED TOGETHER

ACCEPTABLE



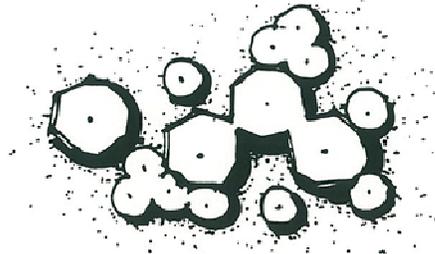
INDIVIDUAL PLANTS IN COMPOSITION ARE
 SCATTERED AND SPOTTY WHICH INCREASES
 MAINTENANCE

UNACCEPTABLE



SMALL SHRUBS ARE PROPERLY MASSED IN
 LARGER GROUPS—WORKS WELL IN BEDS

ACCEPTABLE

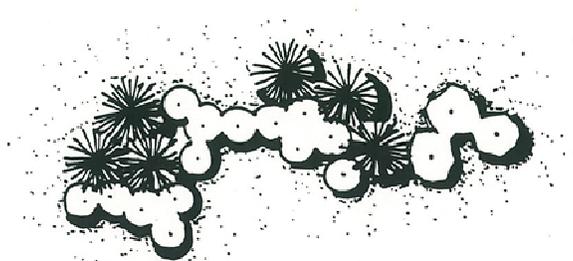


SMALL SHRUBS PLACED IN TOO MANY
 SEPARATE GROUPS

UNACCEPTABLE

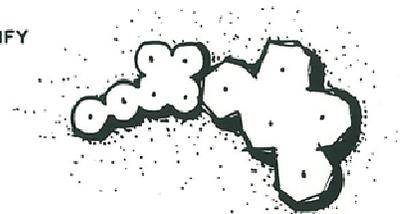
PLANTING COMPOSITION

Deciduous shrubs are best used with evergreen shrubs for year round effect. Evergreens should be clustered together to unify the composition. Scattering them throughout the landscape visually fragments the composition, particularly in winter. Small shrubs are more effective when massed in front of larger shrubs for scale and texture.



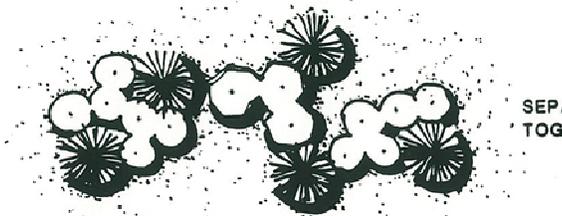
EVERGREENS ARE CLUSTERED TOGETHER TO UNIFY THE COMPOSITION

ACCEPTABLE



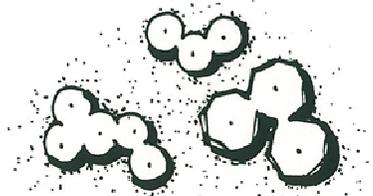
SEPARATE PLANT GROUPS ARE MASSES TOGETHER, AVOIDING WASTED SPACE

ACCEPTABLE



EVERGREENS ARE TOO SCATTERED AND THEREFORE VISUALLY BREAK UP THE COMPOSITION

UNACCEPTABLE



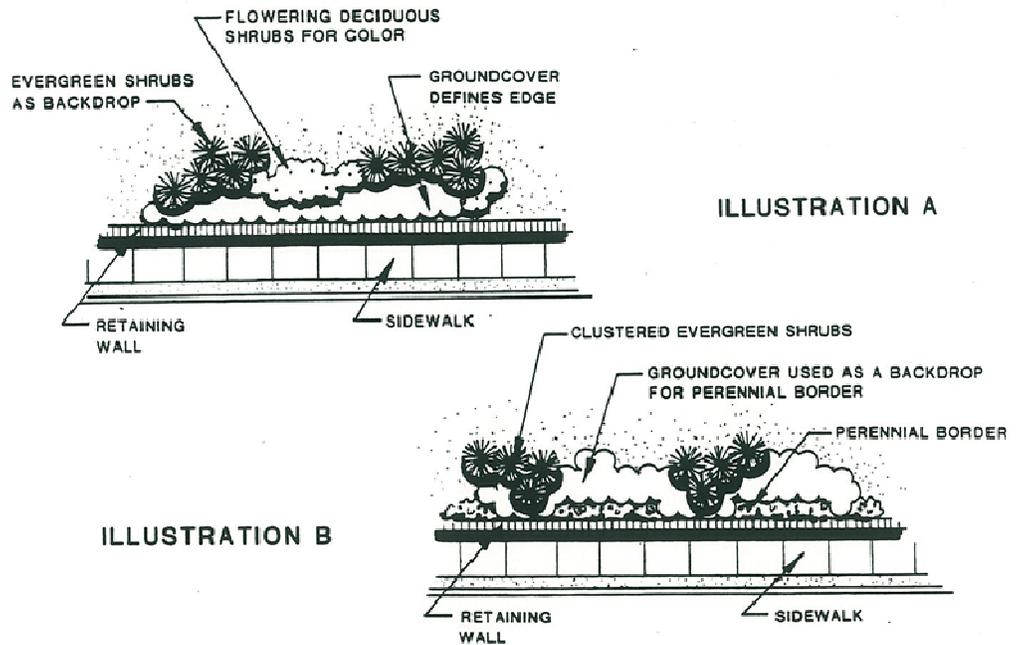
WASTED SPACE CREATED BETWEEN SEPARATE PLANT GROUPS INCREASES MAINTENANCE

UNACCEPTABLE

PLANTING COMPOSITION

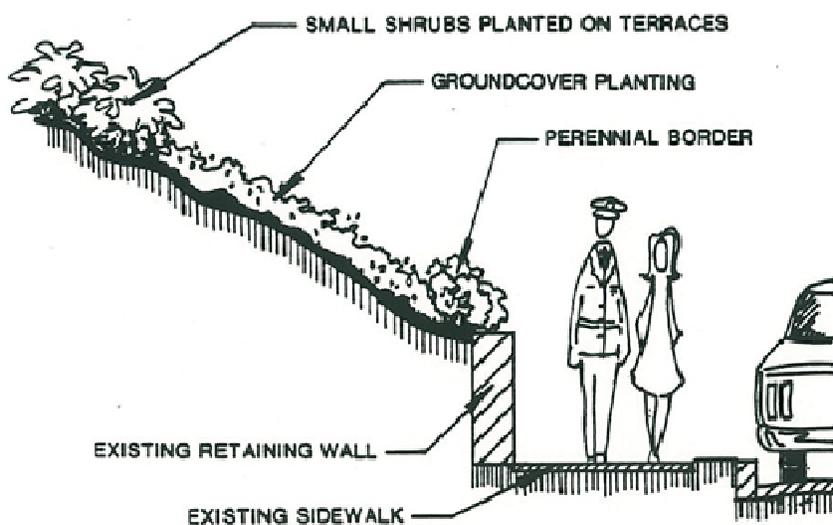
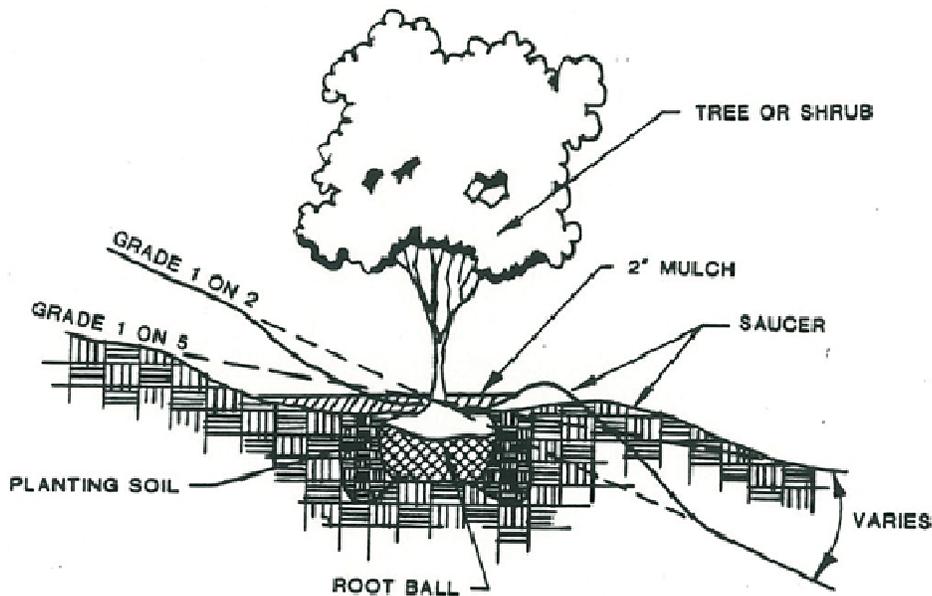
SLOPE PLANTING

Situations may occur on post where slope planting is required, either on existing terrain or on constructed features such as berms. Established plantings on banks slow runoff, stabilize the soil, and provide visual variety. The use of groundcover and low-growing shrubs is practical from the standpoint of maintenance, particularly where the slope is too steep for easy or safe mowing. The two suggested schemes show low-maintenance planting compositions varied in color, texture, and form. Illustration A combines evergreen shrubs for year round interest, flowering deciduous shrubs for seasonal color, and groundcover to tie the planting mass together and define the edge. Illustration B substitutes a perennial border for seasonal color, using it to define the edge. The evergreen shrubs again provide a year round backdrop, and the groundcover ties the composition together. The individual types of shrubs are to be clustered together, and the masses interspersed to balance the composition. The most appropriate shrubs for slope planting are small or medium size, with a horizontal rather than upright growth habit.



SLOPE PLANTING

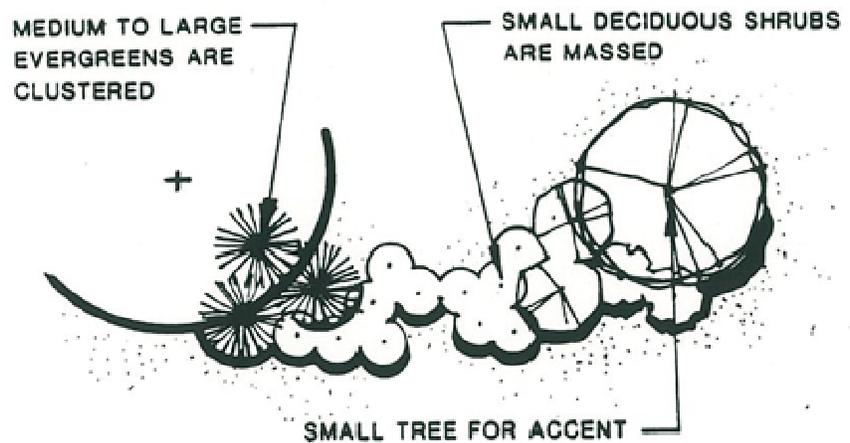
In order to plant on slopes, terraces or saucers shall be formed to support the plant and retain water. Place the tree or shrub at field grown level in the middle of the planting hole. Mound up soil at the lower edge to form a 4" lip above the planting hole and backfill with planting soil consisting of 3 parts sandy loam and 1 part composted cow manure. Flood the saucer at planting, and cover with a 2" layer of pine bark mulch.



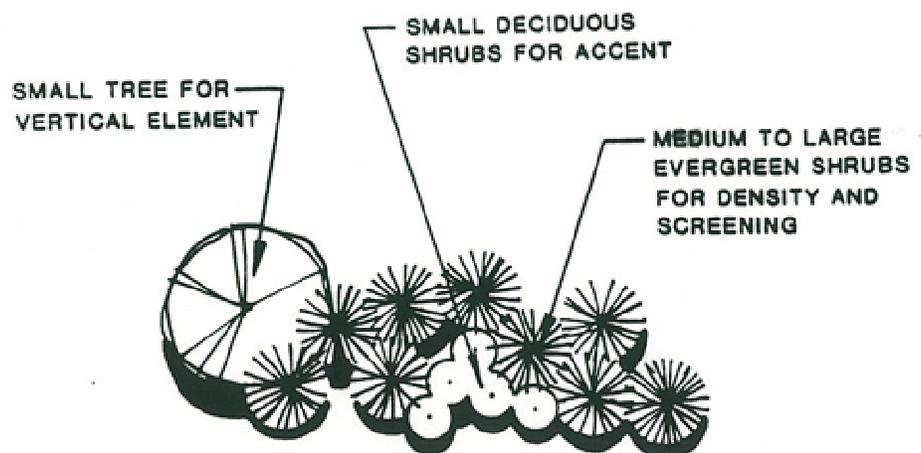
SLOPE PLANTING

BUFFERS

Buffers are a composite of plants used to separate land uses and add visual interest. Buffer planting should contain a mix of evergreen and deciduous plant material for year round effect. The density of the buffer and the number of plants in the buffer depend on the desired degree of separation. A buffer composition such as the one shown below can be used to define zones, direct pedestrian traffic, or direct views.



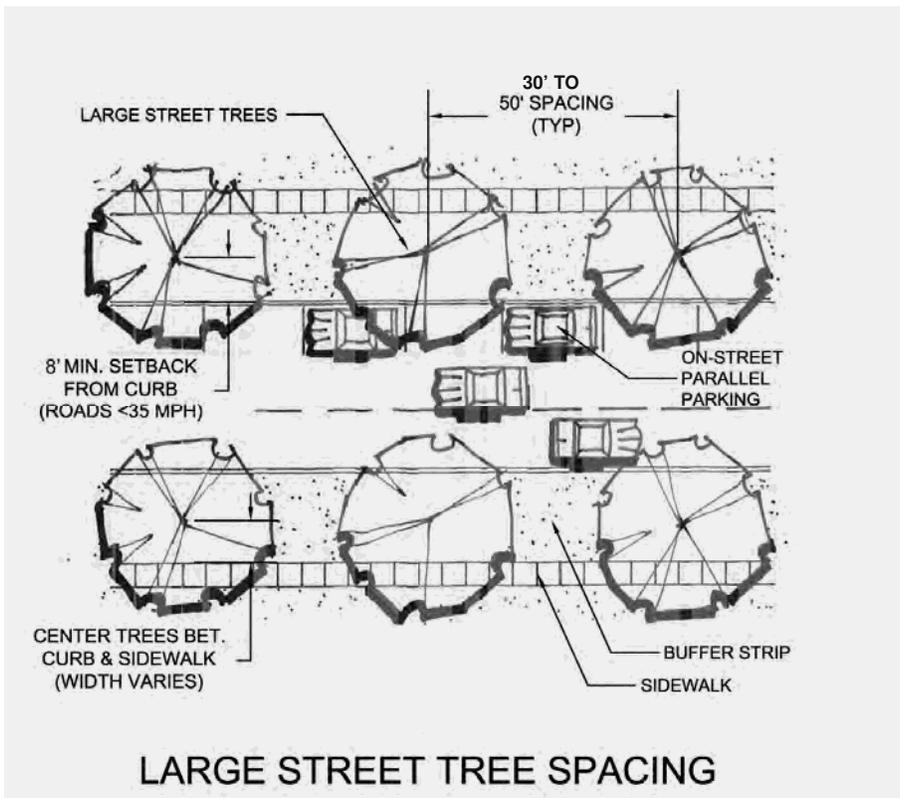
Plant screens are to be used to buffer unsightly views. A typical combination of plant materials for screening should consist of medium to large Evergreen shrubs for year round screening. Small deciduous shrubs should be used as a foreground accent and small trees for verticality. The plant buffer will screen undesirable views and help abate noise.



BUFFERS

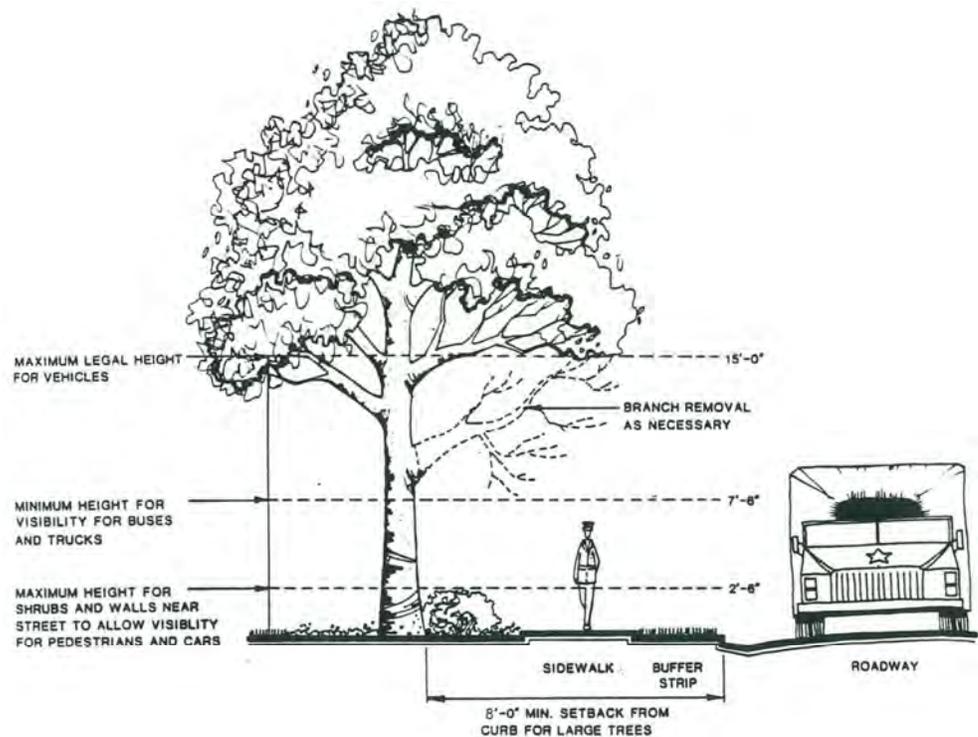
STREET TREE SPACING

Trees located along roadways provide shade, screening, vertical relief, and definition of the road corridor. The selection of suitable trees for roadside planting should reflect consideration of the following factors: mature height, spread, growth habit, texture, mass with and without leaves, light and water requirements of the species, resistance to exhaust fumes, strength and resilience of the wood, and the type of fruit produced by the tree. The best trees for street use are large deciduous trees with a broad spreading shape that are long-lived, well adapted to the roadside environment, and have only small or insignificant fruit that will not prove hazardous when dropped. Small trees should be used along roadways in secondary plantings for accent and to reinforce the pedestrian scale. Large trees are to be used in primary plantings along streets to define the corridor and provide climate modification. Large street trees are to be spaced 30' to 50' apart at regular intervals, and set in the middle of the planting area between the sidewalk and the curb. The trees on opposite sides of the street should be symmetrically spaced. Trees for an entire block should be planted at the same time, and all trees on any one street are to be the same type except for variations to achieve special effects. The minimum clearance from street surface to branches overhanging the vehicular path is to be 15'. Street trees are not to be planted so as to obstruct the 50' cone of vision at intersections. Street trees shall be centered between the back of curb and the sidewalk. Where no sidewalk exists, trees shall be offset from the back of curb in a manner that best aligns with existing vegetation. There shall be a minimum setback of 8' for trees planted along base roads less than 35 mph. For roads between 35 mph and 45 mph, a setback of 10' shall be the minimum.



VEHICLE CLEARANCE

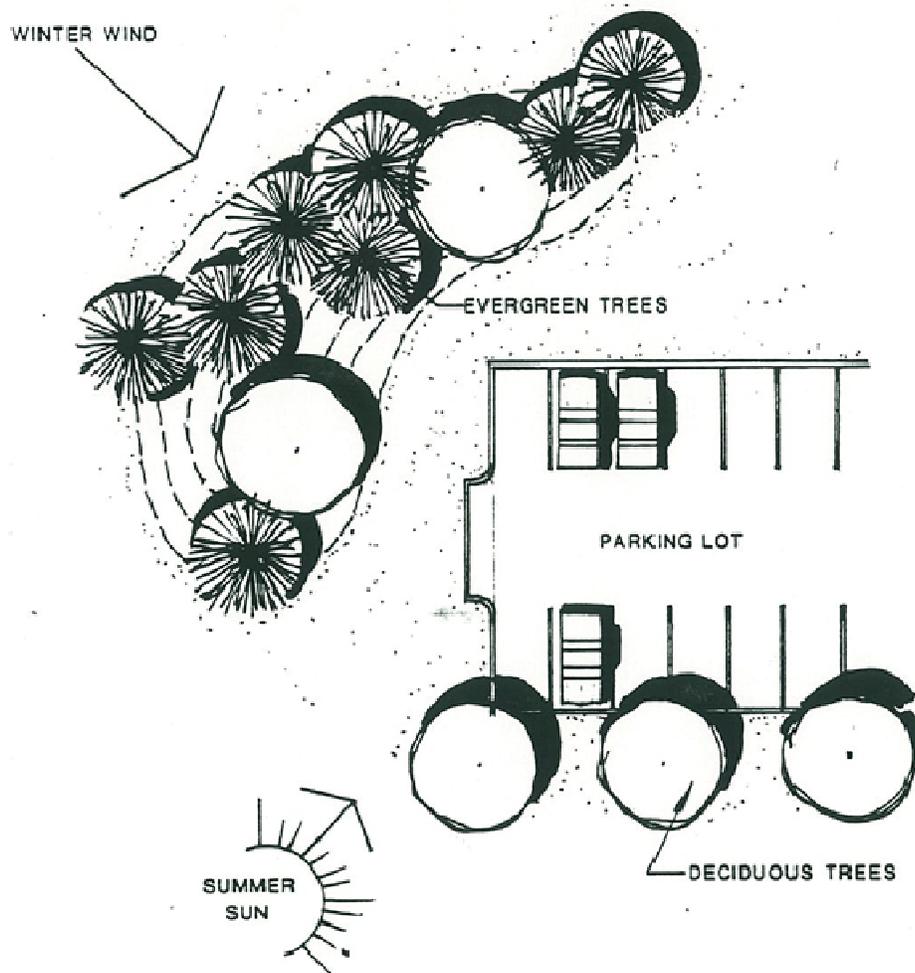
Large street trees shall be planted in the middle of the planting area between the sidewalk and back of curb. A minimum of 5' x 10' is necessary for each large street tree. Once the trees reach a breadth that extends into the traffic lane or zone of visibility, some branch removal may be necessary. In order for the tallest vehicles such as tractor-trailer trucks to clear, overhanging branches lower than 15' must be removed. The zone of visibility that must remain unobstructed for drivers of vehicles of all sizes as well as pedestrians is between 2'-6" and 7'-6" in height. This clearance is to be observed within the 50' cone of vision at intersections, and anywhere else oncoming or entering traffic might be obscured by walls, vegetation, or other elements.



VEHICLE CLEARANCES

PARKING LOT MICROCLIMATE

Landscaping can be used to create a more comfortable microclimate in parking lots. The inclusion of landscaped islands helps reduce the effects of wind and heat, but combining islands and bordering trees, fences, and berms can significantly temper conditions within the parking lot. A row of deciduous trees planted along the south or southwesterly border of a parking lot provides shade from the summer sun. A screen of evergreen trees, especially used with an earth berm or a fence, can shelter parking areas from harsh winter winds when placed on the north or northwesterly side of the lot. A combination of evergreen and deciduous trees provides wind screening as well as seasonal variation.

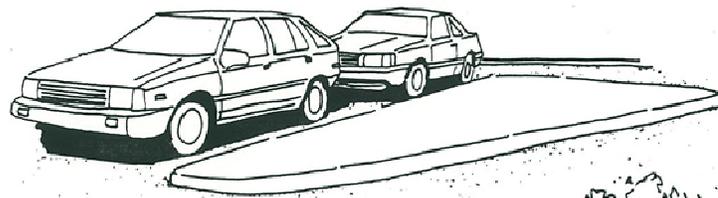


PARKING LOT MICROCLIMATE

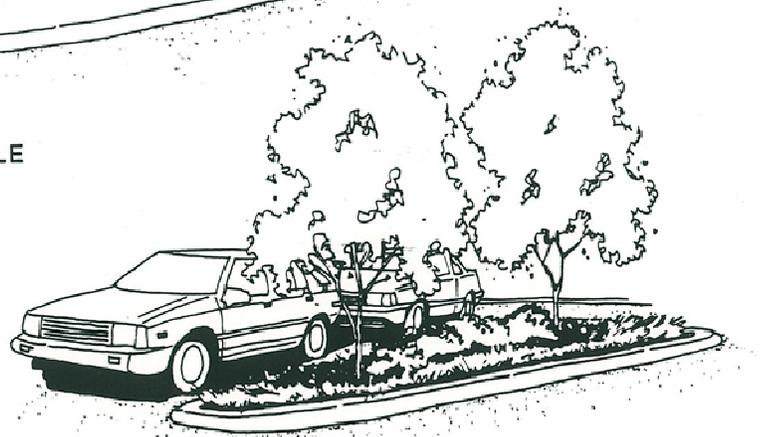
PARKING ISLANDS

Parking islands are useful in controlling traffic flow, acting as barriers, separating vehicular and pedestrian use, breaking up long rows of parking spaces, and preserving existing trees. The raised parking island shown in the "unacceptable" illustration is an impermeable surface that does nothing to reduce heat, glare, or visual monotony. A landscaped island can provide relief to the desert-like atmosphere of the parking lot.

A typical planting scheme would consist of low-maintenance ground cover, low-growing shrubs, and small or medium deciduous trees. Plant materials selected should be ecologically suited to the site conditions, and not heavily dependent upon fertilizers, irrigation, and chemical sprays. The composition of plants should provide seasonal interest throughout the year. Planting of the islands should allow for the overhang of cars (2'-10") and the opening of doors. Low branches of larger trees should be pruned so as not to interfere with cars or pedestrian paths. Islands should have a minimum width of 9' where trees are to be planted.



UNACCEPTABLE

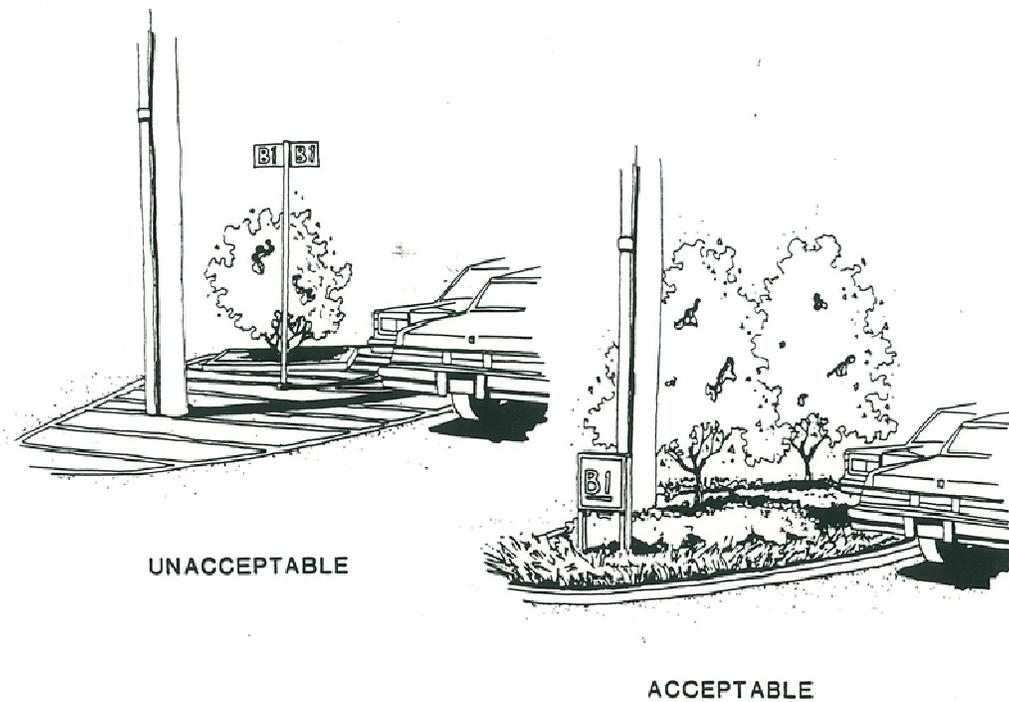


ACCEPTABLE

PARKING ISLANDS

The "unacceptable" illustration shows a parking island designated by painted stripes on the pavement. It offers no protection for the utility pole or the sign in the center. In addition, painted zones will not prevent people from parking in undesirable locations. The planting area within the striped zone is small, and adds to the clutter of the island. The large shrub is inappropriate as a parking lot plant; it offers little shade and its density obstructs visibility.

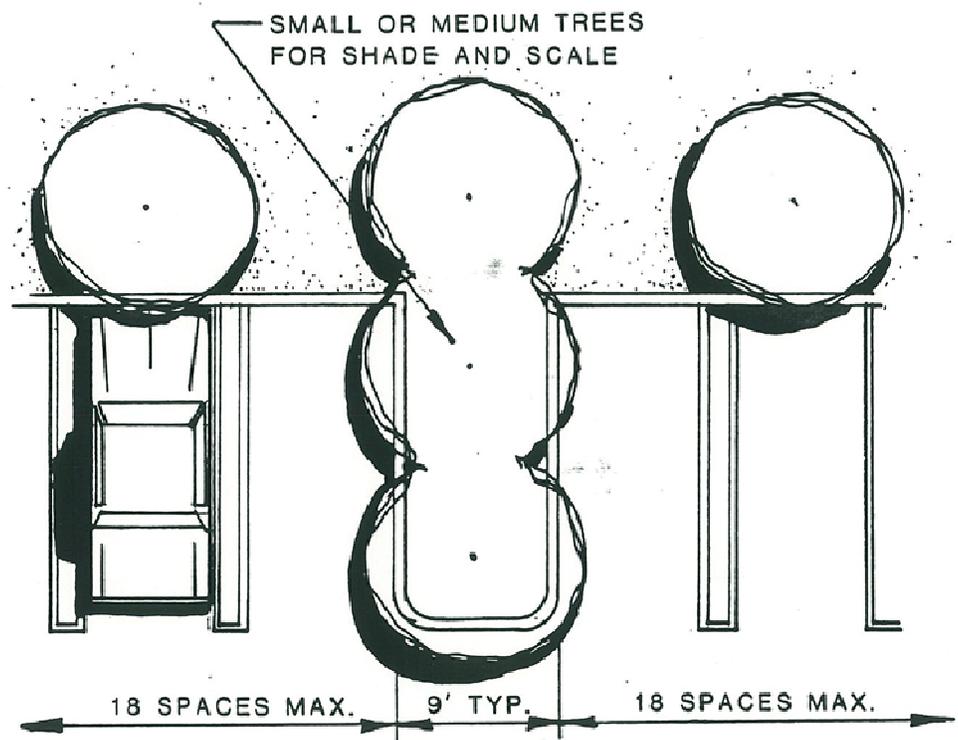
The acceptable planted island shown below not only restricts traffic and parking in designated areas, but serves to anchor the sign and utility pole, pulling the elements together into an orderly composition. The lower sign placed at the entrance to the traffic aisle is easily viewed. The planting scheme offers shade, varied color and texture, and breaks up the view of long rows of parked cars and expanses of asphalt.



PARKING ISLANDS

PARKING LOTS

The landscaping of parking lots along edges and in medians and islands provides several important benefits. Massed plantings and berms reduce headlight glare and lessen the effect of harsh winter winds. Trees provide shade, reducing heat and glare. The permeable surface of the islands and medians allows percolation to take place, reducing run-off and contributing to the replenishment of groundwater supplies. Landscaping provides visual interest, screens, undesirable views, and can be used to define spaces, edges, and paths. Not only does the presence of vegetation improve the environment in the parking lot, but benefits the surrounding area as well. Vegetative screens and trees in islands prevent heat and light reflected off of pavement and parked cars from being intrusive upon offices in surrounding buildings.

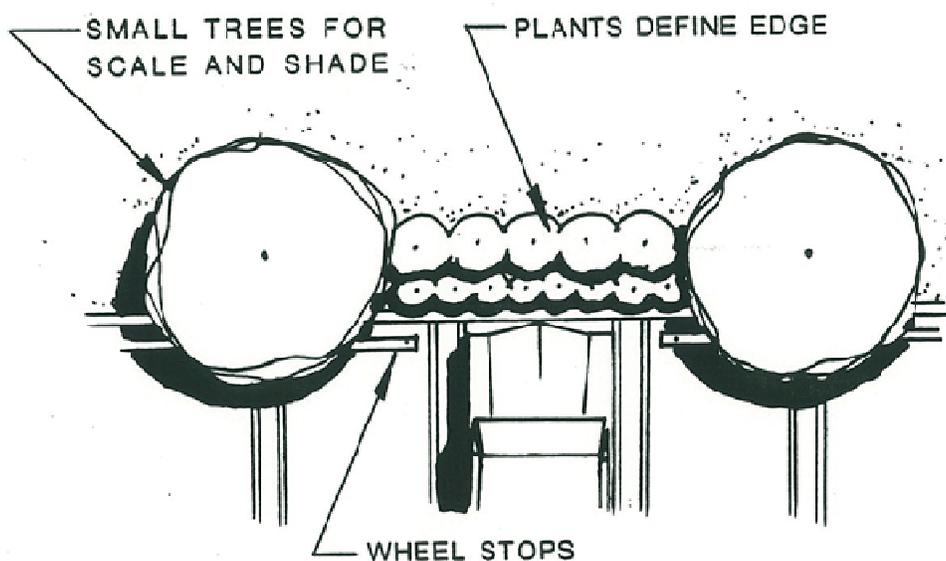


PARKING LOT LANDSCAPING

Plant material used in and around parking lots should be able to withstand heat, wind, exposure to sun, air pollution, and periods of little water. Selected plants should be a low maintenance variety that require minor pruning, spraying, and fertilizing. Generally, plants that are native to the United States and suitable for Zone 7 of the USDA Plant Hardiness Zone Map are much better adapted to parking lot conditions than exotic species. Small or medium sized deciduous trees should be used in medians and parking islands for shade, and to make large parking lots more human in scale. Evergreens can be used where screening of wind, glare, or view is needed, but low-branching plants should be kept out of areas such as parking islands where good visibility is necessary for safety and security. Groundcover is preferable to grass in islands and small spaces where mowing would be a problem. Shrubs should be low-growing, and all plants should be maintained so as not to impair visibility or obstruct parking spaces and traffic lanes. All trees and shrubs should be planted clear of the overhang limits of cars and car doors. Where wheel stops are used, plants may be placed closer to curbs and edges.

Per the guidelines of the ACP, the planted areas within the parking lot should total at least 10% of the gross lot area. They should also be planted at a ratio of one tree for every five parking spaces in a manner that will shade the majority of the pavement of the lot when the trees reach maturity.

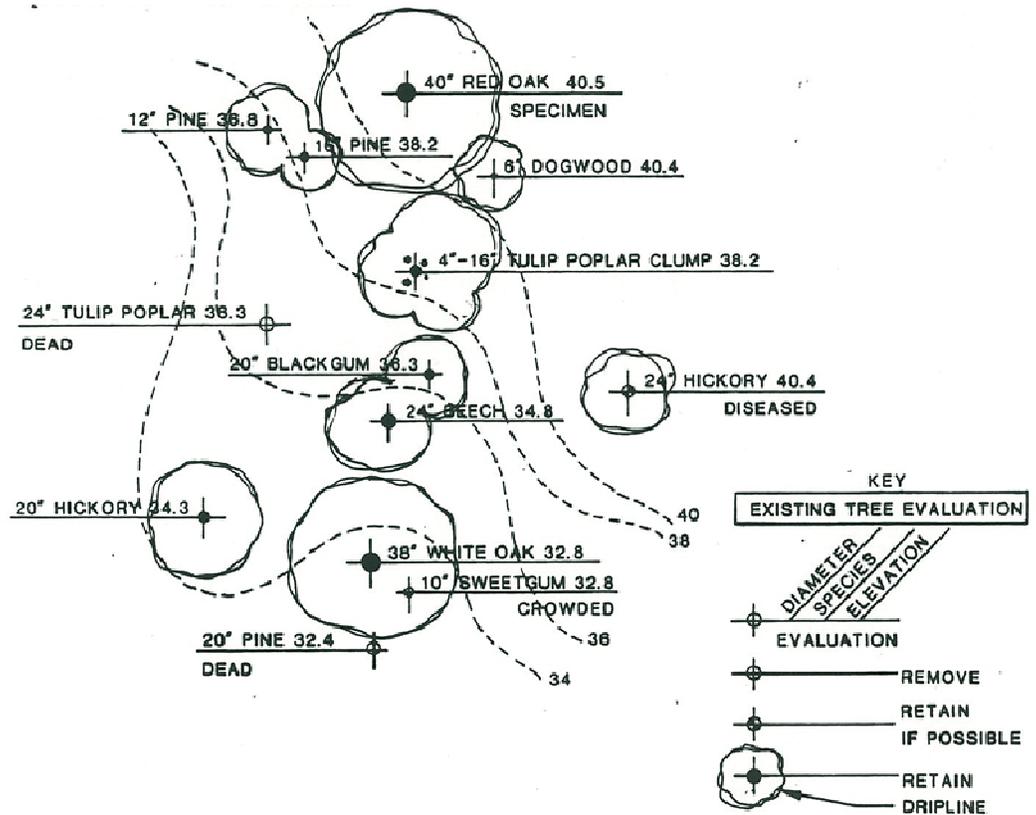
Plant materials should be selected and composed to provide year-round seasonal interest. Combining evergreen with deciduous material and including plants that have spring or summer flowers, fall color, or interesting winter effects will produce a varied, dynamic landscape.



PARKING LOT LANDSCAPING

TREE EVALUATION

Prior to any clearing, earth movement, or construction, an accurate inventory should be made of all trees and shrub masses. The trees and shrubs are to be located on a topographic map, and notations are to be made giving the size, species, and interpolated spot elevation of the plant or plant mass. An examination of the existing plant material must be made to evaluate condition and relative value, and the information shall be noted on the map. From this inventory and evaluation, priority trees and shrubs will be selected for preservation on the development site. Final decisions regarding destruction of plant material should be made only after final design and construction documents have been approved. Precautions shall be taken to prevent damage to and destruction of plants selected for retention prior to any site disturbance. Precautions shall include the fertilization of trees and erection of protective barricades.



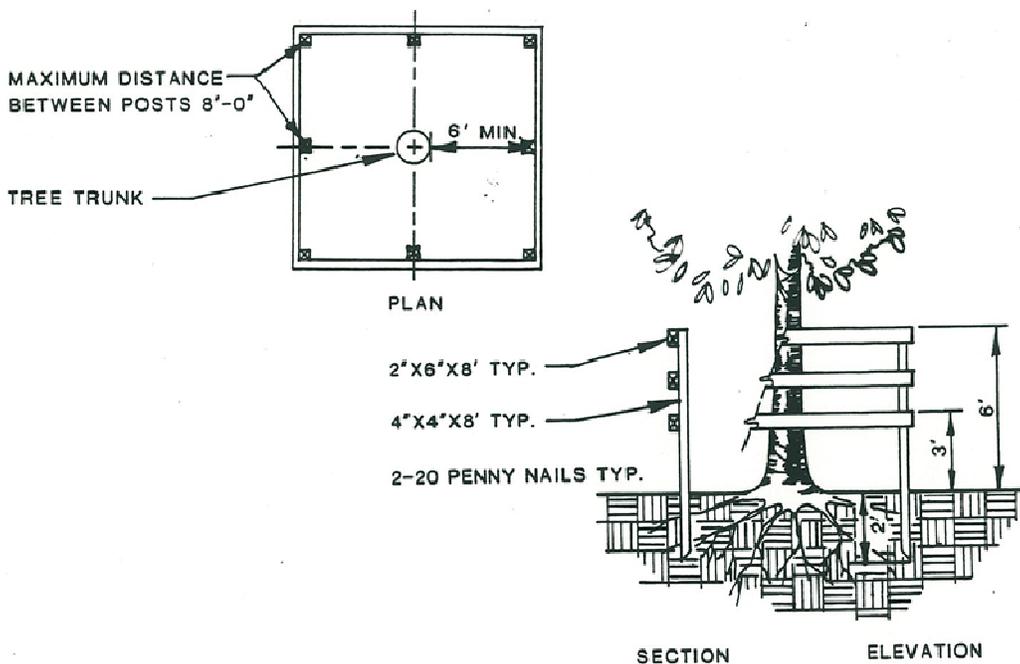
INVENTORY AND EVALUATION

TREE PROTECTION

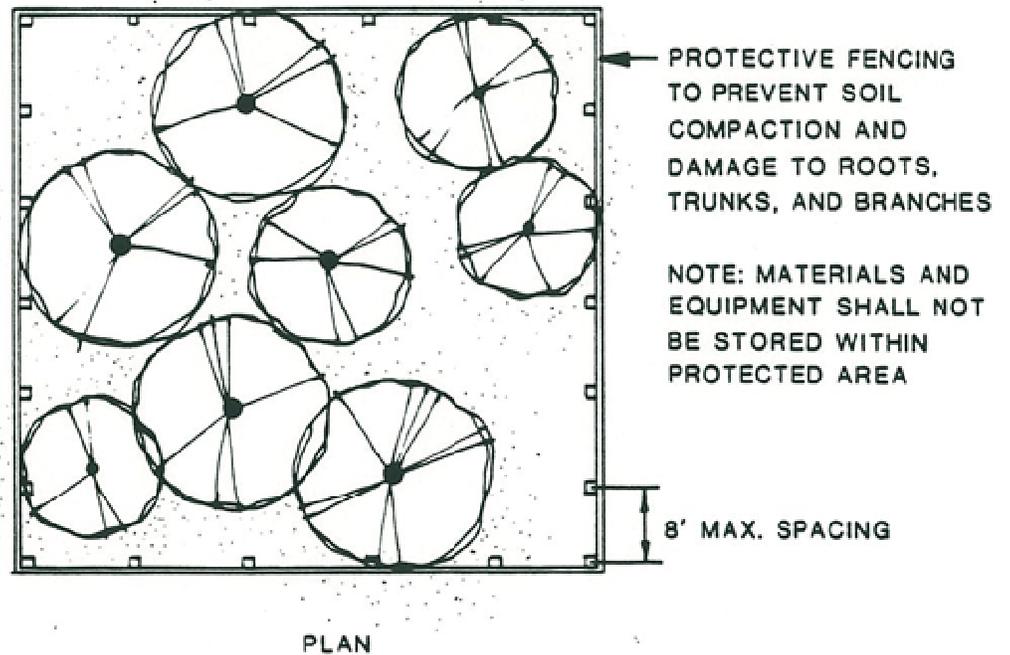
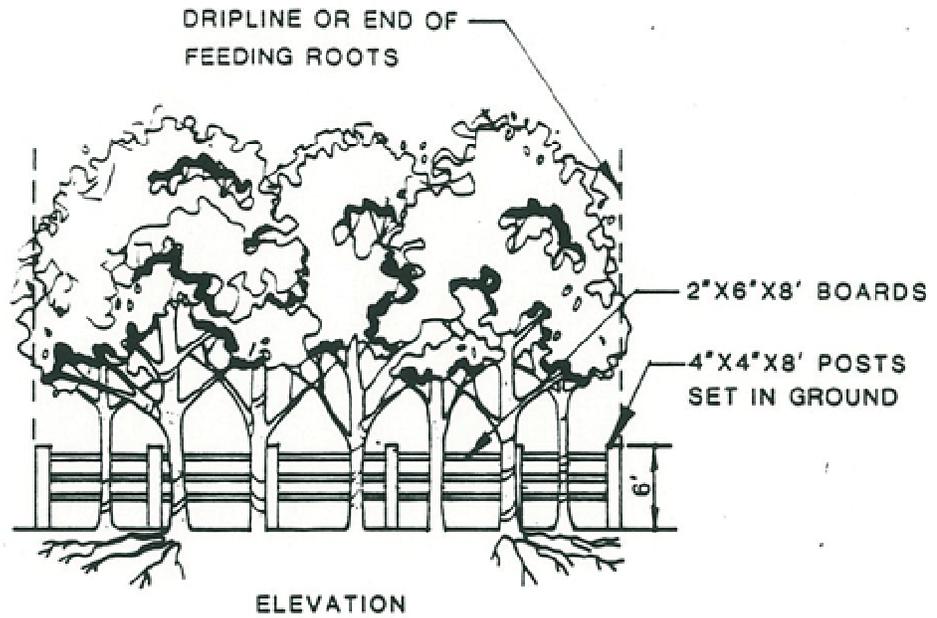
Existing vegetation designated to be retained on site during and after construction shall be surrounded with protective barricades prior to the start of any demolition, grading, or construction. Key trees shall be fertilized prior to on-site activity to help them survive damage. The fencing shall serve to protect not only the trunks and branches of plants, but also to prevent heavy machinery from compacting soil within the drip line. Fencing shall be constructed of pressure-treated timber and 20-penny nails. Vertical 4" x 4" x 8' posts are to be placed no more than 8' apart, and shall be sunk 2' into the ground. Horizontal members shall be 2" x 6" x 8' boards.

Barricades are to include all of the area within the drip line of the trees if possible. Tree roots extend out anywhere between 2 to 5 times the diameter of the crown. If nearby roads or buildings do not permit this, then the barricade shall be placed no closer than 6'-0" to the tree trunk. Tree barriers must be replaced if they are damaged.

Trees or shrubs grouped closely together may be included in one common barricade. Under no circumstances shall materials and equipment be stored within the protected area.



TREE PROTECTION

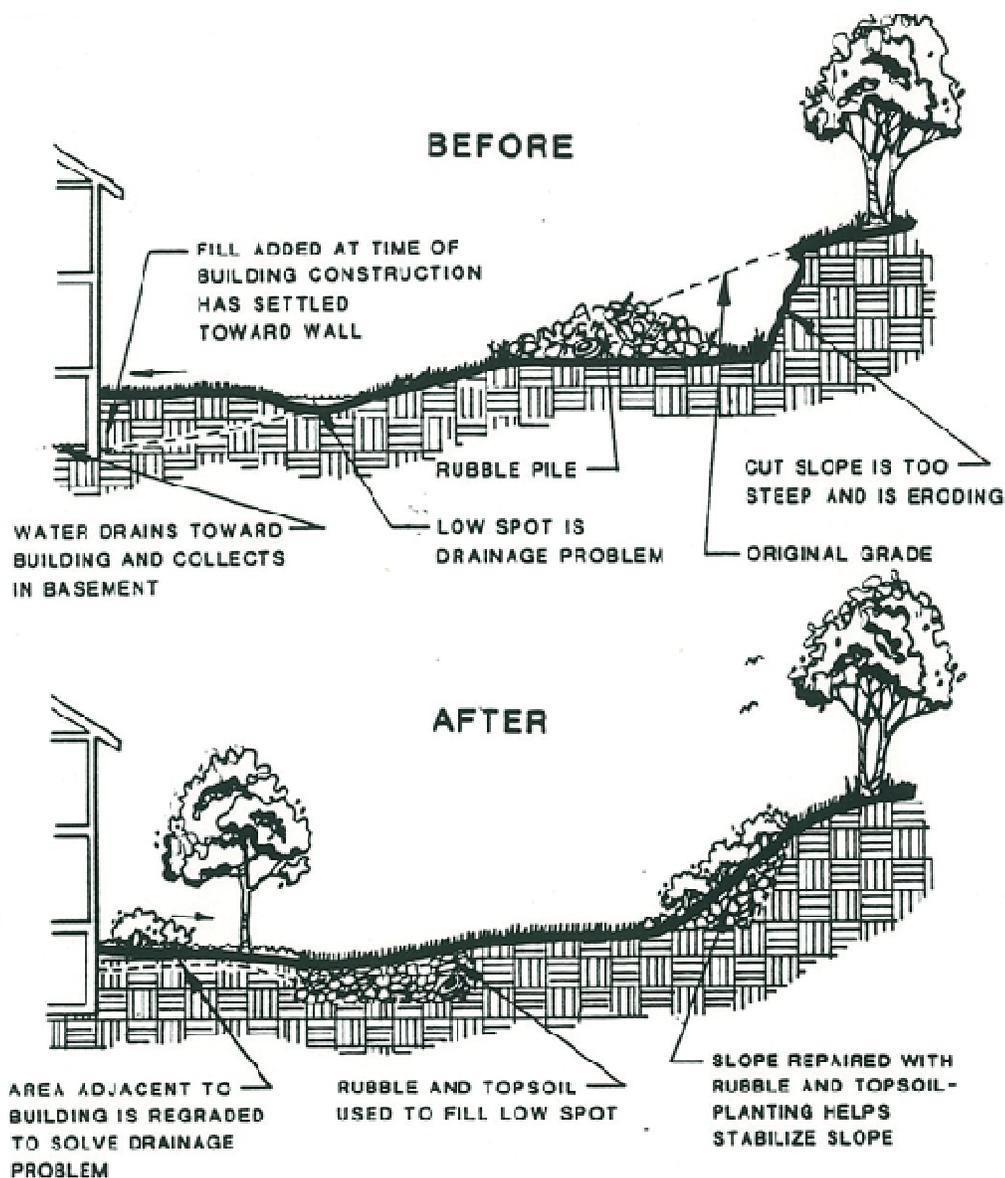


TREES AND SHRUBS CLOSELY GROUPED MAY BE ENCLOSED IN ONE ENLARGED BARRICADE

TREE PROTECTION

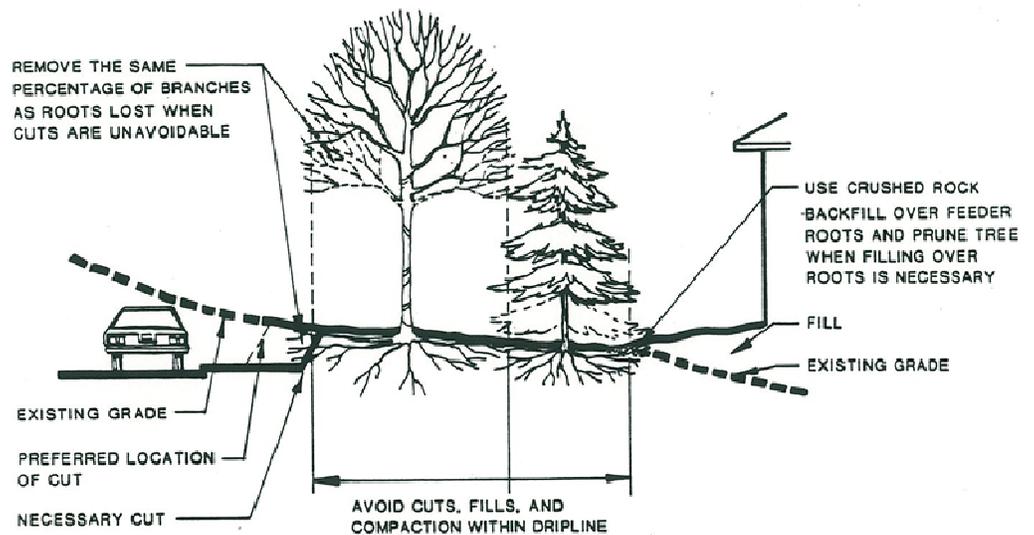
GRADING

The landscape may be altered by the movement of earth to correct drainage problems, prevent erosion, or create features such as berms. In order to reduce off-site drainage and hauling costs, soil shall be relocated on site and rubble buried as fill. Excavated clean soil improved with compost, leaf mold, peat, or partially decomposed wood chips may be spread evenly over compacted rubble fill at a minimum depth of 18" to repair the landscape and support plant life. Low spots where water collects and stands shall be corrected in built areas. Grade paved and planted areas to direct run-off to areas where water can infiltrate the ground at a reasonable rate and not cause erosion.



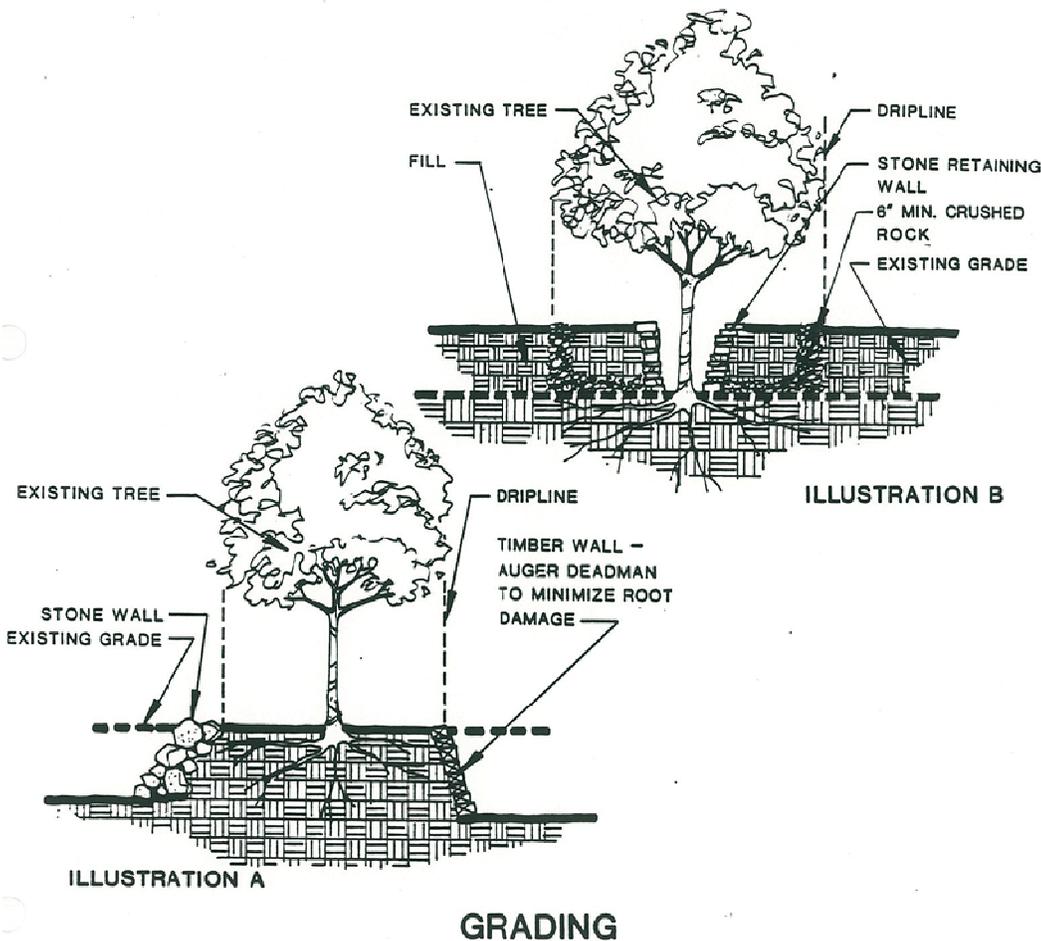
GRADING

The preservation of existing plant material can significantly reduce landscaping costs. Existing vegetation should be viewed as a valuable resource, and measures shall be taken to protect and preserve plants selected for retention. When grade changes are necessary around existing vegetation, disturbance to the plants shall be as slight as possible. Roots generally grow within 4' of the existing grade around a tree. The large 'woody roots close to the surface are the major anchors and structural supports. However, a network of fibrous roots are the primary mechanism for moisture intake, and are most dense at the drip line where water is most abundant. When fibrous roots are cut, water intake is reduced while water loss through transpiration continues at the same rate. When the delicate balance of water intake and evaporation is disturbed, the plant is placed in jeopardy.



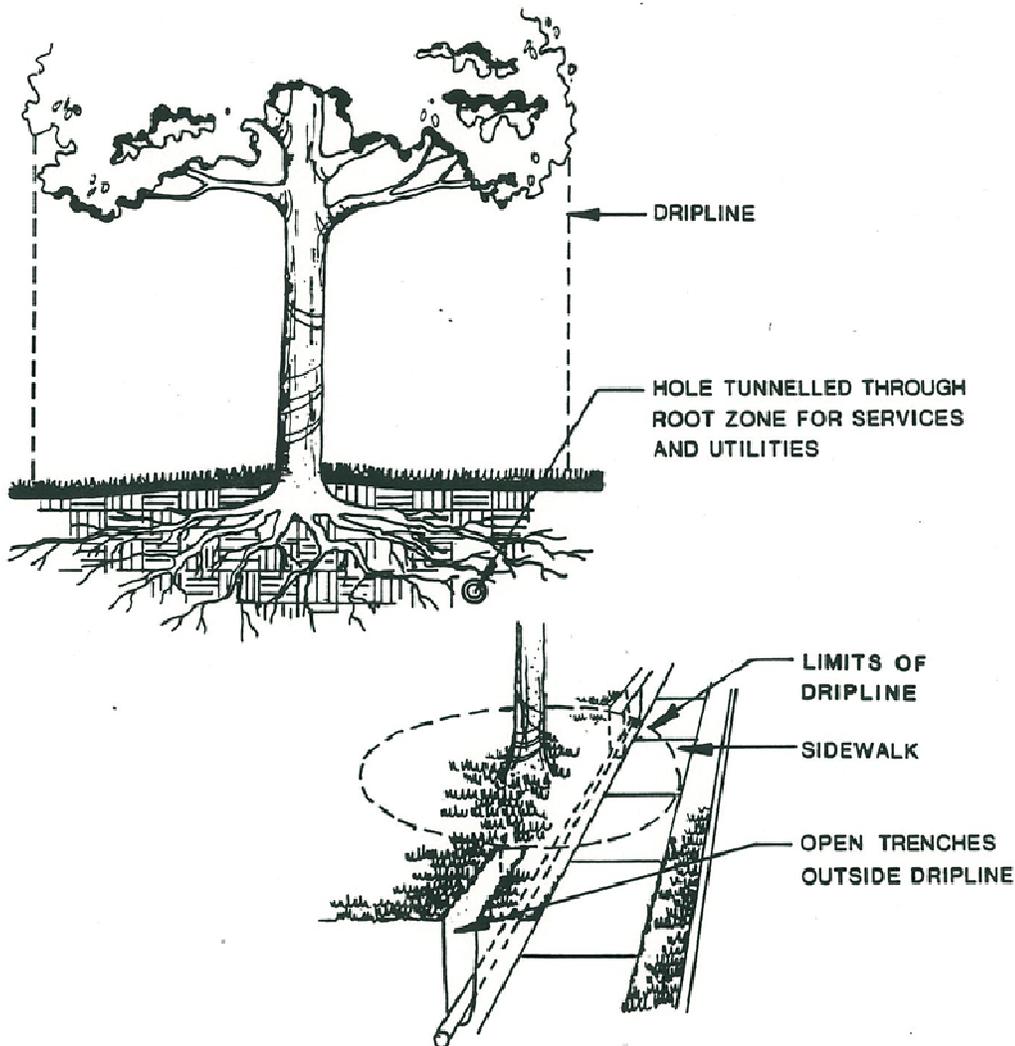
GRADING

To avoid endangering the plant, cuts and fills should not be executed within the drip line without appropriate compensation. The details below show grade changes made around existing trees. Illustration A shows the preferred method of cutting around a tree in which the cuts are made outside the drip line. The existing grade is held by back-sloped walls of stone or timber. Illustration B depicts a fill within the drip line. The roots of the tree are assured water and air by a 6" minimum layer of crushed rock or gravel over the existing grade from the trunk to the drip line.



TRENCHING

Open trenches for services and utilities shall not be dug within the drip line of trees and large shrubs. In order to avoid damage to roots, a hole shall be carefully tunneled through the root zone. Open trenching may be continued outside the drip line of the plant.



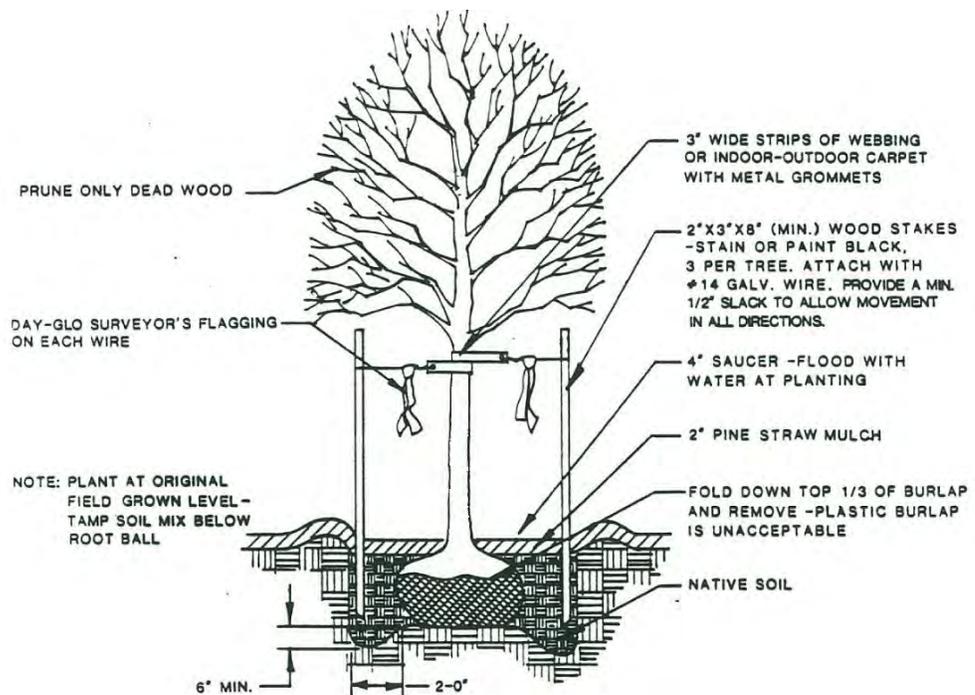
TRENCHING THROUGH ROOT ZONES

TREE PLANTING DETAIL

Plant trees at original field grown level and tamp the soil mix below the root ball. The planting soil shall be the native soil on site. Flood the saucer with water at planting.

Wrap the trunk up to the first branch with a crepe tree wrap to protect against sudden fluctuations in temperature. Burlap is not acceptable for this purpose. Wrap from the bottom up to create overlapping turns that will shed moisture. Secure the last turn of the wrap with waterproof tape. Apply wrapping in the fall and remove in the spring for two years. Tree wrap left on the trunk during the spring and summer growing seasons can harbor pests and disease.

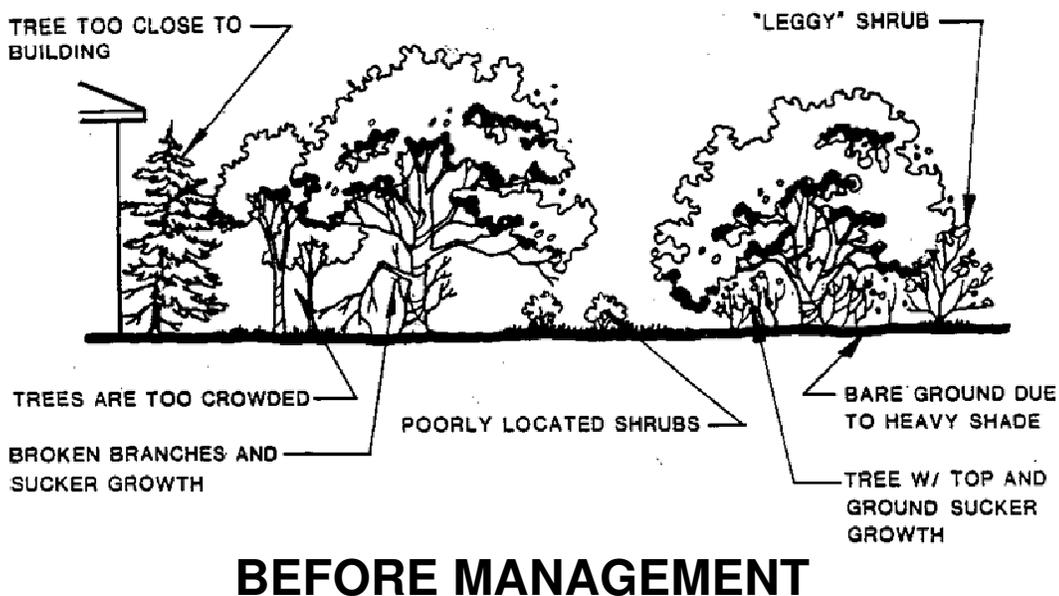
Stake or guy trees as needed, but do not allow wires or other supports to remain on the tree for more than 2 growing seasons or one year. Dependency on the artificial supports can cause weakness in the plant and may inhibit growth. Attach supports to the tree with 3" wide strips of webbing or indoor-outdoor carpet which have metal grommets inserted at each end. Use one strip per wire, wrapping the strip around the trunk. Thread the wire through the grommets, and attach it to the stake.



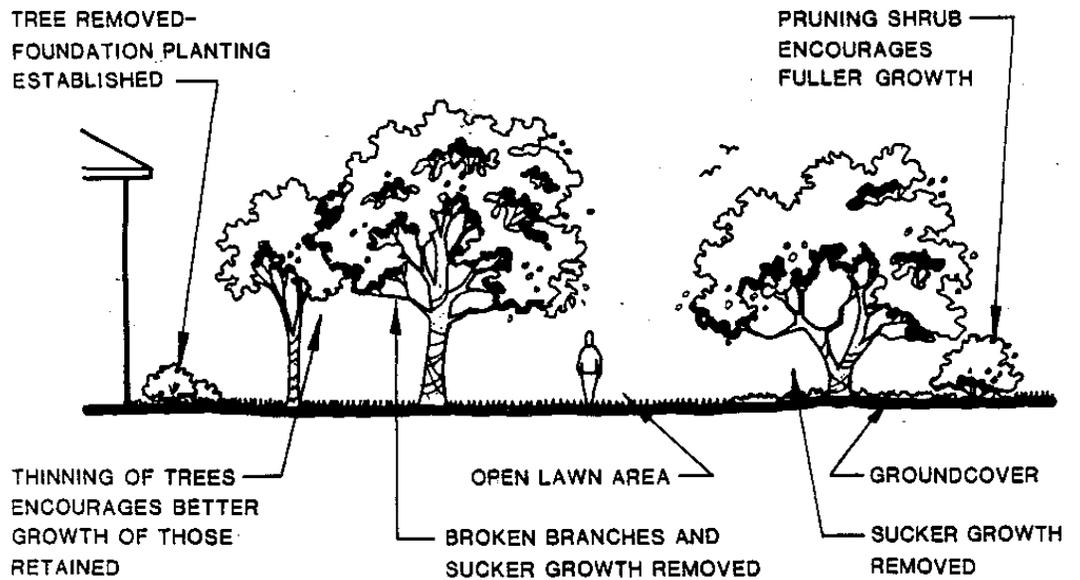
TREE PLANTING DETAIL

DEVELOPED LANDSCAPE MANAGEMENT

Even low-maintenance landscapes benefit from management to prevent overcrowding. Competition for moisture and sunlight, root drainage, pest infestation, and sucker growth impedes plant growth. Management should include periodic pruning, thinning, and removal of dead or diseased plant material. The "before" illustration depicts an unmanaged landscape in which several problems are present. The conifer, growing too close to the building, is not allowed to develop symmetrically. The concentration of branches on one side is likely to eventually cause the tree to topple, possibly causing foundation damage by the roots. Allowing overcrowding creates competition for moisture and light, producing weak and poorly developed plants. Dead and broken branches are not only hazardous, but can encourage pest infestation and disease as well. Unchecked sucker growth increases competition within the same plant and distorts the plant's shape. Isolated shrubs planted in open lawn areas interrupt the space and make mowing tedious. Shrubs are better located as masses in planting beds or as hedges which are pruned to encourage fullness.



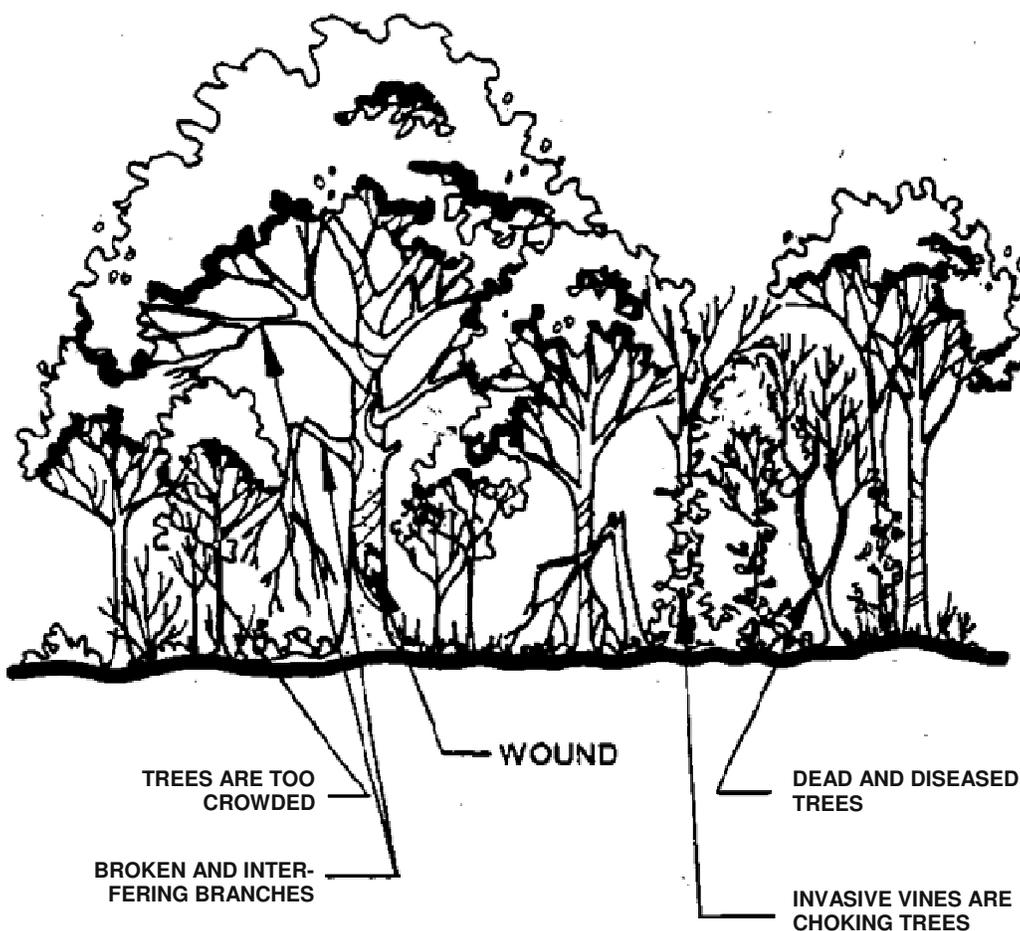
The "after" illustration presents a healthy, well-managed landscape. The plants selected for retention have room to develop fully without competition for moisture, light, and nutrients. The lawn area is uncluttered, easier to maintain, and receives more sunlight for better growth. Groundcover is used under trees or in areas of heavy shade where most grasses do not cover well. The shrubs are pruned correctly, stimulating fuller growth and leafiness. Dead branches and sucker growth have been removed, resulting in shapelier and healthier plants.

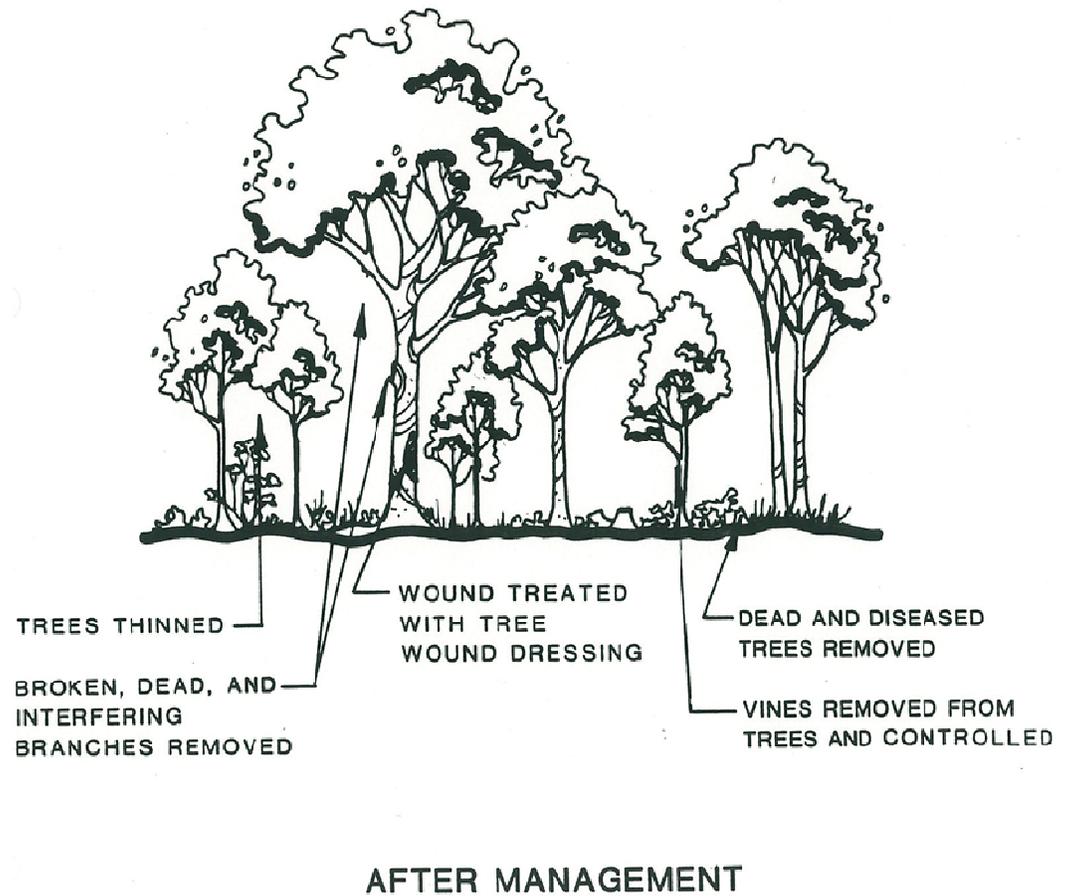


AFTER MANAGEMENT

NATURAL LANDSCAPE MANAGEMENT

Natural areas may require some maintenance for visual, safety, or recreational reasons. For example, forest edges that abut developed areas may be maintained to improve views or eliminate hazards from falling trees or branches. Management should include some thinning to reduce overcrowding and competition, removal of dead or diseased plant material, and the control of invasive vines. The "before" sketch shows a crowded forest environment where young, vigorous climax tree species are in competition with short-lived, fast-growing species. There is an abundance of dead wood, and trees are being choked by invasive vines such as Japanese honeysuckle.

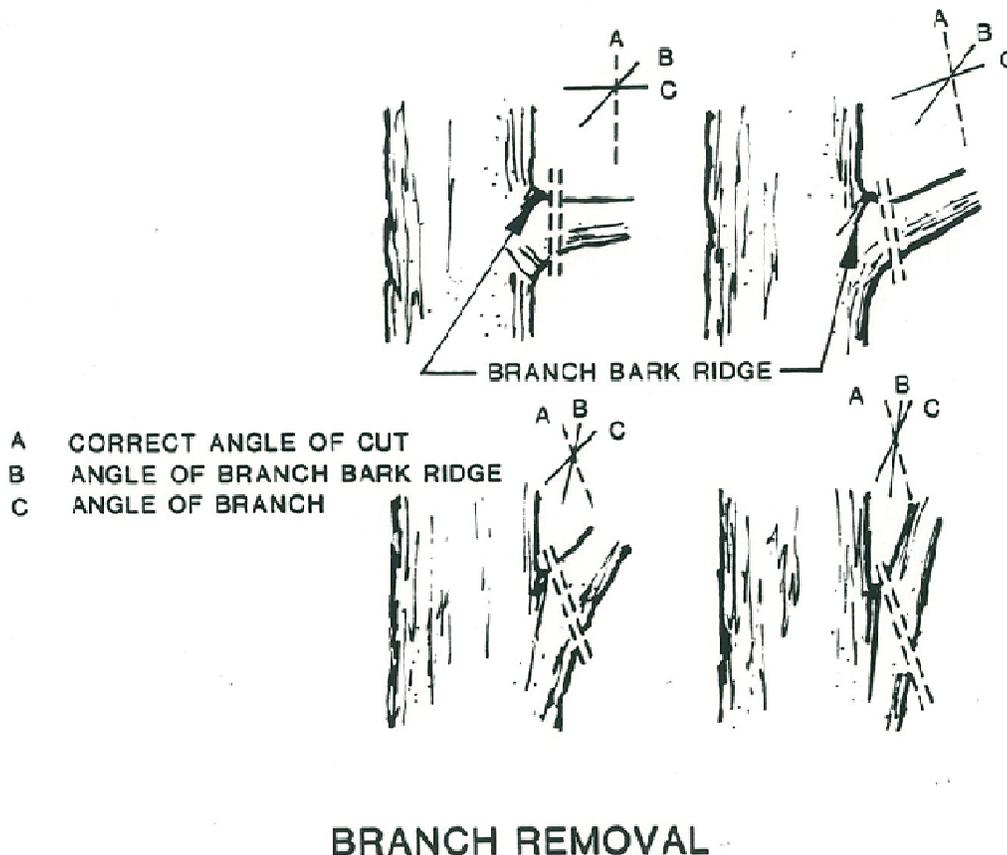




The "after" illustration shows a healthy managed forest environment where climax species are encouraged to flourish. Dead and diseased plant material is removed, vines are brought under control, and some thinning is done to reduce competition.

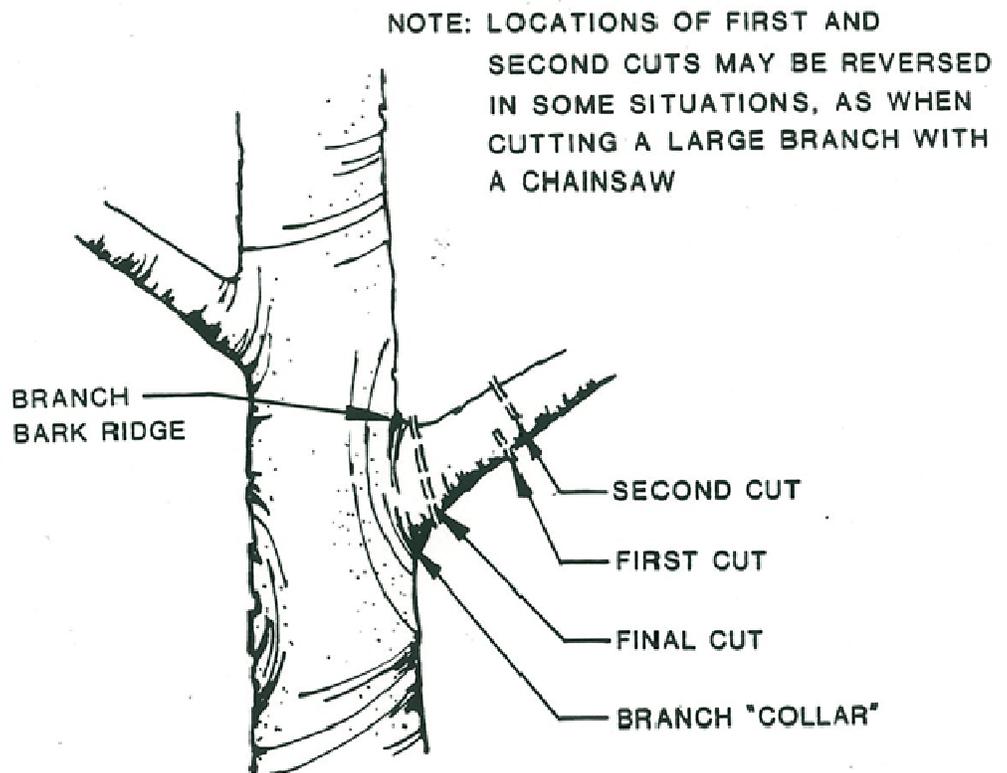
PRUNING

Pruning of established trees shall be limited to removal of dead, weak, damaged, or interfering branches, and epicormic growth of suckers. The practice of topping trees to reduce height is to be avoided. When branch removal is necessary, avoid injury to the branch collar; cutting into the collar will destroy the tree's natural defenses against infection. The collar surrounds the branch, and is usually indicated by a slight swelling near the trunk or main stem. The branch bark ridge is formed above the branch where it joins the trunk. All cuts shall be made outside both the branch collar and bark ridge. If the collar is undetectable, all cuts are to be made outside the branch bark ridge at an angle opposite that formed by the ridge and the branch, as shown in illustration A. Branches over 1" in diameter shall be removed in three steps, as shown in illustration B. The three cuts are to prevent the bark from stripping during removal of the branch.



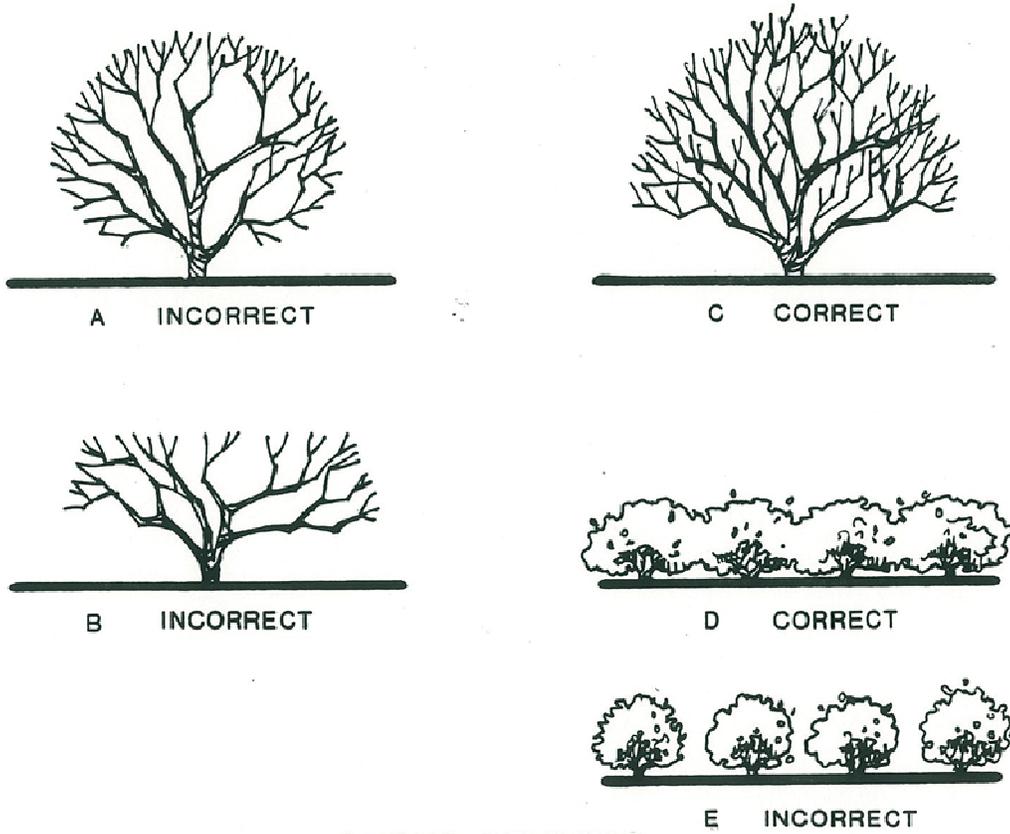
Young or newly planted trees will require early training by selective branch removal. However, small branches (sucker•) along the trunks of the tree should be removed, but only as part of training during the second and third growing seasons. The main objective in training a tree is to develop strong scaffold branches that form the primary structure. Select branches for retention based on good vertical and radial spacing on the trunk. Avoid having several branches on the same radial plane, except for plants such as conifers that naturally have a whorled branching habit. Branches that interfere with each other and have weak or narrow notches should be removed, allowing better growth for the stronger branches. Training should begin in the second year after planting, but avoid removing all of the branches selected for omission until late winter of the third growing season.

All cuts shall be made with sharp, clean tools. Never remove more than 1/3 of the branch mass. Evergreen trees rarely require pruning except to remove dead or interfering branches.



BRANCH REMOVAL

All cuts are to be made with clean, sharp tools outside of the branch bark ridge. Pruning shall respect the natural form and character of the plant. Illustration A shows a common pruning mistake in which the plant is sheared into a spherical shape. The lower and inferior branches are shaded, depriving them of both sunlight and rain. The shrub is stiff and formal, and does not fit easily into the landscape. Illustration B shows a plant that has been topped, giving it an unnatural table like appearance and exposing large woody stubs. The correct method of pruning is shown in illustration C, wherein the plant is allowed to regenerate from the inside out, maintaining a natural form. Drawings D and E depict shrubs massed together, either in a hedge or as an area planting. The objective is to encourage the plants to grow together, forming a continuous body or solid mass.



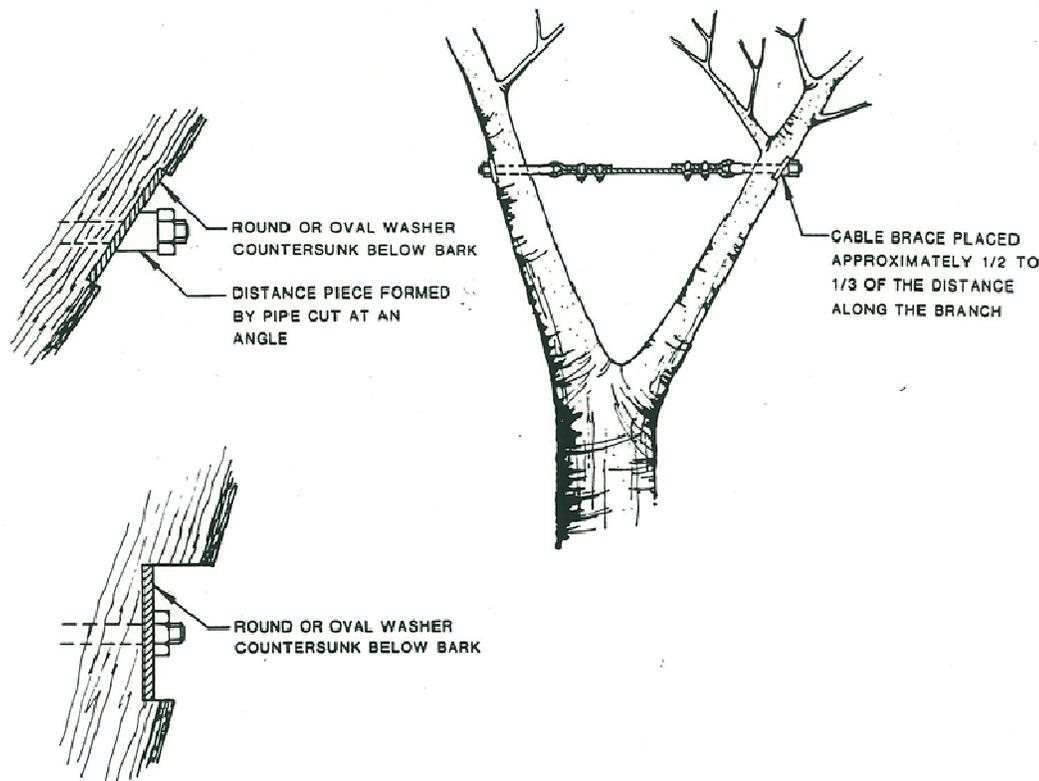
SHRUB PRUNING

Pruning of shrubs can be generally categorized into two methods, thinning and heading back. Thinning is the preferred method. Thinning helps to gradually renew the plant while maintaining a natural shape. Thinning should be done in the early spring, a few weeks before dormancy ends and growth resumes. To thin a shrub, remove all dead canes, heavy oversized canes, and weak, spindly growth. Cuts are to be made as close to the ground as possible. Pull cut canes up and out in the direction of growth to avoid damage to buds and shoots. Periodic thinning will encourage new growth from the inside out, resulting in a fuller, more vigorous shrub.

Heading back shrubs commonly takes the form of shearing, resulting in a stiff, unnaturally shaped plant. This type of pruning has two major disadvantages. A formally shaped shrub or hedge is labor intensive, requiring frequent maintenance. Shearing also forces shoot growth near the surface of the plant, shading out interior branches and encouraging legginess. Certain situations may indicate the need for heading back such as reduction of plant size or removal of interfering shoots. The correct method of heading back is to remove unwanted sections at the crotch or union of a branch and avoid stubs. To reduce shrub size, prune some branches far back into the plant, and others near the surface so as to maintain a natural shape.

CABLING AND BRACING

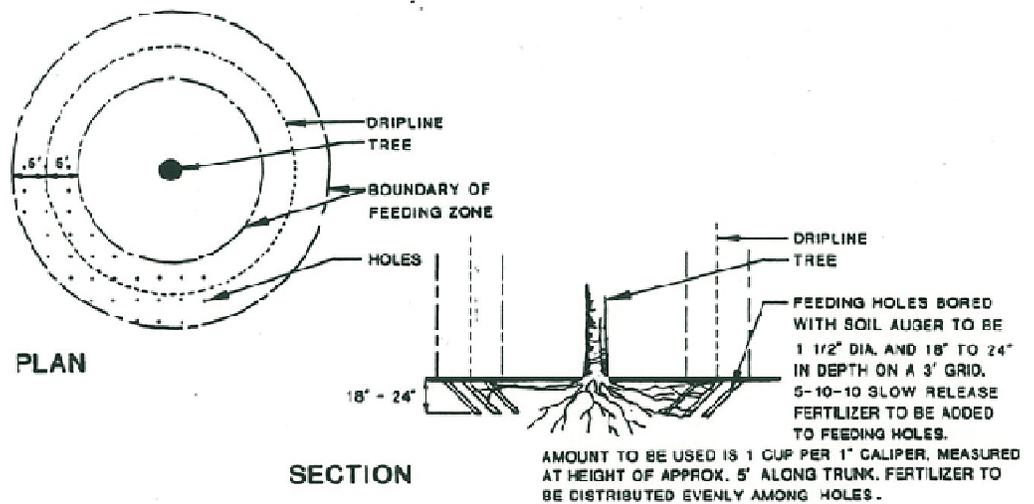
The purpose of cabling and bracing trees is to support weak, heavy, or storm-damaged limbs and to prevent crotch splitting. While limbs and trees with extensive internal decay should be removed, cabling and bracing shall be used where need is indicated in healthy trees, particularly in heavily trafficked areas and near buildings. The installation of cables and braces is to be considered permanent. Removal of the hardware will cause considerable damage to the tree, and probably will result in splitting of the wood. Bracing and cabling is to be done in the winter or dormant season when callus development is most rapid and the leaves are not present. Cables installed during the growing season would be adjusted to the added weight of the leaves, which would then permit slackness of the cable after defoliation.



CABLING AND BRACING

PLANT FEEDING

While turf and flowers are more demanding of nutrients, most trees and shrubs do not require heavy fertilizing once established. Trees should be fed once in the spring with a 5-10-10 slow release fertilizer at a rate of 1 cup to 1" in caliper. To administer fertilizer, drill 1-1/2" diameter holes with a soil auger, 18" to 24" deep. The holes shall be spaced evenly within the feeding zone (a band encompassing the drip line). For large trees, space the holes on a 3' grid within a 10' feeding zone. For small trees, bore 8 to 10 evenly spaced holes around the drip line. Distribute fertilizer evenly among the holes, and water in well. Cover each hole with soil upon completion of the fertilization process. Trees in non-lawn areas such as mulched beds may be fertilized by broadcasting slow-release fertilizer, taking care not to let fertilizer remain on the foliage of any shrubs and groundcover present. Water in well.



PLANT FEEDING

PERIMETER FENCE PLANTING

Reforestation planting shall also follow base protection guidelines. Trees should not be planted in a manner that will allow them to be climbed to gain access to the installation. A 30' buffer should be maintained between the perimeter fences and all existing and proposed plantings. This 30' buffer includes any piece of the plantings including limbs. Existing trees shall be maintained by pruning in order to adhere to this standard.

