
3.0

AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This section describes the environmental characteristics that may be affected by the Proposed Action. The information provided serves as a baseline from which to identify and evaluate environmental changes resulting from activities proposed at Fort Greely. To provide a baseline point of reference for understanding any potential impacts, the affected environment is briefly described; any components of concern are described in greater detail.

Available reference materials, including EAs, EISs, and installation master plans, were acquired to assist in the description of the affected environment, including the original GMD VOC EA and the NMD Deployment EIS. To fill data gaps (questions that could not be answered from the literature) and to verify and update available information, installation and facility personnel; federal, state, and local regulatory agencies; and private individuals were contacted.

Environmental Resources

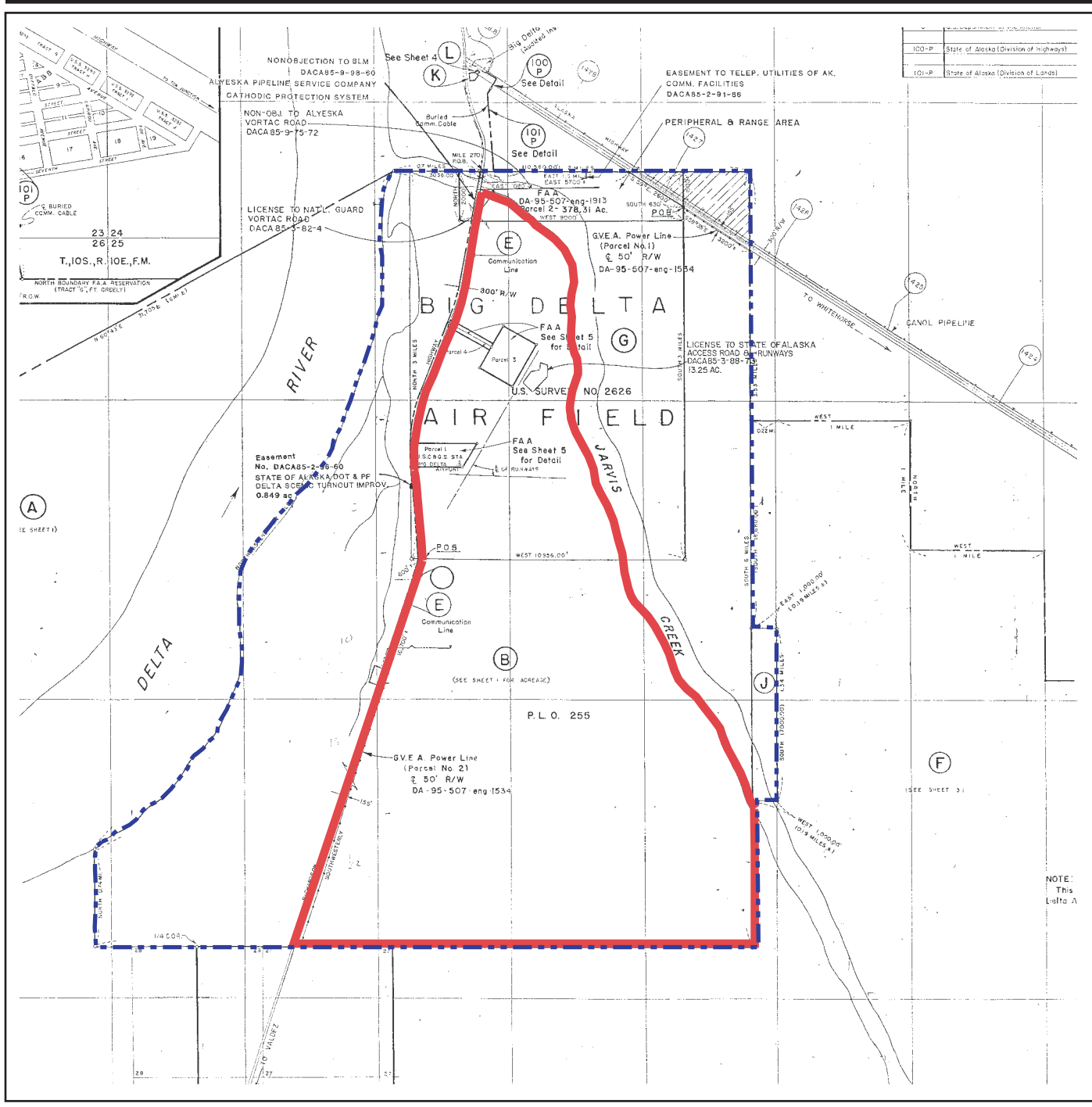
Thirteen broad areas of environmental consideration were considered to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. These areas included air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure, land use, noise, socioeconomics, water resources, and environmental justice. The areas were analyzed as applicable for each proposed activity.

The following sections summarize applicable baseline data from the GMD VOC EA and the NMD Deployment EIS. Information from any other source is specifically referenced.

3.1 FORT GREELY

Fort Greely is located approximately 172 kilometers (107 miles) southeast of Fairbanks and just south of the community of Delta Junction in an unincorporated borough. The current Fort Greely is approximately 2,914 hectares (7,200 acres) (figure 3-1). The remainder of the former Fort Greely was transferred to Fort Wainwright, Alaska and remains under USARAK control. MDA has assumed all costs associated with missile defense activities on Fort Greely. Effective 1 October 2002, USASMDC became the Senior Mission Command for Fort Greely, and is now responsible for providing the necessary support to its tenants, including the GBI VOC test bed.

Fort Greely originally contained 267,519 hectares (661,051 acres), most of which was withdrawn from the Bureau of Land Management. It consisted of the Main Post, two large training areas—Fort Greely West Training Area and Fort Greely East Training Area—and three outlying sites in the area.



EXPLANATION

- Fort Greely Installation Boundary
- - - Public Land Offering 255 area

Land Ownership

Fort Greely, Alaska

Figure 3-1



Not to Scale

Approximately 722 hectares (1,785 acres) of Fort Greely were determined to be surplus following its realignment. This area contained most of the buildings in the cantonment area and the airfield. (Moniz, 2001) The U.S. Army amended the previously approved Determination of Surplus as a result of the realignment of Fort Greely on 8 November 2001. The actual property that is still Fort Greely is a portion of Public Land Offering 255 that has been permanently removed from the control of the Bureau of Land Management.

3.1.1 AIR QUALITY

The significance of a pollutant concentration is determined by comparison with National Ambient Air Quality Standards (NAAQS) and State Ambient Air Quality Standards that establish limits on the maximum allowable concentrations of various pollutants to protect public health and welfare. Alaska has established State Ambient Air Quality Standards. Emissions of air pollutants from operations in Alaska are limited to the more restrictive standard (federal or state).

Region of Influence

Identifying the region of influence (ROI) for air quality assessment requires knowledge of the pollutant types, source emissions rates and release parameters, proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For air pollutants at Fort Greely, the ROI is generally limited to an area extending no more than a few tens of miles downwind from the source. Wind speeds average approximately 18 kilometers (11 miles) per hour and are generally southerly along the Delta River in the summer, which is the main construction season.

Affected Environment

Regional Air Quality

As discussed in the GMD VOC EA, air quality in Alaska is generally very good. Principal sources of air pollution in the Fort Greely area are from limited vehicle traffic and fuels burned for heat and/or power. The Fort Greely area is in attainment for all NAAQS and state standards.

Pollutants from mobile sources, such as automobiles and construction equipment, include hydrocarbons, carbon monoxide, nitrogen oxides, and particulate emissions. The primary pollutant of concern from mobile sources in Alaska is carbon monoxide. As such, this is the only pollutant from mobile sources analyzed in the NMD Deployment EIS, the GMD VOC EA, and this study. Up to 80 percent of carbon monoxide emissions contributing to exceedances of the NAAQS in Fairbanks have been attributed to mobile sources. Cold starts during moderately cold weather, prolonged idling periods, and low-level temperature inversions all contribute to pronounced air quality impacts from motor vehicle emissions in cold climates.

Existing Emissions Sources

Fort Greely has major emissions sources from boilers, generators, storage tanks, and prescribed burning/firefighter training. An application for a Title V Air Permit has been submitted to the Alaska Department of Environmental Conservation (ADEC) (Spiers, 2001a). This application will be revised by USASMDC in early 2003. Fort Greely is not a major source of hazardous air pollutants.

In order to meet Alaska Prevention of Significant Deterioration requirements, Fort Greely must manage activities to control emissions of particulate matter with a diameter of less than 10 microns (PM-10). Prior to the Base Realignment, these emissions on Fort Greely totaled 320 metric tons (353 tons) per year. The current synthetic minor source construction permit requires Fort Greely to limit PM-10 emissions and all other criteria pollutants to 227 metric tons (250 tons) per year each. (Alaska Department of Environmental Conservation, 2002) Construction activities anticipated for the Proposed Action, in addition to the activities previously analyzed in the GMD VOC EA, would fall within this parameter.

Based on the above calculations, ADEC issued a synthetic minor source construction permit to USASMDC to construct the GMD Test Bed at Fort Greely in August 2002. The permit requires USASMDC to limit emissions of oxides of nitrogen, carbon monoxide, particulate matter, sulfur dioxide, and volatile organic compounds. Actions specified in the permit include protecting ambient air quality, meeting applicable regulatory requirements, requiring source testing and monitoring, conducting visible emissions and particulate matter monitoring, and reporting the results to ADEC.

3.1.2 AIRSPACE

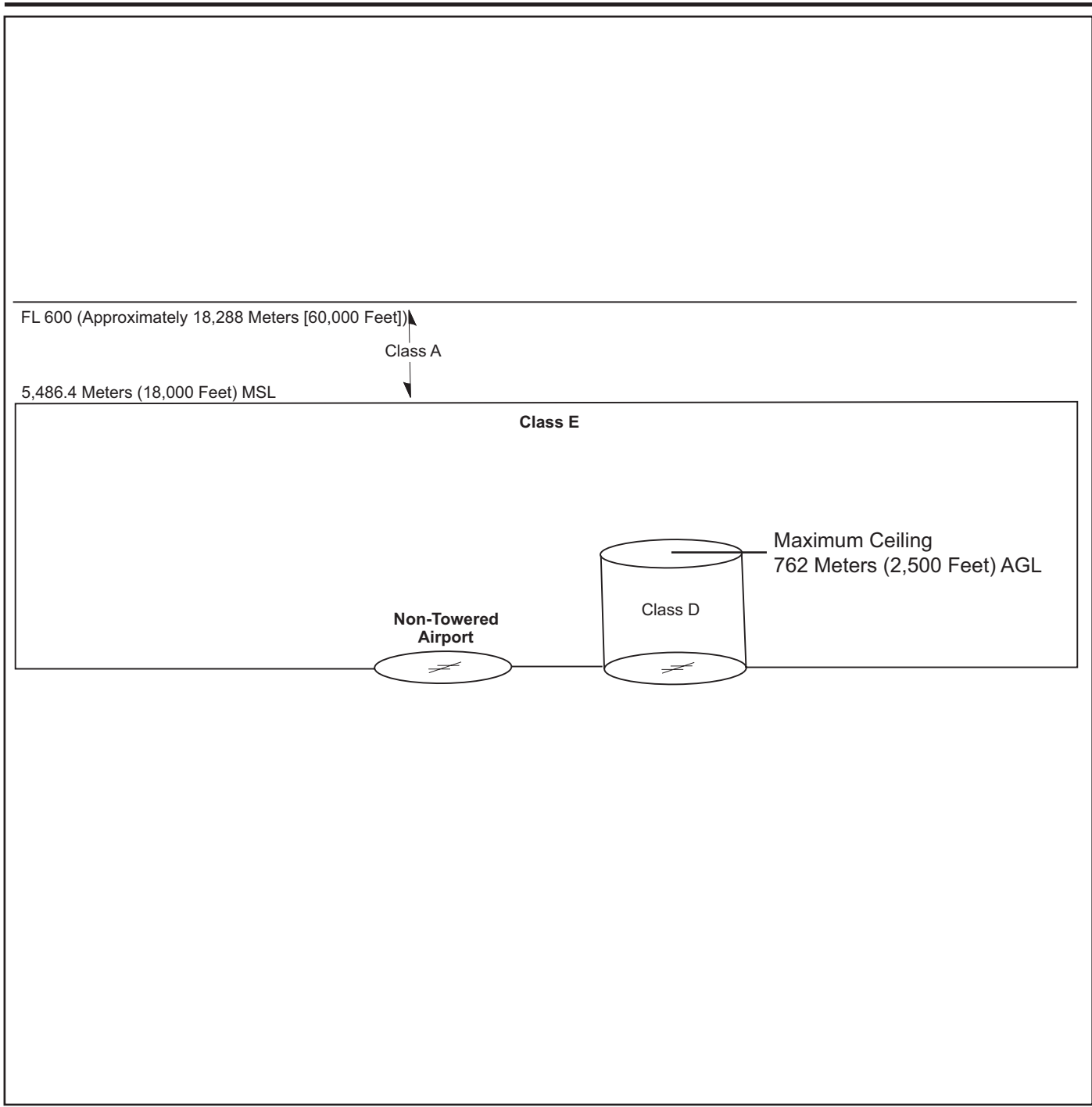
Airspace, or that space which overlies a nation and comes under its jurisdiction, is generally viewed as being unlimited. However, it is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. The scheduling, or time dimension, is a very important factor in airspace management and air traffic control.

Under Public Law 85-725, the FAA is charged with the safe and efficient use of the nation's airspace and has established certain criteria and limits to its use. The method used to provide this service is the National Airspace System. This system is "...a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures; technical information; and manpower and material" (Federal Aviation Administration, 2002). Figure 3-2 depicts the various classes of controlled airspace.

Region of Influence

The ROI is defined as the area that could be affected by the Proposed Action. For the purposes of this EA, it is that airspace within approximately 37 kilometers (20 nautical miles) of Allen Army Airfield at Fort Greely. A 32-kilometer (20-mile) radius of the airfield was chosen as the ROI since that would provide adequate airspace for civilian pilots to either avoid the airspace or contact the control tower prior to entering the airspace over Allen Army Airfield at Fort Greely.

The potentially affected airspace is described below in terms of its principal attributes, namely: controlled and uncontrolled airspace; enroute airways and jet routes, airports and airfields, air navigation and communication facilities, and air traffic control. The air traffic in the ROI is managed by the Anchorage Air Route Traffic Control Center.



EXPLANATION

- AGL = Above Ground Level
- FL = Flight Level
- MSL = Above Mean Sea Level

Classes of Non-Military Airspace

Not to Scale

Figure 3-2

Affected Environment

Controlled and Uncontrolled Airspace

Historically, Allen Army Airfield has been used by the military and to a lesser extent by civilian operators with prior military authorization. The primary users of the Airfield are U.S. Army helicopters and small, fixed-wing aircraft.

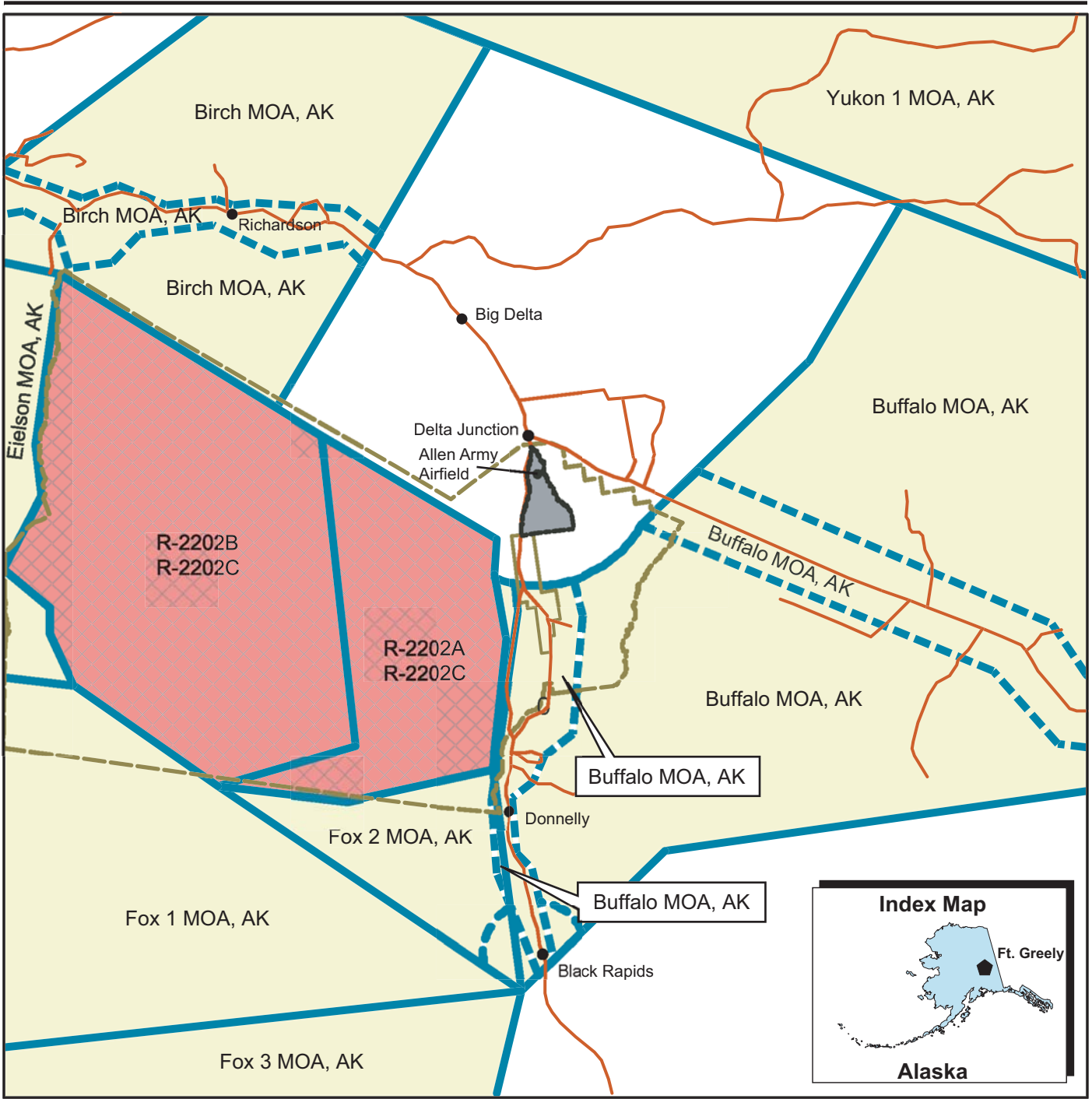
The FAA is responsible for air traffic control within U.S. airspace. There are two basic types of aircraft flight recognized by the FAA's air traffic control system: those operating under Visual Flight Rules (VFR), which depend primarily on the "see and be seen" principle of separation, and those operating under Instrument Flight Rules (IFR), which depend on separation by air traffic controllers.

Above Allen Army Airfield is Class A controlled airspace, extending upward from 5,486 meters (18,000 feet) above mean sea level to flight level (FL) 600 (60,000 feet above mean sea level), where only IFR flights are permitted in accordance with 14 Code of Federal Regulations (CFR) 91, *General Operating and Flight Rules*. In the vicinity of the Airfield, there is no Class B, C, or D controlled airspace, which are the types of airspace around airports with air traffic control towers. However, Class E airspace is currently at Allen Army Airfield. Class E airspace in general is defined in FAA's 14 CFR 71.71, "Class E Airspace," and defined by specific area/site in FAA Order 7400.9J.

Class E airspace surrounds Allen Army Airfield, extending from 213 meters (700 feet) to 5,486 meters (18,000 feet) above the surface. Class E airspace also extends out to protect the instrument approach corridors. Class E airspace contains the low-altitude federal airways that connect Very High Frequency Omni-directional Range (VOR) navigational aids and provide a system of "highways" for air transportation. The network of VORs across the country is supplemented by lower-powered non-directional beacons, which transmit low frequency radio signals on which a pilot can "home" or fly directly toward. The Delta Junction non-directional beacons are located approximately 1.8 kilometers (1 nautical mile) northeast of Allen Army Airfield.

Beyond the Class E airspace immediately surrounding Allen Army Airfield to the north is Class G (uncontrolled) airspace (figure 3-3). The Birch and Buffalo Military Operations Areas are located northwest and southeast of the airfield. A Military Operations Area is an airspace assignment established to separate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. Southwest of the airfield is a special use airspace (R 2202) in which flight is restricted (figure 3-3).

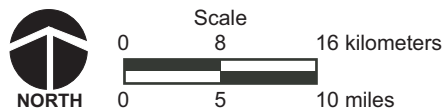
The Alaska Supplement (U.S. Government Flight Information Publication) states that within a 64.8-kilometer (35-nautical-mile) radius of the airfield are three controlled firing ranges, seven drop zones, and one restricted area (U.S. Department of Transportation, 2002). Pilots are warned to avoid overflying the sensitive test ammunition storage area located 2.4 kilometers (1.5 miles) southeast of the Airfield and to avoid overflight of the main post area. Circling south of runway 6/24 is not authorized, and right hand traffic patterns are used for runways 18 and 24.



EXPLANATION

- | | | | |
|--|-----------------------------------|--|---------------------------------|
| | Fort Greely Installation Boundary | | Towns |
| | Military Operating Area (MOA) | | Highway VFR Corridors |
| | Restricted Air Space | | Roads |
| | Unrestricted Air Space | | Donnelly Training Area Boundary |

Airspace



Fort Greely, Alaska

Figure 3-3

Allen Army Airfield does not currently have radar. The only radar in the area supports Donnelly Range. It is primarily used for tracking activities over the Donnelly Range within its Military Operations Areas and restricted airspaces, but does not have the range to cover out to Allen Army Airfield (Sharp, 2002). Fort Wainwright and Anchorage radars are not able to detect traffic below 1,524 meters (5,000 feet) at Allen Army Airfield.

Military Training Routes

The U.S. Air Force is a major user of airspace in the vicinity of Fort Wainwright and Fort Greely. DoD has identified the Stuart Creek and Oklahoma/Delta Creek Impact Areas as the primary sites for military air-to-ground training. Restricted Area R2205 over the eastern portion of the Fort Wainwright Yukon Training Area is the primary air-to-ground weapons range for the U.S. Air Force in Alaska. With the recent addition of Military Operations Areas around R2202, tactical operations are conducted in and around Fort Greely (figure 3-3).

Airports/Airfields

There are no other military airports/airfields in the airspace ROI. Delta Junction Airport is the nearest civilian airfield.

Air Navigation and Communications Facilities

The Big Delta VOR with Tactical Air Navigation (VORTAC) is located on the northwest side of Allen Army Airfield. A VOR provides line-of-sight magnetic compass bearings.

Airport radio communications are at very high frequency (VHF). A common traffic advisory frequency is 122.9, with weather advisory service on 135.65. Operations frequency is 134.45, and on ultra high frequency at 241.0. Civilian aircraft and FAA facilities normally use VHF radios for communication. Allen Army Airfield currently does not have an assigned VHF due to its inactive status.

Air Traffic Control

The airspace ROI lies within the Anchorage Oceanic Control Area/Flight Information Region (CTA/FIR) and within the U.S. Alaskan Air Defense Identification Zone. In the Class A (positive control areas) airspace all operations are conducted under IFR procedures and are subject to air traffic control clearances and instructions. Aircraft separation and safety advisories are provided by air traffic control, the Anchorage Air Route Traffic Control Center. In Class E airspace (general controlled airspace) operations may be either under IFR or VFR: separation service is provided to aircraft operating under IFR only, and to the extent practicable, traffic advisories to aircraft operating under VFR, by the Anchorage Air Route Traffic Control Centers. For Class G airspace (uncontrolled airspace), operations may be either under instrument or visual flight rules, but no air traffic control service is available. There is no airport surveillance radar operating at Allen Army Airfield.

The majority of the civilian north and south traffic is limited to two existing flight corridors (Richardson Highway VFR corridor and the Alaskan Highway VFR corridor) that overlie Richardson Highway and Alaskan Highway, which generally parallel Fort Greely on the west and east, respectively, and thus pass very near to Allen Army Airfield. They also cross the established approach and departure corridors of all runways on the west side of the airfield.

3.1.3 BIOLOGICAL RESOURCES

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by federal or state agencies, to assess their sensitivity to the effects of the Proposed Action. For the purpose of discussion, biological resources have been divided into the areas of vegetation, wildlife, threatened and endangered species, and environmentally sensitive habitat.

Region of Influence

The ROI for biological resources includes the area within and adjacent to the sites on Fort Greely that could potentially be affected by the proposed activities.

Affected Environment

Vegetation

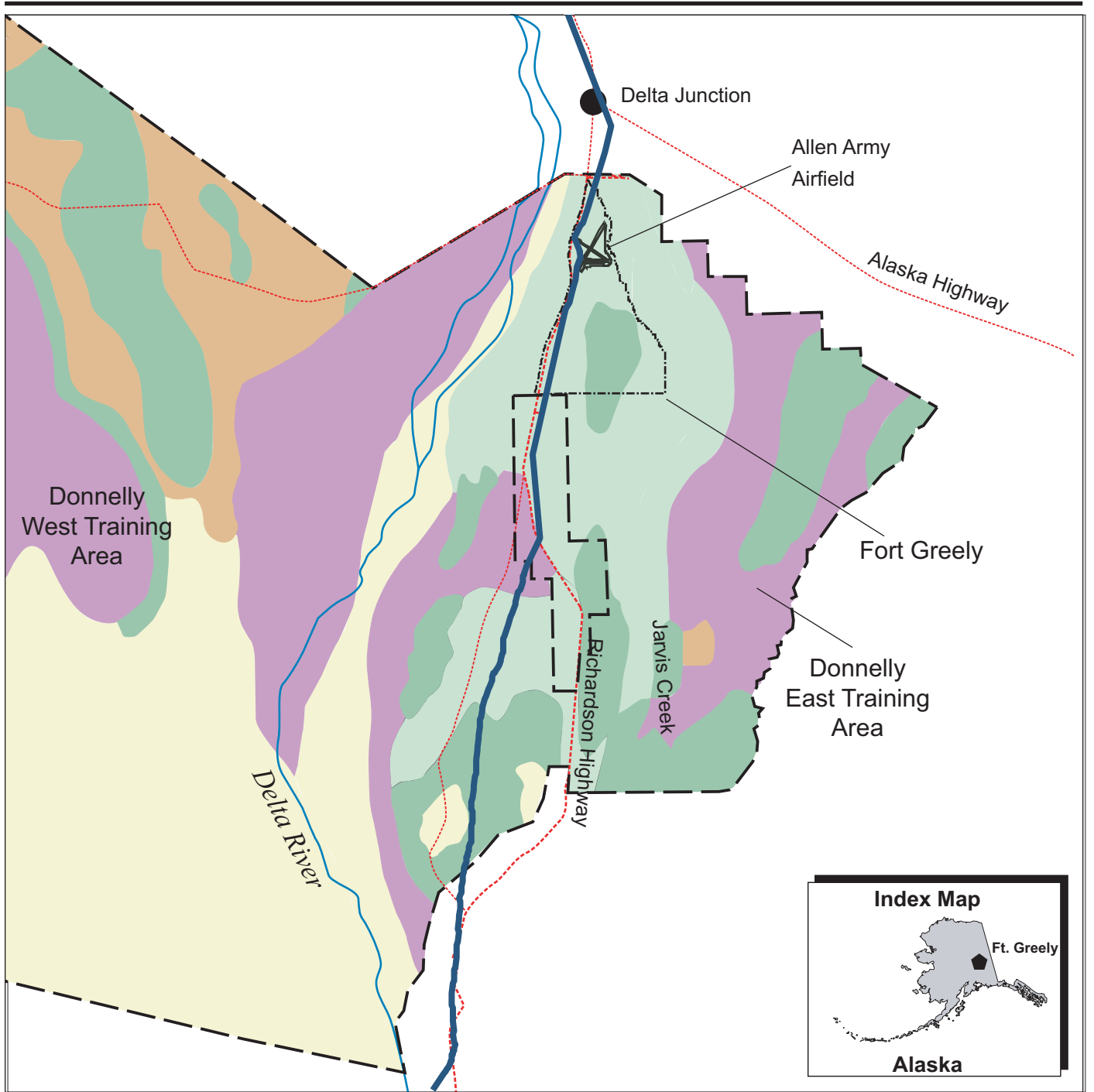
The predominant vegetation (figure 3-4) at the proposed sites is low growing spruce forest, which is common throughout Interior Alaska. Lowland black spruce interspersed with heath bog communities covers a large portion of Fort Greely. Dominant tree species are black spruce and balsam poplar. The understory and groundcover consist of *Vaccinium* spp. (mountain cranberry and bog blueberry), marsh labrador tea, crowberry, and a variety of mosses and lichens.

Native vegetation was removed from most of the cantonment area during the 1950s. The area has been landscaped and is maintained by mowing. A few isolated pockets of forest do remain, particularly north of the airfield and south of the missile field.

In June 1999, a wildfire burned through the area, and as a result, much of the vegetation within Fort Greely was destroyed. Consequently, the habitat types in the burned areas are now in an early successional stage consisting mostly of bare soil, grasses, sprouts, and seedlings. Approximately 54 hectares (134 acres) of the area proposed for test bed use underwent initial site preparation activities in late 2001 and 2002, including vegetation removal and initial earthwork related to site and road grading.

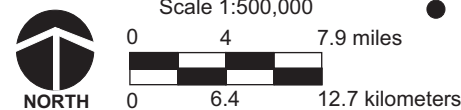
Wildlife

Fort Greely and the Donnelly Training Area support the largest number of game species found at any military installation within the United States. The most common big game species include black bear, grizzly bear, wolf, moose, bison, and barren ground caribou. Within the current Fort Greely, moose is the most common big game species. There are approximately 1.6 to 2.5 moose per 2.6 square kilometers (1 square mile) in the Fort Greely habitat area (Dubois, 2002). According to Alaska Department of Fish and Game (Ihlenfeldt, 2002), only one-third of Fort Greely contains quality moose habitat of about 971 hectares (2,400 acres). This equates to 6 to 10 moose utilizing all of Fort Greely. Fort Greely contains a small percentage of the available habitat for moose in the region. Alaska Department of Fish and Game, Game Management Unit 20D, which Fort Greely falls within, has approximately 14,589 square kilometers (5,633 square miles) for an estimate of 4,956 to 6,704 moose in this unit, or 0.9 to 1.2 moose per 2.6 square kilometers (1 square mile).



EXPLANATION

- | | | | |
|--|---------------------------------|--|----------------------|
| | Roads and Major Trails | | Mixed Forest |
| | Rivers | | Tundra/Barren |
| | Donnelly Training Area Boundary | | Coniferous |
| | Trans-Alaska Pipeline | | Deciduous/High Brush |
| | Fort Greely Boundary | | Muskeg |
| | City | | |



Area Vegetation

Fort Greely, Alaska

Figure 3-4

Commonly occurring predators in the Fort Greely area include grizzly bear, black bear, gray wolf, red fox, marten, coyote, and wolverine. Additional species trapped for fur at Fort Greely are mink, muskrat, snowshoe hare, beaver, lynx, wolf, and red squirrel. Wildlife usage of the cantonment and similarly developed areas include small rodents, ground squirrels, and bats. Moose and other big game species also occasionally utilize these areas. Avian species occurring within the project areas include the common raven, willow ptarmigan, rock ptarmigan, spruce grouse, ruffed grouse, owls, and a variety of songbirds.

Threatened and Endangered Species

No federally proposed or listed threatened, endangered, or candidate plant species are found in Interior Alaska and no known threatened or endangered wildlife species occur on Fort Greely.

Environmentally Sensitive Habitat

No federally designated critical habitat has been identified on Fort Greely.

Wetlands in Alaska are defined by the U.S. Army Corps of Engineers as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” The U.S. Army Corps of Engineers Alaska District and the U.S. Environmental Protection Agency (EPA) regulate wetlands through the Clean Water Act Section 404 Permitting Program. Based on the National Wetlands Inventory, figure 3-5 shows a small palustrine, scrub-shrub, emergent temporarily flooded wetland area near the north end of the 18/36 runway west of Jarvis Creek. A palustrine, scrub-shrub, needle-leaved evergreen wetland is also located south of the cantonment area and east of the GBI VOC test bed, straddling Landfill Road. Also, a third area of palustrine emergent persistent semi-permanently flooded wetland is located along the southern boundary of Fort Greely, southeast of the landfill. (U.S. Army Corps of Engineers, Alaska District, 1999) However, National Wetlands Inventory maps are not always reliable, and a final determination must be made by the U.S. Army Corps of Engineers based on a field investigation. This was done for Fort Greely and only the area along the southern boundary was determined to be a wetland (Phillips, 2002).

3.1.4 CULTURAL RESOURCES

Cultural resources include prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason. For ease of discussion, cultural resources have been divided into archaeological resources (prehistoric and historic), historic buildings and structures, native populations/ traditional resources (e.g., Native American sacred or ceremonial sites), and paleontological resources.

Numerous laws and regulations require that possible effects to cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., SHPO and the Advisory Council on Historic Preservation). In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic

Preservation Act (especially Sections 106 and 110), the Archaeological Resources Protection Act, the Antiquities Act of 1906, the American Indian Religious Freedom Act, and the Native American Graves Protection and Repatriation Act.

Region of Influence

The term ROI is synonymous with the "area of potential effect" as defined under cultural resources regulations, 36 CFR 15 Part 800.16(d). In general, the ROI for cultural resources encompasses areas requiring ground disturbance. The currently defined ROI for the proposed activities at Fort Greely includes alignments of the proposed fences for the cantonment area, southern boundary, and Allen Army Airfield, and the area for extension of the airfield's 18/36 runway, associated approach lighting, and the radar site.

Affected Environment

Prehistoric and Historic Archaeological Resources

As discussed in the GMD VOC EA, archaeological evidence indicates that the Fort Greely area has been occupied for 10,000 to 12,000 years. Sites are found in every vegetative community and predominantly west of the Delta River out of the ROI. Most of the sites are surface flake scatters, isolated artifacts, or are found in a disturbed context and contain insufficient information to determine site function, affiliation, or age.

In 1997, the Bureau of Land Management and the U.S. Army Corps of Engineers, Alaska District conducted a survey of the Base Realignment and Closure cantonment area (including the runway area). Due to a lack of subsurface artifacts, the cantonment area is considered clear of cultural resources concerns. However, two archaeological resources sites were identified in the Fire Tower Hill area. No sites were identified in the airfield area.

There are no recorded sites within the proposed GBI area, and due to the degree of disturbance to the area and the physiographic setting within which the GBI area occurs, the potential for archaeological materials is considered low. An archaeological survey of the Fort Greely ROI performed in August 1999 confirmed this assumption (Northern Land Use Research, Inc, 1999). Recent use sites (i.e., less than 50 years in age) are associated with contemporary hunters, trappers, and the military. None of these display sufficient significance or integrity to be considered eligible for listing in the National Register.

Historic Buildings and Structures

As a result of archaeological investigations, no historic sites have been identified at the current Fort Greely. However, a review of the World War II and Cold War inventory of the former Fort Greely by the Alaska SHPO and subsequent consultation between the U.S. Army and the SHPO indicates that there are 26 buildings and structures eligible for listing in the National Register. A Memorandum of Agreement between the U.S. Army and the Alaska SHPO regarding these buildings has been completed. The Memorandum of Agreement stipulated that all of the buildings within the district "may be altered, demolished, leased with no restrictions, or transferred out of federal ownership with no restrictions" following completion of Historic American Buildings Survey (HABS) Level 1 recordation. All HABS information has been delivered and the Memorandum of Agreement between SHPO and the U.S. Army has been signed. (Spiers, 2001a)

Native Populations/Traditional Resources

Fort Greely encompasses lands historically and prehistorically occupied by the Tanana Indians. Salcha Natives used the Delta River and Delta Creek for subsistence hunting in historic times; however, this generally ceased by the 1920s. By 1962 there were no native settlements in the Tanana Valley between Healy Lake and Nenana.

No Alaska Native traditional cultural properties have been formally identified within the ROI. In addition, no Alaska Native reservations or villages are in the immediate vicinity of Fort Greely. Tanana is the closest Alaska Native village, approximately 129 kilometers (80 miles) east of Fort Greely.

Paleontological Resources

The ROI at Fort Greely is situated within an alluvial fan, characterized by glacial till; portions of the ROI are also underlain by permafrost. Although the bones of Ice Age mammals have been found elsewhere on the installation, no paleontological remains have been encountered within the ROI.

3.1.5 GEOLOGY AND SOILS

Geology and soils include those aspects of the natural environment related to the earth, which may affect or be affected by the Proposed Action. These features include physiography, geologic units and their structure, the presence/availability of mineral resources, soil condition and capabilities, and the potential for natural hazards.

Region of Influence

The ROI for geology and soils includes that area that could potentially be disturbed by construction activities associated with the proposed fences, the runway extension, and the radar site.

Affected Environment

Physiography

Fort Greely encompasses a portion of Tanana–Kuskokwim Lowlands physiographic province. Streams flowing through the foothills generally originate in the Alaska Range and flow north in rugged V-shaped canyons and across broad terraced valleys. Fort Greely is situated between two significant drainages originating in the foothills—the Delta River to the west and Jarvis Creek to the east. The terrain at the site is mildly undulating with elevations ranging from approximately 411 to 442 meters (1,350 to 1,450 feet). The site vicinity has a northeast surface gradient of about 18 meters (60 feet) per 1.6 kilometers (1 mile).

Geology

Fort Greely is located on a low alluvial terrace that has a gently undulating surface. The terrace is composed of glacial outwash deposits that are underlain by till, which is in turn underlain by stratified gravel. Moraine features to the east and south of the cantonment are composed of coarse, unstratified, unsorted till ranging from silty gravel with sand to sandy silt with gravel.

Wind blown loess of glacial origin forms a mantle over much of the Fort Greely area, ranging from several centimeters thick to greater than 1.5 meters (5 feet) thick. Discontinuous permafrost occurs throughout the region. The permafrost ranges from the surface to as much as 66 meters (217 feet) below ground surface.

Soils

No detailed soil surveys have been completed for Fort Greely. Shallow, well-drained silt loams with sandy to gravelly underlying material occupy most of the rolling uplands on the surface of the glacial moraines and alluvium east of the Delta River. The exact thickness and areal extent of these soils at the site are unknown.

Geologic Hazards

Fort Greely lies in seismic Zone 3, where major earthquake damage has a 10 percent probability of occurring at least once in 50 years. Earthquake epicenters are scattered throughout Fort Greely and surrounding areas. From past studies there appears to be no concentration of seismic events in the area, and serious damage has not been reported.

Permafrost was not encountered within test borings conducted at the proposed GBI VOC test site in 1999, nor did ground penetrating radar indicate any ice lenses or other permafrost features.

3.1.6 HAZARDOUS MATERIALS AND WASTE

The relevant aspects of hazardous materials/waste management include the applicable federal and state regulations and Fort Greely Environmental Procedures. These procedures include specific procedures for hazardous materials usage and hazardous waste generation, and management programs for existing hazardous waste-contaminated sites within areas potentially affected by the Proposed Action, as well as spill notification and response procedures.

Hazardous materials and hazardous waste management activities are governed by specific environmental regulations. Any hazardous materials and waste management plans applicable to the proposed activities that have lapsed since realignment would be updated and reinstated. For the purposes of the following analysis, the terms hazardous materials or hazardous waste will mean those substances defined by both federal and state regulations.

Region of Influence

The ROI for hazardous materials and hazardous waste management includes the area of the Proposed Action and support activities at Fort Greely.

Affected Environment

Hazardous Materials Management

The *Hazardous Materials and Waste Management Procedures*, created by USASMDC for Fort Greely in October 2002 as part of the *Fort Greely Environmental Procedures*, complies with all applicable state and federal regulations. It established standard operating procedures for the

correct management and storage of hazardous materials. (U.S. Army Space and Missile Defense Command, 2002b)

USASMDC has also prepared *Spill Notification and Response Procedures* for Fort Greely (U.S. Army Space and Missile Defense Command, 2002b), which leads personnel through procedures necessary to safely detect, report, contain, and clean up all spill discharges on post. Also, a *Storm Water Pollution Prevention Plan* (SWPPP) is scheduled to be completed in December 2002. The plan includes site-specific good housekeeping practices, facility surveys, satellite accumulation area inspections, employee training, record keeping and internal reporting, comprehensive site compliance evaluation, and sediment and erosion control. The installation also complies with applicable reporting requirements by submitting annual emergency response and extremely hazardous substances updates to the local emergency management officials.

Hazardous Waste Management

Fort Greely is registered by the EPA as a small quantity generator. The wastes are accumulated in 208-liter (55-gallon) drums at satellite accumulation points before disposal. An unnumbered building near T100 serves as the temporary hazardous waste storage facility (Spiers, 2001a). Hazardous waste management is performed in accordance with the *Hazardous Materials and Waste Management Procedures* established by USASMDC for Fort Greely. (U.S. Army Space and Missile Defense Command, 2002b)

Pollution Prevention

A Pollution Prevention Plan for Fort Greely is scheduled to be developed and implemented in fiscal year 2003. This plan would aid in the elimination or reduction of hazardous substances, pollutants, and contaminants. Recycling activities at Fort Greely include fuels, batteries, and brass shell casings.

Installation Restoration Program

No Installation Restoration Program (IRP) sites on Fort Greely have been listed on the Comprehensive Environmental Response, Compensation, and Liability Act National Priorities List. In addition, there are no known leaking underground storage tank sites on the installation (Boerst, 2002).

Three buildings within the cantonment area are on the State Priorities List for cleanup and/or monitoring. These include Building 612, where waste drains to the sanitary sewer; Building 601, where transformers, solvents, and herbicides have been stored in the Resource and Utilities yard north of the building; and Building 605, which includes a maintenance shop, paint bay, and battery storage facility.

Environmental cleanup at Fort Greely has been addressed under both the IRP and the Base Realignment and Closure Environmental Cleanup Program. Numerous sites have been investigated by the U.S. Army and remediated under these programs. Investigations are now complete at all known sites, while several suspected sites are still being investigated. Cleanup of the nuclear waste line from the past activities of the SM-1A nuclear reactor has been completed, and other cleanup actions at Building 110 and the old firefighter training pits are currently underway. Building 101 and several other sites are being characterized for the extent

of contamination and scheduled for cleanup. (Spiers, 2001b) Remediation activities will follow Fort Greely's *Institutional Controls, Excavation Clearances Procedures*, which requires permission before initiating digging. (U.S. Army Space and Missile Defense Command, 2002b)

Other

Due to the age of the existing control tower at the Allen Army Airfield, lead-based paint and/or asbestos could be present.

3.1.7 HEALTH AND SAFETY

Health and safety includes consideration of any activities, occurrences, or operations that have the potential to affect one or more of the following:

The well-being, safety, or health of workers—Workers are considered to be persons directly involved with the operation producing the effect or who are physically present at the operational site.

The well-being, safety, or health of members of the public—Members of the public are considered to be persons not physically present at the location of the operation, including workers at nearby locations who are not involved in the operation and the off-post population. Also included within this category are hazards from equipment, structures, plants, and animals.

Region of Influence

The ROI for health and safety of workers includes the immediate work areas used during the proposed construction activities. The ROI for public safety includes properties immediately adjacent to the installation and the transportation network for hazardous materials.

Affected Environment

Fort Greely maintains maintenance personnel and firefighting support. The fire station is located in the cantonment area and is staffed to support the current MDA mission. To assist in emergency response, Fort Greely maintains cooperative agreements with most of the small communities within a 161-kilometer (100-mile) radius of the installation.

The Allen Army Airfield at Fort Greely is only minimally used for training. The Clear Zones for the airfield are currently contained within the installation boundaries. No airport surveillance radars currently exist at Fort Greely.

Under a Memorandum of Understanding, the Bureau of Land Management Alaska Fire Service is responsible for fire detection and suppression on withdrawn lands. The Alaska Fire Service has a reciprocal Fire Protection Agreement with the State of Alaska, Department of Natural Resources, Division of Forestry. Nineteen fires of 40 hectares (100 acres) or more occurred on Fort Greely from 1954 to 1997. A 15-meter (50-foot) firebreak around all facilities has historically been required.

3.1.8 INFRASTRUCTURE

Infrastructure addresses those facilities and systems that provide power, water, wastewater treatment, the collection and disposal of solid waste, and other utility services.

Region of Influence

The utility systems that could potentially be affected by the Proposed Action include potable water distribution; wastewater collection; solid waste collection and disposal; telephone lines; and electrical lines.

Affected Environment

Solid Waste

Current solid waste management operations consist of solid waste collection, volume reduction by open pit burning, and final disposal (including ash) in the landfill. The installation landfill is an Alaska Class II Municipal Solid Waste Landfill that is currently permitted to receive both sewage sludge and asbestos materials. The current facility is not lined, but does have groundwater monitoring tubes. Cells at this facility are about 18 meters (60 feet) by 61 meters (200 feet) by 6.1 meters (20 feet) deep and have the capacity for another 1.5 years usage under current conditions. Once the existing landfill is closed, new cells are planned to be opened immediately south of the existing cells. A permit for this effort has been submitted to ADEC. Open burning is authorized under the current permit and conducted about once a week in a burn facility located away from the working force and not inside the landfill boundary. It is limited to wood, paper, and cardboard that do not create black smoke or smoldering of waste. Gravel is used for daily cover at the working face of the landfill.

Water

The potable water supply at Fort Greely is currently managed from Building 606, the power plant. Two groundwater wells are used to supply all of the existing building facilities and fire hydrants within the main cantonment. These two wells have a combined capacity of 4.2 million liters per day (1.1 million gallons per day). A 712,000-liter (188,000-gallon) storage tank is located in Building 606 and feeds two 76,000 liter (20,000 gallon) pressure tanks that pump into a piped water system. The existing installation water system, when all buildings were in use, consumed roughly 1.1 million liters per day (0.3 million gallons per day). Two new 1,893-liter- (500-gallon-) per-minute wells were developed during initial GMD site preparation activities at the GBI test bed to provide a dependable water source for the test bed activities.

Wastewater

The sewage system at Fort Greely has a capacity of 1.7 million liters per day (0.46 million gallons per day) and is operated by USASMDC. Wastewater usage, when all buildings were in use, was less than 1.2 million liters per day (0.32 million gallons per day). Sewer lines convey wastewater to an Imhoff (septic) tank inside Building 633. Sludge from the bottom of this tank is pumped to sludge drying beds. Once the sludge is dried, it is hauled to the landfill. Effluent from the Imhoff tank is conveyed to the sewage lagoon. The lagoon is aerated for further treatment. Effluent leaving the sewage lagoon is discharged to Jarvis Creek under a National Pollutant Discharge Elimination System (NPDES) permit held by USASMDC. Monitoring and sampling of the effluent is conducted daily by the Fort Greely Department of Public Works work

force. All wastewater facilities are in excellent condition and meet current and future MDA mission demands.

Electricity

Electrical power requirements at Fort Greely are currently met through a combination of power supplied from Fort Wainwright and on-post generators run by Fort Greely personnel. The electrical power from Fort Wainwright is "wheeled" over the commercial electrical grid that exists between the two bases and is eventually supplied to Fort Greely through an existing 2.9-megawatt (MW) substation. The average electrical power demand at Fort Greely was approximately 1.8 MW when all buildings were in use. However, peak demands of up to 3.3 MW sometimes occurred during the winter. When the demand at Fort Greely exceeded the capacity of the substation, the additional power requirements were met by the three on-post diesel-powered generators, which together can generate up to 0.95 MW.

Traffic

With no existing security fences around the cantonment area, southern boundary, or Allen Army Airfield, vehicular traffic can currently access Fort Greely without entering through the main security gate. Personnel from Donnelly Training Range routinely use roads, paths, and fords to cross between the east and west ranges. These main routes include a ford to cross Jarvis Creek near the airfield and Firebreak Road in the southern area to access other fords.

3.1.9 LAND USE

Land use can be defined as the human use of land resources for various purposes including economic production, natural resources protection, or institutional uses. Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of uses that are allowable or protect specially designated or environmentally sensitive uses. Potential issues typically stem from encroachment of one land use or activity on another, or an incompatibility between adjacent land uses that leads to encroachment.

Region of Influence

The ROI for land uses includes all lands on and adjacent to Fort Greely that could be potentially affected by the Proposed Action.

Affected Environment

Fort Greely is not located in a municipality or a borough, and there are no local zoning or land use policies. There are also no state zoning or land use plans or guidelines for the area. Therefore, existing land uses do not conflict with any federal, state, or local land use plans or policies. The land around Fort Greely is composed of forests, tundra, or wetlands and serves as a military training range. The closest inhabited structures are in Delta Junction.

The current Fort Greely is approximately 2,914 hectares (7,200 acres). The boundary was established using the border described in Public Land Offering 255. The remainder of the former Fort Greely was transferred to Fort Wainwright, Alaska and remains under USARAK control. Other than the vehicle test loops used to test vehicles in extreme weather conditions and varying snow depths, there are very few man-made structures on the range areas under USARAK control.

When portions of the range are not in use for the testing of materials, infantry, and artillery, engineer units use the area for non-firing marches, troop maneuvers, artillery unit training, and small arms training (with blank ammunition).

In the past, the military and the public used the former Fort Greely for a wide range of recreation activities. Portions of the installation were closed at times for military missions, and impact areas were always closed for safety considerations. Otherwise, most of the remainder of the installation was used for recreation after obtaining permission from Fort Greely. The most common recreation activities on the installation were hunting, fishing, and trapping. Other activities include off-road vehicle use, hiking, backpacking, camping, boating, bicycling, wildlife watching, and skiing. Recreational use of the Donnelly Training Area continues; however, for security reasons, the current Fort Greely is only accessible to authorized personnel.

The majority of Fort Greely is heavily forested, including the western boundary as viewed from Richardson Highway. This is the only area commonly observed by the public.

The use of Fort Greely's natural resources for legal subsistence is nonexistent (U.S. Department of the Army, 1999). Hunting, fishing, and trapping permits for Fort Greely are issued to civilians. Most are residents of non-native communities in Big Delta and Delta Junction.

3.1.10 NOISE

Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with time; therefore, to compare levels over different time periods, several descriptors have been developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on humans and animals, including land-use compatibility, sleep interference, annoyance, hearing loss, speech interference, and startle effects.

The decibel (dB) is the accepted standard unit for the measure of the amplitude of sound because it accounts for the large variations in amplitude and reflects the way people perceive changes in sound amplitude. Sound also varies with frequency or pitch. When describing sound and its effect on a human population, A-weighted sound levels, measured in A-weighted decibels (dBA), are typically used to account for the response of the human ear. The term "A-weighted" refers to a filtering of the sound signal to emphasize frequencies in the middle of the audible spectrum and to de-emphasize low and high frequencies in a manner corresponding to the way the human ear perceives sound.

The primary environmental noise descriptor used in environmental noise assessments is the A-weighted Day-Night Equivalent Sound Level (which is abbreviated DNL and symbolized as L_{dn}). The DNL was developed to evaluate the total daily community noise environment. The DNL is the average A-weighted acoustical energy during a 24-hour period, with 10 dBA added to all signals recorded within the hours of 10:00 p.m. and 7:00 a.m. This 10 dBA is a penalty that accounts for the extra sensitivity people have to noise during typical sleeping hours.

Almost all federal agencies having non-occupational noise regulations use DNL as their principal noise descriptor for community assessments.

Region of Influence

The ROI for noise includes those areas potentially affected by proposed activities that could experience DNLs greater than or equal to 65 dBA, those areas potentially affected by proposed activities that might experience short-term noise events (of less than 8 hours) with noise levels greater than or equal to 85 dBA, and those areas along roadways potentially affected by proposed activities that might experience a Continuous Equivalent Sound Level ($L_{eq(1 \text{ hour})}$) greater than or equal to 67 dBA.

Affected Environment

The area surrounding Fort Greely is sparsely populated, and thus, would be expected to have a background noise level of DNL less than or equal to 55 dBA. However, under certain conditions, a low-level droning noise from a nearby Trans-Alaska pipeline pumping station can be heard at Fort Greely and was estimated to be approximately 55 dBA.

The principal sources of noise at Fort Greely are vehicular traffic and military activities. In the past, a small firing range was operated on Fort Greely for both training and recreational purposes. This firing range could become operational again in the future. Other noise sources could include aircraft overflights and maintenance equipment. Frequency and duration of noise from military activities on surrounding training lands vary as a factor of the irregular training schedules. Noise from military activity on Donnelly East and West training lands, while intermittent, can be fairly loud. Noise from weapons testing at Donnelly Training Areas adjacent to Fort Greely typically ranges from 112 to 190 dBA. The noise levels on the ground from a helicopter at 460 meters (1,500 feet) and 76 meters (250 feet) of altitude are 79 dBA and 95 dBA, respectively. Maintenance equipment, such as the tracked vehicles used for trail maintenance, can generate noise levels up to 105 dBA.

The main highways in the vicinity of Fort Greely are the Richardson Highway and the Alaska Highway. No noise sensitive receptors (churches and communities) are known immediately adjacent to Fort Greely. The town of Delta Junction is located about 8 kilometers (5 miles) north of the Fort Greely cantonment area. Delta/Greely School District leases a school building at Fort Greely, but it is currently not used as a classroom facility. The gym, however, is used for basketball and other extracurricular activities after normal school hours by authorized personnel.

3.1.11 SOCIOECONOMICS

Socioeconomics describes a community by examining its social and economic characteristics. Several demographic variables are analyzed in order to characterize the community, including population size, the means and amount of employment, and income creation. In addition, socioeconomics analyzes the fiscal condition of local government and the allocation of the assets of the community, such as its schools, housing, public services, and healthcare facilities.

Region of Influence

The ROI is assumed to include Fort Greely, Delta Junction, and Big Delta.

Affected Environment

Fort Greely is in Interior Alaska, on the Richardson Highway. The nearest town to Fort Greely is Delta Junction, about 8 kilometers (5 miles) north of the main cantonment area. The area is

sparsely populated with an economy dependent on Fort Greely, state employment, some agriculture and Alyeska Pipeline Service Company. Fort Greely's arctic training became a major contributor to the local economy. In July 1995, the Base Realignment and Closure Commission recommended realignment of Fort Greely, which was completed in July 2001. However, changes were immediately made to the recommended realignment to establish the current Fort Greely.

Population

The ROI is part of a wider region known as the Southeast Fairbanks Census Area. In 2000, it was estimated that the Census Area had a population of 6,174. The population of the ROI at that time was 2,050, or 33 percent of the Census Area.

Population growth in the Census Area was affected by the reduction in personnel at Fort Greely. The population in the census area increased approximately 7.3 percent between 1990 and 2000, whereas the rest of the state's growth was 14 percent. The impact of the downsizing of Fort Greely on the region's population is further emphasized as Fort Greely's share of the Census Area population fell from 52.2 percent in 1990 to 22.5 percent in 2000.

The Alaska Native population of the ROI in 2000 was relatively small, with Fort Greely having the lowest density of the three communities at 1.3 percent. Delta Junction and Big Delta had Alaska Native populations of 4.0 percent and 1.5 percent, respectively (U.S. Census Bureau, 2002).

Employment

Before realignment, Fort Greely accounted for approximately 50 percent of all the employment in its surrounding communities, emphasizing the lack of diversity in the economy of the ROI. The School District is the second largest government employer in the area, along with state and federal highway maintenance services. The highway also provides some tourism-related employment during the summer months.

Unemployment in 2000 was 6 percent and 12.8 percent for Delta Junction and Big Delta respectively. The number of residents 16 years and over not in the labor force was 40.9 percent for Delta Junction, and 48.4 percent for Big Delta (U.S. Census Bureau).

Retail Sales

Retailing within the ROI is limited to small convenience stores, usually combined with a gas station, and tourism-related retailing, including bars and restaurants. The nearest variety retailing center to the ROI is Fairbanks.

Income

Big Delta had the highest median income between the two communities that are located close to Fort Greely. Big Delta also had the highest proportion of individual residents living below the poverty level, with 30 percent. Delta Junction had 19.4 percent. According to the 2000 Census Bureau data, the median income for Big Delta was \$49,000 and for Delta Junction was \$43,500.

Housing, Education, and Health

There were 654 homes in the Big Delta and Delta Junction communities in 2000. A little over 27 percent were vacant. (U.S. Census Bureau) However, temporary housing and hotels are currently at a premium in the Delta Junction area as rents have substantially increased due to construction work at Fort Greely.

There are five schools in the Delta/Greely School District, with an estimated student roll of 604. The school at Fort Greely is not currently used as a classroom facility. Additionally, some district students attend “cyber” and correspondence schools. (Delta/Greely School District, 2002) Delta Junction has a family medical center, and Fort Greely has a clinic. The nearest hospital is 153 kilometers (95 miles) away at Fairbanks.

Fiscal Condition

Delta Junction raised \$150,000 of revenue in 1997 from local service charges and external, state sources. It spent almost \$184,000 in the same year, the majority on public safety, roads, parks, and recreation. Delta Junction does not levy a bed tax on temporary accommodation.

3.1.12 WATER RESOURCES

This section describes the existing water resource conditions at each of the proposed sites. Water resources include surface water, groundwater, water quality, and flood hazard areas.

Region of Influence

The water resources ROI includes all surface water features, drainage areas, and underlying aquifers that could be affected by construction or operations. This includes the area from the Allen Army Airfield south to the southern boundary.

Affected Environment

Surface Water

Fort Greely is in the Delta River watershed. The Delta River to the west and Jarvis Creek immediately east are the two primary drainages for the Fort Greely ROI. Both are glacier-fed and silt-laden. The peak flow in these water systems is reached in late summer, when snow and ice melt is augmented by rainfall. Minimum flow occurs in winter when precipitation occurs as snow and Jarvis Creek and Delta River are generally frozen solid. Other surface water bodies within the ROI are intermittent, unnamed creeks and lakes.

Although floodplain boundaries have not been developed for the ROI, there is a low probability of flooding. High flows in the Delta River overflow to the west rather than toward the ROI. Jarvis Creek overflowed into an old channel during a 1967 flood. Since a barrier was placed at the overflow location, flooding along the old channel has not occurred.

Due to the relatively flat terrain and permeable soils within the ROI, much of the storm water runoff infiltrates before it reaches a water body. Fort Greely operates under an NPDES Multi-Sector Industrial Storm Water Permit and an SWPPP is scheduled to be completed in December 2002.

Groundwater

One unnamed water-bearing unit has been described in the ROI. This unit consists of a lower stratified gravel layer. The top of the water-bearing unit is encountered at about 52 meters (170 feet) below ground surface. One boring completed at Fort Greely penetrated the alluvium to depths of 122 meters (400 feet) below ground surface. It has been reported that the lower stratified gravel aquifer is at least partially confined by low-permeability lenses and seams that may result in the formation of perched water zones.

Groundwater flows northeasterly at a regional gradient ranging from approximately 1.5 to 6 meters (5 to 21 feet) per mile. Groundwater in the area is recharged continuously by the Delta River and by infiltration of meltwater from the Alaska Range in the late spring and early summer. The depth to groundwater ranges from 52 meters (170 feet) to at least 91 meters (300 feet) below ground surface, and fluctuates in response to seasonal recharge. As of 1983, there were five usable wells on Fort Greely, located near the north end of Fort Greely, yielding an estimated combined capacity in excess of 15 million liters (4 million gallons) per day (U.S. Army Corps of Engineers, 1996). Two new 1,893-liter- (500-gallon-) per-minute wells were developed in 2001 during initial site preparation activities.

Water Quality

State primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water. Secondary drinking water standards are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (skin or tooth discoloration) or aesthetic effects (taste, odor, or color) in drinking water. The drinking water source at Fort Greely is the groundwater. Groundwater quality in the vicinity of Fort Greely also meets the state drinking water standards. Surface water quality samples at Fort Greely meet the primary drinking water standards; however, the concentrations of aluminum, iron, and manganese were higher than the secondary standards. Measurements of pH on Fort Greely were within the state standards.

3.1.13 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued 11 February 1994. Objectives of the Executive Order include development of federal agency implementation strategies, identification of minority and low-income populations where proposed federal actions have disproportionately high and adverse human health and environmental effects, and participation of minority and low-income populations. Although an environmental justice analysis is not mandated by NEPA, DoD has directed that NEPA will be used as the primary approach to implement the provision of the Executive Order.

The 2000 Census of Population and Housing reports numbers including both minority and poverty residents. Minority populations included in the census are identified as Black or African American; American Indian, Eskimo or Aleut; Asian; Native Hawaiian or Pacific Islander; Hispanic or Latino; or other. Poverty status (used to define low-income status) is reported as the number of families with income below poverty level. The 1999 poverty status indicates 11.6 percent of families at Fort Greely, 12.3 percent at Delta Junction, and 7.9 percent at Big Delta were below the poverty level (U.S. Census Bureau, 2002). No families live at Fort Greely since the Base Realignment.

Region of Influence

The ROI for environmental justice includes the Census Designated Places (Big Delta and Fort Greely) and the closest town, Delta Junction, which are in the Southeast Fairbanks Census Area.

Affected Environment

Based upon the 2000 Census of Population and Housing, the Southeast Fairbanks Census Area has a population of 6,174. Of that total, 1,167 persons, or 18.9 percent, were low income, and 1,463 persons, or 23.7 percent, were minority.

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