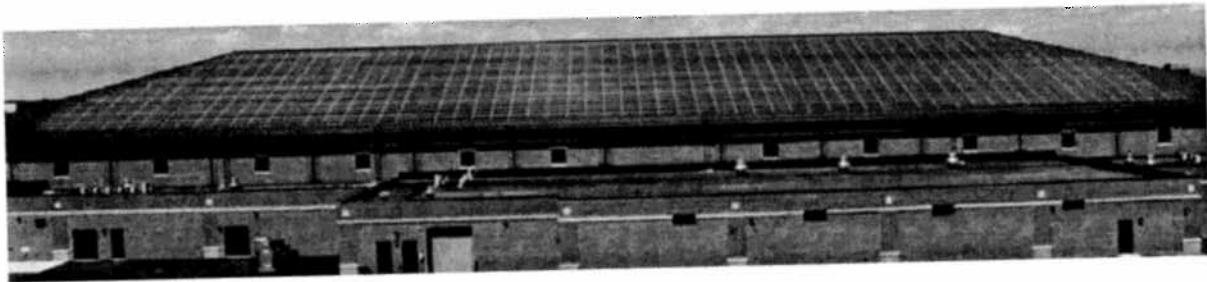


**EXHIBIT M**

**FINAL  
ENVIRONMENTAL ASSESSMENT**

**Solar Panel Systems at  
Joint Base McGuire-Dix-Lakehurst, New Jersey**



**MARCH 2012**

**Prepared by: EHS Technologies, Moorestown, NJ**

| <b>Report Documentation Page</b>   |                                    |                                     | <i>Form Approved<br/>OMB No. 0704-0188</i> |   |                                 |
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**Finding of No Significant Impact (FONSI)**  
**Environmental Assessment (EA)**  
**Solar Panel Systems at**  
**Joint Base McGuire-Dix-Lakehurst New Jersey**

**Purpose**

The purpose of the proposed action is to reduce the energy costs at Joint Base McGuire-Dix-Lakehurst (JB MDL) and comply with the Energy Policy Act of 2005 that requires the Federal Government to meet renewable energy goals and promotes a photovoltaic energy commercialization program for Federal buildings.

The U.S. Air Force has prepared this EA IAW the National Environmental Policy Act (NEPA); Council on Environmental Quality (CEQ) regulations implementing NEPA; and Title 32, Code of Federal Regulations, Part 989, as amended, "Environmental Impact Analysis Process" (EIAP).

**Proposed Action**

JB MDL proposes to establish seven solar panel systems across the McGuire and Lakehurst portions of JB MDL. There will be four roof systems and two ground-based systems on McGuire, and one ground-based system on Lakehurst.

**Description of the Alternatives**

Alternative 1 – Establish seven solar panel systems across JB MDL (Preferred Alternative).

JB MDL would use a competitive process to establish a Power Purchase Agreement (PPA) or similar instrument with a third party who would construct, operate, and maintain seven solar panel systems on JB MDL property. The property may be leased to the third-party (lessee) using the leasing authority of 10 USC 2667. PPAs allow Federal agencies to purchase electric utility service from on-site renewable energy projects. With a PPA, a developer installs a renewable energy system on agency property to provide electric utility service. The system is paid for through the sale of Renewable Energy Certificates, tax incentives, and the sale of electric energy. After installation, the developer owns, operates, and maintains the system for the life of the contract.

Two of the solar fields (Sites A and B, totaling 12.3 acres) would be located on the north side of Wrightstown-Cookstown Road on McGuire and one solar field (Site C, up to 28 acres) would be located east of Hangar 1 on Lakehurst. The solar fields would be fenced in accordance with National Electric Code requirements. Four buildings on McGuire (1757, 2202, 2503, and 3101) would contain up to 500,000 square feet of roof-top solar panels. Collectively the systems would provide about 14 megawatts (MW) of electric power or about 13,600 MW-hours annually. The design would comply with National Fire Protection Association (NFPA) requirements for building-mounted solar systems.

No Action Alternative

Under this alternative, JB MDL would not establish the seven solar panel systems as described under Alternative 1.

## **Summary of Anticipated Environmental Impacts Associated with the Proposed Action**

Based on the analysis in the EA, which is herewith incorporated by reference, I determine that no significant adverse effects are expected on any resource area as a result of the implementation of the proposed action. We would adhere to all installation management plans, policies and procedures. Furthermore, the project would adhere to several sustainable design and construction best management practices to minimize environmental impacts. During construction and operation, the proposed action would result in less than significant impacts to land use, air quality, noise, geology, water resources, biological resources, cultural resources, energy and infrastructure, materials and waste and safety. There would be long-term positive impacts on socioeconomics. Overall, the analysis in the EA indicates that the solar systems, as described under the proposed action, would not result in or contribute to significant adverse direct, indirect, or cumulative impacts to the resources in the region.

## **Public Review and Interagency and Intergovernmental Coordination Planning**

The Interagency and Intergovernmental Coordination for Environmental Planning process associated with the preparation of the EA was conducted during a 30 days, beginning 21 November 2011. The public and agency review of the draft EA and draft Finding of No Significant Impact was conducted between 3 February 2012 and 7 March 2012. Copies of these documents were available for public review at the Manchester Library, Ocean County and Pemberton Library, Burlington County. All public comments received were addressed in the final EA.

## **Finding of No Significant Impact**

The Air Force, JB MDL has determined that the Preferred Alternative is Alternative 1 and that JB MDL would proceed with a PPA for seven solar panel systems.

I conclude that the environmental effects of the Proposed Action at JB MDL are not significant, that preparation of an Environmental Impact Statement is unnecessary, and that a FONSI is appropriate. The EA, prepared IAW NEPA, CEQ regulations, and 32 Code of Federal Regulations 989 as amended, is herein incorporated by reference.



JOHN M WOOD, Colonel, USAF  
Commander



Date

Attachment: Environmental Assessment

Cover Photographs: (top) An 815,000 kilowatt solar roof installation at Fort Dix.  
(bottom) A 4-megawatt array in Vineland NJ (Vineland Solar One).

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## List of Acronyms

|                 |  |                 |   |
|-----------------|--|-----------------|---|
| AFI             | Air Force Instruction                            | MW              | Megawatt  |
| APZ             | Accident Potential Zone                          | MWh             | Megawatt-hour                                     |
| ATSDR           | Agency for Toxic Substances and Disease Registry | NAAQS           | National Ambient Air Quality Standards            |
| BMPs            | Best Management Practices                        | NEPA            | National Environmental Policy Act                 |
| BOMARC          | Boeing Michigan Aeronautical Research Center     | NFPA            | National Fire Protection Association              |
| CAA             | Clean Air Act                                    | NHPA            | National Historic Preservation Act                |
| CEA             | Classification Exception Area                    | NJ              | New Jersey  |
| CEQ             | Council on Environmental Quality                 | NJAC            | New Jersey Administrative Code                    |
| CFR             | Code of Federal Regulations                      | NJDEP           | New Jersey Department of Environmental Protection |
| CH <sub>4</sub> | Methane  | NJSA            | New Jersey Statutes Annotated                     |
| CMP             | Comprehensive Management Plan                    | NOA             | Notice of Availability                            |
| CO              | Carbon monoxide                                  | NOx             | Nitrogen oxides                                   |
| CO <sub>2</sub> | Carbon dioxide                                   | NRHP            | National Register of Historic Places              |
| CRM             | Cultural Resources Manager                       | PAH             | Petroleum Aromatic Hydrocarbons                   |
| DoD             | Department of Defense                            | PM              | Particulate matter                                |
| DRMO            | Defense Reutilization and Marketing Office       | PPA             | Power Purchase Agreement                          |
| EA              | Environmental Assessment                         | RI/FS           | Remedial Investigation /Feasibility Study         |
| EIS             | Environmental Impact Statement                   | RONA            | Record of Non-Applicability                       |
| EO              | Executive Order                                  | RPS             | Renewable Portfolio Standard                      |
| ESA             | Endangered Species Act                           | SAGE            | Semi-Automatic Ground Environment Complex         |
| FAA             | Federal Aviation Administration                  | sf              | Square feet                                       |
| FONSI           | Finding of No Significant Impact                 | SHPO            | State Historic Preservation Office                |
| g               | Gram   | SIP             | State Implementation Plan                         |
| GSF             | Gross square feet                                | SO <sub>2</sub> | Sulfur dioxide                                    |
| GPU             | General Public Utilities                         | SREC            | Solar Renewable Energy Certificate                |
| HAZMART         | Hazardous Material Control Program               | SVOC            | Semi-volatile organic compound                    |
| HP              | Horsepower                                       | tpy             | Tons per year                                     |
| ICRMP           | Integrated Cultural Resources Management Plan    | USEPA           | United States Environmental Protection Agency     |
| INRMP           | Integrated Natural Resources Management Plan     | USFWS           | United States Fish and Wildlife Service           |
| IR              | Installation Restoration                         | USC             | United States Code                                |
| JB MDL          | Joint Base McGuire-Dix-Lakehurst                 | USGS            | United States Geologic Survey                     |
| kW              | Kilowatt   | UST             | Underground storage tank                          |
| kWh             | Kilowatt-hour                                    | VOC             | Volatile Organic Compound                         |
| LTA             | Lighter-Than-Air                                 |                 |   |
| MMBTU           | Million British Thermal Units                    |                 |   |

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# 1. PURPOSE AND NEED FOR THE PROPOSED ACTION

## 1.1 Introduction

JB MDL proposes to establish seven solar panel systems across the McGuire and Lakehurst portions of JB MDL (Figure 1-1). There would be four roof systems and two ground-based systems on McGuire, and one ground-based system on Lakehurst. This Environmental Assessment addresses the potential environmental, socioeconomic, and cultural impacts of this proposal at JB MDL.

This Environmental Assessment (EA) has been prepared to document the potential for environmental impacts resulting from the installation and operation of solar systems on JB MDL. This EA has been prepared under the provisions of, and in accordance with, the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321 *et seq.*), Council of Environmental Quality [CEQ] Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR 989 (*Air Force Environmental Impacts Analysis Process*).

## 1.2 Purpose and Need

The Proposed Action is needed to reduce the energy costs at JB MDL and to comply with the Energy Policy Act of 2005, 42 USC 13201 *et seq.*, that requires the Federal Government to meet renewable energy goals and promotes a photovoltaic energy commercialization program for Federal buildings.

## 1.3 Scope and Content of the Environmental Assessment

This Environmental Assessment evaluates the individual and cumulative effects of the alternatives with respect to land use, air quality, topography and soils, water resources, biological resources, cultural resources, socioeconomics, energy and infrastructure, materials/waste, and human health and safety.

## 1.4 Decisions to be Made

JB MDL will decide on the whether to enter into a Power Purchase Agreement (PPA) with a third party who would install and maintain solar panel systems in the areas identified in this EA. JB MDL will decide on the duration, terms and conditions of the lease and PPA, and over time continually reassess the agreement's effectiveness, costs, and benefits.

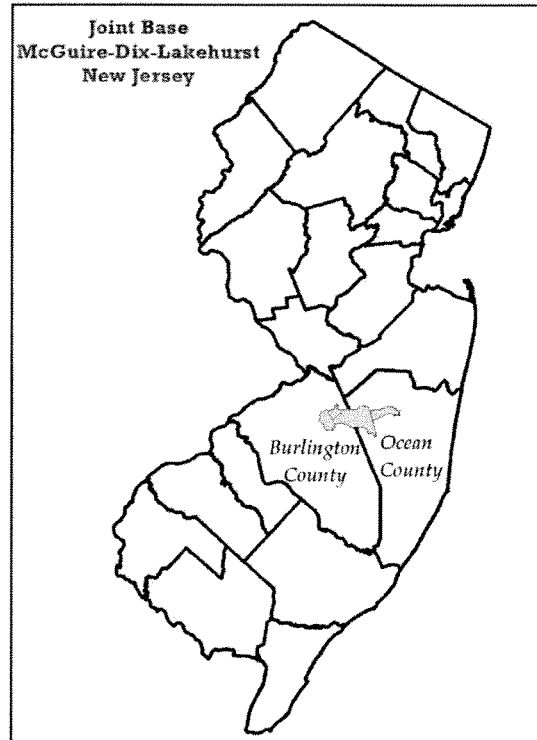


Figure 1-1. Location of JB MDL

## 1.5 Interagency Coordination and Public Involvement

Public participation is a significant component of the NEPA process. The following provides a listing of key public notification and participation events that have and will occur as part of this environmental review process:

- JB MDL conducted intergovernmental and tribal<sup>1</sup> coordination for environmental planning pursuant to the requirements of NEPA as required under Executive Order (EO) 12372, which has since been superseded by EO 12416 – *Intergovernmental Review of Federal Programs*, and subsequently supplemented by EO 13132. The Draft EA provides a list of agencies and tribes contacted during initial scoping (Chapter 9). Appropriate consultation will also be conducted with the NJ Pinelands Commission. Copies of the letters received from the respective agencies and tribes are included in **Appendix A**.
- The project sites are located in previously disturbed areas that are unlikely to contain archeological sites; however, if sites are discovered, JB MDL would cease all disturbance activity, secure the site(s) and contact the JB MDL Cultural Resources Manager (CRM). The CRM will take necessary actions pursuant to the JB MDL Integrated Cultural Resources Management Plan (ICRMP).
- JB MDL published and distributed the Draft EA and Draft Finding of No Significant Impact (FONSI) for a 30-day public comment period between February 3, 2012 and March 7, 2012. The mailing list for the Draft EA is provided in Chapter 10. Notification of the availability of the Draft EA and FONSI has been accomplished through publication of a legal Notice of Availability (NOA) in the *Asbury Park Press* and the *Burlington County Times*, the local newspapers that service the JB MDL region. Upon distribution of the Draft EA to the public, copies of the Draft EA and important reference documents were made available for public review at the Manchester Branch of the Ocean County Library and the Pemberton Branch of the Burlington County Library. The JB MDL Public Affairs Officer is the primary point of contact for any inquiries from the local news media.
- JB MDL received responses and/or comment letters from all interested parties in association with the public circulation of the Draft EA. Copies of received responses/comments on the Draft EA, as well as responses to these comments, are provided in **Appendix D**.

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<sup>1</sup> Informal coordination letters were sent to three federally-recognized Native American tribes to notify them of the project and determine their potential level of interest. If any tribe expresses concern about the project, formal consultation procedures would be initiated pursuant to the tribe's wishes.

## 2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

### 2.1 Proposed Action

JB MDL proposes to reduce its energy costs and increase its use of renewable energy in accordance with the Energy Policy Act of 2005 by establishing solar panel systems across the base.

### 2.2 Alternatives

This EA evaluates the individual and cumulative effects of the following alternatives with respect to land use, air quality, topography and soils, water resources, biological resources, cultural resources, socioeconomics, infrastructure, materials and waste, and human health and safety.

#### 2.2.1 Alternative 1 – Establish seven solar panel systems across JB MDL (Preferred Alternative).

JB MDL would use a competitive process to establish a PPA or similar instrument with a third party who would construct, operate, and maintain seven solar panel systems on JB MDL property. The property may be leased to the third-party (lessee) using the leasing authority of 10 USC 2667. PPAs allow Federal agencies to purchase electric utility service from on-site renewable energy projects. With a PPA, a developer installs a renewable energy system on agency property to provide electric utility service. The system is paid for through the sale of Renewable Energy Certificates, tax incentives, and the sale of electric energy. After installation, the developer owns, operates, and maintains the system for the life of the contract.

Two of the solar fields (Sites A and B, totaling 12.3 acres) would be located on the north side of Wrightstown-Cookstown Road on McGuire (Figure 2-1) and one solar field (Site C, up to 28 acres) would be located east of Hangar 1 on Lakehurst (Figure 2-2). The solar fields would be fenced in accordance with National Electric Code requirements. Four buildings on McGuire (1757, 2202, 2503, and 3101) would contain up to 500,000 square feet of roof-top solar panels (Figure 2-1). Collectively the systems would provide about 14 megawatts (MW) of electric power or about 13,600 MW-hours (MWh) annually. The design would comply with National Fire Protection Association (NFPA) requirements for building-mounted solar systems (Section 3.11.1). The proposed systems<sup>2</sup> are summarized below:

- Site A, McGuire, 1330 kilowatts (kW) (1,250 MWh/year) on 4.3 acres;
- Site B, McGuire, 2465 kW (2,325 MWh/year) on 8 acres;
- Site C, Lakehurst, 7390 kW (7,230 MWh/year) on 28 acres;
- Building 3101 (warehouse), McGuire, 1350 kW (1,275 MWh/year), rooftop;
- Building 2504 (gym), McGuire, 395 kW (371 MWh/year), rooftop;
- Building 1757 (freight terminal), McGuire, 845 kW (797 MWh/year), rooftop;
- Building 2202 (mobility readiness center), McGuire, 400 kW (376 MWh/year), rooftop.

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<sup>2</sup> System energy output was estimated for analysis purposes in this EA using Roofray.com© assuming the effective area would be reduced somewhat based on NFPA requirements. The actual electricity produced by the systems would depend on the design and efficiency of the systems and could be greater or less than listed here.

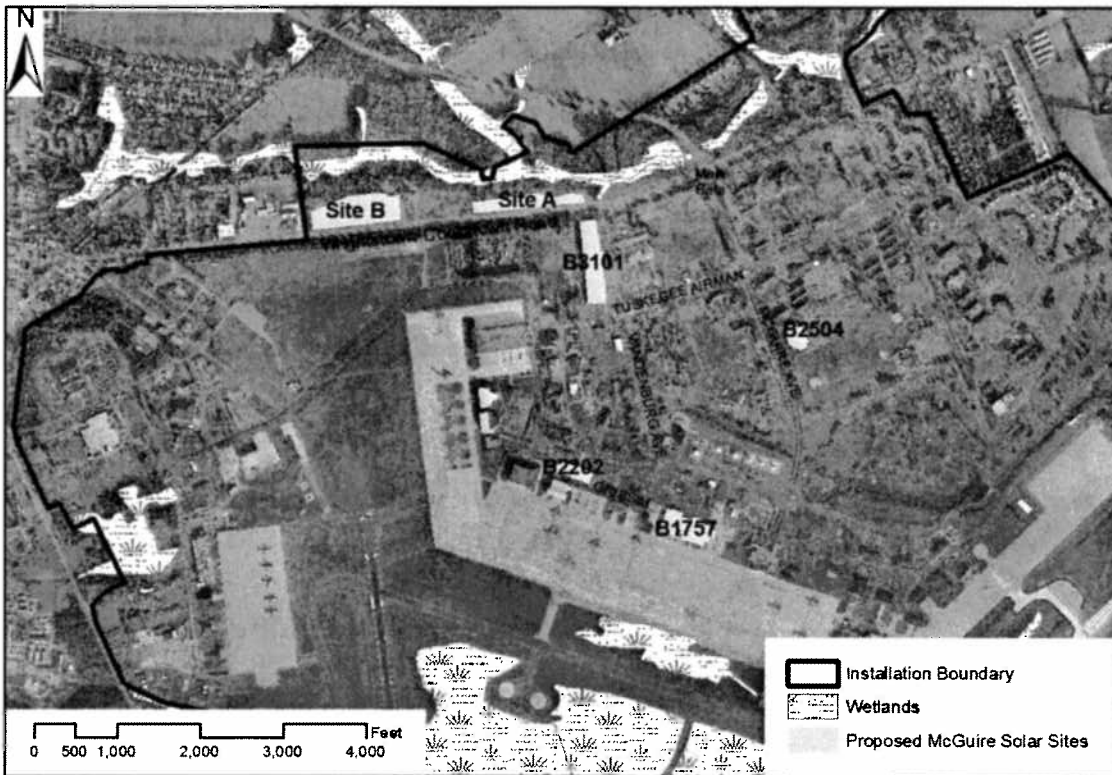


Figure 2-1. Proposed Solar Sites on McGuire.



Figure 2-2. Proposed Solar Field on Lakehurst (Site C).

### **2.2.2 Alternative 2 – No Action Alternative.**

As required under NEPA and 32 CFR 989, the No Action Alternative (Alternative 2) is retained in this EA for comparative analysis. Under this alternative, JB MDL would not establish the seven solar panel systems as described under Alternative 1.

### **2.2.3 Reasonable Selection Standards**

JB MDL developed the Proposed Action to meet reasonable selection standards that include:

- Installing systems on land that is not mission essential. This includes areas that are under-utilized or that are not suitable for other intensive uses, such as past-contaminated sites or areas incompatible with occupied facilities like aircraft accident potential zones<sup>3</sup> (APZs).
- Installing systems in close proximity to electrical substations. By avoiding long transmission lines from the solar panels to their point of tie-in to the base electrical system, energy transmission losses would be minimized.
- Installing roof-top systems on buildings with newer metal standing-seam roofs. This type of roofing allows the panels to clamp onto the roof seams so that no fasteners would penetrate the roofs, avoiding the potential for roof leaks.
- Avoiding adverse effects (direct or indirect) to properties on, or eligible for listing on, the National Register of Historic Places. To reduce potential for adverse aesthetic or structural impacts to historic properties, JB MDL ruled out the installation of solar panels on or in close proximity to historic properties identified by the base Integrated Cultural Resource Management Plan.
- Avoiding adverse effects to wildlife habitat, wetlands, or floodplains. To reduce potential adverse impacts to Federal or State-listed threatened or endangered species, areas known to support these species would not be appropriate for solar panel systems. Furthermore, areas containing wetlands or in 100-year floodplains were avoided.

### **2.2.4 Sustainable Operations and Best Management Practices**

To minimize impacts on the environment, JB MDL would incorporate the following sustainable operation elements and construction best management practices (BMPs) into the lease agreement as part of the implementation of the Proposed Action:

- The Lessee would design a stormwater management system in accordance with New Jersey Administrative Code (N.J.A.C.) 7:8-1.1, et seq. and submit stormwater management designs and plans for certification by the appropriate soil district and obtain authorization under the New Jersey Department of Environmental Protection (NJDEP) general permit to discharge stormwater associated with a construction activity for Sites A, B, and C.
- Ground disturbance for the project would not occur within 150 feet of wetlands.
- A site-specific construction and operation health and safety plan would be provided by the Lessee, and approved by JB MDL, prior to the initiation of work on JB MDL.
- A Digging Permit would be required prior to any subsurface disturbance. New buried electric lines for the project would be routed away from known Installation Restoration (IR) sites with soil contamination on JB MDL.

---

<sup>3</sup> Accident potential zones are areas beyond the clear zone of a runway that have significant or measurable potential for aircraft accidents. For this reason, development should be restricted to certain types of land uses and densities. For example, residential development, educational facilities and medical facilities are considered incompatible and are strongly discouraged in APZs (DODI 4165.57).

- Visual screening of field-based solar fields would be provided where they would intrude on viewsheds of off-base businesses or residences. A vegetation screen of two rows of white pine trees would be planted between Site C and Hangar 1 to address indirect adverse effects on this National Historic Landmark based on a recommendation by SHPO.
- If archeological sites or cultural artifacts are inadvertently discovered during ground disturbing activities or normal operations at the solar sites, JB MDL would cease all disturbance activity, secure the site(s) and contact the JB MDL Cultural Resources Manager (CRM). The CRM would take necessary actions pursuant to the base ICRMP.
- Tree cutting for solar field installation(s) would be conducted outside the migratory bird breeding season of March 15 through July 31.
- The JB MDL Natural Resources Manager would periodically monitor the site during land clearing operations for the presence of special status species, particularly the Northern Pine Snake. If any are discovered, construction personnel would be required to contact the Natural Resources Manager at 732-323-2911. The Natural Resources Manager would attempt to capture and relocate them to other suitable habitat on the base.
- JB MDL would seek bids for the forest products removed from the site in accordance with 10 USC 2665 and Air Force Instruction (AFI) 32-7064 (Air Force, 2004), and the proceeds deposited into the AF Forestry Account.
- Nests that birds may establish in and around the panels would be removed outside the migratory bird breeding season.
- Areas underneath and around the ground-based panels would be re-planted with native grasses after the panels are installed to promote water infiltration and increase grassland habitat. The Lessee would develop a site-specific vegetation maintenance plan and Integrated Pest Management Plan that includes measures to minimize the use of pesticides and herbicides and measures to discourage the establishment of invasive plant species.
- In the event of a hazardous material or petroleum spill, the system operator would immediately contact the base Dispatch Office at 911 or 609-754-2001 on McGuire and 732-323-4000 on Lakehurst in accordance with base spill response policy.
- Cleaning products used on the solar panels must be non-toxic, phosphate-free, pH neutral, and biodegradable. The cleaning products and method of cleaning must be pre-approved by JB MDL 87th Civil Engineer Squadron, Asset Management (CES/CEA).
- To reduce the potential for spills during operation, the system operator would:
  - Inspect equipment and vehicles for leaks daily.
  - Store hazardous materials and wastes in a manner that provides secondary containment in the event of a spill.
- Inverters and transformers would be located away from occupied buildings so any potential associated high-frequency noise would not cause annoyance.
- The lessee would design the solar systems to prevent harmful glare to aircraft pilots and tower personnel. This could require use of less reflective panel materials and painting of metal solar panel frames with a matte black finish.
- The lessee would be required to remove the panels and restore ground-based sites to their original condition within 12 months of cessation of utilization in accordance



with the Pinelands Comprehensive Management Plan (CMP) (N.J.A.C. 7-50-5:36(a)4i through iii).

- To avoid potential traffic safety hazards, the lessee and its agents would not be allowed to park vehicles on, or off-load equipment from, public roads (e.g., Wrightstown-Cookstown Road).
- All systems would be metered to ensure the Government received the amount of electricity paid for and to ensure that applicable Solar Renewable Energy Certificates (SRECs) are based on accurate measurements.

### **2.3 Alternatives Considered but Eliminated from Further Study**

The following alternatives were considered, but were eliminated from further study based on the reasonable selection standards in Section 2.2 and the reasons cited below:

- Purchase renewable power from an off-site entity. While feasible, the Energy Policy Act of 2005 establishes a double credit bonus for Federal agencies if renewable energy is produced on-site at a Federal facility, on Federal lands, or on Native American lands. Therefore, JB MDL is seeking to promote on-site renewable energy generation as its primary strategy. It is important to note that the Proposed Action does not preclude the base from purchasing renewable energy in the future from other sources or installing additional systems to further the base's energy goals.
- Install only roof-top systems. This alternative is also feasible, but would result in a multitude of very small systems to achieve the same amount of energy generation as the Proposed Action, causing inefficiencies and higher costs associated with system installation and maintenance.
- Install only ground-based systems. This alternative is also feasible but would not take advantage of nearly half a million square feet of available space across some of the larger roofs on the McGuire portion of JB MDL.
- Install roof-top systems on the large hangars on Lakehurst. This alternative is feasible but may result in adverse impacts to the historic qualities of the hangars in the eligible Lighter-Than-Air historic district.
- Install additional ground-based systems on Dix or other locations at JB MDL. This alternative is feasible but would likely compromise existing missions/land uses at the base, or locate solar fields in remote and inefficient locations relative to the existing electrical distribution systems on JB MDL. JB MDL is in the process of creating a Joint Base Master Plan. In the future, if missions or land uses change, there could be further opportunity to install additional ground-based systems.

The NJDEP Division of Fish and Wildlife and USFWS requested that the EA examine rooftop systems, parking lot roofs, and unforested land options as alternatives to the proposed Site C tree clearing (see Appendix A). Based on the location of the primary Lakehurst substation, rooftop and parking lot systems would likely have adverse indirect effects on the eligible Lighter-Than-Air (LTA) Historic District. Other open space in the area is considered high quality grassland habitat. The location of Site C would remove trees, but these provide relatively low-quality habitat that has been subject to tip blight in recent years (see Section 3.6.3.3). Site C provided the closest area to the substation with the least potential environmental and cultural resource impacts.

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## 3. AFFECTED ENVIRONMENT

### 3.1 General Overview

This section specifically describes current baseline environmental, cultural, and socioeconomic conditions of JB MDL. The potential direct, indirect, and cumulative effects of the Proposed Action components and alternatives on each of the resources are addressed in Section 4.

#### 3.1.1 Project Location

The project study areas are located in JB MDL, surrounded by Burlington and Ocean Counties, NJ, in the central part of the State. JB MDL is located within the Pinelands National Reserve, also referred to as the Pinelands. This reserve consists of approximately 1.1 million acres in southern NJ, managed by the NJ Pinelands Commission. The Pinelands National Reserve includes portions of seven counties, including: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Ocean.

The study areas include two land parcels on the McGuire portion of JB MDL, along Wrightstown-Cookstown Road, four buildings on McGuire, and a 28-acre parcel east of Hangar 1 on Lakehurst.

For reference purposes in this EA, the parcels will be referred to by their letter designations in Figures 2-1 and 2-2. Buildings will be referred to by their building number.

#### 3.1.2 Scope of Affected Environment

This EA evaluates the individual and cumulative effects of the following alternatives with respect to land use, air quality, topography and soils, water resources, biological resources, cultural resources, socioeconomics, infrastructure, materials and waste, and health and safety. The Proposed Action of installing solar panels would, once operational, be environmentally benign and would not pose issues of Environmental Justice. Similarly the installed systems would not produce high noise levels that would be a concern to receptors. The systems would passively provide power with little system maintenance required, resulting in little impact to base population, transportation, and traffic. As there would be negligible impacts associated with Environmental Justice, noise, and traffic, these resources are not further analyzed in this EA.

### 3.2 Land Use

In the NJ Pinelands, specific areas have been designated for environmental protection, forestry, and agriculture, with growth being directed and encouraged in and around areas capable of accommodating further development. The Pinelands Comprehensive Management Plan zones JB MDL as "Military and Federal Installation Area" (Figure 3-1) defined as Federal enclaves within the Pinelands. Permitted uses are those associated with function of the installation or other public purpose uses (NJ Pinelands, 2011a).

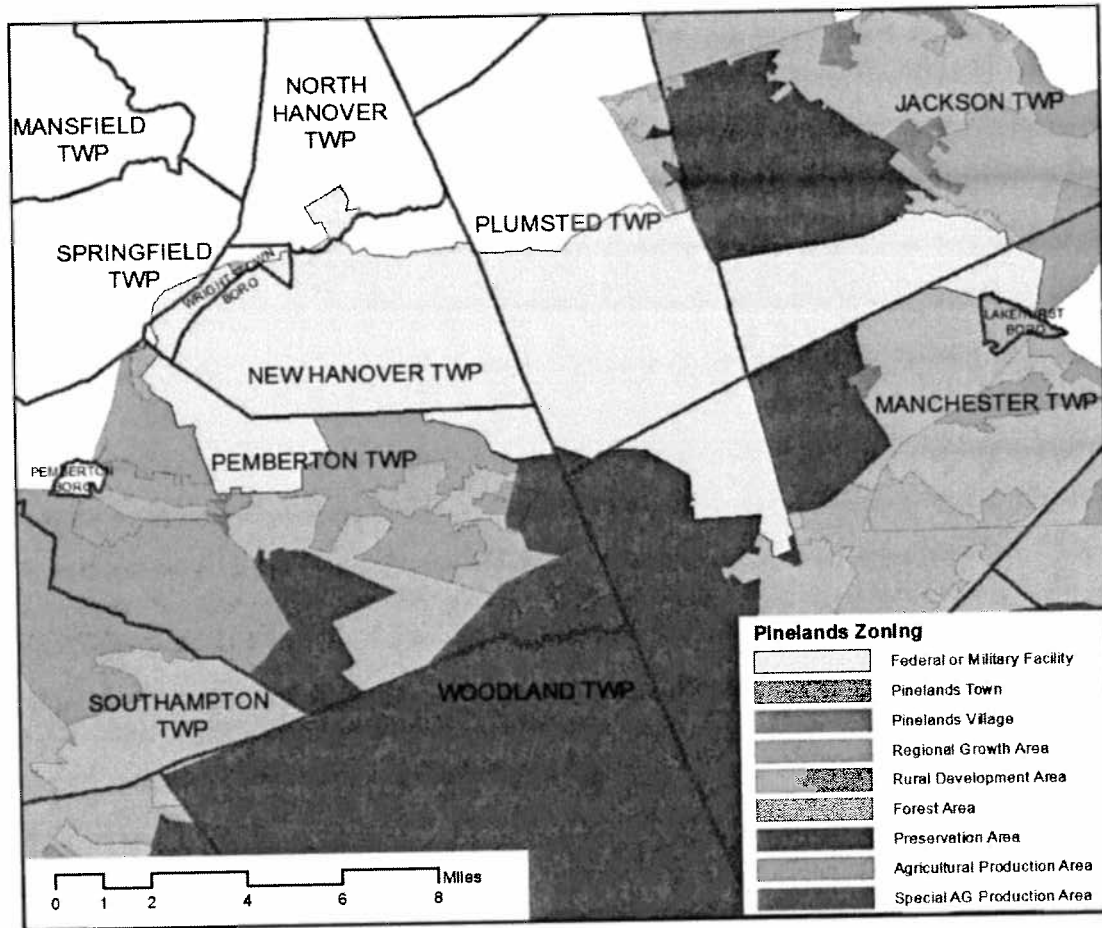


Figure 3-1. Pinelands Zoning

Table 3-1 lists the past, present and planned land uses of the proposed solar sites.

Table 3-1. Land Use of Study Areas

| Location      | Description   | Former Use(s)  | Current Use   | Future Use   |
|---------------|---|--|---|--|
| Site A        | 4.3 acre parcel along Wrightstown-Cookstown Road.                 | Farming prior to 1940; Open Space; Adjacent to former Defense Reutilization and Marketing Office (DRMO). | Open Space  | Area designated as Open Space. Area is located in APZ I for runway 18-36.      |
| Site B        | 8 acre parcel along Wrightstown-Cookstown Road.                   | Farming prior to 1940; Open space; Adjacent to former base landfill and skeet range.                     | Open Space; Located in a runway Accident Potential Zone.              | Area designated as Open Space. Area is located in APZ I for runway 18-36.      |
| Site C        | 28 acre parcel east of Hangar 1 and west of Route 547, Lakehurst. | Field of several railroad spurs on the east entrance of Hangar 1 from 1921 to late 1940s.                | Forested. Zones as Open Space. Recreational trail surrounds the site. | Area designated as Aircraft Operations and Maintenance or Industrial land use. |
| Building 1757 | Freight terminal and support facility built in 2005.              | None   | Freight terminal  | Same as current. Area designated for Airfield Operations.                      |

| Location      | Description  | Former Use(s)                                    | Current Use   | Future Use  |
|---------------|--|--|---|---|
| Building 2202 | Mobility readiness, flight management, and crew controller facility built in 2006. | None   | Mobility Readiness  | Same as current. Area designated for Airfield Operations.         |
| Building 2504 | Gym, constructed in 2004. <sup>4</sup>   | Built on site of former gym constructed in 1957. | Gym and resale outlet.  | Same as current. Area designated for Community Support functions. |
| Building 3101 | Base warehouse, constructed in 1954.   | Same as present.                                 | Packing and crating; base contracting; base supply; storage and administrative. | Same as current. Area designated for Base Support functions.      |

### 3.2.1 Surrounding Off-Base Land Uses

Site A is located near the northern border of JB MDL, surrounded by forest and open space to the east, north, and west and by Wrightstown-Cookstown Road and other portions of JB MDL to the south.

Site B is located near the northern border of JB MDL, adjacent to the Days Inn hotel on Wrightstown-Cookstown Road. Other major businesses that would be within 1,000 feet of Site B along this road include Dunkin Donuts, Dollar General, and Thunderbird Bowling Lanes.

Site C is located along the eastern border of JB MDL, adjacent to Route 547. To the east of Route 547 is the River Pointe retirement community, consisting of single family homes and undeveloped vacant housing lots.

## 3.3 Air Quality

### 3.3.1 Ambient Air Quality

Ambient air quality in an area can be characterized in terms of whether or not it complies with the primary and secondary National Ambient Air Quality Standards (NAAQS). The Clean Air Act (CAA) requires the USEPA to set NAAQS for pollutants considered harmful to public health and the environment.

NAAQS are provided for six principal pollutants, called criteria pollutants (as listed under Section 108 of the CAA), including the following: carbon monoxide (CO), lead, nitrogen oxides (NOx), ozone, particulate matter (PM), and sulfur dioxide (SO<sub>2</sub>).

Each state and locality has the primary responsibility for air pollution prevention and control. The CAA requires each state to promulgate a State Implementation Plan (SIP) that provides for implementation, maintenance, and enforcement of the NAAQS in each Air Quality Control Region in the state. In addition, the CAA allows states to adopt air quality standards more stringent than the Federal standards. Regions that comply with the standards are designated as attainment areas. In areas where the applicable NAAQS are not being met, a non-attainment status is designated (USEPA, 2007).

<sup>4</sup> Building 2504 was originally constructed in 1957. During the 2004 renovation, the entire building, with the exception of a 1998 basketball court addition, was demolished and replaced with new structure (Lyman, 2011).

NJ's location along the northeast corridor between the major metropolitan centers of Boston and Washington, D.C., places NJ at the epicenter of pollutants transported from other states. In addition, westerly winds from the Ohio River Valley and nighttime reservoirs of pollutants from southern States along the Appalachian Mountain Range have been shown to contribute to high ozone and fine particulate concentrations in NJ (NJDEP, 2010). Currently, the entire State of NJ does not meet the NAAQS for ozone and is classified as moderate non-attainment for ozone.

Atmospheric ozone occurs when NOx, CO and Volatile Organic Compounds (VOCs) react in the atmosphere in the presence of sunlight (a photochemical reaction). NOx and VOCs are called ozone precursors and are regulated as a means of controlling ozone production. Motor vehicle exhaust, industrial emissions, and chemical solvents are the major anthropogenic sources of these chemicals.

The October 29, 2007 NJ SIP established general conformity budgets for McGuire AFB and Lakehurst for VOCs and NOx. These proposed budgets were established to provide the bases the operational flexibility to meet their missions and future missions of the DoD. These proposed budgets were approved by EPA under 40 CFR 52.1582(m)(5). The 2011 general conformity budget for Lakehurst is 129 tons per year (tpy) of VOC and 793 tpy of NOx. The 2011 budget for McGuire is 703 tpy of VOC and 1,534 tpy of NOx (NJDEP, 2007). There is no specific SIP budget for the former Fort Dix area.

### 3.3.2 General Conformity Rule

The General Conformity Provision of the CAA (42 USC 7401 *et seq.*; 40 CFR 50-87) Section 176(c), including the USEPA's implementation mechanism, the General Conformity Rule (40 CFR 51, Subpart W), requires Federal agencies to prepare written Conformity Determinations for Federal actions in or affecting NAAQS non-attainment areas or maintenance areas. Since Burlington and Ocean Counties are currently in non-attainment status for ozone, the procedural requirements of the General Conformity Rule are in effect for the Proposed Action. Air emissions associated with the proposed action would occur during the site preparation and construction phase. Once the systems are operational, there would be no emissions except from maintenance worker vehicles. A Conformity Rule Compliance analysis is provided in Appendix B.

### 3.3.3 NJ Electric Power Emissions

The majority of NJ electricity comes from nuclear, followed by natural gas, coal, and biomass (see Section 3.9). From the EPA eGrid database and reported 2010 emissions from NJ power generators, the Table 3-2 provides the emissions per MWh of these sources<sup>5</sup>.

Table 3-2. Emissions from NJ Electricity Sources

|  | Natural Gas | Coal       | Biomass   |
|--|-------------|------------|-----------|
| Total MWh <sup>1</sup>                                     | 62,940,179  | 10,622,424 | 1,311,448 |
| Total NOx, tons <sup>1</sup>                               | 22,884      | 12,635     | 7,482     |
| Total SO <sub>2</sub> , tons <sup>1</sup>                  | 83,493      | 62,298     | 20,949    |
| Total Carbon Dioxide (CO <sub>2</sub> ), tons <sup>1</sup> | 21,937,504  | 11,523,898 | 1,553,143 |
| Total Methane (CH <sub>4</sub> ), lbs <sup>1</sup>         | 1,496,957   | 267,331    | 763,521   |

<sup>5</sup> For purposes of analysis, it is assumed that JB MDL receives its electricity from only in-state sources.

|                          | By Individual Source |         |         | NJ Mix of Energy <sup>2</sup> |
|--------------------------|----------------------|---------|---------|-------------------------------|
|                          | Natural Gas          | Coal    | Biomass |                               |
| Lbs NOx/MWh              | 0.73                 | 2.38    | 11.41   | 0.62                          |
| Lbs SO <sub>2</sub> /MWh | 2.65                 | 11.73   | 31.95   | 2.38                          |
| Lbs CO <sub>2</sub> /MWh | 697.09               | 2169.73 | 2368.59 | 455.65                        |
| Lbs CH <sub>4</sub> /MWh | 0.02                 | 0.03    | 0.58    | 0.02                          |

<sup>1</sup> Source: USEPA, 2010. Nuclear, solar and wind sources result in negligible air emissions.

<sup>2</sup> Based on the percentages in Figure 3-11.

### 3.4 Topography and Soils

Sites A, B, and C have fairly level topography. Soil types vary across JB MDL. The McGuire area is at the northern boundary of the NJ Pinelands and its soils are more similar to fertile farmland soils found in central NJ. The Lakehurst soils are more sandy and more typical of NJ Pine Barrens soils. Table 3-3 lists the soil types found at the proposed ground-based solar sites.

Table 3-3. Soil Types

| Location | Soil Type 1                                 | Description   |
|----------|---|---|
| Site A   | ConA - Collington Loam 0-2% slopes          | Consists of well-drained loamy soils, formed by marine deposits. Native vegetation is a hardwood forest that consists of red oak, yellow poplar, hickory, ash, and beech with an understory of viburnums. These soils have a high available water capacity and moderate organic-matter content. This soil is well suited to all crops grown in the area and requires no special management. This soil is considered Prime Farmland in NJ. |
| Site B   | ConA - Collington Loam 0-2% slopes          | See above.  |
|          | AdmA – Adelphia fine sandy loam 0-2% slopes | Moderately slow to moderate permeability. High or moderately high water capacity. Organic matter content is moderate and natural fertility is moderately high. Soils are strongly acid. Subsurface drainage is needed to make this soil suited to crops. Land with soil type Adelphia fine sandy loam is considered Prime Farmland in NJ.   |
| Site C   | DocB – Downer loamy sand 0-5% slopes        | Downer loamy sand, 0-5 percent is characterized as nearly level to gently sloping, well-drained soil. Downer loamy sand has a low to moderate available water capacity, and the permeability of this soil is moderate or moderately rapid. Downer loamy sand has a slight water erosion hazard and a severe wind erosion hazard. Runoff is slow. This soil is generally suitable for most urban uses. This soil is not Prime Farmland.    |

Sources: USDA, 1980; USDA, 1987

### 3.5 Water Resources

#### 3.5.1 Regulatory Framework

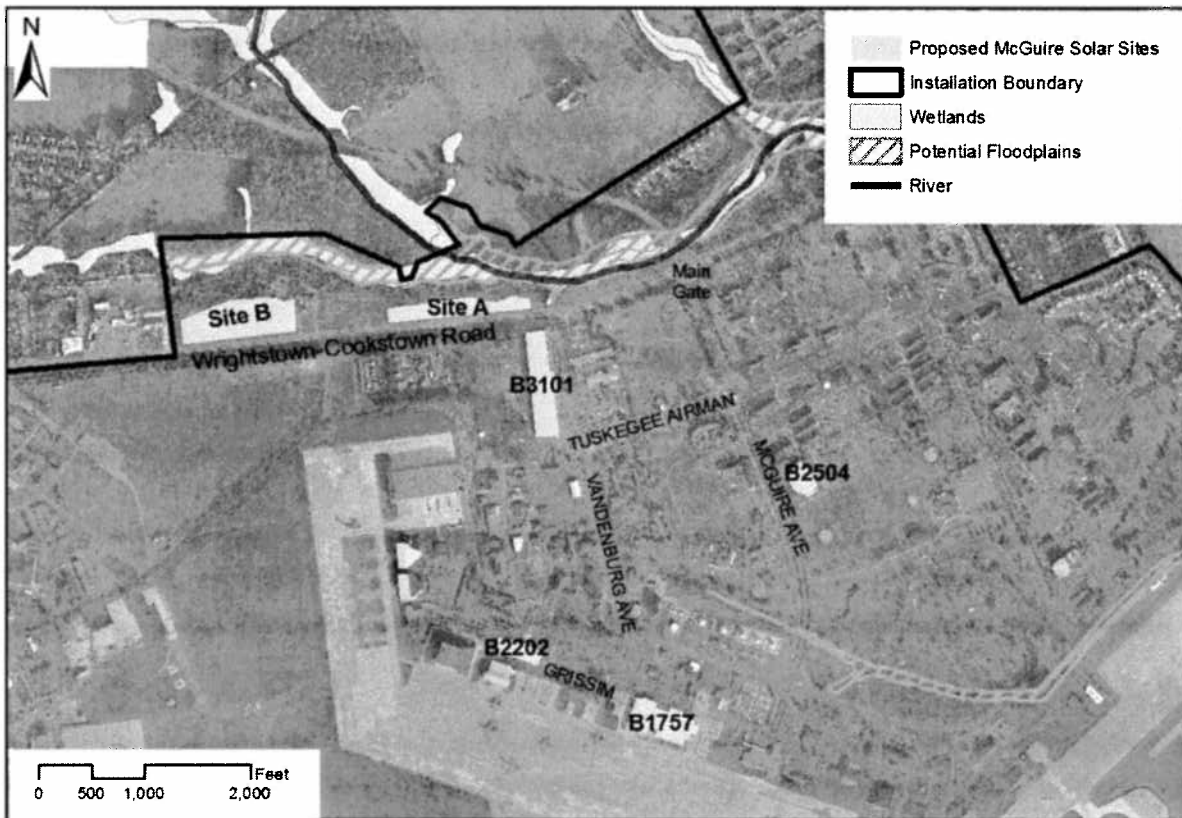
Water resources at JB MDL are also regulated under Federal Clean Water Act under the jurisdiction of the NJDEP. NJDEP has the primary responsibility for protecting NJ's surface and ground waters from pollution caused by improperly treated wastewater and its residuals, as well as destruction of watersheds from development.

### 3.5.2 Surface Water Resources

The North Run stream is located north of Sites A and B (Figure 3-2). Site C is located over 1,800 feet from the nearest water body. Table 3-4 provides a summary of surface water near the study areas.

**Table 3-4. Surface Water Resources near the Study Areas**

| Location | Description   | Name of closest water body | Distance to Closest Water Body/ Wetland | Watershed                          |
|----------|---|----------------------------|---|------------------------------------|
| Site A   | 4.3 acre parcel along Wrightstown-Cookstown Road,                 | North Run (stream)         | 150-200 feet (varies)                   | Crosswicks Creek Watershed         |
| Site B   | 8 acre parcel along Wrightstown-Cookstown Road                    | North Run (stream)         | 315-430 feet (varies)                   | Crosswicks Creek Watershed         |
| Site C   | 28 acre parcel east of Hangar 1 and west of Route 547, Lakehurst. | Ridgeway Branch            | 1800 feet                               | Union/Ridgeway Branch (Toms River) |



**Figure 3-2. Surface Water and Potential Floodplains on McGuire**

### 3.5.3 Floodplains

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. These areas can be subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, frequency of precipitation events, and size of the watershed above the floodplain. A 100-year floodplain is an area that has a 1



percent chance of inundation by a flood event in a given year. Federal, state and local regulations often limit floodplain development to passive uses to reduce risks to human health and safety.

The Federal Emergency Management Agency Flood Insurance Maps do not provide information on the presence of 100- or 500-year floodplains on McGuire. McGuire identified potential flood zones based on underlying soil characteristics and the presence of water bodies and wetlands. These include areas along the North Run stream (See Figure 3-2).

Site C on Lakehurst would be over a quarter-mile from the closest floodplain.

### 3.5.4 Groundwater

#### 3.5.4.1 Sites A and B

The near-surface formations at Sites A and B include the Cohansey/Kirkwood formation, underlined by the Vincentown formation. These formations are generally 50 feet thick and are underlined by the Hornerstown formation, a clay confining unit. Depth to water ranges from 8-15 below ground surface and flows to the northeast with a downward gradient. There is potential groundwater discharge to surface water in North Run.

There is known groundwater contamination associated with former base landfill (LF-03), located north and east of Site B, and north of Site A. This landfill operated from 1950, possibly into the 1960's. Base generated waste, possibly including drums of waste oil and miscellaneous industrial chemicals were placed in the landfill. Initial groundwater sampling results indicate the presence of chlorinated solvents and gasoline compounds at depths ranging between 18 and 55 feet with levels less than 200 parts per billion of total volatile organic compounds. Groundwater flow is to the northeast, toward the North Run (Figure 3-3).

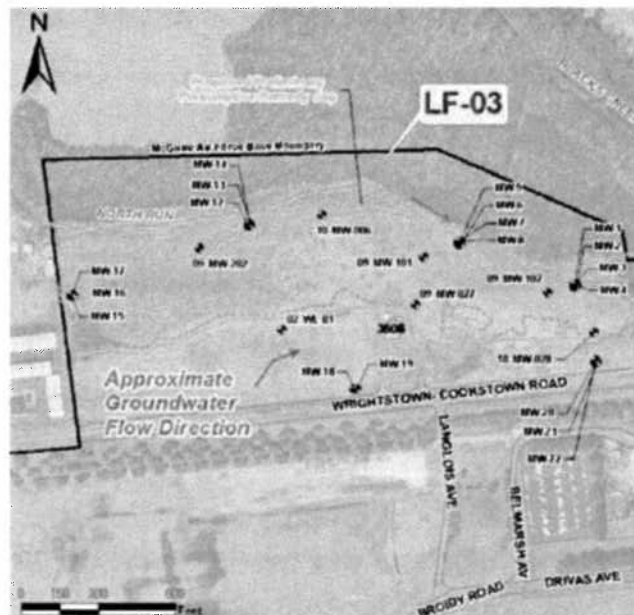


Figure 3-3. Former Landfill (LF-03) on McGuire.

The landfill site is undergoing a remedial investigation and the proposed remedy for groundwater contamination in the area has not been determined. However, the base site

manager indicated that the presumptive remedy would likely be a landfill cap and that long-term monitoring of groundwater would be necessary. Although a Classification Exception Area (CEA) designation is not in place, it is likely a CEA would be pursued when the remedy is in place by JB MDL in the future (Mak, 2011). There was also a former DRMO located between Sites A and B. Surface contamination from the DRMO may have also contributed to groundwater contamination in this area. Additional site information is provided in Section 3.11.2.

Both Sites A and B are outside the footprint of the former landfill. However, monitoring wells were installed in these areas to help determine the extent of groundwater contamination associate with the landfill. There are 4 wells on Site A and 7 wells on Site B. During sampling events in 2010, all groundwater samples from these wells were below regulatory levels of concern. JB MDL would need to maintain access to these wells for future groundwater monitoring.

### 3.5.4.2 Site C

The near surface formation at Site C is the Cohansey Aquifer. Groundwater flow at Site C is generally to the North-Northeast. The western portion of Site C is underlain by a CEA. The CEA was designated in the eastern portion of Lakehurst in January 2000 with a restriction depth of 200 feet. This CEA, called Areas A & B, is for groundwater contaminated from several National Priority List sites associated with past industrial operations (Figure 3-4). Groundwater in this area is contaminated with chlorinated solvents (trichloroethylene, perchloroethylene, and vinyl chloride) and gasoline components.

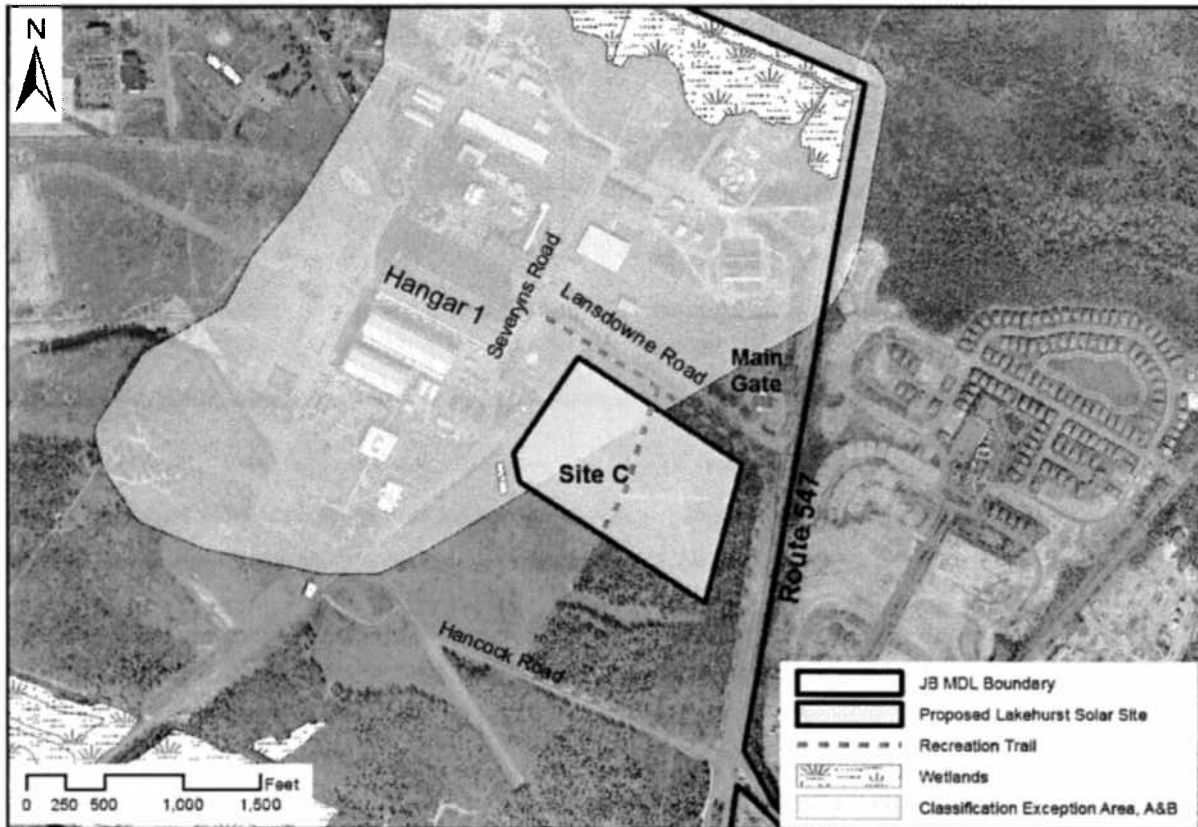


Figure 3-4. Classification Exception Area, Areas A & B

A groundwater extraction and treatment system for this area began operation in October 1993. In the most recent system progress report (July 2011), only 6 of the 42 monitoring wells exceeded applicable standards. In 2011, the highest concentration of groundwater contamination (total VOCs greater than 10 parts per billion) was located at the intersection of Lansdowne Road and Severyns Road, on the northeast corner of Hangar 1 (Figure 3-5) (JB MDL, 2011). Well sampling results immediately surrounding Site C indicate non-detect values, indicating no contamination of concern directly under or upgradient of Site C.

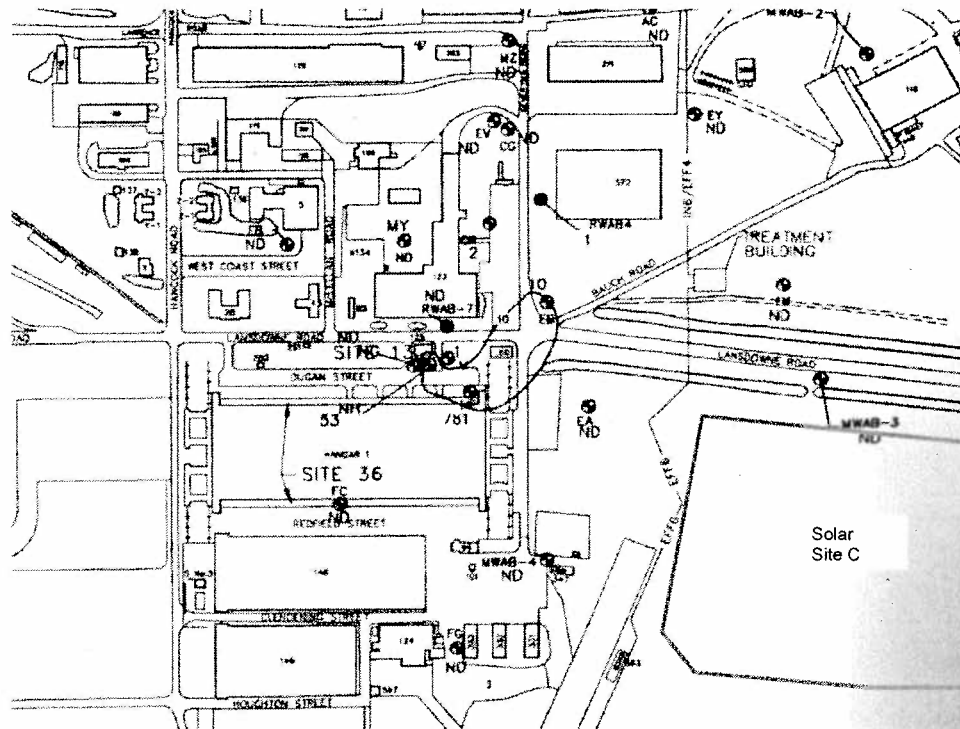


Figure 3-5. Concentrations of Total VOCs, Areas A&B Groundwater

Source: JB MDL, 2011

### 3.5.4.3 Buildings 1757, 2202, 2504, and 3101

Groundwater formations under the study buildings are the same as for Sites A and B. There is petroleum groundwater contamination at Building 1757, suspected to be associated with TU021, Pump House C (former site designation SS-21). There is also an area of groundwater contamination (SS-24) at Building 2202. See Section 3.11.4.5 for a full discussion of Sites TU021 and SS-24. There are no contaminated groundwater sites associated with Buildings 2504 and 3101.

### 3.5.5 Stormwater Management

All construction projects at the base shall have site-specific soil erosion and stormwater management plans considering runoff control during and after construction. Proposed projects that disturb more than 1 acre of soil must obtain authorization under NJPDES Permit No. NJG008323, or under an individual permit. The procedures and practices included in these plans shall be in accordance with the Standards for Soil Erosion and Sediment Control under Chapter 251, P.L. 1975, the Soil Erosion and Sediment Control Act and the Federal Water Pollution Control Act, 33 U.S.C. 1323.

JB MDL and its projects must comply with the stormwater requirements of the Energy Independence and Security Act of 2007, 42 USC 17001, et seq., (Section 438, Stormwater Runoff). All newly constructed drainage systems shall have a maintenance and inspection schedule as part of their design. Inspections of all major drainage facilities are conducted annually and after major storms.

State law S-921 was passed in 2010 that exempts solar panels from being designated as an impervious surface or impervious cover, as it applies to the various laws relating to municipal land use, stormwater management, and the Highlands. However, foundations and any impervious ground cover materials would be accounted for in stormwater management design calculations.

## **3.6 Biological Resources**

### **3.6.1 Regulatory Framework**

Protection and management of biological resources at JB MDL is mandated by a number of laws, regulations, and guidance documents. The primary statutes, regulations, EOs, and guidance that direct, and apply to, the management of biological resources at the installation include the following:

- Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.)
- Endangered Species Preservation Act of 1966 (16 USC 1531)
- Federal Noxious Weed Act of 1975 (7 USC 2801)
- Fresh Water Pollution Control Act, as amended by the Clean Water Act (33 USC 1251 et seq.)
- Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.)
- Fish and Wildlife Coordination Act of 1934 (16 USC 661 et seq.)
- Migratory Bird Conservation Act of 1966 (16 USC 715)
- Migratory Bird Treaty Act of 1918 (16 USC 703-711)
- Sikes Act of 1960 (16 USC 670 et seq.), and Sikes Act Improvement Act of 1997
- 10 USC 2665; Sale of Certain Interests in Land; Logs
- AFI 32-7064, Integrated Natural Resources Management
- EO 11988, Floodplain Management, 24 May 1977
- EO 11990, Protection of Wetlands, 24 May 1977
- EO 11991, Protection and Enhancement of Environmental Quality, 24 May 1977
- Pinelands Comprehensive Management Plan (N.J.S.A. 13:18A-1 et seq., N.J.A.C. 7:50 et seq.).

### **3.6.2 Integrated Natural Resource Management Plan**

A Joint Base Integrated Natural Resource Management Plan (INRMP) is under development. Until the new INRMP is promulgated, natural resources for the Lakehurst study area are addressed by the 2002 Lakehurst INRMP (NAES, 2002). A draft McGuire AFB INRMP

(McGuire AFB, 2006) addresses natural resources for the McGuire study areas. The INRMPs provide detailed descriptions of the natural resources present, identifies management issues, and establishes specific natural resources management activities.

### 3.6.3 Vegetation

#### 3.6.3.1 Sites A and B

Most of McGuire is developed, with extensive areas of maintained grasslands, lawns, and other landscaped areas (golf course and housing). Sites A and B are within the grounds maintenance area designated “semi-improved” (Figure 3-6). These areas have a maintained mowed height between 4 and 14 inches.

#### 3.6.3.2 Buildings 1757, 2202, 2504, and 3101

These buildings are surrounded by pavement and maintained (improved) lawn areas (Figure 3-6).

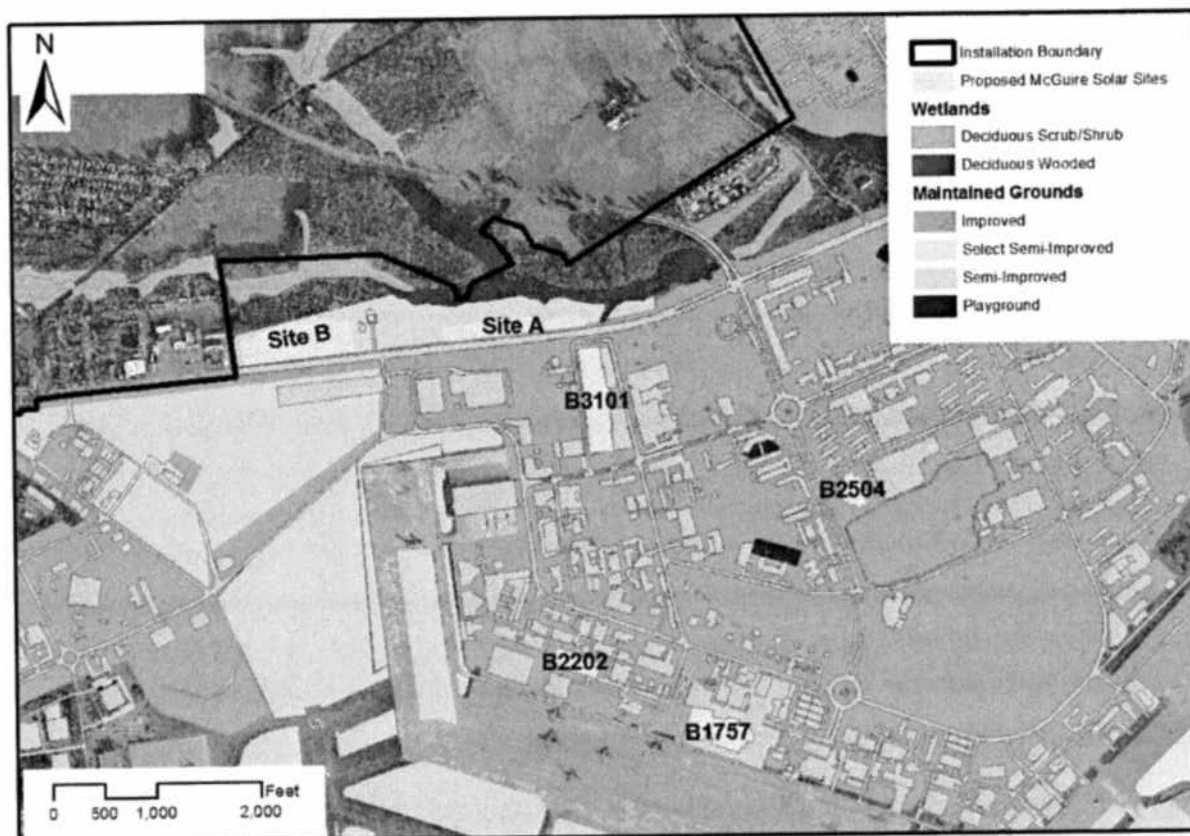


Figure 3-6. Vegetation at McGuire

#### 3.6.3.3 Site C

Vegetation communities at Lakehurst are diverse, ranging from open grasslands to mature forest communities. Lakehurst consists of approximately 45 percent upland forest, 28 percent brushland and shrubland, 1.3 percent surface waters, 12 percent wetlands, and 13 percent developed/disturbed areas. According to the Lakehurst INRMP, there were 759 acres of Mixed Forest, and 3,326 acres of total forest across the 7,430 acre Lakehurst area (44 percent of the base) in 2002. Plant species found within the region are common for climatic and hydrologic conditions of the Pine Barrens Natural Community.

Site C is dominated by a planted rows of mixed pine, planted in the early 1980s. The Lakehurst INRMP shows this area as Mixed Forest (>50% coniferous with >50% crown closure). Site C contained several acres of Austrian pine up until 2002, when 6 acres of them were severely damaged by a fungus causing Sphaeropsis tip blight (Joyce, 2011a). This disease is most common in Austrian Pines that are 25 to 30 years old. The 6 acres of diseased trees were removed in 2005 (Figure 3-7), and since then, natural scrub/shrub vegetation has grown up in this area.

Site C includes 16.8 acres of mixed pine, 6 acres of scrub/shrub, and 5.2 acres of grassland.



Figure 3-7. View of Site C, Looking West, 2007

### 3.6.4 Mammals

#### 3.6.4.1 Sites A and B

Although extensive wildlife surveys have not been performed for McGuire, there are a limited number of small mammalian species that have been observed on the base. Because the Pine Barrens ecology is unique, there are few generalist mammalian species that have the potential to occur at the base. These species include the groundhog (*Marmota monax*), which is the most prevalent mammalian species on base, the beaver (*Castor canadensis*), eastern cottontail rabbit (*Sylvilagus floridanus*), red squirrel (*Tamiasciurus hudsonicus*), white-footed mouse (*Peromyscus leucopus*), and meadow vole (*Microtus pennsylvanicus*).

Airfield grassland areas can provide suitable habitat for various species of mice and eastern cottontail. Mammals such as beaver and common muskrat (*Ondatra zibethicus*) are known to inhabit marshy and stream areas on base. Upland forest areas, though disturbed and fragmented, can support habitat for eastern gray squirrel (*Sciurus carolinensis*), and eastern chipmunk (*Tamias striatus*). Forested wetland can support habitat for common raccoon (*Procyon lotor*), and long-tailed weasel (*Mustela frenata*).

#### 3.6.4.2 Site C

There have been no mammal surveys conducted on Lakehurst other than rare species surveys. However, the vegetative communities are representative of NJ Pine Barrens, and common large to medium species that are likely to occur include: white-tailed deer; gray fox; opossum; and raccoon. Species that occur less frequently include: red fox and eastern coyote. Groundhogs are commonly found occur along grass taxiway clearzones and lawn areas at the base. Common medium to small mammals that occupy upland forests include: eastern gray squirrel, red squirrel, and southern flying squirrel. Small mammals that occur in dry upland areas include white-footed mice and pine voles (NAES, 2002). During a forest bird survey in September 2006, a red fox was observed at Site C.

### 3.6.5 Forest Birds (Site C)

According to the Lakehurst INRMP, the extensive areas of pine and mixed pine and oak forests provide habitat for a number of bird species. Between August 2006 and July 2007, a forest bird

survey was conducted by the NJ Audubon Society on Lakehurst. One of the survey points was located 700 feet south of Site C within a stand of mixed pine similar to that of Site C (point F1, Figure 3-8). Forest bird counts were conducted once per month at each point between sunrise and 10 am unless weather or other climatic conditions interfered with the sampling protocol. Prior to each count, the observer recorded starting time, wind intensity in Beaufort Scale, and temperature. No surveys were conducted when winds were above Beaufort Scale 4 or when moderate rain or noise levels significantly affected the observer's ability to detect vocalizations. Each count lasted 10 minutes, during which the observer recorded all individuals, by species, detected by sight or sound.

Fourteen bird species were recorded at point F1 at least once over the twelve month survey. The most prevalent was the Caroline Chickadee which was identified in 10 monthly surveys, followed by the Pine Warbler identified in five monthly surveys. The following species were identified in two to three monthly surveys: Blue Jay, Brown Headed Cowbird, Eastern Wood Peewee, and Chipping Sparrow. Species that were detected during only one monthly survey included: White Throated Sparrow, Northern Flicker, Downy Woodpecker, Eastern Towhee, Mourning Dove, American Crow, Yellow-Rumped Warbler, and American Robin.

### **3.6.6 Special Status Species**

#### **3.6.6.1 Sites A and B**

No federally-listed or federal-candidate species have been documented at McGuire. The bog turtle (*Glyptemys mühlenbergii*), a federally listed threatened and State-listed endangered species, has been documented within 0.1 mile of McGuire. Although the bog turtle has not been found at the base, suitable habitat exists on the base. The palustrine communities associated with North Run can provide suitable habitat.

Bald eagle (*Haliaeetus leucocephalus*), State-listed as endangered, are known to nest throughout New Jersey and migrate through the area encompassing and adjacent to the base. Foraging habitat for bald eagles consists of large perch trees near a body of water. The northeastern portion of the base supports bald eagle foraging habitat.

Although state-listed grassland birds are known to breed in and around the runway clearzones, Sites A and B would not provide suitable habitat for these birds, as they are routinely mowed and maintained as lawn areas.

#### **3.6.6.2 Site C**

No Federally-listed or proposed threatened or endangered flora or fauna species have been documented in the vicinity of Site C. Therefore, no further consultation pursuant to Section 7 of the ESA is required.

However, the following State-listed species or species of special concern have been sighted at least once over the last 20 years within 1,500 feet of Site C (Figure 3-8):

- Grasshopper Sparrow: State Threatened (grassland habitat)
- Eastern Meadowlark: Breeding and Non-Breeding - NJ Special Concern (grassland habitat)
- Black Throated Green Warbler: Breeding - NJ Special Concern; Non-breeding – stable (coniferous and mixed forest breeding habitat)
- Northern Pine Snake – State threatened.

- Sickie-leaved golden aster (*Chrysopsis falcata*); listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction; Rare in state with 21 to 100 occurrences state-wide.

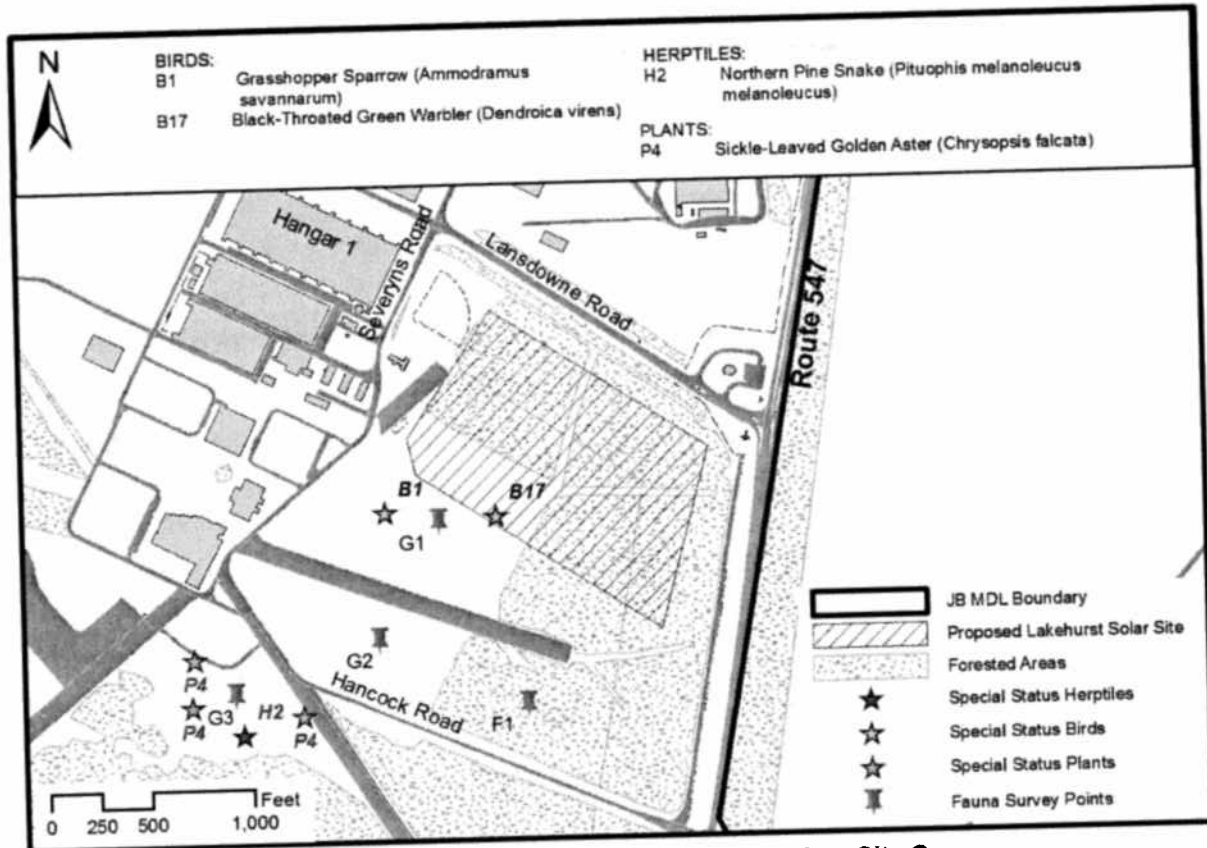


Figure 3-8. Special Species Sightings Near Site C

Lakehurst contains large expanses of grasslands (approximately 1,700 acres) within its airfield clear zones and the jump circle. The base has an established grassland bird survey and protection program. The base manages its grasslands located in and around runways, taxiways, and the Jump Circle to discourage use by large birds that can cause aircraft strike hazard. By keeping the grass height high, these areas provide suitable habitat for small State-listed threatened and endangered birds such as the Upland Sandpiper and Grasshopper Sparrow. Land disturbance and mowing of grasslands is avoided during the breeding season (April 1 – July 15) (NAES, 2002).

There have been quarterly grassland bird surveys at Points G1 and G2 (Figure 3-8) since 2000 (with the exception of 2001). These points are located within a 29.5-acre contiguous grassland area. Table 3-5 provides survey data for Grasshopper Sparrows (State-Threatened), Upland Sandpipers (State-Threatened) and Eastern Meadowlarks (NJ Special Concern). Grasshopper Sparrows are commonly found at both survey points, with an average of 6 to 8 found annually at each point since 2000. On average, there were 1-2 Eastern Meadowlarks located at each point annually on average since 2000. There have been no Upland Sandpipers identified at either site. Upland sandpipers generally require grassland habitat areas much larger than that available in the study area.



Table 3-5. Grassland Bird Survey Data near Site C

| Year           | G1,<br>Grasshopper<br>Sparrow | G1, Upland<br>Sandpiper | G1, Eastern<br>Meadowlark | G2,<br>Grasshopper<br>Sparrow | G2,<br>Upland<br>Sandpiper | G2, Eastern<br>Meadowlark |
|----------------|-------------------------------|-------------------------|---------------------------|-------------------------------|----------------------------|---------------------------|
| 2000           | 6                             | 0                       | 0                         | 2                             | 0                          | 6                         |
| 2001           | -----No Survey Done-----      |                         |                           |                               |                            |                           |
| 2002           | 9                             | 0                       | 0                         | 8                             | 0                          | 3                         |
| 2003           | 5                             | 0                       | 0                         | 4                             | 0                          | 0                         |
| 2004           | 7                             | 0                       | 0                         | 6                             | 0                          | 0                         |
| 2005           | 11                            | 0                       | 0                         | 10                            | 0                          | 0                         |
| 2006           | 10                            | 0                       | 0                         | 10                            | 0                          | 2                         |
| 2007           | 7                             | 0                       | 5                         | 11                            | 0                          | 4                         |
| 2008           | 7                             | 0                       | 2                         | 5                             | 0                          | 1                         |
| 2009           | 7                             | 0                       | 4                         | 6                             | 0                          | 2                         |
| 2010           | 4                             | 0                       | 0                         | 3                             | 0                          | 0                         |
| <b>Average</b> | <b>7.3</b>                    | <b>0</b>                | <b>1.1</b>                | <b>6.5</b>                    | <b>0</b>                   | <b>1.8</b>                |

Note: See Figure 3-8 for the locations of survey points G1 and G2.  
Source: Joyce, 2011b

While the Northern Pine Snake population outside of JB MDL is facing increasing threats from land development and poaching, there is a thriving population of these snakes within the Lakehurst portion of the base and they are found in relative abundance in nearly every area of Lakehurst. During a three-year study period in the late 1990's, 55 Northern Pine Snakes were captured and released (NAES, 2002). Six of the greatest threats to Northern Pine Snakes in the State are: 1) habitat loss and fragmentation; 2) poaching and illegal collection; 3) predation from both natural and subsidized predators; 4) mortality along roads; 5) fire suppression and habitat change; and 6) off-road vehicle use (Golden, et al., 2009). It is likely that, as a secure facility, the base offers substantial protection to this species from at least two of these six threats (poaching and off-road vehicle use).

The nesting season for Northern Pine Snakes is from June 20 through about July 10. They hibernate from mid-fall to mid-spring in natural cavities. The Navy began a Northern Pine Snake protection program and data collection effort over 15 years ago, and known nesting sites and hibernacula are protected from disturbance by 350-foot and 150-foot buffers respectively on the base (NAES, 2002). Artificial hibernacula are created to encourage their survival and wire fencing is placed over den entrances to discourage predators from digging up eggs. While there were no documented dens or nest sites within Site C, there have been sightings of Northern Pine Snakes within 2000-feet of Site C. With their large range, it is likely that Site C provides foraging habitat for this species.

### 3.6.6.3 Buildings 1757, 2202, 2504, and 3101

Buildings 1757, 2202, 2504, and 3101 are located in the densely built-up area of McGuire, surrounded by pavement, maintained lawn, and other buildings. There are no biological species of special concern inhabiting these areas.

## 3.7 Cultural Resources

### 3.7.1 Integrated Cultural Resources Management Plan

JB MDL operates its cultural resources management program in accordance with AFI 32-7065 – Cultural Resources Management. An ICRMP covering the entire Joint Base is under development and should be promulgated in late 2012. Until then, the plans in effect for actions within their respective portions of the Joint Base are the 2006 Naval Air Engineering Station ICRMP (NAES, 2006) and 2008 McGuire AFB ICRMP (McGuire AFB, 2008).

The ICRMP provides an internal compliance and management tool that integrates the entirety of the cultural resources program with ongoing mission activities. The ICRMP establishes priorities for the identification and standards for the evaluation of cultural resources, and provides a schedule to accomplish program objectives during a five-year program.

### 3.7.2 Archeological Sites

#### 3.7.2.1 McGuire

A phase I archaeological survey was conducted in 1994 by Argonne National Laboratory (1995) in areas of high archaeological sensitivity on McGuire (ANL, 1995). The survey found areas of prehistoric and historic archaeological potential along the North Run that lies within 250 feet of proposed solar array areas A and B. Shovel testing in those areas failed to produce evidence of Native American sites or other cultural items.

Two historic archaeological sites (28-BU-458 and 28-BU-459) were identified and found to be eligible for listing in the National Register upon further investigation (Mariah Associates, Inc. 1996). Those sites are shown within the SHPO sensitivity areas map and are not located within the project area. Based on previous investigations in the project area at McGuire, there is no potential to affect archaeological resources. Proposed solar sites A and B, and Buildings 1757, 2202, 2504, and 3101 are not close to any of the eligible sites (Figure 3-9).

#### 3.7.2.2 Lakehurst

No prehistoric archeological sites have been identified on NAES Lakehurst. Two cultural resource surveys have been conducted for Lakehurst, including a reconnaissance survey conducted in 1994 that identified areas of prehistoric site sensitivity, and one subsurface survey conducted in 2008 that tested areas having high archeological sensitivity along an installation road. Neither survey encountered evidence of prehistoric occupation.

Prehistoric sites are rare in the Outer Coastal Plain of New Jersey. Nevertheless, potential remains for the presence of prehistoric sites. In the mid-1990s, as part of the Cultural Resources Survey for Naval Air Engineering Station Lakehurst, New Jersey, NAES Lakehurst prepared and refined a sensitivity model for prehistoric sites based on the cultural record of the Pinelands and environmental factors, including soils, elevation, slope, and distance from water or wetlands. The model divides NAES Lakehurst into four sensitivity types: disturbed areas and areas of low, moderate and high potential to contain archeological sites (Figure 3-10). Site C was highly disturbed in the 1920's when the Naval Air Station was established, and several rail lines were installed to the east of Hangar 1. Based on the extensive past surface disturbance of this area, there is low potential for intact archeological sites to be affected by the Proposed Action.

### 3.7.3 Historic Architectural Resources

#### 3.7.3.1 McGuire

Between 1995 and 1998, McGuire AFB inventoried Cold War Era buildings (ca 1945-1989) and evaluated them under criteria for exceptional significance, as they had been built less than 50 years prior. The only properties considered potentially eligible were those associated with the Semi-Automatic Ground Environment (SAGE) Complex and Boeing Michigan Aeronautical Research Center (BOMARC) facility. Neither of these facilities are in close proximity to the study areas for the proposed solar farms. Building 2504 (gym) is the closest proposed solar project site to the SAGE facility, located approximately a ½-mile away (Figure 3-9). BOMARC is located several miles from the proposed solar sites.

Building 3101, base warehouse, was built in 1954. It was evaluated in 1998 and not found to be eligible for listing on the National Register based on exceptional significance. The 1998 survey stated that the warehouse played a significant role in McGuire's mission in materiel transport, as a point of materiel staging. In 2006, a new roof was added to the warehouse that changed it from a flat roof to a pitched steel standing-seam roof (Lyman, 2011). The original flat roof remains under the newer pitched roof.

#### 3.7.3.2 Lakehurst

The Lakehurst Lighter-Than-Air (LTA) Historic District is an early air transportation historic district located on the Lakehurst portion of JB MDL. It has a period of significance spanning the entire period of Navy LTA operations from 1921 to 1962. The district is comprised of 74 contributing properties and 10 non-contributing properties. Originally delineated as part of the *Cultural Resources Survey for Naval Air Engineering Station, New Jersey* in 1994, the district was determined eligible for inclusion in the National Register in 1996.

Most of the 74 contributing properties were constructed between 1919 and 1945. The main body of the district consists of an industrial area and two arms that extend northwest along Lansdowne Road to a residential/administrative area and southwest along Saniuk Road to Mat 3. A third arm extends northeast to include Hanger 4. The industrial area along Hancock Road contains the main concentration of operational facilities (NAES, 2006). Hangar 1 is a National Historic Landmark (Figure 3-10) built in 1921. Proposed solar site C would be located 500 feet to the east of Hangar 1, outside the LTA district.

### 3.7.4 Native American Consultation

JB MDL is in the process of establishing a formal government to government relationship with the following Native American tribes: Delaware Nation, Delaware Tribe of Indians and the Stockbridge Munsee Community. No Native American Traditional Cultural Properties, protected tribal resources, tribal rights, sacred tribal sites, or Indian land are known to be present within the ground-based project study areas. The likelihood of finding Native American artifacts or sites within the project study areas is extremely low, as these areas have been previously disturbed through military activity or farming use.

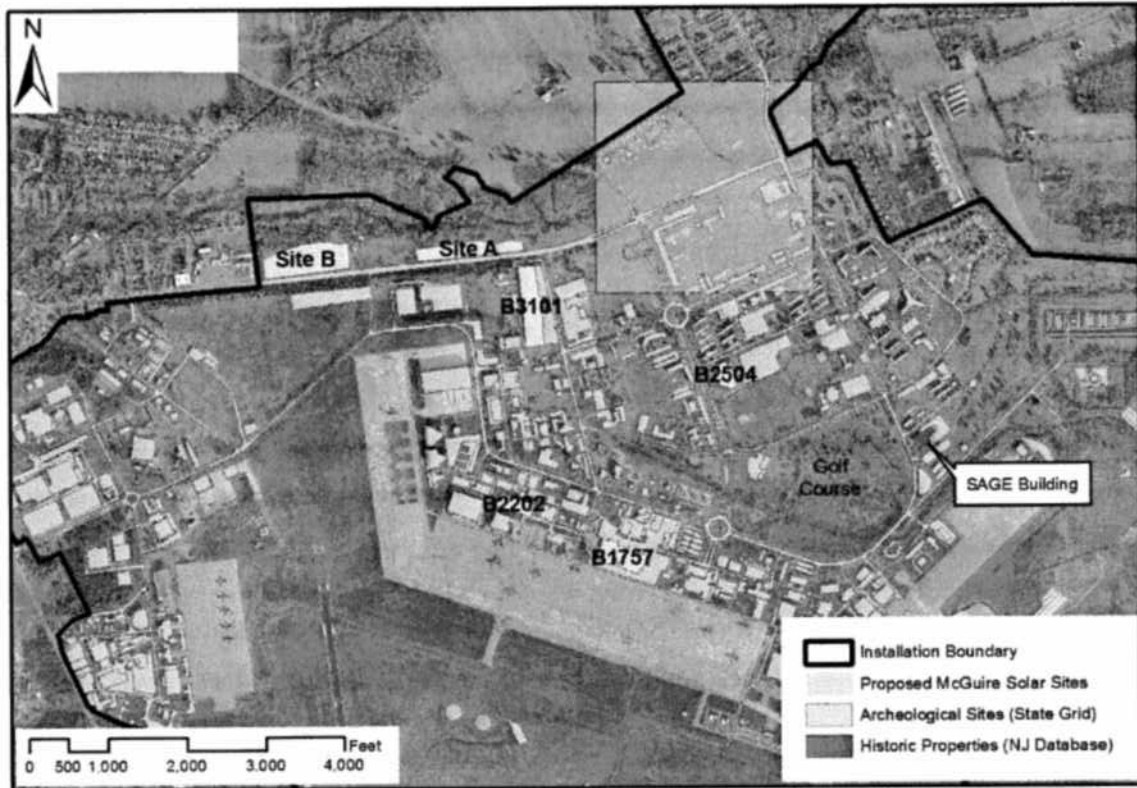


Figure 3-9. Cultural Resources on McGuire

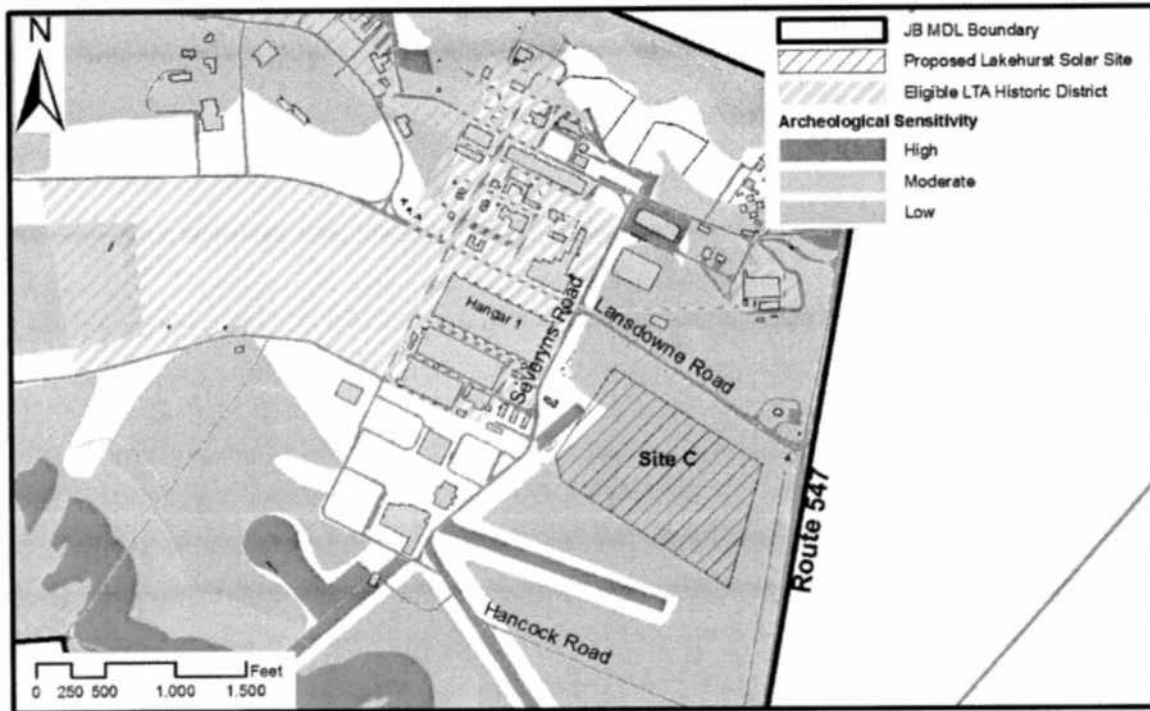


Figure 3-10. Cultural Resources Near Site C on Lakehurst

## **3.8 Socioeconomics**

### **3.8.1 JB MDL**

JB MDL spans more than 20 miles east to west with 42,000-contiguous acres. It is located within two of the largest counties in New Jersey, Ocean and Burlington, and bordered by 10 townships or boroughs.

JB MDL is home to more than 80 mission partners who provide a wide range of combat capability. Mission partners include: the 99th Regional Support Command, the 72nd Field Artillery Brigade, the 108th Wing, the 305th Air Mobility Wing, the 514th Air Mobility Wing, the 621st Contingency Response Wing, the Army Support Activity, the Naval Air Systems Command, the Naval Air Warfare Center Aircraft Division, the Marine Aircraft Group 49, and the United States Air Force Expeditionary Center. Several federal, state and local agencies to include the United States Coast Guard Atlantic Strike Team, the New Jersey National Guard, the Department of Homeland Security, the Department of Justice, the Department of Veterans Affairs and the Department of Agriculture also reside on JB MDL. The host unit - the 87th Air Base Wing - is responsible for providing installation support for the joint base community and its 3,933 facilities.

The Joint Base is one of the largest employers in New Jersey - the only other entity employing more than JB MDL is the State of New Jersey. JB MDL has approximately 40,000 assigned personnel with a mix of approximately 31 percent military and 69 percent civilian. In Fiscal Year 2010, the annual payroll was approximately \$2B, with base contract expenditures of approximately \$2.1B. Service members and family members living and working on and around JB MDL contribute to an overall economic impact of \$6.9 billion to the state.

### **3.8.2 Economics of Solar Technology**

#### **3.8.2.1 Solar Job Creation**

A November 2009 study by the University of California, Berkley, indicates that renewable energy technologies generate more jobs per unit of energy than fossil fuel-based technologies. Among renewable technologies, solar photovoltaic energy production creates the most jobs per unit of electricity input. An EPRI study in 2001 estimated a construction employment rate of 7.14 jobs/MW for solar photovoltaic systems and 0.12 jobs/MW for operations (EPRI, 2001).

#### **3.8.2.2 SRECS**

NJ's SREC program provides a means for SRECs to be created and verified, and allows electric suppliers to buy and retire these certificates in order to meet their solar Renewable Portfolio Standard (RPS) requirements. All electric suppliers must use the SREC program to demonstrate compliance with the RPS. New Jersey's on-line marketplace for trading SRECs, launched in June 2004, is the first such operation in the world. The price of SRECs is determined primarily by their market availability and the price of the Solar Alternative Compliance Payment for the State RPS. The Solar Alternative Compliance Payment is effectively a ceiling on the value of SRECs because it is the per MWh payment that electricity suppliers must make if they fail to obtain enough SRECs to cover their RPS obligation (DSIRE, 2011).

#### **3.8.2.3 Federal Solar Incentives**

The American Recovery and Reinvestment Act of 2009 modified Section 48 of the U.S. tax code to allow owners of production tax credit-eligible renewable projects, such as solar photovoltaic energy projects, to make an irrevocable election to earn a one-time corporate investment tax

credit in lieu of claiming the production tax credit. The tax credit is equal to 30 percent of the costs attributable to the facility, which typically excludes other project costs, such as transmission equipment or ancillary site improvements.

### 3.8.2.4 Buy American Act

The Buy American Act is the major domestic preference statute governing procurement by the federal government. The federal government is required to buy domestic “articles, materials, and supplies” when they are acquired for public use unless a specific exemption applies. The Fiscal Year 2011 National Defense Appropriations Act included a specific provision (Section 846) requiring all DoD contracts requiring photovoltaic devices to comply with the Buy American Act. This includes energy savings performance contracts, utility service contracts, land leases, and private housing contracts, to the extent that such contract result in ownership of the photovoltaic device by the DoD. For the purposes of this provision, the DoD is deemed to own a photovoltaic device if it is installed on DoD property or in a facility owned by the DoD; and reserved for the exclusive use of the DoD for the full economic life of the device.

## 3.9 Energy and Infrastructure

### 3.9.1 NJ Energy Sources

Like other states in the Northeast, New Jersey has some of the most expensive electricity prices in the United States. Half of the State’s generated electricity is from nuclear power, while natural gas meets almost a third of the State’s demand (Figure 3-11). Though the State reportedly has significant wind energy potential, wind makes a negligible contribution to New Jersey’s electricity supply (IER, 2011).

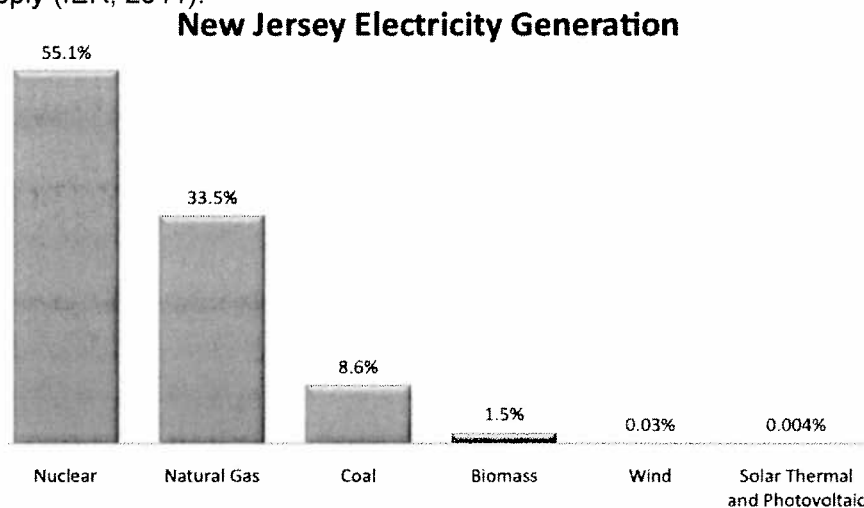


Figure 3-11. NJ Electricity Generation Mix

New Jersey has three nuclear power plants. One of those, the Oyster Creek Nuclear Generating Station, first came online in 1969 and is the oldest operating nuclear power plant in the United States. It is scheduled to cease operation in 2019. New Jersey has no fossil fuel reserves, so its natural gas arrives through pipelines from Pennsylvania, while coal is shipped to the state from West Virginia, Pennsylvania, and Virginia.

New Jersey requires utilities to sell a certain percentage of electricity from renewable sources. The State’s renewable portfolio standard requires utilities to provide 22.5 percent of electricity sales from renewables by 2021. In addition, the standard also contains a separate solar specific

provision which requires the procurement of at least 2,518 gigawatt-hours from in-state solar electric generators during energy year 2021 (June 2020 to May 2021), and 5,316 gigawatt-hours during energy year 2026 and each year thereafter.

### **3.9.2 JB MDL Electricity Infrastructure**

The electrical power that supplies McGuire and Lakehurst is purchased from General Public Utilities (GPU) Energy (a division of FirstEnergy Corp and holding company of Jersey Central Power and Light). JB MDL consumes approximately 174,390 MWh of electricity annually.

On McGuire, electrical power is supplied via a single 34.5-kV switching station. The primary distribution system is a 12.45/7.2-kV line that leaves the main substation. This substation supplies power throughout McGuire via seven feeder circuits which each serve a different area of the installation. On McGuire, the majority of the electrical system consists of aboveground lines, and the poles associated with these lines are typically 40 to 50 years old. The overhead distribution is prone to power outages due to ice buildup on the lines, automobile accidents, lightning strikes, falling trees, and aging equipment. Underground electrical utilities are in place in select areas of the installation to reduce outages.

On Lakehurst, primary incoming power supply near Route 547 is a 34.5-kV line to Substation 1, located less than 400 feet southwest of Site C. This substation reduces the power down to 2,400 volts for distribution, except for certain major facilities. The entire electrical distribution system at Lakehurst, except for off-base housing, is underground.

## **3.10 Materials and Waste**

JB MDL adheres to a Hazardous Material Control and Management Plan which defines the procedures for the handling and disposal of hazardous waste. According to the management plan, each department and tenant must possess a Hazardous Waste Coordinator and Spill Response Coordinator. The base HAZMART process receives hazardous materials at a central location where they are distributed on an as-needed basis and their usage and disposal are tracked. The Spill Response Coordinator and/or the Hazardous Waste Coordinator must be contacted in the event of a spill.

The most common solar panel types are crystalline silicon and thin film. Thin film panels offer lower manufacturing costs and are becoming more prevalent. The three main types of thin films are cadmium telluride (the most common on the market), amorphous silicon, and a compound semiconductor: copper, indium, gallium, selenide (a developing technology).

Researchers at the Brookhaven National Laboratories and the National Renewable Energy Laboratory estimate that the cadmium content of a 1 square meter solar panel is less than a C-sized nickel-cadmium battery. Cadmium telluride is more stable and less soluble than elemental cadmium and likely to be much less toxic. The cadmium telluride is encapsulated between layers of glass and its vapor pressure at ambient temperature is zero, making it impossible for any vapors or dust to be generated. Cadmium telluride is so well encapsulated and immobile that broken panels pass Federal Toxicity Characteristic Leaching Procedure criteria for nonhazardous waste and can be disposed of in landfills (NJ Pinelands, 2011b).

Research indicates that recycling of solar panels is both technologically and economically feasible. Many solar panel manufacturers have implemented voluntary take-back and recycling programs (NJ Pinelands, 2011b).

### 3.11 Human Health and Safety

#### 3.11.1 Fire Code

The NFPA included new requirements for solar installations in their 2012 NFPA 1: Fire Code (Section 11.12). The NFPA Fire Code for building-mounted solar installations requires specific marking requirements for system components (service disconnect panel, raceways, conduits, enclosures, cable assemblies, and junction boxes), as well as any secondary power sources. Installer contact information signage is also required. The code also provides specific spacing and area criteria for access pathways between panels, distances from the edges of roofs, area available for emergency egress and areas for smoke ventilation options. The code also requires that conduits, cables, and raceways be located such that they pose the least trip hazard to firefighters.

#### 3.11.2 Solar Panel Reflectivity

Solar panel reflectivity is a potential concern around airports, as flash blindness episodes of pilots or air traffic controllers can result in aviation accidents. Solar photovoltaic systems employ glass panels that are designed to maximize sunlight absorption and minimize reflection to increase electricity production efficiency. To limit reflection, solar panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Modern panels reflect as little as 2 percent of the incoming sunlight depending on the angle of the sun and use of anti-reflective coatings (FAA, 2010). Figure 3-12 depicts the reflectivity produced from different surfaces.

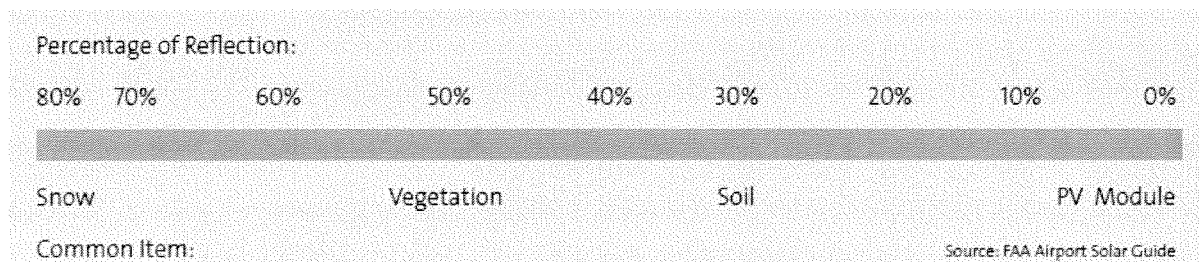


Figure 3-12. Reflectivity Produced by Different Surfaces

Solar installations are presently operating at a number of airports including MW-sized solar facilities covering multiple acres. The Federal Aviation Administration (FAA) conducted a survey of project managers at six airports where solar sites have been operational for 1-3 years. There have not been serious complaints from pilots or air traffic control due to glare impacts. The anecdotal evidence suggest that either significant glare is not occurring during times of operation or if glare is occurring, it is not a negative effect and a minor part of the landscape to which pilots and tower personnel are exposed (FAA, 2010). Based on solar project information from Nellis AFB, the chief glare concern was the reflective metal from the panel frames and not the panels themselves. When the frames were painted with a non-reflective matte finish, the glare problem was resolved (Blazak, 2011).

Because there are no specific standards for airport solar facilities and potential glare, the type of glare analysis that is needed may vary. Depending on the site specifics, an acceptable evaluation could involve one or more of the following levels of assessment: 1) qualitative analysis of potential impact in consultation with the control tower, pilots and airfield officials; 2) a demonstration field test with solar panels at the proposed site in coordination with airfield



personnel; and/or 3) a geometric analysis to determine days and times when an impact is predicted (FAA, 2010).

### **3.11.3 Lead and Asbestos**

Buildings 1757, 2202 and 2504 were built post-1980 and do not have lead or asbestos-containing building materials. Building 3101 was constructed in 1954 and was reviewed for the presence of lead and asbestos. Based on a review of building records and a visual inspection on November 3, 2011, there are no indications of lead or asbestos in the roof or sub-roof building materials (Mason, 2011).

### **3.11.4 Site Contamination - McGuire**

There are several IR sites on McGuire (Figure 3-13) near the proposed ground-based and rooftop solar sites. Descriptions of IR sites within 200 feet of proposed solar sites are provided below.

#### **3.11.4.1 Former Base Landfill (LF-03), McGuire**

Proposed solar sites A and B are adjacent to former base landfill site LF-03. This former 12.7-acre landfill is in the northwestern part of the base, adjacent to DRMO. It operated from 1950 to the 1960s. General base refuse, drums of waste oil, and miscellaneous industrial chemicals were deposited in the landfill. Following EPA site inspections in the mid-1970s, all exposed material was removed and the landfill leveled with a cover of sandy soil

Between 1983 and 1996, five investigations were conducted where VOCs, semi-volatile organic compounds (SVOCs) and metals were detected. Remedial Investigations (RIs) were conducted between 2004 and 2007. In March 2010, JB MDL notified the EPA of the proposed use of a Presumptive Remedy for the source areas of wastes. RI addendum field work was completed in Summer 2011. Sampling at the site revealed the following contaminants (ATSDR, 2002):

- Groundwater: VOCs (chlorobenzenes, benzene, toluene, xylenes, and vinyl chloride) and metals (arsenic, antimony, and cadmium).
- Surface Soil: Metals (antimony and cadmium) and petroleum aromatic hydrocarbons (PAHs) detected above Agency for Toxic Substances and Disease Registry (ATSDR) cleanup values
- Surface water: Metals, including arsenic, cadmium, chromium, copper, mercury, nickel, selenium, and lead, were detected at levels above ATSDR cleanup values for groundwater and background surface water concentrations.
- Sediment: Metals and chlordane were detected at levels above NJ background concentrations for soil, but below ATSDR cleanup values for soil.
- Leachate: VOCs (benzene) and metals were found at concentrations similar to those detected in the groundwater.

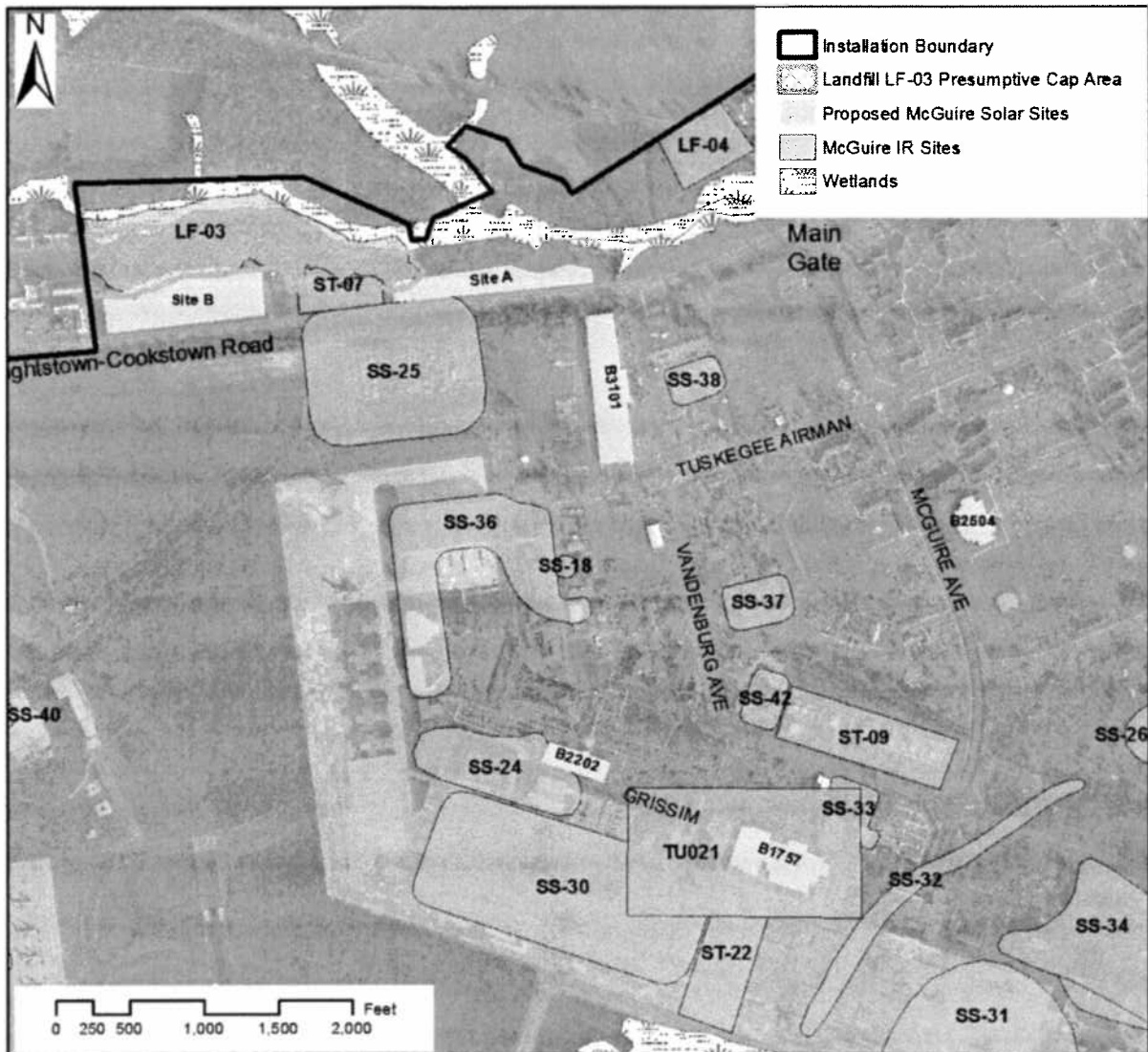


Figure 3-13. Installation Restoration Sites on McGuire

**3.11.4.2 Former DRMO Storage Yard (ST-07), McGuire**

Between proposed solar sites A and B is the former DRMO Storage Yard. This 4-acre yard is located on the north side of Wrightstown-Cookstown Road, which runs along the base's northern boundary. Used petroleum products, out-of-service PCB-laden transformers, and various hazardous wastes generated by the base and Fort Dix were disposed of at this facility. The site was fenced until completion of remediation activities.

In 1994, a 10,000-gallon underground storage tank (UST) was removed, along with contaminated soil. JB MDL proposed a Non-Time Critical Removal Action of PCB-contaminated soils in May 2010. The soil removal was completed in Summer 2011.

Sampling at the site revealed the following contaminants (ATSDR, 2002):

- Groundwater: In 1996/1997, VOCs, including benzene, chlorobenzene, vinyl chloride, and cis-1,2-dichloroethane, were detected at levels above ATSDR cleanup values.
- Soil: In 1991, metals (e.g., chromium and cadmium) and PAHs were detected at levels above ATSDR cleanup values and/or background concentrations. Samples may represent subsurface samples, however.
- Surface Water: (See LF-03)
- Sediment: (See LF-03)

#### 3.11.4.3 **Former Skeet Range (McGuire)**

North of proposed solar Site B is the former Skeet Range that was operated from approximately 1943 to 1959 (Figure 3-14). The site is 29 acres. A large portion of the former Skeet Range footprint received extensive fill and site disturbance from landfill activity that occurred from 1950 to the early 1960's. The landfill activity began after Skeet Range activities ceased. A Phase I Site Evaluation was completed in January 2010. Results indicated the potential for metals and polycyclic aromatic hydrocarbons from clay pigeons (although no clay pigeons were identified on the site). Fieldwork for a Phase II study was completed in November 2010.

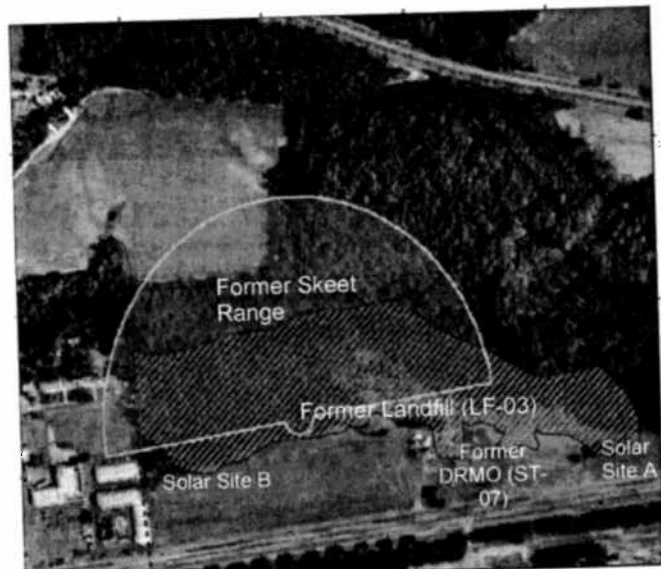


Figure 3-14. Location of Former Skeet Range near Solar Sites A and B

#### 3.11.4.4 **Former Entomology Shops (SS-25)**

Proposed solar Site A would be located within 200 feet of IR site SS-25. SS-25 consisted of three former entomology shops. Remedial investigation field work and sampling revealed soil contaminated with pesticides, metals, and petroleum aromatic hydrocarbons. An Engineering Evaluation/Cost Analysis was conducted in 2010 that recommended soil removals at "hot spots" and capping with soil over less contaminated areas. However, in 2011 the Air Force decided to address the site through the traditional Remedial Investigation/Feasibility Study process. The three hot spots identified were located south of Wrightstown-Cookstown Road.

#### 3.11.4.5 **Installation Restoration Sites near Proposed Solar Roofs**

There are no identified contaminated sites within 200 feet of Buildings 3101 and 2504.

Building 2202 is adjacent to IR site SS-24. Cleaning chemicals were used at the site since the 1950s and old drawings indicated an oil water separator tied into an old leach field. Approximately 500 cubic yards of tetrachloroethylene contaminated soil was removed in 2003. Groundwater sampling indicates the presence of perchloroethylene and gasoline constituents. Depth to groundwater ranges between 5-10 feet below ground surface. A draft RI workplan was submitted to EPA in September 2010. RI Addendum field work was completed in May 2011.

Building 1757 is within 200 feet of IR sites ST-22, SS-30, and TU021. The water table occurs at approximately 5 to 10 feet below ground surface at these sites. ST-22 is a fuel leak site located in the northeast section of the main aircraft parking apron. In 1988, a jet propulsion fuel (JP-4) pipeline ruptured beneath the reinforced concrete flightline ramp and an unknown volume of fuel was released onto the ground surface. Soil and groundwater chemicals of concern include gasoline constituents, total petroleum hydrocarbons and lead. A Draft RI Report was submitted in July 2009. RI Addendum field work began in June 2011.

SS-30 consists of soil hot spots in the vicinity of a former fuel hydrant, in an area of buildings where maintenance and support activities utilized oils, hydraulic fluid, solvents, batteries, paints and thinner. Contaminants of concern for soil and groundwater include gasoline constituents and total petroleum hydrocarbons. A Draft RI Report was submitted in July 2009. RI Addendum field work began in June 2011.

TU021, former "Pump House C" was located 300 feet southwest of the intersection of Grissom Road and Vandenberg Avenue, adjacent to the main concrete apron. Its footprint overlaps portions of sites SS-22 and SS-30. The pump house included seven 25,000-gallon and one 5,000-gallon USTs containing jet fuel for aircraft. The USTs were placed out of service in 2003 and the tanks and pipelines were removed in 2005. Soil that was visibly stained was also removed. Investigations in 2006 and 2007 found jet fuel-related soil and groundwater contamination. Test pits and soil field screening in 2008 around the site recommended additional delineation of impacted soils and groundwater. A RI was completed in December 2010. The highest Total Petroleum Hydrocarbon result was 10,300 ppm at a depth of 5 feet, just south of Building 1757. There are several wells with VOCs above action levels surrounding Building 1757, with the highest concentrations found to the west of the building.

## 4. ENVIRONMENTAL CONSEQUENCES

### 4.1 General Overview

This section identifies potential direct and indirect effects of the alternatives for each resource area described in Section 1 and compares and contrasts the potential effects of those alternatives. The potential environmental, cultural, and socioeconomic effects of implementing each identified alternative, as well as any required mitigation associated with each alternative, are also presented.

### 4.2 Land Use

#### 4.2.1 Effects of Alternative 1

No significant adverse land use impacts would be anticipated due to implementation of Alternative 1. The ground-based sites are presently vacant land and have been identified by JB MDL as non-mission essential. The installation of solar panels on building roofs would not affect land use.

The Proposed Action requires development within the NJ Pinelands. The Pinelands CMP aims to direct solar farms on unforested areas, such as landfills and sand mines. However, the proposed solar fields would be consistent with the function of the military installation and substantively meets solar development requirements of the Pinelands Comprehensive Management Plan. Although Site C would require tree clearing which could be considered inconsistent with the CMP, the trees to be cleared were deliberately planted with non-native mixed pine in the early 1980's and a large portion of the stand suffered from tip blight in 2005. Prior to the 1980's, the site had been cleared of vegetation since 1921 to support airship operations. Hence, the solar farm on Site C would not displace native vegetation or forest with high ecological value. The development of the solar fields would, with the adherence to the sustainable design and construction best management practices described in Section 2.2.4, result in less than significant adverse impacts to the environmental resources of the Pinelands Area.

Site A is surrounded by forest and open space to the east, north and west and by Wrightstown-Cookstown Road and other portions of JB MDL to the south. There would be no adverse effects on adjacent land uses at Site A.

Site B is located adjacent to the Days Inn hotel on Wrightstown-Cookstown Road, where the east facing rooms would overlook the solar field less than 100 feet away. To reduce adverse aesthetic impacts to the Days Inn, JB MDL would require the lessee to install an evergreen vegetation screen on the west end of the parcel. In addition, new transformers or inverters that could cause high-frequency "humming" noise impacts would be located as far away from the Inn as practicable. Other major businesses that would be within 1,000 feet of the solar farm along this road include Dunkin Donuts, Dollar General, and Thunderbird Bowling Lanes. However, these businesses would not be in view of the panels, as the Days Inn would be located in-between them. The closest residences would be along Platt Ave behind the Days Inn, although the solar panels would not be in their viewshed, as 300 feet of forest would remain between these locations.

Many Installation Restoration sites governed by the McGuire Federal Facilities Agreement with EPA are in the remedial investigation phase. Because some sites are not fully characterized,

there is potential for land use conflicts if new contamination is found or if proposed remedies require installation of wells, piping, and treatment buildings that require additional land outside of the current site footprints. Proposed solar Sites A and B have potential, although low, to incur future land use conflicts based on their proximity to the former base landfill and former DRMO yard.

An existing exercise path is located adjacent to and through proposed solar Site C. Under this alternative, a portion of the path would be closed and rerouted outside the proposed solar field fenceline. This would be a minor change to the path and would not significantly impact its recreational use. Site C would not interfere with the use of the adjacent baseball field. However, there would be a slight risk of baseballs damaging solar panels if they were placed too close to the ball field. A row of pine trees would be planted between the baseball field and the solar farm that would reduce this potential cause of damage. Because rows of pine trees would be retained along the east side of the solar farm, the solar panels would not cause visual intrusion to the River Pointe retirement community on the east side of Route 547.

#### **4.2.2 Effects of Alternative 2 (No Action Alternative)**

No adverse land use impacts would result from Alternative 2.

### **4.3 Air Quality**

#### **4.3.1 Effects of Alternative 1**

Fugitive dust from on-site construction activities and mobile source emissions from construction vehicles, equipment, and the motor vehicles of construction workers would occur. Project construction would involve earth movement, grading, tree clearing and other typical construction activities. Exhaust emissions from construction vehicles, personal vehicles, soil erosion, and fugitive dust are all construction issues that would cause minor, short-term air quality impacts.

Based on the analysis provided in Appendix B, temporary construction-related emissions, when added to current emissions at Lakehurst, would be well below the Lakehurst SIP budget for NO<sub>x</sub> and VOCs; therefore, the Record of Non-Applicability (RONA) satisfies the General Conformity Rule. As such, the RONA documents JB MDL's decision not to prepare a written conformity determination for the Proposed Action. Construction BMPs, as described in Section 2.2.4, would sufficiently minimize airborne particulate emissions. Mobile source emissions during construction would result in direct, minor, short-term adverse air quality impacts.

Once the solar installations are completed, intermittent commuter trips would occur under this alternative by a handful of workers to maintain the sites as needed. There would be no appreciable increase of automobile emissions once the facility becomes operational.

Based on the mix of electricity sources in NJ, the generation of 13,600 MWh/year of solar energy by the seven proposed systems on JB MDL would avoid 4.2 tons of NO<sub>x</sub>, 16.2 tons of SO<sub>2</sub>, 3,098 tons of CO<sub>2</sub> and 0.13 tons of CH<sub>4</sub> annually. The emissions from the construction phase (see Appendix B) would be more than offset within the first year of the systems operation. Overall, the long term impacts to air quality would be positive.

#### **4.3.2 Effects of Alternative 2 (No Action Alternative)**

The No Action Alternative would not affect air quality. However, there would be no reduction in annual air emissions associated with JB MDL energy use.

## **4.4 Topography and Soils**

### **4.4.1 Effects of Alternative 1**

No substantial changes to the topography of the project sites would be required to implement the Proposed Action. Installation of the solar fields at Sites A, B, and C would include land clearing and minor soil grading during the initial construction phase. As a result, there would be potential for soil erosion by wind and rain if adequate soil conservation practices are not followed. However, the installer would obtain certification of soil erosion and sediment control plans by the Burlington and Ocean County Soil Conservation Districts and obtain an authorization to discharge stormwater associated with a construction activity under the NJDEP general permit.

Soils at Sites A and B are considered Prime Farmland soils in NJ. However, the installation of solar panels would not remove soil from the site and at the end of the useful life of the project, the site would be restored to its original condition.

With the adherence to sustainable design and construction best management practices described in Section 2.2.4, there would be minimal impact to topography and soils.

### **4.4.2 Effects of Alternative 2 (No Action Alternative)**

No adverse impacts to topography, and soils would result from implementation of Alternative 2, as the construction of the proposed solar fields would not occur.

## **4.5 Water Resources**

### **4.5.1 Effects of Alternative 1**

No significant, adverse impacts to surface water resources would be anticipated due to implementation of Alternative 1, provided that protective measures required by the Burlington and Ocean County Soil Conservation District are followed.

Although Sites A, B, and C have areas of groundwater contamination, the surface installation of the solar panels would not disturb groundwater and there would be no pathway for exposure of workers to groundwater contamination. The lessee would design the systems at Sites A and B to allow continued access to groundwater monitoring wells at the site.

There is also contaminated groundwater under and around Buildings 1757 and 2202, where contamination could be encountered at a depth of 5 feet. With proper coordination, new buried electric lines for the solar systems could be sited away from known IR sites to avoid worker contact with contaminated groundwater.

With the use of environmentally-friendly cleaning solutions (see Section 2.2.4), the operation of the solar fields would not contribute to groundwater or surface water contamination.

Sites A and B would be located adjacent to but outside a 100-year floodplain. Based on the topography of the area, the proposed solar farms would not be adversely affected by flooding. There would be no ground disturbance within 150 feet of wetlands (see Section 2.2.4). With the use of soil conservation BMPs, there would be no significant impacts to wetlands.

#### **4.5.2 Effects of Alternative 2 (No Action Alternative)**

No adverse impacts to water resources would occur from the implementation of the No Action Alternative, as the construction and operation of the proposed solar fields would not occur.

### **4.6 Biological Resources**

#### **4.6.1 Effects of Alternative 1**

During land clearing and site preparation, the construction noise and presence of workers would cause birds and animals to temporarily leave the ground-based sites and seek other locations both on and off the base to reside and forage in.

##### **4.6.1.1 Sites A and B**

No species of special concern would be affected by the Proposed Action. These sites are semi-improved grass areas with no known species of concern. At another federal solar installation in a Pine Barrens area (Long Island NY), birds were found to create nests in the cable trays under the panels. In this example, birds found nesting were the Eastern Phoebe and Barn Swallows (Green, 2011). Both species are migratory and often nests on human structures such as bridges and buildings. To protect the wiring of the proposed solar field, long-term use of the trays for nesting would be discouraged. In the event an established nest is found within or around the panel structures, the maintenance workers would wait until a time outside of breeding season to remove the nest.

##### **4.6.1.2 Site C**

The solar field at Site C would result in the removal of approximately 16.8 acres of mixed pine. Tree cutting would be conducted outside of the migratory bird breeding season of March 15 to July 31 to reduce impacts on migratory birds. The proposed tree removal represents less than 1 percent of the Lakehurst area's forest, and 3 percent of mixed forest (>50% coniferous with >50% crown closure). As described in Section 2.2.4, JB MDL would seek bids for the forestry products cleared from the site in accordance with 10 USC 2665 and AFI 32-7064, and deposit proceeds in the AF Forestry Account. Removal of plant communities and habitat, and subsequent displacement of animal species, would result in minor, long-term adverse impacts to biological resources at Lakehurst.

No Federally-listed threatened or endangered species are located within the Site C project study area; therefore, no further consultation with the USFWS pursuant to Section 7 of the ESA is required.

Special species previously encountered in grasslands near the site include the Black Throated Green Warbler, Grasshopper Sparrows and Eastern Meadowlark. The Proposed Action would remove 5.2 acres of grassland habitat, or approximately 0.3 percent of Lakehurst's 1,700 acres of grassland habitat. As shown in Table 3.5, the grassland near Site C provides habitat for approximately 14 Grasshopper Sparrows and 3 Eastern Meadowlarks annually. With 5.2 acres of the 29.5 acres of this habitat removed under the Proposed Action, proportionately up to 3 Grasshopper Sparrows and 1 Eastern Meadowlark would be displaced, resulting in minor localized adverse impacts to these species. While grass would be planted under and around the panels, this would not create suitable habitat for State-listed grassland birds.

As described under Sites A and B, to protect the wiring of the proposed solar field, long-term use of the trays for nesting would be discouraged. In the event an established nest is found



within or around the panel structures, the maintenance workers would wait until a time outside of breeding season to remove the nest (see Section 2.2.4).

Based on the extensive snake monitoring program data at Lakehurst, there are no known hibernacula or nests for the Northern Pine Snake (State-Threatened) near Site C. The Lakehurst INRMP includes protective buffers of 350 feet around known hibernacula and 150 feet around single nest sites for the Northern Pine Snake; consequently, the project would be in compliance with the INRMP's Northern Pine Snake protection elements. Based on numerous previous sightings within a quarter-mile of the site on all sides, the site is considered foraging habitat for the pine snake. The loss of 1 percent of Lakehurst's forested area would not pose an irreversible adverse impact on foraging habitat that is critical to the survival of the relatively abundant local population of Northern Pine Snakes on Lakehurst. Given the relative abundance of pine snakes on Lakehurst, it is always possible that hibernacula or nests could be inadvertently uncovered or disturbed by construction activities. The Natural Resources Manager would periodically monitor construction activities for the presence of snakes and construction personnel would be required to contact the Natural Resources Manager at 732-323-2911 if snakes are discovered (see Section 2.2.4).

#### **4.6.1.3 Buildings 1757, 2202, 2504, and 3101**

There would be no impact to biological resources from the installation of rooftop solar systems.

#### **4.6.2 Effects of Alternative 2 (No Action Alternative)**

Under the No Action Alternative, there would be no land disturbance or vegetation removal. There would be no impact to biological resources under this alternative.

### **4.7 Cultural Resources**

#### **4.7.1 Effects of Alternative 1**

##### **4.7.1.1 Sites A and B**

No impacts to cultural resources would be anticipated from the implementation of the Proposed Action at Sites A and B. These ground-based site locations have low potential to contain National Register eligible archeological resources based on previous land disturbance and shovel testing that revealed no evidence of cultural artifacts (Section 3.7.2.1). If archeological sites or cultural artifacts are inadvertently discovered during ground disturbing activities or normal operations at these sites, JB MDL would cease all disturbance activity, secure the site(s) and contact the JB MDL CRM. The CRM would take necessary actions pursuant to the base ICRMP (see Section 2.2.4).

The Delaware Nation requested copies of cultural surveys for this project. A copy of the 1995 study (ANL, 1995) that evaluated portions of Sites A and B was mailed to them during the EA's public comment period.

##### **4.7.1.2 Site C**

Site C at Lakehurst would be located outside the boundaries of the National Register eligible LTA Historic District. However, the site would be 500 feet from Hangar 1, a National Historic Landmark. The panels would be ground-based, with a height of no more than 6 feet. A site visit was conducted by the SHPO for the project at Site C on August 11, 2011. Per their recommendation from the site visit, JB MDL would include a vegetative visual barrier consisting of two rows of white pine trees just within the full western boundary of the proposed solar farm site. The trees would be of sufficient planting height and separation to ensure total screening of

the solar farm from the perspective of a viewer looking at Hangar 1 or the other historic properties (or from windows inside those other buildings—no windows in Hangar 1 look out on the proposed site). By implementing this measure, SHPO concurs that the Proposed Action at Site C would not have an indirect adverse visual effect on Hangar 1 or the LTA Historic District.

Site C has low potential to contain National Register eligible archeological resources based on previous heavy land disturbance and grading (e.g. for the rail lines serving Hangar 1) during the 1920s. There has been no shovel testing for cultural artifacts on this site and therefore no site-specific cultural surveys were available to send to the Delaware Nation per their request. However, if archeological sites are inadvertently discovered during ground disturbing activities or normal operations at this site, JB MDL would cease all disturbance activity, secure the site(s) and contact the JB MDL CRM. The CRM would take necessary actions pursuant to the base ICRMP (see Section 2.2.4).

#### **4.7.1.3 Buildings 1757, 2202, 2504, and 3101**

Buildings 1757, 2202 and 2504 were constructed between 2004 and 2005 and no consultation with SHPO would be needed for these solar projects. Building 3101, base warehouse, was built in 1954 and may have Cold War era significance. However, the roof architecture was altered substantively in 2006, changing it from a flat roof to a pitched steel standing-seam roof<sup>6</sup>. The addition of solar panels to this newer roof would not affect any of the original, potentially historic elements of the building. The panels would be visible, but would be flush mounted to the roof, reducing their visual impact. The panels would also be easily removable as they would clamp onto the standing seams of the roof. Consequently, the solar panels proposed for Building 3101 would have no adverse effect on the historic aspects of the building. The NJ SHPO concurred with a No Adverse Effect determination for Building 3101 (see Appendix A).

The closest project building to the SAGE facility would be Building 2504 (gym), located about a ½-mile away (Figure 3-9). Based on the distance between these buildings, the presence of the golf course and scattered trees between the buildings, and the flush mounting of the solar panels to the roofs, there would be no adverse indirect effects of the proposed solar projects on the SAGE facility. SHPO concurred with a No Adverse Effect determination for indirect effects to the SAGE facility (see Appendix A).

#### **4.7.2 Effects of Alternative 2 (No Action Alternative)**

No adverse impacts to cultural resources would be anticipated from the implementation of the No Action Alternative, as no land disturbance or construction would occur.

### **4.8 Socioeconomics**

#### **4.8.1 Effects of Alternative 1**

Implementation of Alternative 1 would likely employ regional contractors for site preparation, electrical work, and installation of solar panels. The gross cost for installing the panels across the 3 sites and 4 buildings would be approximately \$100M (RoofRay, 2011). The panels would produce approximately 13,600 MWh of electricity annually (RoofRay, 2011). The wholesale price of electricity varies with demand, but is typically around \$0.02/kilowatt-hour (kWh) (King, 2011). JB MDL currently pays about \$0.12/kWh. The cost savings to JB MDL would depend on the rates offered through the PPA.

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<sup>6</sup> The original flat roof remains under the 2006 pitched roof (Lyman, 2011).

The operator of the system would be eligible to receive solar renewable energy credits and available federal tax incentives. Between September 2010 and July 2011, the average SREC value was \$608/MWh but the value has recently declined significantly due to low demand (NJ Clean Energy Program, 2011). JB MDL would seek fair market value for the lease of its land for the installation of the solar farms. The payback timeframe would depend on the terms of the power purchase agreement, tax credits available at the time of the installation, the land lease costs to the operator, and the annual solar renewable energy credit rates. Overall, the anticipated payback timeframe to the operator would range between 6 and 10 years.

It is anticipated that the construction of the panels would employ up to 100 construction workers over a 6-12 month construction period based on an estimated 7.14 jobs per MW of installed solar voltaic systems (EPRI, 2001). Hiring regional contractors could provide short-term jobs and revenue to local and regional residents, resulting in minor, short-term positive impacts to the regional economy.

Approximately 2-3 long-term, full-time jobs are expected to be created for the management, operation, inspection, and maintenance of the solar panels.

#### **4.8.2 Effects of Alternative 2 (No Action Alternative)**

There would be no impact to jobs under the No Action Alternative, as the project would not occur. JB MDL would lose the opportunity to reduce its utility rates, resulting in negative impacts to its operating costs.

### **4.9 Energy and Infrastructure**

#### **4.9.1 Effects of Alternative 1**

The proposed solar systems would provide approximately 13,600 MWh/year of electricity to JB MDL at a reduced cost. The systems would help JB MDL meet its renewable energy goals under the Energy Policy Act of 2005. The systems would provide about 6-8 percent of the base's annual electricity use.

Construction of the proposed solar panels at JB MDL would require installation of inverters, transformers, and new buried electric lines, although their locations near existing substations would limit the amount of new line needed. Access to the panels would be controlled by fences or locks on any roof access doors.

The contractor would coordinate the design for the installation of the roof panels with JB MDL Civil Engineering Squadron to ensure that methods of fastening them do not void roof warranties or impair the structures. The overall design would also be reviewed by JB MDL electrical engineers, fire safety personnel, planners, and installation restoration managers to ensure the systems comply with the Unified Facility Code, Air Force regulations, and other base requirements.

Field installed panels would likely require installation of 3-foot deep cement pilings for their foundations. A digging permit would be required before subsurface disturbance in order to protect underground utilities and ensure the safety of the installation crew (Section 2.2.4).

As stated in Section 4.2.1, an exercise path is adjacent to and runs through Site C. A portion of the path would be closed and rerouted outside the proposed solar field fenceline. This would be

a minor change to the path and would not significantly change recreational infrastructure. Site C would not alter the baseball field.

#### **4.9.2 Effects of Alternative 2 (No Action Alternative)**

No changes to JB MDL energy and infrastructure would occur, as the proposed solar systems would not be installed.

### **4.10 Materials and Wastes**

#### **4.10.1 Effects of Alternative 1**

Primary construction materials would include structural steel, concrete, electrical components, and solar panels. These materials are readily available from several sources in NJ.

Whenever heavy equipment is operated, there is potential for inadvertent spills or leaks of fuel or hydraulic oil. The potential for spills or leaks would be minimized provided that the sustainable operations and BMPs described in Section 2.2.4 are implemented.

The removal of trees from Site C would result in the largest construction waste stream for the project. This waste may be in the form of logs and wood chips. As described in Section 2.2.4, JB MDL would seek bids for the forestry products cleared from the site in accordance with AFI 10 USC 2665 and AFI 32-7064, and deposit proceeds into the AF Forestry Account.

At the end of the effective life of the systems, it would be feasible to recycle the solar panels through voluntary take-back programs from solar panel manufacturers, or through other recycling programs.

Overall, Alternative 1 would have minor impacts on regional material supplies and would produce minor amounts of waste from construction activities.

#### **4.10.2 Effects of Alternative 2 (No Action Alternative)**

There would be no impact to material supplies or waste generation levels under Alternative 2, as the construction of the proposed solar systems would not occur.

### **4.11 Human Health and Safety**

#### **4.11.1 Effects of Alternative 1**

A site-specific construction and operation health and safety plan would be provided by the Lessee, and approved by JB MDL, prior to the initiation of work on JB MDL (Section 2.2.4). Sites A and B are adjacent to two IR sites. There are also several contaminated sites around the buildings proposed for rooftop systems. With proper coordination, new buried electric lines for the solar systems could be sited away from known IR sites to avoid worker contact with contaminated soils and groundwater.

Rooftop systems would conform to NFPA requirements for system component labeling, emergency disconnection, and roof access/egress.

Potential glare from the solar systems that could adversely affect pilot vision would be minimized by the lessee to the satisfaction of the JB MDL airspace manager. This could require use of less reflective panel materials and painting of metal solar panel frames with a matte black finish.

With the adherence to an approved project-specific Health and Safety Plan, there would be no significant adverse impacts to health and safety from Alternative 1.

#### **4.11.2 Effects of Alternative 2 (No Action Alternative)**

There would be no impact to human health and safety under Alternative 2, as the construction and operation of the proposed solar systems would not occur.

### **4.12 Cumulative Impacts**

The CEQ regulations implementing NEPA requires the consideration of cumulative impacts as part of the process. "Cumulative impacts result from the incremental impact of the Proposed Action when added to other past, present and reasonably foreseeable future actions" (40 CFR 1508.7). Secondary impacts are those that are caused by the Proposed Action, but may occur later in time or farther removed in distance, relative to the primary impacts of the Proposed Action.

Relevant actions (those that could result in cumulative impacts) include regulations, policies, and trends related to solar energy. Relevant actions also include projects planned within 5 miles of the project sites that could compete for resources or affect energy and infrastructure, land use, and forest habitat.

#### **4.12.1 Cumulative Impacts of Solar Energy Projects, Policies, and Trends**

##### **4.12.1.1 Revised Pinelands Regulations for Solar Farms**

The New Jersey Pinelands Commission amended the CMP in October 2011 with regard to solar generating sites in the Pine Barrens. The rule changes open previously restricted areas of the Pinelands for development for larger solar-energy systems, provided that all existing Pinelands standards are met as well as certain other environmental conditions exclusive to the more sensitive areas of the preserve. The change was made to allow solar facilities to be installed on old landfills, brownfields, and other previously disturbed areas in the Pinelands, such as abandoned gravel or sand mines (NJ Pinelands, 2011a).

This revision would likely increase the number of solar developments in the Pinelands. There are over 75 landfills in the NJ Pinelands that could take economic advantage of the revised Pinelands solar regulations. For example, in 2010, a 6.5-MW solar farm was approved at the closed portion of the 30-acre Stafford County Landfill. The solar farm will provide power to the adjacent Stafford Business Park.

The Proposed Action, when added to other past and future solar development in the Pinelands, would have an overall positive cumulative impact on clean renewable energy and beneficial land reuse in NJ.

##### **4.12.1.2 State-wide Solar Implementation**

NJ is second in the U.S. for the amount of solar energy generated. From 2001 to 2011, the number of solar projects installed each year in NJ has increased significantly. Between January 2001 and July 2011, there were 10,741 projects installed providing 399,660 kW of power. The continuation of this trend would depend on the amount of federal and state incentives available to residential and commercial property owners.

In 2011 Final State Energy Plan, the (Governor) Christie Administration documented its strategic vision for the use, management, and development of energy in NJ over the next

decade (State of NJ, 2011). The State remains committed to meeting the renewable energy portfolio standard of 22.5 percent from renewable sources by 2021. However, the State Energy Board is conducting a regulatory review to ensure state-sponsored programs achieve a sensible balance among competing resources planning, economic and environmental objectives from both a participant's and non-participant's perspective. The plan also seeks to amend the Solar Advancement Act to change from explicit gigawatt-hour requirements for solar energy to a defined percentage of total energy. The plan also recommends promoting solar installations that provide economic and environmental benefits, such as solar farms on brownfield sites and landfills that can offset costs to remediate these sites (State of NJ, 2011). Such installations would get priority for approval. The plan also recommends a temporary acceleration of the RPS to provide interim relief for the current SREC market.<sup>7</sup>

The Proposed Action, when added to other past and future solar development in NJ, would have a positive cumulative impact on sustaining the renewable energy portfolio standard, while reducing air emissions and providing State-wide economic benefits.

#### **4.12.1.3 Solar Energy on JB MDL**

Previously installed solar projects on JB MDL include:

- NJ Department of Military and Veterans Affairs (NJDMAVA) building, 180.8 kW, June 2005;
- McGuire Medical Clinic, 75 kW, March 2009;
- McGuire Library, 14 kW, February 2009;
- McGuire Civil Engineering Maintenance Facility, 90 kW in 2010;
- McGuire Dining Facility, 63 kW in 2010;
- NJDMAVA Car Port, 288 kW;
- Fort Dix 99th Regional Support Command Headquarters and Strategic Deployment Site Building, 263 kW, September 2009;
- Fort Dix Warehouse Building 3351, 442 kW, September 2009
- Fort Dix Ground Array (adjacent to B3351), 703 kW, not operating; and
- Lakehurst parking lot light poles, saving 12 MW-hrs/year (approximately 15 kW).

Together, these projects equal 1.4 MW (operational). The Proposed Action would increase the amount of solar energy production on JB MDL by 14 MW, essentially providing 10 times the amount of solar energy currently produced. Together, these projects would provide 7-9 percent of the base's annual electricity use.

The base is also considering the addition of large-scale solar walls to provide heat for manufacturing, warehouse and storage spaces, offsetting a portion of the base natural gas use. The two projects proposed on Lakehurst (Buildings 148 and 149) are expected to save more than 7,566 million British Thermal Units (MMBTUs) of energy annually. The three projects proposed on McGuire (Buildings 3101, 3210 and 3211) are projected to save 8,041 MMBTUs annually.

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<sup>7</sup> The SREC market in NJ for energy year 2012 was supplied fully within the first two months and, as a result, SREC prices dropped from a spot market high of close to \$600 to a low of \$160. As of December 2012, it is estimated that NJ is ahead of the RPS schedule by 18 months. NJ proposes to take action to provide relief to the solar industry and give certainty to the financial community (State of NJ, 2011).

#### **4.12.1.4 Off-base Solar Projects**

An approved but not yet installed 107-acre solar farm by Effisolar Corporation will be located in North Hanover on Block 602, Lot 9, less than a half-mile from McGuire. This site will generate 17.5 MW of electricity and will be located north of JB MDL, partially in the McGuire airfield runway 18/36 APZ.

Approximately 5 miles north-northeast of McGuire, the Township of Chesterfield revised its zoning in October 2011, to establish a zone for commercial solar farms in the office park section of town, near the New Jersey Turnpike. A solar farm has been proposed in that area on 9.9 acres owned by the Shadyrest Bible Church.

In northern Pemberton Township, near Route 206 (approximately 5 miles east of JB MDL), a 7-MW solar farm on 60 acres was approved in May 2011.

These projects would have a beneficial cumulative impact on renewable energy generation in NJ and would assist the JB MDL's efforts to reduce future residential development and encroachment within 5 miles of the base.

#### **4.12.2 Cumulative Impacts of JB MDL Tree Clearing**

In addition to the Proposed Action at Site C, there are several construction projects across JB MDL that are approved or planned that would convert forested land to cleared land or developed land. These include:

- McGuire Airfield Clear Zone Tree Clearing (approved): 175 acres of tree clearing in airfield safety zones. This will include 16 acres of scrub-shrub wetlands and 137 acres of forested wetlands. Another 22 acres of tree clearing would occur in upland areas. As a mitigation measure for this project, JB MDL will distribute tree seedlings during the next two Earth Day events.
- Army Flight Activity Facility on Lakehurst (planned): 37 acres of upland forest would be cleared for a proposed hangar, aircraft parking and short taxiway.
- Long-Endurance Multi-Intelligence Vehicle Airfield on Lakehurst (planned): 77 acres of forest proposed to be cleared under the "major Lakehurst facility and airfield improvements alternative", inclusive of 17.6 acres of tree removal within wetland areas.

These projects, when added to the Proposed Action, would remove 289.8 acres of forest across JB MDL. This would result in localized moderate impacts to forest dwelling species in the areas of the tree removal, although cumulatively, the impacts would be minor when compared to the remaining 25,000+ acres of forest habitat at JB MDL.

#### **4.12.3 Cumulative Impacts Associated with Alternative 2 (No Action Alternative)**

Under the No Action Alternative the JB MDL would not construct the solar systems described under Alternative 1. No cumulative environmental, socioeconomic or cultural resources impacts would be anticipated.

### **4.13 Irreversible and Irretrievable Commitment of Resources**

An irreversible commitment of resources is defined as the loss of future options. The term applies primarily to the effects of use of nonrenewable resources such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long periods. It could also apply to the loss of an experience as an indirect effect of a "permanent"

change in the nature or characters of the lands. An irretrievable commitment of resources is defined as the loss of production, harvest, or use of natural resources. The amount of production foregone is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume production.

The Proposed Action would not have irreversible impacts because different future uses of the land are still possible. A future decommissioning process could restore the site for alternative uses. The locations of the proposed ground based sites are consistent with the surrounding JB MDL land uses and would not adversely affect off-base land uses.

The primary irretrievable impacts of the Proposed Action would involve the commitment of energy, labor, material, and funds, for the construction of the systems. The Proposed Action would increase the amount of renewable energy used by JB MDL, offsetting the use of nonrenewable energy resources that would otherwise be irretrievably consumed.

#### **4.14 The Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity**

The Proposed Action would commit resources in the form of energy, labor, materials, and funds for the foreseeable future. The justification for these commitments at this time is described in Chapter 1, Purpose and Need for the Proposed Action. Long-term productivity associated with the Proposed Action includes the ability of JB MDL to reduce its energy costs that will in turn reduce federal deficits or allow more funding to be directed to the primary mission of supporting the Warfighter.

#### **4.15 Unavoidable Adverse Impacts**

During construction there would unavoidable, although temporary, increase in construction-related noise and air pollutant emissions at the sites. There would be increased truck traffic to and from the site to deliver construction equipment and materials. The proposed solar systems would consume materials for their construction and consume minor amounts of water for routine cleaning operations.

Implementation would remove 16.8 acres of mixed pine plantation, 6 acres of scrub/shrub vegetation, and 5.2 acres of grassland at Site C. This would remove a minor amount of forest habitat for forest birds and clearing would temporarily displace mammals at the site. The 5.2 acres of open grassland at Site C would remove grassland bird habitat for the State-listed threatened grasshopper sparrow and birds of special concern (Eastern Meadowlark and Black Throated Green Warbler).



## 5. COMPARISON OF ALTERNATIVES AND CONCLUSIONS

As a result of the implementation of Alternative 1, the following impacts would be anticipated:

- Conversion of 40.3 acres of underutilized open space to utility use (reversible);
- Minor, short-term adverse air quality impacts due to increased mobile emissions and fugitive dust during land clearing.
- Positive long-term impact in the form of reduced air emissions from the use of clean, renewable energy.
- Minor, short-term soil erosion from site preparation activities.
- Minor, long-term loss of 16.8 acres of pine plantation, 6 acres of scrub/shrub, and 5.2 acres of grassland bird habitat. Habitat displacement for up to 4 state-listed grassland birds based on historical bird-count averages.
- Minor, positive socioeconomic impacts in the form of jobs and JB MDL reduced energy costs.

There would be no impacts associated with Alternative 2, the No Action Alternative, although opportunities to reduce utility costs and associated energy air emissions associated with Alternative 2 would be lost. A summary of impacts for both alternatives is provided in Table 5-1.

Based on the analysis presented in this EA, Alternative 1 is the Preferred Alternative. The evaluation performed within the EA concludes that, with the adherence to sustainable operations and best management practices in Section 2.2.4, no significant impacts would occur as a result of implementation of the Preferred Alternative. This analysis determines that an Environmental Impact Statement (EIS) is not necessary for the implementation of Alternative 1 and that a FONSI is appropriate.

**Table 5-1. Summary of Impacts**

| Resource Area        | Alternative 1- Proposed Action: Establish Seven Solar Systems at JB MDL  | Alternative 2 - No Action Alternative  |
|----------------------|--|--|
| Land Use             | The action would be consistent with existing and planned land use. Would convert 40.3 acres of open space to utility use. No adverse impact.   | No impact.   |
| Air Quality          | Construction activities would result in minor, short-term increases in air emissions. Over the long-term, the systems would reduce the annual air emissions associated with JB MDL energy use.   | No impact. However, there would be no reduction in annual air emissions associated with base energy use. |
| Topography and Soils | System installation at ground-based sites would not require substantial changes in topography. Site clearing would have a minor, short-term effect on soil erosion with the use of soil conservation BMPs.   | No impact.   |
| Water Resources      | Routine cleaning of solar panels would use negligible amounts of water. Ground-based sites would not be located in floodplains or within 150 feet of wetlands. With the use of soil conservation BMPs, impacts to surface water resources would be negligible. | No impact.   |

| Resource Area             | Alternative 1- Proposed Action: Establish Seven Solar Systems at JB MDL  | Alternative 2 - No Action Alternative   |
|---------------------------|--|---|
| Biological Resources      | <p>No wetlands would be affected. No federally-listed threatened or endangered species would be affected. The removal of trees at Site C would have a minor long-term impact on forest habitat. At Site C, there would be a loss of 5.2 acres of State-listed grassland bird habitat, representing a 0.3 percent loss of this type of habitat on Lakehurst.</p>  | No impact.  |
| Cultural Resources        | <p>The three ground-based sites have low potential for archeological sites. Building 3101 is more than 50 years old and may be eligible for listing on the National Register of Historic Places based on Cold-War architectural features or historic significance. However, based on the 2006 roof alteration, the solar panels would have No Adverse Effect on the buildings historic features. A No Adverse Effect concurrence was received from SHPO on January 13, 2012.</p> <p>With the planting of a tree screen described in Section 2.2.4, SHPO determined that the solar project at Site C would not have an adverse effect on Hangar 1 or the LTA district (see Appendix A).</p> | No impact.  |
| Socioeconomics            | <p>Up to 100 short-term jobs would be created for the manufacture, construction and installation of the seven systems. Approximately 2-3 long-term jobs would be created for the management and oversight of the systems. There would be a positive impact on the regional economy. JB MDL would reduce its energy costs.</p>  | <p>No impact. However, there would be no cost savings to the base from reduced energy cost, nor any new jobs created.</p> |
| Energy and Infrastructure | <p>The systems would provide renewable, clean, and less expensive energy to JB MDL. There would be adequate utility infrastructure to support the systems.</p>   | No impact.  |
| Materials and Waste       | <p>Construction would result in minor amounts of construction waste. Land clearing at Site C would generate minor amounts of vegetation waste. Operations would generate minor amounts of wastewater from routine cleaning of panels. At the end of their useful life, solar panels or their components could be recycled.</p>   | No impact.  |
| Human Health and Safety   | <p>With proper coordination, new buried utility lines could be sited to avoid worker contact with contaminated soils on McGuire. Rooftop systems would conform to NFPA requirements for system component labeling, emergency disconnection, and roof access/egress. Potential glare from the solar systems (that could adversely affect pilot vision) would be minimized by the lessee to the satisfaction of the JB MDL airspace manager. With adherence to an approved project-specific Health and Safety Plan, there would be no significant adverse impacts to human health and safety from Alternative 1.</p>   | No impact.  |

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