*DRAFT*

# ENVIRONMENTAL ASSESSMENT

## ADDRESSING

## ACTIVITIES ASSOCIATED WITH DEVELOPMENT OF A REGIONAL WASTEWATER TREATMENT PLANT

## ELLSWORTH AIR FORCE BASE, SOUTH DAKOTA

**APRIL 2011**

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| $\mu g/m^3$ | micrograms per cubic meter |
| ACC | Air Combat Command |
| ACHP | Advisory Council on Historic Preservation |
| ACM | asbestos-containing material |
| AFB | Air Force Base |
| AFI | Air Force Instruction |
| AFCEE | Air Force Center for Engineering and the Environment |
| AFOSH | Air Force Occupational and Environmental Safety, Fire Protection, and Health |
| AFPD | Air Force Policy Directive |
| AICUZ | Air Installation Compatible Use Zone |
| AOC | Area of Concern |
| APE | Area of Potential Effect |
| APZ | Accident Potential Zone |
| AQCR | Air Quality Control Region |
| ARSD | Administrative Rules of South Dakota |
| AST | aboveground storage tank |
| BASH | bird/wildlife aircraft strike hazard |
| BD/DR | Building Demolition/Debris Removal |
| bgs | below ground surface |
| BHPL | Black Hills Power and Light |
| BHRCI | Black Hills-Rapid City Intrastate |
| BMP | best management practice |
| BMW | Bombardment Wing |
| BOD | biochemical oxygen demand |
| BW | Bomb Wing |
| CAA | Clean Air Act |
| CAIS | Chemical Agent Identification Set |
| CAS | conventional activated sludge |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| CRM | Cultural Resources Manager |
| CWA | Clean Water Act |
| CZ | Clear Zone |
| dBA | A-weighted decibel |
| DERP | Defense Environmental Restoration Program |
| DNL | day-night average sound level |
| DOD | Department of Defense |
| DOE/EIA | U.S. Department of Energy, Energy Information Administration |
| EA | Environmental Assessment |
| EDA | Ellsworth Development Authority |
| EIAP | Environmental Impact Analysis Process |
| EIS | Environmental Impact Statement |
| EISA | Energy Independence and Security Act |
| EO | Executive Order |
| EOD | Explosive Ordnance Disposal |
| ERP | Environmental Restoration Program |
| ERSZ | Electromagnetic Radiation Safety Zone |
| ESA | Endangered Species Act |
| FAA | Federal Aviation Administration |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| FONPA | Finding of No Practicable Alternative |
| FONSI | Finding of No Significant Impact |
| $ft^2$ | square feet |
| FY | Fiscal Year |
| GHG | greenhouse gas |
| gpdc | gallons per day per capita |
| HAP | hazardous air pollutant |
| HAZMART | hazardous materials pharmacy |
| HQ | headquarters |
| HUD | U.S. Department of Housing and Urban Development |
| ICRMP | Integrated Cultural Resources Management Plan |
| IFAS | integrated fixed-film activated sludge |
| IICEP | Interagency and Intergovernmental Coordination for Environmental Planning |
| IRP | Installation Restoration Program |
| JP-8 | Jet Propellant 8 |

*continued on inside back cover* →

← *continued from inside front cover*

| | |
|---|---|
| km | kilometer |
| kV | kilovolt |
| kW | kilowatt |
| LBP | lead-based paint |
| LTM | long-term monitoring |
| MBBR | moving bed bio-reactor |
| MFH | military family housing |
| mg/L | milligram per liter |
| $mg/m^3$ | milligrams per cubic meter |
| MGD | million gallons per day |
| MMRP | Military Munitions Response Program |
| MOGAS | mobility gasoline |
| MOU | Memorandum of Understanding |
| MSA | Munitions Storage Area |
| msl | mean sea level |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NRHP | National Register of Historic Places |
| NWP | Nationwide Permit |
| O/W | oil/water |
| $O_3$ | ozone |
| ODS | ozone-depleting substance |
| OSHA | Occupational Safety and Health Administration |
| OU | Operable Unit |
| Pb | lead |
| PCB | polychlorinated biphenyl |
| $PM_{10}$ | particulate matter equal to or less than 10 microns in diameter |
| $PM_{2.5}$ | particulate matter equal to or less than 2.5 microns in diameter |
| ppd | pounds per day |
| ppm | parts per million |
| PSD | Prevention of Significant Deterioration |
| psi | per square inch |
| QD | quantity-distance |
| RAFS | Rushmore Air Force Station |
| RCRA | Resource Conservation and Recovery Act |
| RWWTP | regional wastewater treatment plant |
| SAC | Strategic Air Command |
| SARA | Superfund Amendment and Reauthorization Act |
| SBR | sequencing batch reactor |
| SDDENR | South Dakota Department of Environment and Natural Resources |
| SDSWDS | South Dakota Surface Water Discharge System |
| SDSWQS | South Dakota Surface Water Quality Standards |
| SDWA | Safe Drinking Water Act |
| SEL | Sound Exposure Level |
| SHPO | State Historic Preservation Officer |
| SIP | State Implementation Plan |
| $SO_2$ | sulfur dioxide |
| SPCC | Spill Prevention, Control, and Countermeasures |
| SWANCC | Solid Waste Agency of Northern Cook County |
| SWD | Surface Water Discharge |
| SWPPP | Storm Water Pollution Prevention Plan |
| TCP | traditional cultural properties |
| tpy | tons per year |
| TSCA | Toxic Substances Control Act |
| TSS | total suspended solids |
| U.S.C. | United States Code |
| USACE | U.S. Army Corps of Engineers |
| USAF | U.S. Air Force |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| UST | underground storage tank |
| UXO | unexploded ordnance |
| VOC | volatile organic compound |
| WAPA | Western Area Power Administration |
| WP | Waste Pond |
| WWTP | wastewater treatment plant |

## COVER SHEET

## DRAFT ENVIRONMENTAL ASSESSMENT
## ADDRESSING
## ACTIVITIES ASSOCIATED WITH DEVELOPMENT OF A REGIONAL WASTEWATER TREATMENT PLANT
## ELLSWORTH, AFB, SOUTH DAKOTA

**Responsible Agencies:** U.S. Air Force (USAF), Headquarters Air Combat Command (ACC), and Ellsworth Air Force Base (AFB), South Dakota.

**Affected Location:** Ellsworth AFB.

**Proposed Action:** Decommissioning and demolition of existing wastewater treatment plant (WWTP) on Ellsworth AFB, granting of an easement on Ellsworth AFB to the South Dakota Ellsworth Development Authority (EDA), and construction of a new sanitary sewer pipeline within the easement to direct wastewater flow from Ellsworth AFB to a proposed future regional wastewater treatment plant (RWWTP) off-installation.

**Report Designation:** Draft Environmental Assessment (EA).

**Abstract:** Ellsworth AFB is faced with having to upgrade its current wastewater treatment systems to meet more stringent State of South Dakota-mandated restrictions on wastewater discharge. Ellsworth AFB is proposing to decommission and demolish its current wastewater treatment plant (WWTP) and allow construction of a new sanitary sewer pipeline on Ellsworth AFB within an easement granted to the South Dakota EDA. The sanitary sewer pipeline would connect to an existing pipeline southeast of the installation that would flow to a proposed future RWWTP off-installation. In addition to evaluating these activities, this EA also evaluates Ellsworth AFB's contribution to the regional wastewater stream. Under this Proposed Action, decommissioning of the existing WWTP would start in early 2014 and the installation would begin sending flow to the proposed future RWWTP by summer 2014. At no time during the decommissioning process would flow be untreated before the RWWTP goes online. The proposed corridor for establishing a new sewer pipeline would cross portions of the Ellsworth AFB's Prairie Ridge Golf Course and a small, unnamed creek east of the existing WWTP.

This EA has been prepared to evaluate the Proposed Action and alternatives, including the No Action Alternative, and to aid in determining whether a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI)/(FONPA) can be prepared or whether an Environmental Impact Statement (EIS) is needed. Resources that will be considered in the impact analysis are land use, infrastructure, noise, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, and hazardous materials and wastes.

Written comments and inquiries regarding this document should be directed to Ms. Melody Jensen, 28 CES/CEAON, 2103 Scott Drive, Ellsworth AFB, SD 57706-4711, by telephone to (605) 385-2685, and by email to Melody.Jensen@ellsworth.af.mil.

## PRIVACY ADVISORY

Your comments on this Draft EA are requested. Letters or other written comments will be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the EA.

***DRAFT***

# ENVIRONMENTAL ASSESSMENT

## ADDRESSING

## ACTIVITIES ASSOCIATED WITH DEVELOPMENT OF A REGIONAL WASTEWATER TREATMENT PLANT

## ELLSWORTH AFB, SOUTH DAKOTA

---

**APRIL 2011**

# Executive Summary

## Introduction

This Environmental Assessment (EA) describes the proposal by Ellsworth Air Force Base (AFB) to decommission and demolish its current wastewater treatment plant (WWTP) and grant an easement to establish a new sanitary sewer pipeline.

## Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to decommission and demolish the existing WWTP and provide an easement for the construction of a sanitary sewer pipeline on Ellsworth AFB that would connect to a pipeline off-installation that would flow to the proposed future regional WWTP (RWWTP). Ellsworth AFB and the City of Box Elder are currently faced with upgrading their individual wastewater treatment facilities to meet more stringent South Dakota Surface Water Discharge System (SDSWDS) limits imposed by the South Dakota Department of Environment and Natural Resources (SDDENR) that will become effective for Ellsworth AFB on October 1, 2014. The feasibility of constructing an RWWTP to support the sewage treatment needs of Ellsworth AFB and the City of Box Elder to meet these standards was evaluated. The engineering feasibility study indicated that it would be more cost-effective for an RWWTP to treat Ellsworth AFB's and City of Box Elder's sewage together versus using individual systems.

The existing WWTP at Ellsworth AFB is not capable of meeting future ammonia-removal requirements that will become effective for Ellsworth AFB on October 1, 2014. Ellsworth AFB was issued a new interim discharge permit effective from January 1, 2010, until December 31, 2014.

The need for the Proposed Action is to provide wastewater treatment capacity for Ellsworth AFB to meet more stringent SDSWDS standards. Ellsworth AFB operates a secondary conventional rock media trickling filtration WWTP. Effective October 1, 2014, Ammonia-N 30-day average and daily maximum limits will be instituted for Ellsworth AFB. The current WWTP at Ellsworth AFB is not capable of meeting these future ammonia removal requirements within its current operational profile.

On February 4, 2009, House Bill Number 1301 was enacted by the legislature of the State of South Dakota, creating the South Dakota Ellsworth Development Authority (EDA). The South Dakota EDA seeks to address a number of issues concerning the future of the installation and compatible civilian development around Ellsworth AFB. Ultimately, the South Dakota EDA would be responsible for construction of the RWWTP and associated infrastructure. The creation of a new RWWTP would also help to serve the adjacent City of Box Elder, which is currently above its capacity for treating wastewater and also must comply with the more stringent SDSWDS standards. Box Elder's demand for wastewater treatment is expected to increase because of expected population growth in the region.

## Description of the Proposed Action and Alternatives

***Proposed Action.*** The Proposed Action includes three components: (1) decommissioning and demolition of the existing WWTP, (2) granting an easement on Ellsworth AFB to the South Dakota EDA and construction of a sanitary sewer pipeline within the easement, and (3) Ellsworth AFB's contribution to the regional wastewater stream, as discussed in the following paragraphs:

1. ***Decommissioning/Demolition of the WWTP.*** Under the Proposed Action the existing WWTP would be decommissioned and demolished. Decommissioning would begin in early 2014 with flow being sent to the proposed RWWTP in summer 2014. WWTP decommissioning involves disconnecting the influent piping and rerouting it to the new RWWTP; discontinuing effluent outflow; pumping all residual wastewater out of the treatment units; removing and properly disposing of all residual sludge; cleaning or decontaminating all treatment units and equipment; disconnecting utilities (e.g., water and electricity); removing from service petroleum-containing equipment and tanks including generators and transformers; and properly disposing of all residual chemicals, including chlorine, sulfur dioxide, and laboratory analysis chemicals. At no point during decommissioning would flow be untreated before the RWWTP goes online. Demolition involves disassembly and removal of the infrastructure, including treatment units, buildings, and piping. Backfilling, grading, and revegetation would be needed in areas where below-ground structures have been removed. If indicated during the removal process or by historical records or experience, soil and groundwater contamination testing could be required.

2. ***Wastewater Pipeline Easement and Construction.*** The Proposed Action would include the granting of an easement to the South Dakota EDA and the construction of a sanitary sewer pipeline within the easement by the South Dakota EDA. The easement would extend from a manhole just upgradient from the existing Ellsworth AFB WWTP across portions of the installation's golf course and potentially across a former landfill. The easement would begin at a wastewater junction point to the west of Building 3013 and travel southeast along the golf course to a wastewater pipeline junction point east of Ellsworth Road. This easement would be granted to allow construction of an 18- to 36-inch pipeline on Ellsworth AFB to ultimately connect with the proposed future RWWTP. Because of the natural topography of this area, the preferred pipeline route would follow natural contours to allow the pipeline to be gravity-fed versus installing a lift station to pump effluent. The proposed corridor is primarily to the west of a creek and its floodplain, but the corridor would eventually cross the creek and floodplain.

3. ***Ellsworth AFB's Wastewater Contribution to the Regional Waste Stream.*** Under the Proposed Action, after completion of the decommissioning process for the existing Ellsworth AFB WWTP, flow from Ellsworth AFB would be sent through a sanitary sewer pipeline to the proposed future RWWTP off-installation. The current annual average daily flow of wastewater from Ellsworth AFB is 0.5 million gallons per day (MGD) and the maximum daily flow is 1.41 MGD. The projected wastewater flow from Ellsworth AFB in 2028 is an annual average daily flow of 1.5 MGD and maximum daily flow of 2.3 MGD. The City of Box Elder has undergone recent growth by annexing portions of Ellsworth AFB, which have nearly doubled the size of the city to a population of approximately 9,200. This annexation and other future developments by the city have increased the need for the city to expand its current wastewater treatment facilities, which are currently over capacity.

***WWTP Upgrade Alternative.*** This alternative would require certain upgrades to meet the more stringent SDSWDS standards. The associated upgrades include the following to bring the existing WWTP into compliance:

- Activated sludge equipment (e.g., blowers, air diffusers, aeration basins) and a new process building to house the equipment
- New secondary clarification designed for the activated sludge process
- Ultraviolet disinfection to eliminate the hazards associated with chlorine gas handling
- Conversion of the existing anaerobic digesters to aerobic digesters to eliminate ammonia loading associated with effluent recycle

- Addition of sludge cake storage and vehicle equipment storage to address current needs at the facility.

The WWTP Upgrade Alternative would not help the City of Box Elder meet the SDSWDS permit requirements for ammonia or address issues with its lagoon treatment facility, which is operating over capacity. The WWTP Upgrade Alternative would therefore require the City of Box Elder to expand its own current wastewater treatment facilities.

***No Action Alternative.*** Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action, nor would the existing WWTP be upgraded to meet the SDSWDS permit requirements for ammonia discharge limits. Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would however be unable to meet the more stringent SDSWDS standards for ammonia. The No Action Alternative would likely be an infeasible alternative, as Ellsworth AFB's existing WWTP would not meet future ammonia discharge limit requirements.

## Summary of Environmental Effects from the Proposed Action and Alternatives

***Land Use.*** Under the Proposed Action, land use of the WWTP would remain industrial through decommissioning of the existing WWTP. Following decommissioning, the facilities associated with the WWTP would be demolished, resulting in short-term, negligible, direct, adverse impacts on land use from the use of demolition equipment in the area and the increased presence of construction vehicles related to demolition activities. Long-term, minor, direct, beneficial effects on land use would be expected if the area currently occupied by the WWTP is returned to open space, thus resulting in fewer uses in Accident Potential Zone (APZ) 1. No impacts on land use would be expected from granting an easement to the South Dakota EDA as land use would not change. Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline due to the temporary closure of a portion or all of the golf course during pipeline construction. No impacts on land use would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

Under the WWTP Upgrade Alternative, short-term, minor, adverse impacts on land use would be expected due to an increased presence of construction vehicles and disturbances related to construction activities. Land use surrounding the existing WWTP would remain the same.

***Infrastructure and Utilities.*** Short-term, moderate, direct adverse impacts on water supply would be expected from a temporary increase in water use during decommissioning and demolition phases of the Proposed Action; however, these increases are not anticipated to exceed existing capacity. Long-term, moderate, direct, adverse impacts on water supply would be expected due to a reduction in water supply within the unnamed tributary for downstream livestock farmers and a reduction in water supply for irrigation of the golf course. The increase in the installation's water demand for irrigation of the golf course is not anticipated to exceed the installation's existing water supply capacity. Short-term, negligible to minor, adverse impacts on sanitary sewer and wastewater systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected due to slight increases in demand for these systems. Short-term, negligible to minor, direct, adverse impacts, and long-term, minor, indirect, beneficial impacts on storm drainage systems would be expected due to a potential temporary increase in soil erosion and sediment transport during sheet flow runoff from demolition activities, if proper best management practices (BMPs) are not fully utilized, and a long-term decrease in impervious surfaces and sheet flow runoff into storm water drainage systems, respectively. No impacts on natural gas systems would be expected from the Proposed Action. No impacts on infrastructure and utilities would be expected from an easement being granted on Ellsworth AFB. Short-term, negligible, adverse impacts on

water supply, sanitary sewer and wastewater systems, storm drainage systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected due to slight increases in demand for these systems during pipeline construction.

Short-term, negligible, direct, and long-term, minor, direct, adverse impacts on water supply would be expected under the WWTP Upgrade Alternative. Water demand would increase slightly during construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility; however, potential increases in water demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Upgrades would bring the WWTP in compliance with the more stringent SDSWDS permit requirements, which would result in beneficial impacts on the sanitary sewer and wastewater system. Short-term, negligible, indirect, and long-term, minor, indirect, adverse impacts on storm drainage systems would be expected. Ground disturbance from construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff. Upon completion of construction activities, the amount of impervious surfaces would increase due to additional buildings associated with the WWTP and storm water permeation into the ground would decrease, thereby permanently increasing storm water runoff.

***Noise.*** Short-term, minor, adverse impacts would be expected due to increased noise during demolition activities associated with the Proposed Action. No impacts on the noise environment at Ellsworth AFB would be expected from a pipeline easement being granted; however, construction of the wastewater pipeline would result in short-term, minor, adverse effects on the noise environment. No impacts on the noise environment at Ellsworth AFB would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Short-term, minor, adverse impacts on noise under the WWTP Upgrade Alternative would be expected during construction of the necessary upgrades for the existing WWTP. No long-term impacts on noise would be expected under the WWTP Upgrade Alternative.

***Air Quality.*** Short-term, minor, adverse impacts on air quality from demolition and construction emissions and land disturbance would be expected. The Proposed Action would result in minor impacts on regional air quality during demolition activities, primarily from site-disturbing activities and operation of construction equipment. All emissions associated with demolition operations would be temporary in nature and would not be expected to contribute to or affect local or regional attainment status with the National Ambient Air Quality Standards (NAAQS). The Proposed Action would generate particulate matter emissions as fugitive dust from ground-disturbing activities and would have negligible contribution towards the South Dakota statewide greenhouse gas (GHG) inventory. The Proposed Action would generate emissions well below 10 percent of the emissions inventory for the Black Hills-Rapid City Intrastate Air Quality Control Region (AQCR). No impacts on local or regional air quality at Ellsworth AFB would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts on local and regional air quality would be expected from construction of the sanitary sewer pipeline. No impacts on air quality would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Impacts under the WWTP Upgrade Alternative would be similar in nature but slightly greater than the Proposed Action. Impacts on air quality would result from construction activities associated with upgrading the existing WWTP.

***Safety.*** Short-term, negligible to minor, adverse impacts on safety would be expected during demolition of the WWTP; however, no long-term operational safety impacts would be expected. Risk to contractors would be minimal since it is assumed that contractors would be required to establish and maintain

demolition safety programs during demolition activities. No impacts on safety would be expected from an easement being granted on Ellsworth AFB; however, short-term, minor, adverse impacts could be expected during construction of the sanitary sewer pipeline. No impacts on safety would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream. Impacts under the WWTP Upgrade Alternative would be similar to those described for the Proposed Action. Short-term impacts could be expected during construction of necessary upgrade components for the existing WWTP.

***Geological Resources.*** Short-term, minor, direct, adverse impacts on geological resources would be expected during decommissioning and demolition activities from soil disturbances, compaction of surrounding soils from construction equipment, and increased soil erosion and transfer into storm water runoff. Long-term, indirect, beneficial impacts on geological resources would be expected from decommissioning following demolition activities. The decrease in impervious surfaces associated with removal of structures would be expected to reduce volume and velocity of storm water runoff and associated potential erosion and offsite transport of sediments. Also, because flow into the unnamed tributary would drastically decrease from decommissioning of the WWTP, stream channel erosion occurring within and downstream of the tributary would be expected to decrease. No impacts on geological resources would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts on soils would be expected during construction of the pipeline due to soil disturbances. Long-term, minor, adverse impacts on topography would be expected from pipeline construction due to anticipated mitigation requirements of adding an additional landfill cap over ERP site OU-6, which would raise the elevation of the land in the northern portion of the proposed pipeline corridor. No impacts on geological resources would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

The WWTP Upgrade Alternative would be anticipated to have short-term, minor, direct and long-term, minor, indirect, adverse impacts on geology and soils. Construction and demolition activities necessary to upgrade the existing WWTP would disturb soils and increase the potential for elevated rates of erosion and sedimentation, resulting in short-term, minor adverse impacts. Construction activities would entail grading and removal of vegetation, and soil would become compacted under the weight of construction equipment.

***Water Resources.*** Short-term, moderate, adverse impacts on water resources would be expected from decommissioning and demolition of the Ellsworth AFB WWTP due to increased storm water runoff during demolition activities and a temporary increase in water use at Ellsworth AFB when the decommissioned units and equipment are washed and decontaminated. Cessation of flow from the WWTP into the unnamed tributary could also diminish groundwater recharge, potentially reducing flow for groundwater wells along the tributary downstream from the WWTP. Long-term, moderate, indirect, beneficial effects from decommissioning would result from the alteration of water velocity, quantity, and quality within the unnamed tributary currently receiving treated effluent. The cessation in flow from the WWTP to the tributary would likely reduce stream channel erosion and improve the in-stream water quality of the tributary and downstream waters as effluent would no longer be discharged.

No impacts would be expected on water resources from granting the pipeline easement. Short-term, minor, adverse impacts on surface water would be expected from the construction of the sanitary sewer pipeline due to increased soil erosion from exposed soils during storm events and sedimentation within the unnamed tributary of Box Elder Creek. Short-term, minor, adverse impacts on floodplains would be expected from the construction of the sanitary sewer pipeline within the 100-year floodplain of the unnamed tributary of Box Elder Creek. No direct impacts on water resources would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, indirect impacts on stream flow and channel morphology could occur as a result of the cessation in discharge of WWTP effluent into the unnamed tributary due to the decrease in water input into the unnamed tributary.

The WWTP Upgrade Alternative would result in short-term, minor, direct, adverse and long-term, beneficial impacts on water resources. Short-term, minor, direct, adverse impacts would be expected during construction of facilities to house the additional equipment necessary to upgrade the existing WWTP. During construction activities, removal of vegetation and construction, demolition, and road construction activities would increase storm water runoff volume and velocity due to the increase in impervious surfaces. Under the WWTP Upgrade Alternative, effluent would continue to flow from Outfall 005 to the unnamed tributary that flows into Box Elder Creek. However increased amounts of ammonia would be removed from the effluent, therefore long-term beneficial impacts would result from the decrease in ammonia present in the water column.

***Biological Resources.*** Short-term, negligible, direct, adverse impacts on biological resources would be expected from temporary disturbances to vegetation (e.g., trampling and removal) and wildlife (e.g., noise, demolition activities, and heavy equipment use). No impacts on federally threatened or endangered species would be expected from WWTP decommissioning and demolition activities under the Proposed Action. Two state-listed sensitive species (Swainson's hawk and burrowing owl) and several migratory bird species could potentially occur near the WWTP; however, these species are discouraged in the WWTP and golf course area due to bird/wildlife aircraft strike hazard (BASH) concerns associated with the runway. Therefore, no new impacts from demolition activities on these species would be expected, as their presence is already discouraged. Short-term, negligible, indirect, adverse effects on other migratory bird species that do not pose BASH concerns would be expected due to temporary noise and visual disturbances. Short-term, negligible to minor, indirect, adverse effects on wetlands to the east of and within the Project area could occur from increased erosion, sedimentation, and pollutants entering these wetlands during demolition activities.

Long-term, negligible to minor, direct, beneficial effects on vegetation would be expected from the demolition of the WWTP and revegetation with native species. Long-term, minor, indirect, beneficial effects on wildlife (e.g., invertebrates, fish, and amphibians) and wetlands within the main installation east of the Project area would be expected due to a reduction in ammonia, total suspended solids, chlorine, and other pollutants being discharged into the tributary and downstream waters from the WWTP. Long-term, direct, minor to moderate, adverse effects on wetlands could occur as a result of discontinuing outflow from the WWTP. Once the WWTP is decommissioned, the wetlands along the main installation drainage to the east of, and crossing, the Project area would receive a largely reduced input of surface water, which would alter hydrology of the wetlands and could potentially result in decreased wetland acreage.

No impacts on vegetation, wildlife, wetlands, and sensitive and protected species would be expected from granting the pipeline easement. Short-term, negligible, adverse impacts on vegetation, wildlife, and sensitive and protected species would be expected from the construction of a sanitary sewer pipeline within the proposed pipeline corridor. Short-term, minor, adverse impacts on wetlands would be expected from the construction of a pipeline due to increased erosion, sedimentation, and inflow of pollutants. In addition, the buried pipeline would likely be required to cross the wetland, resulting in temporary disturbances to the wetland during pipeline construction.

No impacts on vegetation and sensitive and protected species would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream; however, long-term, minor, indirect, adverse effects on off-installation wildlife and wetlands could be expected from increased effluent into Box Elder Creek.

Impacts on vegetation and wildlife from the WWTP Upgrade Alternative would be similar to, but greater than, those discussed under demolition activities of the Proposed Action. Short-term, negligible to minor, direct, adverse effects on wildlife would be expected due to disturbances from noise, demolition and

construction activities, and heavy equipment use. Long-term, minor, indirect, beneficial effects on wildlife would result from the decrease in ammonia being introduced to the water column due to new NPDES requirements. Because ammonium compounds can decrease dissolved oxygen through chemical reactions, decreasing ammonia would have a beneficial impact on water quality within these wetlands. Impacts on sensitive and protected species from the WWTP Upgrade Alternative would be similar to those discussed under demolition activities of the Proposed Action.

***Cultural Resources.*** No adverse impacts on architectural or archaeological cultural resources would be expected from the Proposed Action or the WWTP Upgrade Alternative.

***Socioeconomic Resources and Environmental Justice.*** Short-term, minor, direct, beneficial impacts on the construction industry would be expected due to creation of jobs for construction workers. The increase in the payroll tax revenues, purchase of materials, and purchase of goods and services in the area around Ellsworth AFB would result in short-term, negligible, indirect, beneficial impacts on the local economy. No impacts on demographics or environmental justice would be expected. No impacts on socioeconomic resources and environmental justice would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts on recreational users would be expected from the construction of the sanitary sewer pipeline, as they will temporarily be precluded from using the golf course. Short-term, minor, beneficial effects on the construction industry would be expected from the construction of the sanitary sewer pipeline due to the temporary creation of jobs to execute this portion of the Proposed Action. Environmental justice issues would not be expected to result from the construction of the wastewater pipeline, as this action will occur on Ellsworth AFB. No impacts on socioeconomic resources or environmental justice would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Impacts on socioeconomic resources under the WWTP Upgrade Alternative would be similar to the Proposed Action. No impacts on demographics or environmental justice would be expected under the WWTP Upgrade Alternative.

***Hazardous Materials and Wastes.*** Short-term, minor, adverse impacts on hazardous materials and waste management would be expected from demolition of the WWTP due to anticipated use of hazardous materials and generation of hazardous wastes during demolition. The existing WWTP might contain asbestos-containing material (ACM), lead-based paint (LBP), and light ballasts, sump pumps, or pad-mounted transformers containing polychlorinated biphenyls (PCBs); therefore, short-term, minor, adverse impacts would be expected due to hazardous waste management requirements, and long-term, minor, beneficial impacts would be expected due to the removal of these substances from Ellsworth AFB. Hazardous materials and wastes would be stored and disposed of in accordance with all applicable Federal, U.S. Air Force (USAF), and state regulations. No impacts on the installation's hazardous waste management program, Pollution Prevention Program, and Environmental Restoration Program (ERP) sites near the Project area (Operable Unit- [OU] 6 and OU-11) would be expected.

No impacts on hazardous materials and wastes would be expected from the granting of the wastewater pipeline easement. Short-term, minor, adverse impacts on the ERP, hazardous materials management, and hazardous wastes would be expected from the construction of the sanitary sewer pipeline. The proposed sanitary sewer pipeline construction would not require the demolition of existing facilities or infrastructure; therefore, no impacts on ACM, LBP, and PCBs would be expected from the construction of the pipeline. Short-term, negligible, adverse impacts on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of a sanitary sewer pipeline.

Long-term, minor, adverse impacts on hazardous wastes from Ellsworth AFB's wastewater contribution to the regional waste stream would be expected due the generation of an additional volume of hazardous

waste in the form of sludge. No impacts on ERP sites, hazardous materials and petroleum products, ACM, LBP, PCBs, and pollution prevention would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Long-term, minor, indirect, adverse effects on hazardous materials or waste management would be expected as a result of the WWTP Upgrade Alternative. The modification and continued operation of the Ellsworth AFB WWTP would result in minor increases in the existing hazardous materials and waste management volumes. Ellsworth AFB would dispose of increasing volumes of hazardous wastes associated with the wastewater treatment process from future increases in wastewater generation.

## Cumulative Impacts

Cumulative impacts on environmental resources result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts would result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

Future projects at Ellsworth AFB or in its vicinity that have been identified as contributing to potential cumulative effects on environmental resources include annexation of Ellsworth AFB and associated mixed-use development on the installation, development of military family housing (MFH) units on Ellsworth AFB, and construction of the RWWTP off-installation. Anticipated cumulative adverse effects would be related to environmental impacts from demolition and construction activities (e.g., increased demand of infrastructure and utilities, ground disturbances and soil erosion, sedimentation and increased pollution in waterways). Anticipated cumulative beneficial effects on socioeconomics in the surrounding area would be expected from economic expenditures associated with the RWWTP and MFH actions. No significant cumulative impacts on the environment would be anticipated from the Proposed Action in conjunction with other activities.

**DRAFT**
**ENVIRONMENTAL ASSESSMENT ADDRESSING ACTIVITIES**
**ASSOCIATED WITH DEVELOPMENT OF A REGIONAL WASTEWATER TREATMENT PLANT**
**ELLSWORTH AFB, SOUTH DAKOTA**

**TABLE OF CONTENTS**

## TABLE OF CONTENTS (CONTINUED)

## TABLE OF CONTENTS (CONTINUED)



## APPENDICES

## FIGURES



## TABLES

# 1. Purpose of and Need for the Action

This Environmental Assessment (EA) describes and analyzes the proposal by Ellsworth Air Force Base (AFB) to decommission and demolish their current wastewater treatment plant (WWTP) and grant an easement for construction of a new sanitary sewer pipeline that would connect to an existing sanitary sewer main line. The sanitary sewer pipeline would ultimately connect to a proposed future regional wastewater treatment plant (RWWTP) off-installation, which is proposed to be constructed adjacent to the City of Box Elder's current wastewater treatment lagoon facility southeast of the city along Box Elder Creek. This EA does not evaluate construction of wastewater pipelines outside the Ellsworth AFB installation boundary or the off-installation RWWTP. This EA also does not evaluate the use of existing wastewater pipelines outside the Ellsworth AFB installation boundary. This section presents background information, the purpose of and need for the Proposed Action, the location and mission of Ellsworth AFB, the scope of the environmental review anticipated, and an overview of the organization of this document.

## 1.1 Background

Ellsworth AFB is located in western South Dakota. The installation is approximately 7 miles northeast of Rapid City, South Dakota, and borders the City of Box Elder to the southeast (see **Figure 1-1**). The existing Ellsworth AFB WWTP is in the southeastern comer of the installation. Ellsworth AFB's WWTP consists of a biological treatment system that employs a trickling filter process to achieve secondary treatment levels. The plant uses preliminary, primary, and secondary treatment processes and provides sludge stabilization and sludge dewatering processes. The WWTP was initially designed to treat an average daily wastewater flow of 1.5 million gallons per day (MGD); however, present average daily treated flow is approximately 0.5 MGD.

The WWTP was constructed in 1943, with the most recent modification occurring in 2005 when new screening and flume equipment were added at the Pretreatment Building (Building 3013) (EAFB 2001). The WWTP discharges under a South Dakota Surface Water Discharge System (SDSWDS) (Permit No. SD0000281) from Outfall 005 to an unnamed tributary that flows into Box Elder Creek, which is a tributary to Rapid Creek in the Cheyenne River Basin. Discharged water from the WWTP that flows into the unnamed tributary is used to irrigate Ellsworth AFB's Prairie Ridge Golf Course (EAFB 2001) and is used by local ranchers to the east of Ellsworth AFB to provide water for their livestock.

On February 4, 2009, House Bill Number 1301 was enacted by the legislature of the State of South Dakota, creating the South Dakota Ellsworth Development Authority (EDA) (see **Appendix A**). The South Dakota EDA seeks to address a number of issues concerning the future of the installation and compatible civilian development around Ellsworth AFB. In addition, the creation of the South Dakota EDA allows Ellsworth AFB to work with community leaders and the state to advance a public partnership for an RWWTP that is mutually beneficial for Ellsworth AFB and the City of Box Elder versus a privately owned WWTP facility. Ultimately, the South Dakota EDA would be responsible for construction of the RWWTP and associated infrastructure (State of South Dakota 2009).

## 1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to demolish and decommission the existing Ellsworth AFB WWTP and provide an easement for the establishment of a sanitary sewer pipeline on Ellsworth AFB that would connect to a pipeline off-installation that would flow to the proposed future RWWTP. Ellsworth AFB and the City of Box Elder are currently faced with upgrading their individual wastewater treatment facilities to meet more stringent SDSWDS limits imposed by the South Dakota Department of Environment and Natural Resources (SDDENR) that will become effective for Ellsworth AFB on

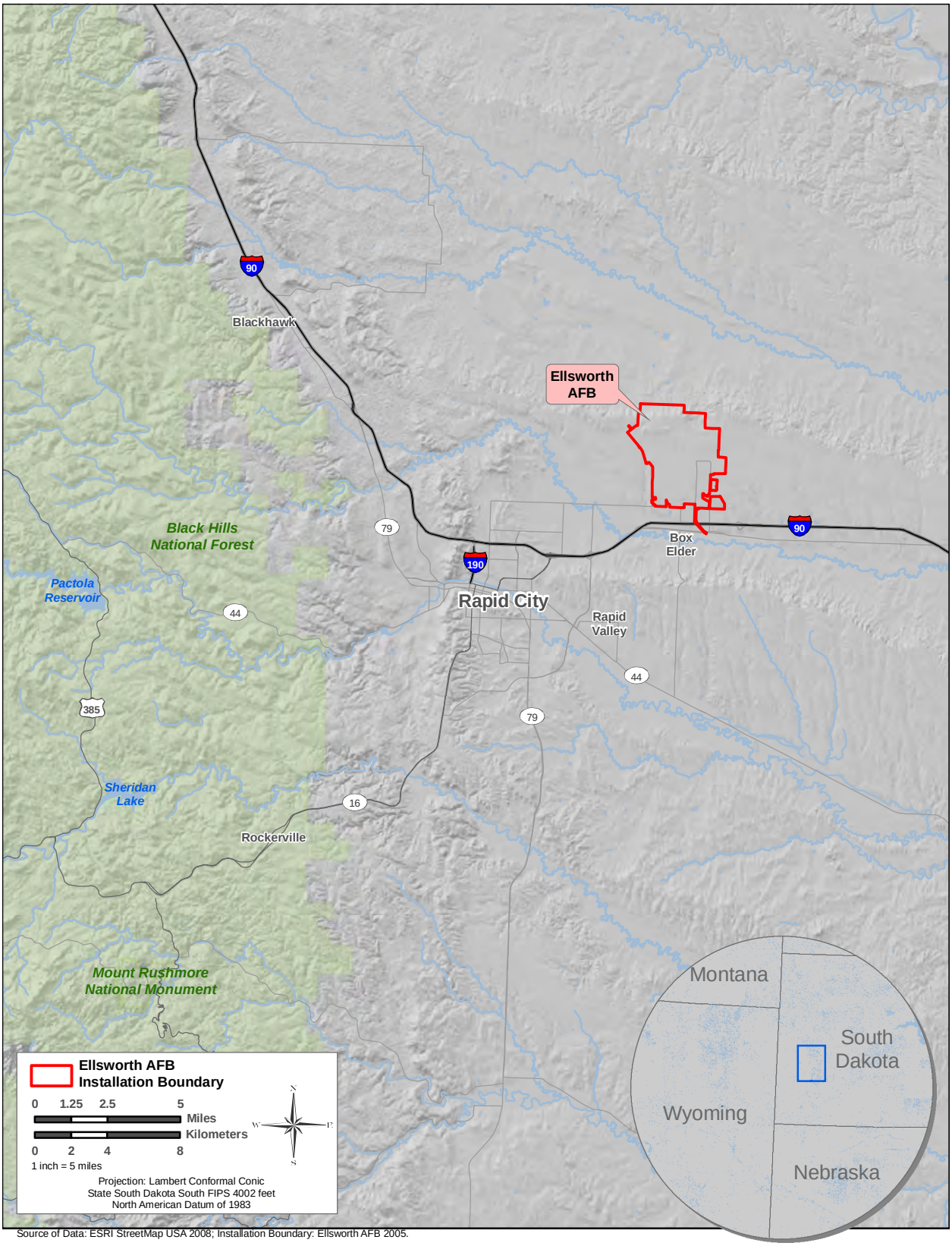



**Figure 1-1. Ellsworth AFB and Surrounding Area**

October 1, 2014. The feasibility of constructing an RWWTP to support the sewage treatment needs of Ellsworth AFB and the City of Box Elder to meet these standards were evaluated. The engineering feasibility study indicated that it would be more cost-effective for an RWWTP to treat Ellsworth AFB's and City of Box Elder's sewage together versus using individual systems (EAFB 2008a).

The need for the Proposed Action is to provide wastewater treatment capacity for Ellsworth AFB to meet more stringent SDSWDS standards. Ellsworth AFB operates a secondary conventional rock media trickling filtration WWTP. Effective October 1, 2014, Ammonia-N 30-day average and daily maximum limits will be instituted for Ellsworth AFB (see **Section 2.1.1**). The existing WWTP at Ellsworth AFB is not capable of meeting these future ammonia removal requirements within its current operational profile (EAFB 2004a).

The passage of House Bill Number 1301 permitted the creation of the South Dakota EDA, which is authorized to construct a new RWWTP. In addition to providing wastewater treatment for Ellsworth AFB, the new RWWTP would help to serve the adjacent City of Box Elder, which is currently over its capacity for treating wastewater and also must comply with the more stringent SDSWDS standards (Landguth 2009). Box Elder's demand for wastewater treatment is expected to increase because of expected population growth in the region.

## 1.3 Location and Mission

Ellsworth AFB consists of approximately 5,415 acres in Meade and Pennington counties in southwestern South Dakota (see **Figure 1-1**). Ellsworth AFB is the second largest employer in South Dakota and has an estimated annual economic impact of $300 million. The installation supports 8,673 personnel, of which 458 are nonappropriated fund civilians, 516 are appropriated fund civilians, 3,246 are appropriated fund military, and 4,453 are dependents. According to Fiscal Year (FY) 2008 data, the installation employed approximately 4,200 persons with another 1,360 indirectly employed persons (28 BW 2008).

Ellsworth AFB originated as the Rapid City Army Air Base in January 1942. The installation was renamed Ellsworth AFB in honor of Brigadier General Richard E. Ellsworth, commander of the 28th Strategic Reconnaissance Wing, in 1953. The primary unit initially assigned to the installation was the 28th Bombardment Wing (BMW) flying the B-29 "Super Fortress." In July 1949, the 28 BMW began conversion from B-29s to the B-36 Peacemaker, and in June 1957 the B-36s were replaced with the B-52 Stratofortress. In 1958, all units on the installation came under the command of the Strategic Air Command's (SAC) 821st Strategic Aerospace Division, headquartered at Ellsworth AFB. In addition to its strategic bombardment mission, under SAC, Ellsworth AFB was home to intercontinental ballistic missile squadrons from 1960 until the early 1990s. In January 1987, the installation received its first B-1 bomber to replace the aging B-52s, and the 12th Air Division moved to Ellsworth AFB to provide advanced bomber aircrew training. The 28th BMW became the 28th Bomb Wing (BW) in September 1991 and absorbed all the functions of the 821st. In 1992, the 28th BW was assigned to the newly formed Air Combat Command (ACC) (EAFB 2009a).

## 1.4 Summary of Key Environmental Compliance Requirements

### 1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] Section 4321-4347) is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential

environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that is charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The process for implementing NEPA is codified in Title 40 Code of Federal Regulations (CFR) Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.* The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA), when a FONPA is appropriate (see **Section 1.4.2**), or whether the preparation of an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required. Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the U.S. Air Force (USAF) will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is its *Environmental Impact Analysis Process* (EIAP), 32 CFR Part 989, as amended.

### 1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of key environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

This EA examines potential effects of the Proposed Action and alternatives on 11 resource areas: land use, infrastructure, noise, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, and hazardous materials and wastes. These resources were identified as being potentially affected by the Proposed Action and include applicable elements of the human environment that are prompted for review by Executive Order (EO), regulation, or policy.

EO 11990, *Protection of Wetlands*, states that "…each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use." In addition, Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, guides the USAF's process for the protection of wetlands.

EO 11998, *Floodplain Management*, states that "…if an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain…and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain. Where the only

practicable alternative is to site in a floodplain, a specific process must be followed to comply with EO 11988. This eight-step process is detailed in the Federal Emergency Management Agency (FEMA) document "Further Advice on EO 11988 Floodplain Management." The eight steps are as follows:

1. Determine whether the action will occur in, or stimulate development in, a floodplain.
2. Receive public review/input of the Proposed Action.
3. Identify and evaluate practicable alternatives to locating in the floodplain.
4. Identify the impacts of the Proposed Action (when it occurs in a floodplain).
5. Minimize threats to life, property, and natural and beneficial floodplain values, and restore and preserve natural and beneficial floodplain values.
6. Reevaluate alternatives in light of any new information that might have become available.
7. Issue findings and a public explanation.
8. Implement the action.

In accordance with EOs 11988 and 11990 and 32 CFR Part 989, a FONPA must accompany the FONSI stating why there are no practicable alternatives to development within the floodplain or construction within a wetland.

The proposed corridor for the sanitary sewer pipeline crosses the unnamed tributary of Box Elder Creek (see **Figure 2-1**). Therefore, development would occur within the 100-year floodplain of the unnamed tributary and construction would occur within the tributary and associated wetland areas when the pipeline is installed. As no practicable alternative to constructing within the floodplain or wetlands has been identified, a FONPA would be issued for this project and would accompany the FONSI. Construction within the unnamed tributary and associated wetlands would also likely require a U.S. Army Corps of Engineers (USACE) Clean Water Act (CWA) Section 404(b) Nationwide Permit (NWP). In addition, when the new sanitary sewer pipeline is ultimately installed, an NWP-12 for utility line construction activities within waters of the United States could also be required. This would depend on how the pipeline would cross the tributary and the area of impact on wetlands or other waters of the United States associated with crossing the unnamed tributary and floodplain. NWP-12 applies to utility line activities that would result in less than 0.5 acres of impacts on wetlands or other waters of the United States. The permitting authority would be determined based on negotiations between the USAF and the South Dakota EDA.

The Proposed Action could affect the acreage of wetlands on Ellsworth AFB resulting from the loss of discharge from Outfall 005, which drains to the unnamed tributary and associated wetland areas. The loss of wetland acreage would also likely require a USACE CWA Section 404(b) NWP. EO 11990, *Protection of Wetlands*, requires that "…each agency shall provide leadership and shall take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities." Additional information concerning wetland permitting and potential mitigation is discussed in **Section 4**. Because the USAF has a no-net-loss policy with respect to wetlands, Ellsworth AFB would need to undertake appropriate mitigation and implement best management practices (BMPs) to minimize any potential loss of wetlands.

**Section 2.4** identifies all applicable permits, licenses, and consultation requirements potentially required from implementation of the Proposed Action. **Appendix B** contains examples of relevant laws, regulations, and other requirements that are often considered as part of the analysis. Where useful to better understanding, key provisions of the statutes and EOs described in **Appendix B** will be discussed in more detail in the text of the EA.

### 1.4.3 Interagency and Intergovernmental Coordination for Environmental Planning and Public Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. AFI 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning* (IICEP), requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, Ellsworth AFB will notify relevant Federal, state, and local agencies of the Proposed Action and provide them sufficient time to make known their environmental concerns specific to the action. The IICEP process also provides Ellsworth AFB the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. All IICEP material related to this EA is included in **Appendix C**, which will be expanded throughout the EIAP process.

A Notice of Availability for the Draft EA and Draft FONSI/FONPA will be published in the *Rapid City Journal* and the *Plainsman* (see **Appendix C**), and the Draft EA will be made available to the public for a 30-day review period. The Notice of Availability will be issued to solicit comments on the Proposed Action and involve the local community in the decisionmaking process. Copies of the Draft EA are available for review at the Rapid City Public Library. Public and agency comments on the Draft EA will be considered prior to a decision being made as to whether or not to sign the FONSI/FONPA.

## 1.5 Organization of this Document

This EA is organized into seven sections, plus appendices. **Section 1** provides the purpose of and need for the Proposed Action. **Section 2** contains a description of the Proposed Action, the alternatives, and the No Action Alternative. **Section 3** contains a general description of the environmental and socioeconomic resources and baseline conditions that could potentially be affected by the Proposed Action and alternatives; and presents the analysis of the potential environmental consequences of implementing the Proposed Action and alternatives. **Section 4** includes an analysis of the potential cumulative impacts at Ellsworth AFB and its vicinity. **Section 5** lists the preparers of the document and **Section 6** presents the references used in the preparation of the document.

**Appendix A** contains a copy of the State of South Dakota's House Bill Number 13 providing legislation for creation of the South Dakota EDA. **Appendix B** contains applicable laws, regulations, policies, and planning criteria potentially relevant to NEPA analysis. **Appendix C** includes IICEP materials developed to date. **Appendix D** contains representative photos of the Proposed Action area at Ellsworth AFB. **Appendix E** contains air quality calculations.

# 2. Description of the Proposed Action and Alternatives

This section presents information on Ellsworth AFB's Proposed Action and alternatives. The Proposed Action includes the evaluation of three components for this EA: (1) decommissioning and demolition of the existing WWTP, (2) granting an easement for a sanitary sewer pipeline, and (3) Ellsworth AFB's contribution to the regional wastewater stream (see **Sections 2.2.1**, **2.2.2**, and **2.2.3** respectively). **Section 2.3** identifies alternatives to the Proposed Action, including the No Action Alternative. Implementation of the Proposed Action, as described in **Section 2.2**, is Ellsworth AFB's Preferred Alternative. Screening criteria used to develop a framework for the Proposed Action and alternatives are presented in **Section 2.1**.

## 2.1 Screening Criteria for Proposed Action and Alternatives

Several criteria were used to develop the Proposed Action and identify alternatives for consideration in the EA, including the following:

- Must meet SDSWDS limits imposed by the SDDENR that will become effective on October 1, 2014, for Ellsworth AFB. Ammonia-N 30-day average limits must not exceed amounts ranging from 2.0 to 5.0 milligrams per liter (mg/L), depending on month and season.
- Must construct a treatment system capable of treating Ellsworth AFB's future (2028) projected flow of 1.5 MGD.
- Must consider the economic feasibility of a separate versus a regional future combined treatment system for Ellsworth AFB and the City of Box Elder.
- Must consider the proximity of potential alternatives to Ellsworth AFB and the feasibility to connect with existing wastewater infrastructure.
- Must evaluate the wastewater treatment options available to use in a future treatment system (EAFB 2008a).

## 2.2 Detailed Description of the Proposed Action

### 2.2.1 Decommissioning/Demolition of the WWTP

Under the Proposed Action, the existing WWTP would be decommissioned and demolished. Decommissioning would begin in early 2014 with flow being sent to the proposed RWWTP in summer 2014. WWTP decommissioning involves disconnecting the influent piping and rerouting it to the new RWWTP; discontinuing effluent outflow; pumping all residual wastewater out of the treatment units; removing and properly disposing of all residual sludge; cleaning or decontaminating all treatment units and equipment; disconnecting utilities (e.g., water and electricity); removing from service petroleum-containing equipment and tanks including generators and transformers; and properly disposing of all residual chemicals, including chlorine, sulfur dioxide, and laboratory analysis chemicals. At no point during decommissioning would flow be untreated before the RWWTP goes online. Demolition involves disassembly and removal of the infrastructure, including treatment units, buildings, and piping. Backfilling, grading, and revegetation would be needed in areas where below-ground structures have been removed. If indicated during the removal process or by historical records or experience, soil and groundwater contamination testing could be required.

To provide context for decommissioning of the WWTP, a description of plant operation and wastewater treatment processes follows. Flow to the current WWTP is through gravity sewers and force mains. The primary sources of wastewater on Ellsworth AFB are the military family housing (MFH) areas, main installation buildings, and flightline areas. Flow enters the WWTP at the Pretreatment Building (Building 3013). Industrial sewage emanates from shops in the flightline area of the installation and flows southeast to the Industrial Waste Treatment Building. The industrial sewer joins the sanitary sewer just ahead of the point where it enters the Pretreatment Building. The sanitary system collects domestic wastewater throughout the installation and flows by gravity with the exception of the three areas that are served by lift stations. All three lift stations are tied in to the plant instrumentation system (EAFB 2001). Treatment consists of oil/water (O/W) separation, screening, comminution, grit removal, primary clarification, a trickling filter, secondary clarification, chlorination, dechlorination, anaerobic digestion, and sludge filter pressing before being discharged to Outfall 005 (EAFB 2002). The current treatment process of wastewater at Ellsworth AFB includes the following:

- ***Industrial Pretreatment.*** Transported wastewater flows to the Industrial Waste Treatment Building for pretreatment by an O/W separator. Waste oil and the solids are removed from the separator, which are disposed of off-installation by a private contractor. Effluent from the O/W separator is then discharged into the sanitary treatment system along with domestic sewage (EAFB 2002).
- ***Primary Treatment.*** The primary treatment begins with a mechanical bar screen. The removed screenings are disposed of weekly by a contractor at the Rapid City Landfill. The wastewater is then split and sent through two aerated grit chambers. The grit that settles in the hoppered bottoms of the aerated grit chambers is pumped to the grit classifier/washer where heavier materials are separated from the wastewater. The grit is then washed in the grit collection hopper before being augured to the disposal chute where it drops into a dumpster. Grease is also removed in the grit chambers and lifted to the grit dumpster for disposal (EAFB 2002).

  The wastewater flows from the grit chambers over rectangular weirs into a collection channel that can route the flow into one of three channels. Flow is then routed to a 9-inch Parshall flume with an ultrasonic level sensor followed by a pH probe, both of which send signals to continuous recorders in the control building (EAFB 2002).

  Flow is then sent to one of three primary clarifiers, each with a volume of 162,000 gallons. Wastewater from the clarifiers then flows to the trickling filter. Primary sludge is pumped from the clarifiers to the digesters. Scum from the surface of the clarifiers is pumped back to the Pretreatment Building where it is combined with the incoming wastewater (EAFB 2002).
- ***Secondary Treatment.*** Primary clarifier effluent enters the trickling filter and is distributed over the rock media by rotating distribution arms. Wastewater trickles down through the media, contacting microorganisms attached to the rock, to an underdrain system. The discharge from the trickling filter then flows through two rectangular secondary clarifiers to the chlorine contact chamber. Wastewater is also pumped from the secondary clarifiers back to the inlet of the trickling filter as recycle water to keep the trickling filter operating during low-flow periods. Sludge from the secondary clarifiers is pumped to the digesters (EAFB 2002).
- ***Sludge Stabilization and Dewatering.*** A combination of primary and secondary sludge is pumped to anaerobic digesters. After digestion, a belt filter press is used for sludge dewatering. After dewatering the sludge is disposed of in accordance with the Ellsworth AFB sludge only permit (EAFB 2002).
- ***Disinfection.*** After leaving the secondary clarifiers, the wastewater flows through the two chlorine contact chambers in series to Outfall 005. Discharges from Outfall 005 are continuous and average 700,000 gallons per day (EAFB 2002).

The discharge from Outfall 005 flows into an unnamed tributary that crosses the Prairie Ridge Golf Course for approximately 0.5 miles to Outfall 006. Discharges from the unnamed tributary at this point and Outfall 006 flow approximately 3 miles to Box Elder Creek. The unnamed tributaries and Box Elder Creek are classified by the South Dakota Surface Water Quality Standards (SDSWQS), Administrative Rules of South Dakota (ARSD), Chapters 74:51:01 and 74:51:03 (EAFB 2002).

SDDENR established interim ammonia effluent limits until September 30, 2014, and as a result, Ellsworth AFB was issued a new interim discharge permit effective from January 1, 2010, until December 31, 2014. The interim SDSWDS permit limitations for effluent are included in **Table 2-1**. As discussed in **Section 1.2**, effective October 1, 2014, Ammonia-N 30-day average and daily maximum limits will be instituted for Ellsworth AFB (see **Table 2-2**). Ellsworth AFB currently is not capable of meeting these future ammonia-removal requirements that are shown in **Table 2-2**.

**Table 2-1. Current SDSWDS Permit Limitations**

| Parameter | Units | 30-Day Average | 7-Day Average | Daily Maximum |
|---|---|---|---|---|
| Biochemical Oxygen Demand (5- day) | mg/L | 30 | 45 | N/A |
| Total Suspended Solids | mg/L | 30 | 45 | N/A |
| Oil and Grease | mg/L | N/A | N/A | 10.0 |
| Fecal Coliform (May 1 – September 30) [1] | no./100 mL | 1,000 | N/A | 2,000 |
| Total Residual Chlorine [2] | mg/L | N/A | N/A | 0.019 |
| The pH of the discharge shall not be less than 6.0 or greater than 9.0 standard units in any sample. | | | | |
| There shall be no Acute Whole Effluent Toxicity in the discharge, as measured by the WET test. | | | | |

Source: SDDENR 2010

Notes:

1. Fecal coliform organisms from May 1 to September 30 shall not exceed a concentration of 1,000 per 100 milliliters as a geometric mean based on a minimum of five samples obtained during separate 24-hour periods for any calendar month. They shall not exceed 2,000 per 100 milliliters in any one sample from May 1 to September 30.
2. SDDENR considers the analytical detection limit for total residue chlorine to be 0.05 mg/L.

Key: mg/L = milligrams per liter

In addition to the permit limitations imposed under SDSWDS, there are sludge requirements that the WWTP must meet. The Ellsworth AFB WWTP has been issued a Sludge Disposal Permit Number SDL-000281 by the SDDENR authorizing the installation to landfill sludge at the Rapid City municipal landfill. This permit contains specific limitations and monitoring, recordkeeping, and reporting requirements (EAFB 2001).

The proposed timeline for the demolition of the existing WWTP following decommissioning has not yet been established. It is assumed that the concrete and other demolition debris would be recycled to the maximum extent possible or sent to a landfill. The various WWTP facilities that would be decommissioned and demolished under the Proposed Action are listed in **Table 2-3**. Ellsworth AFB would not demolish Building 3015, which functions as the O/W separator for industrial flow, as O/W separation would continue to be applied to industrial wastewater prior to leaving the installation. Should soil or groundwater testing during demolition reveal contamination, long-term remediation and monitoring could be required. Any areas backfilled or graded during demolition would be monitored for erosion until vegetation has been reestablished to a satisfactory level on the soil surface.

**Table 2-2. Future SDSWDS Permit Limitations as of October 1, 2014**

| Parameter | Units | 30-Day Average | 7-Day Average | Daily Maximum |
|---|---|---|---|---|
| Biochemical Oxygen Demand (5-day) | mg/L | 30 | 45 | N/A |
| Total Suspended Solids | mg/L | 30 | 45 | N/A |
| Oil and Grease | mg/L | N/A | N/A | 10.0 |
| Escherichia coli (E. coli), (May 1 – September 30) [1] | no./100 mL | 630 | N/A | 1,178 |
| Ammonia-Nitrogen | mg/L | | N/A | |
| January 1 – January 31 | | 4.5 | | 8.0 |
| February 1 – February 29 | | 4.0 | | 10.0 |
| March 1 – March 31 | | 4.0 | | 15.0 |
| April 1 – April 30 | | 4.5 | | 15.0 |
| May 1 – May 31 | | 3.5 | | 15.0 |
| June 1 – June 30 | | 3.0 | | 15.0 |
| July 1 – July 31 | | 2.0 | | 15.0 |
| August 1 – August 31 | | 3.3 | | 20.0 |
| September 1 – September 30 | | 2.5 | | 15.0 |
| October 1 – October 31 | | 3.5 | | 15.0 |
| November 1 – November 30 | | 5.0 | | 15.0 |
| December 1 – December 31 | | 4.0 | | 11.0 |
| Total Residual Chlorine[2] | mg/L | N/A | N/A | 0.019 |
| The pH of the discharge shall not be less than 6.0 or greater than 9.0 standard units in any sample. | | | | |
| There shall be no Acute Whole Effluent Toxicity in the discharge, as measured by the WET test. | | | | |

Source: SDDENR 2010

Notes:

1. E. coli organisms from May 1 to September 30 shall not exceed a concentration of 630 per 100 milliliters as a geometric mean based on a minimum of five samples obtained during separate 24-hour periods from any calendar month. They shall not exceed 1,178 per 100 milliliters in any one sample from May 1 to September 30.
2. SDDENR considers the analytical detection limit for total residue chlorine to be 0.05 mg/L.

**Table 2-3. Existing WWTP Facilities to be Demolished under the Proposed Action**

| Building Number | Building Function or Process | Square Footage ($ft^2$) |
|---|---|---|
| 3003 | Sludge Pits Reinput | 13,952 |
| 3005 | Main Building | 1,885 |
| 3006 | Clarifier Pits | 156 |
| 3007 | Digestor Building | 5,419 |
| 3008 | Clarifier, Effluent Strut, Sludge/Scum Pits | 1,670 |
| 3009 | Chlorine Storage Facility | 144 |
| 3010 | Dome-Trickling Filter | 12,131 |
| 3011 | Belt Press Building | 890 |
| 3013 | Pretreatment Facility | 2,018 |
| 3014 | Chlorine and Effluent Sampling Facility | 114 |
| | **Total to be Demolished** | **38,379** |

### 2.2.2 Wastewater Pipeline Easement and Construction

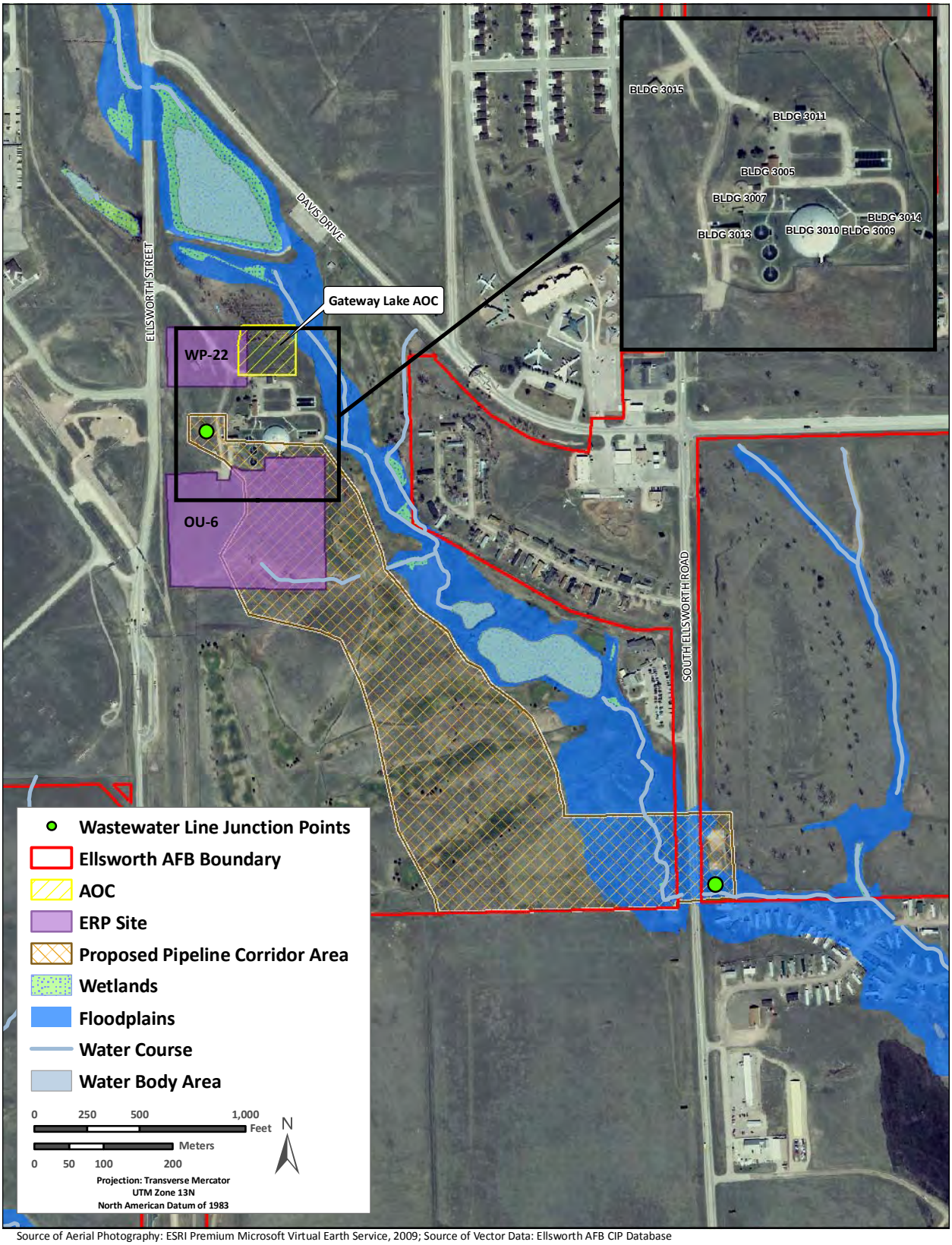
The Proposed Action would include the granting of an easement on Ellsworth AFB to the South Dakota EDA and construction of an 18- to 36-inch sanitary sewer pipeline within this easement to ultimately connect to the proposed RWWTP. The easement would extend from the manhole just upgradient of the existing Ellsworth AFB WWTP across portions of the installation's golf course and potentially across a former landfill (Operable Unit [OU]-6). The easement would begin at wastewater junction point to the west of Building 3013 and travel southeast along the golf course to a wastewater pipeline junction point east of Ellsworth Road (see **Figure 2-1**). The corridor being evaluated for the proposed sewer pipeline is shown in **Figure 2-1** and represents the area that a sanitary sewer pipeline could be routed, depending on siting constraints. Because of the natural topography of this area, the preferred pipeline route would follow natural contours to allow the pipeline to be gravity-fed versus installing a lift station to pump effluent. The proposed corridor is primarily to the west of the floodplain, but the corridor would cross the floodplain and a creek. As discussed in **Section 1.4.2**, potential impacts on wetlands and floodplains require a FONPA. In addition, appropriate permits, mitigation, and BMPs would be required because of the potential impacts on wetlands and the floodplain. For purposes of this EA, it is assumed that the trench and associated temporary disturbances to install the pipeline would be approximately 3,525 feet in length (0.67 miles) and 10 feet in width, for a total of 35,250 square feet ($ft^2$) (0.81 acres) of disturbance.

OU-6 is former Landfill No. 5 on Ellsworth AFB, which is an installation Environmental Restoration Program (ERP) site. The Department of Defense (DOD) has developed the ERP program to facilitate thorough investigation and cleanup of contaminated sites on military installations. OU-6 was an active landfill from 1960 to 1980 and it was used primarily to dispose of construction and demolition debris. Some reports indicate that digested sewage sludge, miscellaneous refuse, and possible shop wastes might have been disposed of at this landfill. After closing of the landfill, OU-6 was covered with a cap of clean soil in 1995. Samples are periodically collected from three wells on OU-6. To date, sampling results have not indicated a need to conduct further remedial activities associated with OU-6 (EAFB 2009b). If required, an additional soil fill cap would be placed above the existing landfill cap to provide a buried conduit for the proposed sanitary sewer pipeline.

There are existing utilities and easements in the vicinity of the proposed pipeline corridor that would be considered during establishment of the proposed wastewater pipeline easement. A permanent easement for a high-pressure gas line was granted to Montana-Dakota Utilities in 1951. This easement extends from southwest to northeast across the central portion of the Prairie Ridge Golf Course. An easement for a sanitary sewer line to the Terrace on the Green mobile home park northeast of the golf course carries sanitary waste southeast across the golf course to the wastewater pipeline junction point east of Ellsworth Road. This sanitary sewer line also services a connection from the golf course clubhouse and maintenance facility as a result of a 2006 Memorandum of Understanding (MOU) signed by Ellsworth AFB and the City of Box Elder. This MOU allows the sewage from the installation's golf course to be treated by Box Elder in exchange for Box Elder residents being allowed to use the golf course. There is also an installation-owned water line that extends across the golf course from northwest to southeast and provides potable water to the golf course clubhouse through a connecting line (Hoffman 2009).

### 2.2.3 Ellsworth AFB's Wastewater Contribution to the Regional Waste Stream

The EA will also evaluate Ellsworth AFB's wastewater contribution to the regional wastewater stream. Under the Proposed Action, after completion of the decommissioning process for the existing Ellsworth AFB WWTP, flow from Ellsworth AFB would be sent through a sanitary sewer pipeline to the proposed future RWWTP off-installation. The current and projected wastewater production flows for




Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

**Figure 2-1. Proposed Pipeline Corridor**

Ellsworth AFB and the City of Box Elder are described below. The impacts of Ellsworth AFB's current and future contributions on a regional level will be described in **Section 3** of the EA. The City of Box Elder has undergone recent growth by annexing portions of Ellsworth AFB, which have nearly doubled the size of the city to a population of approximately 9,200 by including the installation's resident population as residents of Box Elder. This annexation and other future developments by the city have increased the need for the city to expand its current wastewater treatment facilities, which are currently above capacity. The City of Box Elder expects to add approximately 3,130 homes over the next 10 years to the collection system (EAFB 2008a). A summary of the predicted growth, equivalent population, and associated flow associated with the City of Box Elder is provided in **Table 2-4**.

**Table 2-4. City of Box Elder Summary of Future Wastewater Flows**

| Parameter | Value | Equivalent Population | Associated Flow (MGD) |
|---|---|---|---|
| Annual Average Daily Flow (MGD) | 0.32 | NA | NA |
| Persons per household * | 2.9 | NA | NA |
| Current housing inventory | 1,700 | 4,930 | 0.32 |
| Gallons per day per capita (gpdc) | 65 | NA | NA |
| Increase in homes, 0–10 years | 3,130 | 9,077 | 0.59 |
| Increase in homes, 11–20 years | 3,130 | 9,077 | 0.59 |
| Future number of homes (year 2028) | 7,960 | 23,084 | 1.5 |

Source: EAFB 2008a
Note: * 2000 Census data
Key: NA = Not applicable

**Table 2-5** summarizes current and estimated future flows for the City of Box Elder and Ellsworth AFB wastewater streams. The period of record used to determine the current City of Box Elder flows is August 2005–July 2007. The period of record used to determine the current Ellsworth AFB flows is October 2008–September 2009. Flows are estimated for 2028, approximately 20 years in the future. The table shows that the average daily wastewater production for Ellsworth AFB is projected to triple from the current flow of 0.5 MGD to about 1.5 MGD by 2028. The combined average daily flow for Ellsworth AFB and the City of Box Elder is expected to increase from 0.82 MGD at present to 3.0 MGD by 2028.

**Table 2-5. Current and Future Wastewater Flows, Box Elder and Ellsworth AFB WWTPs**

| Flow Parameter (MGD) | Current Flow | | | Future Flow (2028) | | |
|---|---|---|---|---|---|---|
| | Box Elder | EAFB | Combined | Box Elder | EAFB | Combined |
| Annual Average Daily Flow | 0.32 | 0.50 | 0.82 | 1.5 | 1.5 | 3.0 |
| Maximum Monthly Flow | 0.43 | 0.82 | 1.25 | 2.1 | NA | NA |
| Maximum Daily Flow | 0.64 | 1.41 | 2.05 | 3.0 | 2.3 | 5.3 |

Sources: EAFB 2008a, EAFB 2008b, EAFB 2009c
Key: NA=Not Applicable

## 2.3 Alternatives

Ellsworth AFB identified treatment and infrastructure locations to be considered as potential alternatives to the Proposed Action and the No Action Alternative. These considered alternatives are discussed below.

### 2.3.1 WWTP Upgrade Alternative

This alternative would require certain upgrades to the existing Ellsworth AFB WWTP in order to meet more stringent SDSWDS standards imposed on the installation by October 1, 2014. The associated upgrades include the following to bring the existing WWTP into compliance:

- Activated sludge equipment (e.g., blowers, air diffusers, aeration basins) and a new process building to house the equipment
- New secondary clarification designed for the activated sludge process
- Ultraviolet disinfection to eliminate the hazards associated with chlorine gas handling
- Conversion of the existing anaerobic digesters to aerobic digesters to eliminate ammonia loading associated with effluent recycle
- A new pumphouse
- Addition of sludge cake storage and vehicle equipment storage to address current needs at the facility (EAFB 2004b)
- Demolish existing chlorine building and trickling filter
- Construct service road.

The WWTP Upgrade Alternative would not help the City of Box Elder meet the SDSWDS permit requirements or address issues with its lagoon treatment facility, which is operating over capacity. The WWTP Upgrade Alternative would therefore require the City of Box Elder to expand its own current wastewater treatment facilities. Nonetheless, upgrading the existing Ellsworth AFB WWTP is considered a reasonable alternative and is carried forth for further analysis in this EA.

### 2.3.2 Treatment Alternatives Considered

Ellsworth AFB evaluated a range of alternatives to effectively treat wastewater to meet more stringent SDSWDS standards. These included pumping wastewater to Rapid City for treatment and upgrading existing treatment facilities. In addition, treatment options for use at the proposed RWWTP are also discussed.

***Pumping to the Rapid City WWTP.*** Pumping wastewater to be treated by the Rapid City WWTP was considered, but preliminary feasibility studies indicated that the cost of pumping wastewater would be almost 50 percent greater than any other treatment option. In addition, no easements or agreements are currently in place with Rapid City that would allow this to occur. Therefore, pumping wastewater to Rapid City does not meet the stated selection criteria in **Section 2.1** and is not evaluated in further detail in this EA.

***Separate Sewage Treatment Systems.*** A comparison of separate sewage treatment systems for Ellsworth AFB and the City of Box Elder with a combined system was conducted as part of a feasibility analysis for the RWWTP (EAFB 2008a). Comparing the lifecycle cost of separate facilities with a single RWWTP indicates that an RWWTP is more economical. The cost of constructing and operating an RWWTP was on the order of approximately $24.5 million, $8.8 million less than upgrading the existing separate

treatment facilities operated by Ellsworth AFB and the City of Box Elder (EAFB 2008a). In addition, the passage of House Bill Number 1301 permitted the creation of the South Dakota EDA, which is authorized to construct the RWWTP. Nonetheless, upgrading the existing Ellsworth AFB WWTP is considered a reasonable action alternative to the Proposed Action, and this alternative is presented in **Section 2.3.1**.

***RWWTP Treatment Options.*** Screening criteria were used to evaluate different treatment options for the RWWTP and after applying those screening criteria to the various treatment options available, three were chosen for further analysis. The three treatment options evaluated included sequencing batch reactors (SBRs), conventional activated sludge (CAS), and integrated fixed-film activated sludge (IFAS) (EAFB 2008a). These three treatment options were then compared to the cost of separate versus combined treatment facilities. The comparison indicated that the CAS process might be slightly more economical than SBRs; however, the cost difference is not significant when considering the accuracy of the cost estimates. IFAS/moving bed bio-reactor (MBBR) was significantly more costly than the other alternatives and was therefore eliminated. SBRs were the best treatment alternative based on the non-cost factors of the prior screening process; therefore, using SBRs is the recommended wastewater treatment process (EAFB 2008a). The treatment process, although not evaluated in this EA, is relevant as it is addressed as part of the discussion of the contribution to regional wastewater streams by Ellsworth AFB in **Section 2.1.3** and analysis in **Section 3**.

### 2.3.3 Pipeline Corridor Alternatives Considered

Two general corridors were considered as easements to be granted to the South Dakota EDA for a sanitary sewer pipeline. The first corridor connects the inflow for the existing Ellsworth AFB WWTP to an existing sewer line corridor at the intersection of Ellsworth Road and the unnamed tributary of Box Elder Creek that flows through the Prairie Ridge Golf Course. A second corridor is along Ellsworth Street (west of the existing WWTP) and follows a former railroad spur that connected Ellsworth AFB with a railroad line in the City of Box Elder south of Interstate 90 (I-90) (see **Figures 1-1** and **2-1**). However, this second route would require construction of a lift station to pump the wastewater up to the elevation of the railroad spur, and this route would be more than twice as long as the route across the golf course. In addition, the golf course route would maximize use of existing sanitary sewer infrastructure already in place and would not require a lift station. For these reasons, the railroad spur route was not considered to be a practicable alternative to the golf course route and is therefore not evaluated in further detail in this EA.

### 2.3.4 The No Action Alternative

CEQ regulations require inclusion of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and alternatives can be evaluated. Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action nor would the existing WWTP be upgraded to meet the SDSWDS permit requirements.

Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would however be unable to meet the more stringent SDSWDS standards for ammonia. The No Action Alternative would likely be an infeasible alternative, as Ellsworth AFB's existing WWTP would not meet future ammonia discharge limit requirements.

## 2.4 Summary of Environmental Impacts and Environmental Protection Measures

**Table 2-6** presents a summary of the environmental impacts that could result from implementation of the Proposed Action and Alternatives as a result of the analysis presented in **Section 3**. **Table 2-7** presents BMPs and environmental protection measures that Ellsworth AFB and their contractors would comply with to minimize or eliminate impacts on environmental resources.

**Table 2-6. Summary of Environmental Impacts**

| Environmental Resource | Proposed Action | | | WWTP Upgrade Alternative | No Action Alternative |
|---|---|---|---|---|---|
| | WWTP Decommissioning and Demolition | Wastewater Pipeline Easement and Construction | Contribution to Regional Waste Stream | | |
| **Land Use** | • Short-term, negligible, adverse impacts and long-term, minor, beneficial impacts would be expected. | • No impacts on land use would be expected from granting the easement.<br>• Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline. | • No impacts on land use would be expected. | • Short-term, minor, adverse impacts on land use would be expected. | • No impacts on land use would be expected. |
| **Infrastructure/ Utilities** | • Short- and long-term, moderate, adverse impacts on water supply would be expected.<br>• Short-term, negligible to minor, adverse impacts on sanitary sewer and wastewater systems, liquid fuels, electrical systems, solid waste disposal, storm drainage systems, and transportation would be expected.<br>• Long-term, beneficial impacts on storm drainage systems would be expected.<br>• No impacts on natural gas systems would be expected. | • No impacts would be expected on water supply, sanitary sewer and wastewater systems, storm drainage system, electrical supply, liquid fuel supply, natural gas supply, solid waste, or transportation from an easement being granted on Ellsworth AFB.<br>• Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected during pipeline construction. | • No impacts would be expected on water supply, sanitary sewer and wastewater systems, storm drainage system, electrical supply, natural gas supply, liquid fuel supply, solid waste, or transportation. | • Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, electrical supply, and liquid fuels would be expected.<br>• Short-term, minor, adverse impacts on solid waste disposal would be expected.<br>• Short-term, negligible to minor, adverse impacts on transportation would be expected.<br>• Long-term, minor, adverse impacts water supply, storm drainage systems, and electrical supply would be expected.<br>• Long-term, beneficial impacts on sanitary sewer and wastewater systems would be expected.<br>• No impacts on natural gas systems would be expected. | • Long-term, moderate, adverse impacts on the sanitary sewer system would be expected from wastewater effluent not meeting future ammonia limits. |

| Environmental Resource | Proposed Action | | | WWTP Upgrade Alternative | No Action Alternative |
|---|---|---|---|---|---|
| | WWTP Decommissioning and Demolition | Wastewater Pipeline Easement and Construction | Contribution to Regional Waste Stream | | |
| **Noise** | • Short-term, minor, adverse effects would be expected. | • No impacts on the noise environs at Ellsworth AFB would be expected from granting the easement.<br>• Short-term, minor, adverse impacts on the noise environs would be expected from construction of the sanitary sewer pipeline. | • No impacts on the noise environs at Ellsworth AFB would be expected. | • Similar to impacts discussed under WWTP Decommissioning and Demolition. | • No impacts on noise would be expected. |
| **Air Quality** | • Short-term, minor, adverse impacts from construction and demolition emissions and land disturbance would be expected. | • No impacts on local or regional air quality at Ellsworth AFB would be expected from granting the easement.<br>• Short-term, minor, adverse impacts on air quality would be expected from construction of the sanitary sewer pipeline. | • No impacts on local or regional air quality at Ellsworth AFB would be expected. | • Short-term, minor, adverse impacts from construction and demolition emissions and land disturbance would be expected. | • No impacts on local or regional air quality at Ellsworth AFB would be expected. |
| **Safety** | • Short-term, negligible to minor, adverse impacts would be expected. | • No impacts on safety would be expected from granting the easement.<br>• Short-term, minor, adverse impacts on safety would be expected during construction of the sanitary sewer pipeline. | • No impacts on safety would be expected. | • Short-term, negligible to minor, adverse impacts would be expected. | • No impacts on safety would be expected. |
| **Geological Resources** | • Short-term, minor and long-term, negligible adverse and long-term beneficial impacts on geological resources and soils would be expected. | • No impacts on geological resources would be expected from granting the pipeline easement.<br>• Short-term, minor, adverse impacts on soils would be expected during construction of the pipeline.<br>• Long-term, minor, adverse impacts on topography would be expected during construction. | • No impacts on geological resources and soils would be expected. | • Short- and long-term, minor, adverse, impacts on geological resources and soils would be expected. | • No impacts on geological resources and soils would be expected. |

| Environmental Resource | Proposed Action | | | WWTP Upgrade Alternative | No Action Alternative |
|---|---|---|---|---|---|
| | WWTP Decommissioning and Demolition | Wastewater Pipeline Easement and Construction | Contribution to Regional Waste Stream | | |
| **Water Resources** | • Short-term, moderate, adverse and long-term, moderate, beneficial impacts on water resources would be expected from an alteration of water velocity, quantity, and quality on the tributary currently receiving treated effluent. | • No impacts would be expected on water resources from granting the pipeline easement.<br>• Short-term, minor, adverse impacts on surface water would be expected from the construction of the sanitary sewer pipeline.<br>• Short-term, minor, adverse impacts on floodplains would be expected from the construction of the sanitary sewer pipeline within the 100-year floodplain of the unnamed tributary of Box Elder Creek. | • No direct impacts would be expected on water resources from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, indirect impacts from the cessation of the discharge of WWTP effluent into the unnamed tributary (resulting in decreased water flow within and downstream of the unnamed tributary and altered stream channel morphology) would be expected. | • Short-term, minor adverse impacts during construction would be expected.<br>• Long-term beneficial impacts from the decrease in ammonia present in the water column. | • Long-term, minor, adverse impacts on water resources would be expected from an inability to meet new SDSWDS ammonia discharge limits. |
| **Biological Resources** | • Short-term, direct, negligible adverse and long-term, negligible to minor, beneficial effects on vegetation and wildlife would be expected.<br>• Long-term, direct, minor to moderate, adverse effects and indirect, negligible to minor, adverse effects on wetlands to the east of and within the Project area would be expected.<br>• No impacts on sensitive and protective species would be expected. | • No impacts on vegetation, wildlife, wetlands, and sensitive and protected species would be expected from granting the easement.<br>• Short-term, negligible, adverse impacts on vegetation, wildlife, and sensitive and protected species would be expected from the construction of a sanitary sewer pipeline.<br>• Short-term, minor, adverse impacts on wetlands would be expected from the construction of a pipeline. | • No impacts on vegetation and sensitive and protected species would be expected. However, long-term minor adverse effects on off-installation wildlife and wetlands could be impacted from increased effluent into Box Elder Creek. | • Impacts on vegetation and wildlife would be similar to, but greater than, those discussed under WWTP Decommissioning and Demolition.<br>• Impacts on sensitive and protected species and wetlands would be similar to those discussed under WWTP Decommissioning and Demolition. | • Long-term, minor, adverse impacts would be expected from an inability to meet new SDSWDS ammonia discharge limits. |

| Environmental Resource | Proposed Action | | | WWTP Upgrade Alternative | No Action Alternative |
|---|---|---|---|---|---|
| | **WWTP Decommissioning and Demolition** | **Wastewater Pipeline Easement and Construction** | **Contribution to Regional Waste Stream** | | |
| **Cultural Resources** | • No adverse impacts on architectural or archaeological cultural resources would be expected. | • No adverse impacts on architectural or archaeological cultural resources would be expected. | • No adverse impacts on architectural or archaeological cultural resources would be expected. | • No impacts on cultural resources would be expected. | • No impacts on cultural resources would be expected. |
| **Socioeconomic Resources and Environmental Justice** | • Short-term, minor, direct, beneficial impacts on the construction industry would be expected.<br>• Short-term negligible, indirect, beneficial impacts on the local economy.<br>• No impacts on demographics or environmental justice would be expected. | • No impacts on socioeconomic resources would be expected from granting the easement.<br>• Short-term, minor, adverse impacts on golf course users would be expected from the construction of the pipeline.<br>• Short-term, minor, beneficial effects on the construction industry would be expected from the construction of the pipeline.<br>• No impacts on demographics or environmental justice would be expected from the construction of the pipeline. | • No impacts on socioeconomic resources would be expected. | • Impacts would be similar to those described under WWTP Decommissioning and Demolition. | • No impacts on socioeconomic resources and would be expected. |

| Environmental Resource | Proposed Action | | | WWTP Upgrade Alternative | No Action Alternative |
|---|---|---|---|---|---|
| | **WWTP Decommissioning and Demolition** | **Wastewater Pipeline Easement and Construction** | **Contribution to Regional Waste Stream** | | |
| **Hazardous Materials and Wastes** | • Short-term, minor, adverse and long-term, minor, beneficial impacts on hazardous materials management would be expected.<br>• Short-term, minor, adverse and long-term, minor, beneficial impacts on hazardous wastes would be expected.<br>• No impacts on the installation's hazardous waste management program, Pollution Prevention Program, and ERP sites (OU-6 and OU-11) would be expected.<br>• The existing WWTP might contain ACM, LBP, and light ballasts, sump pumps, or pad-mounted transformers containing PCBs; therefore, there might be short-term, minor, adverse and long-term, minor, beneficial impacts. | • No impacts on hazardous materials and wastes would be expected from granting the pipeline easement.<br>• Short-term, minor, adverse impacts on the ERP, hazardous materials management, and hazardous wastes would be expected from the construction of the pipeline.<br>• No impacts on ACM, LBP, and PCBs would be expected from the construction of the pipeline.<br>• Short-term, negligible, adverse impacts on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of the pipeline. | • Long-term, minor, adverse impacts on hazardous and petroleum wastes would be expected from additional sludge generation.<br>• No impacts on ERP sites, hazardous materials and petroleum products, ACM, LBP, PCBs, and pollution prevention would be expected. | • Long-term, minor, adverse impacts on hazardous materials or waste management would be expected as a result of the Proposed Action not being implemented. | • No impacts on hazardous materials and wastes would be expected. |

**Table 2-7. Environmental Protection Measures**

| Environmental Resource | Environmental Protection Measures |
|---|---|
| **Land Use (see Section 3.1)** | • Continued adherence to the Air Installation Compatible Use Zone (AICUZ) study and General Plan to ensure compatibility with on- and off-installation land uses. |
| **Infrastructure and Utilities (see Section 3.2)** | • Coordination with local utility companies and the Civil Engineering staff at Ellsworth AFB for identification of utility locations prior to implementation of the Proposed Action.<br>• Permits required for trenching and excavation would be obtained prior to commencement of construction or demolition. |
| **Noise (see Section 3.3)** | • Noise generation would last only for the duration of construction and demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). |
| **Air Quality (see Section 3.4)** | • Implementation of fugitive dust-control measures (e.g., windbreaks and barriers, control of vehicle access).<br>• Construction and demolition equipment would be properly tuned and maintained prior to and during construction and demolition activities.<br>• Utilization of existing power sources (e.g., power poles) during construction and demolition rather than temporary power generation. |
| **Safety (see Section 3.5)** | • Contractors would follow ground safety regulations and workers compensation programs.<br>• Demolition activities would be performed in a manner that does not pose any risk to its workers or installation personnel.<br>• Contractors would be responsible for an industrial hygiene program.<br>• Upon discovery of munitions, unexploded ordinance (UXO), or Chemical Agent Identification Sets (CAISs) during construction or demolition, contractors would cease work in the area and notify the Ellsworth AFB Explosive Ordnance Disposal (EOD) Flight. |
| **Geological Resources (see Section 3.6)** | • Implementation of fugitive dust-control measures (e.g., watering).<br>• Implementation of erosion and storm water management practices.<br>• Implementation of standard erosion-control measures (e.g., silt fencing, sediment traps).<br>• Berming along nearby water bodies to decrease the amount of sedimentation in adjacent water bodies. |

| Environmental Resource | Environmental Protection Measures |
|---|---|
| **Water Resources (see Section 3.7)** | • A National Pollutant Discharge Elimination System (NPDES) permit would be obtained as applicable prior to demolition activities.<br>• Development of an erosion–and-sediment-control plan and Storm water Pollution Prevention Plan (SWPPP).<br>• Implementation of standard erosion-control measures (e.g., silt fencing, sediment traps).<br>• Proper housekeeping, retention of debris, demolition equipment maintenance, petroleum and hazardous material storage, and adherence to the Spill Prevention, Control, and Countermeasures (SPCC) Plan in the event of a spill to minimize the introduction of pollutants to surface waters. |
| **Biological Resources (see Section 3.8)** | • Revegetation in the Project area upon completion of demolition and construction activities.<br>• CWA Section 404 permits would be required for wetland disturbance. Permitting authority would be determined based on negotiations between the USAF and the South Dakota EDA.<br>• Mitigation or compensation for any loss of wetland acreage as a result of the Proposed Action, per the "No Net Loss" national policy. |
| **Cultural Resources (see Section 3.9)** | • If archaeological resources are discovered during implementation of the Proposed Action, the installation Cultural Resource Manager (CRM) would ensure the provisions of the Archeological Resources Protection Act (16 U.S.C. Sections 470aa–470mm) and 32 CFR Part 229 are followed.<br>• If human remains are discovered during implementation of the Proposed Action, the installation CRM would be immediately notified and formal notification, consultation, treatment, and disposition procedures would be followed as outlined in the Integrated Cultural Resources Management Plan (ICRMP). |
| **Socioeconomic Resources and Environmental Justice (see Section 3.10)** | • No environmental protection measures have been identified for socioeconomic resources and environmental justice. |
| **Hazardous Materials and Wastes (see Section 3.11)** | • Preparation of a health and safety plan by the contractor prior to commencement of construction and demolition activities.<br>• If contamination is encountered, the handling storage, transportation, and disposal activities would be conducted in accordance with appropriate regulations.<br>• Project planning would include protection of ERP infrastructure and avoiding disturbance to ERP site OU-6 (i.e., through use of an added clean fill cap to serve as a conduit for a new pipeline), and a waiver request would be submitted prior to construction or demolition in the vicinity of an ERP site. |

# 3. Affected Environment and Environmental Consequences

This section provides a characterization of the affected environment and presents an analysis of the potential direct and indirect effects each alternative would have on the affected environment. Cumulative and other effects are discussed in **Section 4**. All potentially relevant resource areas were initially considered in this EA.

The specific criteria used in this section for evaluating potential environmental effects associated with alternatives are presented under each resource area. The significance of an action is measured in terms of its context and intensity. The following elaborates on the nature of characteristics that might relate to various environmental effects.

***Short-term or long-term.*** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic, such as those caused by operational phases of a project.

***Direct or indirect.*** A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct effect of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

***Negligible, minor, moderate, or major.*** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.

***Adverse or beneficial.*** An adverse effect is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource.

***Significance.*** Significant effects are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27).

***Context.*** The context of an effect can be localized or more widespread (e.g., regional).

***Intensity.*** The intensity of an effect is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Effects are also considered in terms of their potential for violation of Federal, state, or local environmental law; their controversial nature; the degree of uncertainty or unknown effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative effects (see **Section 4**).

# 3.1 Land Use

## 3.1.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, "labels," and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, and the duration of a proposed activity and its "permanence."

## 3.1.2 Description of Affected Environment

Ellsworth AFB consists of approximately 5,415 acres in Meade and Pennington counties in southwestern South Dakota, 7 miles northeast of Rapid City (see **Figure 1-1**). The City of Box Elder borders the installation to the southeast. A portion of the installation was recently annexed to the City of Box Elder to encourage development activities for the city. The existing Ellsworth AFB WWTP is in the southeastern comer of the installation. For the purposes of this land use analysis, the project vicinity is defined as the WWTP and associated facilities and the proposed pipeline corridor as shown in **Figure 2-1**.

***On-installation.*** Land use patterns on Ellsworth AFB are compatibly arranged to support mission requirements. Ellsworth AFB maintains a residual amount of open space to buffer incompatible uses and to support future installation functions or expanded missions (EAFB 2007a). There are 11 existing land use types at Ellsworth AFB. See **Table 3-1** for these exiting land use types and corresponding acreages.

These land use categories on Ellsworth AFB were developed to prevent incompatible siting of facilities and operations. The WWTP is in an industrial area of the installation, while the proposed pipeline corridor, which extends through the golf course, is part of the outdoor recreation land use category (see **Figure 3-1**). To the north of the Project area, current land uses include outdoor recreation and open space. Land uses to the west and south of the Project area are predominantly airfield and airfield pavements. To the east of the Project area, land use is outdoor recreation, which includes portions of the Prairie Ridge Golf Course (EAFB 2007a). South of the Project area is the Ellsworth installation boundary and the City of Box Elder.

**Table 3-1. Land Use Categories at Ellsworth AFB**

| Category | Acreage | Percent of Land Use * |
|---|---|---|
| Airfield and Airfield Pavements | 1,042 | 19 |
| Aircraft Operations and Maintenance | 130 | 2 |
| Industrial | 741 | 14 |
| Administrative | 50 | 1 |
| Community (Commercial) | 45 | 1 |
| Community (Service) | 46 | 1 |
| Medical | 22 | 1 |
| Housing (accompanied) | 588 | 11 |
| Housing (unaccompanied) | 49 | 1 |
| Outdoor Recreation | 293 | 5 |
| Open Space (including water) | 2409 | 44 |
| **Total** | **5,415** | |

Source: EAFB 2007a

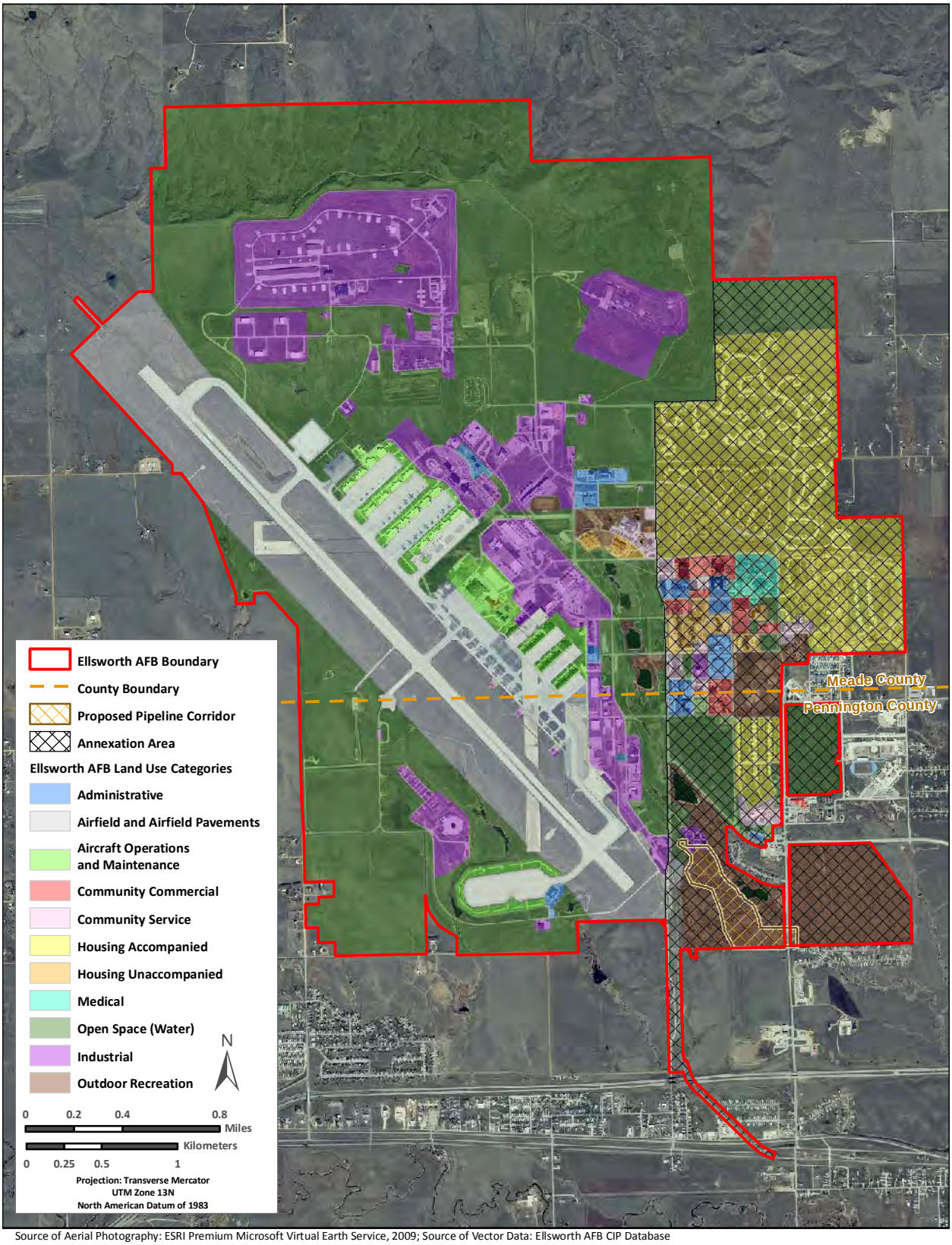
Note: * Values were rounded up to the closest percent.

DOD has determined that the areas immediately beyond the ends of runway and along the approach and departure flights paths at Ellsworth AFB have significant potential for aircraft accidents (see **Figure 3-2**). Based on this analysis, DOD developed three zones that have high relative potential for accidents, the Clear Zone (CZ), Accident Potential Zone (APZ) I, and APZ II. The CZ, the area closest to the runway end, is the most hazardous. APZ I is an area beyond the CZ that has significant potential for accidents. APZ II is an area beyond APZ I with a lesser, but still significant, potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the USAF, land use planning and controls are strongly encouraged in these areas for the protection of the public. The Proposed Project Corridor is 1,000 feet southeast of the southern end of the runway and is partially within the CZ and APZ I.

The WWTP and a portion of the proposed pipeline corridor are within the DNL of 80+ noise contour while the remaining portion of the proposed pipeline corridor is within the DNL of 75+ noise contour (see **Section 3.3** for noise).

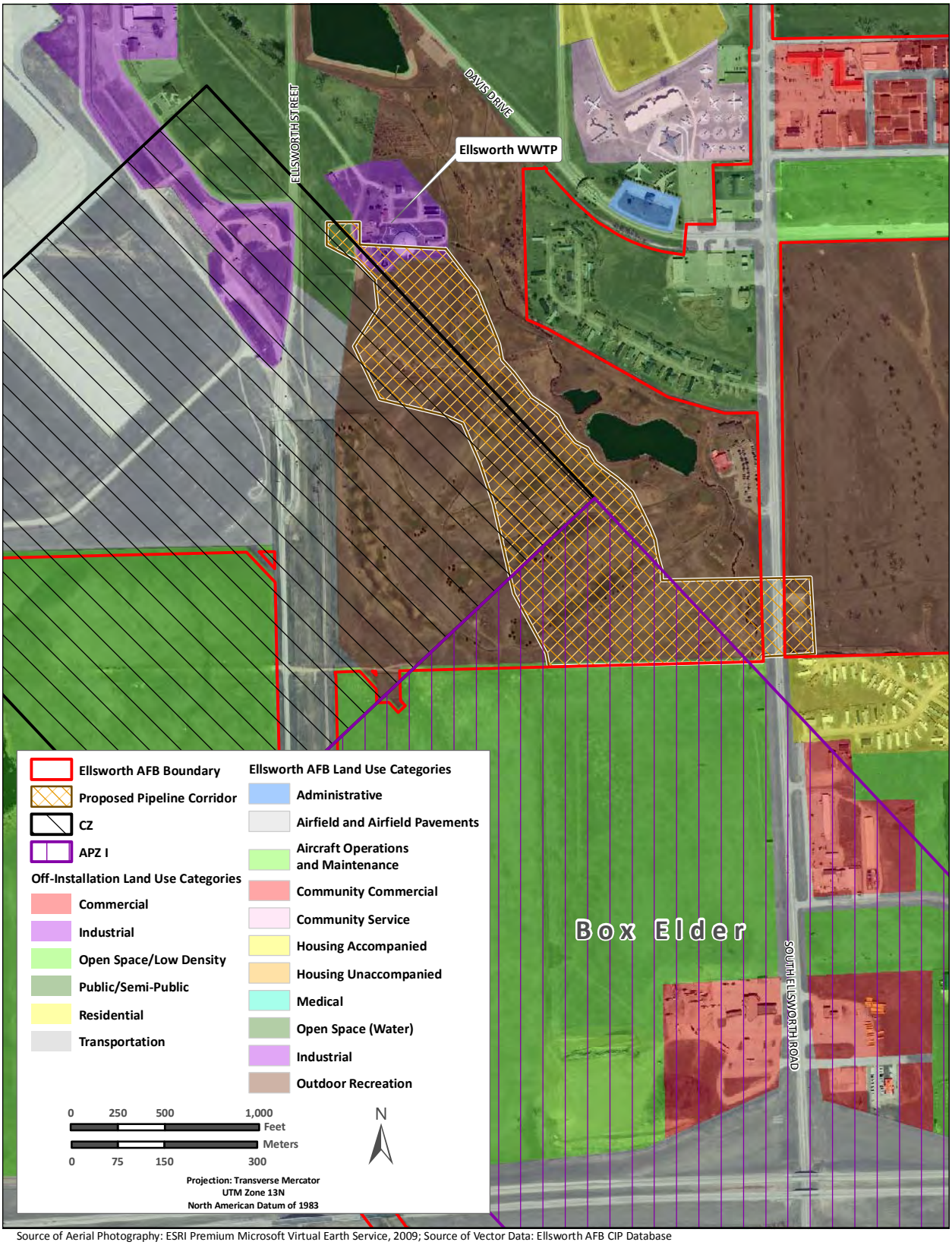
***Off-installation.*** Since the 1940s, growth in several communities, including Box Elder, has increased thereby impacting land use surrounding Ellsworth AFB. Current land use surrounding Ellsworth AFB is mixed. Land use in areas to the west, north, and intermittently to the east of Ellsworth AFB is classified as low-density rural-agricultural. The City of Box Elder is adjacent to Ellsworth AFB, southeast of the installation boundary. Land uses within Box Elder consist of open space/low density uses with residential and commercial uses along major transportation routes.

In recent years the City of Box Elder has sought to attract businesses to provide economic opportunities as well as retail and dining options for those living on- and off-installation. Some businesses have declined relocating to the City of Box Elder because population levels in the city were not large enough to meet their requirements. On August 28, 2009, the City of Box Elder annexed the residential areas of Ellsworth AFB. This annexation allowed the City of Box Elder to increase their population and tax revenues in hopes of attracting new businesses (Box Elder undated, Box Elder 2009). **Figure 3-1** shows the annexation boundary.




Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

**Figure 3-1. Land Use on Ellsworth AFB and Annexation Boundary**




Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

**Figure 3-2. CZ and APZs on Proposed Project Area**

In an interest to provide compatible civilian development and future growth near Ellsworth AFB, the State of South Dakota enacted legislation in the form of House Bill 1301 to establish the South Dakota EDA. This bill was introduced by the Governor of South Dakota and became effective on July 1, 2009 (see **Appendix A**).

The *City of Box Elder Comprehensive Plan: Goal and Policies* serves as a guide for policy decisions relating to the physical growth and economic development of Box Elder. The City of Box Elder recognizes the special relationship it has with Ellsworth AFB due the installation's proximity and economic impact upon the city (Box Elder 2002).

Land use for Pennington County is driven by the Pennington County zoning districts, which are published in the *Pennington County Comprehensive Plan* (Pennington County 2003). The Comprehensive Plan proposes a series of objectives to accomplish this goal. The goals applicable to Ellsworth AFB include the following:

- Provide for stable neighborhoods by minimizing adverse effects from conflicting land uses
- Transition between types of land uses, especially between conflicting land uses, shall be orderly and efficient through the use of buffers such as increased setbacks, open space, fencing, and landscaping.

Land use policies and decisionmaking for Meade County is guided by the county's June 2009 Comprehensive Plan (Meade County 2009).

## 3.1.3 Environmental Consequences

### Evaluation Criteria

The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be significant if any of the following were to happen:

- Be inconsistent or in noncompliance with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

### 3.1.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, negligible, adverse impacts and long-term, minor, beneficial impacts on land use would be expected from decommissioning and demolition of the WWTP. The WWTP is currently in APZ I and few land uses are compatible with the areas associated with the end of runway. Land use of the WWTP would remain industrial through decommissioning of the existing WWTP. Following decommissioning, the facilities associated with the WWTP would be demolished, resulting in short-term, negligible, direct, adverse impacts on land use from the use of demolition equipment in APZ I and the increased presence of construction vehicles related to demolition activities. Long-term, minor, direct, beneficial effects on land

use would be expected if the area currently occupied by the WWTP is returned to open space, thus resulting in fewer uses in APZ I. Currently, there are no plans to redevelop the Ellsworth WWTP site. Land use is restricted in this area because of Air Installation Compatible Use Zone (AICUZ) recommendations; however, another industrial type use would be compatible for this site. Site redevelopment would have to take AICUZ noise zone classifications into consideration.

#### Wastewater Pipeline Easement and Construction

Under the Proposed Action an easement would be granted to the South Dakota EDA securing the right-of-way for a sanitary sewer pipeline across portions of OU-6, the Prairie Ridge Golf Course, and a small, unnamed creek east of the existing WWTP. The easement would extend from the wastewater junction point shown in **Figure 2-1** southeast across South Ellsworth Road. The easement would be entirely within Ellsworth AFB except for a small portion that crosses South Ellsworth Road. Analysis of the easement from Ellsworth AFB property to the RWWTP will be covered in separate environmental documentation.

No impacts on land use would be expected from granting an easement to the South Dakota EDA as land use would generally not change from granting this easement. No long-term effects would be expected from granting an easement to the South Dakota EDA as an easement would not be expected to affect current or adjacent land uses.

Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline due to the temporary closure of a portion or all of the golf course during pipeline construction. Adverse impacts from the construction of a sanitary sewer pipeline would likely occur only for the duration of construction. No long-term impacts would be expected from pipeline construction.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts on land use would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. Development of an RWTTP is consistent with the goals outlined in an MOU between Ellsworth AFB and the City of Box Elder; therefore no impacts on land use would be expected (EAFB undated).

### 3.1.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the SDSWDS permit requirements regarding ammonia. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Activities necessary to bring the current WWTP into compliance would not affect current industrial land uses or adjacent land uses which are compatible with the WWTP. However, short-term, minor, adverse impacts on land use would be expected due to an increased presence of construction vehicles and disturbances related to construction activities. The WWTP Upgrade Alternative would not help the City of Box Elder meet the SDSWDS permit requirements or address issues with its lagoon treatment facility, which is operating over capacity. The WWTP Upgrade Alternative would therefore require the City of Box Elder to expand its current wastewater treatment facilities.

### 3.1.3.3 No Action Alternative

Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action and would not upgrade the existing WWTP to meet the SDSWDS permit requirements. Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would, however, be unable to meet the more stringent SDSWDS standards for ammonia and would have to cease

operation at that time, forcing Ellsworth AFB to identify alternative sources for wastewater treatment. No impacts on land use would be expected under the No Action Alternative.

### 3.1.4 Environmental Protection Measures

Land use planning on Ellsworth AFB will continue to be guided by the community of installation-approved plans including the AICUZ study and General Plan. Adherence to these plans will help ensure that growth and organization of Ellsworth AFB is done in a compatible manner with on- and off-installation land uses.

## 3.2 Infrastructure and Utilities

### 3.2.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function and includes utility lines. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure components discussed in this section include water supply, sanitary sewer and wastewater system, storm water drainage, power supply, natural gas supply, fuel supply, solid waste management (i.e., nonhazardous waste), and transportation.

### 3.2.2 Description of Affected Environment

#### Water Supply

Drinking water for Ellsworth AFB is delivered by the Rapid City Water Division via a 16-inch water main. Sources for this water system include three infiltration galleries along the Rapid Creek alluvium, including the Jackson Springs Gallery, Meadowbrook Gallery, and Girl Scouts Gallery. Nine other off-installation wells operated by the Rapid City Water Division draw water from the subsurface Minnelusa and Madison Aquifers. During peak demand summer periods, the city also uses surface water from Rapid Creek, which originates in the Rapid Creek drainage area in the Black Hills west of Rapid City. This source includes the Deerfield and Pactola surface water reservoirs (EAFB 2007a). All of the water supply wells on the installation have been abandoned and are not in service. Peak demand flows at Ellsworth AFB range from 1 to 4 MGD. Ellsworth AFB maintains a utility service contract with the Rapid City Water Treatment Plant that outlines the provisions for the treatment and transport of water from the Rapid City municipal system to the 16-inch water supply line owned by Ellsworth AFB. Under the current utility service contract, approximately 1.6 MGD are allotted to Ellsworth AFB; however, this contract is currently under renegotiation to increase allocation to approximately 2.7 MGD. The water distribution system at Ellsworth AFB is composed of more than 66 miles of piping. The installation's water storage capacity is 3.8 million gallons, which equates to 2.5 days of water usage. The 28th Medical Group Bio-Environmental Engineering Flight is responsible for on-installation monitoring of the potable water distribution system. There are 22 on-installation monitoring points that are sampled at the rate of 11 points each month. Samples have historically been within limits (EAFB 2008c).

There are several operational and abandoned water lines in the vicinity of the Proposed Project Corridor (see **Figure 3-3**). Operational water lines are to the north, east, west, and northwest of the Proposed Project Corridor. There are several operational water lines in the northern portion of the Proposed Project Corridor and one northwestern-southeastern directional operating water line that runs through the central portion of the Proposed Project Corridor. Abandoned water lines are to the north, northeast, east, and northwest of the Proposed Project Corridor and in the north-central portion of the Proposed Project Corridor.

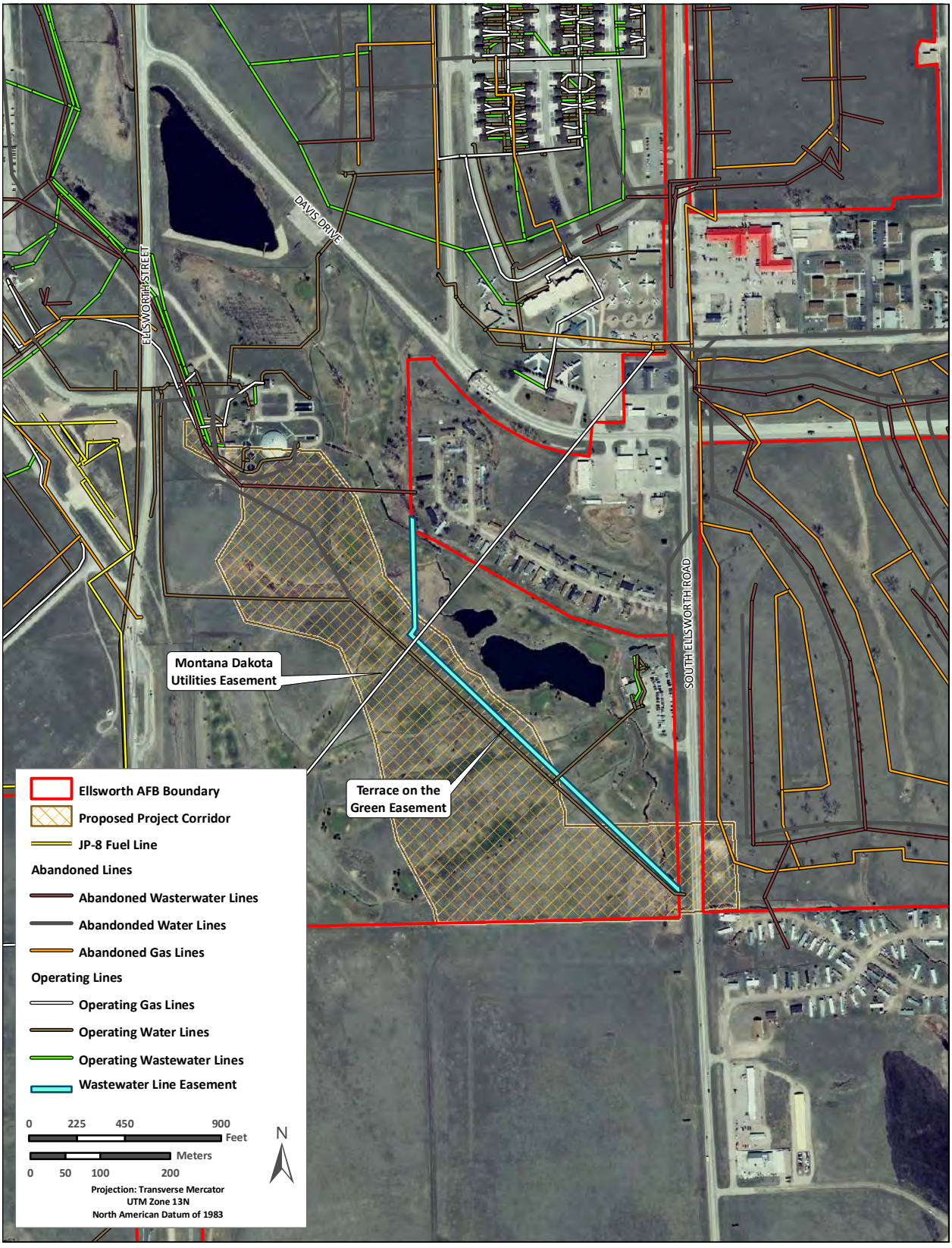



**Figure 3-3. Locations of Existing Utility Lines in the Vicinity of the Proposed Project Corridor**

Local ranchers to the east of Ellsworth AFB use water for their livestock from the unnamed tributary that receives effluent flow from the WWTP.

### Sanitary Sewer and Wastewater System

The sanitary sewer system at Ellsworth AFB is composed of a system of collection piping, seven lift stations, and a WWTP. The collection piping comprises a total of 28 miles of piping (EAFB 2008c). There are several operational wastewater and abandoned lines in the vicinity of the Proposed Project Corridor. Operational wastewater lines are to the north, east, and northwest of the Proposed Project Corridor. There is an easement to the Terrace on the Green mobile home park for a northwestern-southeastern directional operating wastewater line that runs along the eastern portion of the Proposed Project Corridor. Abandoned wastewater lines are to the north, northeast, east, southeast, and northwest of the Proposed Project Corridor and in the northern portion of the Proposed Project Corridor (see **Figure 3-3**).

The existing Ellsworth AFB WWTP has several components including an O/W separator, primary clarifiers, secondary clarifiers, chlorine contact chambers, a dechlorination basin, anaerobic sludge digesters, ancillary equipment (e.g., pipes, pumps), utilities (e.g., electrical, potable water), a pretreatment building, a laboratory, an office, and a sludge dewatering building. The WWTP uses several chemicals including chlorine, sulfur dioxide ($SO_2$), sludge flocculation polymer, sample preservatives (i.e., acids and bases), and sample buffer solutions and reagents (see representative photos in **Appendix D**) (EAFB 2001).

The average and maximum daily flows of the WWTP are 0.5 and 1.41 MGD, respectively. The average biochemical oxygen demand (BOD) and total suspended solids (TSS) loadings for the WWTP, which were calculated based on influent data from the WWTP from October 2000 through August 2003, are 920 pounds per day (ppd) and 1,200 ppd, respectively (EAFB 2008a). These loadings are somewhat lower than those for typical domestic wastewater, which is likely due to the industrial activities that take place at Ellsworth AFB. The industrial activities potentially contribute pollutants to the wastewater, which include aqueous film-forming foam used in aircraft hangars for fire suppression; heavy metals from vehicle and aircraft maintenance; oil, grease, and toxic hydrocarbon compounds from petroleum spills; cleaners; acids; soaps; floor maintenance products; chlorine from seasonal drainage of swimming pool water; and permethrin from washing uniforms in insecticides. Implementation of an industrial wastewater program at Ellsworth AFB has minimized discharges of these pollutants to the sanitary sewer system (Miller 2009, Styles 2009). In the past 20 years, a major fuel spill has not reached the WWTP at Ellsworth AFB, and permethrin levels have been sampled every 8 days for the past several years with only one recorded spike of permethrin in wastewater (Styles 2010).

***City of Box Elder.*** The major treatment processes of the existing Box Elder WWTP and their associated units include a mechanically cleaned bar screen for pretreatment; a four-cell stabilization pond system, which includes aeration equipment, one 5-acre primary cell, cell No. 2 (13 acres), cell No. 3 (7 acres), and cell No. 4 (2.7 acres); and a 35-acre flood-type irrigation system for wastewater disposal. Effluent from the stabilization ponds is either discharged to Box Elder Creek through Outfall No. 001 or routed to the irrigation system. Overflow from the irrigation system to Box Elder Creek is not authorized under the current NPDES permit (Permit No. SD0025186); however, in the event it occurred, it would enter Box Elder Creek and would be designated as Outfall No. 002. The average daily flow for the existing Box Elder WWTP is 0.32 MGD. The maximum daily and monthly flow is 0.64 MGD and 0.43 MGD, respectively (EAFB 2008a).

### Storm Drainage System

The storm drainage system at Ellsworth AFB consists of a network of swales, ditches, streams, lakes, and covered piping. Storm water from this system drains north or south through discharge points to Elk Creek or Box Elder Creek, respectively (EAFB 2008c). Storm water from the industrial areas of Ellsworth AFB drain into seven watersheds, four of which drain into unnamed tributaries of Box Elder Creek and three of which drain into unnamed tributaries of Elk Creek (EAFB 2008d). Detention ponds were created along some of the unnamed tributaries to collect surface water runoff and decrease the rate of discharge into the creeks to reduce flooding (EAFB 2008c).

Ellsworth AFB maintains a South Dakota Surface Water Discharge (SWD) Permit (No. SD-0000281) with SDDENR for storm water discharges. There are 10 outfalls at Ellsworth AFB, 4 of which (Nos. 004 and 008–010) are no longer used and not included in the SWD permit. Outfall Nos. 001–003 and 006 discharge to unnamed tributaries of Box Elder Creek and Outfall No. 007 discharges to an unnamed tributary of Elk Creek (EAFB 2002). Outfall No. 005 discharges treated wastewater effluent from the WWTP to Outfall No. 006. The outfalls are further described in **Section 3.7.2**. Ellsworth AFB also maintains a Storm Water Pollution Prevention Plan (SWPPP), which documents existing storm water management practices, ensures compliance with the conditions of the SWD permit, and provides guidance for minimizing the potential for storm water pollution (EAFB 2009d).

### Electrical System

Ellsworth AFB purchases power from Western Area Power Administration (WAPA) and Black Hills Power and Light (BHPL) Company of Rapid City. WAPA provides the main power and BHPL provides the emergency backup supply. Power is delivered to Ellsworth AFB through two 115-kilovolt (kV) distribution lines. The electrical system includes two 25-Megavolt-Ampere transformers that are capable of providing electricity to the entire installation. There are 10 primary distribution lines, 9 of which are operational and 1 is reserve. The primary distribution lines feed two secondary substations and transformers by more than 70 miles of three-phase primary cable. More than 175 miles of secondary cable transfer power to approximately 2,100 facilities at Ellsworth AFB. The electrical system is a mesh network that allows each primary distribution line to switch to at least one other distribution line (EAFB 2008c).

In addition to primary power, Ellsworth AFB has backup systems to support priority facilities with redundant power for mission-critical loads during catastrophic power outages. The Power Production Shop at Ellsworth AFB provides and maintains 45 diesel-powered Real Property-Installed Equipment (stationary) generators and 21 diesel-powered Equipment Authorized Inventory Data (portable) generators. The capacities of the generators range from 4 to 600 kilowatts (EAFB 2008c).

### Natural Gas System

The natural gas distribution system at Ellsworth AFB is composed of 44 miles of underground piping. Approximately 88 percent of the natural gas piping is made of polyethylene, which is a lightweight plastic that is resistant to chemicals and moisture. Ellsworth AFB receives natural gas from Montana Dakota Utilities. Natural gas is transported to the installation through a 12-inch, 45-pound-force per square inch (psi) line north of Taxiway F (EAFB 2008c).

There is an easement to Montana Dakota Utilities for a northeast-southwest directional operating natural gas line that runs through the central portion of the Proposed Project Corridor. In addition, there are several abandoned natural gas lines to the east, northeast, northwest, and west of the Proposed Project Corridor (see **Figure 3-3**).

### Liquid Fuel Supply

The liquid fuel system at Ellsworth AFB is composed of three modified Type I Pumphouses and one Type III Hydrant Refueling System. The three Type I Pumphouses are on the south ramp and the Type III Hydrant Refueling System is an integral part of the Consolidated Aircraft Servicing System at the North Dock area. There are also two bulk storage areas (Areas C and D) that receive fuel from Rapid City through a 6-inch commercial underground pipeline, immediately west of the Proposed Project Corridor, or by commercial tank trucks (see **Figure 3-3**). JP-8 is received at the installation through the pipeline at a rate of approximately 580 gallons per minute. Area C is composed of a 6-inch commercial receipt pipeline, receiving filter/separator station, two 20,000-gallon underground storage tanks (USTs), and transfer and receipt pumps for jet fuel. Area D is composed of two aboveground storage tanks (ASTs) with capacities of 35,000 gallons and 55,000 gallons, receiving filter/separator station, and an off-loading and fill stand pumphouse with issue filter/separators. A 6-inch transfer line interconnects Area C Type I Pumphouses with Area D. For ground transfer of fuels, there are three 10,000-gallon fuel transfer trucks (one for mobility gasoline [MOGAS] and two for diesel) with receiving and issue pumps and meters (EAFB 2008c).

The military vehicle service station is composed of two 12,000-gallon tanks (one MOGAS with one double dispenser and one diesel with two double dispensers). The Aerospace Ground Equipment service station is composed of one 20,000-gallon (Jet Propellant 8 [JP-8]) tank with two single dispensers and two JP-8 tanks (10,000 gallons and 6,000 gallons), each with a single dispenser (EAFB 2008c). Additional ASTs in the vicinity of the project site are discussed in **Section 3.11.2**.

### Solid Waste

All solid waste at Ellsworth AFB is collected and transported off-installation by a contractor. The contractor collects refuse, recyclables, and yard waste. Solid waste and recyclables are collected curbside in the MFH areas and in dumpsters throughout the installation. In addition, a central Recycling Center (Building 9050) on Centennial Drive is available for the disposal of tires, wood waste, yard waste, recyclables, appliances, and bulky solid waste items that are otherwise too large for curbside pickup (EAFB 2008c, EAFB 2005a). The Recycling Center is run by the solid waste collection contractor and augments the current solid waste collection services. Refuse, recyclables, and yard waste are taken off-installation to the Rapid City Sanitary Landfill, Rapid City Municipal Recycling Facility, and Rapid City Composting Facility, respectively. Spent fire fighting foam and deicing fluid are collected in a 70,000-gallon underground storage tank and recycled at the Rapid City Composting Facility. Construction rubble and petroleum-contaminated soil were previously disposed of in landfills at Ellsworth AFB; however, those landfills have since been closed (EAFB 2008c). Ellsworth AFB operates a recycling program that implements AFI 32-7042, *Solid and Hazardous Waste Compliance*; AFI 32-7080, *Pollution Prevention Program*; and the Ellsworth AFB Solid Waste Management Plan (EAFB 2005a).

### Transportation

Primary access to Ellsworth AFB is served by Highway 90, an east-west directional highway south of the installation. Highway 90 is one of the primary arterials serving the Rapid City area. There are several secondary arterials within the Ellsworth AFB boundary. Secondary roadways surrounding the proposed Project area include Davis Street to the north and northeast, North Ellsworth Road to the east and southeast, and Ellsworth Street to the west and northwest (EAFB 2006a).

## 3.2.3 Environmental Consequences

### Evaluation Criteria

The analysis to determine potential impacts on infrastructure and infrastructure systems considers primarily whether a proposed action would exceed capacity or place unreasonable demand on a specific utility.

Sustainable design measures would be incorporated where practicable to reduce demand. The construction contractor would coordinate with the Civil Engineering staff at Ellsworth AFB and local utility companies prior to commencement of any construction or demolition activities to determine the utility locations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that could be encountered during excavation and trenching activities. Any permits required for excavation and trenching would be obtained prior to the commencement of construction or demolition activities.

#### 3.2.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

***Water Supply.*** Short- and long-term, moderate, direct, adverse impacts on water supply would be expected. Water demand would increase slightly during the decommissioning and demolition phases of the Proposed Action when the decommissioned units and equipment are washed and decontaminated; however, potential increases in water demand associated with decommissioning and demolition activities would be temporary and are not anticipated to exceed existing capacity. After decommissioning and demolition of the existing WWTP is completed, flow in the unnamed tributary that currently receives effluent from the WWTP would cease flowing year-round and return to a natural hydrologic scheme. Water would flow in the unnamed tributary only in response to precipitation events. Farmers downstream of the Ellsworth AFB WWTP currently use the unnamed tributary as a source for their water supply for livestock. Cessation of the WWTP effluent flow in the unnamed tributary would reduce the availability of this water supply source to these farmers. As a result, these farmers could be required to obtain water for their livestock from another source, most likely from the Rapid City Water Division.

In addition, the Ellsworth AFB Prairie Ridge Golf Course is currently irrigated with water from a reservoir pond along the unnamed stream adjacent to the golf course. The reservoir is replenished by effluent from the installation's WWTP. Cessation of the WWTP flow to the golf course pond would reduce the amount of water available in the reservoir available for irrigation supply. Ellsworth AFB is considering ways to alleviate this including installation of a "purple pipe" reclaimed wastewater line from the proposed RWWTP to Ellsworth AFB to replenish the golf course pond or irrigation of the golf course with the potable water supply provided to Ellsworth AFB. During peak irrigation season, the use of the existing water source for golf course irrigation would likely increase the installation's water demand by approximately 250,000 gallons per day, and this would not exceed the installation's existing water supply capacity (28 BW 2006).

***Sanitary Sewer and Wastewater System.*** Short-term, negligible, direct, adverse impacts on the sanitary sewer and wastewater system would be expected. There would be a slight increase in wastewater due to decommissioning and demolition activities associated with the Proposed Action when the decommissioned units and equipment are washed and decontaminated. Potential increases in wastewater associated with decommissioning and demolition activities would be temporary and are not anticipated to exceed existing capacity. The sanitary sewer and wastewater system would be operable during the

decommissioning and demolition process. No long-term, adverse, direct or indirect impacts on sanitary sewer and wastewater systems would be expected.

***Storm Drainage System.*** Short-term, negligible to minor, direct, adverse, and long-term, minor, indirect, beneficial impacts on storm drainage systems would be expected. Ground disturbance from demolition activities would temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff if proper BMPs are not fully utilized. Upon completion of demolition activities, the amount of impervious surfaces would decrease due to fewer buildings and structures associated with the WWTP and storm water permeation into the ground would increase, thereby permanently decreasing sheet flow runoff into the storm water drainage system. No long-term, adverse, direct or indirect impacts on storm drainage systems would be expected.

***Electrical System.*** Short-term, minor, direct, adverse impacts on the electrical system would be expected. Electricity demand would increase slightly during the decommissioning and demolition phases of the Proposed Action to support decommissioning and demolition activities; however, potential increases in electricity demand associated with demolition activities would be temporary and are not anticipated to exceed existing capacity. No long-term, adverse, direct or indirect impacts would be expected.

***Natural Gas System.*** No impacts on natural gas systems would be expected. Decommissioning and demolition activities associated with the Proposed Action would not require the use of natural gas.

***Liquid Fuel Supply.*** Short-term, negligible, direct, adverse impacts on liquid fuels would be expected. During decommissioning and demolition, petroleum-based products would be used for demolition equipment and vehicles. Fuel would be provided to demolition equipment and vehicles by Ellsworth AFB under the terms of the construction contract. Portable fuel storage and distribution systems would be used at the project site during decommissioning and demolition activities. The increase in fuel demand during the duration of the Proposed Action would be temporary and is not anticipated to exceed existing capacity. Therefore, no long-term impacts on liquid fuels would be expected.

***Solid Waste.*** Short-term, minor, direct, adverse impacts on solid waste disposal would be expected. Any increases in municipal solid wastes associated with the demolition phases of the Proposed Action would be minimal, temporary in nature, and would be disposed of in accordance with relevant Federal, state, and local regulations. **Table 3-2** summarizes the estimate of debris that could potentially be generated from demolition activities. Demolition materials would be recycled or reused to the greatest extent possible. Demolition debris that could not be recycled or reused would be taken off-installation to an approved landfill within the vicinity of Ellsworth AFB.

***Transportation.*** Short-term, negligible to minor, direct, adverse impacts on transportation would be expected. Potential increases in regional traffic volume in the vicinity of Ellsworth AFB due to demolition vehicles and commuting contractor employees associated with the decommissioning and demolition activities would be temporary. A temporary parking lot for demolition vehicles would be used during the Proposed Action; therefore, there would be no impacts on parking at Ellsworth AFB. Appropriate signage would be in place for demolition traffic. No long-term, adverse, direct or indirect impacts on transportation would be expected.

### Wastewater Pipeline Easement and Construction

***Water Supply.*** No impacts on water supply would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on water supply could be expected. Water demand could increase slightly to support the general construction of a sanitary sewer pipeline; however, potential increases in water demand associated with general construction activities would be temporary.

**Table 3-2. Estimate of Debris Generated from Demolition Activities**

| Building Number | Building Function or Process | Square Footage ($ft^2$) | Total Debris (tons)* |
|---|---|---|---|
| 3003 | Sludge Pits Reinput | 13,952 | 1,102 |
| 3005 | Main Building | 1,885 | 149 |
| 3006 | Clarifier Pits | 156 | 12 |
| 3007 | Digestor Building | 5,419 | 428 |
| 3008 | Clarifier, Effluent Strut, Sludge/Scum Pits | 1,670 | 132 |
| 3009 | Chlorine storage facility | 144 | 11 |
| 3010 | Dome-Trickling Filter | 12,131 | 958 |
| 3011 | Belt Press Building | 890 | 70 |
| 3013 | Pretreatment facility | 2,018 | 159 |
| 3014 | Chlorine and Effluent sampling facility | 114 | 9 |
| **Total** | | **38,379 $ft^2$** | **3,032 tons** |

Note: * The estimated total debris was calculated using a generation factor of 158 $lb/ft^2$, which is the average generation rate of nonresidential construction and demolition debris documented by the USEPA in the *Estimated 2003 Building-Related Construction and Demolition Materials Amounts* (USEPA 2003).

***Sanitary Sewer and Wastewater System.*** No impacts on sanitary sewer and wastewater systems would be expected from the granting of a pipeline easement or construction of the proposed sanitary sewer pipeline within the proposed pipeline corridor.

***Storm Drainage System.*** No impacts on the storm drainage system would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on the storm drainage system could be expected. Ground disturbance from the construction of a sanitary sewer pipeline could temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff.

***Electrical System.*** No impacts on the electrical system would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on the electrical system could be expected. Electricity demand would increase slightly to support construction of a sanitary sewer pipeline; however, potential increases in electricity demand associated with construction activities would be temporary.

***Natural Gas System.*** The granting of a pipeline easement and construction of a sanitary sewer pipeline would not require the use of natural gas; therefore, no impacts on the natural gas system would be expected.

***Liquid Fuel Supply.*** No impacts on liquid fuel supply would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on liquid fuels could be expected from use of petroleum-based products for construction equipment and vehicles. Fuel would be provided to construction equipment and vehicles by Ellsworth AFB under the terms of the construction contract. Portable fuel storage and distribution systems would be used at the project site during construction activities.

***Solid Waste.*** No impacts on solid waste management would be expected from the granting of a pipeline easement. Short-term and long-term, negligible, adverse impacts on solid waste disposal could be expected from increases in municipal waste due to construction activities.

***Transportation.*** No impacts on transportation would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on transportation could be expected from possible increases in regional traffic volume in the vicinity of Ellsworth AFB due to construction vehicles and commuting contractor employees associated with the construction.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

The proposed RWWTP would be off-installation on approximately 10 acres of land, west of the stabilization pond system at the existing City of Box Elder WWTP. The proposed RWWTP would be composed of several components including headworks, batch reactor process buildings, a post-equalization tank, a waste-activated sludge tank, an ultraviolet disinfection unit, aerated sludge storage tanks, sludge dewatering units, ancillary equipment (e.g., pipes, pumps), utilities (e.g., electrical, potable water), and administrative buildings. The proposed RWWTP would use several chemicals such as oxidant, alkali, polymer, acid, caustic, carbon source (nutrient), coagulant, sample preservatives (i.e., acids and bases), and sample buffer solutions and reagents (EAFB 2008a).

The City of Box Elder's population is predicted to increase by more than 6,000 residential homes (more than 18,000 people) over the next 20 years (EAFB 2008a). **Table 2-4** in **Section 2** summarized the current and estimated future flows for the City of Box Elder and Ellsworth AFB wastewater streams. The table shows that the average daily wastewater production for Ellsworth AFB is projected to triple from the current flow of 0.5 MGD to about 1.5 MGD by 2028. The combined average daily flow for Ellsworth AFB and the City of Box Elder is expected to increase from 0.82 MGD at present, to 3.0 MGD by 2028. **Table 3-3** summarizes the current and future pollutant loadings anticipated for the year 2028. The BOD and TSS loadings for the current Ellsworth AFB wastewater stream were calculated using data which yielded the following average influent values in terms of concentration:

- BOD: 155 mg/L
- TSS: 210 mg/L.

**Table 3-3. Current and Future Pollutant Loadings for the City of Box Elder and Ellsworth AFB**

| Parameter (ppd) | Current | | | Future (2028) | | |
|---|---|---|---|---|---|---|
| | City of Box Elder | Ellsworth AFB[a] | Combined | City of Box Elder[b] | Ellsworth AFB | Combined |
| Average 5-Day BOD Load | N/A | 920 | N/A | 3,924 | 2,300[c] | 6,224 |
| Maximum Monthly BOD Load | N/A | N/A | N/A | 4,473 | N/A | N/A |
| Average TSS Load | N/A | 1,200 | N/A | 4,617 | N/A | N/A |
| Maximum Monthly TSS Load | N/A | N/A | N/A | 6,002 | N/A | N/A |

Sources: EAFB 2008a, EAFB 2008b, EAFB 2009c

Notes:

a. This is based on influent data for Ellsworth WWTP from October 2000 through August 2003.

b. This is not based on actual data, but is based on recommended standards for wastewater treatment plant design (EAFB 2008a).

c. This is an estimate and is not based on actual data.

Pollutant loading data for the City of Box Elder wastewater were not available. The RWWTP feasibility study assumed for planning purposes that the City of Box Elder wastewater currently has, and will have, the following influent pollutant loadings, which are typical of domestic wastewater (EAFB 2008a):

- BOD: 0.17 ppd per capita (310 mg/L) at the current wastewater generation rate of 65 gallons per day per capita
- TSS: 0.20 ppd per capita (370 mg/L) at the current wastewater generation rate of 65 gallons per day per capita.

No impacts would be expected on water supply, the sanitary sewer and wastewater system, the storm drainage system, electrical supply, natural gas supply, liquid fuel supply, solid waste, or transportation from Ellsworth AFB's wastewater contribution to the regional waste stream. After flow from the Ellsworth AFB WWTP would be diverted to the new RWWTP, the water levels of Box Elder Creek would initially remain at its current levels. There might be a slight increase in water availability downstream of the RWWTP outfall, as there would be less water withdrawal and infiltration from the unnamed tributary to Box Elder Creek that currently receives the Ellsworth AFB WWTP discharge. Future flows in Box Elder Creek could increase if the on-installation population generating wastewater increases, thereby increasing RWWTP effluent flow to Box Elder Creek.

#### 3.2.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Upgrades would result in the following impacts on infrastructure:

***Water Supply.*** Short-term, negligible, direct, and long-term, minor, direct, adverse impacts on water supply would be expected. Water demand would increase slightly during construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility; however, potential increases in water demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Water demand would increase slightly as a result of additional WWTP infrastructure and treatment processes; however, potential long-term increases in water demand would be minor and not anticipated to exceed existing capacity.

***Sanitary Sewer and Wastewater System.*** Short-term, negligible, direct, adverse, and long-term, minor, direct, beneficial impacts on sanitary sewer and wastewater systems would be expected. There would be a slight increase in wastewater due to construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility. Potential increases in wastewater associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Upgrades associated with the WWTP Upgrade Alternative would bring the WWTP in compliance with the more stringent SDSWDS permit requirements for ammonia, which would result in beneficial impacts on the sanitary sewer and wastewater system. However, similar beneficial effects would occur from construction of the RWWTP. No long-term, adverse, direct or indirect impacts on sanitary sewer and wastewater systems would be expected. Impacts related to effluent are discussed in **Section 3.7.3**.

***Storm Drainage System.*** Short-term, negligible, indirect, and long-term, minor, indirect, adverse impacts on storm drainage systems would be expected. Ground disturbance from construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff. Upon completion of construction activities, the amount of impervious surfaces would increase due to additional buildings

associated with the WWTP and storm water permeation into the ground would decrease, thereby permanently increasing storm water runoff. Impacts related to effluent are discussed in **Section 3.7.3**.

***Electrical System.*** Short-term, negligible, and long-term, minor, direct, adverse impacts on electrical supply would be expected. Electricity demand would increase slightly during construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility; however, potential increases in electricity demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Electricity demand would increase slightly as a result of additional WWTP infrastructure and treatment processes; however, potential long-term increases in electricity demand would be minor and not anticipated to exceed existing capacity.

***Natural Gas System.*** No impacts on natural gas systems would be expected. Upgrades associated with the WWTP Upgrade Alternative would not require the use of natural gas.

***Liquid Fuel Supply.*** Short-term, negligible, indirect, adverse impacts on liquid fuels would be expected. During construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility, petroleum-based products would be used for construction equipment and vehicles. Fuel would be provided to construction equipment and vehicles by Ellsworth AFB under the terms of the construction contract. Portable fuel storage and distribution systems would be used at the project site during construction activities. The increase in fuel demand during the construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would be temporary and is not anticipated to exceed existing capacity. Therefore, no long-term impacts on liquid fuels would be expected.

***Solid Waste.*** Short-term, minor, direct, adverse impacts on solid waste disposal would be expected. Any increases in municipal solid wastes associated with the Ellsworth AFB WWTP upgrades would be minimal, temporary in nature, and would be disposed of in accordance with relevant Federal, state, and local regulations.

***Transportation.*** Short-term, negligible to minor, indirect, adverse impacts on transportation would be expected. Potential increases in regional traffic volume in the vicinity of Ellsworth AFB due to construction vehicles and commuting contractor employees associated with the construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would be temporary. A temporary parking lot for construction vehicles would be used during the construction activities; therefore, there would be no impacts on parking at Ellsworth AFB. Appropriate signage would be in place for construction traffic. No long-term, adverse, direct or indirect impacts on transportation would be expected.

#### 3.2.3.3 No Action Alternative

Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action and would not upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would, however, be unable to meet the more stringent SDSWDS standards for ammonia and would have to cease operation at that time, forcing Ellsworth AFB to identify alternative sources for wastewater treatment. The No Action Alternative would result in long-term, moderate, adverse impacts on the sanitary sewer system from Ellsworth AFB being required to identify alternative sources for treating wastewater treatment following expiration of their current WWTP SDSWDS permit.

### 3.2.4 Environmental Protection Measures

As part of the Proposed Action, the contractor would coordinate with local utility companies and the Civil Engineering staff at Ellsworth AFB prior to commencement of any construction or demolition activities to determine the estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably can be expected to be encountered during excavation and trenching activities associated with the Proposed Action. Any permits required for excavation and trenching would be obtained prior to the commencement of construction or demolition activities.

## 3.3 Noise

### 3.3.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Sound is measured with instruments that record instantaneous sound levels in decibels. A-weighted decibel (dBA) is used to characterize sound levels (measured in dBA) that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one's ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

***Noise Metrics and Regulations.*** Sound levels, resulting from multiple single events, are used to characterize community noise effects from aircraft or vehicle activity and are measured in day-night average sound level (DNL). The DNL noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10-dBA penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging single event values for a given 24-hour period. DNL is the preferred sound level metric used to characterize noise impacts of the Federal Aviation Administration (FAA), U.S. Department of Housing and Urban Development (HUD), U.S. Environmental Protection Agency (USEPA), and DOD for modeling airport environments.

DNL is the metric recognized by the U.S. government for measuring noise and its impacts on humans. According to the USAF, the FAA, and the HUD criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds a DNL of 75 dBA, "normally unacceptable" in regions exposed to noise between 65 dBA and 75 dBA, and "normally acceptable" in areas exposed to noise of 65 dBA or under. The Federal Interagency Committee on Noise developed land use compatibility guidelines for noise in terms of DNL sound levels (FICON 1992). For outdoor activities, the USEPA recommends a DNL sound level of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA 1974).

Noise levels vary depending on the population density and proximity to land uses such as parks, schools, or industrial facilities. As shown on **Table 3-4**, noise levels in a suburban residential area are at a DNL of about 55 dBA, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (FHWA 1980).

**Table 3-4. Typical Outdoor Noise Levels**

| DNL (dBA) | Location |
|---|---|
| 50 | Residential area in a small town or quiet suburban area |
| 55 | Suburban residential area |
| 60 | Urban residential area |
| 65 | Noisy urban residential area |
| 70 | Very noisy urban residential area |
| 80 | City noise (downtown of major metropolitan area) |
| 88 | 3rd floor apartment in a major city next to a freeway |

Source: FHWA 1980

Most people are exposed to sound levels of a DNL of 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise effects on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 dBA (FICON 1992). Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with effect assessments and that there is a consistent relationship between DNL and the level of annoyance.

***Demolition Sound Levels.*** Building demolition work can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from graders, loaders, trucks, generators, and other work activities and processes. **Table 3-5** lists noise levels associated with common types of demolition equipment. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

**Table 3-5. Predicted Noise Levels for Demolition and Construction Equipment**

| Equipment | Predicted Noise Level at 50 Feet |
|---|---|
| Bulldozer | 80 dBA |
| Dump Truck | 83–94 dBA |
| Backhoe | 72–93 dBA |
| Front-End Loaders | 72–82 dBA |
| Generators | 71–80 dBA |

Source: USEPA 1971

### 3.3.2 Description of Affected Environment

***Ambient Noise Environment.*** The ambient noise environment at Ellsworth AFB is affected mainly by installation aircraft operations and vehicles. Noise from aircraft operations dominates the ambient environment throughout Ellsworth AFB as a result of operations performed by the 28 BW. The noise

contour for the DNL of 65 to 80+ dBA noise zones from aircraft operations at Ellsworth AFB extends along the runways to the northwest and southeast, and encompasses the existing WWTP proposed for demolition (EAFB 2008e). Vehicles also contribute to the ambient noise environment. Roadways around the vicinity of the project and Ellsworth AFB include I-90 south of the installation, Davis Street, Ellsworth Street, South Ellsworth Road, Ellsworth Road, Commercial Gate Drive, and the local roadway network on the installation.

## 3.3.3 Environmental Consequences

### Evaluation Criteria

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated qualitatively for the alternatives considered.

### 3.3.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Noise from demolition activities varies depending on the type of demolition equipment being used, the area that the action would occur in, and the distance from the noise source. To predict how demolition activities would impact adjacent populations, noise from demolition activities were estimated using equations to calculate approximate cumulative noise from construction equipment and the noise levels at noise sensitive receptors. For example, as shown in **Table 3-5**, demolition usually involves several types of equipment (e.g., bulldozers and loaders) that can be used simultaneously. Under the Proposed Action, the cumulative noise from the demolition equipment, during the busiest day, was estimated to determine the total impact of noise from demolition activities at a given distance. Examples of expected cumulative demolition noise during daytime hours at specified distances are shown in **Table 3-6**. These sound levels were predicted for 100, 200, 400, 800, and 1,200 feet from the source of the noise.

**Table 3-6. Predicted Noise Levels from Demolition and Construction Activities**

| Distance from Noise Source | Predicted Noise Level |
|---|---|
| 100 feet | 84 dBA |
| 200 feet | 78 dBA |
| 400 feet | 72 dBA |
| 800 feet | 66 dBA |
| 1,200 feet | 62 dBA |

The existing WWTP falls within the 80+ dBA noise contour from aircraft operations at Ellsworth AFB. The Proposed Project Corridor is also partially within the 80+ dBA noise contour. Since multiple single noise events create the cumulative DNL value, the actual sound levels that a person hears within the area of the 80+ dBA noise contour fluctuates throughout a 24-hour period. Consequently, populations within

and adjacent to the WWTP are accustomed to fluctuations of noise levels in the 70 to 90 dBA range. Noise generation would last only for the duration of demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Consequently, demolition activities at Ellsworth AFB would result in short-term, minor, adverse effects on the noise environment (see **Section 3.1.3.1** for a discussion of land use related impacts).

#### Wastewater Pipeline Easement and Construction

Granting of an easement would not have an impact on the noise environs at Ellsworth AFB. Construction activities related to construction of a sanitary sewer pipeline would likely result in impacts similar to those discussed under Decommissioning and Demolition. Predicted noise levels from pipeline construction activities would be similar to those shown in **Table 3-6**. The Proposed Project Corridor is partially within the 80+ dBA noise contour. Similarly to the populations within and adjacent to the WWTP, the populations within the Proposed Project Corridor are accustomed to fluctuations of noise levels in the 70 to 90 dBA range. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Consequently, construction of the wastewater pipeline would result in short-term, minor, adverse effects on the noise environment.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

This portion of the Proposed Action would not have an effect on the noise environs in the Proposed Project Corridor or on Ellsworth AFB.

### 3.3.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the SDSWDS permit requirements for ammonia discharge. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

There would be an increase in construction activities in connection with the upgrades of the existing WWTP. The noise generated by the construction activities would be similar in nature to the demolition noise described for the decommissioning and demolition activities.

Since the WWTP falls within the noise contours from aircraft operations at Ellsworth AFB the work area under the WWTP Upgrade Alternative falls within the 80+ dBA noise contour. The expected noise impacts would be similar to those described in **Section 3.3.3.1**. Consequently, construction activities at Ellsworth AFB would result in impacts on the noise environment; however, these impacts would be expected to be less than significant.

### 3.3.3.3 No Action Alternative

No impacts on noise would be expected under the No Action Alternative.

## 3.3.4 Environmental Protection Measures

Noise generation would last only for the duration of construction and demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.).

# 3.4 Air Quality

## 3.4.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter ($mg/m^3$), or micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone ($O_3$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), $SO_2$, respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [$PM_{10}$] and particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-7** presents the primary and secondary USEPA NAAQS.

Although $O_3$ is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because $O_3$ is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "$O_3$ precursors." These $O_3$ precursors consist primarily of nitrogen oxides ($NO_x$) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric $O_3$ concentrations by controlling VOC pollutants (also identified as reactive organic gases) and $NO_2$.

As authorized by the CAA, USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour $O_3$, $PM_{2.5}$, and regional haze standards that were promulgated in that year. The 1-hour $O_3$ standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour $O_3$ NAAQS. The effective designation date for most areas was June 15, 2004. USEPA designated $PM_{2.5}$ nonattainment areas in December 2004, and finalized the $PM_{2.5}$ implementation rule in January 2005. No county in the state of South Dakota was identified as being nonattainment for the $PM_{2.5}$ standard.

**Table 3-7. National and State Ambient Air Quality Standards**

| Pollutant | Averaging Time | Primary Standard | | Secondary Standard |
|---|---|---|---|---|
| | | Federal | State | |
| **CO** | 8-hour (1) | 9 ppm (10 mg/m$^3$) | Same | None |
| | 1-hour (1) | 35 ppm (40 mg/m$^3$) | Same | None |
| **Pb** | Quarterly average | 1.5 µg/m$^3$ | Same | Same as Primary |
| | Rolling 3-Month Average | 0.15 µg/m$^3$ (2) | -- | Same as Primary |
| **$NO_2$** | Annual Arithmetic Mean | 53 ppb (3) | Same | Same as Primary |
| | 1-hour | 100 ppb (4) | -- | None |
| **$PM_{10}$** | Annual Arithmetic Mean | -- | -- | Same as Primary |
| | 24-hour (5) | 150 µg/m$^3$ | Same | Same as Primary |
| **$PM_{2.5}$** | Annual Arithmetic Mean (6) | 15 µg/m$^3$ | Same | Same as Primary |
| | 24-hour (7) | 35 µg/m$^3$ | Same | Same as Primary |
| **$O_3$** | 8-hour (8) | 0.075 ppm (2008 Standard) | 0.080 ppm | Same as Primary |
| | 8-hour (9) | 0.08 ppm (1997 Standard) | | Same as Primary |
| | 1-hour (10) | 0.12 ppm | -- | Same as Primary |
| **$SO_2$** | Annual Arithmetic Mean | 0.03 ppm | Same | 0.5 ppm (3-hour) (1) |
| | 24-hour (1) | 0.14 ppm | Same | 0.5 ppm (3-hour) (1) |
| | 1-hour | 75 ppb (11) | Same | None |

Sources: USEPA 2010, SDDENR 2009

Notes: Parenthetical values are approximate equivalent concentrations.

1. a. Not to be exceeded more than once per year.
2. Final rule signed 15 October 2008.
3. The official level of the annual $NO_2$ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
4. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective 22 January 2010).
5. Not to be exceeded more than once per year on average over 3 years.
6. To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m$^3$.
7. To attain this standard, the 3-year average of the weighted annual of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m$^3$ (effective 17 December 2006).
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).
9. a. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
   b. The 1997 standard, and the implementation rules for that standard, will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
   c. USEPA is in the process of reconsidering these standards (set in March 2008).
10. a. USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (anti-backsliding).
    b. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
11. Final rule signed on 2 June 2010. To attain this standard, the 3-year average of the 99th percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Key: ppm = parts per million; mg/m$^3$ = milligrams per cubic meter; µg/m$^3$ = micrograms per cubic meter

On 22 September 2009, the USEPA issued a final rule for mandatory greenhouse gas (GHG) reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide ($CO_2$) and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of $CO_2$ equivalent per year. The first emissions report is due in 2011 for 2010 emissions. Although GHGs are not currently regulated under the CAA, the USEPA has clearly indicated that GHG emissions and climate change are issues that need to be considered in future planning. GHGs are produced by the burning of fossil fuels and through industrial and biological processes.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, installation, or activity) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)]. Because Ellsworth AFB is not within 10 kilometers of a Class I area, PSD regulations do not apply and are not discussed further in this EA.

### 3.4.2 Description of Affected Environment

Ellsworth AFB is in Meade and Pennington counties and the City of Box Elder is in Pennington County. Meade and Pennington counties are within the Black Hills-Rapid City Intrastate (BHRCI) Air Quality Control Region (AQCR). The BHRCI AQCR consists of the counties of Butte, Custer, Fall River, Lawrence, Meade, and Pennington, South Dakota. As defined in 40 CFR 81.342, Meade and Pennington counties are designated as attainment/unclassifiable for all criteria pollutants (USEPA 2002a).

The most recent emissions inventories for Meade and Pennington counties and the BHRCI AQCR are shown in **Table 3-8**. Meade and Pennington counties are considered the local area of influence, and the BHRCI AQCR is considered the regional area of influence for the air quality analysis.

**Table 3-8. Local and Regional Air Emissions Inventory for the Proposed Action (2002)**

| | $NO_x$ (tpy) | VOC (tpy) | CO (tpy) | $SO_2$ (tpy) | $PM_{10}$ (tpy) | $PM_{2.5}$ (tpy) |
|---|---|---|---|---|---|---|
| Meade County, SD | 1,546 | 1,360 | 9,680 | 136 | 5,069 | 787 |
| Pennington County, SD | 9,559 | 5,799 | 40,433 | 2,738 | 8,409 | 1,802 |
| BHRCI AQCR | 15,082 | 9,923 | 68,289 | 3,295 | 22,883 | 4,248 |

Source: USEPA 2002b

The U.S. Department of Energy, Energy Information Administration (DOE/EIA), estimates that in 2005 gross $CO_2$ emissions in South Dakota were 14.4 million metric tons (DOE/EIA 2005).

SDDENR regulates air quality for the State of South Dakota. Ellsworth AFB is classified as a synthetic minor with SDDENR (SDDENR 2007). As required by SDDENR, Ellsworth AFB calculates annual

criteria pollutant emissions from stationary sources and provides this information to SDDENR. There are various sources on-installation that emit criteria pollutants and HAPs, including generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coating/paint booths, and miscellaneous chemical usage.

## 3.4.3 Environmental Consequences

### Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP or permit limitations.

### 3.4.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, minor, direct, adverse impacts would be expected from construction and demolition emissions and land disturbance. The Proposed Action would result in minor impacts on regional air quality during demolition activities, primarily from site-disturbing activities and operation of construction equipment. Appropriate fugitive dust-control measures would be employed during demolition activities to suppress emissions. All emissions associated with demolition operations would be temporary in nature. It is not expected that emissions from the Proposed Action would contribute to or affect local or regional attainment status with the NAAQS. Emissions from the Proposed Action are summarized in **Table 3-9**. Emissions estimation spreadsheets and summary of the methodology used are included in **Appendix C**.

**Table 3-9. Estimated Air Emissions Resulting from the Proposed Action**

| Activity | $NO_x$ tpy | VOC tpy | CO tpy | $SO_2$ tpy | $PM_{10}$ tpy | $PM_{2.5}$ tpy | $CO_2$ tpy |
|---|---|---|---|---|---|---|---|
| Combustion | 0.454 | 0.027 | 0.179 | 0.009 | 0.027 | 0.027 | 52.975 |
| Fugitive Dust | -- | -- | -- | -- | 2.107 | 0.118 | -- |
| Haul Truck On-Road | 0.003 | 0.002 | 0.008 | 0.000 | 0.003 | 0.001 | 0.655 |
| Construction Worker Commuter | 0.110 | 0.110 | 0.992 | 0.001 | 0.010 | 0.007 | 131.482 |
| **Total Proposed Action Emissions** | **0.567** | **0.139** | **1.178** | **0.011** | **2.148** | **0.245** | **185.111** |
| Percent of BHRCI Inventory | 0.004 | 0.001 | 0.002 | < 0.001 | 0.009 | 0.006 | 0.001* |

Note: * Percent of State of South Dakota $CO_2$ emissions.

The Proposed Action would generate particulate matter emissions as fugitive dust from ground-disturbing activities. Appropriate fugitive dust-control measures would be employed during construction activities to suppress emissions. Emissions of all criteria pollutants would result from demolition activities, combustion of fuels from on-road haul trucks transporting materials, and construction commuter emissions.

Fugitive dust emissions would be greatest during initial site preparation activities and would vary from day to day depending on the demolition phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Fugitive dust emissions for various demolition activities were calculated using emissions factors and assumptions published in USEPA AP-42. These estimates assume that the project duration is 12 months or 240 working days for demolition. Emission calculations and methodology used are included in **Appendix E**.

The Energy Information Administration estimates that in 2008 gross $CO_2$ emissions in South Dakota were 14.9 million metric tons (DOE/EIA 2010). Approximately 168 metric tons of $CO_2$ were estimated to be emitted by the Proposed Action, which is approximately 0.001 percent of the South Dakota statewide $CO_2$ emissions. Therefore, the Proposed Action would have negligible contribution towards the South Dakota statewide GHG inventory. $CO_2$ emission estimates are included in **Appendix E**.

Since Ellsworth AFB is in attainment for all criteria pollutants, General Conformity Rule requirements are not applicable. The Proposed Action would generate emissions well below 10 percent of the emissions inventory for the BHRCI AQCR and the emissions would be short-term. Therefore, the demolition activities associated with the Proposed Action would not have significant impacts on air quality at Ellsworth AFB or on regional or local air quality. **Appendix E** includes the air emissions estimation spreadsheets and methodology.

#### Wastewater Pipeline Easement and Construction

The granting of an easement to the South Dakota EDA to construct a pipeline from Ellsworth AFB to the proposed future RWWTP would have no adverse impact on local or regional air quality. Construction activities related to construction of a sanitary sewer pipeline would result in impacts similar to those discussed under Decommissioning and Demolition. **Table 3-9** includes estimated emissions from pipeline construction activities.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

The future contributions of Ellsworth AFB's wastewater to the proposed RWWTP would not involve any construction or other ground-disturbing activities. Therefore, future contributions to the RWWTP would have no adverse impact on local or regional air quality.

### 3.4.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

Short-term, minor, direct, adverse impacts would be expected from construction and demolition emissions and land disturbance. The WWTP Upgrade Alternative would result in minor impacts on regional air quality during construction and demolition activities, primarily from site-disturbing activities and operation of construction equipment. Appropriate fugitive dust-control measures would be employed during construction and demolition activities to suppress emissions. All emissions associated with

construction and demolition operations would be temporary in nature. It is not expected that emissions from the WWTP Upgrade Alternative would contribute to or affect local or regional attainment status with the NAAQS. Emissions from the WWTP Upgrade Alternative are summarized in **Table 3-10**. Emissions estimation spreadsheets and summary of the methodology used are included in **Appendix C**.

**Table 3-10. Estimated Air Emissions Resulting from the WWTP Upgrade Alternative**

| Activity | $NO_x$ tpy | VOC tpy | CO tpy | $SO_2$ tpy | $PM_{10}$ tpy | $PM_{2.5}$ tpy | $CO_2$ tpy |
|---|---|---|---|---|---|---|---|
| Construction Combustion | 5.028 | 0.547 | 2.206 | 0.382 | 0.359 | 0.348 | 570.338 |
| Construction Fugitive Dust | -- | -- | -- | -- | 1.274 | 0.125 | -- |
| Haul Truck On-Road | 0.003 | 0.002 | 0.008 | 0.000 | 0.003 | 0.001 | 0.671 |
| Construction Commuter | 0.110 | 0.110 | 0.992 | 0.001 | 0.010 | 0.007 | 131.482 |
| **Total Proposed Action Emissions** | **5.141** | **0.659** | **3.205** | **0.383** | **1.646** | **0.481** | **702.491** |
| Percent of BHRCI Inventory | 0.034 | 0.007 | 0.005 | 0.012 | 0.007 | 0.011 | 0.004* |

Note: * Percent of State of South Dakota $CO_2$ emissions.

The construction project would generate particulate matter emissions as fugitive dust from ground-disturbing activities. Appropriate fugitive dust-control measures would be employed during construction activities to suppress emissions. Emissions of all criteria pollutants would result from construction and demolition activities; combustion of fuels from on-road haul trucks transporting materials, and construction commuter emissions.

Fugitive dust emissions would be greatest during initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Fugitive dust emissions for various construction activities were calculated using emissions factors and assumptions published in USEPA AP-42. These estimates assume that the project duration is 12 months or 240 working days for construction. Emissions calculations and methodology used are included in **Appendix E**.

The Energy Information Administration estimates that in 2008 gross $CO_2$ emissions in South Dakota were 14.8 million metric tons (DOE/EIA 2010). Approximately 638 metric tons of $CO_2$ were estimated to be emitted by the WWTP Upgrade Alternative, which is approximately 0.004 percent of the South Dakota statewide $CO_2$ emissions. Therefore, the WWTP Upgrade Alternative would have negligible contribution towards the South Dakota statewide GHG inventory. $CO_2$ emission estimates are included in **Appendix E**.

Since Ellsworth AFB is in attainment for all criteria pollutants, General Conformity Rule requirements are not applicable. The WWTP Upgrade Alternative would generate emissions well below 10 percent of the emissions inventory for the BHRCI AQCR and the emissions would be short-term. Therefore, the construction and demolition activities associated with the WWTP Upgrade Alternative would not have significant impacts on air quality at Ellsworth AFB or on regional or local air quality.

#### 3.4.3.3 No Action Alternative

No impacts on air quality would be expected under the No Action Alternative.

### 3.4.4 Environmental Protection Measures

Contractors would be required to implement fugitive dust-control measures, such as wind breaks and barriers, frequent water applications, application of soil additives, control of vehicle access, vehicle speed restrictions, covering of piles, use of gravel at site exit points, washing of equipment at the end of each work day and prior to site removal, and work stoppage. All construction and demolition equipment would be properly tuned and maintained prior to and for the duration of the Proposed Action. In addition, construction and demolition equipment and vehicles would reduce idling times to 5 minutes or less when possible. The Proposed Action would utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.

## 3.5 Safety

### 3.5.1 Definition of the Resource

A safe environment is one in which the potential for death, serious bodily injury or illness, or property damage is eliminated or reduced as much as possible. Human health and safety addresses workers' health and safety during burning, demolition, and construction activities, and public safety during burning, demolition, and construction activities and subsequent operations of those facilities.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

AFI 91-202, *USAF Mishap Prevention Program*, implements AFPD 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the BASH Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel. AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health* (AFOSH) *Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. EIAP 32 CFR 989.27, *Occupational Safety and Health*, requires an assessment of direct and indirect impacts of proposed actions on the safety and health of USAF employees and others at a work site.

### 3.5.2 Description of Affected Environment

It is assumed that all applicable standards, such as those required by the Occupational Safety and Health Administration (OSHA), are strictly followed at Ellsworth AFB, and installation personnel are regularly briefed on hazards and safety concerns existing in their particular workplace. All contractors performing demolition and construction activities are responsible for following ground safety and OSHA regulations and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal

protective equipment, and use and availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplaces; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous material), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures or engaged in hazardous waste work.

Explosive safety clearance zones must be established around facilities used for the storage, handling, or maintenance of munitions. Air Force Manual 91-201, *Explosives Safety Standards*, establishes the size of the clearance zones based on quantity-distance (QD) criteria or the category and weight of the explosives contained within the facility. There are Explosive Safety Zones on Ellsworth AFB. These zones have been integrated into one large zone that essentially encompasses the east and west sides of the active runway, the bomber alert area, the Munitions Storage Area (MSA) in the northern portion of the installation, and the small arms training range and supporting ammunition storage area east of the MSA (EAFB 2008c). There are no Explosive Safety Zones within the proposed project site.

DOD analysis has determined that the areas immediately beyond the ends of runway and along the approach and departure flights paths at Ellsworth AFB have significant potential for aircraft accidents. Based on this analysis, DOD developed three zones that have high relative potential for accidents, the CZ, APZ I, and the APZ II. The CZ, the area closest to the runway end, is the most hazardous. APZ I is an area beyond the CZ that has significant potential for accidents. APZ II is an area beyond APZ I with a lesser, but still significant, potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the USAF, land use planning and controls are strongly encouraged in these areas for the protection of the public. Ellsworth AFB's CZ encompasses an area 3,000 feet wide by 3,000 feet long. APZ I is 3,000 feet wide by 5,000 feet long and APZ II is 3,000 feet wide by 7,000 feet long (EAFB 2008e). The proposed project is 1,000 feet southeast of the southern end of the runway and within APZ I.

There are two Electromagnetic Radiation Safety Zones (ERSZs) on Ellsworth AFB. One of the ERSZs is within the northern Airfield CZs and one is within the southern Airfield CZs. Both of the ERSZs at Ellsworth AFB are restricted (EAFB 2008c). The proposed project is not within an ERSZ.

Range sites on Ellsworth AFB contain various munitions and unexploded ordnance (UXO). Most of the munitions, UXO, and CAISs on the surface have been removed. However, munitions, UXO, and CAISs still can be found below the ground surface. The proposed project is not within range sites; therefore, there is an extremely low potential for encountering munitions and UXO at the proposed project site (EAFB 2007c).

### 3.5.3 Environmental Consequences

#### Evaluation Criteria

If implementation of any alternative were to substantially increase risks associated with the safety of personnel, contractors, or the contractor residences, or substantially hinder the ability to respond to an emergency, it would represent a significant impact on safety. Impacts were assessed based on the potential effects of project activities on Ellsworth AFB operations and personnel.

### 3.5.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, negligible to minor, direct, adverse impacts would be expected during demolition of the WWTP; however, no long-term operational safety impacts would be expected. Risk to contractors would be minimal since it is assumed that contractors would be required to establish and maintain demolition safety programs during demolition activities. Adherence to these established safety programs would help to reduce any potential demolition safety risks associated with the Proposed Action. Work areas surrounding demolition activities would be fenced and appropriate signs posted to further reduce safety risks. Because there are no known range sites within the existing WWTP and public access to the WWTP would be restricted, no impacts associated with fire hazards or public safety would be expected. If inadvertent discovery of munitions or UXO occurs during demolition activities, the contractor would be required to immediately stop work in the area, personnel would move away from the site, and the Ellsworth AFB Explosive Ordnance Disposal Flight would be contacted. Though the Proposed Project Corridor is within APZ I, no impacts on public safety would be expected from APZ I, as land use would not change in the Proposed Project Corridor.

#### Wastewater Pipeline Easement and Construction

No impacts on safety would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts could be expected during construction of the sanitary sewer pipeline; however, no long-term operational safety impacts would be expected. Risk to contractors would be minimal since contractors would be required to establish and maintain construction safety programs during pipeline construction activities. It is assumed that construction work areas would be fenced and appropriate signs posted to further reduce safety risks.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts on safety would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

### 3.5.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Short-term, negligible to minor, direct, adverse impacts would be expected during construction and demolition activities, however no long-term operational safety impacts would be expected. Risk to contractors would be minimal since contractors would be required to establish and maintain construction safety programs. Adherence to these established safety programs would help to reduce any potential construction safety risks associated with the WWTP Upgrade Alternative.

Work areas surrounding construction activities would be fenced and appropriate signs posted to further reduce safety risks. Because there are no known range sites within the existing WWTP at Ellsworth AFB and public access to the WWTP would be restricted, no impacts associated with fire hazards or public safety would be expected. If inadvertent discovery of munitions or UXO occurs during construction of the new process building, sludge cake storage facility, or vehicle equipment storage facility, the contractor would be required to immediately stop work in the area, personnel would move away from the site, and the Ellsworth AFB Explosive Ordnance Disposal Flight would be contacted.

#### 3.5.3.3 No Action Alternative

No impacts on safety would be expected under the No Action Alternative.

### 3.5.4 Environmental Protection Measures

All contractors performing demolition activities at Ellsworth AFB are responsible for following ground safety regulations and worker compensation programs. In addition, all contractors are required to perform demolition activities in a manner that does not pose any risk to its workers or installation personnel. An industrial hygiene program addresses exposure to hazardous materials, use of personal protective equipment, and the availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable.

If any suspected military munitions, UXO, or CAIS-related material is found during construction and demolition activities, work would stop in the area, personnel would move away from the site, and the Ellsworth AFB EOD Flight would be contacted.

## 3.6 Geological Resources

### 3.6.1 Definition of the Resource

Geological resources consist of this Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology.

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

### 3.6.2 Description of Affected Environment

***Geology.*** Ellsworth AFB is within the Great Plains province displaying nearly level areas, called benches or tables. This flat-lying land is reflective of the mature stage of erosion of the province and more than 500 million years of tectonic stability. The plains are composed of marine and stream sediments deposited during the Mesozoic Era (60 to 255 million years before present) when a shallow sea covered the region. The flat plains are interrupted by conspicuous buttes, which are isolated flat-topped hills with steep slopes that are capped with erosion-resistant rock. Buttes are primarily formed from erosion of sedimentary rocks underlying the erosion-resistant cap rock (USGS undated). Generally, the Great Plains slope gently to the east from the western border of the Black Hills towards the Missouri River. The Black Hills and adjoining areas were formed during tectonic uplift.

Ellsworth AFB is situated in the Kennedy Basin, consisting of a series of thick beds of sandstone, limestone, and shale, overlying crystalline basement rocks. These are overlain by deposits of limestone, sandstone, and dolomite, several of which include known aquifers. A band of marine shale with intermittent sandstone and limestone beds, more than 1,000 feet in thickness, extends to the surface at the installation. The uppermost of these deposits is the Pierre Shale, which forms the bedrock surface at the installation, and is present from depths of 40 feet below ground surface (bgs) to surface outcroppings. Unconsolidated materials including colluvial and alluvial deposits and residual material overlay the Pierre Shale on the installation (EAFB 2005b).

***Topography.*** The topography of Ellsworth AFB is level to gently sloping, with the exception of the northernmost section of the installation that descends abruptly northward to a valley floor. The remainder of the installation slopes southward towards Box Elder Creek. Elevations of the installation range from 3,380 feet above mean sea level (msl) in the north to 3,080 feet above msl in the south. Elevations within the site of the Proposed Action range from approximately 3,110 to 3,150 feet above msl, with elevations sloping to the southeast (EAFB 2005b).

***Soils.*** The soils mapped over the vast majority of the installation include loams and clay loams of the Nunn series. The Nunn series consists of very deep, well-drained soils that formed in loess and mixed alluvium. Runoff is negligible to low and permeability is moderately slow to slow. Nunn soils are on terraces or alluvial fans and in drainageways. Slopes range from 0 to 25 percent. Additionally, Onita clay loams, Kyle clay, and Lohmiller silty clay compose a minor portion of the soils within the Site. Onita clay loams are very deep, moderately well- to well-drained soils with moderately slow to slow permeability that formed in local alluvium mainly on footslopes. These soils generally occur along swales and drainageways on the installation. Slopes range from 0 to 4 percent. The Kyle series consists of very deep and well-drained soils formed in sediments weathered from clay shale on uplands and colluvial fans. Permeability is very slow. Gilgai microrelief, which consists of small mounds and depressions formed from shrinking and swelling of the soil, is in most areas. The Lohmiller series consists of very deep, well-drained soils formed in alluvium on bottom lands. Permeability is slow or moderately slow (NRCS 2009).

Approximately 97 percent of the soils at the site of the WWTP are composed of Nunn loams with 6 to 12 percent slopes, and the remaining 3 percent in the northeastern extent is composed of Lohmiller silty clay with 0 to 3 percent slopes. Approximately 82 percent of the soil within the pipeline corridor easement area is a Nunn loam with 6 to 12 percent slopes. Soils present in minor amounts include the Zigweid-Nihill complex with 6 to 15 percent slopes in the western portion of the site, the Nunn-Urban Land Complex with 0 to 3 percent slopes, and the Lohmiller silty clay with 0 to 3 percent slopes (NRCS 2009).

The Nunn loam (6 to 12 percent slopes) is considered to be a farmland of statewide importance. However, because this land is not currently available as farmland and this area is not available for future agricultural use, it would not meet the criteria for farmland of statewide importance.

## 3.6.3 Environmental Consequences

### Evaluation Criteria

Protection of unique geological features, minimization of soil/sediment erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geological resources were assessed by evaluating the following:

- Potential to destroy unique geological features
- Potential for soil erosion
- Proximity to or impact on geologic hazards (such as locating a Proposed Action in a seismic zone)
- Potential to affect soil or geological structures that control groundwater quality or groundwater availability
- Alteration of soil structure or function.

#### 3.6.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, minor, direct, adverse and long-term, negligible, indirect, beneficial impacts on geologic resources and soils would be expected from implementing the Proposed Action. Short-term, minor adverse impacts would be anticipated to occur on soils during decommissioning and demolition activities as soil would be disturbed. Compaction of surrounding soils could occur under the weight of construction equipment. Soil erosion and transfer in storm water runoff could result because of compaction of soil due to vehicle use, foot traffic, removal of vegetation, and grading activities. Adverse impacts would be minimized with implementation of BMPs. including wetting of soils, and implementation of erosion and storm water management practices to contain soil and runoff onsite. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies. Wetting of soils would occur on a daily basis as needed to prevent erosion and generation of dust (see discussion on Air Quality, **Section 3.4.3.1**).

Long-term, indirect, beneficial impacts from decommissioning would be expected on geology and soils following demolition activities. Once vegetation has reestablished after demolition activities have ceased, erosion and sedimentation rates would be expected to decrease. The decrease in impervious surfaces associated with removal of structures would be expected to reduce volume and velocity of storm water runoff and associated potential erosion and offsite transport of sediments. Also, because flow into the tributary from Outfall 005 would drastically decrease, stream channel erosion occurring within and downstream of the tributary would be expected to decrease. Please see **Section 3.7** for a discussion on water resources.

##### Wastewater Pipeline Easement and Construction

No impacts would be expected on geology and soils from granting the pipeline easement. Short-term, minor, adverse impacts on soils would be expected during construction of the pipeline due to soil disturbances. Compaction of surrounding soils could occur under the weight of construction equipment. No effects on soils from compaction would be expected in the northern portion of the proposed pipeline corridor in ERP site OU-6 because the existing top layer of soils are composed of highly compacted fill material (i.e., clay soils) that serve as the landfill cap. Soil erosion and transfer in storm water runoff could result because of compaction of soil due to vehicle use, foot traffic, removal of vegetation, and grading activities. Adverse impacts would be minimized with implementation of BMPs. including wetting of soils, and implementation of erosion and storm water management practices to contain soil and runoff onsite. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies. Wetting of soils would occur on a daily basis as needed to prevent erosion and generation of dust (also see **Section 3.4**).

Long-term, minor, adverse impacts on topography would be expected from pipeline construction due to anticipated mitigation requirements of adding an additional landfill cap to protect the integrity of the existing 3-foot cap on ERP site OU-6. This additional landfill cap would raise the elevation of the land in the northern portion of the proposed pipeline corridor (i.e., OU-6), thereby altering topography within the corridor.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts would be expected on geology and soils from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

### 3.6.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

The WWTP Upgrade Alternative would be anticipated to have short-term, minor, direct and long-term, minor, indirect, adverse impacts on geology and soils. Construction and demolition activities necessary to upgrade the existing WWTP, would disturb soils and increase the potential for elevated rates of erosion and sedimentation, resulting in short-term, minor, adverse impacts. Construction activities would entail grading and removal of vegetation, and soil would become compacted under the weight of construction equipment. Compaction of soil could decrease storm water infiltration rates and alter flow patterns. Construction of buildings, additions, and roads, and clearing of vegetation would increase impervious surfaces and therefore increase volume and velocity of storm water runoff and associated soil erosion and sedimentation rates. Soil erosion and sediment production would be minimized for all construction operations as a result of following an approved sediment-and–erosion-control plan.

Soil productivity would decline in disturbed areas and be eliminated in those areas within the footprint of building structures, and roadways. Loss of soil structure due to compaction from foot and vehicle traffic could result in changes in drainage patterns. Soil erosion- and sediment-control measures would be included in site plans to minimize long-term erosion and sediment production.

The proposed site for the WWTP upgrades was analyzed for engineering limitations for building and road construction. Construction, demolition, and road construction would occur in Nunn loam soils with 6 to 12 percent slopes. This soil is rated as very limited to building construction because of shrink-swell potential, slope, and depth to saturation. The proposed road to the Processing House is rated as very limited due to low strength, shrink-swell, and frost action. Therefore, site-specific soil surveys should be conducted prior to the initiation of construction activities to determine that any necessary design considerations address soil limitations.

### 3.6.3.3 No Action Alternative

No impacts on geological resources and soils would be expected under the No Action Alternative.

## 3.6.4 Environmental Protection Measures

Fugitive dust from demolition activities would be minimized by BMPs such as watering and implementation of erosion and storm water management practices to contain soil and runoff onsite, thereby reducing the total amount of soil exposed. Standard erosion-control means (e.g., silt fencing, sediment traps, application of water sprays, and revegetation at disturbed areas) would also reduce

environmental consequences related to those activities. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies.

## 3.7 Water Resources

### 3.7.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes. Groundwater consists of subsurface hydrologic resources. It is an essential resource that functions to recharge surface water and is often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Wetlands are discussed in **Section 3.8**. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. The CWA (33 U.S.C. 1251 et seq., as amended) establishes Federal limits, through the National Pollutant Discharge Elimination System (NPDES), on the amounts of specific pollutants that are discharged to surface waters in order to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (end of pipe) and nonpoint sources (storm water) of water pollution. Section 404 of the CWA regulates the discharge of dredge or fill material into waters of the United States, which includes wetlands. Waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by the USEPA and the USACE. These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries.

The USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. This Rule became effective February 1, 2010, and will be phased in over 4 years. All new construction sites are required to meet the non-numeric effluent limitations and to design, install, and maintain effective erosion and sedimentation controls, including the following:

- Control storm water volume and velocity to minimize erosion
- Control storm water discharges including both peak flow rates and total storm water volume
- Minimize the amount of soil exposed during construction activities
- Minimize the disturbance of steep slopes
- Minimize sediment discharges from the site using controls that address factors such as the amount, frequency, intensity, and duration of precipitation; the nature of resulting storm water runoff; and soil characteristics, including the range of soil particle sizes expected to be present on the site
- Provide and maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal, and maximize storm water infiltration where feasible
- Minimize erosion at outlets, downstream channels, and stream banks
- Minimize soil compaction and preserve topsoil where feasible.

In addition, construction site owners and operators that disturb 1 or more acres of land are required to use BMPs to ensure that soil disturbed during construction activities does not pollute nearby water bodies.

Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. Section 17094) establishes into law new storm water design requirements for Federal construction projects that disturb a footprint greater than 5,000 $ft^2$ of land. EISA Section 438 requirements are independent of storm water requirements under the CWA. The project footprint consists of all horizontal hard surfaces and disturbed areas associated with the project development. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology shall be modeled or calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate storm water retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible. Post-construction analyses shall be conducted to evaluate the effectiveness of the as-built storm water reduction features. As stated in a DOD memorandum dated January 19, 2010, these regulations will be incorporated into applicable DOD Unified Facilities Criteria within 6 months (DOD 2010). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and habitat for a diversity of plants and animals. Flood potential is evaluated by FEMA, which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year. EO 11988, *Floodplain Management*, directs Federal agencies to avoid siting within floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific eight-step process must be followed to comply with EO 11988 (see **Section 1.4.2**). This eight-step process is detailed in the FEMA document "Further Advice on EO 11988 Floodplain Management." In addition, a FONPA is required for each individual project that affects a floodplain.

### 3.7.2 Description of Affected Environment

***Groundwater.*** Groundwater occurs under confined and unconfined conditions at Ellsworth AFB. The installation is underlain by three confined aquifers and one shallow unconfined aquifer. The uppermost confined aquifer is the Inyan Kara Aquifer, confined by beds of Upper Cretaceous strata above and Permian-Jurassic strata below. This aquifer occurs in permeable sandstone within the Fall River and Lakota formations. The Inyan Kara Aquifer supplies a large portion of the domestic water supply for Rapid City. The Minnelusa Aquifer lies below the Inyan Kara Aquifer and is confined by Permian-Jurassic strata above and Pennsylvanian confining beds below. Recharge for this limestone aquifer lies west of the installation among the foothills between Rapid City and the Black Hills. The upper portion of this aquifer is the most heavily used in the communities near Ellsworth AFB. The deepest confined aquifer that underlies the installation is the Madison Aquifer, which is beneath Lower Pennsylvanian confining strata. This aquifer is a limestone deposit and has the most dependable water quality of any of the regional confined aquifers (EAFB 2005b). The shallow unconfined aquifer consists of the weathered/fractured zone of the Pierre Shale and the overlying unconsolidated deposits. Groundwater ranges from 20 to 60 feet bgs, and the flow direction and velocity of groundwater varies across the installation (EAFB 2008c).

Drinking water for Ellsworth AFB is delivered by the Rapid City Water Division via a 16-inch water main. Sources for this water system include three infiltration galleries along the Rapid Creek alluvium,

including the Jackson Springs Gallery, Meadowbrook Gallery, and Girl Scouts Gallery. Nine other off-installation wells operated by the Rapid City Water Division draw water from the subsurface Minnelusa and Madison Aquifers. During peak demand summer periods, the city also uses surface water from Rapid Creek, which originates in the Rapid Creek drainage area in the Black Hills west of Rapid City. This source includes the Deerfield and Pactola surface water reservoirs (EAFB 2007a). Ellsworth AFB previously used groundwater wells as a source of potable water; however, these wells have since been abandoned. The 28th Medical Group Bio-Environmental Engineering Flight is responsible for on-installation monitoring of the potable water distribution system. There are 22 on-installation monitoring points that are sampled at the rate of 11 points each month. Samples have historically been within limits (EAFB 2008c).

***Surface Water.*** Ellsworth AFB lies within the Missouri River Basin, with three major streams occurring near Ellsworth AFB including Elk Creek, Box Elder Creek, and Rapid Creek. Elk Creek and Rapid Creek are perennial streams, and Box Elder Creek is an ephemeral stream. Generally, streams that flow only during and immediately after precipitation events are considered ephemeral while perennial streams have continuous flow year-round. A natural divide in the northern portion of the installation directs overland flow either north or south. The northern portion of Ellsworth AFB is drained by seven unnamed ephemeral drainages that discharge into Elk Creek, approximately 5 miles to the northeast. Surface drainage from four drainages in the southern portion of Ellsworth AFB flows generally south-southeast via retention ponds (including a series of four relatively large man-made lakes), ditches, storm sewers, and ephemeral streams. Surface runoff from industrial areas on Ellsworth AFB drains five watersheds through outfalls, which are permitted by the SDDENR SDSWDS permit number SD-0000281. Four of the permitted storm water outfalls discharge into unnamed tributaries of Box Elder Creek, which then flow into Box Elder Creek about one mile south of the installation boundary. The fifth permitted storm water outfall discharges into an unnamed tributary of Elk Creek north of the installation. Both Elk and Box Elder Creeks eventually flow into the Cheyenne River. **Figure 3-4** depicts surface water features near the site of the Proposed Action.

The WWTP discharges treated effluent into the unnamed tributary of Box Elder Creek through Outfall 005. This unnamed tributary is ephemeral, and has not historically flowed year-round. However, once the WWTP began to discharge into the unnamed tributary in 1943, flow became perennial. Discharges from this outfall are continuous and average 0.5 MGD (EAFB 2008b, EAFB 2009e). Sampling of the effluent occurs in accordance with the SDSWDS permit, and no violations of water quality standards have occurred (EAFB 2008c). Of the total WWTP discharge, approximately 250,000 gallons of the treated effluent is used for irrigation during the golf season, with the remainder being discharged off-installation through Outfall 006 downstream of the golf course (28 BW 2006). Due to the fluctuation in irrigation rates, the daily downstream discharge likely averages from 0.25 MGD to 0.5 MGD, depending on the season.

The Prairie Ridge Golf Course is below the convergence of two perennial streams, one from the base of Gateway Lake (to the northeast of the WWTP) and the other from the WWTP, creating the unnamed tributary to Box Elder Creek. Two ponds are present adjacent to fairway holes 4 and 9, and jurisdictional wetlands are also present (see **Section 3.8** for a discussion on wetlands). The tributary carrying treated effluent flows into the 2.7-acre Golf Course Lake, the larger of the two golf course ponds, which is used for golf course irrigation (28 BW 2006, EAFB 2008c). Discharge from Golf Course Lake is conveyed through Outfall 006 along the southern installation boundary. The majority of the flow from this outfall comes from Outfall 005 unless there is a major storm event or heavy snow melt. According to the 2006 *Final Golf Course Environmental Management Plan* for the Prairie Ridge Golf Course, discharge from Outfall 006 is periodically visually monitored for oil sheen, turbidity, algal growth, and solids by golf course personnel (EAFB 2002, 28 BW 2006). The installation maintains clean storm water runoff by adhering to the SWPPP, and *Industrial Waste Management Plan* (EAFB 2008c).


Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

**Figure 3-4. Surface Water Resources near the Proposed Project Site**

Water bodies present at and adjacent to the golf course have the potential to receive inputs of pesticide, herbicide, and slow-release fertilizer from course maintenance activities. Vegetated buffers are maintained around water bodies on the golf course, and water features are regularly monitored for the presence of algae, soil erosion, excessive aquatic plant growth, fish kills, and sedimentation. Ponds are periodically dredged to remove accumulated silt and restore previous water volume. All water feature maintenance activities are coordinated with the natural resources manager at Ellsworth AFB (28 BW 2006).

***Floodplains.*** According to a 1996 floodplain study, 262 acres of Ellsworth AFB property are within a 100-year floodplain (28 BW 2006). A 100-year floodplain is adjacent to the WWTP (EAFB 2007b). The southeastern corner of the Proposed Project Corridor crosses the floodplain. Approximately 22 acres of the Prairie Ridge Golf Course are within 100-year floodplains (28 BW 2006). The northern limit of the Box Elder Creek floodplain is approximately 50 feet south of the southern installation boundary. Flooding along this creek has severe impacts on the community of Box Elder and Ellsworth AFB (EAFB 2005b).

## 3.7.3 Environmental Consequences

### Evaluation Criteria

Evaluation criteria for effects on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action would have significant effects on water resources if it were to do one or more of the following:

- Substantially reduce water availability or supply to existing users
- Create or contribute to overdraft of groundwater basins
- Exceed safe annual yield of water supply sources
- Cause a violation of water quality standards or increase the magnitude or frequency of an existing water quality violation
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources.

The potential effect of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

### 3.7.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, moderate, direct, adverse impacts could occur as a result of increased surface water runoff and sedimentation due to ground disturbances from the removal of the WWTP facility. The NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that would disturb 1 acre or more to obtain coverage under an NPDES permit for their storm water discharges. Although the area of facilities to be demolished under the Proposed Action is less than 1 acre (0.88 acres), it is likely that the Proposed Action would disturb 1 acre or greater due to associated disturbances around these facilities and demolition staging areas. Therefore, an NPDES construction storm water permit would be obtained for the demolition of the WWTP. In addition, if it is determined

that the demolition of the WWTP would disturb 1 acre or more, Ellsworth AFB would also be subject to the CWA Final Rule regarding non-numeric effluent limitations, as described in **Section 3.7.1**. The implementation of sediment- and erosion-control BMPs would minimize the adverse effects from ground disturbances associated with the Proposed Action (see **Section 3.7.4**). No wastewater or other fluids would be discharged from the site during decommissioning and demolition.

Ellsworth AFB would be subject to the new storm water design requirements of Section 438 of the EISA that require Federal construction projects that disturb 5,000 $ft^2$ or more of land to maintain or restore predevelopment site hydrology to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. The demolition of the existing WWTP would disturb approximately 38,379 $ft^2$ and, therefore, would require implementation of the storm water design requirements of Section 438 of the EISA.

Short-term, minor, adverse effects on water resources would be expected from the temporary increase in water use at Ellsworth AFB when the decommissioned units and equipment are washed and decontaminated. However, this is unlikely to reduce water availability or supply to existing users. Decommissioning and demolishing the WWTP would be anticipated not to exceed the safe annual yield of water supply.

Long-term, moderate, indirect, beneficial effects from decommissioning would result in an alteration of water velocity, quantity, and quality on the tributary currently receiving treated effluent. The tributary would likely revert back to an ephemeral stream, flowing primarily in response to storm events or heavy snow melt. This reduction in flow would additionally reduce stream channel erosion, as less water would be available and flowing at a rate less adequate to remove and carry sediment. The cessation of the Ellsworth WWTP discharge is likely to improve the in-stream water quality of the tributary and downstream waters as wastewater pollutants would no longer be discharged. However, it is possible that dissolved oxygen in the tributary would decrease slightly as there would be less mixing between the atmosphere and water interface at the outfall. Total dissolved solids within the tributary would also decline, as solids are present within the effluent. Because there would be less total dissolved solids and less erosion expected to occur from the decreased flow, the contribution of sediment to the Golf Course Lake and other downstream receiving water bodies would decrease. Erosion and sedimentation rates would further decrease as vegetation becomes established at the site of WWTP removal. Due to the reduction in sedimentation, the frequency of dredging activities within the golf course ponds could decline.

The golf course is currently irrigated with water from the golf course pond, which is constantly replenished by the WWTP effluent (28 BW 2006). Cessation of the WWTP flow would likely make the golf course pond unavailable for irrigation supply, and establishing a new source would be necessary. Ellsworth AFB is considering using "purple pipe," reclaimed wastewater lines, which would replace the golf course pond supply. However, use of "purple pipe" would require piping irrigation water uphill. If reclaimed wastewater lines are not installed, the golf course would likely irrigate with potable water from the installation's current water supply. During the peak irrigation season, this would increase the installation's potable water demand by approximately 250,000 gallons per day (28 BW 2006) and place an additional burden on the current water sources.

The potential additional demand on water supply would be 250,000 gallons per day during peak golf season, if this source is determined to be suitable for golf course irrigation. If total season demand is conservatively estimated to be 6 months at this rate, this would be an increased demand of 45 million gallons per year.

In some locations, Box Elder Creek and its tributaries serve as recharge areas for groundwater. With cessation of flow from the Ellsworth AFB WWTP to the unnamed tributary, this recharge effect would be diminished along the tributary downstream from the WWTP, which could potentially reduce flow for wells in this area.

### Wastewater Pipeline Easement and Construction

No impacts on water resources would be expected from the granting of the pipeline easement. Short-term, minor to moderate, adverse impacts on surface water would be expected from the construction of the sanitary sewer pipeline due to increased soil erosion from exposed soils during storm events and sedimentation within the unnamed tributary of Box Elder Creek. The trench to install the pipeline and associated disturbances would total approximately 35,250 $ft^2$ (0.81 acres) in disturbance. Ellsworth AFB would be subject to the new storm water design requirements of Section 438 of the EISA that require Federal construction projects that disturb 5,000 $ft^2$ or more of land to maintain or restore predevelopment site hydrology to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. The excavation of the wastewater pipeline trench would disturb approximately 38,379 $ft^2$ and, therefore, would require implementation of the storm water design requirements of Section 438 of the EISA. Environmental protection measures, as discussed in **Section 3.7.4**, would be implemented in order to minimize adverse impacts on surface water quality.

Short-term, minor, adverse impacts on floodplains would be expected from the construction of the sanitary sewer pipeline. The proposed pipeline corridor crosses the unnamed tributary of Box Elder Creek (see **Figure 2-1**). Therefore, development would occur within the 100-year floodplain of the unnamed tributary and construction would occur within the tributary and associated wetland areas when the pipeline is installed and a FONPA will be issued. Per EO 11998, *Floodplain Management*, adverse effects and incompatible development should be avoided to minimize harm to floodplains. Environmental protection measures, as discussed in **Section 3.7.4**, would be implemented in order to minimize adverse impacts on the floodplain. Since the sanitary sewer pipeline would be buried below the ground surface, no increase in impervious surfaces would occur and no long-term impacts on floodplains would be expected.

Construction within the unnamed tributary and associated wetlands would likely require a USACE CWA Section 404(b) NWP. In addition, an NWP-12 for utility line construction activities within waters of the United States could also be required. This would depend on how the pipeline would cross the tributary and the area of impact on wetlands or other waters of the United States associated with crossing the unnamed tributary and floodplain. NWP-12 applies to utility line activities that would result in less than 0.5 acres of impacts on wetlands or other waters of the United States. The permitting authority would be determined based on negotiations between the USAF and the South Dakota EDA.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No direct effects on water resources would be expected from the contribution of Ellsworth AFB's wastewater stream to the regional stream. However, indirect impacts on stream flow and channel morphology could occur as a result of the cessation in discharge of WWTP effluent into the unnamed tributary due to the decrease in water input into the unnamed tributary. **Section 3.2.3.1** provides additional discussion on impacts from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

#### 3.7.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

The WWTP Upgrade Alternative would result in short-term, minor, direct, adverse and long-term, beneficial impacts on water resources. Short-term, minor, direct, adverse impacts would be expected during construction of facilities to house the additional equipment necessary to upgrade to the IFAS system. During construction activities, removal of vegetation and construction, demolition, and road construction activities would increase storm water runoff volume and velocity due to the increase in impervious surfaces. This runoff has the potential to transport sediments and pollutants and impact surface water quality of the receiving water body. However, adherence to the erosion-and-sediment-control plan and SWPPP would prevent surface water degradation. Adherence to BMPs, proper engineering practices, and applicable codes and ordinances would reduce storm water runoff-related impacts to a level of insignificance.

There would be no increase in the amount of potable water needed to operate the equipment necessary to support IFAS treatment of wastewater.

Under the WWTP Upgrade Alternative, effluent would continue to flow from Outfall 005 to the unnamed tributary that flows into Box Elder Creek. However increased amounts of ammonia would be removed from the effluent; therefore, long-term beneficial impacts would result from the decrease in ammonia present in the water column. Because ammonium compounds can decrease the dissolved oxygen content in water through chemical reactions, decreasing ammonia would have a beneficial impact on water quality. The continued discharge of effluent into Outfall 005 would otherwise not be expected to result in any adverse impacts on water resources.

#### 3.7.3.3 No Action Alternative

Impacts on water resources under the No Action Alternative would be long-term, minor, and adverse from an inability to meet new SDSWDS ammonia discharge limits.

### 3.7.4 Environmental Protection Measures

An NPDES construction storm water permit would be obtained as applicable for the demolition of the WWTP. An erosion-and-sediment-control plan and SWPPP would be developed for the Proposed Action to minimize soil erosion and surface water degradation. BMPs would be developed as part of the SWPPP to manage storm water both during and after construction. Standard erosion-control measures (e.g., silt fencing, sediment traps, application of water sprays, and restablization and revegetation of disturbed areas) would minimize environmental impacts on surface water. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies. Proper housekeeping, retention of debris within the site boundaries, demolition equipment maintenance, petroleum and hazardous material storage, and adherence to the installation's SPCC Plan in the event of a spill would minimize introduction of pollutants to surface waters.

# 3.8 Biological Resources

## 3.8.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the U.S. Fish and Wildlife Service (USFWS). Federal species of concern are not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of an action. Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act (ESA) and sensitive ecological areas as designated by state or Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats). Biological resources also include wetlands. Wetlands are important natural systems and habitats because of the diverse biological and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, unique plant and wildlife habitat provision, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 329).

## 3.8.2 Description of Affected Environment

***Vegetation.*** The National Hierarchical Framework of Ecological Units, adopted by the U.S. Forest Service in 1993, places Ellsworth AFB in the Northwestern Great Plains section of the Temperate Steppe division (USFS 1994). Currently, the majority of land on Ellsworth AFB is disturbed or improved, dominated by native Kentucky bluegrass (*Poa pratensis*) interspersed with hairy crabgrass (*Digitaria sanguinalis*), common broad-leaved plants including field bindweed (*Convolvulus arvensis*) and common dandelion (*Taraxacum officinale*), and several native and exotic ornamental species. Most of these grassy areas are maintained at a height of 7 to 14 inches, as recommended in Ellsworth AFB's Integrated Natural Resources Management Plan. Natural areas on the installation are covered in remnant mixed-grass prairie habitat with species such as western wheatgrass (*Pascopyrum smithii*), wheatgrass (*Agropyron cristatum*), and green needle-grass (*Stipa viridula*) (EAFB 2005b).

A small area of riparian habitat occurs on the installation along tributaries and impoundments. Dominant species found in the riparian habitat include eastern cottonwood (*Populus deltoides*), sandbar willow (*Salix exigua*), narrowleaf cattail (*Typha angustifolia*), and sedges (*Carex* spp.) (EAFB 2005b). Riparian trees surround the lakes, including eastern red cedar (*Juniperus virginiana*), green ash (*Fraxinus pennsylvanica*), eastern cottonwood, and sandbar willow. These trees flourish due to their proximity to water and represent the major tree stands on the installation (EAFB 2008c).

The project area is primarily composed of turfgrasses associated with the golf course, including nonnative perennial ryegrass (*Lolium perenne*) and native Kentucky bluegrass, and, to a lesser extent, nonnative creeping bentgrass (*Agrostis stolonifera*). Ornamental trees are positioned throughout the golf course. Groves of conifers and eastern cottonwood are situated along the drainage that crosses the southeastern portion of the Project area (28 BW 2006).

***Wildlife.*** Wildlife that naturally occurs in the region of Ellsworth AFB includes many species of birds, reptiles, amphibians, and mammals that are characteristic of the Great Plains. Common wildlife species that occur near Ellsworth AFB are typical of semi-developed grassland areas. The most suitable wildlife habitat on the installation is restricted to the remnant mixed-grass prairie or riparian areas on the installation.

Common bird species on the installation include mallard (*Anas platyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), greater yellow legs (*Tringa melanoleuca*), mourning dove (*Zenaida macroura*), barn swallow (*Hirundo rustica*), and common grackle (*Quiscalus quiscula*). Common reptiles and amphibians on the installation include snapping turtle (*Chelydra serpentina*), bullsnake (*Pituophis melanoleucus*), prairie rattlesnake (*Crotalus viridis*), Blanchard's cricket frog (*Acris crepitans*), and bullfrog (*Rana catesbeiana*). Common mammals include mule deer (*Odocoileous hemionus*), white-tailed deer (*O. virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), whitetail jackrabbit (*Lepus townsendii*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), black-tailed prairie dog (*Cynomys ludovicianus*), and big brown bat (*Eptesicus fuscus*) (EAFB 2005b).

The Prairie Ridge Golf Course, partially within the project area, has an active pest control program to address occasional pests, including prairie dogs. Prairie dogs can provide food sources to raptors and their burrows attract burrowing owls (*Athene cunicularia*) that use unoccupied holes for shelter and nesting, causing increased BASH risk and damage to infrastructure (EAFB 2005b).

***Sensitive and Protected Species.*** There are no known resident federally or state-listed threatened or endangered species on Ellsworth AFB. One study with relevance to threatened and endangered species, *Biological Survey of Ellsworth Air Force Base, South Dakota* (EAFB 2005b), was conducted on the installation in 1994. Three bird species and one mammal species were found on Ellsworth AFB that are classified as sensitive species by the South Dakota Natural Heritage Program (EAFB 2005b, SDNHP 2008). These are rare species requiring special attention; however, their populations do not warrant listing on the Federal or state threatened or endangered species lists. These species are burrowing owl, Swainson's hawk (*Buteo swainsoni*), loggerhead shrike (*Lanius ludovicianus*), and silver-haired bat (*Lasionycteris noctivagans*) (EAFB 2005b). According to Ellsworth AFB's General Plan, there are currently two species on Ellsworth AFB that are considered sensitive and warrant special attention: the Swainson's hawk and the burrowing owl (EAFB 2008c). Per the General Plan, although these sensitive species are relatively secure, special care should be taken during new construction to ensure minimal disturbance to habitats (EAFB 2008c). Habitat for these sensitive species does occur in the proposed project corridor, however measures are taken to actively discourage and monitor for these species due to BASH concerns.

Due to the installation's proximity to the Central Flyway, a north-south regional migratory bird route, migratory birds are a concern on Ellsworth AFB, particularly during the spring migratory period. The numerous bodies of water around the airfield create attractive nesting grounds for migratory birds. The presence of rain and concrete surface are also huge attractions to gulls during this time of year (EAFB 2008c). Due to BASH concerns, Ellsworth AFB has a "zero tolerance" policy for gulls and nesting geese, meaning these birds are dispatched when they are observed on installation, and a "low tolerance" policy for ducks, hawks, and eagles. Avian nesting habitat for these species develops primarily in riparian areas on or near the installation (EAFB 2008c).

***Wetlands.*** A *Natural Resources and Database Mapping and Wetland Database and Mapping Report* was finalized in January 2003 for Ellsworth AFB (EAFB 2008c). This report updated the 1994 wetland delineation (EAFB 1994) performed for Ellsworth AFB. According to the 2003 update, there are approximately 44.6 acres of jurisdictional wetlands on Ellsworth AFB. These areas include drainage channels to Box Elder Creek, scattered impoundments that include four man-made lakes, and swales

(EAFB 2008c). The majority of these wetlands occur in five geographic regions of the installation, including the main installation drainage, fire training area drainage, alert apron drainage, west boundary drainage, and MSA drainage. Wetlands on miscellaneous impoundments and swales on the installation were also identified (EAFB 1994).

Jurisdictional wetlands were delineated along the main installation drainage including areas along Gateway, Bandit, and Heritage lakes. Jurisdictional wetlands within the project area occur within the section of the main installation drainage that crosses the southeasternmost portion of the project area. Additional wetlands occur along the main installation drainage and impoundments adjacent to the eastern side of the project area. This drainage receives overland flow, discharge from the WWTP, and water from several culverts. Dominant vegetation in wetlands along this drainage include broadleaf cattail (*Typha latifolia*), softstem bulrush (*Scirpus validus*), creeping spikerush (*Eleocharis palustris*), and wooly sedge (*Carex lanuginosa*). Two impoundments on the golf course were created by diverting and damming the main installation channel. Although these impoundments do support wetlands, they are considered atypical (EAFB 1994, EAFB 2005b).

At the time of the 1994 delineation, all the wetlands were considered jurisdictional; however, on January 9, 2001, the Supreme Court issued the Solid Waste Agency of Northern Cook County (SWANCC) decision, which determined that isolated, nonnavigable, intrastate waters are no longer protected by the CWA if use by migratory birds is the sole basis for Federal jurisdiction. Therefore, because of the SWANCC decision some of these isolated wetlands might no longer be considered jurisdictional (EAFB 2005b). A discussion of waters of the United States, which are also protected under the CWA, is included in **Section 3.7**.

### 3.8.3 Environmental Consequences

#### Evaluation Criteria

Biological resources are evaluated in terms of compliance with Section 7 of the ESA and related laws and authorities. Emphasis is placed on species with legal, commercial, recreational, ecological, or scientific importance. The level of impact on biological resources is based on (1) the importance (e.g., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to the proposed activities, and (4) the duration of ecological ramifications. Impacts on biological resources are considered significant if species or habitats of high concern are adversely affected over relatively large areas, or disturbances cause reductions in population size or distribution of a species of special concern. A habitat perspective is used to provide a framework for analysis of general classes of effects (i.e., removal of critical habitat, noise, human disturbance).

Determination of the significance of wetland impacts is based on (1) the function and value of the wetland, (2) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (3) the sensitivity of the wetland to proposed activities, and (4) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid "taking" threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

### 3.8.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

***Vegetation.*** The Proposed Action would be expected to have short-term, negligible, direct, adverse impacts on vegetation surrounding the existing WWTP. The vegetation surrounding the WWTP is modified, landscaped, and mowed regularly. Vegetation is primarily composed of native and nonnative grasses and various broad-leaved weeds. As there have been no observations made of any unique native vegetative species occurring within this area, impacts on vegetation are expected to be negligible from the temporary disturbances from demolition activities (e.g., trampling and removal). This vegetation would be expected to regenerate once demolition activities have ceased; therefore, no long-term, adverse impacts would be expected.

Long-term, negligible, indirect, beneficial effects on vegetation would also be expected from the Proposed Action. Once the WWTP has been demolished, the site would be revegetated with native vegetation. Therefore, a larger proportion of native vegetation cover within the Project area could result from the Proposed Action.

***Wildlife.*** The Proposed Action would have short-term, negligible, direct, adverse impacts on wildlife due to disturbances from noise, demolition activities, and heavy equipment use. Most wildlife species in the construction vicinity would be expected to quickly recover once the demolition noise and disturbances have ceased. In addition, the demolition area would be relatively small in size and is in a partially developed area where disturbances are common. Most of the area surrounding the WWTP and within the project area is regularly mowed and provides marginal habitat for most wildlife species. Species likely to use the area include those species typical of developed areas, such as deer, raccoon, rabbits, mourning dove, common grackle, and killdeer. High noise events could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, negligible, adverse impacts. Wildlife would be anticipated to return once demolition activities have ceased for the day or demolition period; therefore, no long-term, adverse impacts on wildlife would be expected from demolition of the WWTP.

Wildlife within the project area is expected to be habituated to noise disturbances due to aircraft. The majority of the project area is within the 80 to 85 dBA noise zone. This noise level is created by the runway that is just east of the WWTP. The southeastern portion of the project area falls within the 75 to 80 dBA noise zone. Wildlife accustomed to this sound intensity would not be expected to be significantly impacted from noise generated from heavy equipment and demolition activities. The Sound Exposure Level (SEL), a measure of the total sound exposure of an event compressed into a 1-second time interval providing a measure of the total sound energy of a single event, from aircraft experienced within the project area is estimated to reach levels of 118 dB SEL. As shown in **Table 3-5**, predicted noise levels at 50 feet from the source of demolition equipment (e.g., bulldozers, dump truck, back hoe, front-end loaders, and generators) would range from 71 to 94 dBA. The level of noise that is regularly experienced within the project area, in addition to the fact that wildlife species are generally discouraged from the project area and harassed due to BASH concerns, suggests that wildlife species in the project area are adapted to frequent noise and disturbances and would be negligibly impacted by the Proposed Action.

Long-term, minor, indirect, beneficial effects on invertebrates, fish, and amphibians that use the main installation drainage, impoundments, and wetlands east of the project area would be expected from the decommissioning of the WWTP. Decommissioning of the WWTP would discontinue effluent outflow to this drainage, thereby reducing the amount of ammonia, TSS, chlorine, and other pollutants being discharged into the tributary and downstream waters. Dissolved oxygen levels and water quality would be anticipated to improve, resulting in long-term, beneficial effects on wildlife.

***Sensitive and Protected Species.*** There are no known resident federally or state-listed threatened or endangered species on Ellsworth AFB; therefore, no impacts on threatened or endangered species would be expected from WWTP decommissioning and demolition activities under the Proposed Action. The Swainson's hawk and burrowing owl are two sensitive species, as listed by the South Dakota Natural Heritage Program, which could potentially occur near the WWTP (EAFB 2008c). However, although the Ellsworth AFB General Plan calls for consideration and protection of these two species on the installation, these species are discouraged in the WWTP and golf course area due to BASH concerns of the runway. The Prairie Ridge Golf Course has an active pest control program to address occasional pests such as prairie dogs, which can attract raptors and burrowing owls (EAFB 2005b). Ellsworth AFB also has a "low tolerance" policy for several species, including hawks. Therefore no new impacts from demolition activities on these species would be expected, as their presence is already discouraged. Many migratory bird species, particularly gulls, hawks, geese, and ducks, are also actively discouraged from the Prairie Ridge Golf Course due to BASH concerns. Therefore, no new impacts on these migratory bird species would be expected, as their presence is also discouraged. Short-term, negligible, indirect, adverse impacts on other migratory bird species would be expected due to temporary noise and visual disturbances, as discussed for wildlife.

***Wetlands.*** Long-term, direct, minor to moderate, adverse impacts on wetlands could occur as a result of discontinuing outflow from the WWTP. Once the WWTP is decommissioned, the wetlands along the main installation drainage to the east of, and crossing, the project area would receive a largely reduced input of surface water, estimated to be approximately 700,000 gallons less per day. The discontinued outflow from the WWTP would alter the hydrology of the wetlands adjacent to and within the project area by decreasing surface water flow to the wetlands. As a result, a decrease in wetland acreage could occur from decreasing the hydroperiod within or along the banks of the tributary and impoundments. The magnitude of impact from the decreased hydroperiod would depend upon the amount of surface water and groundwater flow entering the wetlands from remaining water sources after the WWTP is decommissioned. As the wetlands associated with this tributary downstream of the WWTP would still be expected to receive surface waters from upstream of the WWTP, overland flow during storm events, water from several culverts, and groundwater, it is assumed that wetland acreage could ultimately resemble conditions that existed prior to the WWTP establishment, although the extent of this coverage is unknown. Altering the hydrology could, in turn, decrease wetland vegetation in favor of more terrestrial vegetation species and ultimately adversely affect wildlife habitat provided by the wetlands. Similarly, a decrease in water outflow to the tributary from the WWTP could also be expected to impact wetlands off-installation that might occur further downstream along the unnamed tributary to Box Elder Creek.

The last wetland delineation performed for Ellsworth AFB was in January 2003. Per Federal regulations, wetland delineations are valid for 5 years; therefore, Ellsworth AFB would need to perform a new jurisdictional determination and delineation of wetlands and other waters of the United States on the installation. If it is determined that wetland acreage would be lost as a result of the Proposed Action, Ellsworth AFB would likely be required to obtain a permit under Section 404 of the CWA for altering hydrology and potentially decreasing wetland acreage and mitigate or compensate for the impacts made on these wetlands in order to comply with the "No Net Loss" national policy. There are no additional South Dakota wetland regulations that Ellsworth AFB would be required to comply with.

On the other hand, long-term, minor, indirect, beneficial effects on water quality within the wetlands would be expected from decommissioning of the WWTP, due to the decrease in ammonia, TSS, chlorine, and other pollutants being discharged to the water column from the WWTP. Because ammonium compounds and nutrients can decrease dissolved oxygen and other water quality parameters through chemical and biological reactions, decreasing these inputs would have a beneficial impact on water quality within the wetlands.

Short-term, negligible to minor, indirect, adverse impacts on wetlands to the east of and within the project area could occur from increased erosion, sedimentation, and pollutants entering these wetlands during demolition activities. However, adherence to an erosion–and-sediment-control plan and SWPPP should prevent surface water degradation. Assuming appropriate BMPs are implemented during demolition activities, no significant adverse impacts on receiving wetlands would be expected. In the event of a spill or leak of fuel or other construction-related products, there could be adverse impacts on wetland surface water quality. All fuels and other potentially hazardous materials would be contained and stored appropriately. In the event of a spill, procedures outlined in Ellsworth AFB's SPCC Plan would be followed to quickly contain and clean up a spill (see **Sections 3.11** for a discussion on hazardous materials and wastes).

### Wastewater Pipeline Easement and Construction

***Vegetation.*** No impacts on vegetation would be expected from the granting of an easement to the South Dakota EDA. Short-term, negligible, adverse impacts on vegetation would be expected from the construction of the sanitary sewer pipeline due to temporary vegetation removal and trampling. The majority of vegetation that would be disturbed would be turfgrasses associated with the golf course. The groves of conifers and eastern cottonwood situated along the unnamed tributary to Box Elder Creek could also be impacted. Disturbed sites would be revegetated once construction activities are complete; therefore, no long-term impacts on vegetation would be expected.

***Wildlife.*** No impacts on wildlife would be expected from the granting of an easement to the South Dakota EDA. Short-term, negligible, adverse impacts on wildlife would be expected from the construction of the sanitary sewer pipeline due to temporary habitat removal and disturbances from noise and heavy construction equipment. Temporary adverse impacts on wildlife would be similar to those discussed under demolition activities of the Proposed Action.

***Sensitive and Protected Species.*** No impacts on sensitive and protected species would be expected from the granting of an easement to the South Dakota EDA. Anticipated adverse impacts from the construction of the pipeline would be negligible, as the sensitive species on Ellsworth AFB and migratory bird species are already discouraged.

***Wetlands.*** No impacts on wetlands would be expected from the granting of an easement to the South Dakota EDA. Short-term, minor, adverse impacts on wetlands would be expected from the construction of a pipeline due to increased erosion, sedimentation, and inflow of pollutants. In addition, the buried pipeline would likely be required to cross the wetland, resulting in temporary disturbances to the wetland during pipeline construction. A FONPA will be issued for the proposed crossing of wetlands within the proposed pipeline corridor. All required permits would be obtained prior to commencing construction activities, and the wetland would be restored following construction activities. Environmental protection measures, discussed in **Section 3.8.4**, would be implemented in order to minimize adverse impacts on wetlands.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

***Vegetation.*** No impacts on vegetation would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

***Wildlife.*** No direct impacts on wildlife would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. Long-term, minor, indirect, adverse impacts on off-installation wildlife could occur from increased effluent from Ellsworth AFB into Box Elder Creek. Increased wastewater from Ellsworth AFB to the proposed RWWTP outfall into Box Elder Creek would be

expected to introduce increased levels of water pollutants (e.g., ammonia, total suspended solids, chlorine), thus indirectly affecting wildlife species within Box Elder Creek due to decreased dissolved oxygen levels and water quality.

***Sensitive and Protected Species.*** No impacts on sensitive and protected species would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

***Wetlands.*** No impacts on wetlands on Ellsworth AFB would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, impacts on off-installation wetlands that might occur downstream of the proposed RWWTP along Box Elder Creek could be expected from additional surface water input into those wetlands, a portion of which would be from Ellsworth AFB. Wetlands could be beneficially or adversely affected from increased surface water input, which is not known at this time. Long-term, minor, adverse impacts on wetlands that occur along Box Elder Creek could result from increased water pollutants (e.g., TSS, ammonia, chlorine) from Ellsworth AFB's wastewater contribution to Box Elder Creek.

#### 3.8.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

***Vegetation.*** Impacts on vegetation from the WWTP Upgrade Alternative would be similar to, but greater than, those discussed under demolition activities of the Proposed Action. Construction activities would cause short-term, negligible, direct, adverse impacts on vegetation due to trampling and temporary removal of vegetation. Long-term, negligible, direct, adverse impacts on vegetation would be expected from the construction of new buildings, demolition, and a road for upgrading the WWTP due to the permanent removal of vegetation for these improvements.

***Wildlife.*** Impacts on wildlife from the WWTP Upgrade Alternative would be similar to, but greater than, those discussed under demolition activities of the Proposed Action. Short-term, negligible to minor, direct, adverse impacts on wildlife would be expected due to disturbances from noise, demolition and construction activities, and heavy equipment use.

Long-term, minor, indirect, beneficial effects on wildlife would result from the decrease in ammonia being introduced to the water column due to new NPDES requirements. Because ammonium compounds can decrease dissolved oxygen within the water column, decreasing levels of ammonia would have a beneficial impact on invertebrates, fish, and amphibians within the main installation drainage, impoundments, and wetlands east of, and within, the project area.

***Sensitive and Protected Species.*** Impacts on sensitive and protected species from the WWTP Upgrade Alternative would be similar to those discussed under demolition activities of the Proposed Action. No impacts on federally or state-listed threatened or endangered species would be expected from the WWTP Upgrade Alternative. The Swainson's hawk and burrowing owl are two sensitive species, as listed by the South Dakota Natural Heritage Program, which could potentially occur near the WWTP (EAFB 2008c). However, although the Ellsworth AFB General Plan calls for consideration and protection of these two species on the installation, these species are discouraged in the WWTP area due to BASH concerns. In addition, many migratory bird species, particularly gulls, hawks, geese, and ducks, are also actively discouraged from the Prairie Ridge Golf Course and surrounding area near the runway due to BASH concerns. Therefore, no new impacts on these migratory bird species would be expected from the WWTP Upgrade Alternative as their presence is also discouraged. Short-term and long-term,

negligible, adverse impacts on other migratory bird species would be expected due to temporary disturbances and permanent removal of habitat, respectively.

***Wetlands.*** Impacts on wetlands from the WWTP Upgrade Alternative would be similar to those discussed under demolition activities of the Proposed Action. Short-term, negligible to minor, indirect, adverse impacts on wetlands east of and within the project area could occur from increased erosion, sedimentation, and pollutants to these wetlands during construction activities. However, adherence to BMPs outlined in the erosion-and–sediment-control plan and SWPPP should prevent surface water degradation.

Long-term, indirect, beneficial impacts on wetlands would result from the decrease in ammonia present in the water column due to new NPDES requirements. Because ammonium compounds can decrease dissolved oxygen through chemical reactions, decreasing ammonia would have a beneficial impact on water quality within these wetlands.

#### 3.8.3.3 No Action Alternative

Impacts on biological resources under the No Action Alternative would be long-term, minor, and adverse from an inability to meet new SDSWDS ammonia discharge limits.

### 3.8.4 Environmental Protection Measures

An erosion-and-sediment-control plan and SWPPP would be developed for the Proposed Action to minimize soil erosion and surface water degradation. BMPs would be developed as part of the SWPPP to manage storm water both during and after construction. Standard erosion-control measures (e.g., silt fencing, sediment traps, application of water sprays, and restablization and revegetation of disturbed areas) would minimize environmental impacts on wetlands. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent wetlands. After demolition and construction activities have ceased, the Project area would be revegetated with native species. CWA Section 404 permits might be required for altering hydrology and potentially decreasing wetland acreage from discontinuing outflow to downstream receiving waters following WWTP decommissioning and from a pipeline potentially crossing a wetland. If it is determined that wetland acreage is lost, mitigation or compensation for the impacts made on these wetlands would be required in order to comply with the "No Net Loss" national policy. Permitting authority would be determined based on negotiations between the USAF and the South Dakota EDA.

## 3.9 Cultural Resources

### 3.9.1 Definition of the Resource

Cultural resources include a variety of heritage or cultural-related resources that are considered under certain Federal laws, regulations, EOs, and other requirements. Typically, cultural resources are divided into *archaeological resources* (prehistoric or historical sites where human activity has left physical evidence of activities but no standing structures remain) or *architectural resources* (buildings or other structures or groups of structures of historic, technological, or aesthetic significance), and *traditional cultural properties* (TCPs).

Architectural resources include standing buildings, bridges, and other structures. Generally, architectural resources not less than 50 years old qualify for nomination to the National Register of Historic Places (NRHP). More recent structures, such as Cold War-era resources, could warrant protection if they have

the potential to gain significance in the future or if they meet exceptional significance criteria relevant to the Cold War Era historical context.

*Traditional cultural properties or sacred sites* are a special category of cultural resources. These site types can encompass archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that native people consider essential for the preservation of traditional culture. A traditional cultural property contains an intangible cultural element that is linked to a specific geographic location.

The evaluation and consultation processes promulgated in Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) requires assessment of an undertaking's potential impact on historic properties within the project's Area of Potential Effect (APE) on federally managed properties. The APE is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Section 110 of the NHPA requires Federal land-holding agencies to inventory all cultural resources on properties under their jurisdiction irrespective of potential future impacts.

As part of the EA process, NEPA requires an assessment of potential impacts on cultural resources and aspects of the "human environment," which is defined as "the natural and physical (built) environment and the relationship of people with that environment" (40 CFR 1508.14). Under Section 106 of the NHPA, Federal agencies are required to conduct an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's APE, which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The Federal agency official is charged with providing the Advisory Council on Historic Preservation (ACHP) an opportunity to comment in accordance with its regulations, 36 CFR Part 800. Under Section 110 of the NHPA, Federal agencies are required to locate and inventory all resources under their purview that are recommended as eligible for inclusion in the NRHP on owned, leased, or managed property. In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, determinations regarding the potential effects of an undertaking on historic properties are presented to the State Historic Preservation Officer (SHPO). Cultural resources not evaluated for NRHP eligibility are considered eligible for compliance purposes until such evaluation has been completed and a formal determination of eligibility is made.

### 3.9.2 Description of Affected Environment

Ellsworth AFB originated as the Rapid City Army Air Base in 1942. In 1953, the installation was renamed Ellsworth AFB in honor of Brigadier General Richard E. Ellsworth, commander of the 28th Strategic Reconnaissance Wing. Ellsworth AFB played a significant role in America's World War II military efforts and was an important Strategic Air Command facility throughout the Cold War years. The installation retains historic resources significant for their association with each of these periods (EAFB 2005c).

Ellsworth AFB encompasses the former Rushmore Air Force Station (RAFS), which was operated by the Atomic Energy Commission (EAFB 2008f). As a unit of the Strategic Air Command, the installation continued to host long-range bomber aircraft. From the early 1960s until the early 1990s, the installation was the host unit for a group of 150 Minuteman intercontinental ballistic missiles; these were later upgraded to Minuteman II. As Cold War tensions ebbed in the early 1990s, the installation's alert functions and missile programs were decommissioned (EAFB 2007d).

Cultural resource site records are maintained by the South Dakota SHPO and the South Dakota State Archeological Research Center. Prior to 1994, no records existed of historic or prehistoric sites on

Ellsworth AFB. In 1994, Dakota Research Services performed a comprehensive archaeological survey at the installation, covering all significant tracts of undisturbed land within the installation boundaries; both pedestrian survey and soil auger testing were conducted (EAFB 2007d). The survey identified no significant archaeological sites on Ellsworth AFB.

The results of the archaeological surveys of Ellsworth AFB indicate no Native American Graves Protection and Repatriation Act-related items are known or are likely to be encountered on-installation. The installation CRM provided notice of this finding to federally recognized tribes in the area (EAFB 2005c). No sensitive American Indian resources or TCPs have been identified or are likely to be found on-installation.

Most of the installation's original 1942 structures were demolished in the 1960s and 1970s, and few World War II-era buildings remain. The installation was once composed primarily of temporary buildings, nearly all of which have been demolished. Only a few of the original permanent buildings are still standing and, of these, even fewer retain historic integrity.

An architectural survey was conducted at Ellsworth AFB in August 2006 as part of the 2007 ICRMP update (EAFB 2007d). The field work consisted of verifying physical location, appearance, and characteristics of 119 previously surveyed structures, and 20 new structures (not previously surveyed) that were at least 45 years old. The report from this survey, finalized in February 2007, validated previous NRHP eligibility for 4 World War II- and 3 Cold War-era buildings and recommended individual eligibility status for an additional 14 Cold War-era buildings. None of the buildings within this proposed project APE were found to be eligible. Building 3005 was originally listed as eligible in a 1997 architectural survey, but considerable interior and exterior modifications to the structure made it ineligible according to the 2007 survey (EAFB 2007e).

The Ellsworth AFB Cultural Resources Manager (CRM) determined that the archaeological survey of the installation is complete per Section 110 (a) (2) of the NHPA. Since no significant archaeological properties exist on-installation, further archaeological investigations are unnecessary (EAFB 2007d).

## 3.9.3 Environmental Consequences

### Evaluation Criteria

Analysis of the potential impacts and adverse effects on cultural resources associated with proposed actions on Federal property includes the assessment of both direct and indirect impacts on cultural resources. Adverse effects could include physically altering, damaging, or destroying a cultural resource. These can also include altering a characteristic that contributes to a resource's NRHP eligibility or introducing visual or audible elements out of character with or affecting the original setting of the resource. The intentional or benign neglect of a cultural resource that results in its full or partial destruction could also be an adverse effect. Adverse effects associated with indirect impacts might include the cumulative effects of the intensified use of an area in which a cultural resource is located resulting from construction or project-related improvement of the area, including improvements to transportation corridors in the vicinity that provide for or indirectly lead to increased access to the area.

### 3.9.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

No effects on architectural or archaeological cultural resources would be expected from the decommissioning and demolition of the WWTP. Demolition involves disassembly and removal of the

infrastructure, including treatment units, buildings, and piping. Backfilling, grading and revegetation are required in areas where below-ground structures are removed. There are no current plans to demolish Building 3015 under the Proposed Action. The ten associated WWTP facilities that would be decommissioned and demolished under the Proposed Action are listed in **Table 2-2**.

The WWTP was constructed in 1943; the most recent modification occurred in 2005 when new screening and flume equipment were added to the Pretreatment Facility (Building 3013) (EAFB 2001). Several buildings at Ellsworth AFB have been evaluated as eligible for NRHP listing within three military historic contexts: World War II (1941–1945), the Cold War (1946–1989), and post-Cold War (1990–present). The ten buildings proposed for demolition and removal are not among the significant historic properties on-installation. None of the associated WWTP facilities or infrastructure is considered eligible for NRHP listing (EAFB 2007d, EAFB 2007e).

Based on previous survey and subsurface testing results, the likelihood of encountering any significant archaeological resources within the APE is extremely low. The Section 106 guidelines established in the Ellsworth AFB ICRMP apply (EAFB 2007d).

#### Wastewater Pipeline Easement and Construction

No effects on architectural or archaeological cultural resources would be expected from the granting of a pipeline easement at Ellsworth AFB.

No historic buildings or structures are present within the proposed easement. Based on previous survey and subsurface testing results, the likelihood of encountering any significant archaeological resources within the APE of the easement is extremely low. The proposed construction of a sanitary sewer pipeline would have no adverse effect on architectural or archaeological cultural resources. The Section 106 guidelines established in the Ellsworth AFB ICRMP apply (EAFB 2007d).

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts on architectural or archaeological cultural resources from contribution of Ellsworth AFB's wastewater to the regional waste stream would be expected.

### 3.9.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. No impacts would be expected on cultural resources from implementation of the WWTP Upgrade Alternative. None of the associated WWTP facilities or infrastructure is considered eligible for NRHP listing and based on previous survey and subsurface testing results, the likelihood of encountering any significant archaeological resources within the APE is extremely low.

### 3.9.3.3 No Action Alternative

No impacts on cultural resources would be expected under the No Action Alternative.

## 3.9.4 Environmental Protection Measures

In the unlikely event that archaeological resources are discovered during implementation of the Proposed Action, the Ellsworth AFB CRM would ensure the provisions of the Archaeological Resources Protection Act (16 U.S.C. Sections 470aa to 470mm) and 32 CFR Part 229 are followed. These

provisions include protection of any such site from unauthorized damage or vandalism and controlling access to the site. The Base Civil Engineer would stop all demolition in the vicinity of the resource and immediately notify higher headquarters, the SHPO, and appropriate tribal CRMs. The installation CRM would develop an action plan to stabilize and avoid the resources or arrange for the recovery of data through archaeological investigation in consultation with these parties and the demolition team. In the unlikely event that human remains are inadvertently or accidentally discovered during the Proposed Action, the installation CRM would be immediately notified and formal notification, consultation, treatment, and disposition procedures would be followed as outlined in the ICRMP.

## 3.10 Socioeconomic Resources and Environmental Justice

### 3.10.1 Definition of the Resource

***Socioeconomics.*** Socioeconomics is the relationship between economies and social elements such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment can identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the before and after effects of any jobs created or lost as a result of a proposed action. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

***Environmental Justice.*** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and the disproportionate effects that could be imposed on them. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

***Children's Environmental Health and Safety Risks.*** EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each Federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

### 3.10.2 Description of Affected Environment

For the purpose of evaluating baseline socioeconomic conditions, data from three geographic areas will be analyzed: (1) place level data from the City of Box Elder, (2) county level data from Meade and Pennington counties, and (3) state level data from South Dakota. A place is designated by the U.S. Census Bureau as either a legally bounded incorporated town or an area that is composed of a concentration of population that is unincorporated, but locally identified by a name.

***Demographic Characteristics.*** The population in the State of South Dakota grew 8.5 percent from 1990 to 2000 and 6.5 percent from 2000 to 2008. From 1990 to 2000 Pennington County's population

increased 8.9 percent, similar to the State of South Dakota, but from 2000 to 2008 the population in Pennington County grew 11.3 percent, nearly double that of the State of South Dakota during the same time period. Growth in Meade County was robust from 1990 to 2000 at 10.9 percent but from 2000 to 2008 a 1.1 percent decrease in population occurred (U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2008a). Box Elder experienced 6.0 percent growth from 1990 to 2000, slightly less than the State of South Dakota. From 2000 to 2008 Box Elder experienced a 23.8 percent increase in population. **Table 3-11** contains more detailed demographic data (U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2008a, U.S. Census Bureau 2008b).

**Table 3-11. Population Growth from 1990 to 2008**

| Geographic Area | Population | | | Percent Change in Population | |
|---|---|---|---|---|---|
| | 1990 | 2000 | 2008 | 1990 to 2000 | 2000 to 2008 |
| City of Box Elder | 2,680 | 2,841 | 3,517 | 6.0% | 23.8% |
| Meade County | 21,878 | 24,253 | 23,989 | 10.9% | -1.1% |
| Pennington County | 81,343 | 88,565 | 98,533 | 8.9% | 11.3% |
| South Dakota | 696,004 | 754,844 | 804,194 | 8.5% | 6.5% |

Sources: U.S. Census Bureau 1990, 2000, 2008a, 2008b

***Ellsworth AFB.*** Ellsworth AFB is the second largest employer in South Dakota, second only to Avera McKennan Hospital in Sioux Falls and has an estimated annual economic impact of $300 million. The installation supports 8,673 personnel, of which 458 are nonappropriated fund civilians, 516 are appropriated fund civilians, 3,246 are active-duty military members, and 4,453 are dependents. The nonappropriated personnel are employed by the Ellsworth Morale and Recreation fund. The funding for these positions is not appropriated by Congress, but is generated by activities (e.g., childcare facilities and recreational facilities) and grants from the Army and Air Force Exchange Service. According to FY 2008 data, the installation directly employed approximately 4,200 persons. Total payroll for Ellsworth AFB is approximately $163 million and total direct expenditures were an additional $95 million. There are another 1,360 persons indirectly employed as a result of Ellsworth AFB resulting in approximately $43 million in wages for those indirectly employed (EAFB 2006b).

***Employment Characteristics.*** **Table 3-12** contains employment data by industry. The largest industry is the educational, health, and social services industry representing 21.1 percent of those employed in Box Elder, 20.3 percent of those employed in Meade County, and 21.8 percent in Pennington County. The second and third largest industries in these locales are the retail trade industry and the arts, entertainment, recreation, accommodation, and food services industry. The area around Ellsworth AFB has similar employment trends as compared to the State of South Dakota, which has a slightly higher percentage of employees working in the manufacturing job industry when compared to the area around Ellsworth AFB.

***Environmental Justice and Children's Environmental Health and Safety Risks.*** Minority and low-income populations were characterized for the City of Box Elder, Meade County, Pennington County, and South Dakota, **Table 3-13**. The American Indian and Alaskan Native population is high throughout the four geographic areas ranging from 2.0 percent to 8.3 percent compared to the United States average of 0.9 percent. There is also a higher percentage of African American and Hispanic populations in the City of Box Elder when compared to South Dakota percentages. Box Elder also had 15.9 percent of individuals and 13 percent of families living below the poverty level in 2000. The median annual household income in the City of Box Elder is $11,000 less than the South Dakota median income (U.S. Census Bureau 2000).

**Table 3-12. Overview of Employment by Industry, 2000**

| | City of Box Elder | Meade County | Pennington County | South Dakota |
|---|---|---|---|---|
| In armed forces | 3.6% | 8.4% | 1.8% | 0.6% |
| Agriculture, forestry, fishing and hunting, and mining | 2.0% | 7.7% | 2.3% | 8.1% |
| Construction | 7.5% | 7.2% | 7.4% | 6.3% |
| Manufacturing | 10.0% | 7.3% | 9.2% | 11.1% |
| Wholesale trade | 2.1% | 2.3% | 3.1% | 3.3% |
| Retail trade | 14.3% | 14.2% | 14.3% | 12% |
| Transportation and warehousing, and utilities | 3.8% | 7.1% | 4.2% | 4.7% |
| Information | 1.4% | 1.6% | 2.2% | 2.1% |
| Finance, insurance, real estate, and rental and leasing | 4.8% | 6.1% | 7.4% | 7.4% |
| Professional, scientific, management, administrative, and waste management services | 6.0% | 4.0% | 6.8% | 5.0% |
| Educational, health, and social services | 21.1% | 20.3% | 21.8% | 22.0% |
| Arts, entertainment, recreation, accommodation, and food services | 13.2% | 9.5% | 10.2% | 8.3% |
| Other services (except public administration) | 6.5% | 6.0% | 6.0% | 5.1% |
| Public administration | 7.4% | 6.8% | 5.1% | 4.8% |

Source: U.S. Census Bureau 2000

**Table 3-13. Race, Ethnicity, and Poverty Characteristics**

| | City of Box Elder | Meade County | Pennington County | South Dakota |
|---|---|---|---|---|
| White | 83.4% | 86.7% | 92.7% | 88.7% |
| Black or African American | 2.3% | 0.9% | 1.5% | 0.6% |
| American Indian and Alaska Native | 5.6% | 8.1% | 2.0% | 8.3% |
| Asian | 2.1% | 0.9% | 0.6% | 0.6% |
| Native Pacific Islander | 0.1% | 0.1% | 0.1% | 0% |
| Two or More Races | 0.7% | 0.7% | 0.6% | 0.5% |
| Hispanic or Latino | 5.8% | 2.7% | 2.5% | 1.3% |
| Individuals below poverty level | 15.9% | 9.4% | 11.5% | 13.2% |
| Families below poverty level | 13.0% | 7.9% | 8.6% | 9.3% |
| Median Household Income | $32,344 | $36,992 | $37,485 | $43,237 |

Source: U.S. Census Bureau 2000

## 3.10.3 Environmental Consequences

### Evaluation Criteria

***Socioeconomics.*** This section addresses the potential for direct and indirect impacts the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and increases in employment. Similarly, impacts are evaluated to determine if overstimulation of the economy (e.g., housing availability is inadequate to accommodate increases in permanently based workforce) could occur as a result of the Proposed Action.

***Environmental Justice and Children's Environmental Health and Safety Risks.*** Ethnicity and poverty data are examined for the City of Box Elder, Meade County, Pennington County, and South Dakota to determine if a low-income or minority population could be disproportionately affected by the Proposed Action. As discussed in **Section 3.10.2**, minority populations within the City of Box Elder are higher than the other geographic areas.

### 3.10.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

The decommissioning and demolishing of the existing WWTP on Ellsworth AFB would result in the creation of jobs as construction workers would be needed to execute this portion of the Proposed Action. This job creation would result in short-term, minor, direct, beneficial impacts on the construction industry. The increase in the payroll tax revenues, purchase of materials, and purchase of goods and services in the area around Ellsworth AFB would result in short-term, negligible, indirect, beneficial impacts on the local economy. The number of jobs created would not be expected to outstrip the local supply of construction workers, as there are approximately 4,100 construction workers in Meade and Pennington counties. Impacts on demographics would not be expected, as the demolition of the existing WWTP should not require construction workers from outside of the surrounding area to relocate for the decommissioning and the demolition of the WWTP. Environmental justice issues would not be expected to result from the decommissioning and demolition of the existing WWTP as this action will occur on Ellsworth AFB.

### Wastewater Pipeline Easement and Construction

The granting of a sewer pipeline easement to the South Dakota EDA would not result in impacts on socioeconomics or environmental justice. Short-term, minor, adverse impacts would be expected from the construction of the sanitary sewer pipeline, as golfers temporarily would be precluded from using the golf course. Short-term, minor, beneficial effects on the construction industry would be expected from the construction of the sanitary sewer pipeline due to the temporary creation of jobs to execute this portion of the Proposed Action. The increase in the payroll tax revenues, purchase of materials, and purchase of goods and services in the area around Ellsworth AFB would result in short-term, negligible, indirect, beneficial impacts on the local economy. The number of jobs created would not be expected to outstrip the local supply of construction workers, as there are approximately 4,100 construction workers in Meade and Pennington counties. Impacts on demographics would not be expected, as the construction of the wastewater pipeline would not require construction workers from outside of the surrounding area to relocate for the Proposed Action. Environmental justice issues would not be expected to result from the construction of the wastewater pipeline, as this action would occur entirely on Ellsworth AFB.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

The flow of wastewater from Ellsworth AFB to the RWWTP would not result in impacts on socioeconomics as the demographics or the employment characteristics of the area would not be altered as a result of Ellsworth AFB's wastewater contribution to the regional waste stream. Environmental justice issues would not be anticipated as the area around where the RWWTP would be constructed is primarily agricultural and has very low population levels.

### 3.10.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Short-term, minor, beneficial effects on socioeconomic resources would be expected. Instead of increases in employment resulting from the demand for construction workers for the decommissioning and demolition of the existing WWTP, there would be a demand for construction workers to install the necessary infrastructure to continue maintenance on the Ellsworth AFB WWTP. Off-installation minority and low-income populations, limited in size and proximity to the installation, would not be affected by the relatively small-scale construction associated with the WWTP Upgrade Alternative. Therefore, consideration of environmental justice impacts will not be studied in detail.

### 3.10.3.3 No Action Alternative

No impacts on socioeconomic resources would be expected under the No Action Alternative.

## 3.10.4 Environmental Protection Measures

No environmental protection measures have been identified for socioeconomic resources and environmental justice.

# 3.11 Hazardous Materials and Wastes

## 3.11.1 Definition of the Resource

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. §6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries,

hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). USEPA is given authority to regulate these special hazard substances by the Toxic Substances Control Act (TSCA) Title 15 U.S.C. Chapter 53. TSCA Subchapter I identifies PCBs, Subchapter II handles ACMs, and Subchapter IV discusses LBP. USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR Part 763 with additional regulation concerning emissions (40 CFR Part 61). Whether from lead abatement or other activities, depending on the quantity or concentration, the disposal of the LBP waste is potentially regulated by the RCRA at 40 CFR Part 260. The disposal of PCBs is addressed in 40 CFR Parts 750 and 761. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

DOD has developed the ERP, intended to facilitate thorough investigation and cleanup of contaminated sites on military installations. Through the ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed).

For the USAF, AFPD 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all Federal regulations and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards.

### 3.11.2 Description of Affected Environment

***Hazardous Materials and Petroleum Products.*** AFI 32-7086, Hazardous Materials Management, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. As part of the Hazardous Waste Management Plan, Ellsworth AFB has established a hazardous materials pharmacy, also known as the HAZMART, in accordance with AFI 32-7086. The HAZMART ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used. The HAZMART tracks the acquisition and use of these materials through the Environmental Management System. To accomplish the goals of the Environmental Management System, Ellsworth AFB has established the Environmental Leadership Counsel; a collaborative team composed of senior Ellsworth AFB leaders who assign personnel to the Cross Functional Teams to collectively implement the Pollution Prevention Plan (EAFB 2005d).

The Ellsworth AFB WWTP contains hazardous materials (hydrogen sulfide, liquid-gas chlorine, sulfur dioxide, and various corrosive polymers) and petroleum products. One AST is associated with Building 3005 at the WWTP. Tank 3005-2 (which had replaced Tank 3005-1) is a 491-gallon diesel storage tank connected to a 100 kilowatt (kW) emergency generator (EAFB 2008c).

***Hazardous and Petroleum Wastes.*** Ellsworth AFB maintains a Hazardous Waste Management Plan (EAFB 2005d) as directed by AFI 32-7042, Solid and Hazardous Waste Compliance. This plan prescribes the roles and responsibilities of all members of Ellsworth AFB with respect to the waste stream

inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management. Ellsworth AFB is a large-quantity hazardous waste generator (Handler Identification). Building 1908 is the RCRA Part B Permitted Hazardous Waste Storage Facility (USEPA 1971).

The Ellsworth AFB WWTP contains hazardous wastes such as waste oil. One underground storage tank is associated with Building 3015 (O/W separator), which is part of the WWTP. Tank 3015-1 is a 1,000-gallon tank that stores used oil from the O/W separator (EAFB 2008g). Another former O/W separator at Building 1709, northwest of the WWTP near the runway, was removed (EAFB 2008b). There are several other USTs associated with JP-8 and other aircraft activities that are west of the proposed project area.

***Environmental Restoration Program.*** The Defense Environmental Restoration Program (DERP) was formally established by Congress in 1986 to provide for the cleanup of DOD property at active installations, Base Realignment and Closure installations, and formerly used defense sites throughout the United States and its territories. The three restoration programs under the DERP are the Installation Restoration Program (IRP), Military Munitions Response Program (MMRP), and Building Demolition/Debris Removal (BD/DR). The IRP requires each installation to identify, investigate, and clean up contaminated sites. The MMRP addresses nonoperational military ranges and other sites that are suspected or known to contain UXO, discarded military munitions, or munitions constituents. BD/DR involves the demolition and removal of unsafe buildings and structures. Eligible ERP sites include those contaminated by past defense activities that require cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendment and Reauthorization Act (SARA), and certain corrective actions required by RCRA. Non-ERP sites are remediated under the Compliance-Related Cleanup Program. There is one ERP site within the proposed Project area (OU-6). In addition to the one active ERP site, there is one closed ERP site (Waste Pond-[WP] 22) and one Area of Concern (AOC), a former incinerator ash disposal site near Gateway Lake, in the immediate vicinity of the proposed Project area; see **Figure 2-1**.

OU-6 (ERP site LF-06 or Landfill 5) is south of the WWTP. From 1960 to 1980, demolition debris and hardfill materials were placed in the landfill along with miscellaneous refuse, dried sewage sludge, and possibly shop wastes. OU-6 has been tested, and capped, and groundwater long-term monitoring (LTM) has been in place since 1996. OU-6 was deleted from the National Priorities List in December 2006. Contamination in groundwater from this site is addressed in OU-11 (EAFB 2007c). The groundwater component of all ERP OUs at Ellsworth AFB was consolidated into OU-11 in 2005 in order to expedite partial site deletions and possible redevelopment of these areas, as long as the integrity of the remedy is maintained. *In situ* biodechlorination to remediate the groundwater contamination is in use approximately 1.1 miles north of the Ellsworth AFB WWTP. Contaminated groundwater is pumped out of the ground and treated to meet South Dakota drinking water standards. The treated water is then discharged to a local drainage, rerouted to the Ellsworth AFB WWTP, or re-injected into the ground (EAFB 2007c).

An LTM sampling event associated with ongoing groundwater monitoring in April 2009 included collection of groundwater samples for analysis of VOCs at three monitoring wells within or near OU-6. No contaminants were found above respective South Dakota Groundwater Standards. In addition, a landfill cover inspection at OU-6 revealed that the 3-foot landfill cover is in good condition with no issues that require correction (EAFB 2009b).

WP-22 consists of former portions of the existing Ellsworth AFB WWTP that were operated at Ellsworth AFB between 1948 and 1972. The wastewater treatment facility formerly consisted of a two-step chemical and physical treatment of effluent from the flight line shops and pump houses. The first step

consisted of adding ferric sulfate to the incoming effluent causing the coagulation of petroleum-based products. The remaining fluid portion would then be treated with lime to balance the pH of the liquid before releasing it to the natural drainage pathways surrounding the wastewater treatment facility. The coagulated sludge would be periodically removed and placed in the sludge drying beds east of the facility for dewatering. The dried sludge would then be collected and moved to an installation landfill for disposal. An initial remedial investigation was conducted in 1995 resulting in a remedial action plan issued in 1997. Upon completion of the remedial action and subsequent 5 years of monitoring, the site was closed in 2005 (EAFB 2007c); therefore, no impacts related to WP-22 would be expected and this issue is not discussed further in this EA.

The Gateway Lake AOC was identified in a preconstruction geotechnical investigation conducted in 2002. Subsequent historical research revealed that this area was a historic ravine that was used as a disposal area for ash from a nearby incinerator. A remedial investigation was conducted to determine the extent of the waste disposal area and the characteristics of the waste. The electro-magnetic survey revealed a total waste disposal area of approximately 0.33 acres and the associated sampling indicated a thickness between 6 and 7.5 feet. Laboratory analysis of the ash bed samples determined the material did not qualify as a RCRA hazardous waste and could be disposed of as municipal waste. The ash bed was removed in 2007 (EAFB 2007f, EAFB 2006c). Therefore, no impacts would be expected related to the Gateway Lake AOC and this issue is not discussed further in this EA.

***Asbestos-Containing Material.*** Asbestos is regulated by USEPA under the CAA, TSCA, and CERCLA. USEPA has established that any material containing more than 1 percent asbestos by weight is considered an ACM. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is any ACM that does not meet the criteria for friable ACM.

AFI 32-1052, Facilities Asbestos Management, provides the direction for asbestos management at USAF installations. It requires installations to develop an asbestos management plan for the purpose of maintaining a permanent record of the status and condition of ACM in installation facilities, and documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects.

In a survey conducted in 1994, several buildings and structures on the installation were found to contain ACMs. The buildings associated with the Ellsworth AFB WWTP were not included as a part of the 1994 survey (EAFB 1995). The Ellsworth AFB WWTP was constructed in 1943; therefore, despite the lack of an asbestos survey, it is assumed that the WWTP contains ACMs.

***Lead-Based Paint.*** The Residential LBP Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X) regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards. The Federal government banned the use of most LBP in 1978. Therefore, it is assumed that all structures constructed prior to 1978 could contain LBP. The Ellsworth AFB WWTP has not been surveyed for LBP; however, it was constructed in 1943 and therefore could contain LBP.

***Polychlorinated Biphenyls.*** PCBs are a group of chemical mixtures used as insulators in electrical equipment such as transformers and fluorescent light ballasts. Federal regulations govern items containing 50 to 499 ppm PCBs. Chemicals classified as PCBs were widely manufactured and used in the United States throughout the 1950s and 1960s. PCB-containing oil is typically found in older electrical transformers and light fixtures (ballasts). Transformers containing greater than 500 ppm PCBs, between 50 and 500 ppm PCBs, and less than 50 ppm PCB are considered PCB, PCB-contaminated, and non-PCB, respectively.

A survey for PCBs has not been conducted at the Ellsworth AFB WWTP. The fluorescent light ballasts in the buildings, sump pumps at the three lift stations, and any pad-mounted transformers near the WWTP might contain PCBs. Some PCB transformers on the installation were removed in the 1990s. Other items that might contain PCBs include capacitors and surge protectors.

***Pollution Prevention.*** AFI 32-7080, Pollution Prevention Program, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12873, Federal Acquisition, Recycling, and Waste Prevention; and EO 12902, Energy Efficiency and Water Conservation at Federal Facilities. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans, which have management and minimization strategies for ozone-depleting substances (ODSs), USEPA's 17 industrial toxics, hazardous wastes, municipal solid wastes, affirmative procurement of environmentally friendly products, energy conservation, and air and water pollutant reduction. Ellsworth AFB fulfills this requirement with the following plans.

- Pollution Prevention Management Action Plan (EAFB 2006d)
- Environmental Restoration Program (EAFB 2007c)
- Hazardous Waste Management Plan (EAFB 2005d).

## 3.11.3 Environmental Consequences

### Evaluation Criteria

Impacts would be considered significant if a proposed action resulted in worker, resident, or visitor exposure to hazardous materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on hazardous materials management would be considered significant if the Federal action resulted in noncompliance with applicable Federal and SDDENR regulations, or increased the amounts generated or procured beyond current Ellsworth AFB waste management procedures and capacities. Impacts on ERP sites would be considered significant if the Federal action disturbed (or created) contaminated sites resulting in adverse impacts on human health or the environment.

### 3.11.3.1 Proposed Action

### Existing Ellsworth AFB WWTP Decommissioning and Demolition

***Hazardous Materials and Petroleum Products.*** Short-term, minor, direct, adverse and long-term, minor, direct, beneficial effects on hazardous materials management would be expected as a result of decommissioning and demolition of the Ellsworth AFB WWTP. Hazardous materials and petroleum products would be encountered during the decommissioning and demolition of the existing WWTP resulting in short-term, adverse effects. During the decommissioning process, all hazardous materials would be removed and properly disposed of offsite, and the ASTs on the site would be reused elsewhere or properly closed and disposed of offsite in accordance with Federal, state, and USAF regulations. The removal of these hazardous materials would result in long-term, minor, beneficial effects. It is anticipated that the quantity of hazardous materials and petroleum products encountered during demolition activities would be minimal.

Contractors would be responsible for the management of hazardous materials and petroleum product usage, which would be handled in accordance with Federal, state, and USAF regulations. Contractors must report the use of hazardous materials to the HAZMART, including pertinent information (e.g., Material Safety Data Sheets). If a material that is less hazardous can be used, the HAZMART should make these recommendations. Use of the HAZMART would also ensure that ODSs are not

available for use. Use of ODSs in such products as refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request by waiver.

***Hazardous and Petroleum Waste.*** Short-term, minor, direct, adverse effects on hazardous wastes would occur as a result of the decommissioning and demolition of the WWTP. It is anticipated that the quantity of hazardous wastes generated from the proposed decommissioning and demolition activities would be negligible resulting in short-term effects.

No effects on the installation's hazardous waste management program would be expected from the demolition activities. Any residual sludge or waste oil encountered during the demolition of the WWTP facilities would be treated and disposed of by a certified contractor. Hazardous waste disposal and demolition contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the installation's Hazardous Waste Management Plan. BMPs would be followed to ensure that contamination from a spill would not occur. If, however, a spill would occur, the SPCC Plan outlines the appropriate measures for spill situations (EAFB 2005d).

***Environmental Restoration Program.*** No effects on ERP site OU-6 would be expected. ERP site OU-6 is south of the WWTP and it is not expected that the demolition activities would disturb OU-6. The proposed area of effect for the demolition activities does not overlap with the boundary of this ERP site. OU-11 would not be affected by the Proposed Action.

***Asbestos-Containing Materials.*** The existing WWTP might contain ACMs; therefore, short-term, minor, direct, adverse and long-term, minor, indirect, beneficial effects on ACMs would be expected. In accordance with the Asbestos Management Plan, sampling for ACMs would occur prior to demolition and would be disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any ACMs would be short-term in duration and would result in less than significant effects. Any identified asbestos would be separated from the remainder of the demolition materials as required and remediated in accordance with Federal, state, and USAF regulations (EAFB 2005d). Removal of ACM would result in long-term, minor, beneficial effects.

***Lead-Based Paint.*** The existing WWTP might contain LBP; therefore, short-term, minor, direct, adverse and long-term, minor, indirect, beneficial effects on LBP would be expected. In accordance with the LBP Management Plan, sampling for LBP would occur prior to demolition and would be disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any LBP would be short-term in duration and would result in less than significant effects. Any identified LBP would be separated from the remainder of the demolition materials as required and remediated in accordance with Federal, state, and USAF regulations (EAFB 2005d). Removal of LBP would result in long-term, minor, beneficial effects.

***Polychlorinated Biphenyls.*** The existing WWTP might contain light ballasts or sump pumps; therefore, short-term, minor, direct, adverse effects on PCBs would be expected. The light fixtures within the buildings and sump pumps in the three lift stations would be removed prior to demolition and sampled for PCBs. Pad-mounted transformers would also be sampled for PCBs prior to removal or alteration of the utility. If any PCB-containing materials are identified, they would be handled in accordance with Federal and state regulations and the installation's Hazardous Waste Management Plan and be disposed of at a hazardous waste disposal facility (EAFB 2005d). Sampling, removal, and disposal of any PCBs would be short-term in duration and would result in less than significant effects.

***Pollution Prevention.*** Negligible effects on the Pollution Prevention Program at Ellsworth AFB would be expected from implementation of the Proposed Action. Most demolition practices do not call for the use of large quantities of hazardous materials; however, an incremental increase would be expected from

the use of construction equipment during this time. The Pollution Prevention Program and associated plans at Ellsworth AFB would accommodate the Proposed Action. Adherence to these plans, in particular the SPCC Plan, would reduce adverse effects resulting from the Proposed Action. BMPs used at construction sites would minimize effects on the natural environment.

### Wastewater Pipeline Easement and Construction

***Environmental Restoration Program.*** No effects on ERP site OU-6 would be expected from the granting of a pipeline easement to the South Dakota EDA; however, short-term, minor, adverse impacts on the ERP could be expected from construction of the wastewater pipeline. Potential impacts on OU-6 from the construction of the sanitary sewer pipeline could be prevented by adding an additional landfill cap to protect the integrity of the existing 3-foot cap on OU-6.

***Hazardous Materials and Petroleum Products.*** No impacts on hazardous materials and petroleum products would occur as a result of the granting of an easement to the South Dakota EDA. Short-term, minor, direct, adverse impacts on hazardous materials management would be expected as a result of the construction of a sanitary sewer pipeline within the proposed pipeline corridor. Hazardous materials and petroleum products would be used during construction activities. It is anticipated that the quantity of hazardous materials and petroleum products used during construction activities would be minimal.

Contractors would be responsible for the management of hazardous materials and petroleum product usage, which would be handled in accordance with Federal, state, and USAF regulations. Contractors must report the use of hazardous materials to the HAZMART, including pertinent information (e.g., Material Safety Data Sheets). If a material that is less hazardous can be used, the HAZMART should make these recommendations. Use of the HAZMART would also ensure that ODSs are not available for use. Use of ODSs in such products as refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request by waiver.

***Hazardous and Petroleum Waste.*** No impacts on hazardous wastes would occur as a result of the granting of an easement to the South Dakota EDA. Short-term, minor, direct, adverse effects on hazardous wastes would occur as a result of construction of the wastewater pipeline. It is anticipated that the quantity of hazardous wastes generated from the proposed construction activities would be minimal.

No effects on the installation's hazardous waste management program would be expected from the construction activities. Hazardous waste disposal and construction contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, and the installation's Hazardous Waste Management Plan. BMPs would be followed to ensure that contamination from a spill would not occur. If, however, a spill would occur, the SPCC Plan outlines the appropriate measures for spill situations (EAFB 2005d).

***Asbestos-Containing Materials, Lead-Based Paint, and Polychlorinated Biphenyls.*** The proposed sanitary sewer pipeline construction would not require the demolition of existing facilities or infrastructure; therefore, these resources would not be affected by the proposed wastewater pipeline easement and construction at Ellsworth AFB.

***Pollution Prevention.*** No impacts on Ellsworth AFB's Pollution Prevention Program would occur as a result of the granting of an easement to the South Dakota EDA. Short-term, negligible, adverse effects on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of a sanitary sewer pipeline. A minimal increase in the use of hazardous materials and petroleum products would be expected from the use of construction equipment during this time. Adherence to Federal, state, and

USAF pollution prevention laws and regulations, and the implementation of pollution prevention BMPs during construction, would minimize effects from construction activities on the natural environment.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

***Hazardous and Petroleum Waste.*** Long-term, minor, direct, adverse effects on hazardous and petroleum wastes from Ellsworth AFB's wastewater contribution to the regional waste stream would be expected. The wastewater contribution of Ellsworth AFB to the regional waste stream would generate an additional volume of hazardous waste in the form of sludge. Ellsworth AFB is expecting a three-fold increase in the average daily volume of wastewater generated at the installation over the next 20 years (EAFB 2008a). It is anticipated that the RWWTP would have the capacity and means for disposing of the additional volume of hazardous waste created by Ellsworth AFB's contribution.

***Hazardous Materials and Petroleum Products, Environmental Restoration Program, Asbestos-Containing Materials, Lead-Based Paint, Polychlorinated Biphenyls, and Pollution Prevention.*** These resources would not be affected by Ellsworth AFB's wastewater contribution to the regional waste stream.

### 3.11.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

Long-term, minor, indirect, adverse effects on hazardous materials or waste management would be expected as a result of the WWTP Upgrade Alternative. The modification and continued operation of the Ellsworth AFB WWTP would result in minor increases in the existing hazardous materials and waste management volumes. Ellsworth AFB would dispose of increasing volumes of hazardous wastes associated with the wastewater treatment process from future increases in wastewater generation.

### 3.11.3.3 No Action Alternative

No impacts on hazardous materials and wastes would be expected under the No Action Alternative.

## 3.11.4 Environmental Protection Measures

Although there is a low likelihood for construction workers to be exposed to contamination from ERP sites during construction or demolition, it is recommended that a health and safety plan be prepared by the contractor in accordance with OSHA requirements prior to commencement of construction or demolition activities proximate to ERP sites. Should contamination be encountered, handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and Ellsworth AFB programs and procedures. Project planning would include protection of ERP infrastructure such as monitoring wells, treatment systems, and conveyance pipes to avoid disruption of clean-up activities. A clean fill cap could be added to serve as a conduit for a new pipeline. Prior to the start of any construction involving an ERP site, a waiver request must be submitted to Headquarters (HQ) ACC and Air Force Center for Engineering and the Environment (AFCEE) for approval.

# 4. Cumulative and Other Adverse Impacts

## 4.1 Cumulative Effects Analysis

CEQ regulations stipulate that the cumulative effects analysis in an EA should consider the potential environmental effects resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). CEQ guidance in considering cumulative effects affirms this requirement, stating that the first steps in assessing cumulative effects involves defining the scope of the other actions and their interrelationship with a proposed action. The scope must consider other projects that coincide with the location and timetable of a proposed action and other actions. Cumulative effects analyses must also evaluate the nature of interactions among these actions.

To identify cumulative effects, the analysis needs to address two fundamental questions:

1. Does a relationship exist such that affected resource areas of the Proposed Action or alternatives might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
2. If such a relationship exists, then does an EA or EIS reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both timeframe and geographic extent in which effects could be expected to occur, as well as a description of what resources could potentially be cumulatively affected.

### 4.1.1 Projects Identified for Cumulative Effects

***Annexation of Ellsworth AFB.*** In recent years the City of Box Elder has sought to attract businesses to provide economic opportunities and retail and dining options for those living on- and off-installation. Some businesses have declined relocating to the City of Box Elder because population levels in the city were not large enough to meet their requirements. On August 28, 2009, the City of Box Elder annexed the residential areas of Ellsworth AFB. This annexation allowed the City of Box Elder to increase their population and tax revenues in hopes of attracting new businesses (Box Elder undated, Box Elder 2009). The City of Box Elder plans to redevelop, through an agreement with the South Dakota EDA, the former MFH areas of Skyway and Renel Heights into mixed-use developments. Additional changes are also planned for the City of Box Elder in areas south of the installation boundary that are within the APZs associated with the aircraft operations. These changes include potentially relocating the temporary mobile homes east of the golf course area and relocating homes south of the installation to more compatible areas, as these housing areas are within the 75 to 79+ noise zone as indicated in Ellsworth AFB's AICUZ study.

***Military Family Housing.*** The USAF operates and maintains approximately 104,000 MFH units at its installations throughout the United States. More than 38 percent of all units do not meet current modern standards and require either major improvement or replacement. At most installations the demand for adequate on-installation housing exceeds supply. Ellsworth AFB has USAF-owned MFH units in two neighborhoods. These neighborhoods (and their number of MFH units) are Rushmore Heights (183) and Prairie View (100). Both neighborhoods have been renovated within the past 5 years. In addition to the existing occupied neighborhoods, the project footprint includes three additional parcels being considered for housing development. The Black Hills Estates housing area, which contained 500 occupied housing units, was demolished in 2008. HQ ACC proposes to convey 283 MFH units, lease 3 parcels, and

transfer responsibility for providing housing and ancillary supporting facilities at Ellsworth AFB to the Project Owner.

***RWWTP.*** The South Dakota EDA is proposing to construct an RWWTP to serve Ellsworth AFB and the City of Box Elder. Ellsworth AFB and the City of Box Elder are currently faced with upgrading their individual WWTPs to meet more stringent SDSWDS limits imposed by the SDDENR. An engineering feasibility study indicated that it would be more cost effective for an RWWTP to treat Ellsworth AFB's and City of Box Elder's sewage together versus using individual systems (EAFB 2008a). In addition, surrounding communities have a growing need for an RWWTP to provide a means for economic growth and to prevent nitrogen contamination in groundwater from private subsurface disposal systems. Box Elder's demand for wastewater treatment is expected to increase because of expected population growth in the region. The proposed RWWTP would be constructed directly adjacent to the current lagoon wastewater treatment facility in Box Elder. It is assumed that the South Dakota EDA would acquire any core trunk lines that would deliver effluent to the RWWTP.

### 4.1.2 Cumulative Effects

Cumulative effects of implementing the Proposed Action and the projects identified for potential cumulative effects are presented in **Table 4-1**. No significant adverse cumulative effects were identified in the cumulative effects analysis.

## 4.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

***Geological Resources.*** Under the Proposed Action, demolition and pipeline construction activities, such as excavating, would result in some minor soil disturbance. Implementation of BMPs during demolition and construction would limit environmental consequences resulting from these activities. Standard erosion-control means would also reduce environmental consequences related to these characteristics. Although unavoidable, impacts on soils at the installation are not considered significant.

***Hazardous Wastes and Materials.*** Products containing hazardous materials would be used during the proposed demolition of the WWTP and construction of the sanitary sewer pipeline. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Contractors must report use of hazardous materials. Contractors would also be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the Hazardous Waste Management Plan. The potential for construction accidents or spills during fuel handling are unavoidable risks associated with the Proposed Action.

***Energy Resources.*** The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource, for demolition and pipeline construction activities. The use of nonrenewable resources in demolition and construction activities would be unavoidable. Relatively small amounts of energy resources would be committed to the Proposed Action and are not considered significant.

In addition, the Proposed Action and projects identified would be expected to result in long-term, beneficial cumulative effects. The construction of an RWWTP and the upgrade and expansion of the sanitary sewer system on- and off- installation would be expected to have beneficial, cumulative effects on sanitary sewer and wastewater systems. The conveyance of MFH would result in utility system upgrades for several MFH units, which would allow for more efficient energy use and would be expected to have beneficial, cumulative effects on power supply and natural gas supply.

## Table 4-1. Cumulative Effects Summary

| Resource Area | Past Actions | Current Background Activities | Proposed Action | Known Future Actions | Cumulative Effects |
|---|---|---|---|---|---|
| **Land Use** | Ellsworth AFB has been used as a military installation at its current location since the 1940s. Surrounding area of Box Elder has developed but remains mostly rural. | Current land use at proposed site is Outdoor Recreation and surrounding land use types include open space, outdoor recreation, airfield and airfield pavements, and family housing. | Short-term, negligible, adverse impacts and long-term minor beneficial impacts would be expected from decommissioning and demolition of the WWTP. No impacts would be expected from granting an easement as land use would be compatible with existing uses. Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline. No impacts from Ellsworth's contribution to the regional waste stream would be expected. | Long-term, beneficial effects from annexation would be expected, as incompatible uses in APZs would be relocated to more compatible areas. Short-term adverse effects during construction of MFH units from use of construction equipment and possible short-term disruption of adjacent land uses. | No land use changes on Ellsworth AFB would be expected from future actions. Current land uses would remain compatible with adjacent uses. Off-installation construction of an RWWTP would not affect land use on Ellsworth AFB. Short-term disruption of land use off-installation from construction of a sanitary sewer pipeline would be expected. No significant adverse cumulative effects are expected. |
| **Infrastructure and Utilities** | Infrastructure and utilities (including transportation networks) have been well-developed on Ellsworth AFB and in the surrounding urban area. | Most of the utilities and infrastructure systems are in good working condition, supporting the Ellsworth AFB population. However, Ellsworth AFB continues to improve utility and infrastructure systems, as needed. | Short- and long-term, moderate, adverse impacts on water supply would be expected from demolition activities. Short-term, negligible to minor, adverse impacts on sanitary sewer and wastewater systems, liquid fuels, electrical systems, solid waste disposal, storm drainage systems, and transportation would be expected from demolition activities. Long-term, beneficial impacts on storm drainage systems would be expected from demolition activities. No impacts on natural gas systems would be expected.<br>Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected during pipeline construction.<br>No impacts on infrastructure and utilities would be expected from Ellsworth AFB's contribution to the regional wastewater stream. | Short-term, negligible to minor, adverse affects on infrastructure and utilities (including transportation) during construction and demolition activities. Long-term, negligible to minor, adverse effects on infrastructure and utilities (including transportation) from an increase in demand resulting from an increase in personnel. However, the increased demands would not be significant because utility systems would be upgraded, as needed, to meet increased demands. Increases in storm water runoff from increased impermeable surfaces would be offset by the subsequent demolition and removal of aged infrastructure and impermeable surfaces. | Short-term, adverse effects ranging from negligible to minor could occur during construction and demolition activities. Long-term, adverse cumulative effects ranging from negligible to moderate could occur upon completion of the projects due to increases in demand. Long-term, beneficial effects would be expected from upgrading and expanding aged or inefficient utilities and infrastructure. |

| Resource Area | Past Actions | Current Background Activities | Proposed Action | Known Future Actions | Cumulative Effects |
|---|---|---|---|---|---|
| **Noise** | Ambient sound environment has been dominated by activities common to a military installation and aircraft operations. | Ambient sound environment is affected mainly by aircraft operations and vehicle traffic. Noise levels are comparable to a noisy urban residential area. | Short-term, minor, adverse effects on the noise environs would be expected from demolition activities and construction of the pipeline. No impacts on the noise environs would be expected from granting of an easement or from Ellsworth AFB's contribution to the regional waste stream. | Short-term, minor, adverse effects are expected from construction activities related to MFH and an RWWTP. | The noise environment would continue to be comparable to a noisy military aircraft area. No significant adverse cumulative effects expected. |
| **Air Quality** | Ellsworth AFB is within the BHRCI AQCR. Meade and Pennington counties are designated as attainment/unclassifiable for all criteria pollutants. | Air emissions include criteria pollutants and HAP from vehicles and buildings. | Short-term, minor, direct, adverse impacts would be expected from demolition and pipeline construction emissions and land disturbance. No air quality impacts from granting an easement or Ellsworth AFB's contribution to the regional waste stream would be expected. | Short-term, adverse effects would be expected from construction activities. No long-term effects on air quality would be expected. | Air emissions associated with MFH construction, construction associated with annexation activities, and construction of an RWWTP, would not be expected to result in violations of NAAQS or noticeably degrade ambient air quality. No significant adverse cumulative effects expected. |
| **Safety** | Past renovation, demolition, and construction activities have resulted in short-term construction safety risks. | Non-airfield development constrained in CZs and APZs. Explosive Safety Zones, ranges, and ERSZs constrained for safety reasons. | Short-term, negligible to minor, adverse effects from construction safety risks during demolition and new construction would be expected. No impacts from granting an easement or from Ellsworth AFB's contribution to the regional waste stream would be expected. | Continued renovation, demolition, and new construction could cause temporary safety risks. | Construction safety risks would cease beyond completion of demolition and construction. No long-term or significant effects would be expected. |
| **Geological Resources** | Past activities have modified soils. | Demolition of MFH units has resulted in disturbance. | Short-term, negligible to minor, adverse effects would be expected from demolition activities and pipeline construction. No impacts from granting an easement or from Ellsworth AFB's contribution to the regional waste stream would be expected. | Short-term, adverse effects are expected from construction activities.<br>Long-term, adverse effects on soils are expected from increased impervious surfaces associated with MFH units, development of annexed areas, and construction of an RWWTP. | Soils on Ellsworth AFB are intensely modified by previous development activities. Future actions would further disturb soils. No significant adverse cumulative effects expected. |

| Resource Area | Past Actions | Current Background Activities | Proposed Action | Known Future Actions | Cumulative Effects |
|---|---|---|---|---|---|
| **Water Resources** | The WWTP began to discharge into the unnamed tributary in 1943. At that time, flow in the tributary became perennial.<br>Development of Ellsworth AFB has increased impervious surfaces and storm water flow to the various tributaries and impoundments on the installation. | The Prairie Ridge Golf Course exists at the convergence of two perennial streams, one from the base of Gateway Lake (to the northeast of the WWTP) and the other from the WWTP, creating the unnamed tributary to Box Elder Creek. Flow in this tributary is perennial due to effluent from the WWTP.<br>No violations of water quality standards have occurred within the effluent discharged to the unnamed tributary. | Short- and long-term, moderate impacts on water resources would be expected from decommissioning and demolition of the Ellsworth AFB WWTP.<br>Long-term effects from decommissioning would be expected from an alteration of water velocity, quantity, and quality on the tributary currently receiving treated effluent.<br>No impacts would be expected on water resources from granting the pipeline easement. Short-term, minor, adverse impacts on surface water and floodplains would be expected from the construction of the sanitary sewer pipeline.<br>No direct impacts would be expected on water resources from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, long-term, indirect, adverse impacts from the cessation of the discharge of WWTP effluent into the unnamed tributary (resulting in decreased water flow within and downstream of the unnamed tributary) would be expected. | Short-term, adverse effects would be expected from construction activities due to increased storm water runoff, soil erosion, and sedimentation within nearby waterways.<br>Long-term, adverse effects would be expected from creation of additional impervious surfaces upstream of the WWTP in the MFH areas.<br>Long-term, adverse effects on hydrology and water quality in Box Elder Creek from effluent of the RWWTP. Adverse effects could include increased turbidity, channel bank erosion, and an increase in water pollutants (e.g., ammonia, TSS, chlorine). Long-term, adverse effects on water resources could be expected from increased wastewater being piped to the RWWTP from the addition of more than 1,000 people. Long-term, adverse effects on water quality would be expected from the addition of pollutants (e.g., ammonia, TSS, chlorine) in effluent to Box Elder Creek. | Cumulative effects on water quality would be expected from the Proposed Action in combination with various proposed construction projects on- and off-installation. Construction and demolition projects would be expected to increase sedimentation and TSS within Box Elder Creek and its unnamed tributary crossing the project area. Additionally, the increased effluent from Ellsworth AFB would be anticipated to increase pollutants such as TSS, nutrients, and chlorine. However, the implementation of proper BMPs during construction and storm water management after construction would minimize adverse impacts on water quality and cumulative effects are not anticipated to be significant. |

| Resource Area | Past Actions | Current Background Activities | Proposed Action | Known Future Actions | Cumulative Effects |
|---|---|---|---|---|---|
| **Biological Resources** | Ellsworth AFB is a largely developed installation. | The majority of land on Ellsworth AFB is disturbed or improved. Wildlife species on-installation are relatively adapted to living in an urban environment with frequent noise and visual disturbances. There are approximately 45 acres of jurisdictional wetlands on Ellsworth AFB. Jurisdictional wetlands are within the project area. Additional wetlands occur along the main installation drainage and impoundments adjacent to the eastern side of the project area. This drainage receives overland flow, discharge from the WWTP, and water from several culverts. | Short-term, direct, negligible adverse and long-term, negligible to minor, beneficial effects on vegetation and wildlife would be expected from the decommissioning and demolition of the WWTP.<br>Long-term, direct, minor to moderate, adverse effects and indirect, negligible to minor, adverse effects on wetlands to the east of and within the project area would be expected from the decommissioning and demolition of the WWTP.<br>No impacts on vegetation, wildlife, wetlands, or sensitive and protected species would be expected from granting the easement. Short-term, negligible, adverse impacts on vegetation, wildlife, and sensitive and protected species would be expected from the construction of the sanitary sewer pipeline. Short-term, minor, adverse impacts on wetlands would be expected from the construction of the pipeline.<br>No impacts on vegetation and sensitive and protected species would be expected from Ellsworth AFB's contribution to the regional wastewater stream. However, long-term, minor, adverse effects on off-installation wildlife and wetlands could be expected from increased effluent into Box Elder Creek. | Short- and long-term adverse effects on vegetation and wildlife could occur from construction activities and loss of habitat in the former MFH Skyway and Renel Heights and current MFH area. Increased impervious surfaces near the main installation drainage could result in long-term, adverse effects on wetlands. Similar effects could be expected from activities associated with the RWWTP.<br>Long-term, adverse effects on wildlife and wetlands could be expected from increased effluent into Box Elder Creek due to a decrease in water quality. Wetlands along Box Elder Creek downstream of the proposed RWWTP could be beneficially or adversely affected from increased surface water input.<br>Long-term, adverse effects on wildlife would be expected from the addition of more than 1,000 people to the installation due to increased disturbances (e.g., traffic) on the installation. | Various impacts from noise and visual disturbances on wildlife from demolition and pipeline construction activities under the Proposed Action and other on- and off-installation construction projects would be intermittent and short-term. Therefore, no significant cumulative impacts from short-term disturbances would be expected.<br>Increased storm water runoff from development of the former Skyway and Renel Heights areas might negligibly counteract the adverse impacts on wetlands from the Proposed Action. |

| Resource Area | Past Actions | Current Background Activities | Proposed Action | Known Future Actions | Cumulative Effects |
|---|---|---|---|---|---|
| **Cultural Resources** | Ellsworth AFB became operational in 1942. Most of the 1942 structures were demolished in the 1960s and 1970s. | Four World War II- and three Cold War-era buildings were recommended for individual eligibility status for an additional 14 Cold War-era buildings. None of the buildings within this proposed project APE were found to be eligible. No significant archaeological properties exist on Ellsworth AFB. | No effects on architectural or archaeological cultural resources would be expected from decommissioning and demolition of the existing WWTP, granting of an easement, construction of the sanitary sewer pipeline, or Ellsworth AFB's contribution to the regional waste stream. | No effects would be expected from conveying three parcels and constructing MFH units. Future development of Skyway and Renel Heights would not impact cultural resources. | Because no significant archaeological properties exist on-installation and there are few significant historic properties on-installation, no significant adverse cumulative effects are expected. |
| **Socioeconomic Resources and Environmental Justice** | Ellsworth AFB has been a large employer and economic base in the area. | The top employment industry in the surrounding area is the educational, health, and social services industry. | Short-term, minor, beneficial effects would be expected from demolition and construction activities and associated personnel expenditures. No impacts on demographics or environmental justice would be expected from the Proposed Action. | Short-term, minor, beneficial effects are expected from construction expenditures related to MFH and the RWWTP. | Economic expenditures associated with the RWWTP and MFH actions would cumulatively have beneficial socioeconomic effects in the surrounding area. No significant adverse cumulative effects are expected. |
| **Hazardous Materials and Wastes** | Hazardous wastes and materials, ACM, LBP, pesticides, ASTs and USTs, compliance-related clean-up sites, ERP sites, ordnance, and MMRP sites occur at Ellsworth AFB as a result of historic use as a military installation. | Hazardous wastes and materials, ACM, LBP, pesticides, ASTs and USTs, compliance-related clean-up sites, ERP sites, ordnance, and MMRP sites are managed in accordance with USAF and other applicable Federal regulations. | Short-term, minor, adverse effects during demolition activities. Demolition would require use of small quantities of hazardous materials. Demolition of older buildings could uncover ACM and LBP. Short-term, minor, adverse impacts on the ERP, hazardous materials management, and hazardous wastes would be expected from the construction of the pipeline. No impacts on ACM, LBP, and PCBs would be expected from the construction of the pipeline. Short-term, negligible, adverse impacts on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of the pipeline. No impacts on hazardous materials and wastes from granting an easement or from Ellsworth AFB's contribution to the regional waste stream would be expected | Short-term, minor, adverse effects on hazardous materials management could be expected from the use and storage of hazardous materials during construction of the MFH units and mixed-use development in the former MFH areas. | Cumulatively, use of hazardous materials and generation of solid waste would increase with all proposed actions. Handling and disposal of hazardous materials and wastes would be in accordance with USAF and other applicable Federal regulations. No significant adverse cumulative effects are expected. |

## 4.3 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

Impacts as a result of the Proposed Action would occur within the boundaries of the installation. Construction of a sanitary sewer pipeline would cross under Ellsworth Road, but would only be expected to result in temporary effects on transportation. The Proposed Action would not conflict with any applicable off-installation land use ordinances or designated CZs. Development of an RWTTP is consistent with the goals outlined in an MOU between Ellsworth AFB and the City of Box Elder; therefore, no impacts on land use plans would be expected (EAFB undated).

## 4.4 Relationship Between Short-term Use and Long-term Productivity

Short-term uses of the biophysical components of the human environment include direct impacts, usually related to construction activities that occur over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss.

This EA identifies potential short-term adverse effects on the natural environment as a result of demolition and construction activities. These potential adverse effects include noise emissions, air emissions, soil erosion, and storm water runoff into surface water. Decommissioning and demolishing the WWTP would be expected to increase the long-term productivity of the site by returning it to open space and allowing for a more compatible land in the APZ.

## 4.5 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. A commitment of resources is related to use or destruction of nonrenewable resources, and effects that such a loss will have on future generations. For example, if prime farmland is developed there would be a permanent loss of agricultural productivity. Demolition of the existing WWTP involves the irreversible and irretrievable commitment of material resources and energy, land resources, landfill space, and human resources. The impacts on these resources would be permanent.

***Energy Resources.*** Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products (e.g., gasoline and diesel) and electricity. During demolition, gasoline and diesel fuel would be used for the operation of construction vehicles. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

***Landfill Space.*** The generation of demolition debris and subsequent disposal of that debris in a landfill would be an irretrievable adverse impact. Construction contractors would be expected to recycle debris to the maximum extent practicable. If a greater percentage is recycled, then irretrievable impacts on landfills would be reduced. Any waste that is generated by the Proposed Action that is disposed of in a landfill would be considered an irretrievable loss of that landfill space.

***Human Resources.*** The use of human resources for demolition is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities, and is considered beneficial.

# 5. List of Preparers

This EA has been prepared by HDR under the direction of the ACC and Ellsworth AFB. The individuals who contributed to the preparation of this document are listed below.

**Domenick Alario**
B.A. Geography
Years of Experience: 6

**Louise Baxter**
M.P.A. Public Administration
B.S. Political Science
Years of Experience: 19

**Tom Blonkowski**
B.A. Environmental Economics
Years of Experience: 2

**David Brown**
M.A. Anthropology
B.S. Anthropology
A.A. Liberal Arts
Years of Experience: 10

**Jennifer Buzun**
M.S. Environmental Engineering
B.A. Mathematics and Computer Science
Years of Experience: 26

**Marcus Grant**
M.A. Experimental Psychology
B.A. Anthropology and Psychology
Years of Experience: 32

**Daniel Koenig**
B.S. Environmental Policy and Planning
Years of Experience: 5

**David Knowlton**
M.S. Geographic Information Systems and Remote Sensing
B.S. Anthropology/Archaeology
Year of Experience: 5

**Shad Manning**
M.S. Environmental Science
B.A. Paleobiology
B.A. Anthropology
Years of Experience: 4

**Cheryl Myers**
A.A.S. Nursing
Years of Experience: 21

**Jennifer Rose**
M.S. Environmental Science and Policy
B.S. Geology
Years of Experience: 5

**Patrick Solomon**
M.S. Geography
B.A. Geography
Years of Experience: 17

**Elizabeth Vashro**
B.A. Environmental Studies
Years of Experience: 4

**Jeffrey Weiler**
M.S. Resource Economics/Environmental Management
B.A. Political Science
Years of Experience: 36

**Audrey Stuller**
M.S. Environmental Science and Policy
B.S. Wildlife Science
Years of Experience: 5

***THIS PAGE INTENTIONALLY LEFT BLANK***

# 6. References


28 BW 2006 — 28th Bomb Wing (28 BW). 2006. *Final Golf Course Environmental Management Plan Prairie Ridge Golf Course*. United States Air Force Ellsworth Air Force Base Air Combat Command. June 2006.

28 BW 2008 — 28 BW. 2008. *2008 Economic Impact Analysis*. September 2008.

Box Elder 2002 — City of Box Elder. 2002. *City of Box Elder Comprehensive Plan Goals and Policies*. 5 July 2002.

Box Elder 2009 — City of Box Elder. 2009. A Resolution to Clarify the Municipal Boundaries of the City of Box Elder in Meade and Pennington Counties, South Dakota. Box Elder, South Dakota. 17 September 2009.

Box Elder undated — City of Box Elder. Undated. A Study to Determine the Need to Annex a Portion of Ellsworth Air Force Base by the City of Box Elder.

DOE/EIA 2010 — Department of Energy, Energy Information Administration (DOE/EIA). 2010. *State Carbon Dioxide Emissions, Emissions Detail by State, South Dakota*. Available online: <*http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html*>. Accessed 17 December 2010.

EAFB 1994 — Ellsworth Air Force Base (EAFB). 1994. *Wetlands Delineation at Ellsworth Air Force Base, Pennington and Meade Counties, South Dakota*. Prepared for: Ellsworth Air Force Base. Prepared by Mariah Associates, Inc. September 1994.

EAFB 1995 — EAFB. 1995. *Asbestos and Lead-Based Paint Identification Survey Final Report (Volume I of III).* F33615-89-D-4001, Order 0036. June 1995.

EAFB 2001 — EAFB. 2001. *Operations and Maintenance Manual Ellsworth Air Force Base Wastewater Treatment Plant*. November 2001.

EAFB 2002 — EAFB. 2002. *NPDES Outfalls Statement of Basis*. Permit Number: SD-0000281.

EAFB 2004a — EAFB. 2004. W*astewater Treatment Plant Basis Of Design Report, Ellsworth Air Force Base*. Ellsworth Air Force Base, South Dakota. October 2004.

EAFB 2004b — EAFB. 2004. *Wastewater Treatment Facilities Plan, Ellsworth Air Force Base*. Rapid City, South Dakota. March 2004.

EAFB 2005a — EAFB. 2005. *Ellsworth AFB Recycling Program Pamphlet.* 22 September 2005.

EAFB 2005b — EAFB. 2005. *Integrated Natural Resources Management Plan (INRMP) for Ellsworth Air Force Base and Badlands Bombing Range, South Dakota*. December 2005.

EAFB 2005c — EAFB. 2005. *Integrated Cultural Resources Management Plan (ICRMP).* July 2005.

EAFB 2005d — EAFB. 2005. *Hazardous Waste Management Plan.* May 2005.

EAFB 2006a — EAFB. 2006. *Ellsworth GeoBase. Ellsworth AFB Road Map.* October 2006.

EAFB 2006b — EAFB. 2006. *Ellsworth Air Force Base Economic Impact Analysis Fiscal Year 2006.*

EAFB 2006c — EAFB. 2006. *Work Plan For Excavation and Disposal of Ash and Debris, Gateway Lake Area*. April 2006.

EAFB 2006d EAFB. 2006. *Pollution Prevention Management Action Plan.* November 2006.

EAFB 2007a EAFB. 2007. *Electronic General Plan, 95 percent Submittal*. Prepared by HB&A. January 2007.

EAFB 2007b EAFB. 2007. *Ellsworth AFB Draft: Special Flood Hazard Areas Map.* 26 September 2007.

EAFB 2007c EAFB. 2007. *Ellsworth Air Force Base Environmental Restoration Program Site Summaries.* December 2007.

EAFB 2007d EAFB. 2007. Update to the *Integrated Cultural Resources Management Plan (ICRMP).*

EAFB 2007e EAFB. 2007. Ellsworth AFB Historic Site Inventory. Prepared by J.M. Waller. February 2007.

EAFB 2007f EAFB. 2007. *Ash Removal at Gateway Lake Site - Revised Report*. Prepared by EarthTech for Ellsworth AFB. 30 April 2007.

EAFB 2008a EAFB. 2008. *Feasibility Study for Regional Wastewater Treatment Facility*. March 2008.

EAFB 2008b EAFB. 2008. Air Force Form 1462, *Water Pollution Control Utility Operating Log*. January-December 2008.

EAFB 2008c EAFB. 2008. General Plan for Ellsworth AFB. Ellsworth AFB, South Dakota.

EAFB 2008d EAFB. 2008. *Environmental Assessment for Wherry Land, Ellsworth Air Force Base.* 1 December 2008.

EAFB 2008e EAFB. 2008. *Air Installation Compatible Use Zone (AICUZ) Study*. October 2008.

EAFB 2008f EAFB. 2008. Ellsworth Air Force Base History. Available online: <*http://www.ellsworth.af.mil/library/history.asp*>. Accessed January 24, 2008.

EAFB 2008g EAFB. 2008. *Ellsworth Air Force Base Underground Storage Tank (UST) Database. UST Records and Related Documents.* 1991-2008.

EAFB 2009a EAFB. 2009. *Ellsworth Air Force Base Guide.* Available online: <*http://www.mybaseguide.com/air-force/ellsworth-afb/history.aspx*>. Accessed 3 November 2009.

EAFB 2009b EAFB. 2009. *Draft Long Term Monitoring Data Report, ACC 4-Base PBC.* Ellsworth Air Force Base, South Dakota. August 2009.

EAFB 2009c EAFB. 2009. Air Force Form 1462, *Water Pollution Control Utility Operating Log*. January-September 2009.

EAFB 2009d EAFB. 2009. *Preliminary Draft Storm Water Pollution Prevention Plan, 2009 Update*.

EAFB 2009e EAFB. 2009. AF Form 1462. *Water Pollution Control Utility Operating Log*.

EAFB undated EAFB Undated. Memorandum of Understanding Joint Goals for Ellsworth Air Force Base and the City of Box Elder.

FHWA 1980 — Federal Highway Administration (FHWA). 1980. "Caltrans Noise Manual." March 1980. Available online: <*http://www.dot.ca.gov/hq/research/researchreports/1978-1980/80-07.pdf*>. Accessed 30 October 2008.

FICON 1992 — Federal Interagency Committee on Noise (FICON). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues*. August 1992.

Hoffman 2009 — Hoffman, Karen. 2009. Personal Communication between Karen Hoffman, Ellsworth AFB Real Property Office and Daniel Koenig and Patrick Solomon of HDR. 10 November 2009.

Landguth 2009 — Landguth, Scott. 2009. Personal Communication between Scott Landguth, Incentive Consulting, Contractor to South Dakota Ellsworth Economic Development Authority and Patrick Solomon, Daniel Koenig, and Jennifer Buzun of HDR. 20 October 2009.

Meade County 2009 — Meade County. 2009. *Meade County Comprehensive Plan*. June 2009.

Miller 2009 — Miller, Todd. 2009. Personal Communication between Todd Miller, Chief WWTP Operator, and Jennifer Buzun of HDR. 1 December 2009.

NRCS 2009 — Natural Resource Conservation Service (NRCS). 2009. "Web Soil Survey." Available online: <*http://webbsoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx*>. Accessed 4 November 2009.

Pennington County 2003 — Pennington County. 2003. *Pennington County Comprehensive Plan*. August 2003.

SDDENR 2007 — South Dakota Department of Environment and Natural Resources (SDDENR). 2007. *South Dakota Department of Environment and Natural Resources Minor Air Quality Permit.* November 27, 2007.

SDDENR 2009 — SDDENR. 2009. *Ambient Standards.* <*http://denr.sd.gov/des/aq/monitoring/ambientstandards.aspx*>. Accessed 8 December 2009.

SDDENR 2010 — SDDENR. 2010. *Surface Water Discharge Permit Authorizing Discharge Under the South Dakota Surface Water Discharge System. Ellsworth AFB.* Permit No: SD0000281. 1 January 2010.

SDNHP 2008 — South Dakota Natural Heritage Program (SDNHP). 2008. *Rare, Threatened or Endangered Animals Tracked by the South Dakota Natural Heritage Program*. Last updated 29 December 2008. Available online: <*http://www.sdgfp.info/Wildlife/Diversity/RareAnimal.htm*>. Accessed 17 November 2009.

State of South Dakota 2009 — State of South Dakota. 2009. House Bill No. 1301. Eighty-Fourth Session Legislative Assembly, 2009. 4 February 2009.

Styles 2009 — Styles, Jerry. 2009. Personal Communication between Jerry Styles, USAF ACC 28 CES/CEANC and Jennifer Buzun of HDR. 1 December 2009.

Styles 2010 — Styles, Jerry. 2010. Personal Communication between Jerry Styles, USAF ACC 28 CES/CEANC and Dan Koenig of HDR. 18 February 2010.

U.S. Census Bureau 1990 — U.S. Census Bureau. 1990. "American Fact Finder". Available online: <*http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_tabId=DEC2&_submenuId=datasets_1&_lang=en&_ts=203863707222*>. Accessed 30 November 2009.

U.S. Census Bureau 2000 — U.S. Census Bureau. 2000. "American Fact Finder." Available online: <*http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=&_lang=en&_ts=*>. Accessed 30 November 2009.

U.S. Census Bureau 2008a — U.S. Census Bureau. 2008. "American Fact Finder." Available online: <*http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=P*EP>. Accessed 30 November 2009.

U.S. Census Bureau 2008b — U.S. Census Bureau. 2008. "Table 4: Annual Estimates of the Resident Population for Incorporated Places in South Dakota, Listed Alphabetically: April 1, 2000 to July 1, 2008". Available online: <*www.census.gov/popest/cities/tables/SUB-EST2008-04-46.xls*>. Accessed 1 December 2009.

USEPA 1971 — U.S. Environmental Protection Agency (USEPA). 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. 31 December 1971.

USEPA 1974 — USEPA. 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Publication No. 550/9-74-004. Washington D.C. March 1974.

USEPA 2002a — USEPA. 2009. Part 81 - Designation of Areas for Air Quality Planning Purposes - Table of Contents, Subpart C – Section 107 Attainment Status Designations, Sec. 81.342, South Dakota. Available online: <*http://edocket.access.gpo.gov/cfr_2002/julqtr/40cfr81.342.htm*>. Accessed 8 December 2009.

USEPA 2002b — USEPA. 2002. AirData Tier Report for Black Hills-Rapid City Intrastate Air Quality Control Region, South Dakota. Available online: <*http://www.epa.gov/air/data/geosel.html*>. Accessed 8 December 2009.

USEPA 2003 — USEPA. 2003. *Estimated 2003 Building-Related Construction and Demolition Materials Amounts*.

USEPA 2010 — USEPA. 2010. *National Ambient Air Quality Standards (NAAQS)*. Available online: <*http://www.epa.gov/air/criteria.html*>. Accessed 17 December 2010.

USFS 1994 — U.S. Forest Service (USFS). 1994. *Ecological Subregions of the United States*. WO-WSA-5. Compiled by W. Henry McNab and Peter E. Avers. Prepared in Cooperation with Regional Compilers and the ECOMAP Team of the Forest Service. July 1994.

USGS undated — U.S. Geological Survey (USGS). Undated. "Interior Plains Region." Available online: <*http://vulcan.wr.usgs.gov/LivingWith/VolcanicPast/Notes/interior_plains*>. Accessed 13 November 2009.

# APPENDIX A

## SOUTH DAKOTA HOUSE BILL 1301

# State of South Dakota

**EIGHTY-FOURTH SESSION**
**LEGISLATIVE ASSEMBLY, 2009**

400Q0402

## HOUSE BILL NO. 1301

Introduced by: The Committee on State Affairs at the request of the Office of the Governor

FOR AN ACT ENTITLED, An Act to create the South Dakota Ellsworth Development Authority.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF SOUTH DAKOTA:

Section 1. There is created the South Dakota Ellsworth Development Authority, a body corporate and politic, with such duties and powers as are set forth in this Act to carry out the provisions of this Act. The authority is hereby constituted an independent public instrumentality exercising essential public functions.

Section 2. The authority shall consist of seven members appointed by the Governor with the advice and consent of the Senate. The terms for the initial appointments shall be as follows: three members shall serve three years, two members shall serve two years, and two members shall serve one year. Not all of the members may be of the same political party. One of the members shall be designated by the Governor as chair. The members shall elect from among their number such other officers as they may determine. The Governor may remove any member of the board for cause.

Section 3. The authority is attached to the Department of Tourism and State Development

225 copies of this document were printed by the South Dakota Legislative Research Council at a cost of $.04 per page.

for reporting purposes. The authority shall submit such records, information, and reports in the form and at such times as required by the secretary of the Department of Tourism and State Development. However, the authority shall report to the Governor at least annually.

Section 4. All appointments to the authority after the initial appointments shall be made for a four-year term. Each member's term of office shall expire on the applicable third Monday in January, but the member shall continue to hold office until a successor is appointed and qualified. Any vacancy in the authority shall be filled by appointment for only the balance of the unexpired term. A majority of the members of the authority constitutes a quorum.

Section 5. No member of such authority may receive any compensation for services rendered under this Act. However, members shall be reimbursed for necessary expenses incurred in connection with duties and powers prescribed by this Act.

Section 6. The authority may employ agents and employees necessary to carry out the duties and purposes of the authority.

Section 7. The authority may exercise the following powers:

(1) Protect and promote the economic impact of Ellsworth Air Force Base and associated industry;

(2) Have perpetual succession as a body politic and corporate exercising essential public functions;

(3) Sue and be sued in its own name;

(4) Have an official seal and alter the seal at will;

(5) Maintain an office at such places within the state as the authority may designate;

(6) Make and execute contracts and all other instruments necessary or convenient for the performance of its duties and the exercise of its powers and functions under this Act;

(7) Borrow money and accept gifts;

(8) Apply for and use gifts, grants, or loans of money or other property from the United States, the state, a unit of local government, or any person for any authority purposes and enter into agreements required in connection therewith;

(9) Hold, use, and dispose of such moneys or property for any authority purposes in accordance with the terms of the gift, grant, loan, or agreement;

(10) Employ fiscal consultants, engineers, attorneys, management service providers, and such other consultants and employees as may be required and contract with agencies of the state to provide staff and support services;

(11) Procure insurance against any loss in connection with its property and other assets, including loans, bonds, and notes in such amounts and from such insurers as it may deem advisable;

(12) Hold, control, and acquire by donation or purchase any public easements, dedications to public use, platted reservations for public purposes, or any reservations for those purposes authorized by this Act and make use of such easements, dedications, or reservations for any of the purposes authorized by this Act;

(13) Lease as lessor or lessee to or from any person, firm, limited liability company, corporation, association or body, public or private, any projects of the type that the authority may undertake and facilities or property of any nature for the use of the authority to carry out any of the purposes authorized by this Act;

(14) Borrow money and issue bonds, certificates, warrants, notes, or other evidence of indebtedness as provided by this Act;

(15) Procure insurance, letters of credit, guarantees, or other credit enhancement arrangements from any public or private entities, including any department, agency, or instrumentality of the United States or the state, for payment of all or any portion

of any bonds issued by the authority, including the power to pay premiums, fees, or other charges on any such insurance, letters of credit, guarantees, or credit arrangements;

(16) Receive and accept from any source financial aid or contributions of moneys, property, labor, or other things of value to be held, used, and applied to carry out the purposes of this Act subject to the conditions upon which the grants or contributions are made, including gifts or grants from any department, agency, or instrumentality of the United States for any purpose consistent with the provisions of this Act;

(17) To the extent permitted under its contract with the holders of bonds of the authority, consent to any modification with respect to the rate of interest, time, and payment of any installment of principal or interest, or any other term of any contract, loan, loan note, loan note commitment, contract, lease, or agreement of any kind to which the authority is a party;

(18) Make loans and grants to, and enter into financing agreements with, any governmental agency or any person for the costs incurred in connection with the development, construction, acquisition, improvement, maintenance, operation, or decommissioning of any facilities, or for the maintenance of the physical or structural integrity of real or personal property incorporated or which may be incorporated into such facilities, in accordance with a written agreement between the authority and such governmental agency or person. However, no such loan or grant may exceed the total cost of such facilities as determined by the governmental agency or person and approved by the authority;

(19) Cooperate with and exchange services, personnel, and information with any governmental agency;

(20) Enter into agreements for management on behalf of the authority of any of its properties upon such terms and conditions as may be mutually agreeable;

(21) Sell, exchange, lease, donate, and convey any of its properties whenever the authority finds such action to be in furtherance of the purposes for which it was organized;

(22) Acquire, construct, develop, maintain, hold, lease, license, operate, dispose of, or decommission real and personal property projects, facilities, or any undertaking necessary for establishing compatible land use, as provided for in subdivision 50-10-32(2), around Ellsworth Air Force Base, or generally suitable for protecting or promoting the economic impact on the state of Ellsworth Air Force Base and related industries;

(23) Indemnify any person or governmental agency for such reasonable risks as the authority deems advisable if the indemnification is a condition of a grant, gift, or donation to the authority. However, any such obligation to indemnify may only be paid from insurance or from revenues of the authority, and such obligation does not constitute a debt or obligation of the State of South Dakota;

(24) Acquire, by condemnation under power of eminent domain in accordance with chapter 21-35, any property adjacent to or in the immediate vicinity of Ellsworth Air Force Base that falls within a controlled compatible land use area defined in subdivision 50-10-32(3), or private property that falls within the boundaries of Ellsworth Air Force Base, but only as necessary for the authority's purposes pertaining to establishing compatible land use as defined in subdivision 50-10-32(2), or as provided for in the 1994 Department of Defense approved Ellsworth Air Force Base Air Installation Compatible Use Zone Study;

(25) Cooperate with, or contract with, other governmental agencies as may be necessary,

convenient, incidental, or proper in connection with any of the powers, duties, or purposes authorized by this Act;

(26) Construct, purchase, sell, license, lease, or operate a bulk wastewater treatment facility and pipelines necessary to contract for bulk treatment of wastewater generated by Ellsworth Air Force Base or other authorized sewer utilities generating wastewater in the Box Elder Creek watershed;

(27) Exercise such power over property controlled by the authority as is necessary or expedient for the promotion of health and safety; and

(28) Do any act and execute any instrument which in the authority's judgment is necessary or convenient to the exercise of the powers granted by this Act or reasonably implied from it.

Section 8. The authority may invest in the following:

(1) Bonds, notes, certificates of indebtedness, treasury bills, or other securities constituting direct obligations of, or obligations the principal of and interest on which are fully guaranteed or insured by, the United States of America;

(2) Obligations issued by, or obligations, the principal of and interest on which, are fully guaranteed or insured by, any agency or instrumentality of the United States of America;

(3) Certificates of deposit or time deposits constituting direct obligations of any bank which is a qualified public depository or any savings and loan association which is a savings and loan depository under the Public Deposit Insurance Act pursuant to chapter 4-6A, unless sufficient volume of such certificates is not available at competitive interest rates. In that event, the authority may purchase non-collateralized direct obligations of any bank or savings institution or holding company if such

institution or holding company is rated in one of the highest two quality categories by a nationally recognized rating agency;

(4) Obligations of any solvent insurance company or other corporation or business entity existing under the laws of the United States or any state thereof, if the obligation of the insurance company or other corporation or business entity is rated in one of the two highest classifications established by a standard rating service of insurance companies or a nationally recognized rating agency;

(5) Short term discount obligations of the Federal National Mortgage Association;

(6) Obligations issued by any state of the United States or any political subdivision, public instrumentality, or public authority of any state of the United States, which obligations are not callable before the date the principal of the obligation will be required to be paid and which obligations are fully secured as to both sufficiency and timely payment by, and payable solely from, securities described in subdivision (1) and which obligations are rated in the highest investment classification by at least two standard rating services of such obligations;

(7) An account with the State Investment Council.

Any securities may be purchased at the offering or market price of the security at the time of the purchase. Any security so purchased shall mature or be redeemable on a date or dates prior to the time when, in the judgment of the authority, the funds so invested will be required for expenditure. The express judgment of the authority as to the time when any funds will be required for expenditure or be redeemable is final and conclusive. Investment in any obligation enumerated in this section may be made either directly or in the form of securities of, or other interests in, an investment company registered under the Federal Investment Act of 1940, whose shares are registered under the Federal Securities Act of 1933, and whose investments are

limited to these obligations.

Section 9. The authority may issue revenue bonds, notes, or other evidences of indebtedness to pay the cost incurred in connection with developing, constructing, acquiring, improving, maintaining, operating, and decommissioning projects. For the purpose of evidencing the obligations of the authority to repay any money borrowed, the authority may, pursuant to resolution, from time to time issue and dispose of its interest bearing revenue bonds, notes, or other instruments and may also from time to time issue and dispose of such bonds, notes, or other instruments to refund, at maturity, at a redemption date or in advance of either, any revenue bonds, notes, or other instruments pursuant to redemption provisions or at any time before maturity. Any such revenue bonds, notes, or other instruments shall be payable solely from the revenues or income to be derived with respect to such projects, from the leasing or sale of such projects, or from any other funds available to the authority for such purposes. The revenue bonds, notes, or other instruments may bear such date or dates, may mature at such time or times not exceeding forty years from their respective dates, may bear interest at such rate or rates, may be in such form, may carry such registration privileges, may be executed in such manner, may be payable at such place or places, may be made subject to redemption in such manner and upon such terms, with or without premium as is stated on the face thereof, may be authenticated in such manner, and may contain such terms and covenants as may be provided by an applicable resolution.

Section 10. Any holder of any revenue bonds, notes, or other instruments issued by the authority may bring suits at law or proceedings in equity to compel the performance and observance by any person or by the authority or any of its agents or employees of any contract or covenant made with the holders of such revenue bonds, notes, or other instruments, to compel such person or the authority or any of its agents or employees to perform any duties required to

be performed for the benefit of the holders of any such revenue bonds, notes, or other instruments by the provision of the resolution authorizing their issuance and to enjoin such person or the authority or any of its agents or employees from taking any action in conflict with any such contract or covenant.

Section 11. If the authority fails to pay the principal of, or interest on, any of the revenue bonds or premium, if any, as the principal or interest becomes due, a civil action to compel payment may be instituted in circuit court by the holder or holders of the revenue bonds on which such default of payment exists or by an indenture trustee acting on behalf of such holders. Delivery of a summons and a copy of the complaint to the chair of the authority constitutes sufficient service to give the circuit court jurisdiction of the subject matter of such a suit and jurisdiction over the authority and its officers named as defendants for the purpose of compelling such payment.

Section 12. Notwithstanding the form and tenor of any such revenue bond, note, or other instrument and in the absence of any express recital on the face of any such revenue bond, note, or other instrument that it is nonnegotiable, any such revenue bond, note, and other instrument is a negotiable instrument. Pending the preparation and execution of any such revenue bond, note, or other instrument, a temporary revenue bond, note, or instrument may be issued as provided by resolution.

Section 13. To secure the payment of any revenue bond, note, or other instrument, the revenues to be received by the authority from a lease agreement or loan agreement shall be pledged, and, for the purpose of setting forth the covenants and undertakings of the authority in connection with the issuance thereof and the issuance of any additional revenue bond, note, or other instrument payable from such revenue, income, or other fund to be derived from any facilities, the authority may execute and deliver a trust agreement. A remedy for any breach or

default of the terms of any such trust agreement by the authority may be by mandamus proceedings in circuit court to compel the performance and compliance with the trust agreement, but the trust agreement may prescribe by whom or on whose behalf the action may be instituted.

Section 14. Any revenue bonds or notes shall be secured as provided in the authorizing resolution which may, notwithstanding any other provision of this Act, include in addition to any other security, a specific pledge or assignment of and lien on, or security interest in, any or all revenues or money of the authority from whatever source that may by law be used for debt service purposes and a specific pledge or assignment of, and lien on, or security interest in, any funds or accounts established or provided for by resolution of the authority authorizing the issuance of any such revenue bond, note, or other instrument. Any pledge made by the authority of revenues or other moneys received or to be received by the authority pursuant to an agreement with a governmental agency relating to a project to pay any revenue bond, note, or other evidence of indebtedness of the authority is binding from the time the pledge is made. Revenues and other moneys received or to be received by the authority pursuant to an agreement with a governmental agency relating to a project so pledged to pay any revenue bond, note, or other evidence of indebtedness of the authority shall be held outside of the state treasury and in the custody of the authority or a trustee or a depository appointed by the authority. Revenues or other moneys received or to be received by the authority pursuant to an agreement with a governmental agency relating to a project so pledged to pay any revenue bond, note, or other evidence of indebtedness of the authority and thereafter received by the authority or such trustee or depository shall immediately be subject to the lien of the pledge without any physical delivery thereof or further act, and the lien of any pledge is binding against all parties having claims of any kind of tort, contract, or otherwise against the authority or the State of South Dakota, irrespective of whether the parties have notice thereof. Neither the resolution nor any other

instrument by which a pledge is created need be filed or recorded except in the records of the authority.

Section 15. The State of South Dakota pledges to and agrees with the holders of the revenue bonds and notes of the authority issued pursuant to this Act that the state will not limit or decrease the rights and powers vested in the authority by this Act so as to impair the terms of any contract made by the authority with such holders or in any way impair the rights and remedies of such holders until such revenue bonds, notes, or other instruments, together with interest thereon, with interest on any unpaid installments of interest, and all costs and expenses in connection with any action or proceedings by or on behalf of such holders, are fully met and discharged. The authority may include these pledges and agreements of the state in any contract with the holders of revenue bonds, notes, or other instruments issued pursuant to this section.

Section 16. Nothing in this Act may be construed to authorize the authority to create a debt of the state within the meaning of the Constitution or statutes of South Dakota and all revenue bonds, notes, and other instruments and obligations issued by the authority pursuant to the provisions of this Act are payable and shall state that they are payable solely from the funds pledged for their payment in accordance with the resolution authorizing their issuance or in any trust indenture or mortgage or deed of trust executed as security therefor. The state is not liable for the payment of the principal of, or interest on, any bonds, notes, instruments, or obligations issued by the authority or for the performance of any pledge, mortgage, obligation, or agreement of any kind whatsoever which may be undertaken by the authority. No breach of any such pledge, mortgage, obligation, or agreement may impose any pecuniary liability upon the state or any charge upon its general credit or against its taxing power.

Section 17. The state and all counties, municipalities, political subdivisions, public bodies, public officers, banks, bankers, trust companies, savings banks and institutions, building and

loan associations, savings and loan associations, personal representatives, conservators, trustees, and other fiduciaries may legally invest any debt service funds, money, or other funds belonging to them or within their control in any bonds or notes issued pursuant to this Act.

Section 18. Any documentary material or data made or received by the authority for purposes under this Act, to the extent that such material or data consists of trade secrets, scientific or technical secrets, matters involving national security, or commercial or financial information regarding the operation of a business, may not be considered public records, and are exempt from disclosure. Any discussion or consideration of such information, any discussion of personnel matters, and any discussion of strategy related to any contract negotiation, may be held by the authority in executive session.

Section 19. The authority may acquire title to any project with respect to which it exercises its authority.

Section 20. The provisions of § 5-2-19 do not apply to real or personal property given to the authority.

Section 21. The authority shall designate a qualified public depository as defined in § 4-6A-1 as a depository of its money. Those depositories shall be designated only within the state and upon condition that bonds approved as to form and surety by the authority and at least equal in amount to the maximum sum expected to be on deposit at any one time shall be first given by the depositories to the authority, those bonds to be conditioned for the safekeeping and prompt repayment of the deposits. If any of the funds of the authority are deposited by the treasurer in any such depository, the treasurer and the sureties on the treasurer's official bond are, to that extent, exempt from liability for the loss of any of the deposited funds by reason of the failure, bankruptcy, or any other act or default of the depository. However, the authority may accept assignments of collateral by any depository of its funds to secure the deposits to the same

extent and conditioned in the same manner as assignments of collateral are permitted by law to secure deposits of the funds consistent with the provisions of chapter 4-6A.

Section 22. The income of the authority and all land, improvements, equipment, fixtures, or other property interests owned by the authority are exempt from all taxation in the State of South Dakota. The authority is exempt from the provisions of chapter 47-31B.

Section 23. Notwithstanding any other provisions of law, all funds received by the authority shall be set forth in an informational budget as described in § 4-7-7.2.

Section 24. The authority may enter into intergovernmental agreements with any governmental agency.

Section 25. The authority may share employees with governmental agencies.

*THIS PAGE INTENTIONALLY LEFT BLANK*

# APPENDIX B

## APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

# Appendix B

# Applicable Laws, Regulations, Policies, and Planning Criteria

When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. In addition to the National Environmental Policy Act (NEPA), there are other environmental laws and Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

*NOTE: This is not a complete list of all applicable laws, regulations, policies, and planning criteria potentially applicable to documents, however, it does provide a general summary for use as a reference.*

## Airspace Management

Airspace management procedures assist in preventing potential conflicts or accidents associated with aircraft using designated airspace in the United States, including restricted military airspace. Airspace management involves the coordination, integration, and regulation of the use of airspace. The Federal Aviation Administration (FAA) has overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and air traffic control (ATC) procedures. All military and civilian aircraft are subject to Federal Aviation Regulations (FARs). The FAA's *Aeronautical Informational Manual* defines the operational requirements for each of the various types or classes of military and civilian airspace.

Some military services have specific guidance for airspace management. For example, airspace management in the U.S. Air Force (USAF) is guided by Air Force Instruction (AFI) 13-201, *Air Force Airspace Management*. This AFI provides guidance and procedures for developing and processing special use airspace (SUA). It covers aeronautical matters governing the efficient planning, acquisition, use, and management of airspace required to support USAF flight operations. It applies to activities that have operational or administrative responsibility for using airspace, establishes practices to decrease disturbances from flight operations that might cause adverse public reaction, and provides flying unit commanders with general guidance for dealing with local problems. The U.S. Army, per Army Regulation (AR) 95-2, *Airspace, Airfields/Heliport, Flight Activities, Air Traffic Control and Navigational Aids*, provides similar guidance and procedures for U.S. Army airspace operations.

## Noise

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The U.S. Department of Housing and Urban Development (HUD), in coordination with the Department of Defense (DOD) and the FAA, has established criteria for acceptable noise levels for aircraft operations relative to various types of land use.

The U.S. Army, through AR 200-1, *Environmental Protection and Enhancement*, implements Federal laws concerning environmental noise form U.S. Army activities. The USAF's Air Installation Compatible Use Zone (AICUZ) Program, (AFI 32-7063), provides guidance to air bases and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near USAF installations.

## Land Use

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activities occurring on a defined parcel of land. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories.

Land use planning in the USAF is guided by *Land Use Planning Bulletin, Base Comprehensive Planning* (HQ USAF/LEEVX, August 1, 1986). This document provides for the use of 12 basic land use types found on a USAF installation. In addition, land use guidelines established by the HUD and based on findings of the Federal Interagency Committee on Noise (FICON) are used to recommend acceptable levels of noise exposure for land use. The U.S. Army uses the 12 land use types for installation land use planning, and these land use types roughly parallel those employed by municipalities in the civilian sector.

## Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation's air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQS) which regulate carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to utilize financial and technical assistance and leadership from the Federal government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by the USEPA as being in attainment or nonattainment for pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCRs). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassified. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction and long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency could also be subject to USEPA's Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states all Federal agencies will comply with all Federal- and state-approved requirements.

The General Conformity Rule requires that any Federal action meet the requirements of a State Implementation Plan (SIP) or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to Federal actions that are considered "regionally significant" or where the total emissions from the action meet or exceed the *de minimis* thresholds presented in 40 CFR 93.153. An action is regionally significant when the total nonattainment

pollutant emissions exceed 10 percent of the AQCR's total emissions inventory for that nonattainment pollutant. If a Federal action does not meet or exceed the *de minimis* thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

### Health and Safety

Human health and safety relates to workers' health and safety during demolition or construction of facilities, or applies to work conditions during operations of a facility that could expose workers to conditions that pose a health or safety risk. The Federal Occupational Safety and Health Administration (OSHA) issues standards to protect persons from such risks, and the DOD and state and local jurisdictions issue guidance to comply with these OSHA standards. Safety also can refer to safe operations of aircraft or other equipment.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program,* implements Air Force Policy Directive (AFPD) 91-3, *Occupational Safety and Health,* by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements.

AFI 91-202, *USAF Mishap Prevention Program*, implements AFPD 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information.

U.S. Army regulations in AR 385-10, *Army Safety Program,* prescribe policy, responsibilities, and procedures to protect and preserve U.S. Army personnel and property from accidental loss or injury. AR 40-5, *Preventive Medicine,* provides for the promotion of health and the prevention of disease and injury.

### Geological Resources

Recognizing that millions of acres per year of prime farmland are lost to development, Congress passed the Farmland Protection Policy Act to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland (7 Code of Federal Regulations [CFR] Part 658). Prime farmland is described as soils that have a combination of soil and landscape properties that make them highly suitable for cropland, such as high inherent fertility, good water-holding capacity, and deep or thick effective rooting zones, and that are not subject to periodic flooding. Under the Farmland Protection Policy Act, agencies are encouraged to conserve prime or unique farmlands when alternatives are practicable. Some activities that are not subject to the Farmland Protection Policy Act include Federal permitting and licensing, projects on land already in urban development or used for water storage, construction for national defense purposes, or construction of new minor secondary structures such as a garage or storage shed.

### Water Resources

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specified contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a

Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

The USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. As of February 1, 2010, all new construction sites are required to meet the non-numeric effluent limitations and design, install, and maintain effective erosion and sedimentation controls. In addition, construction site owners and operators that disturb 1 or more acres of land are required to use best management practices (BMPs) to ensure that soil disturbed during construction activities does not pollute nearby water bodies. Effective August 1, 2011, construction activities disturbing 20 or more acres must comply with the numeric effluent limitation for turbidity in addition to the non-numeric effluent limitations. The maximum daily turbidity limitation is 280 nephelometric turbidity units (ntu). On February 2, 2014, construction site owners and operators that disturb 10 or more acres of land are required to monitor discharges to ensure compliance with effluent limitations as specified by the permitting authority. Construction site owners are encouraged to phase ground-disturbing activities to limit the applicability of the monitoring requirements and the turbidity limitation. The USEPA's limitations are based on its assessment of what specific technologies can reliably achieve. Permittees can select management practices or technologies that are best suited for site-specific conditions.

The Coastal Zone Management Act (CZMA) of 1972 declares a national policy to preserve, protect, and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone refers to the coastal waters and the adjacent shorelines, including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and includes the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone through the development of land and water use programs in cooperation with Federal and local governments. States may apply for grants to help develop and implement management programs to achieve wise use of the land and water resources of the coastal zone. Development projects affecting land or water use or natural resources of a coastal zone must ensure the project is, to the maximum extent practicable, consistent with the state's coastal zone management program.

The Safe Drinking Water Act (SDWA) of 1974 establishes a Federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new Federal

enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set current Federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

The Wild and Scenic Rivers Act of 1968 provides for a wild and scenic river system by recognizing the remarkable values of specific rivers of the Nation. These selected rivers and their immediate environment are preserved in a free-flowing condition, without dams or other construction. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by an Act of Congress, an act of state legislature, or by the Secretary of the Interior upon the recommendation of the governor of the state(s) through which the river flows.

EO 11988, *Floodplain Management* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted floodproofing and flood protection to include elevating structures above the base flood level rather than filling in land.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (October 5, 2009), directed the USEPA to issue guidance on Section 438 of the Energy Independence and Security Act (EISA). The EISA establishes into law new storm water design requirements for Federal construction projects that disturb a footprint of greater than 5,000 square feet of land. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate storm water retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses will be conducted to evaluate the effectiveness of the as-built storm water reduction features. These regulations are applicable to DOD Unified Facilities Criteria. Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

### Biological Resources

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species which can be obtained by calling the appropriate State Fish and Wildlife office. Some species also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess; offer to or sell, barter, purchase, or deliver; or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport, or carry from one state, territory, or district to another; or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

### Cultural Resources

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the religious use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and American Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). The ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the NHPA directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 106 of the act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 establishes rights of American Indian tribes to claim ownership of certain “cultural items,” defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on Federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate American Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971), directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which might qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American Indian religious practitioners’ access to and ceremonial use of American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000), was issued to provide for regular and meaningful consultation and collaboration with Native American tribal officials in the development of Federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Native American tribes. EO 13175 recognizes the following fundamental principles: Native American tribes exercise inherent sovereignty over their lands and members, the United States government has a unique trust relationship with Native American tribes and deals with them on a government-to-government basis, and Native American tribes have the right to self-government and self-determination.

EO 13287, *Preserve America* (March 3, 2003), orders Federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

### Socioeconomics and Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations, and develop agencywide environmental justice strategies. The strategy must list "programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations." A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each Federal agency.

### Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal "Superfund" to respond to emergencies immediately. Although the "Superfund" provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters.

The Pollution Prevention Act (PPA) of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes; redesigning products; substituting raw materials; and making improvements in management techniques, training, and inventory control. Consistent with pollution prevention principles, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (January 24, 2007 [revoking EO 13148]), sets a goal for all Federal agencies to promote environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and use of paper of at least 30 percent post-consumer fiber content. In addition, EO 13423 sets a goal that requires Federal agencies to ensure that they reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of; increase diversion of solid waste, as appropriate; and maintain cost-effective waste prevention and

recycling programs at their facilities. Additionally, in *Federal Register* Volume 58 Number 18 (January 29, 1993), CEQ provides guidance to Federal agencies on how to "incorporate pollution prevention principles, techniques, and mechanisms into their planning and decisionmaking processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA."

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for "cradle-to-grave" management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive, toxic, or listed by USEPA as being hazardous. With the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA amendments strengthen control of both hazardous and nonhazardous waste and emphasize the prevention of pollution of groundwater.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards and authorizes USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the Emergency Planning and Community Right to Know Act (EPCRA), which requires facility operators with "hazardous substances" or "extremely hazardous substances" to prepare comprehensive emergency plans and to report accidental releases. If a Federal agency acquires a contaminated site, it can be held liable for cleanup as the property owner/operator. A Federal agency can also incur liability if it leases a property, as the courts have found lessees liable as "owners." However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it can claim the "innocent purchaser" defense under CERCLA. According to Title 42 United States Code (U.S.C.) 9601(35), the current owner/operator must show it undertook "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" before buying the property to use this defense.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorized USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singled out polychlorinated biphenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and could cause adverse health effects in humans. TSCA and its regulations govern the manufacture, processing, distribution, use, marking, storage, disposal, clean-up, and release reporting requirements for numerous chemicals like PCBs. TSCA Title II provides statutory framework for "Asbestos Hazard Emergency Response," which applies only to schools. TSCA Title III, "Indoor Radon Abatement," states indoor air in buildings of the United States should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, "Lead Exposure Reduction," directs Federal agencies to "conduct a comprehensive program to promote safe, effective, and affordable monitoring, detection, and abatement of lead-based paint and other lead exposure hazards." Further, any Federal agency having jurisdiction over a property or facility must comply with all Federal, state, interstate, and local requirements concerning lead-based paint.

### Energy

EO 13514, *Federal Leadership In Environmental, Energy, And Economic Performance* (dated October 5, 2009), directs Federal agencies to improve water use efficiency and management; implement high

performance sustainable Federal building design, construction, operation and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional development and transportation planning, sustainable building design and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings. The CEQ regulations at 40 CFR 1502.16(e) directs agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Section 503(b) of EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. EO 13423 sets goals in energy efficiency, acquisition, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. Sustainable design measures such as the use of "green" technology (e.g., photovoltaic panels, solar collection, heat recovery systems, wind turbines, green roofs, and habitat-oriented storm water management) would be incorporated where practicable.

# APPENDIX C

## INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING CORRESPONDENCE AND PUBLIC INVOLVEMENT

**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS 28TH MISSION SUPPORT GROUP (ACC)**
**ELLSWORTH AIR FORCE BASE SOUTH DAKOTA**

MEMORANDUM FOR DISTRIBUTION 14 Dec 2009

FROM: Ellsworth AFB
28 CES/CEAON
2103 Scott Drive
Ellsworth AFB, South Dakota 57706-4711

SUBJECT: Description of Proposed Action and Alternatives (DOPAA) for an Environmental Assessment Associated with Development of a Regional Wastewater Treatment Plant near Ellsworth Air Force Base (AFB), South Dakota

1. Ellsworth AFB is preparing an Environmental Assessment (EA) addressing elements contributing to the establishment of a regional wastewater treatment plant (RWWTP). The Proposed Action includes the demolition and decommissioning of the existing Ellsworth AFB wastewater treatment plant (WWTP), granting an easement for a sanitary sewer pipeline route, and assessing the impacts of Ellsworth AFB's contribution to the regional wastewater stream. The DOPAA is included with this correspondence.

2. The environmental impact analysis process for the Proposed Action and the No Action Alternative is being conducted by Ellsworth AFB in accordance with the Council on Environmental Quality (CEQ) guidelines pursuant to the requirements of the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the attached DOPAA and solicit your comments concerning the proposal and any potential environmental consequences. Also enclosed is the distribution list of those Federal, state, and local agencies that have been contacted. If there are any additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.

3. Please provide any comments or information directly to Ms. Melody Jensen, 28 CES/CEAON, 2103 Scott Drive, Ellsworth AFB, SD 57706-4711 by within 30 days of the date shown on this letter.

MARK A. HOWARD
Flight Chief, Asset Management
28th Civil Engineer Squadron

Attachments:
1. DOPAA
2. Distribution List

*THIS PAGE INTENTIONALLY LEFT BLANK*

# Interagency and Intergovernmental Coordination for Environmental Planning Distribution List

Ms. Greta Chapman
Director
Rapid City Public Library
610 Quincy Street
Rapid City, SD 57701

The Honorable Governor Dennis Daugaard
State of South Dakota
Office of the Governor
500 E Capitol Avenue
Pierre, SD 57501

The Honorable Mayor Al Dial
City of Box Elder
520 N Ellsworth Road, #9C
Box Elder, SD 57719

Major General Steven Doohen
Secretary
South Dakota Department of Military & Veterans Affairs
Soldiers & Sailors Memorial Building
425 East Capitol Avenue
Pierre, SD 57501-5070

The Honorable Mayor Alan Hanks
City of Rapid City
300 Sixth Street
Rapid City, SD 57701

Ms. Monica Heller
Community Planning Coordinator
City of Rapid City
300 Sixth Street
Rapid City, SD 57701

Mr. Dan Jennissen
Planning Director
Pennington County
315 Saint Joseph Street, Ste. 118
Rapid City, SD 57701

Mr. Mike Kintigh
Regional Supervisor
South Dakota Game, Fish and Parks
3305 W South Street
Rapid City, SD 57702

Mr. Bruce Lindholm
Director
South Dakota Department of Transportation
Office of Aeronautics
700 E Broadway Avenue
Pierre, SD 57501-2586

Mr. Michael McMahon
Planning & Zoning Coordinator
City of Box Elder
520 N Ellsworth Road, #9C
Box Elder, SD 57719

Meade County Commissioners
1425 Sherman Street
Sturgis, SD 57785

Mr. John Miller
Surface Water Quality Program
SDDENR
PMB 2020
Joe Foss Building
523 E Capitol
Pierre, SD 57501

Mr. Joe Nadenicek
Staff Attorney
SD Dept. of Environmental and Natural Resources
523 E Capitol Avenue
Pierre, SD 57501

Ms. Paige Hoskinson Olson
Review and Compliance Coordinator
Department of Tourism and State Development
711 E Wells Avenue
Pierre, SD 57501-3369

Pennington County Commissioners
315 Saint Joseph Street, Ste. 156
Rapid City, SD 57701

Mr. Bill Rich
Planning Director
Meade County
1425 Sherman Street
Sturgis, SD 57785

South Dakota State Historical Society
900 Governors Drive
Pierre, SD 57501-2217

U.S. Fish and Wildlife Service
South Dakota Ecological Services Field Office
420 S. Garfield Avenue Suite 400
Pierre, SD 57501-5408

SouthDakota Department of Tourism and State Development

December 30, 2009

Ms. Melody Jensen
28CES/CEAON
2103 Scott Drive
Ellsworth AFB, SD 57706-4711

**PRE-SECTION 106 PROJECT CONSULTATION**
Project: 091216014F – Environmental Assessment for Development of a Regional Wastewater Treatment Plant at Ellsworth Air Force Base
Location: Meade County
(DOD)

Dear Ms. Jensen:

Thank you for the opportunity to comment on the above referenced project. The South Dakota Office of the State Historic Preservation Officer (SHPO) has the following recommendations for fulfilling the requirements of Section 106 of the National Historic Preservation Act of 1966 (as amended).

On December 16, 2009, we received Mr. Mark A. Howard's letter and the document entitled "Final Description of the Proposed Action and Alternative for an Environmental Assessment Associated with Development of a Regional Wastewater Treatment Plant, Ellsworth Air Force Base, South Dakota". The information indicates the proposed action is the type of activity with the potential to cause effects on historic properties. In order for my office to provide meaningful comment as to the effect of the project on historic properties, your agency will need to provide documentation consistent with the documentation standards outlined in 36 CFR part 800.11, the implementing regulations for Section 106 of the National Historic Preservation Act.

To aid you in providing complete information I have enclosed 36 CFR part 800.11 (documentation standards), the form "Section 106 Project Review Form", and "Information Need for Section 106 Project Review." The submission of documentation that fulfills the requirements of 36 CFR 800.11 will help to ensure that adequate information has been supplied for my office to concur with your agency's determination of effect.

Should you require any additional information, please contact Paige Hoskinson Olson at (605) 773-6004. Your concern for the non-renewable cultural heritage of our state is appreciated. The full text of 36 CFR part 800 is available on the Advisory Council on Historic Preservation's web page at www.achp.gov.

Sincerely,

Jay D. Vogt
State Historic Preservation Officer

Paige Hoskinson Olson
Review and Compliance Coordinator

Office of Tourism
Governor's Office of Economic Development
Tribal Government Relations
711 E Wells Ave / Pierre, SD 57501-3369
Phone: 605-773-3301 / Fax: 605-773-3256
travelsd.com / sdgreatprofts.com / sdtribalrelations.com

South Dakota Arts Council
800 Governors Dr. / Pierre, SD 57501-2294
Phone: 605-773-3131 or 1-800-423-6665 in SD
Fax: 605-773-6962
sdac@state.sd.us / sdarts.org

**South Dakota State Historical Society**
**900 Governors Dr. / Pierre, SD 57501-2217**
**Phone: 605-773-3458 / Fax: 605-773-6041**
**sdhistory.org**

South Dakota Housing Development Authority
PO Box 1237 / Pierre, SD 57501-1237
Phone: 605-773-3181 / Fax: 605-773-5154
sdhda.org

SouthDakota GREAT FACES, GREAT PLACES

**National Historic Preservation Act of 1966 (as amended) Sec. 800.11 Documentation standards.**
(a) *Adequacy of documentation.* The agency official shall ensure that a determination, finding, or agreement under the procedures in this subpart is supported by sufficient documentation to enable any reviewing parties to understand its basis. The agency official shall provide such documentation to the extent permitted by law and within available funds. When an agency official is conducting phased identification or evaluation under this subpart, the documentation standards regarding description of historic properties may be applied flexibly. If the Council, or the SHPO/THPO when the Council is not involved, determines the applicable documentation standards are not met, the Council or the SHPO/THPO, as appropriate, shall notify the agency official and specify the information needed to meet the standard. At the request of the agency official or any of the consulting parties, the Council shall review any disputes over whether documentation standards are met and provide its views to the agency official and the consulting parties.
(b) *Format.* The agency official may use documentation prepared to comply with other laws to fulfill the requirements of the procedures in this subpart, if that documentation meets the standards of this section.
(c) *Confidentiality.*
(1) *Authority to withhold information.* Section 304 of the act provides that the head of a Federal agency or other public official receiving grant assistance pursuant to the act, after consultation with the Secretary, shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may cause a significant invasion of privacy; risk harm to the historic property; or impede the use of a traditional religious site by practitioners. When the head of a Federal agency or other public official has determined that information should be withheld from the public pursuant to these criteria, the Secretary, in consultation with such Federal agency head or official, shall determine who may have access to the information for the purposes of carrying out the act.
(2) *Consultation with the Council.* When the information in question has been developed in the course of an agency's compliance with this part, the Secretary shall consult with the Council in reaching determinations on the withholding and release of information. The Federal agency shall provide the Council with available information, including views of the SHPO/THPO, Indian tribes and Native Hawaiian organizations, related to the confidentiality concern. The Council shall advise the Secretary and the Federal agency within 30 days of receipt of adequate documentation.
(3) *Other authorities affecting confidentiality.* Other Federal laws and program requirements may limit public access to information concerning an undertaking and its effects on historic properties. Where applicable, those authorities shall govern public access to information developed in the section 106 process and may authorize the agency official to protect the privacy of non-governmental applicants.
(d) *Finding of no historic properties affected.* Documentation shall include:
(1) A description of the undertaking, specifying the Federal involvement, and its area of potential effects, including photographs, maps, drawings, as necessary;
(2) A description of the steps taken to identify historic properties, including, as appropriate, efforts to seek information pursuant to Sec. 800.4(b); and
(3) The basis for determining that no historic properties are present or affected.
(e) Finding of no adverse effect or adverse effect. Documentation shall include:
(1) A description of the undertaking, specifying the Federal involvement, and its area of potential effects, including photographs, maps, and drawings, as necessary;
(2) A description of the steps taken to identify historic properties;
(3) A description of the affected historic properties, including information on the characteristics that qualify them for the National Register;
(4) A description of the undertaking's effects on historic properties;
(5) An explanation of why the criteria of adverse effect were found applicable or inapplicable, including any conditions or future actions to avoid, minimize or mitigate adverse effects; and
(6) Copies or summaries of any views provided by consulting parties and the public.
(f) *Memorandum of agreement.* When a memorandum of agreement is filed with the Council, the documentation shall include, any substantive revisions or additions to the documentation provided the Council pursuant to Sec. 800.6(a)(1), an evaluation of any measures considered to avoid or minimize the undertaking's adverse effects and a summary of the views of consulting parties and the public.
(g) *Requests for comment without a memorandum of agreement. Documentation shall include:*
(1) A description and evaluation of any alternatives or mitigation measures that the agency official proposes to resolve the undertaking's adverse effects;
(2) A description of any reasonable alternatives or mitigation measures that were considered but not chosen, and the reasons for their rejection;
(3) Copies or summaries of any views submitted to the agency official concerning the adverse effects of the undertaking on historic properties and alternatives to reduce or avoid those effects; and
(4) Any substantive revisions or additions to the documentation provided the Council pursuant to Sec. 800.6(a)(1).

SOUTH DAKOTA STATE HISTORICAL SOCIETY
STATE HISTORIC PRESERVATION OFFICE
**SECTION 106 PROJECT REVIEW FORM**

Submission of a completed Section 106 Project Review Form with adequate information and attachments constitutes a request for review pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). Section 106 requires the South Dakota State Historic Preservation Office to review all projects that are federally funded, licensed, or assisted. We reserve the right to request more information if needed. Typed forms are preferred. **SUBMITTAL OF THIS FORM WITHOUT ALL REQUESTED INFORMATION WILL CAUSE REVIEW DELAYS.**

Section 106 regulations provide for a 30-day response time by the South Dakota State Historic Preservation Office from the date of receipt of complete information.

For projects requiring a license from the Federal Communications Commission, please use FCC Forms 620 or 621. **DO NOT USE THIS FORM.**

## I. PROJECT INFORMATION

☐ THIS IS A NEW SUBMITTAL
☐ THIS IS MORE INFORMATION RELATING TO SHPO PROJECT # _____

**1. PROJECT NAME:** _____

**2. FEDERAL AGENCY FUNDING, LICENSING, OR ASSISTING THE PROJECT**

A. AGENCY NAME: _____
B. AGENCY CONTACT PERSON: _____
C. MAILING ADDRESS: _____
D. EMAIL ADDRESS: _____
E. TELEPHONE NUMBER: _____

**3. STATE AGENCY FUNDING, LICENSING, OR ASSISTING THE PROJECT, IF APPLICABLE**

A. AGENCY NAME: _____
B. AGENCY CONTACT PERSON: _____
C. MAILING ADDRESS: _____
D. EMAIL ADDRESS: _____
E. TELEPHONE NUMBER: _____
F. IF THIS IS A GRANT PROGRAM, PLEASE INCLUDE THE NAME OF THE PROGRAM (FOR EXAMPLE, CDBG OR SRF): _____

**4. CONSULTANT CONTACT PERSON, IF APPLICABLE**

A. COMPANY NAME: _____
B. CONTACT PERSON: _____
C. MAILING ADDRESS: _____
D. EMAIL ADDRESS: _____
E. TELEPHONE NUMBER: _____

SOUTH DAKOTA STATE HISTORICAL SOCIETY
STATE HISTORIC PRESERVATION OFFICE
**SECTION 106 PROJECT REVIEW FORM**

**5. PROJECT LOCATION**

A. ADDRESS: _____

B. CITY: _____

C. COUNTY: _____

D. TOWNSHIP: _____ E. RANGE _____ F. SECTION _____

G. Provide a USGS 7.5 minute quadrangle map of the project area. If the project is in an urban area, show the location(s) on a city map. Photocopies are acceptable, but poor quality maps or insufficient information will cause review delays. Do not enlarge or reduce the map.

Is a map showing the exact location of the project attached to this form?
YES ☐ or NO ☐

**6. PROJECT DESCRIPTION**

Describe all anticipated work associated with the project. Be specific. The description should include all ancillary facilities such as access roads, placement of utilities, additional outbuildings, fences, material borrow areas, staging areas, etc. Use as much space and as many pages as needed to clearly describe the project.

**7. PROJECT PLANS**

Plans, drawings, engineering specifications etc. should be included to help explain the project, but these cannot replace the above verbal description. If new construction is involved, elevation drawings and plans should be included.

Are plans, drawings, engineering specifications, or similar documents attached to this form?
YES ☐ or NO ☐

**8. PHOTOGRAPHS**

Provide several clear, original photographs of the project location. Also, include photographs of every affected buildings/structures, including an overall front view of each structure and other views necessary to describe fully the structures and the project. Streetscape photographs of surrounding buildings and structures should also be included. Photographs should be color and can be either printed or digital images submitted on a CD. Printed digital photographs should have a high dpi and clear resolution. Photographs should also either be labeled or include a key.

NOTE: Projects submitted with insufficient photographs will cause review delays.

Are photographs that clearly show the project location attached to this form?
YES ☐ or NO ☐

**9. PROJECT AREA OF POTENTIAL EFFECT (APE)**

The APE consists of the geographic area or areas within which a project may directly or indirectly, cause changes in the character or use of historic properties. In most instances, the APE is not simply the project's physical boundaries or right-of-way. The APE also includes all ancillary facilities such as access roads, placement of utilities, additional outbuildings, fences, material borrow areas, staging areas, etc. The APE may include visual and audible effects.
Highlight the APE on a localized map.

A. Is a map highlighting the APE attached to this form? YES ☐ or NO ☐

B. Provide a written description of the APE. Describe the steps taken to identify the APE, and justify why the APE boundaries were chosen. If the APE has been previously disturbed, include an explanation of the previous ground disturbance.

## II. IDENTIFY HISTORIC PROPERTIES

**10. IDENTIFICATION EFFORTS** (See 36 CFR 800.4)
Identification of historic properties may include, but is not limited, any of the following identification methods. Check which steps were taken to identify historic properties in the APE. Check all that apply and describe the results.

A. ☐ RECORD SEARCH
Conducted a record search through the Archaeological Research Center in Rapid City. Record searches are available for a fee by calling 605.394.1936. This will include a search of all previously-surveyed archaeological sites and structures within the APE and within one mile of the APE.

If a record search was conducted, is a copy of the results attached to this form? YES ☐ or NO ☐

B. ☐ ON-THE-GROUND SURVEY
Survey by an archaeologist and/or an architectural historian of project area not previously surveyed. Survey type will depend on the scope of the project. A list of professionals is available at www.history.sd.gov/Preservation/TechAssist/hp_consultants.aspx. Guidelines for surveys and reports are available at: www.history.sd.gov/Preservation/PresLaws/r&c_guidelines.pdf and www.history.sd.gov/Preservation/OtherServices/Survey/ArchitecturalSurveyManual2006.pdf.

If a survey was conducted, is a copy of the survey report and/or survey forms attached to this form?
YES ☐ or NO ☐

C. ☐ SEARCHED THE NATIONAL REGISTER OF HISTORIC PLACES DATABASE
This database is available online at: http://nrhp.focus.nps.gov/. NOTE: This database only includes properties *listed* on the National Register of Historic Places. Properties that are *eligible* for the National Register must also be taken into consideration.

If the National Register database was searched, is a printout of any results attached to this form?
YES ☐ or NO ☐

D. ☐ BACKGROUND RESEARCH
Please describe sources reviewed and findings of research. This could include such things as reviewing county or city history books or conducting research at a local historical society, research facility, or county courthouse.

_____
_____

E. ☐ ORAL HISTORY INTERVIEWS
Please list who was interviewed and describe what was learned through the interviews.

_____
_____

F. ☐ CONSULTATION
Please describe who was consulted and the results of the consultation. Examples include tribes, historic preservation commissions, the public, and local historical societies.

_____
_____

G. ☐ OTHER

Describe any other efforts undertaken to identify historic properties and the results of those efforts.

**11. HISTORIC PROPERTIES FINDING**

Based on the efforts described above to identify historic properties, please choose one finding for the project. There are (mark one):

☐ Historic Properties Present in the APE

☐ No Historic Properties Present in the APE

## III. ASSESS EFFECTS

**12. DETERMINATION OF EFFECT**

The federal agency must submit a determination of effect for the SHPO to review this project. Based on the information provided above, the responsible agency official should make a determination of effect on historic properties for this project. Please select and mark one of the following determinations, then explain the basis for your decision

☐ **No Historic Properties Affected** [36 CFR 800.4(d)(1)] – For a determination of no historic properties affected, the agency official finds no historic properties present or that the undertaking will have no effect upon historic properties as defined in Sec. 800.16(i). Please explain.

☐ **Adverse Effect** [36 CFR Part 800.5(a)(1)] – For a determination of adverse effect, the undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may include reasonably foreseeable effects that may occur later in time, be farther removed in distance, or be cumulative. Please explain.

☐ **No Adverse Effect** [36 CRF Part 800.5(b)] – For a determination of no adverse effect, the undertaking is modified or conditions are imposed to avoid adverse effects to a historic property. Please explain.

SOUTH DAKOTA STATE HISTORICAL SOCIETY
STATE HISTORIC PRESERVATION OFFICE
**SECTION 106 PROJECT REVIEW FORM**

The responsible federal agency official must sign this form here prior to submitting it to the SHPO. Projects received without an appropriate signature will cause review delays. **This must be an original signature and not electronic.**

**SIGNATURE** _____ **DATE** _____

**NAME** _____
**TITLE** _____
**AGENCY** _____

FOR SHPO USE ONLY. DO NOT WRITE OR INSERT ANYTHING HERE.

Please print and mail completed form to:

Review and Compliance Coordinator
South Dakota State Historical Society
900 Governors Drive
Pierre, SD 57501

Questions about Section 106 can be directed to:

Paige Hoskinson Olson
Review and Compliance Coordinator
Paige.HoskinsonOlson@state.sd.us
605.773.6004

OR

Amy Rubingh
Review and Compliance Archaeologist
Amy.Rubingh@state.sd.us
605.773.8370

Questions about Section 106 projects on existing buildings or structures can be directed to:

Jason Haug
Director of Historic Preservation
Jason.Haug@state.sd.us
605.773.6296

Project information submitted cannot be returned. This documentation is kept on file at the South Dakota State Historical Society. We review faxed and electronic submissions in the same manner as any other submission and with the same considerations for clarity and completeness. However, original documents with original signature must follow all faxed and electronic submissions. The submission of incomplete, unclear, or confusing information may result in unnecessary delays in the review process until adequate information is obtained.

6

**Additional Resources**

1. South Dakota State Historic Preservation Office www.history.sd.gov/Preservation/
   a. Link to National and State Register Listed Properties: www.history.sd.gov/Preservation/NatReg/NatReg.apsx
   b. Historic Contexts: www.history.sd.gov/Preservation/OtherServices/DocPub/Contexts
   c. *Guidelines for Cultural Resource Surveys and Survey Reports 2005*: www.history.sd.gov/Preservation/PresLaws/r&c_guidelines.pdf

2. Advisory Council on Historic Preservation: www.achp.gov
   a. Link to National Historic Preservation Act of 1966 as amended
   b. 36 CFR Part 800 – Protection of Historic Properties

3. National Park Service: www.nr.nps.gov/
   a. National Register of Historic Places
   b. Publications (National Register Bulletins, Preservation Briefs, etc.): www.nps.gov/history/publications.htm

4. Archaeological Research Center: www.history.sd.gov/Archaeology/ or 605.394.1936
   a. Record Search Information

5. State Archives: www.history.sd.gov/Archives/ or 605.773.3804
   a. Historic photographs
   b. Research material

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

January 5, 2010

Ms. Melody Jensen
Department of the Air Force
28 CES/CEAON
2103 Scott Drive
Ellsworth Air Force Base, South Dakota 57706-4711

Re: Establishment of a Regional Wastewater Treatment Plant, Ellsworth Air Force Base and Box Elder, Pennington and Meade Counties, South Dakota

Dear Ms. Jensen:

This letter is in response to your request dated December 14, 2009, for environmental comments regarding the above referenced establishment of a regional wastewater treatment plant for Ellsworth Air Force Base and Box Elder located in Pennington and Meade Counties in South Dakota.

The whooping crane might occur in this area, and the occurrence would be during spring and fall migration. No U.S. Fish and Wildlife Service (Service) easements are known to exist in this area.

We look forward to seeing the Environmental Assessment and mitigation plans for working around the wetlands in the construction area.

The Service appreciates the opportunity to provide comments. If you have any questions regarding these comments, please contact Charlene Bessken of this office at (605) 224-8693, Extension 231.

Sincerely,

Scott Larson

for Pete Gober
Field Supervisor
South Dakota Field Office

**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS 28TH MISSION SUPPORT GROUP (ACC)**
**ELLSWORTH AIR FORCE BASE SOUTH DAKOTA**

MEMORANDUM FOR DISTRIBUTION

APR 19 2011

FROM: Ellsworth AFB
28 CES/CEA
2125 Scott Drive
Ellsworth AFB, South Dakota 57706-4711

SUBJECT: Draft Environmental Assessment (EA) Addressing Activities Associated with Development of a Regional Wastewater Treatment Plant (RWWTP), Ellsworth Air Force Base (AFB), South Dakota

1. The U.S. Air Force is preparing an EA Addressing Activities Associated with Development of an RWWTP on Ellsworth AFB. In order to meet more stringent State of South Dakota-mandated restrictions on wastewater discharge, Ellsworth AFB is proposing to decommission and demolish its current wastewater treatment plant and allow construction of a new sanitary sewer pipeline on Ellsworth AFB within an easement granted to the South Dakota Ellsworth Development Authority (EDA). The sanitary sewer pipeline would connect to an existing pipeline southeast of the installation that would flow to a proposed future RWWTP off-installation. The Draft EA is included with this correspondence.

2. The environmental impact analysis process for the Proposed Action is being conducted by the U.S. Air Force in accordance with the Council on Environmental Quality guidelines pursuant to the requirements of the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the attached EA and solicit your comments concerning the proposal and any potential environmental concerns you may have. Also enclosed is the distribution list of those Federal, state, and local agencies that have been contacted. If there are any additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.

3. Please provide any comments, information, or inquiries directly to Ms. Melody Jensen, 28 CES/CEAON, 2125 Scott Drive, Ellsworth AFB, South Dakota 57706-4711, by telephone to (605) 385-2685, and by email to melody.jensen@ellsworth.af.mil by MAY 20 2011

MARK A. HOWARD
Environmental Flight Chief
Ellsworth AFB, South Dakota

Attachments:
1. Draft EA and Finding of No Significant Impact/Finding of No Practicable Alternative
2. Distribution List

**PUBLIC NOTICE**
**United States Air Force**

**NOTICE OF AVAILABILITY**
**Draft Environmental Assessment (EA) Addressing Activities Associated with Development of a Regional Wastewater Treatment Plant (RWWTP) Ellsworth Air Force Base (AFB), South Dakota**

Ellsworth AFB has completed a Draft EA that evaluates the potential effects of decommissioning and demolishing its current wastewater treatment plant (WWTP), granting an easement to establish a new sanitary sewer pipeline, and construction of the sanitary sewer pipeline within this easement. The sanitary sewer pipeline would connect to an existing pipeline southeast of the installation that would flow to a proposed future RWWTP off-installation. In addition, the EA evaluates Ellsworth AFB's contribution to the regional wastewater stream.

The analysis considered, in detail, potential environmental effects of the Proposed Action and Alternatives. The results, as found in the EA, show that the Proposed Action or Alternatives would not have a significant adverse impact on the environment, indicating that a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) would be appropriate and preparation of an environmental impact statement (EIS) would not be necessary.

Copies of the Draft EA showing the analysis are available for review at the following library:

**Rapid City Public Library**
**610 Quincy Street**
**Rapid City, SD 57701**

The document is also available online at http://www.ellsworth.af.mil.

Written comments on the Draft EA are invited and will be received for 30 days from the publication of this notice. Comments and inquiries on this document should be provided in writing to:

**Ms. Melody Jensen**
**28 CES/CEAON**
**2103 Scott Drive**
**Ellsworth AFB, SD 57706-4711**
**(605) 385-2685**
**Melody.Jensen@ellsworth.af.mil**

# APPENDIX D

## PHOTO DOCUMENTATION OF PROJECT SITE

# Appendix D

# Photos of Existing WWTP Facility and Proposed Pipeline Corridor at Ellsworth AFB

**Building 3013 – Pretreatment Facility**

**Building 3010 – Trickling Filter**

**Building 3015 – O/W Separator**

**WWTP Facilities Adjacent to Building 3007**

**Proposed Project Corridor Facing Northwest**

**Outfall 005 to Unnamed Creek**

**Proposed Project Corridor Facing South from WWTP**

**Proposed Project Corridor Facing Southeast from WWTP**

**Outfall 006**


**North Side Gate Entrance to OU-6**

# APPENDIX E

## AIR QUALITY CALCULATIONS

| | |
|---|---|
| **Summary** | Summarizes total emissions by calendar year for Proposed Action. |
| **Combustion** | Estimates emissions from non-road equipment exhaust. |
| **Fugitive** | Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust. |
| **Grading** | Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions. |
| **Haul Truck On-Road** | Estimates emissions from haul and water trucks delivering materials to the job site. |
| **Construction Commuter** | Estimates emissions for construction workers commuting to the site. |
| **AQCR Tier Report** | Summarizes total emissions for Black Hills-Rapid City Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions. |

**Air Quality Emissions from Proposed Action**

| | $NO_x$ (ton) | VOC (ton) | CO (ton) | $SO_2$ (ton) | $PM_{10}$ (ton) | $PM_{2.5}$ (ton) | $CO_2$ (ton) |
|---|---|---|---|---|---|---|---|
| Combustion | 0.454 | 0.027 | 0.179 | 0.009 | 0.027 | 0.027 | 52.975 |
| Fugitive Dust | - | - | - | - | 2.107 | 0.211 | - |
| Haul and Water Truck On-Road | 0.003 | 0.002 | 0.008 | 0.000 | 0.003 | 0.001 | 0.655 |
| Construction Worker Commuter | 0.110 | 0.110 | 0.992 | 0.001 | 0.010 | 0.007 | 131.482 |
| ***TOTAL*** | ***0.567*** | ***0.139*** | ***1.178*** | ***0.011*** | ***2.148*** | ***0.245*** | ***185.111*** |

Note: Total CY2010 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

| | | | |
|---|---|---|---|
| $CO_2$ emissions converted to metric tons = | ***167.93*** | ***metric tons*** | |
| State of South Dakota $CO_2$ emissions = | ***14,891,219*** | ***metric tons*** | (DOE/EIA 2010) |
| Percent of State of South Dakota $CO_2$ emissions = | ***0.001%*** | ***metric tons*** | |

Sources:

U.S. Department of Energy (DOE)/Energy Information Administration (EIA). 2010. State Carbon Dioxide Emissions Summary for the State of South Dakota. Available online: <http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html>. Accessed 17 December 2010

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

**Black Hills-Rapid City Intrastate AQCR**

| | Point and Area Sources Combined | | | | | |
|---|---|---|---|---|---|---|
| Year | $NO_x$ (tpy) | VOC (tpy) | CO (tpy) | $SO_2$ (tpy) | $PM_{10}$ (tpy) | $PM_{2.5}$ (tpy) |
| 2002 | 15,082 | 9,923 | 68,289 | 3,295 | 22,883 | 4,248 |

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 8 December 2009.

**Air Quality Emissions from Proposed Action**
**Determination Significance (Significance Threshold = 10% of regional)**

| | Point and Area Sources Combined | | | | | |
|---|---|---|---|---|---|---|
| | $NO_x$ (tpy) | VOC (tpy) | CO (tpy) | $SO_2$ (tpy) | $PM_{10}$ (tpy) | $PM_{2.5}$ (tpy) |
| Regional Emissions | 15,082 | 9,923 | 68,289 | 3,295 | 22,883 | 4,248 |
| Proposed Action Emissions | 0.57 | 0.14 | 1.18 | 0.01 | 2.15 | 0.24 |
| *% of Regional* | **0.004%** | **0.001%** | **0.002%** | **0.000%** | **0.009%** | **0.006%** |

**Combustion Emissions**

Combustion Emissions of VOC, $NO_x$, $SO_2$, CO, $PM_{2.5}$, $PM_{10,}$ and $CO_2$ due to Construction

| | General Construction Activities | Area Disturbed | | |
|---|---|---|---|---|
| 1 | Demolish Sludge Pits Reinput (3003) | 13,962 | ft² | |
| 2 | Demolish Main Building (3005) | 1,885 | ft² | |
| 3 | Demolish Clarifier Pits (3006) | 156 | ft² | |
| 4 | Demolish Digestor Building (3007) | 5,419 | ft² | |
| 5 | Demolish Clarifier, Effluent Strut, and Sludge/Scum Pits (3008) | 1,670 | ft² | |
| 6 | Demolish Chlorine Storage Facility (3009) | 144 | ft² | |
| 7 | Demolish Dome-Trickling Filter (3010) | 12,131 | ft² | |
| 8 | Demolish Belt Press Facility (3011) | 890 | ft² | |
| 9 | Demolish Pretreatment Facility (3013) | 2,018 | ft² | |
| 10 | Demolish Chlorine and Effluent Sampling Facility (3014) | 114 | ft² | |
| 11 | Demolish Sewer Trunk Lines | 6,885 | ft² | Assume 2,295 foot by 3-foot wide foot construction corridor |
| 12 | Construct Wastewater Pipeline | 35,250 | ft² | Assume 3,525 foot by 10-foot wide foot construction corridor |

| | | | |
|---|---|---|---|
| Total General Construction Area: | 0 | ft² | |
| | 35,250.0 | acres | (includes 12) |
| Total Demolition Area | 22,601 | ft² | (includes 2, 4, and 6-10) |
| | 0.5 | acres | |
| Total Area to be Paved: | 0 | ft² | |
| | 0.0 | acres | |
| Total Disturbed Area: | 80,524 | ft² | (includes 1 - 12) |
| | 1.8 | acres | |
| Construction Duration: | 12 | months | |
| Annual Construction Activity: | 240 | days/yr | Assume 12 months, 4 weeks per month, 5 days per week. |

## Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

**Grading**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Bulldozer | 1 | 13.60 | 0.96 | 5.50 | 1.02 | 0.89 | 0.87 | 1456.90 |
| Motor Grader | 1 | 9.69 | 0.73 | 3.20 | 0.80 | 0.66 | 0.64 | 1141.65 |
| Water Truck | 1 | 18.36 | 0.89 | 7.00 | 1.64 | 1.00 | 0.97 | 2342.98 |
| Total per 10 acres of activity | 3 | 41.64 | 2.58 | 15.71 | 0.83 | 2.55 | 2.47 | 4941.53 |

**Paving**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Paver | 1 | 3.83 | 0.37 | 2.06 | 0.28 | 0.35 | 0.34 | 401.93 |
| Roller | 1 | 4.82 | 0.44 | 2.51 | 0.37 | 0.43 | 0.42 | 536.07 |
| Truck | 2 | 36.71 | 1.79 | 14.01 | 3.27 | 1.99 | 1.93 | 4685.95 |
| Total per 10 acres of activity | 4 | 45.37 | 2.61 | 18.58 | 0.91 | 2.78 | 2.69 | 5623.96 |

**Demolition**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Loader | 1 | 13.45 | 0.99 | 5.58 | 0.95 | 0.93 | 0.90 | 1360.10 |
| Haul Truck | 1 | 18.36 | 0.89 | 7.00 | 1.64 | 1.00 | 0.97 | 2342.98 |
| Total per 10 acres of activity | 2 | 31.81 | 1.89 | 12.58 | 0.64 | 1.92 | 1.87 | 3703.07 |

**Building Construction**

| Equipment[d] | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Stationary | | | | | | | | |
| Generator Set | 1 | 2.38 | 0.32 | 1.18 | 0.15 | 0.23 | 0.22 | 213.06 |
| Industrial Saw | 1 | 2.62 | 0.32 | 1.97 | 0.20 | 0.32 | 0.31 | 291.92 |
| Welder | 1 | 1.12 | 0.38 | 1.50 | 0.08 | 0.23 | 0.22 | 112.39 |
| Mobile (non-road) | | | | | | | | |
| Truck | 1 | 18.36 | 0.89 | 7.00 | 1.64 | 1.00 | 0.97 | 2342.98 |
| Forklift | 1 | 5.34 | 0.56 | 3.33 | 0.40 | 0.55 | 0.54 | 572.24 |
| Crane | 1 | 9.57 | 0.66 | 2.39 | 0.65 | 0.50 | 0.49 | 931.93 |
| Total per 10 acres of activity | 6 | 39.40 | 3.13 | 17.38 | 3.12 | 2.83 | 2.74 | 4464.51 |

Note: Footnotes for tables are on following page

**Architectural Coatings**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Air Compressor | 1 | 3.57 | 0.37 | 1.57 | 0.25 | 0.31 | 0.30 | 359.77 |
| Total per 10 acres of activity | 1 | 3.57 | 0.37 | 1.57 | 0.25 | 0.31 | 0.30 | 359.77 |

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

**PROJECT-SPECIFIC EMISSION FACTOR SUMMARY**

| Source | Equipment Multiplier* | Project-Specific Emission Factors (lb/day) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | $NO_x$ | VOC | CO | $SO_2$** | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
| Grading Equipment | 1 | 41.641 | 2.577 | 15.710 | 0.833 | 2.546 | 2.469 | 4941.526 |
| Paving Equipment | 1 | 45.367 | 2.606 | 18.578 | 0.907 | 2.776 | 2.693 | 5623.957 |
| Demolition Equipment | 1 | 31.808 | 1.886 | 12.584 | 0.636 | 1.923 | 1.865 | 3703.074 |
| Building Construction | 1 | 39.396 | 3.130 | 17.382 | 3.116 | 2.829 | 2.744 | 4464.512 |
| Air Compressor for Architectural Coating | 1 | 3.574 | 0.373 | 1.565 | 0.251 | 0.309 | 0.300 | 359.773 |
| Architectural Coating** | | | 0.000 | | | | | |

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

| | Total Area ($ft^2$) | Total Area (acres) | Total Days | |
|---|---|---|---|---|
| Grading: | 80,524 | 1.85 | 2 | (from "Grading" worksheet) |
| Paving: | 0 | 0.00 | 0 | |
| Demolition: | 22,601 | 0.52 | 26 | |
| Building Construction: | 0 | 0.00 | 0 | |
| Architectural Coating | 0 | 0.00 | 0 | (per SMAQMD "Air Quality of Thresholds of Significance", 1994) |

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

## Total Project Emissions by Activity (lbs)

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Grading Equipment | 83.28 | 5.15 | 31.42 | 1.67 | 5.09 | 4.94 | 9,883 |
| Paving | - | - | - | - | - | - | 0 |
| Demolition | 825.16 | 48.91 | 326.45 | 16.50 | 49.89 | 48.40 | 96,067 |
| Building Construction | - | - | - | - | - | - | 0 |
| Architectural Coatings | - | - | - | - | - | - | 0 |
| **Total Emissions (lbs):** | **908.45** | **54.07** | **357.87** | **18.17** | **54.98** | **53.33** | **105,950** |

## Results: Total Project Annual Emission Rates

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Total Project Emissions (lbs) | 908.45 | 54.07 | 357.87 | 18.17 | 54.98 | 53.33 | 105,950 |
| Total Project Emissions (tons) | 0.45 | 0.03 | 0.18 | 0.01 | 0.03 | 0.03 | 52.97 |

## Construction Fugitive Dust Emissions

**Construction Fugitive Dust Emission Factors**

| | Emission Factor | Units | Source |
|---|---|---|---|
| General Demolition and Construction Activities | 0.19 | ton $PM_{10}$/acre-month | MRI 1996; EPA 2001; EPA 2006 |
| New Road Construction Activities | 0.42 | ton $PM_{10}$/acre-month | MRI 1996; EPA 2001; EPA 2006 |
| **$PM_{2.5}$ Emissions** | | | |
| $PM_{2.5}$ Multiplier | 0.10 | (10% of $PM_{10}$ emissions assumed to be $PM_{2.5}$) | EPA 2001; EPA 2006 |
| **Control Efficiency** | 0.50 | (assume 50% control efficiency for $PM_{10}$ and $PM_{2.5}$ emissions) | EPA 2001; EPA 2006 |

## Project Assumptions

***General Demolition and Construction Activities (0.19 ton $PM_{10}$/acre-month)***

| | | |
|---|---|---|
| Duration of Construction Project | 12 | months |
| Area | 1.8 | acres |

***New Road Construction Activities (0.42 ton $PM_{10}$/acre-month)***

| | | |
|---|---|---|
| Duration of Construction Project | - | months |
| Area | - | acres |

| | Project Emissions (tons/year) | | | |
|---|---|---|---|---|
| | **$PM_{10}$ uncontrolled** | **$PM_{10}$ controlled** | **$PM_{2.5}$ uncontrolled** | **$PM_{2.5}$ controlled** |
| General Demolition and Construction | 4.21 | 2.11 | 0.42 | 0.21 |
| New Road Construction | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **4.21** | **2.11** | **0.42** | **0.21** |

## Construction Fugitive Dust Emission Factors

**General Construction Activities Emission Factor**

**0.19 ton $PM_{10}$/acre-month** Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton $PM_{10}$/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton $PM_{10}$/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton $PM_{10}$/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton $PM_{10}$/acre-month) and 75% of the average emission factor (0.11 ton $PM_{10}$/acre-month). The 0.19 ton $PM_{10}$/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton $PM_{10}$/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for $PM_{10}$ and $PM_{2.5}$ in PM nonattainment areas.

**New Road Construction Emission Factor**

**0.42 ton $PM_{10}$/acre-month** Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons $PM_{10}$/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

**$PM_{2.5}$ Multiplier** **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to $PM_{10}$ emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

**Control Efficiency for $PM_{10}$ and $PM_{2.5}$** **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for $PM_{10}$ and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

**References:**

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

**Grading Schedule**

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 1.8 acres/yr (from Combustion Worksheet)
Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

| Means Line No. | Operation | Description | Output | Units | Acres per equip-day) | equip-days per acre | Acres/yr (project-specific) | Equip-days per year |
|---|---|---|---|---|---|---|---|---|
| 2230 200 0550 | Site Clearing | Dozer & rake, medium brush | 8 | acre/day | 8 | 0.13 | 1.85 | 0.23 |
| 2230 500 0300 | Stripping | Topsoil & stockpiling, adverse soil | 1,650 | cu. yd/day | 2.05 | 0.49 | 1.85 | 0.90 |
| 2315 432 5220 | Excavation | Bulk, open site, common earth, 150' haul | 800 | cu. yd/day | 0.99 | 1.01 | 0.92 | 0.93 |
| 2315 120 5220 | Backfill | Structural, common earth, 150' haul | 1,950 | cu. yd/day | 2.42 | 0.41 | 0.92 | 0.38 |
| 2315 310 5020 | Compaction | Vibrating roller, 6 " lifts, 3 passes | 2,300 | cu. yd/day | 2.85 | 0.35 | 1.85 | 0.65 |
| TOTAL | | | | | | | | 3.10 |

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 3.10
Qty Equipment: 3.00
Grading days/yr: 1.03

**Haul and Water Truck Emissions**

Emissions from hauling the raw materials for fill are estimated in this spreadsheet.

Emission Estimation Method: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

Raw Material Assumptions:

Haul trucks carry 20 cubic yards of material per trip.

The distance from the borrow pit is 0.5 miles, therefore the haul truck will travel 1 mile roundtrip.

Estimated number of trips required by haul trucks = total amount of material to be brought on installation/20 cubic yards per truck

| | | | |
|---|---|---|---|
| Total amount of imported materials = | 6,403 | cubic yards | (Assume 10 feet deep disturbance for all pits and 5 feet deep for pipelines) |
| Number of trucks required = | 320 | heavy duty diesel haul trucks | |
| Miles per trip = | 1 | miles | |

Water Transportation Assumptions:

Water trucks carry 4,000 gallons per truckload.

Approximately 814,572 gallons of water will be used for demolition activities.

The distance from the nearest water source is 0.1 miles, therefore the water truck will travel 0.2 miles roundtrip.

Estimated number of trips required by water trucks = total gallons of water to be brought to project site/4,000 gallons per truck

| | | | |
|---|---|---|---|
| Total amount of water needed for construction = | 814,572 | gallons | (Assume 1/8 inch water sprayed over project area once per day) |
| Number of trucks required = | 204 | heavy duty diesel haul trucks | |
| Miles per trip = | 0.2 | miles | |

***Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)***

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| *HDDV* | **6.500** | **4.7000** | **19.10** | **0.512** | **7.7** | **2.01** | **1646** |

Notes:

Emission factors for all pollutants except $CO_2$ are from USAF IERA 2003.

Emission factors for PM, $PM_{10}$, $SO_x$ are from HDDV in Table 4-50 (USAF IERA 2003).

Emission factors for VOC, CO, and $NO_x$ are from Tables 4-41 through 4-43 for the 2010 calendar year, 2000 model year (USAF IERA 2003).

Diesel fuel produces 22.384 pounds of $CO_2$ per gallon.

It is assumed that the average HDDV has a fuel economy of 6.17 miles per gallon, Table 4-51 (USAF IERA 2003)

$CO_2$ emission factor = 22.384 lbs $CO_2$/gallon diesel * gallon diesel/6.17 miles * 453.6 g/lb

**HDDV Haul and Water Truck Emissions From Construction Activities**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| **lbs** | **5.17** | **3.74** | **15.20** | **0.41** | **6.15** | **1.60** | **1309.22** |
| **tons** | **0.003** | **0.002** | **0.008** | **0.000** | **0.003** | **0.001** | **0.655** |

Example Calculation: $NO_x$ emissions (lbs) = miles per trip * number of trips * $NO_x$ emission factor (g/mile) * lb/453.6 g

**Construction Commuter Emissions**

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

| | | |
|---|---|---|
| The average roundtrip commute for a construction worker = | 40 | miles |
| Number of construction days = | 240 | days |
| Number of construction workers (daily) = | 25 | people |

***Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)***

| $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|
| 0.00091814 | 0.00091399 | 0.00826276 | 0.00001077 | 0.00008698 | 0.00005478 | 1.09568235 |

updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

**Construction Commuter Emissions**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| **lbs** | **220.354** | **219.357** | **1983.062** | **2.586** | **20.875** | **13.148** | **262963.764** |
| **tons** | **0.110** | **0.110** | **0.992** | **0.0013** | **0.0104** | **0.0066** | **131.482** |

Example Calculation: $NO_x$ emissions (lbs) = miles/day * $NO_x$ emission factor (lb/mile) * number of construction days * number of workers

**Black Hills-Rapid City Intrastate Air Quality Control Region**

| | | | Point Source Emissions | | | | | | Area Source Emissions (Non-Point and Mobile Sources) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row # | State | County | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC | CO | NOx | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC |
| 1 | SD | Butte Co | 0 | 0 | 0 | 0 | 0 | 0 | 2,685 | 435 | 1,924 | 335 | 67.8 | 418 |
| 2 | SD | Custer Co | 0 | 0 | 0 | 0 | 0 | 0 | 3,905 | 1,186 | 2,219 | 388 | 83.1 | 628 |
| 3 | SD | Fall River Co | 0 | 0 | 0 | 0 | 0 | 0 | 1,941 | 1,157 | 1,582 | 295 | 90.6 | 350 |
| 4 | SD | Lawrence Co | 765 | 39.2 | 79.1 | 41.4 | 4.23 | 70 | 8,880 | 1,160 | 3,601 | 600 | 175 | 1,298 |
| 5 | SD | Meade Co | 0 | 0 | 0 | 0 | 0 | 0 | 9,680 | 1,546 | 5,069 | 787 | 136 | 1,360 |
| 6 | SD | Pennington Co | 2,947 | 4,960 | 445 | 187 | 1,556 | 187 | 37,486 | 4,599 | 7,964 | 1,615 | 1,182 | 5,612 |
| Grand Total | | | 3,712 | 4,999 | 524 | 228 | 1,560 | 257 | 64,577 | 10,083 | 22,359 | 4,020 | 1,735 | 9,666 |

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 8 December 2009.

Black Hills-Rapid City Intrastate Air Quality Control Region 4 (40 CFR 81.342)

| | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|---|
| Meade Co | 9,680 | 1,546 | 5,069 | 787 | 136 | 1,360 |
| Pennington Co | 40,433 | 9,559 | 8,409 | 1,802 | 2,738 | 5,799 |

*THIS PAGE INTENTIONALLY LEFT BLANK*

| | |
|---|---|
| **Summary** | Summarizes total emissions by calendar year for No Action Alternative. |
| **Combustion** | Estimates emissions from non-road equipment exhaust. |
| **Fugitive** | Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust. |
| **Grading** | Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions. |
| **Haul Truck On-Road** | Estimates emissions from haul and water trucks delivering materials to the job site. |
| **Construction Commuter** | Estimates emissions for construction workers commuting to the site. |
| **AQCR Tier Report** | Summarizes total emissions for Black Hills-Rapid City Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions. |

**Air Quality Emissions from No Action Alternative**

| | $NO_x$ (ton) | VOC (ton) | CO (ton) | $SO_2$ (ton) | $PM_{10}$ (ton) | $PM_{2.5}$ (ton) | $CO_2$ (ton) |
|---|---|---|---|---|---|---|---|
| Combustion | 5.028 | 0.547 | 2.206 | 0.382 | 0.359 | 0.348 | 570.338 |
| Fugitive Dust | - | - | - | - | 1.274 | 0.125 | - |
| Haul and Water Truck On-Road | 0.003 | 0.002 | 0.008 | 0.000 | 0.003 | 0.001 | 0.671 |
| Construction Worker Commuter | 0.110 | 0.110 | 0.992 | 0.001 | 0.010 | 0.007 | 131.482 |
| ***TOTAL*** | ***5.141*** | ***0.659*** | ***3.205*** | ***0.383*** | ***1.646*** | ***0.481*** | ***702.491*** |

Note: Total CY2010 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

| | | | |
|---|---|---|---|
| $CO_2$ emissions converted to metric tons = | ***637.29*** | ***metric tons*** | |
| State of South Dakota $CO_2$ emissions = | ***14,385,029*** | ***metric tons*** | (DOE/EIA 2005) |
| Percent of State of South Dakota $CO_2$ emissions = | ***0.004%*** | ***metric tons*** | |

Sources:

U.S. Department of Energy (DOE)/Energy Information Administration (EIA). 2005. State Carbon Dioxide Emissions Summary for the State of South Dakota. Available online: <http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html>. Accessed 8 December 2009

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

**Black Hills-Rapid City Intrastate AQCR**

| | Point and Area Sources Combined | | | | | |
|---|---|---|---|---|---|---|
| Year | **$NO_x$ (tpy)** | **VOC (tpy)** | **CO (tpy)** | **$SO_2$ (tpy)** | **$PM_{10}$ (tpy)** | **$PM_{2.5}$ (tpy)** |
| 2002 | 15,082 | 9,923 | 68,289 | 3,295 | 22,883 | 4,248 |

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 8 December 2009.

**Air Quality Emissions from No Action Alternative**
**Determination Significance (Significance Threshold = 10% of regional)**

| | Point and Area Sources Combined | | | | | |
|---|---|---|---|---|---|---|
| | **$NO_x$ (tpy)** | **VOC (tpy)** | **CO (tpy)** | **$SO_2$ (tpy)** | **$PM_{10}$ (tpy)** | **$PM_{2.5}$ (tpy)** |
| Regional Emissions | 15,082 | 9,923 | 68,289 | 3,295 | 22,883 | 4,248 |
| Proposed Action Emissions | 5.14 | 0.66 | 3.21 | 0.38 | 1.65 | 0.48 |
| *% of Regional* | **0.034%** | **0.007%** | **0.005%** | **0.012%** | **0.007%** | **0.011%** |

**Combustion Emissions**

Combustion Emissions of VOC, $NO_x$, $SO_2$, CO, $PM_{2.5}$, $PM_{10,}$ and $CO_2$ due to Construction

| **General Construction Activities** | **Area Disturbed** | | |
|---|---|---|---|
| Demolish WWTP Facilities | 12,100 | $ft^2$ | |
| Construct New WWTP Facilities | 35,000 | $ft^2$ | |
| Construct WWTP Road | 960 | $ft^2$ | Assume 40-foot long by 24-foot wide |

| | | | |
|---|---|---|---|
| Total General Construction Area: | 35,000 | $ft^2$ | |
| | 0.80 | acres | |
| Total Demolition Area | 12,100 | $ft^2$ | |
| | 0.28 | acres | |
| Total Area to be Paved: | 960 | $ft^2$ | |
| | 0.02 | acres | |
| Total Disturbed Area: | 48,060 | $ft^2$ | |
| | 1.10 | acres | |
| Construction Duration: | 12 | months | |
| Annual Construction Activity: | 240 | days/yr | Assume 12 months, 4 weeks per month, 5 days per week. |

## Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

**Grading**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Bulldozer | 1 | 13.60 | 0.96 | 5.50 | 1.02 | 0.89 | 0.87 | 1456.90 |
| Motor Grader | 1 | 9.69 | 0.73 | 3.20 | 0.80 | 0.66 | 0.64 | 1141.65 |
| Water Truck | 1 | 18.36 | 0.89 | 7.00 | 1.64 | 1.00 | 0.97 | 2342.98 |
| Total per 10 acres of activity | 3 | 41.64 | 2.58 | 15.71 | 0.83 | 2.55 | 2.47 | 4941.53 |

**Paving**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Paver | 1 | 3.83 | 0.37 | 2.06 | 0.28 | 0.35 | 0.34 | 401.93 |
| Roller | 1 | 4.82 | 0.44 | 2.51 | 0.37 | 0.43 | 0.42 | 536.07 |
| Truck | 2 | 36.71 | 1.79 | 14.01 | 3.27 | 1.99 | 1.93 | 4685.95 |
| Total per 10 acres of activity | 4 | 45.37 | 2.61 | 18.58 | 0.91 | 2.78 | 2.69 | 5623.96 |

**Demolition**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Loader | 1 | 13.45 | 0.99 | 5.58 | 0.95 | 0.93 | 0.90 | 1360.10 |
| Haul Truck | 1 | 18.36 | 0.89 | 7.00 | 1.64 | 1.00 | 0.97 | 2342.98 |
| Total per 10 acres of activity | 2 | 31.81 | 1.89 | 12.58 | 0.64 | 1.92 | 1.87 | 3703.07 |

**Building Construction**

| Equipment[d] | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] (lb/day) | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Stationary | | | | | | | | |
| Generator Set | 1 | 2.38 | 0.32 | 1.18 | 0.15 | 0.23 | 0.22 | 213.06 |
| Industrial Saw | 1 | 2.62 | 0.32 | 1.97 | 0.20 | 0.32 | 0.31 | 291.92 |
| Welder | 1 | 1.12 | 0.38 | 1.50 | 0.08 | 0.23 | 0.22 | 112.39 |
| Mobile (non-road) | | | | | | | | |
| Truck | 1 | 18.36 | 0.89 | 7.00 | 1.64 | 1.00 | 0.97 | 2342.98 |
| Forklift | 1 | 5.34 | 0.56 | 3.33 | 0.40 | 0.55 | 0.54 | 572.24 |
| Crane | 1 | 9.57 | 0.66 | 2.39 | 0.65 | 0.50 | 0.49 | 931.93 |
| Total per 10 acres of activity | 6 | 39.40 | 3.13 | 17.38 | 3.12 | 2.83 | 2.74 | 4464.51 |

Note: Footnotes for tables are on following page

**Architectural Coatings**

| Equipment | No. Reqd.[a] per 10 acres | $NO_x$ (lb/day) | VOC[b] (lb/day) | CO (lb/day) | $SO_2$[c] | $PM_{10}$ (lb/day) | $PM_{2.5}$ (lb/day) | $CO_2$ (lb/day) |
|---|---|---|---|---|---|---|---|---|
| Air Compressor | 1 | 3.57 | 0.37 | 1.57 | 0.25 | 0.31 | 0.30 | 359.77 |
| Total per 10 acres of activity | 1 | 3.57 | 0.37 | 1.57 | 0.25 | 0.31 | 0.30 | 359.77 |

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

**PROJECT-SPECIFIC EMISSION FACTOR SUMMARY**

| Source | Equipment Multiplier* | Project-Specific Emission Factors (lb/day) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | $NO_x$ | VOC | CO | $SO_2$** | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
| Grading Equipment | 1 | 41.641 | 2.577 | 15.710 | 0.833 | 2.546 | 2.469 | 4941.526 |
| Paving Equipment | 1 | 45.367 | 2.606 | 18.578 | 0.907 | 2.776 | 2.693 | 5623.957 |
| Demolition Equipment | 1 | 31.808 | 1.886 | 12.584 | 0.636 | 1.923 | 1.865 | 3703.074 |
| Building Construction | 1 | 39.396 | 3.130 | 17.382 | 3.116 | 2.829 | 2.744 | 4464.512 |
| Air Compressor for Architectural Coating | 1 | 3.574 | 0.373 | 1.565 | 0.251 | 0.309 | 0.300 | 359.773 |
| Architectural Coating** | | | 15.247 | | | | | |

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

| | Total Area ($ft^2$) | Total Area (acres) | Total Days | |
|---|---|---|---|---|
| Grading: | 48,060 | 1.10 | 1 | (from "Grading" worksheet) |
| Paving: | 960 | 0.02 | 1 | |
| Demolition: | 12,100 | 0.28 | 14 | |
| Building Construction: | 35,000 | 0.80 | 240 | |
| Architectural Coating | 35,000 | 0.80 | 20 | (per SMAQMD "Air Quality of Thresholds of Significance", 1994) |

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

## Total Project Emissions by Activity (lbs)

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Grading Equipment | 41.64 | 2.58 | 15.71 | 0.83 | 2.55 | 2.47 | 4,942 |
| Paving | 45.37 | 2.61 | 18.58 | 0.91 | 2.78 | 2.69 | 5,624 |
| Demolition | 441.77 | 26.19 | 174.77 | 8.84 | 26.71 | 25.91 | 51,432 |
| Building Construction | 9,455.12 | 751.15 | 4,171.75 | 747.92 | 678.97 | 658.60 | 1,071,483 |
| Architectural Coatings | 71.48 | 312.41 | 31.31 | 5.02 | 6.19 | 6.00 | 7,195 |
| **Total Emissions (lbs):** | **10,055.38** | **1,094.93** | **4,412.13** | **763.52** | **717.19** | **695.67** | **1,140,675** |

## Results: Total Project Annual Emission Rates

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| Total Project Emissions (lbs) | 10,055.38 | 1,094.93 | 4,412.13 | 763.52 | 717.19 | 695.67 | 1,140,675 |
| Total Project Emissions (tons) | 5.03 | 0.55 | 2.21 | 0.38 | 0.36 | 0.35 | 570.34 |

## Construction Fugitive Dust Emissions

**Construction Fugitive Dust Emission Factors**

| | Emission Factor | Units | Source |
|---|---|---|---|
| General Demolition and Construction Activities | 0.19 | ton $PM_{10}$/acre-month | MRI 1996; EPA 2001; EPA 2006 |
| New Road Construction Activities | 0.42 | ton $PM_{10}$/acre-month | MRI 1996; EPA 2001; EPA 2006 |

**$PM_{2.5}$ Emissions**

| | | | |
|---|---|---|---|
| $PM_{2.5}$ Multiplier | 0.10 | (10% of $PM_{10}$ emissions assumed to be $PM_{2.5}$) | EPA 2001; EPA 2006 |
| **Control Efficiency** | 0.50 | (assume 50% control efficiency for $PM_{10}$ and $PM_{2.5}$ emissions) | EPA 2001; EPA 2006 |

## Project Assumptions

***General Demolition and Construction Activities (0.19 ton $PM_{10}$/acre-month)***

| | | |
|---|---|---|
| Duration of Construction Project | 12 | months |
| Area | 1.08 | acres |

***New Road Construction Activities (0.42 ton $PM_{10}$/acre-month)***

| | | |
|---|---|---|
| Duration of Construction Project | 9 | months |
| Area | 0.02 | acres |

| | Project Emissions (tons/year) | | | |
|---|---|---|---|---|
| | **$PM_{10}$ uncontrolled** | **$PM_{10}$ controlled** | **$PM_{2.5}$ uncontrolled** | **$PM_{2.5}$ controlled** |
| General Demolition and Construction | 2.47 | 1.23 | 0.25 | 0.12 |
| New Road Construction | 0.08 | 0.04 | 0.004 | 0.002 |
| **Total** | **2.55** | **1.27** | **0.25** | **0.13** |

## Construction Fugitive Dust Emission Factors

**General Construction Activities Emission Factor**

**0.19 ton $PM_{10}$/acre-month** Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton $PM_{10}$/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton $PM_{10}$/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton $PM_{10}$/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton $PM_{10}$/acre-month) and 75% of the average emission factor (0.11 ton $PM_{10}$/acre-month). The 0.19 ton $PM_{10}$/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton $PM_{10}$/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for $PM_{10}$ and $PM_{2.5}$ in PM nonattainment areas.

**New Road Construction Emission Factor**

**0.42 ton $PM_{10}$/acre-month** Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons $PM_{10}$/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

**$PM_{2.5}$ Multiplier** **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to $PM_{10}$ emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

**Control Efficiency for $PM_{10}$ and $PM_{2.5}$** **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for $PM_{10}$ and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

**References:**

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

**Grading Schedule**

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 1.10 acres/yr (from Combustion Worksheet)
Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

| Means Line No. | Operation | Description | Output | Units | Acres per equip-day) | equip-days per acre | Acres/yr (project-specific) | Equip-days per year |
|---|---|---|---|---|---|---|---|---|
| 2230 200 0550 | Site Clearing | Dozer & rake, medium brush | 8 | acre/day | 8 | 0.13 | 1.10 | 0.14 |
| 2230 500 0300 | Stripping | Topsoil & stockpiling, adverse soil | 1,650 | cu. yd/day | 2.05 | 0.49 | 1.10 | 0.54 |
| 2315 432 5220 | Excavation | Bulk, open site, common earth, 150' haul | 800 | cu. yd/day | 0.99 | 1.01 | 0.55 | 0.56 |
| 2315 120 5220 | Backfill | Structural, common earth, 150' haul | 1,950 | cu. yd/day | 2.42 | 0.41 | 0.55 | 0.23 |
| 2315 310 5020 | Compaction | Vibrating roller, 6 " lifts, 3 passes | 2,300 | cu. yd/day | 2.85 | 0.35 | 1.10 | 0.39 |
| TOTAL | | | | | | | | 1.85 |

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 1.85
Qty Equipment: 3.00
Grading days/yr: 0.62

**Haul and Water Truck Emissions**

Emissions from hauling the raw materials for fill are estimated in this spreadsheet.

Emission Estimation Method: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

Raw Material Assumptions:

Haul trucks carry 20 cubic yards of material per trip.

The distance from the borrow pit is 0.5 miles, therefore the haul truck will travel 1 mile roundtrip.

Estimated number of trips required by haul trucks = total amount of material to be brought on installation/20 cubic yards per truck

| | | | |
|---|---|---|---|
| Total amount of imported materials = | 6,499 | cubic yards | (Assume 5 feet deep for buildings and pipelines and 0.5 aggregate for road) |
| Number of trucks required = | 325 | heavy duty diesel haul trucks | |
| Miles per trip = | 1 | miles | |

Water Transportation Assumptions:

Water trucks carry 4,000 gallons per truckload.

Approximately 898,722 gallons of water will be used for construction and demolition activities.

The distance from the nearest water source is 0.1 miles, therefore the water truck will travel 0.2 miles roundtrip.

Estimated number of trips required by water trucks = total gallons of water to be brought to project site/4,000 gallons per truck

| | | | |
|---|---|---|---|
| Total amount of water needed for construction = | 898,722 | gallons | (Assume 1/8 inch water sprayed over project area once per day) |
| Number of trucks required = | 225 | heavy duty diesel haul trucks | |
| Miles per trip = | 0.2 | miles | |

***Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)***

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| *HDDV* | **6.500** | **4.7000** | **19.10** | **0.512** | **7.7** | **2.01** | **1646** |

Notes:

Emission factors for all pollutants except $CO_2$ are from USAF IERA 2003.

Emission factors for PM, $PM_{10}$, $SO_x$ are from HDDV in Table 4-50 (USAF IERA 2003).

Emission factors for VOC, CO, and $NO_x$ are from Tables 4-41 through 4-43 for the 2010 calendar year, 2000 model year (USAF IERA 2003).

Diesel fuel produces 22.384 pounds of $CO_2$ per gallon.

It is assumed that the average HDDV has a fuel economy of 6.17 miles per gallon, Table 4-51 (USAF IERA 2003)

$CO_2$ emission factor = 22.384 lbs $CO_2$/gallon diesel * gallon diesel/6.17 miles * 453.6 g/lb

**HDDV Haul and Water Truck Emissions From Construction Activities**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| **lbs** | **5.30** | **3.83** | **15.58** | **0.42** | **6.30** | **1.64** | **1341.95** |
| **tons** | **0.003** | **0.002** | **0.008** | **0.000** | **0.003** | **0.001** | **0.671** |

Example Calculation: $NO_x$ emissions (lbs) = miles per trip * number of trips * $NO_x$ emission factor (g/mile) * lb/453.6 g

**Construction Commuter Emissions**

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2010 are used

| | | |
|---|---|---|
| The average roundtrip commute for a construction worker = | 40 | miles |
| Number of construction days = | 240 | days |
| Number of construction workers (daily) = | 25 | people |

***Passenger Vehicle Emission Factors for Year 2010 (lbs/mile)***

| $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|
| 0.00091814 | 0.00091399 | 0.00826276 | 0.00001077 | 0.00008698 | 0.00005478 | 1.09568235 |

updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 27 May 2009.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC

**Construction Commuter Emissions**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ |
|---|---|---|---|---|---|---|---|
| **lbs** | **220.354** | **219.357** | **1983.062** | **2.586** | **20.875** | **13.148** | **262963.764** |
| **tons** | **0.110** | **0.110** | **0.992** | **0.0013** | **0.0104** | **0.0066** | **131.482** |

Example Calculation: $NO_x$ emissions (lbs) = miles/day * $NO_x$ emission factor (lb/mile) * number of construction days * number of workers

**Black Hills-Rapid City Intrastate Air Quality Control Region**

| | | | Point Source Emissions | | | | | | Area Source Emissions (Non-Point and Mobile Sources) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row # | State | County | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC | CO | NOx | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC |
| 1 | SD | Butte Co | 0 | 0 | 0 | 0 | 0 | 0 | 2,685 | 435 | 1,924 | 335 | 67.8 | 418 |
| 2 | SD | Custer Co | 0 | 0 | 0 | 0 | 0 | 0 | 3,905 | 1,186 | 2,219 | 388 | 83.1 | 628 |
| 3 | SD | Fall River Co | 0 | 0 | 0 | 0 | 0 | 0 | 1,941 | 1,157 | 1,582 | 295 | 90.6 | 350 |
| 4 | SD | Lawrence Co | 765 | 39.2 | 79.1 | 41.4 | 4.23 | 70 | 8,880 | 1,160 | 3,601 | 600 | 175 | 1,298 |
| 5 | SD | Meade Co | 0 | 0 | 0 | 0 | 0 | 0 | 9,680 | 1,546 | 5,069 | 787 | 136 | 1,360 |
| 6 | SD | Pennington Co | 2,947 | 4,960 | 445 | 187 | 1,556 | 187 | 37,486 | 4,599 | 7,964 | 1,615 | 1,182 | 5,612 |
| Grand Total | | | 3,712 | 4,999 | 524 | 228 | 1,560 | 257 | 64,577 | 10,083 | 22,359 | 4,020 | 1,735 | 9,666 |

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 8 December 2009.

Black Hills-Rapid City Intrastate Air Quality Control Region 4 (40 CFR 81.342)

| | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|---|
| Meade Co | 9,680 | 1,546 | 5,069 | 787 | 136 | 1,360 |
| Pennington Co | 40,433 | 9,559 | 8,409 | 1,802 | 2,738 | 5,799 |

*THIS PAGE INTENTIONALLY LEFT BLANK*