National Aeronautics and Space Administration

Goddard Space Flight Center
The Facilities Management Division

Roadway and Security Upgrades

WR# A6236-100

Environmental Assessment

Facility Engineering and Technical Services (FaCETS)
Parsons Infrastructure & Technology Group, Inc.
With KCI Technologies, Inc.

***Draft* – April 2007**

ENVIRONMENTAL ASSESSMENT FOR ROADWAY AND SECURITY UPGRADES GODDARD SPACE FLIGHT CENTER GREENBELT, PRINCE GEORGES COUNTY, MARYLAND

Lead Agency: NASA Goddard Space Flight Center

Proposed Action: Construction of a segment of the campus loop road to provide a north-south roadway on the eastern side of campus and construction of relocated North Gate with a truck inspection station on Hubble Road.

For Further Information:

PAUL SHIMELFENYG
Project Manager
Building 18, Room 140
Goddard Space Flight Center
8800 Greenbelt Road
Greenbelt, MD 20771
(301) 286-5088

LIZABETH R. MONTGOMERY
Building 6, Room W136
Goddard Space Flight Center
8800 Greenbelt Road
Greenbelt, MD 20771
Phone: (301) 286-0469

Date: April 2007

Abstract:

This document assesses the environmental impacts of the roadway and security upgrades including constructing a relocated North Gate with a truck inspection station on Hubble Road and constructing a segment of the campus loop road to provide a north-south roadway on the eastern side of campus. The proposed roadway would extend Explorer Road from ICESat Road near the South Gate to connect with Cobe Road to the north. The analysis considers two options, construction of the improvements and a no-action alternative.

The purpose of the checkpoint along Hubble Road is to improve overall campus safety and security by providing an appropriate location to inspect all trucks and commercial vehicles entering the campus. The purposes of the new roadway are to provide a connection between the northern and southern portions of the east campus and to allow for improved traffic circulation around the entire Goddard Space Flight Center (GSFC) campus. During the construction and operation of the roadway and security upgrades, there are no anticipated impacts to the surrounding population, cultural resources, area employment, environmental justice communities, groundwater, endangered species/animal communities, wetlands, floodplains, soils and geology, Landfill B, or utility infrastructure of the campus. Minimal impacts are anticipated to land use, open space, forest stands, slopes, stormwater management, waste management, air quality, noise, transportation, and safety and security.

ROADWAY AND SECURITY UPGRADES

ENVIRONMENTAL ASSESSMENT

Draft – April 2007

EXECUTIVE SUMMARY

Background

This Environmental Assessment (EA) has been prepared in compliance with the *National Environmental Policy Act of 1969* (NEPA), as amended (Title 42, U.S. Code [USC], 4321 *et seg.*), and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] parts 1500-1508). The purpose of this EA is to provide a site-specific evaluation of the potential environmental impacts of the roadway and security upgrades to Goddard Space Flight Space Center that include the construction of a segment of the campus loop road extending Explorer Road and the relocation of the North Gate to a point along Hubble Road, expanding its function to include truck inspections.

The goal of this document is to help decision-makers determine whether an Environmental Impact Statement (EIS) should be prepared prior to the implementation of the Roadway and Security Upgrades.

Proposed Action

The Roadway and Security Upgrades propose constructing a relocated North Gate with a truck inspection station on Hubble Road and constructing a segment of the campus loop road as recommended in the *GSFC Facilities Master Plan* to provide a north-south roadway on the eastern side of campus. The proposed roadway would extend Explorer Road from ICESat Road near the South Gate to connect with Cobe Road to the north.

The new gate would provide an area for inspection of all trucks entering GSFC with room for two tractor trailer size vehicles, a pull off area for vehicle inspection, and a turnaround area for rejected vehicles and trucks. The gate would have measures to provide increased safety and security to the campus including tire shredders, traffic calming rumble strips, K12 swinging gates, and steel bollards around the guard houses. The construction of the relocated North Gate would also allow for the removal of two gates and fencing located along Hubble Road, which limits direct movement of pedestrians and bicyclists between the East and West campuses of GSFC.

The proposed segment of the campus loop road would extend Explorer Road and would restore north-south movement on the eastern portion of campus, lost when Soil Conservation Road was relocated and a portion of the old roadbed was closed to accommodate construction of the Exploration Science Building (ESB). The Explorer Road extension would provide a second access between the east and west areas of campus and provide access from the South Gate to the new parking area for the ESB. The proposed segment of the campus loop road will be referred to as the Explorer Road extension throughout this document.

Need

A security checkpoint with truck inspection capabilities is needed at the north end of Hubble Road to create a fully secured campus. The *GSFC Facilities Master Plan* calls for the consolidation of the GSFC campus from East and West campuses to one campus. The *GSFC Facilities Master Plan's* main goal is to unite the East and West campuses and eliminate public traffic from GSFC. The Soil Conservation Road Relocation project has eliminated the public from passing through GSFC; however, the northern area of GSFC is still disconnected from the majority of the campus. A roadway is needed to provide a connection between the northern and southern portions of the east campus and to also allow for improved traffic circulation around entire GSFC campus.

The proposed Roadway and Security Upgrades would meet the need by providing a secure entrance at the north end of Hubble Road, accommodating the inspection of all trucks entering GSFC, creating an efficient transportation network within the campus, and consolidating GSFC into one campus. The relocated North Gate would allow for the consolidation of campus entrances, allow the removal of gates and fencing along interior campus roadways, provide a secure entrance at the north end of Hubble Road, and provide an appropriate facility for the inspection of all trucks entering the campus. The Explorer Road extension would provide a link between the northern and southern sections of the east campus and connect the northern portions of the east and west campuses. The roadway and security upgrades would also create a pedestrian-friendly campus, encouraging employees to commute to work using carpools and transit.

Summary of Environmental Consequences

During the construction of the Roadway and Security Upgrades, there are no anticipated impacts to the surrounding population, cultural resources, employment, environmental justice communities, groundwater, endangered species/animal communities, wetlands, floodplains, soils and geology, Landfill B, or utility infrastructure of the campus. Minimal impacts are anticipated to land use, open space, forest stands, slopes, stormwater management, waste management, air quality, noise, and transportation.

During the operation of the Roadway and Security Upgrades, there are no anticipated impacts to the population, cultural resources, employment, environmental justice

communities, noise, waste managements, soils and geology, groundwater, wetlands, floodplains, Landfill B, utility infrastructure, land use, open space and forest stands, endangered species. There are positive impacts anticipated to air quality, stormwater management and transportation. The project will provide a significant improvement to overall campus safety and security by providing an appropriate location to inspect all trucks and commercial vehicles entering the campus.

Table ES-1: Summary of Environmental Impacts of Build Alternative

Criteria	Impact		Description of Environmental Impacts
	Yes	No	
Population and Employment		X	
Land Use/Open Space	X		Land use as a research center would not change, however limited areas would change from forest / open space to roadway within the GSFC campus
Cultural and Historic Resources		X	
Environmental Justice Conditions		X	
Transportation	X		Traffic, pedestrian and bicycle patterns would improve on the campus.
Noise	X		There will be noise associated with construction.
Waste Management	X		There would be a small increase in waste generation during construction. Two small structures would be demolished. Transportation routes for all waste streams would be improved by the roadway.
Air Quality	X		There would be a small positive impact to air quality due to a reduction of congestion and idling.
Soils and Geology		X	
Groundwater		X	
Slopes (Topography)	X		Minimal changes would occur during construction.
Forest Stands	X		Portions of forest stands would be removed to make way for the roadway. Mitigation would be provided.
Wetlands		X	
Floodplains		X	

Criteria	Impact		Description of Environmental Impacts
	Yes	No	
Stormwater Management	X		There would be an increase in impervious surface. Flows would drain into approved SWM facilities that include water quality treatment as appropriate.
Endangered Species/Animal Communities		X	
Landfill B		X	
Utility Infrastructure		X	
Safety and Security	X		Safety and Security would be improved by the provision of adequate facilities for truck inspection.

ROADWAY AND SECURITY UPGRADES

ENVIRONMENTAL ASSESSMENT

TABLE OF CONTENTS

EXECUTIVE SUMMARY **2**

TABLE OF CONTENTS **6**

LIST OF FIGURES **9**

LIST OF TABLES **9**

ROADWAY AND SECURITY UPGRADES **10**

ENVIRONMENTAL ASSESSMENT **10**

PART I NEED **10**

1.1 Overview **10**

1.2 Scope **13**

1.3 Need **13**

PART II PROPOSED ACTION AND ALTERNATIVE **16**

2.1 Build Alternative: North Gate and Explorer Road Extension **16**

2.2 No Action Alternative **19**

PART III AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES **21**

3.1 Master Plan Compatibility **21**
3.1.1 Build Alternative 21
3.1.2 No Action Alternative 22

3.2 Population **22**
3.2.1 Affected Environment 22
3.2.2 Environmental Consequences 22

3.3 Land Use **24**
3.3.1 Affected Environment 24

3.3.2 Environmental Consequences....25

3.4 Cultural and Historic Resources....25
3.4.1 Affected Environment....25
3.4.2 Environmental Consequences....26

3.5 Employment Conditions....26
3.5.1 Affected Environment....26
3.5.2 Environmental Consequences....27

3.6 Environmental Justice Conditions....27
3.6.1 Affected Environment....27
3.6.2 Environmental Consequences....27

3.7 Transportation....29
3.7.1 Affected Environment....29
3.7.2 Environmental Consequences....33

3.8 Noise....34
3.8.1 Affected Environment....34
3.8.2 Environmental Consequences....34

3.9 Waste Management....34
3.9.1 Affected Environment....34
3.9.2 Environmental Consequences....35

3.10 Air Quality....35
3.10.1 Affected Environment....35
3.10.2 Environmental Consequences....37

3.11 Soils and Geology....38
3.11.1 Affected Environment....38
3.11.2 Environmental Consequences....38

3.12 Stormwater Management....38
3.12.1 Affected Environment....38
3.12.2 Environmental Consequences....39

3.13 Groundwater....41
3.13.1 Affected Environment....41
3.13.2 Environmental Consequences....41

3.14 Slopes (Topography)....41
3.14.1 Affected Environment....41
3.14.2 Environmental Consequences....43

3.15 Open Space / Forest Stands....43
3.15.1 Affected Environment....43
3.15.2 Environmental Consequences....44

3.16 Wetlands....44
3.16.1 Affected Environment....44
3.16.2 Environmental Consequences....45

3.17 Floodplains.....45
3.17.1 Affected Environment 45
3.17.2 Environmental Consequences.....45

3.18 Animal Communities / Endangered Species 45
3.18.1 Affected Environment 45
3.18.2 Environmental Consequences.....46

3.19 Landfill B 46
3.19.1 Affected Environment 46
3.19.2 Environmental Consequences.....47

3.20 Utility Infrastructure 47
3.20.1 Affected Environment 47
3.20.2 Environmental Consequences.....48

3.21 Safety and Security 48
3.21.1 Affected Environment 48
3.21.2 Environmental Consequences.....49

3.22 Cumulative Impacts.....50

APPENDIX A: AGENCY/PUBLIC INVOLVMENT 53

APPENDIX B: LIST OF PREPARERS 56

APPENDIX C: ACRONYMS, SYMBOLS, ABBREVIATIONS, AND METRIC/BRITISH SYSTEM EQUIVALENTS 57

APPENDIX D: REFERENCES.....59

LIST OF FIGURES

Figure 1-1 Location map....11
Figure 1-2 Vicinity Map....12
Figure 1-3 Existing Buildings....15
Figure 2-1 General Site Area....17
Figure 2-2 Master Plan Improvements 2002-2007....18
Figure 2-3 North Gate Sketch Layout....20
Figure 3-1 Roadway and Security Improvements Limits of Disturbance....23
Figure 3-2 2000 Census Tracts....28
Figure 3-3 Projected Traffic Volumes for 2022....32
Figure 3-4: Drainage Features....40
Figure 3-5: Existing Environmental Features....42

LIST OF TABLES

Table ES-1: Summary Of Environmental Impacts Of Build Alternative....4
Table 1-1: Average Daily Truck Arrivals....13
Table 3-1: 2002 Vehicle Conditions....31
Table 3-2: Projected Vehicles For 2022....31
Table 3-3: National Ambient Air Quality Standards (NAAQS)....36
Table 3-4. Projected Emissions From Truck Idling At The North Gate....37
Table 3-5: Forest Stands....43
Table 3-6 Features Affected By The Proposed Action....51
Table 3-7. Cumulative Impacts To Forest, Wetlands And Impervious Surface....52

ROADWAY AND SECURITY UPGRADES

ENVIRONMENTAL ASSESSMENT

Draft – April 2007

PART I NEED

1.1 Overview

This report provides a site-specific evaluation of the potential environmental effects of the proposed Roadway and Security Upgrades at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's (GSFC) Greenbelt Campus. GSFC is located in Prince George's County, Maryland, northeast of Washington, DC. Figure 1-1 provides a general location map. GSFC is one of several large federal research facilities near the City of Greenbelt. Figure 1-2 shows the location of GSFC in relation to the Beltsville Agricultural Research Center (BARC) and the Patuxent Research Refuge (PRR).

The roadway and security upgrades at GSFC continue NASA's implementation of the *2002 GSFC Facilities Master Plan* which is supported by the *GSFC Master Plan Environmental Assessment,* December 2002. NASA issued a Finding of No Significant Impact based on the *GSFC Master Plan Environmental Assessment.* The *Roadway and Security Upgrades Environmental Assessment* refines and documents the environmental impacts of these proposed upgrades if constructed and the impacts if no upgrades are made.

The proposed upgrades are only one of many actions listed in the *GSFC's Facilities Master Plan* and this document should be treated as part of a series of documents that would ultimately evaluate the entirety of the improvements at GSFC. Actions related to, but not part of the Roadway and Security Improvements are:

- Realignment of Soil Conservation Road
- Construction of the South Gate, and
- Construction of the Exploration Sciences Building (ESB) - formerly known as the Space Sciences Building.

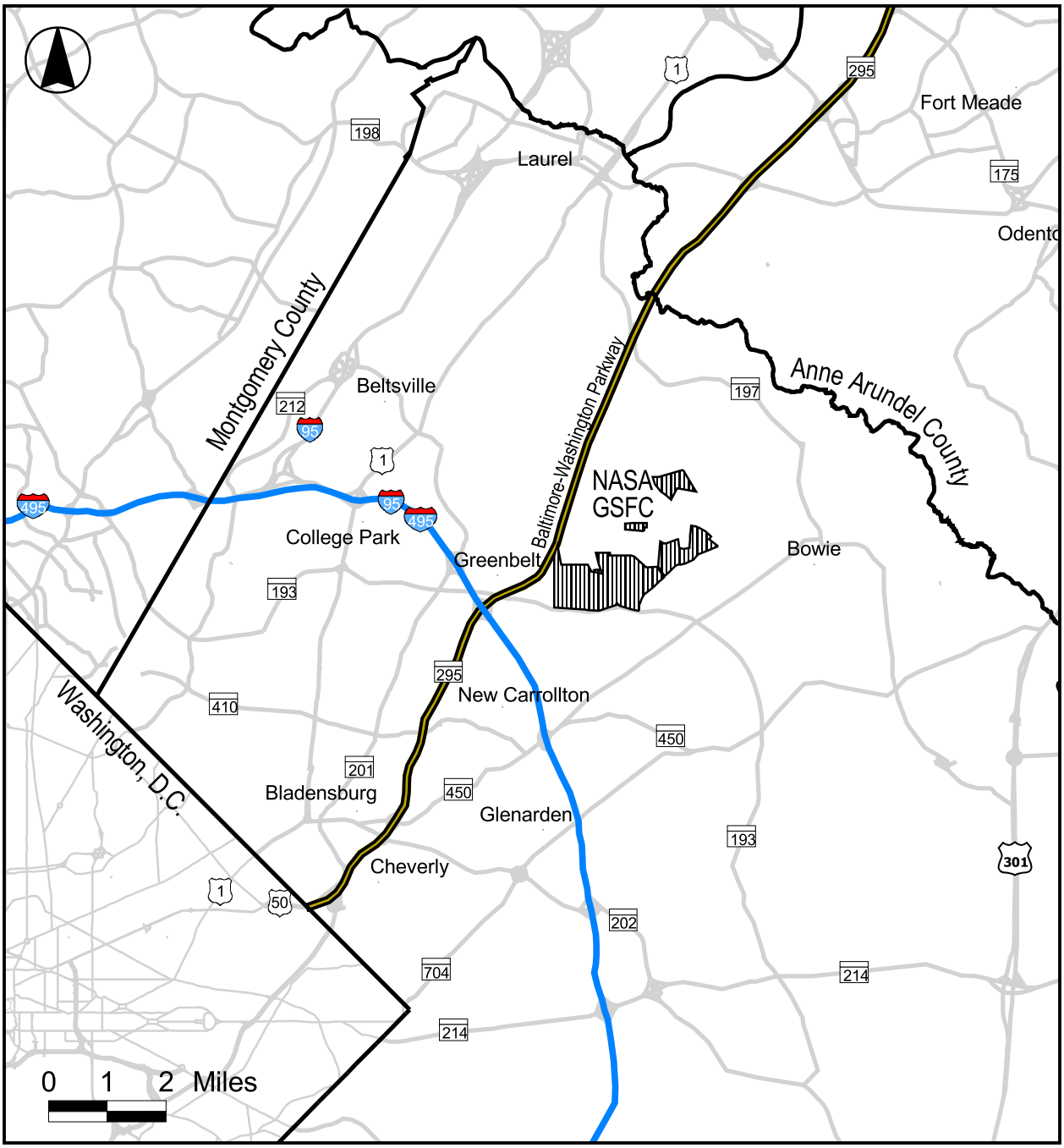

Figure 1-1 Location Map

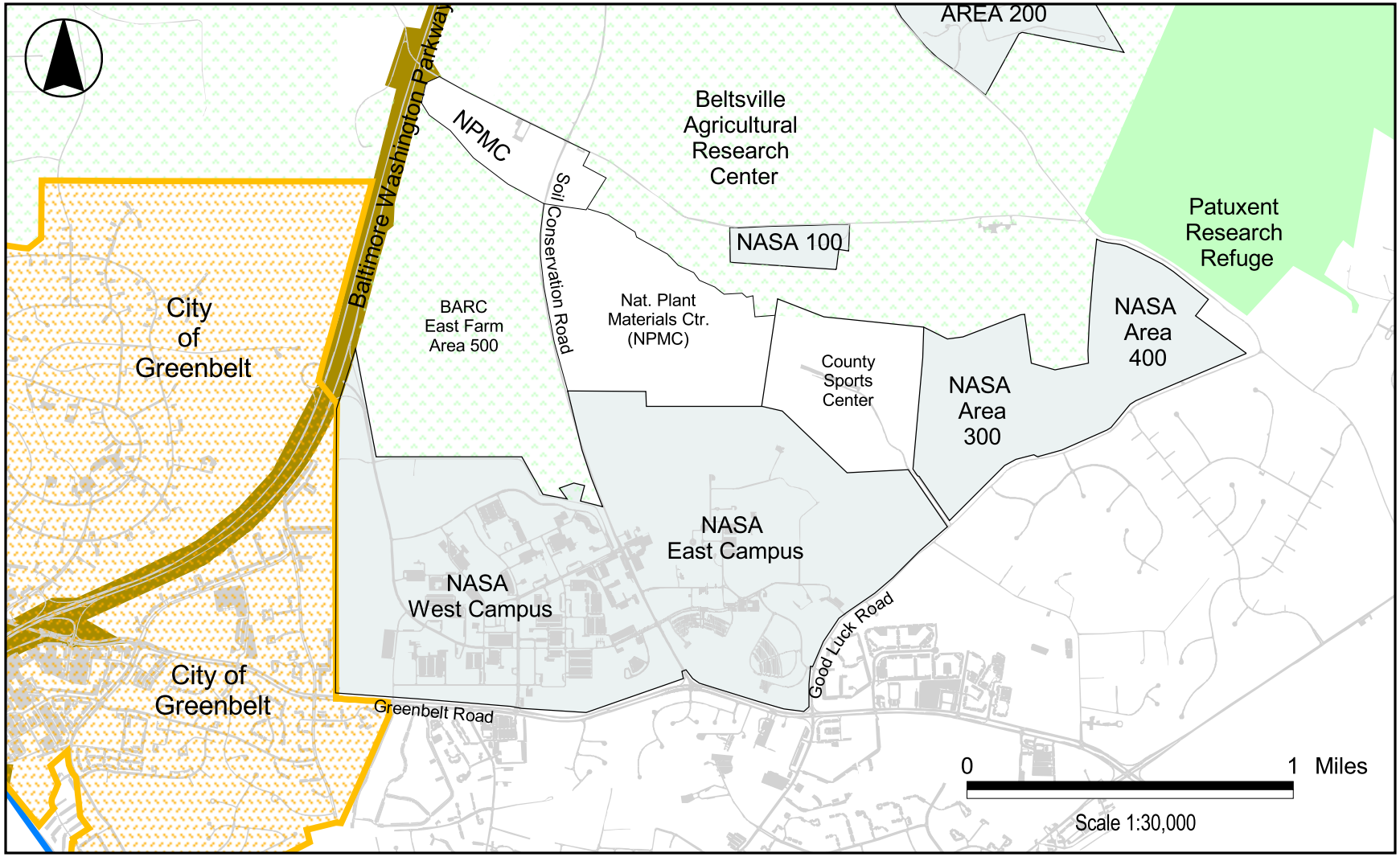

Figure 1-2 Vicinity Map

City of Greenbelt

NASA Properties

Patuxent Research Refuge

Beltsville Agricultural Research Center

Baltimore Washington Parkway

1.2 Scope

This *Roadway and Security Upgrades Environmental Assessment* reviews the impacts of constructing an Explorer Road extension and relocating the North Gate. It describes the proposed build and the no-build options as well as the environmental attributes that might be directly affected by the action. It describes the possible environmental consequences, both positive and negative, that would result from the construction and operation of the Roadway and Security Upgrades and the no-build option.

1.3 Need

During the development of the *GSFC's Facilities Master Plan*, the need to create a consolidated campus (shown in Figure 1-3), to replace the current design of west and east campuses, became paramount for security and safety reasons. The *GSFC's Facilities Master Plan* was developed to make improvements to GSFC and create function-based neighborhoods that would unify around a central campus housing shared facilities. The roadway upgrades called for in the *GSFC's Facilities Master Plan* would provide a more navigable campus by simplifying traffic patterns, improving pedestrian and bicycle circulation, and easing access to parking.

The proposed security upgrades would increase the level of security on the GSFC campus by establishing a new secured gate with truck inspection capability on Hubble Road. The Master Plan estimates that 51 trucks per day make deliveries or provide services on GSFC. A breakdown of the trucks by type is shown in Table 1-1. As part of the enhanced federal security procedures, each truck entering GSFC must be inspected. The site would also need to provide facilities for security personnel including a guard house and parking area

Table 1-1: Average Daily Truck Arrivals

Type of Truck	Number of Trucks per Day
Heavy 3-axle trucks	8
Medium 2-axle trucks	28
Small vans and panel trucks	15
Average per work day	51

Source: *GSFC Facilities Master Plan Environmental Assessment*

After they have been inspected, the trucks would proceed to Building 16/16W and the loading docks or to other locations throughout the campus. Any truck that does not pass inspection would be directed to the lanes designed specifically for a rejected vehicle to turn around..

As part of the implementation of the Master Plan and to improve campus security, the roadway that divided GSFC in two, Soil Conservation Road (Figure 2-2), has been relocated from the center of campus to the perimeter of GSFC. The road through the GSFC campus formerly known as Soil Conservation Road has been renamed. The portion of the road along and north of Building 16 is referred to as Hubble Road

throughout this Environmental Assessment. The portion of the road south of Explorer Road is referred to as ICESat Road throughout the Environmental Assessment. The locations of both roads are shown on Figure 2.1.

With the relocation of Soil Conservation Road there is a continued need to provide access for approximately 23% of the vehicular traffic entering and exiting GSFC from the north along Soil Conservation Road (approximately 597 entering vehicles during the morning rush and 274 exiting during the evening). After entering the GSFC, these vehicles travel to locations all over the campus.

The Master Plan proposes construction of a new road looping between Cobe and Explorer Roads to provide traffic circulation through the interior of the campus and to replace the north-south movement lost due to the relocation of Soil Conservation Road. This road connection is also needed to provide access to new consolidated parking areas located adjacent to the neighborhoods proposed in the *GSFC Facilities Master Plan*. Since 90% of the GSFC workforce drives single occupancy vehicles to work everyday, a road connecting the eastern campus with the western campus is needed to allow for easy and efficient navigation throughout the entire Center.

The current roadways on GSFC provide few facilities for pedestrians and bicyclists. Unobstructed pedestrian connections enabled by the removal of fences along Hubble Road are critical to encouraging non-vehicle internal campus trips. The roadway upgrades proposed in the *GSFC Facilities Master Plan* would accommodate bicycles and provide sidewalks to encourage walking and bicycling from different portions of the campus and to accommodate bicycle commuters.

A new perimeter fence is located along the relocated portion of Soil Conservation Road. If a new gate is located at the north end of Hubble Road, the fences along a portion of Hubble Road inside the GSFC can be removed, eliminating the visual and physical barrier between the east and west campus and the two existing gates along Hubble Road. Such a change would bring the vision of a unified campus outlined in the *GSFC's Facilities Master Plan* into reality and provide a needed upgrade to the GSFC's perimeter security.

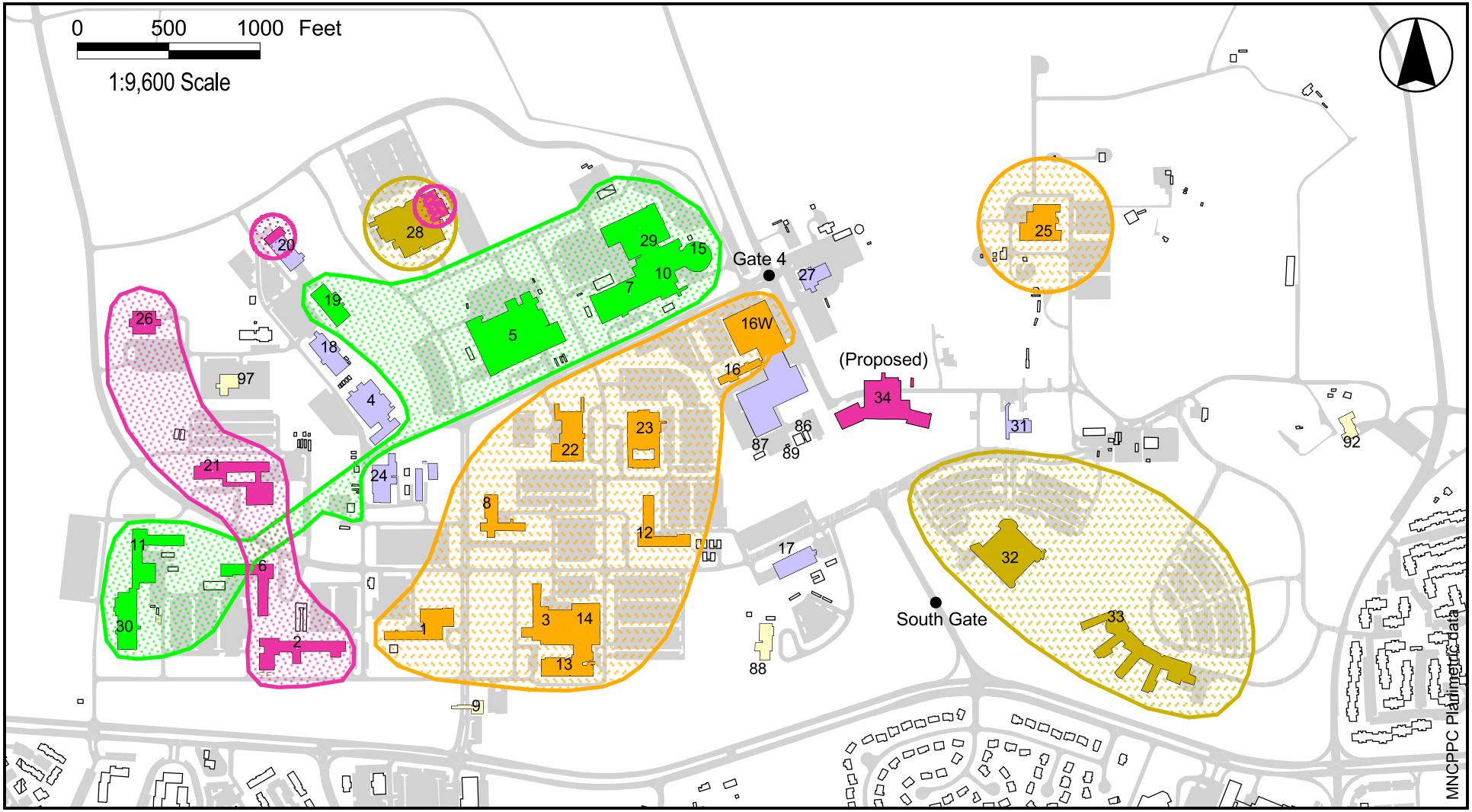

Figure 1-3 Existing Buildings

NASA Buildings

- Earth Science
- Engineering/Technology
- Program/Project Management
- Space Science
- Institutional Support
- Other

Building Adjacency

- Earth Science
- Engineering/Technology
- Program/Project Management
- Space Science

PART II PROPOSED ACTION AND ALTERNATIVE

NASA proposes to construct an internal roadway and a new gate with truck inspection facilities at the northern end of Hubble Road as it enters the GSFC Campus. The general study area for the construction is shown on Figure 2-1.

The North Gate would be relocated from the existing location on Tiros Road to Hubble Road between the intersection with the Explorer Road extension and Cobe Road and the intersection with Soil Conservation Road. The new entrance gate would unify the East and West campuses and permit removal of a portion of the interior fences that presently line Hubble Road.

The proposed Explorer Road extension would connect Cobe Road to the north and Explorer Road to the south contributing a road system that would “loop” around the central area of the GSFC campus. The remaining portion of Explorer Road east of the proposed Explorer Road extension would be renamed Aqua Road. The road connections would allow access to the functional neighborhoods and parking areas that are part of the campus master plan to create a natural “greenway” of open civic space edged by existing and new buildings, and connected by pedestrian pathways.

The Roadway and Security Upgrades would take place along the edge of a developed area of the campus with the Explorer Road extension extending from the existing Explorer Road, swinging to the northeast then to the northwest and connecting to Cobe Road as shown in Figure 2-2. The Roadway and Security Upgrades would be completed in conjunction with the completion of the Exploration Sciences Building.

During construction two staging areas as shown in Figure 2-2 would be established for the storage of materials including pipes, manholes, sand gravel and similar bulk items. Construction equipment would be stored in the roadbed. The north staging area is an existing gravel lot on the north side of Nimbus Road. The south staging area would be a grassed area in vicinity of Building 31 along Aqua Road.

2.1 Build Alternative: North Gate and Explorer Road Extension

The proposed relocated North Gate would be located on Hubble Road, north of the proposed Explorer Road extension. The North Gate would include one exit lane and three entrance lanes, two for automobiles and one for trucks, with a guard house in the middle on an island. The North Gate would also have facilities for personnel parking. Where possible, the existing road right of way would be used for the North Gate. However, there would need to be some construction outside of the existing road right of way in an area of fields and forest stands.

The truck entrance lane at the relocated North Gate would be used as an inspection area for all commercial vehicles. In addition to the actual inspection area, the lane

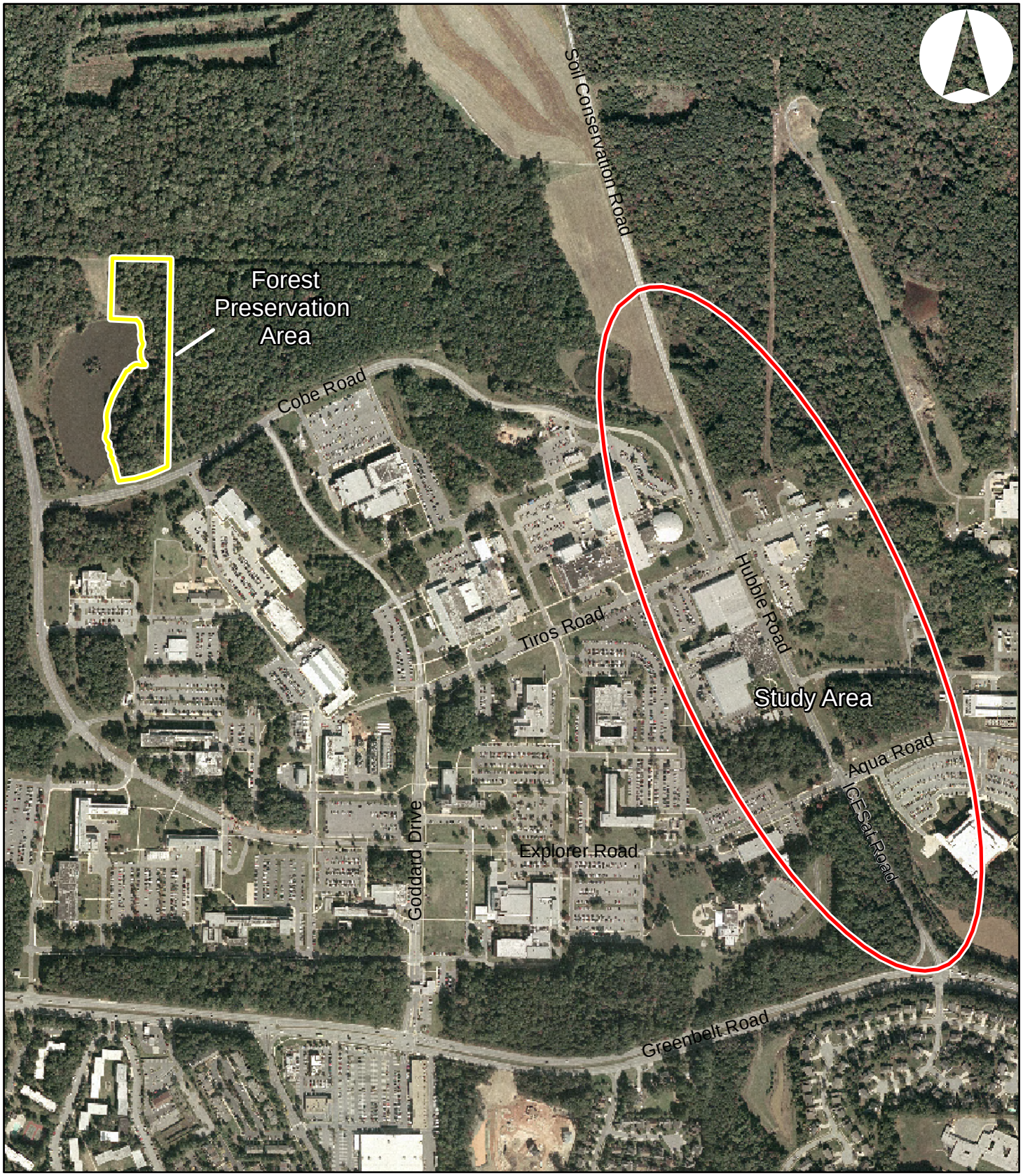

Figure 2-1 General Site Area - October 2005 Orthophotography

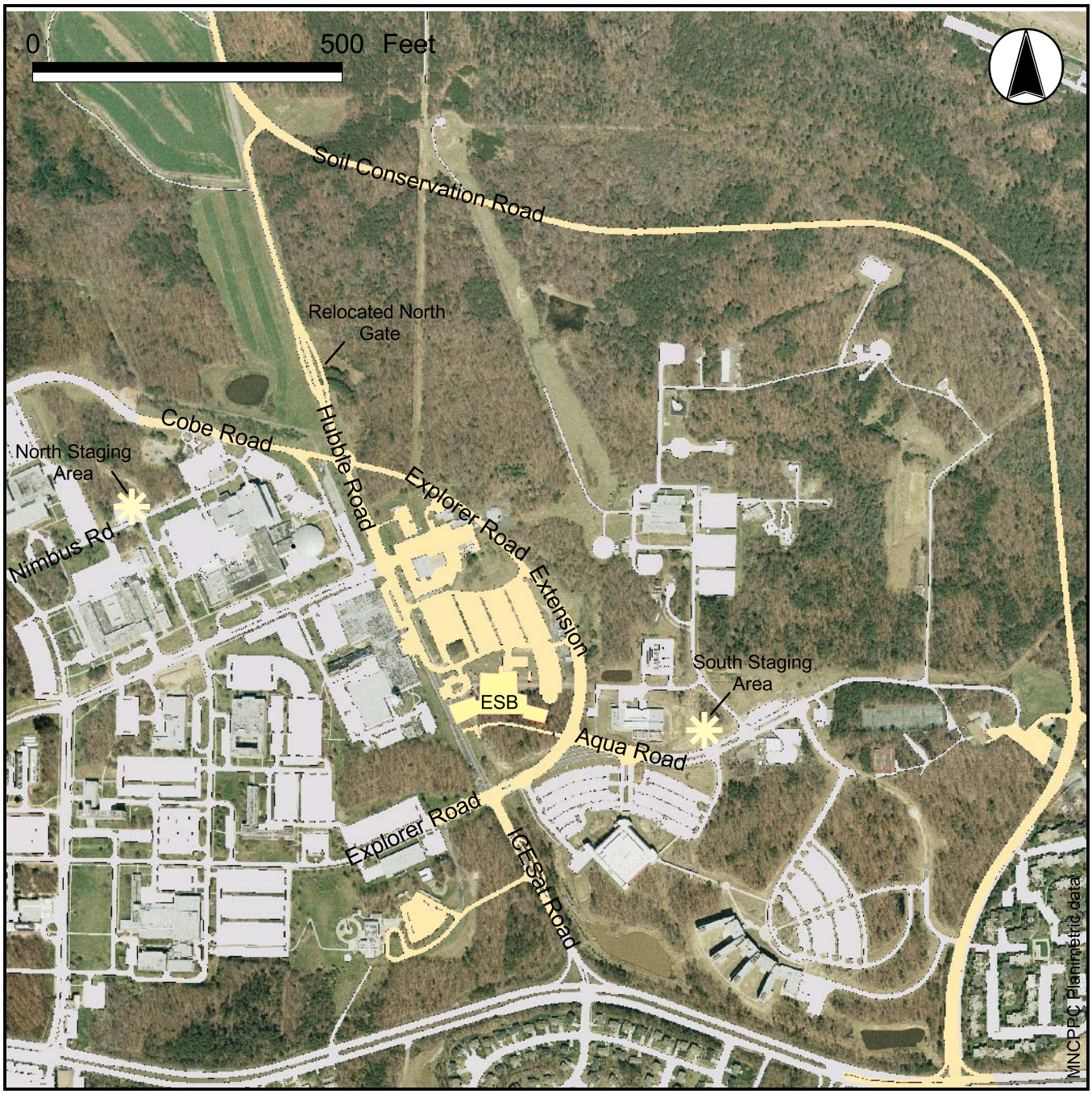

Figure 2-2 Master Plan Improvements 2002 - 2007

would provide storage for one additional tractor trailer size vehicle. To the immediate south of the inspection area and the guard house, a turn around lane would accommodate trucks that are refused entry. These vehicles would proceed along the turnaround lane, merge with Hubble Road, and travel along the east side of Hubble Road to Soil Conservation Road. Security measures at the gate house include traffic calming rumble strips, tire shredders, steel bollards, and a K12 swinging gate. Figure 2-3 is a sketch of the proposed layout for the North Gate.

The Explorer Road extension would begin at ICESat Road as a four lane road separated by a median then transition from 4 lanes to 2 lanes east of the ESB main parking area. From the parking entrance to Hubble Road, the Explorer Road extension would be a two lane undivided roadway. The length of the new roadway would be approximately 884 meters (2,900 feet). Construction would involve grading and movement of some 20,643 cubic meters (27,000 cubic yards) of material. The proposed alignment is shown on Figure 2-2.

The construction of the Explorer Road extension would require the demolition of two buildings in the Building 27 complex, 27B the Explosives Storage Building and 27F the Sand Dome and a small area of Explorer Road would be demolished to create a new intersection with Explorer Road extension.

There would also be two staging areas for the project. The south staging area would be a grassy area located near Building 31. The north staging area would be located at an existing gravel lot on Nimbus Road. As part of construction of the roadway and security upgrades, gates 32A and 17D, along Explorer Road at the ICESat Road intersection, would be removed.

2.2 No Action Alternative

Under the No-Action Alternative, Cobe Road and Explorer Road would continue to function as a partial loop around the GSFC campus. Fencing would be maintained along Hubble Road inside GSFC. Under this alternative, traffic entering GSFC would be controlled through Gate 4 along Tiros Road and traffic entering the Building 27 maintenance area would be controlled through the gate at its entrance. No truck inspection station would be constructed. Trucks carrying deliveries would access GSFC by traveling Good Luck Road north to Soil Conservation Road and then proceeding along Hubble Road to the loading dock in Building 16/16W. Other commercial vehicles that must enter the GSFC Campus would continue to use their current access gates; however, these facilities lack needed commercial vehicle inspection areas.

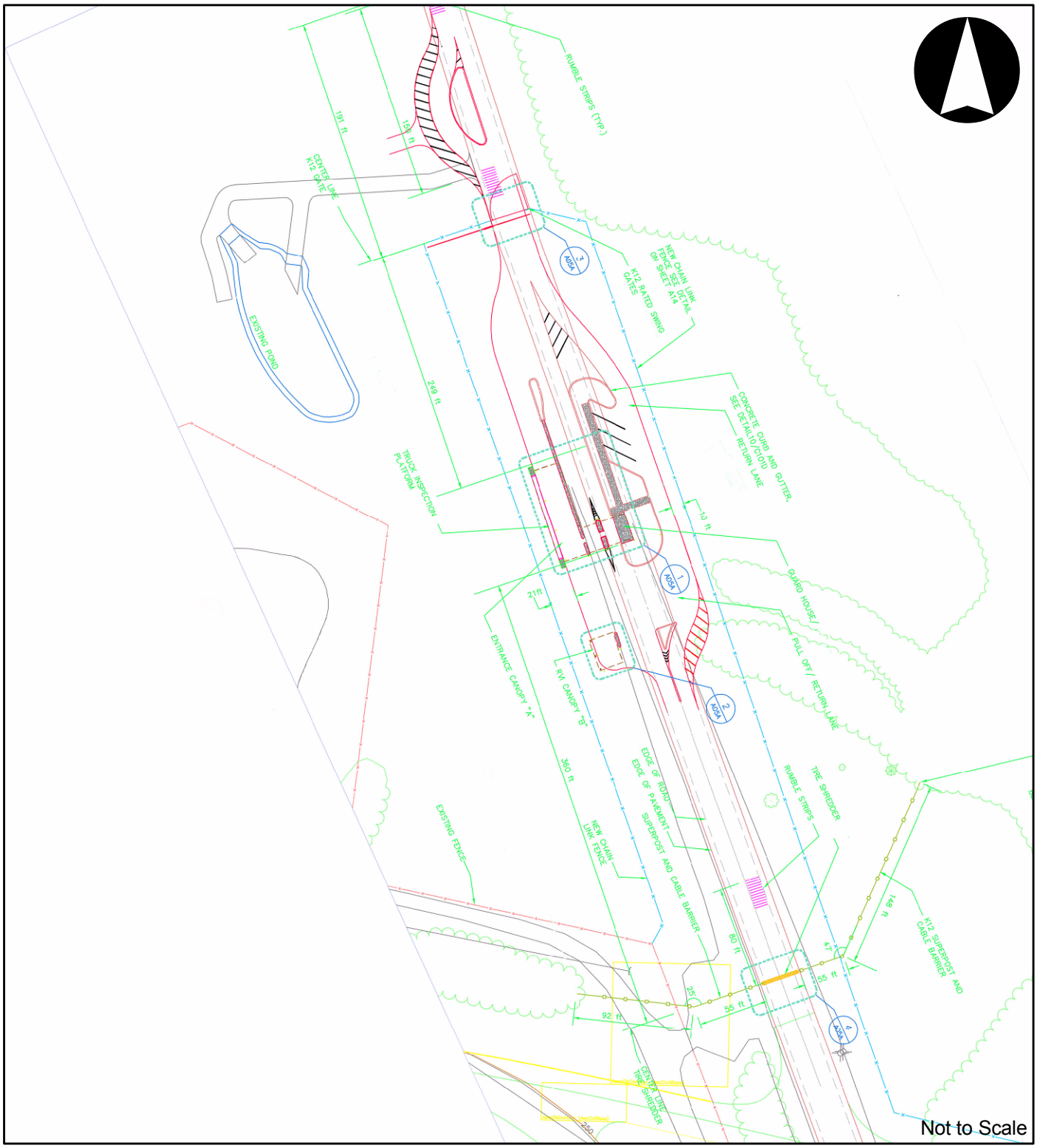

Figure 2-3 North Gate Sketch Layout- 90% Design Plan
Provided by Parsons Infrastructure & Technology Group

PART III AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Part of the Environmental Assessment describes existing conditions and the potential impacts of the two alternatives selected for evaluation: Build (Construction of the North Gate and Explorer Road Extension) and No Action. For each feature the text outlines the existing conditions within the General Site Area and then summarizes the effects upon that feature of constructing the improvements followed by an explanation of the effect upon that feature of taking no action. Part III ends with a summary of the cumulative effects of constructing the proposed improvements when added to the other improvements proposed and evaluated since the completion of the *GSFC Facilities Master Plan*.

3.1 Master Plan Compatibility

In 2002 the *GSFC Facilities Master Plan* was approved by the National Capital Planning Commission. That document is intended to guide the overall development of the GSFC campus in future years and, in particular for the period of 2002-2009. The *GSFC Facilities Master Plan* calls for the realignment of resources at GSFC to consolidate similar functions into a series of neighborhoods: Earth Science Neighborhood, Space Science Neighborhood, and Engineering and Technology Neighborhood. Existing buildings would be renovated or replaced and new buildings will be added to provide the state-of-the-art laboratories and research facilities needed to support the mission of NASA well into the twenty-first century.

A primary goal of the *GSFC Facilities Master Plan* is the uniting of the east and west campuses of GSFC. With the completed relocation of Soil Conservation Road, the first step to a unified campus was completed. The proposed Roadway and Security Upgrades would continue the effort by improving security and providing and efficient flow of traffic around the facilities as described in the *GSFC Facilities Master Plan.*

3.1.1 Build Alternative

The Roadway and Security Upgrades would be located predominately in the central corridor of the campus and would require the demolition of two buildings in the Building 27 complex, 27B (Explosive Storage Building) and 27F (Sand Dome). Figure 3-1 outlines the Limits of Disturbance for construction of the Explorer Road extension. A small portion of Explorer Road would be realigned to facilitate a new intersection of the Explorer Road extension with Explorer Road. At that time, the existing portion of Explorer Road to the east of the Explorer Road extension would be renamed Aqua Road and the new road would become Explorer Road.

The Explorer Road extension would connect the proposed new neighborhoods to one another and provide access to newly designed parking facilities outlined in the *GSFC Facilities Master Plan*. The Explorer Road extension would meet the criteria outlined in

the *GSFC Facilities Master Plan* by creating a more efficient traffic pattern around the campus and compensating for the lost route through campus due to the relocation of Soil Conservation Road.

The North Gate would be relocated to a portion of Hubble Road just north of the intersection with the proposed Explorer Road extension. This addition of a security gate would be essential in the completion of the *GSFC Facilities Master Plan*. It would provide access to the newly unified campus from the north with an area to inspect commercial vehicles entering the campus.

The Roadway and Security Upgrades would help meet future land use goals by streamlining the transportation network around the campus and would also provide links to the proposed neighborhoods. The roadway would also provide pedestrian areas that would encourage employees to carpool or take public transit, thereby reducing their reliance on single occupancy vehicles.

3.1.2 No Action Alternative

If the No Action Alternative is selected, major portions of the master plan could not be completed. The campus would remain divided by Hubble and ICESat Roads and the associated fencing. Also, a portion of Hubble Road has been removed. This closure has limited traffic movements around the East Campus and would also limit access to the ESB under the No Action Alternative.

3.2 Population

3.2.1 Affected Environment

GSFC is located about 11.27 km (7 mi) northeast of Washington, DC, in Prince George's County, Maryland. Prince George's County is developing rapidly and is part of the Baltimore-Washington Consolidated Metropolitan Statistical Area (CMSA). Between 1990 and 2000, the county's population grew by 10 percent to a total population of 801,515. Growth in Prince Georges County is expected to continue with a projected population for 2010 of 852,000 and for 2020 of 917,000, (*Environmental Assessment for GSFC Facilities Master Plan, 2002*).

3.2.2 Environmental Consequences

Build Alternative

Since no additional residences or long-term jobs would be created, the proposed Roadway and Security Upgrades are not expected to have any impact on the population within the area.

No Action Alternative

Under the No Action Alternative, there would no impact on the surrounding population.

Figure 3-1 Roadway and Security Improvements Limits of Disturbance

LOD Staging Areas

3.3 Land Use

3.3.1 Affected Environment

Land Use- Prince George's County

The Beltsville Agricultural Research Center (BARC) borders GSFC to the north. GSFC and BARC contribute to a resource known within Prince George's County as the "green wedge"—a continuous, lightly developed area in a rapidly developing region. The City of Greenbelt is adjacent to the western property limit of GSFC. A mix of commercial and residential development consisting primarily of shopping malls, office parks, and low-rise apartments and condominiums is prevalent in this area. Areas to the south and east of GSFC include the residential areas of Seabrook, Lanham and Glenn Dale.

The Prince George's County General Plan divides the County into policy Tiers: the Developed Tier, the Developing Tier, and the Rural Tier. Each Tier is characterized by the intensity of development, both residential and employment. The Developing Tier encompasses the middle section of Prince George's County and includes GSFC. This Tier experiences the greatest amount of pressure for residential community growth. Due to the dispersed nature of the development in this Tier, circulation depends on the automobile, which has led to roadway congestion. Development controls within this Tier need to balance the pace of development with the demands for adequate roads and new facilities. New development is designed to be more land efficient, more environmentally sensitive, and more effective with respect to transit support. The main goal of the Developing Tier is to maintain a pattern of low- to moderate-density suburban residential communities, distinct commercial centers, and employment areas that are increasingly serviceable by transit.

GSFC is a major employment center and implementation of the GSFC Master Plan is intended to maintain its viability into the future. The areas surrounding GSFC have a mix of suburban land uses, including residential, commercial, and institutional activities, which closely match the *Prince George's County General Plan* proposed land use. No future land use or zoning changes are planned within the *Prince George's County General Plan* for the areas in the vicinity of GSFC.

Land Use- GSFC Campus

GSFC is a 514 ha (1,270 ac) campus divided into two large areas, the east and the west campuses, which are separated by Hubble Road, a portion of which that will be removed as part of the ESB project. Existing structures are widely spaced across the campus and surrounded by parking areas and broad lawns. Figure 1-3 displays the functional distribution of uses. Most science and research activities are located on the west campus. During the 1990s, Earth Science activities were relocated to new facilities on the east campus. The largest undeveloped areas are located on the east campus.

In coming years, the operations on the GSFC campus would be streamlined by

consolidating major activity groupings into five neighborhoods consistent with the *GSFC Facilities Master Plan*. The consolidation of functional uses would strengthen overall teamwork by interconnecting all activities across the campus. The Explorer Road extension would contribute to the *GSFC Facilities Master Plan* by providing connections to three of the five proposed neighborhoods and creating an efficient transportation network throughout the campus. It would also restore north-south traffic movement on the eastern half of campus. The North Gate would enclose the campus from the north and would be the entrance point for all commercial vehicles entering the campus.

The current pedestrian network and location of amenity services are characterized as disconnected by roadways and parking and scattered sidewalks. The new neighborhoods would surround a natural greenway of open space and would be connected by pedestrian walkways. Through the realignment of resources to consolidate similar functions and the development of supportive pedestrian access, as described in the Master Plan, GSFC encourages alternatives to reliance on single occupancy vehicles.

3.3.2 Environmental Consequences

Build Alternative

Prince George's County

The Build Alternative would not change the general land use of GSFC in context to the land use plans for Prince George's County. GSFC would remain part of the Developing Tier and would remain consistent with transit plans outlined in the *Prince George's County General Plan.*

GSFC Campus

There would be some minor changes in land use on the GSFC campus due to the Roadway and Security Upgrades. Specifically, some areas of open space and forest stands would be removed to make way for the Explorer Road extension (See also Section 3.15). Also, Buildings 27B and 27F would be removed for the roadway as well. All these changes are recommended in the *GSFC Facilities Master Plan.* By limiting through public traffic and permitting an unimpeded flow of internal vehicle and pedestrian trips, GSFC would meet the master plan goal of a more unified campus.

No Action Alternative

Under the No Action Alternative, there would be no changes to land use on the GSFC campus or to the surrounding area in Prince George's County.

3.4 Cultural and Historic Resources

3.4.1 Affected Environment

The *Environmental Assessment for GSFC Facilities Master Plan, 2002*, does not show any known historic resource within the General Site Area. This finding was confirmed by a review of the Maryland Department of Natural Resource (MDNR) Technology

Toolbox database and correspondence with the Maryland Historic Trust (see letter dated August 8, 2006, Appendix A). Based on the current level of disturbance within the study area and its general location, no archeological resources are likely to be found. A review of the Phase I Archeological Survey conducted for GSFC also confirms that the probability of finding archeological resources within the Explorer Road extension alignment or the vicinity of the North Gate is low. In a letter dated August 12, 2002 (See Appendix A) the Maryland Historic Trust agreed that:

> …the activities described in the Master Plan and the EA, with the exception of the Soil Conservation Road Realignment, would have no effect to historic properties. (Emphasis in the original letter from Elizabeth J. Cole to Mr. Kim Toufectis.)

No additional archeological surveys were conducted as part of the preparation of this EA for the Roadway and Security Upgrades.

3.4.2 Environmental Consequences

Build Alternative

Based on prior surveys, there are no cultural resources in the area of the proposed build alternative or in surrounding areas. Therefore, there would be no impact to cultural resources due to completion of the Roadway and Security Upgrades. If something is uncovered during the construction, the project would be stopped in the immediate vicinity of the discovery to assess the impact. The Maryland State Historic Preservation Office would be consulted if the initial investigation by a qualified professional indicates the property may be of cultural significance.

No Action Alternative

Based on surveys in the area, there are no cultural resources in the study area therefore there would be no impact under the No Action alternative.

3.5 Employment Conditions

3.5.1 Affected Environment

With a workforce of more than 7,000 federal employees and contractors, GSFC is the third largest job center in the County, behind the University of Maryland College Park Campus and Andrews Air Force Base (*Prince George's County Brief Economic Facts*, Maryland Department of Business and Economic Development, 2005-2006). The majority of the federal employees and private contractors are technical personnel, scientists, engineers, and computer and communications specialists.

In 2002, GSFC contributed more than a billion dollars to Maryland's economy. Space and engineering service industries accounted for about 70 percent of the total direct expenditures. The direct and indirect total economic impact of GSFC was estimated at $2.156 billion in annual gross sales, $905 million in annual employee income, and a maintenance level of 26,690 full-time jobs (*Environmental Assessment for GSFC*

Facilities Master Plan, *2002*).

The NASA work force at GSFC is projected to slowly decline from the current level to about 5,800 by 2020. At the same time, an additional 1,950 employees are expected to work for NASA partners on-site, keeping the overall employee population at the site relatively consistent. This projection assumes that there would be no radical change in the mission of GSFC. An additional 1,000 NASA employees at GSFC could result if there were a significant expansion of the space or earth science programs (*Environmental Assessment for GSFC Facilities Master Plan*, 2002).

3.5.2 Environmental Consequences

Build Alternative

Employment levels at GSFC will not change as a result of the Roadway and Security Upgrades.

No Action Alternative

Under the No Action Alternative, there would be no impact to employment at the GSFC or surrounding areas.

3.6 Environmental Justice Conditions

3.6.1 Affected Environment

Presidential Executive Order 12898, issued February 11, 1994, requires federal agencies to ensure environmental justice as part of their overall mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of activities on minority or low-income populations.

Based on the 2000 Census data, minority individuals comprise greater than 50 percent of all individuals living in five of the seven census tracts that surround GSFC. Census tracts 67.08 and 74.08, shown in Figure 3-2, both located on the west side of the Baltimore-Washington Parkway, have a greater percentage of white population than of minority populations.

Within Prince George's County, 7.7 percent of the people live in households below the poverty level. Six of the seven census tracts that surround GSFC have a higher concentration of poverty than the county average. Census tract 67.08 (Figure 3-2) has a lower concentration of poverty than Prince George's County as a whole.

3.6.2 Environmental Consequences

Build Alternative

While several of the communities surrounding GSFC meet thresholds for environmental justice considerations, there would be no impacts to minority or low-income communities from the Roadway and Security Upgrades.

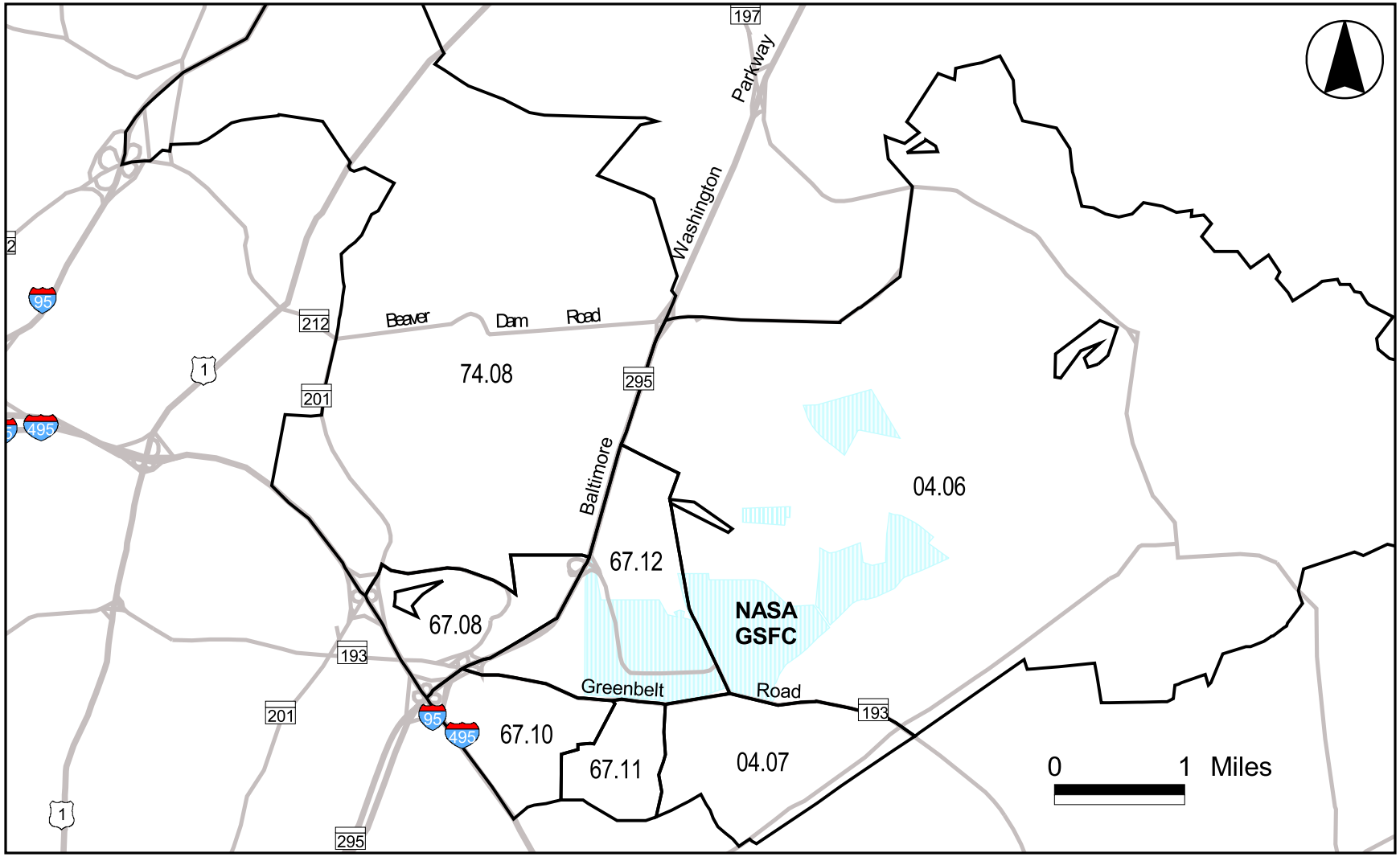

Figure 3-2 2000 Census Tracts

NASA GSFC

2000 Census Tract Boundaries

No Action Alternative

There are several communities surrounding GSFC that meet the thresholds for environmental justice considerations, however, under the No Action Alternative, there would be no impact to these communities.

3.7 Transportation

3.7.1 Affected Environment

Area Roadways

1.6 km (1 mi) southwest of GSFC is the I-95/I-495 Washington Beltway shown in Figure 1-1, an eight-lane interstate freeway that is 103 km (64 mi) long and encircles the District of Columbia and the inner suburbs of Virginia and Maryland. This highly congested freeway provides the region's main access to the District of Columbia and the surrounding suburban areas.

To the west of GSFC lies the Baltimore-Washington Parkway, which is shown in Figures 1-1 and 1-2. This four-lane divided highway with limited access connects the cities of Baltimore, MD and Washington, DC. The segment of the Baltimore-Washington Parkway near GSFC is owned and maintained by the National Park Service (NPS), and is listed on the National Register of Historic Places. The Baltimore-Washington Parkway is a primary route for employee access to the campus.

Greenbelt Road (Maryland Route 193) is an east-west arterial located along the southern boundary of GSFC. This is the primary route for visitor access to and from the campus. Greenbelt Road, which is four to six lanes wide, is owned and maintained by the State of Maryland.

Good Luck Road is adjacent to the eastern boundary of GSFC. This road, which is classified as a county collector road, is generally two lanes wide until it reaches the intersection with Greenbelt Road, where it becomes four lanes. Good Luck Road is owned and maintained by Prince George's County.

The relocated Soil Conservation Road is a two lane road that stretches 1.45 miles from the existing Hubble Road to Good Luck Road. It runs along the northern edge of the GSFC east campus. The road is used by motorists wishing to access Greenbelt Road from north of the GSFC Campus. No trucks are permitted on the portion of Soil Conservation Road north of Hubble Road that runs through BARC. More detailed information on the relocation of Soil Conservation Road can be found in the *GSFC Master Plan Environmental Assessment, 2002*.

Figure 3-1 shows the existing and proposed road layout after completion of the Roadway and Security Upgrades. Hubble Road is a two lane road that divides GSFC into two sections, the east and west campuses. It connects with Building 16/16W to the

south and with Soil Conservation Road to the north. Hubble Road is owned by the U.S. Government and is maintained by NASA.

ICESat Road is a two lane road that connects Greenbelt Road to Explorer Road and serves as an entrance point to the GSFC Campus. ICESat Road is owned by the U.S. Government and is maintained by NASA.

Explorer Road serves the west campus and intersects ICESat Road just north of the South Gate. Aqua Road intersects ICESat Road directly east of Explorer Road and leads to the east campus. Both Explorer Road and ICESat Raod are owned by the U.S. Government and maintained by NASA.

Traffic

As part of the *GSFC Transportation Management Plan,* current commuting and transportation patterns were determined at several locations in the vicinity of GSFC. An employee commuting survey was conducted in October 1999, which determined that during peak usage times, an estimated 90 percent of the GSFC staff commute using a single occupancy vehicle. About eight percent of the employees use ridesharing, approximately two percent commute by bus, and less than one percent ride a bike or walk to the facility (*GSFC Transportation Management Plan,* 2002).

Employees access GSFC via Greenbelt Road from the south and Baltimore-Washington Parkway and Hubble Road from the north. Delivery trucks enter Hubble Road from Soil Conservation Road and go to the loading dock at Building 16/16W. Fences prohibit delivery trucks from entering the secured area of GSFC.

The predominant direction of travel along the Baltimore-Washington Parkway is southbound in the morning and northbound in the evenings. During these peak rush hour periods, the Parkway is typically at or beyond its capacity in the direction of high commuter traffic, while the reverse commute direction is well below its capacity. Trucks, cyclists, and pedestrians are prohibited from using the Baltimore-Washington Parkway.

Soil Conservation Road follows a similar traffic pattern, with the majority of the traffic flowing to the south in the mornings and the north in the evenings. During rush hour peak periods, flow frequently becomes congested at each end of the road and significant delays can occur. Cyclists and pedestrians are able to utilize Soil Conservation Road, although the conditions for such use are inadequate. Trucks are prohibited on Soil Conservation Road through BARC.

A mix of commuters, local retail and commercial traffic, and residential traffic utilizes Greenbelt Road. The rush hour commuter traffic can be fairly heavy westbound in the mornings and eastbound in the evenings and several intersections along the road tend to reach capacity during this time. Conditions for pedestrians and cyclists are inadequate and potentially unsafe.

Table 3-1 shows the traffic entering GSFC by location in 2002. Table 3-2 and Figure 3-3 show the projected traffic by gate in 2022 upon completion of the Master Plan improvements.

Table 3-1: 2002 Vehicle Conditions

Entrance	AM Peak		PM Peak	
	In	Out	In	Out
Gate 3	689	29	26	634
Main Gate / Gate 1	447	59	56	361
Gate 5	428	30	15	362
Gate 16	255	20	27	277
Gate 4	0	0	0	0
Gate 9	25	10	3	10
Totals	1844	148	127	1644

Source: *GSFC Facilities Master Plan Environmental Assessment* Figures 7-12 and 7-13

Table 3-2: Projected Vehicles for 2022

Entrance	AM Peak		PM Peak	
	In	Out	In	Out
Gate 3	682	78	53	519
Main Gate/Gate 1	489	53	35	359
South Gate	827	95	64	664
North Gate	597	39	27	274
Totals	2595	265	179	1816

Source: *GSFC Facilities Master Plan Environmental Assessment* Figures 7-19 and 7-20

Pedestrian/Bicycle

Three Prince George's County pedestrian/bike trails are in the vicinity of GSFC. The Good Luck Road Trail is a multi-use trail that parallels Good Luck Road. Trail IE, the Greenbelt Road Commuter Trail, is a Class I bikeway that is part of the Northeast Branch Park and the related trail system. This 3.6 mile long exclusive right-of-way trail is located alongside Greenbelt Road between Indian Creek and the GSFC in the vicinity of Cipriano Road.

Trail 5A, the South Laurel Trail, which runs alongside Soil Conservation Road, is the main trail in the South Laurel Trail system. The six-mile trail runs between the town of Laurel to the north of GSFC and Greenbelt Road following Soil Conservation Road in the southern half of its route. This is a Class III bikeway that shares the road and shoulder with vehicle traffic. Most of this commuter/recreational trail is located within BARC.

Goddard Space Flight Center

Project Traffic Volumes for 2022

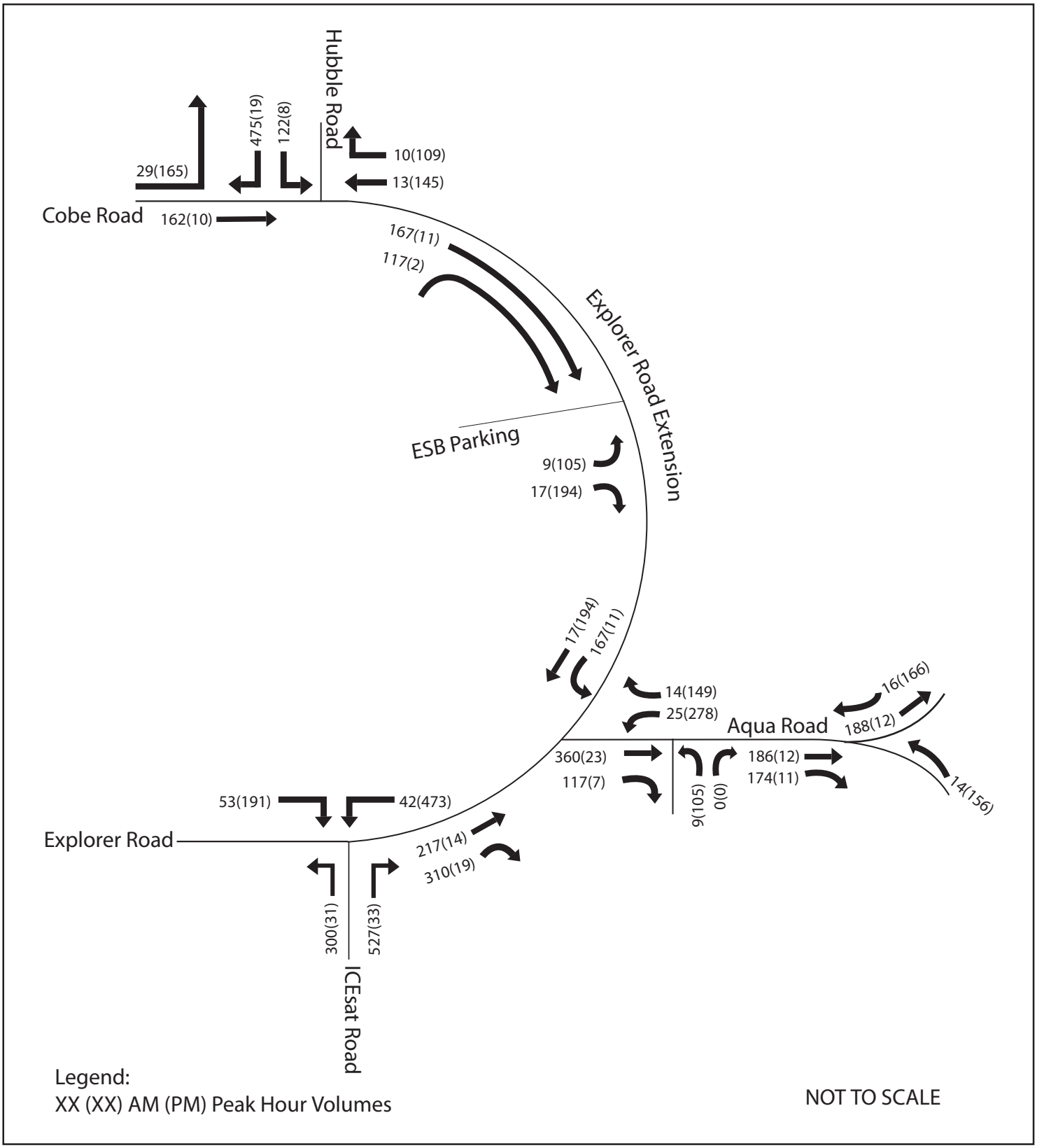

Figure 3-3 Project Traffic Volumes for 2022

3.7.2 Environmental Consequences

Build Alternative

Area Roadways and Traffic

During construction of the Roadway and Security Upgrades, traffic patterns on Aqua Road would be altered when the new connection is made to the Explorer Road extension. Hubble Road would remain open during the construction of the North Gate, but traffic divert to a new strip of roadway while the existing roadway is upgraded.

After the completion of the Roadway and Security Upgrades, traffic on roadways within GSFC would improve markedly. The Explorer Road extension would create a complete transportation network on the GSFC campus allowing motorists to travel in a north-south pattern on the east side of campus.

The Roadway and Security Upgrades would, with other changes to the GSFC campus, create a more pedestrian-friendly campus that would encourage employees to use alternatives to personal vehicles to commute. The Build Alternative would also improve the access on and off the GSFC campus.

Parking

The Roadway and Security Upgrades would link many of the parking facilities on the GSFC campus. Also, the Explorer Road extension would be connected to the new ESB parking lot and would be the main point of access to the parking area for drivers entering the campus at the South Gate. Three parking spaces, to accommodate security personnel and vehicles, are included in the relocated North Gate.

No Action Alternative

Area Roadways and Traffic

Under the No Action Alternative, there would be no impact to area roadways surrounding GSFC. However, roadways on campus would have limited direct access to the East Campus and it would be difficult to travel in the north-south direction on the eastern side of campus. Under this alternative, the possibilities for employee access onto the campus would be limited and would potentially cause a slight increase in traffic traveling along Soil Conservation, Good Luck and Greenbelt Roads to access the eastern campus through the South Gate.

Under the No Action Alternative, there would be no impact to the amount of traffic entering the GSFC campus.

Parking

Under the No Action Alternative, there would be limited access to the new parking facility located next to the ESB. The only access to the ESB parking area under this alternative would be from Hubble Road. There is no increase in parking under the No Action Alternative.

3.8 Noise

3.8.1 Affected Environment

Development at GSFC is surrounded by a perimeter buffer, which is primarily forested. NASA operations are generally conducted indoors and produce negligible exterior noise levels. Many laboratory, testing, and communications functions are extremely sensitive to noise and vibrations. The shortest distance between any NASA building (Building 33) and an outside residence is about 90 m (300 ft).

3.8.2 Environmental Consequences

Build Alternative

The construction of the Explorer Road extension and the North Gate would produce typical disturbances from construction operations. However, there are no residences or sensitive receptors nearby. The completed Roadway and Security Upgrades would not cause an increase in noise disturbances on the GSFC campus.

No Action Alternative

There would not be an increase or decrease in noise in the surrounding area under the No Action Alternative

3.9 Waste Management

3.9.1 Affected Environment

Non-hazardous Waste

Non-hazardous solid waste at GSFC consists of office waste, plastics, glass, wood, and trash. Waste is collected by custodial staff and placed in dumpsters. A private contractor then hauls the waste to the Prince George's County sanitary landfill. GSFC recycles standard items such as white and mixed paper, cardboard, aluminum soda cans, ferrous and nonferrous metals, and glass and plastic containers. Several contractors collect materials for recycling.

Hazardous Waste

The U.S. Environmental Protection Agency (USEPA) classifies GSFC as a large quantity hazardous waste generator. Personnel working with hazardous materials and hazardous waste are trained in hazards, safety, waste minimization, and emergency response procedures. Hazardous wastes are accumulated in secure areas within the building of origin and then transported to the storage facility in Building 27A, where it is stored for less than 90-days. Procedures for the control and minimization of hazardous waste releases are covered in the *GSFC Storm Water Pollution Prevention Plan* and the *GSFC Integrated Contingency Plan*. The Safety and Environmental Division oversees all handling, transport, and disposal of hazardous waste at GSFC to assure compliance in accordance with GSFC procedures as well as federal and state regulatory requirements.

GSFC generally possesses only a small fraction of the quantity of radioactive material allowed by the Nuclear Regulatory Commission (NRC) General Research and Development License issued to GSFC (NRC license 19-05748-02). A private contractor serving federal agencies in the Washington, D.C. area handles off-site transport and disposal under a general U.S. Army contract (*Environmental Assessment for GSFC Facilities Master Plan, 2002*).

3.9.2 Environmental Consequences

Build Alternative

The Roadway and Security Upgrades would require the demolition of Building 27B, the Explosives Storage Building and Building 27F, the sand dome. A pre-demolition survey conducted in November 2005 concluded that no asbestos has been detected in the asphalt roofing of either building. Therefore, the buildings could be demolished and the rubble removed and disposed of without special treatment. The contents of the sand dome would go to a new Sand Storage Structure and the explosives would be dispersed in small quantities to other facilities on-site.

A small storage shed located adjacent to Building 27B would be removed and relocated to a new site in the Building 27 complex. Two guard houses along Explorer Road, former gates 32A and 17D would be removed and disposed of.

If construction occurs, any solid waste from construction, demolition, and land clearing activities would be recycled, if possible, or properly disposed of at a permitted solid waste acceptance facility located off of Good Luck Road.

There would be minimal changes to collection routes during the operation of North Gate and the Explorer Road extension. However, the new road and gate would create more direct routes and allow for the more efficient transport of hazardous waste.

No Action Alternative

Under the No Action Alternative, there would be no demolition of existing buildings.

Under the No Action Alternative, there would be no change to waste collection routes on the GSFC campus.

3.10 Air Quality

3.10.1 Affected Environment

Federal Standards

One of the primary goals of the Clean Air Act Amendments of 1990 (CAAA) is the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS) and the prevention of significant deterioration of air quality in areas that meet the NAAQS. The USEPA calls the pollutants regulated by the NAAQS “criteria” air pollutants, because the agency developed health-based criteria as the basis for the permissible levels. Criteria pollutants include ground-level ozone, carbon monoxide,

particulate matter, lead, sulfur dioxide and nitrogen dioxide. Table 3-3 summarizes the NAAQS for the six criteria pollutants. Primary Standards set limits to protect human health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against damage to animals, crops, vegetation, and buildings.

Table 3-3: National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary Standard Value	PG County Status
Carbon Monoxide (CO) 1-hour Average 8-hour Average	 9 ppm 35 ppm	 Attainment Attainment
Nitrogen Dioxide (NO_2) Annual Arithmetic Mean	 0.053 ppm	 Attainment
Ozone (O_3) 8-hour Average	 0.08 ppm	 Moderate Nonattainment
Lead (Pb) Quarterly Average	 1.5 $\mu g/m^3$	 Attainment
Particulate < 10 micrometers (PM-10) 24-hour Average Particulate < 2.5 micrometers (PM-2.5) 24-hour Average	 150 $\mu g/m^3$ 65 $\mu g/m^3$	Attainment ------ Nonattainment
Sulfur Oxides (SO_X) Annual Arithmetic Mean 24-hour Average 3-hour Average	 0.03 ppm 0.14 ppm -------	 ------ ------ Attainment

The air quality within Prince George's County and surrounding Washington Metropolitan Area has been improving for all of the criteria pollutants identified above with four of the six pollutants well within the NAAQS. In 1989, carbon monoxide reached the health standard at all monitoring locations within the Washington Metropolitan Area and is now at half of the relevant health standard.

The Washington Metropolitan Area, including Prince George's County, is in moderate non-attainment for 8-hour ozone standard.(USEPA OAQPS, 2004) The State Implementation Plan for the attainment of the ozone standard outlines programs and policies for reducing emissions of the ozone-causing pollutants, nitrogen oxides (NOx), and volatile organic compounds (VOC). The reductions would enable the region to meet the federal health standard for ozone by June 2010.

The Washington Metropolitan Area, including Prince George's County, has also recently been added as a nonattainment area for fine particulates, $PM_{2.5}$ (particulate

matter less than 2.5 microns in diameter), and is preparing a State Implementation Plan (SIP) for attaining the standard.

In nonattainment areas, federal agencies are required to determine the conformity of their actions with the SIP for achieving attainment. In the case of the Roadway and Security Upgrades at GSFC, this determination is governed by Maryland regulations for general conformity. For ozone, a general conformity demonstration is required for any project generating more than 50 tons per year of new NOx or VOC emissions. For fine particulates, interim guidance in effect while the SIP is prepared requires a general conformity determination for any action creating more than 100 tons of new fine particulate emissions.

Global Climate Change
GSFC is taking actions in reducing the campus' carbon equivalent footprint. New buildings are to be "green" buildings, such as the new Exploration Sciences Building which will be certified LEED Silver. The campus uses alternative fuels, in some government-owned vehicles (E85, CNG and biodiesel) and for steam production (landfill gas). With the Roadway and Security Improvements, GSFC will continue to reduce congestion and idling vehicles on the campus.

3.10.2 Environmental Consequences

Build Alternative

The proposed action has the potential to generate emission of NOx, VOC and fine particulates from three sources: trucks idling at the inspection station, the operation of gas and diesel construction equipment during construction, and, the running emissions from vehicles traveling on the roadway.

The inspection station will handle 51 trucks per day. If inspection of each truck takes five minutes, total idle time each day would be 4.25 hours per day. Since GSFC typically accepts shipments Monday through Friday, 52 weeks per year, annual hours of truck idling would total approximately 1105 hours. Emissions of NOx, VOC, and fine particulates from this source, would be less than one ton per year, well below the threshold limits for a general conformity determination. Table 3-4 shows the projected annual emissions using a worst–case scenario of all trucks as heavy duty trucks with all inspections taking place in winter.

Table 3-4. Projected Emissions from Truck Idling at the North Gate

Pollutant	Emissions Factor	Annual Emissions (grams)	Annual Emissions (tons)
Nitrogen Oxides (NO_X)	56.7 g/hr	62,653.50	0.000068
VOCs	12.6 g/hr	13,923.00	0.000014
Particulate < 2.5 micrometers (PM-2.5)	2.57 g/hr	2,839.85	0.0000022

Source: Emissions factors from USEPA

Construction of the 2600 foot roadway is a small activity and would likely not create emissions above the de minimus thresholds set out in state and federal regulations.

Total trips along the roadway would be less than 1,000 vehicles per day on less than a mile of roadway. Many of these trips are simply relocating from existing Hubble Road to the Explorer Road extension. These trips would not begin until construction is completed. Again, the anticipated new emissions, if any, would be de minimus.

No Action Alternative

Under the No Action alternative, there would be no changes to air emissions.

3.11 Soils and Geology

3.11.1 Affected Environment

The GSFC is located in the Atlantic Coastal Plain physiographic province. This region is underlain with unconsolidated coastal plain sediments. The project area lies in the Christiana-Sunnyside-Beltsville Soil Association. Dominant soil series in the general site area include Sassafras, Sandy Clay, and Sunnyside. These soils are generally deep, well drained, and compacted.

At the base of the wooded slope, east of the existing Landfill B, Elkton soils are evident. These are the only hydric soils within this portion of the Roadway and Security Upgrades study area. Hydric soils are generally saturated with the water table at or near the ground surface and are an indicator for potential wetlands (description below). All of the soils referenced above possess moderate erosion hazards.

3.11.2 Environmental Consequences

Build Alternative

The existing geology and soils present within the study area do not substantially limit any development. Any cut material would be used to fill in portions of the roadway during construction. Additional fill would be needed for the project and it would be the contactors responsibility to obtain the additional material. Approximately 20,643 cubic meters (27,000 cu. yards) of material would be moved during construction.

No Action Alternative

Under the No Action Alternative, there would be no impact to the existing soils and geology in the study area.

3.12 Stormwater Management

3.12.1 Affected Environment

GSFC is located on the Anacostia-Patuxent River drainage divide (see Figure 3-4) at the apex of five separate tributary stream basins. Virtually no other neighboring property drains onto the site. Stormwater at GSFC is managed by eight stormwater management (SWM) ponds located around the periphery of the Center. The

conveyance system consists of closed storm drains and open drains, such as channels and swales.

The Roadway and Security Upgrades project area would drain into Outfalls 5, 8 and 10. Outfall 10 is located on the north side of the GSFC campus on Beaver Dam Creek on the edge of the campus. Outfalls 5 and 8 are located on Route 193/Greenbelt Road on the southern edge of the campus. Outfall 5 is just east of the Main Gate at Goddard Road and Outfall 8 is west of ICESat Road.

Some improvements to the existing SWM system are planned to prevent active erosion from continuing to degrade receiving stream channels, resulting in decreased water quality and a reduction of viable aquatic habitat. Existing Outfall 5 discharges to the Bald Hill drainage basin without SWM protection. The County plans to construct a SWM facility at Outfall 5.

SWM is required for any new construction. SWM is regulated under *Maryland Stormwater Management Guidelines for State and Federal Projects* (MDE, Water Management Administration, July 2001) and the *2000 Maryland Stormwater* Design Manual, Volumes I&II (MDE, April 2000). The MDE design criteria for SWM encourages low impact development practices and the use of bio-retention devices. New development in Prince George's County is required to control for the 24-hour, 10-year frequency storm event according to the MDE Design Manual. (Maryland Stormwater Management Guidelines for State and Federal Projects, July 2001).

3.12.2 Environmental Consequences

Build Alternative

Stormwater management for the Roadway and Security Upgrades project would be divided into four sections; South site, ESB Location, North Site and the North Gate Area. The project would utilize existing and proposed SWM facilities (shown in Figure 3-4) as well as a new bioretention facility.

Within the Limits of Disturbance of the Roadway and Security Upgrades project, there is a total 2.06 hectares (5.1 acres) of impervious surface. During construction, 0.85 hectares (2.1 acres) of impervious surface would be removed or repaved, leaving a net increase of 1.21 hectares (3.0 acres) of impervious surface as a result of the project.

The South Site, which would cover the southern end of the Explorer Road extension, would drain into an existing SWM pond located to the south of Explorer Road in the northeast corner of Greenbelt Road and ICESat Road. The amount of impervious surface draining into the pond would remain the same as existing conditions and would not require any improvements to be made to the pond.

The ESB Location would drain into the ESB SWM pond to be constructed in the near future and includes the remaining southern portion of the Explorer Road Extension and the portion of the roadway adjacent to the ESB and its associated facilities. The ESB

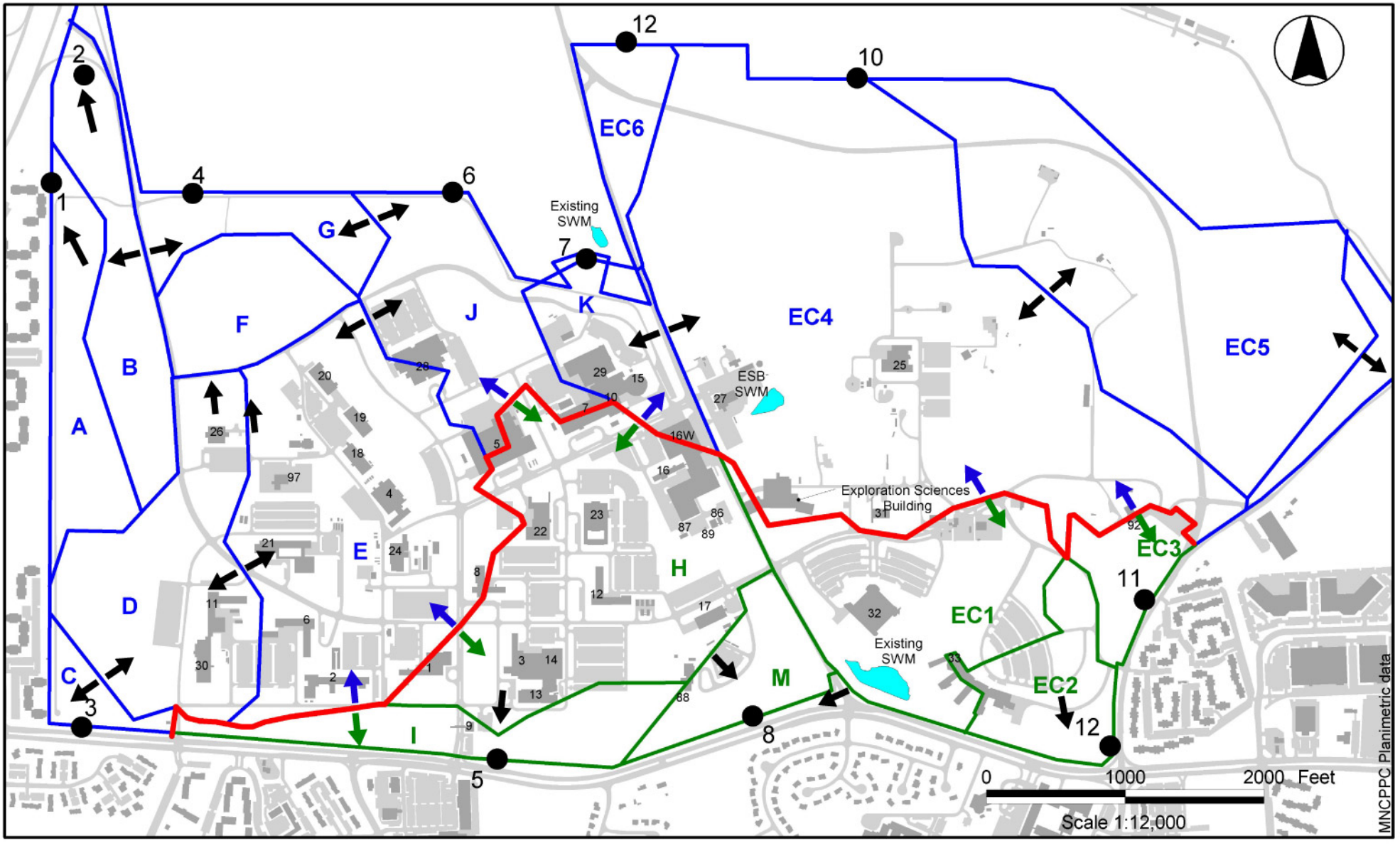

Figure 3-4 Drainage Features

Outfalls | Storm Water Management | Anacostia - Patuxent Drainage Divide

Anacostia Watershed | Patuxent Watershed

pond has been designed to accommodate most of the impervious area from the Roadway and Security Upgrades project and would be able to accommodate 123 cubic meters (0.10 ac.-ft.) of storage needed for the project.

The North Site includes the remaining portion of the Explorer Road Extension and would be treated using a bioretention facility and possibly grass channels along the roadway.

The North Gate area would drain into the existing SWM facility located north of Cobe Road. The facility was designed to treat runoff from 1.55 acres of impervious area and currently less than one acre of runoff reaches the facility. For more information regarding the SWM plan, refer to *Roadway and Security Upgrades Stormwater Management Report*, December 2006.

No Action Alternative

The No Action alternative would have no effect upon existing SWM facilities.

3.13 Groundwater

3.13.1 Affected Environment

GSFC is located within the Patuxent aquifer, which is a ubiquitous confined (artesian) aquifer. Two on-site production wells are used for make-up water for the cooling towers and boilers only. The GSFC campus is served by public water and sewer, primarily provided from surface water sources, and therefore does not significantly draw from the groundwater system.

3.13.2 Environmental Consequences

Build Alternative

There would be no substantial impact to groundwater quality due to the proposed action.

No Action Alternative

Under the No Action Alternative, there would be no impact to the groundwater quality.

3.14 Slopes (Topography)

3.14.1 Affected Environment

The gently undulating topography of GSFC is typical of the upper Coastal Plain. The General Site Area for the project proposed is centrally located on the campus, and on one of three high ground areas of the GSFC site.

There are some very steep slopes in the General Site Area, especially within the wooded area just east of the existing Landfill B site (description below). Steep slopes are defined as slopes with an incline greater than 1:1 or 45 percent. There are no slopes greater than 1:1 that would be disturbed by the proposed action.

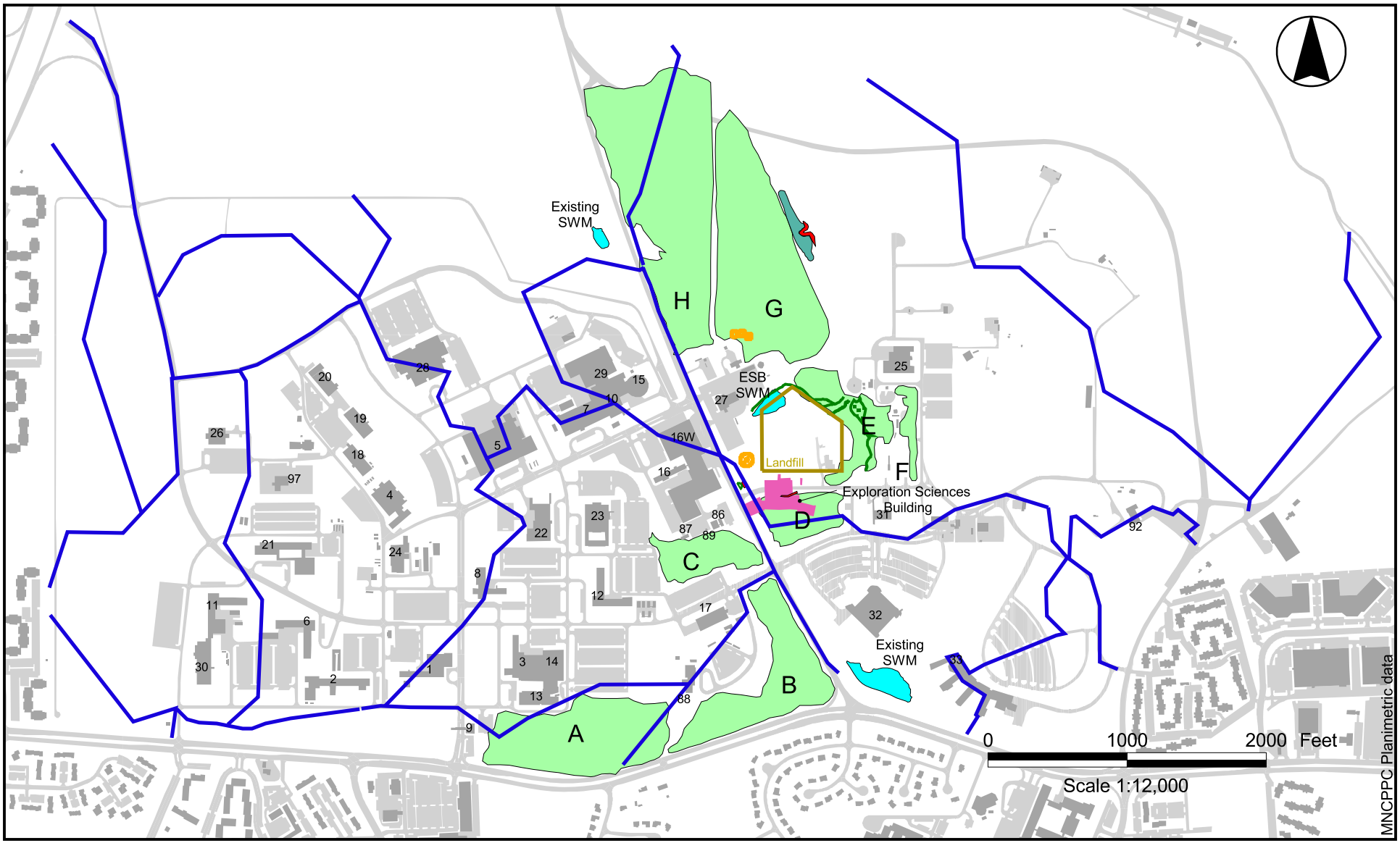

Figure 3-5 Existing Environmental Features

Wetland Areas
Forest Stand
Large Trees
Drainage Areas
Storm Water Management
Landfill B
Wetland Mitigation
Forested Wetland

The swale along the northern portion of the existing landfill site is substantially eroded, especially as it begins to flow along, and at the base of, the steep slopes. Waterways located at the base of the steep slopes associated with the landfill are also substantially eroded. Stabilization of this slope area is proposed as part of the construction of the ESB. The impacts of the proposed stabilization are addressed in the *Space Sciences Building Environmental Assessment.*

3.14.2 Environmental Consequences

Build Alternative

As part of the Roadway and Security Upgrades, the proposed roadway embankment slopes would be stabilized during construction. Methods that would be used include: silt fencing, super silt fencing, soil stabilization matting, earth dikes and inlet protection.

No Action Alternative

The No Action Alternative would have no effect on slopes within the GSFC campus.

3.15 Open Space / Forest Stands

3.15.1 Affected Environment

Forested areas within the General Site Area are shown on Figure 3-5 and summarized in Table 3-5.

Table 3-5: Forest Stands

Forest Stand	Hectares (Acres)
A	5.33 (13.185)
B	4.18 (10.334)
C	1.73 (4.281)
D	1.58 (3.913)
E	2.17 (5.361)
F	0.50 (1.242)
G	10.72 (26.501)
H	8.36 (20.68)

These forest stands are dominated by upland canopy species, primarily red oak (*Quercus rubra)*, white oak (*Quercus alba),* red maple (*Acer rubrum*), and sweet gum (*Liquidambar styraciflua).* The under story, especially the shrub layer, is sparse in Forest Stand C, mainly due to the overabundance of white-tailed deer grazing in this area. The shrub layer in Forest Stand D is dominated by mountain laurel (*Kalmia latifolia*), but is also severely over-browsed by white-tailed deer (Odocoileus virginianus). Forest Stands E and F contain the previously mentioned tree species as well as tulip poplar (*Liriodendron tulipifera*). The low ground portions of these woodlands contain headwater seeps, wetlands, and associated vegetation. Forest Stands G and H are similar in community structure to Forest Stands C and D. Along Soil Conservation Road, Forest Stand H is dominated by young Virginia pine (*Pinus virginiana*) with a narrow strip of mountain laurel (*Kalmia latifolia*) located between the

pine and the oak dominated forest. Deer browse is evident in this woodland as was identified in all other Forest Stands within the GSFC.

A single large willow oak (*Quercus phellos*) specimen tree (52.5" or 133cm DBH) is located on the ESB parking area. Other large trees in the study area include two yellow poplar (*Liriodendron tulipfera)* trees (31" and 30" DBH) and a white oak (*Quercus alba)* tree (30" DBH). All three are located in Forest Stand G along the proposed Explorer Road extension and are shown in Figure 3-5.

3.15.2 Environmental Consequences

Build Alternative

The Roadway and Security Upgrades would cause the removal of approximately 0.49 hectares (1.2 acres) of forest stands D, E, G and H that line the proposed roadway.

Landscaping for the project would be minimal, however, red oaks would be planted along the Explorer Road extension and Aqua Road and dogwoods would be planted in the median of Aqua Road.

The Roadway and Security Upgrades would require a modification to a Forest Preservation Plan that was approved on June 30, 2006 by the Maryland Department of Natural Resources (MDNR) for the construction of the ESB. The approved location for any mitigation required is within or adjacent to a designated forest stand on the northwest portion of campus and is shown in Figure 2-1. After final plans for the Roadway and Security Upgrades are completed, the Forest Conservation Area would be adjusted so both projects are considered together.

No Action Alternative

With the No-Action Alternative, no existing forest stands would be affected.

3.16 Wetlands

3.16.1 Affected Environment

Jurisdictional delineations of wetlands in the vicinity of the ESB and Soil Conservation Road were approved by the U.S. Army Corps of Engineers (See *Wetland and Waterway Report: Proposed Loop Road* August 2006). KCI Technologies, Inc. conducted a field visit on August 15, 2006 to review the area not addressed in the two prior surveys. No additional wetlands were identified along the proposed road alignment. The locations of identified wetlands and a wetland mitigation area in the vicinity of the project are shown in Figure 3-5.

There are several wetlands located in the vicinity of the Roadway and Security Upgrades. There are two small wetlands located near forest stand D near the site of the future ESB. Located on the eastern side of Landfill B are several small intermittent streams and a small wetland. There is also a wetland on the eastern side of forest stand G, next to Beaver Dam Pond. The wetland mitigation area, located east of forest

stand G and west of the existing wetland, will expand the existing wetland by 0.92 acres.

3.16.2 Environmental Consequences

Build Alternative

The existing wetland systems are not located within the project study area and therefore would not be impacted by the proposed Explorer Road extension or North Gate. None of the disturbances due to construction would be in proximity to any off-site wetlands or the associated 100-foot buffer. For additional information regarding the wetlands in the surrounding area, refer to *Wetland and Waterway Report: Proposed Loop Road* August, 2006, and also the wetland reports for the ESB.

There would not be a direct impact from the proposed Roadway and Security Upgrades to any of wetlands in the area. The proposed Roadway and Security Upgrades would have no impacts to the wetland mitigation area, including the 75 foot wetland mitigation buffer located on the eastern side of the Explorer Road extension.

Water quality should be unchanged due to the addition of a bioretention facility as part of the stormwater management and compliance with erosion control requirements.

No Action Alternative

Existing wetland systems would not be affected if the No-Action Alternative were selected. No improvements to the existing stormwater management facilities would be made.

3.17 Floodplains

3.17.1 Affected Environment

The GSFC campus does not include any land within the 100-year floodplain as defined by the Federal Emergency Management Act (FEMA). The closest 100-year floodplain is associated with Beck Branch and is located northeast of the existing GSFC complex outside the study area.

3.17.2 Environmental Consequences

Build Alternative

The Roadway and Security Upgrades would not include construction or fill within 100-year floodplains, as defined by FEMA.

No Action Alternative

Under the No Action Alternative, there would be no impact to the 100-year floodplain.

3.18 Animal Communities / Endangered Species

3.18.1 Affected Environment

No threatened or endangered species are known to inhabit the GSFC campus. This

finding is further supported by the letter from MD DNR dated August 31, 2006 (See Appendix A).

GSFC is home to a variety of wildlife, including at least 40 species of mammals, 65 species of birds, and 50 species of reptiles and amphibians. The overabundance of two species, white-tailed deer (*Odocoileus virginianus*) and Canada goose (*Branta Canadensis*), constitutes a significant ecological imbalance. GSFC recently initiated a wildlife management program to address this problem.

3.18.2 Environmental Consequences

Build Alternative

The Roadway and Security Upgrades would have no anticipated impacts on rare or endangered species.

The clearing of trees directly along the proposed roadway would cause the edge community of the forest to retreat further toward the interior. After examining the area of forest stands which would be disturbed by the construction of the Roadway and Security Upgrades, it was determined that there would be no impact to sensitive animal communities within the forests, specifically Forest Interior Dwelling Bird Species (FIDS). In order for a FIDS habitat to exist, there should be approximately 400 feet from the forest edge to the interior and the forest stand would need to be at least 100 acres in size. Using this criteria to evaluate the possibility of a FIDS habitat, it was determined that it is unlikely that the affected forest stands contain an existing FIDS habitat. Of particular interest are forest stands G and H which are the largest of the forest stands in the study area. Each stand is less than 100 acres. At its widest point, forest stand G is less than 800 feet across. Forest stand H is approximately 900 feet across at its widest point. Soil Conservation Road now cuts through this area along the northern edge of the forest creating a recent disturbance. Soil Conservation Road also cuts through forest stand G along its northern edge. It is unlikely that a FIDS habitat would exist in these two relatively small, disturbed habitats.

No Action Alternative

The No Action Alternative would not affect existing animal communities

3.19 Landfill B

3.19.1 Affected Environment

An existing landfill site (shown in Figure 3-5) is located in the General Site Area for the project: Landfill B, referred to as the “Metro Fill” Site. Hubble Road to the west borders the landfill; Building 27 is to the northwest and Forest Stands E to the north and east. The Explorer Road extension would run along the eastern and northeastern edges of the landfill.

Washington Metropolitan Area Transit Authority (WMATA) contractors used Landfill B as an un-permitted construction rubble and debris fill in constructing the New Carrollton

Metro Center site. The landfill soils are comprised of relatively unconsolidated fill material with some construction debris.

Geophysical surveys conducted in the preparation of the *GSFC Site Investigation Report - Land Fill B* (GSFC, December 31, 2002) indicate that the landfill rubble and debris extend across most of the Landfill B site and that its thickness increases from west to east. Observations made during the trench investigation indicate that Landfill B is comprised predominantly of soil, not rubble or debris. The fill is approximately 6.0-7.5 m (20-24 ft) thick at the eastern edge and thins to zero to the west and south.

Data acquisition is complete and the information provides a good indication that no further remedial action should be required.

The Risk Assessment completed as part of the *GSFC Site Investigation Report - Land Fill B* concluded that adverse non-carcinogenic health effects would not be expected for construction workers or future building occupants at this site. The report further concluded that:

> Property development may proceed without undertaking any remedial measures or incorporating any special protective measures for site workers or on-site employees.
> (*GSFC Site Investigation Report - Landfill B,* GSFC, December 31, 2002, p. 10)

3.19.2 Environmental Consequences

Build Alternative

There would be no impact to Landfill B from the Roadway and Security Upgrades. The *GSFC Site Investigation Report-Landfill B* completed December 31, 2002 states that the fill of the landfill is predominately soil and would cause no threat to health as it contains non-carcinogenic materials. Stabilization of slopes around Landfill B is discussed in the *SSB Environmental Assessment*. Also, it is anticipated that the construction and operation of the Explorer Road Extension would not disturb Landfill B.

No Action Alternative

The No-Action Alternative would have no impact on Landfill B

3.20 Utility Infrastructure

3.20.1 Affected Environment

GSFC's Facilities Management Division (FMD) utility plans were reviewed to evaluate the location, quality, capacity, and reliability of GSFC utilities. Linear utility concentrations exist within and adjacent to road right-of-ways. All of the following issues will be addressed in the projected plans.

The first area of concern is within the limits of the proposed Explorer Road extension

intersection, where an existing steam vault and a storm drain manhole are located.

At the southern end of the proposed Explorer Road extension, a fire hydrant is located at the north side of Explorer Road.

Another area of interest is where the Explorer Road extension would meet an existing east-west road north of Building 31 where there are electric and communication vaults

There is also an existing storm drain located near Building 27F.

To the north of Building 27L, two overhead power poles intersect with the proposed roadway.

There are also street lights located along existing roadways that intersect with the proposed Explorer Road extension.

3.20.2 Environmental Consequences

Build Alternative

All utility relocations would be completed before construction would begin on the Roadway and Security Upgrades. At this time, there are no anticipated long-term additional utility infrastructure impacts.

No Action Alternative

The No-Action alternative would not impact existing utilities.

3.21 Safety and Security

3.21.1 Affected Environment

Perimeter Fencing

The entire perimeter of GSFC is secured with a chain link fence. Access to the campus is controlled through a series of perimeter gates. All access requires security approval and visitors require escorts. Most delivery trucks do not enter beyond the perimeter fence at GSFC. All trucks are directed to a series of loading docks in Building 16/16W with direct access into Hubble Road. Once inspected, trucks are either unloaded into the warehouse and leave without even passing through the fence, or the loaded trucks are directed to a destination on campus.

Explosive Storage Facility

Building 27B, the Explosives Storage Building, is located directly along the proposed alignment of Explorer Road extension. If the building were to remain in place, any occupied buildings or public roadways should be located a minimum distance of 27.5 m (90 ft) away from the structure according to NFPA 495, as cited in the GSFC Evaluation of Explosives Storage Building 27B (1995).

Security / Blast Requirements

Security guidelines call for a 91.5 m (300 ft) buffer between all public vehicles and occupied buildings without proper screening (*SSB Site Selection Study*, 2002). If Building 16/16W were to remain, and continue to accept outside deliveries, a 91.5 m (300 ft) buffer would be appropriate around the present loading docks and access routes required by trucks to reach those docks. Currently, Building 16/16W will remain in place for the short term but it may be removed in the future.

3.21.2 Environmental Consequences

Build Alternative

The Roadway and Security Upgrades would improve the level of safety on the GSFC campus. The North Gate would allow for thorough inspection of trucks and other vehicles that enter the campus. Also, there would be tire shredders located on Hubble Road south of the North Gate as well as traffic calming measures north of the North Gate to slow vehicles while passing though the gate.

There would be an increase in perimeter fencing and the North Gate area would be secured with both fencing and post and cable containments. The North Gate would consist of K12 swinging gates. This change in security procedures would, in turn, permit removal of the existing fences and gates that separate the east and west campuses along Hubble Road.

The Explorer Road extension would allow for easy navigation for drivers through campus. Also, it would provide safe pathways for pedestrians and bicyclists that are currently lacking on the GSFC Campus. Pedestrians would be accommodated on campus with the addition of sidewalks that will connect directly to parking areas and buildings and line roadways. Bicyclists would be permitted to use the roadways and there would be bike lanes along portions of the roadway and signs that encourage drivers to share the road with pedestrians and bicyclists.

Building 27B, the Explosives Storage Building, would be removed during the Roadway and Security Upgrades, eliminating the need for the containment zone.

There would be no need for a security buffer around Building 16/16W under the Roadway and Security Upgrades because all vehicles traveling to the building would have gone through a thorough inspection at the North Gate. The building will remain in operation; however, the building may be removed in the future.

No Action Alternative

The No Action alternative would not affect safety conditions at GSFC. However, the 27.5 m (90 ft) containment zone would need to remain intact around Building 27B according to NFPA 495, as cited in the *GSFC Evaluation of Explosives Storage Building 27B* (1995). Uninspected delivery trucks would continue to travel to Building 16/16W failing to correct a security threat in the center of campus.

3.22 Cumulative Impacts

Build Alternative

The *GFSC Facilities Master Plan* is a major milestone in the development of the GSFC campus. During the Master Plan process, NASA completed a comprehensive assessment of environmental conditions throughout the facility. The Master Plan has not changed appreciably since the Master Plan EA and FONSI. Thus, the cumulative impacts of past, present, and reasonably foreseeable future actions remain within the scope of that EA and FONSI.

NASA has undertaken a series of activities to achieve the Master Plan vision. The cumulative impacts presented here are measured from the date of publication of the *GFSC Facilities Master Plan* in December, 2002. The actions detailed below, are consistent with the Master Plan and are evaluated in the *GFSC Facilities Master Plan Environmental Assessment*, which found them not to have a significant cumulative impact on the environment.

The spatial extent of the cumulative analysis is determined by the impact areas of the affected resources, particularly water resources. Since all stormwater within GSFC drains to locations within the facility, the boundary of the cumulative analysis is the boundaries of the on-campus sub-drainage basins serving the proposed roadway and gate. The projects included with the timeframe and area of cumulative impacts include

- Relocation of Soil Conservation Road
- Construction of the ESB
- Roadway and Security Improvements

Since 2002, the major change in the area of the Roadway and Security Upgrades has been the relocation of Soil Conservation Road. The roadway has been relocated from the center of the GSFC Campus and now connects to Good Luck Road to the east. The roadway opened for use in October, 2006. As part of this project, a gate has been constructed along ICESat Road and is now known as the South Gate.

Another project underway in this area of GSFC is the construction of ESB. This project will consolidate offices and services associated with exploration sciences into one building in the center of campus. Along with the building itself, the construction includes a new parking facility that will be accessed from the Explorer Road extension and Hubble Road. A new SWM facility will serve not only the ESB but also a large portion of the Roadway and Security Upgrades project. Included in the construction of the ESB is the stabilization of slopes around Landfill B. In order to begin construction on the ESB, a portion of Hubble Road has been removed from Explorer Road to Building 16, which has eliminated north-south traffic movement on the east campus.

The Build Alternative for the Roadway and Security Upgrades will produce minimal impacts in the areas of transportation, forests, stormwater, and safety as shown in Table 3-6. The cumulative effects of these impacts in combination with other actions

are discussed below.

Table 3-6 Features Affected by the Proposed Action

Criteria	Impact		Description of Environmental Impacts
	Yes	No	
Transportation	x		Traffic, pedestrian, and bicycle patterns would improve on the campus.
Forest Stands	x		Portions of forest stands and open space would be removed to make way for the roadway. Mitigation would be provided.
Stormwater Management	x		There would be an increase in impervious surface. Flows would drain into approved SWM facilities that include water quality treatment as appropriate.
Safety and Security	x		Safety and Security would be improved by the provision of adequate facilities for truck inspection.

Transportation

Upon completion of the Roadway and Security Upgrades, the Explorer Road extension will replace the north-south movement on campus that was lost when a portion of Hubble Road closed. The new road system will significantly improve east-west traffic movement and provide access to the Exploration Sciences parking lot from the South Gate.

The Roadway and Security Upgrades would be a key element in linking the existing campus with current and future projects. The Explorer Road extension would provide access to the new parking area for the ESB and connect to the South Gate. In the future, the Explorer Road extension, would connect to 3 of the 5 proposed neighborhoods on the GSFC campus, the first being the Exploration Sciences Neighborhood. The upgrades would also create a more pedestrian-friendly campus. Sidewalks would be installed along portions of the new roadway to connect buildings to each other and to parking areas. This would encourage employees to make short trips on foot rather than making short car trips. Amenities, such as convenience stores and dining facilities, in central locations, are planned to encourage employees to remain on campus throughout the day. Taking short trips around and off campus during the day is one of the main reasons for employees using single occupancy vehicles. By changing employee habits, more drivers might find it convenient to carpool and therefore reduce the number of vehicles on campus each day.

Forest

Portions of forest stands were removed to make way for Soil Conservation Road and for the ESB. The forest stands in this area would be impacted again if the Explorer Road extension and North Gate were constructed. To compensate for this loss, a forest preservation area in the northwest portion of campus has been approved. Upon

approval of the plans for the Roadway and Security Upgrades, the Explorer Road extension would be constructed concurrently with the ESB. These two projects would have a combined forest preservation area. Table 3-7 shows the estimated area of forest within the General Site Area impacted by planned activities.

Table 3-7. Cumulative Impacts to Forest Stands and Impervious Surface

	Soil Conservation Road Realignment	Exploration Sciences Building	Roadway and Security Upgrades	Total
Forest Stands	26.2 ac removed 6.6 preserved	3.8 ac removed 6.2 ac preserved*	1.2 ac removed ---	29.7 ac 12.8 ac
Impervious Area	6.2 ac added 11.3 ac total	12.7 ac added 12.7 ac total	3 ac added 5.1 ac total	22 ac add. 30 ac total

* Preserved for both ESB and Roadway and Security Upgrades

Stormwater Management

Stormwater management for the Build Alternative will largely be provided through the use of existing stormwater management ponds and the addition of a bioretention facility within an existing drainage improvement. Some of the drainage area (16.27 ac) will drain into an existing culvert downstream; 19.87 ac will drain into new SWM pond for the ESB north of the parking lot. The southern portion of the Explorer Road extension would drain into an existing SWM facility; the ESB SWM facility would accommodate 0.10 ac-ft of storage. The northern portion of the road would drain into a bioretention facility; North Gate Area would drain into an existing SWM facility

Safety and Security

The Roadway and Security Upgrades diverge from the *GFSC Facilities Master Plan* because the North Gate did not originally have accommodations for commercial vehicle inspection. The master plan originally proposed a receiving facility on Soil Conservation Road that would not require the commercial vehicles to enter campus and be inspected.

No Action Alternative

Under the No Action Alternative, plans outlined in the GSFC Master Plan would not be accomplished. The campus, under this alternative, would have a disconnected feel, travel between the east and west campuses would continue to be restricted, and campus security would not be improved.

APPENDIX A: AGENCY/PUBLIC INVOLVMENT

Letters of request for additional information were sent during the planning process to the Maryland Department of Planning (MDP), the Maryland Department of Natural Resources (MDNR) and the Fish and Wildlife Service (FWS). Responses to those letters from the MDP and MDNR are attached. A response from the FWS had not been received at the time of publication.

After distribution of this draft of the Environmental Assessment, NASA may receive comments from review agencies and the general public. Those comments and NASA's responses will be recorded in this section of the final document.

Maryland Department of Planning
Maryland Historical Trust

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

Audrey E. Scott
Secretary

Florence B. Burian
Deputy Secretary

August 8, 2006

Ms. Lizabeth Montgomery
Environmental Engineer
NASA Goddard Space Flight Center
Greenbelt, MD 20771

Re: Proposed Roadway and Security Upgrades – Goddard Space Flight Center (GSFC)
Prince George's County, Maryland

Dear Ms. Montgomery:

Thank you for your recent letter, dated 27 July 2006 and received by the Maryland Historical Trust on 31 July 2006, requesting information regarding cultural resources that may be affected by the above-referenced project. Since the work involves a federal undertaking, the project is subject to review under Section 106 of the National Historic Preservation Act of 1966, as amended. We offer the following comments.

According to your submittal, the project will entail roadway and security upgrades to NASA's Greenbelt campus. The project includes construction of a new Loop Road to the east of the future Exploration Sciences Building, a North Gate on Soil Conservation Road just north of the Loop Road, and improvements to the South Gate. In our opinion, construction of these three activities will have no effect on historic properties – including archeological resources and the historic built environment.

If you have questions or require further assistance, please contact Jonathan Sager (for historic built environment) at 410-514-7636 or jsager@mdp.state.md.us or me (for archeology) at 410-514-7631 or bcole@mdp.state.md.us. Thank you for providing us this opportunity to comment.

Sincerely,

Elizabeth J. Cole
Administrator, Project Review and Compliance

EJC/JES/200602511

cc: Paul DeMinco (NASA GSFC)

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Robert L. Ehrlich, Jr., Governor
Michael S. Steele, Lt. Governor
C. Ronald Franks, Secretary

August 31, 2006

Ms. Lizabeth Montgomery
Environmental Engineer
NASA – Goddard Space Flight Center
Greenbelt, MD 20771

RE: Environmental Review for Proposed Roadway and Security Upgrades for Godard Space Flight Center Campus at 8800 Greenbelt Road, Prince George's County, Maryland.

Dear Ms. Montgomery:

The Wildlife and Heritage Service has determined that there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated. As a result, we have no specific comments or requirements pertaining to protection measures at this time. This statement should not be interpreted however as meaning that rare, threatened or endangered species are not in fact present. If appropriate habitat is available, certain species could be present without documentation because adequate surveys have not been conducted.

It is important to note that the northern portion of this project site may fall within the boundaries of a wetland draining into Alter Pond that is designated in state regulations as a Nontidal Wetland of Special State Concern (NTWSSC) and regulated by Maryland Department of the Environment. This wetland and its 100' upland buffer are regulated together as an NTWSSC.

Our analysis of the information provided also suggests that the forested area on the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of FIDS habitat is strongly encouraged by the Department of Natural Resources, and DNR can provide further technical assistance on FIDS conservation guidelines upon request.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER #2006.1835.pg
Cc: K. McCarthy, WHS

APPENDIX B: LIST OF PREPARERS

Parsons Infrastructure and Technology Group, Inc.
Gavin Perry
Kirit Patel
Jeffrey Steir

KCI Technologies, Inc.
Dave Boellner
Lauren Bowman
Matt Folley
Erin Lesh
Kelly Lyles
Joel Reightler, PE
Jacquelyn Seneschal, AICP
Tiffany Sevik
Bruce Thompson

EBA Engineering, Inc
Douglas Bobb, PE
Dale Coppage, PE

APPENDIX C: ACRONYMS, SYMBOLS, ABBREVIATIONS, AND METRIC/BRITISH SYSTEM EQUIVALENTS

ac	Acre
ac.-ft.	Acre-Feet
BARC	Beltsville Agricultural Research Center
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CMSA	Consolidated Metropolitan Statistical Area
CO	Carbon Monoxide
DBH	Diameter Breast Height
DC	District of Columbia
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESB	Exploration Sciences Building
FEMA	Federal Emergency Management Agency
FIDS	Forest Interior Dwelling Species
FMD	Goddard's Facilities Management Division
ft	Feet
FWS	Fish and Wildlife Service
GSFC	Goddard Space Flight Center
ha	Hectare
km	Kilometer
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
mi	Mile
MWAQC	Metropolitan Washington Air Quality Committee
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NOx	Nitrogen Oxides
NPS	National Park Service
NRC	Nuclear Regulatory Agency
OAQPS	Office of Air Quality Planning and Standards
PM-2.5	Particulate Matter less than 2.5 microns in diameter
PRR	Patuxent Research Refuge
SCR	Soil Conservation Road
SIP	State Implementation Plan (for air quality improvements)
SWM	Stormwater Management
TPB	National Capital Transportation Planning Board

USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WMATA	Washington Metropolitan Area Transit Authority

METRIC/BRITISH SYSTEM EQUIVALENTS

1meter (m) = 3.2808 feet (ft)	1 foot (ft) = 0.3048 meters (m)
1 meter (m) = 0.0006 miles (mi)	1 mile (mi) = 1609.34 meters (m)
1 hectare (ha) = 2.471 acres (ac)	1 acre (ac) = 0.4047 hectares (ha)
1 cubic meter (m^3) = 1.308 cubic yard (yd^3)	1 cubic-yard (yd^3) = .76455 (m^3)
1 cubic meter (m^3) = .0008 acre-feet (ac-ft)	1 acre-feet (ac-ft) = 1233.49 (m^3)

APPENDIX D: REFERENCES

Census 2000 Summary File 3 (SF3), (The United States Bureau of the Census, August 2002)

Emission Facts, Idling Vehicle Emissions, Office of Mobile Sources, Air and Radiation, EPA, EPA420-F-98-014, April 1998, verified in conversation with Paul Bubbosh, EPA Office of Transportation and Air Quality, January 2, 2007

Environmental Assessment for GSFC Facilities Master Plan, (Goddard Space Flight Center, December 2002)

Environmental Assessment for GSFC Facilities Master Plan Space Science Building (Goddard Space Flight Center, February, 2004)

Facilities Masterplan Roadway Upgrades Project: Loop Road Study 100% Submittal (GSFC, March 22, 2006)

GSFC Evaluation of Explosives Storage Building 27B, (Goddard Space Flight Center, 1995)

GSFC Facilities Master Plan, (Goddard Space Flight Center, December 2002)

GSFC Integrated Contingency Plan, (Goddard Space Flight Center, June 2006)

GSFC Storm Water Pollution Prevention Plan, (Goddard Space Flight Center, April 2005)

GSFC Transportation Management Plan, (Goddard Space Flight Center, December 2002)

Letter from Elizabeth J. Cole, Maryland Department of Planning Maryland Historic Trust, to Ms. Lizabeth Montgomery, NASA Goddard Space Flight Center Environmental Engineer, dated August 8, 2006.

Letter from Elizabeth J. Cole, Maryland Department of Housing and Community Development, Division of Historical and Cultural Programs, to Mr. Kim Toufectis, NASA Goddard Space Flight Center, Facilities Management Division, dated August 12, 2002

Letter from Lori A. Bryne, Maryland Department of Natural Resources, Wildlife and Heritage Service, to Ms. Lizabeth Montgomery, NASA Goddard Space Flight Center Environmental Engineer, dated August 31, 2006.

*Maryland Stormwater Management Guidelines for State and Federal Projects, (*Maryland Department of the Environment, July 2001)

2000 Maryland Stormwater Design Manual, Volumes I&II (Maryland Department of the Environment, April 2000)

*Prince George's County General Plan, (*Maryland National Capital Park and Planning Commission, 2002)

Prince George's County Brief Economic Facts, (Maryland Department of Business and Economic Development. 2005-2006)

Roadway and Security Upgrades Stormwater Management Report, (Goddard Space Flight Center, December 2006)

Site Investigation Report - Land Fill B (GSFC, December 31, 2002)

SSB Siting Analysis and Report (Goddard Space Flight Center, December 31, 2002)

US Environmental Protection Agency Office of Air Quality Planning and Standards, 8-Hour Ground-level Ozone Designations Region 3, April 15, 2004
www.epa.gov/ozonedesignations/regions/regions3desig.htm

Wetlands and Waterway Report: Proposed Loop Road, (KCI Technologies, Inc., *August* 2006)