US Dairy Forage Research Center

FINAL ENVIRONMENTAL ASSESSMENT



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Prepared For:

USDA Agricultural Research Service

Prepared By:







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EXECUTIVE SUMMARY

The U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS) is proposing to construct a new facility to enhance the research capacity of the U.S. Dairy Forage Research Center (USDFRC) Farm in Prairie du Sac (PDS), Wisconsin. ARS personnel formed a USDFRC Facilities Planning Committee consisting of current partners and industry stakeholders to assist in the planning of this project, and the group considered several options for new and remodeled research facilities. Following a comprehensive and objective evaluation process, it was determined that construction of a new USDFRC Farm on an underutilized parcel within the former Badger Army Ammunition Plant (BAAP) would best meet the purpose and need as determined by the ARS, the USDFRC, the University of Wisconsin (UW) Madison, and other stakeholders involved in the project.

This Project is considered a new construction project and, therefore, requires an environmental assessment (EA) in conformance with the National Environmental Policy Act (NEPA) and supplementary USDA and ARS regulations. An EA is "a concise public document...that serves to briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of 'no significant impact' " (40 CFR 1508.9). As required under NEPA (established January 1, 1970 to ensure federal agencies consider the potential impacts of their actions on the environmental Quality (CEQ) guidelines for NEPA implementation. These regulations provide managers and decision makers a means to evaluate the direct, indirect, and cumulative environmental consequences of proposed actions at the earliest possible time (i.e., before irreversible commitment of resources). They also specify how to document efforts to identify, evaluate, quantify, and consider both the positive and negative environmental effects of proposed actions. It is ARS policy to fully comply with the NEPA law and applicable regulations. Whenever possible, preference is given to avoiding or mitigating adverse environmental effects.

An interdisciplinary team of resource specialists used a systematic approach for analyzing the proposed Project and alternatives to it, estimating the environmental effects, and preparing this EA. This EA was prepared in compliance with NEPA and related CEQ guidelines as published in 40 CFR 1500-1508, and with USDA and ARS implementation guidelines as published in 7 CFR 1b and 7 CFR 520, respectively. As such, it evaluates construction and basic operation of the USDFRC Farm. Subsequent environmental documents will be prepared to address the impacts of individual research projects.

This EA concludes that the Proposed Alternative of constructing a new USDFRC research farm at the former BAAP property will involve minimal environmental effects and is the alternative having the least overall impact on its environment. While there are obvious challenges in terms





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of manure management and the potential effects of associated nutrients on groundwater, the construction of modern facilities and establishment of treatment systems are designed to mitigate these effects.





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A. Objective of Proposed Action

A.1 HISTORY AND BACKGROUND

The US Dairy Forage Research Center (USDFRC) in Madison, Wisconsin is one of three research units in Wisconsin administered by the U. S. Department of Agriculture's (USDA) Agricultural Research Service (ARS). The USDFRC is the only USDA-ARS facility out of approximately 100 in the U.S. that addresses the improvement of forage use by cattle (USDA-ARS, 2007). Laboratories, greenhouses, and offices associated with this research are located at the University of Wisconsin-Madison campus, the Institute for Environmentally Integrated Dairy Management in Marshfield, and at the 2,006-acre, 350-cow USDFRC Farm at Prairie du Sac (USDFRC-PDS). The other two USDA-ARS research units in Wisconsin, also located on the UW-Madison campus, focus on cereal crops and vegetable crops. The USDFRC-PDS is the subject of this EA.

The USDA-ARS' mission is to conduct research to "develop and transfer solutions to agricultural problems of high national priority and provides information access and dissemination to: ensure high-quality, safe food and other agricultural products; assess the nutritional needs of Americans; sustain a competitive agricultural economy; enhance the natural resource base and the environment; and provide economic opportunities for rural citizens, communities, and society as a whole (USDA-ARS, 2008a)." The USDFRC facilities in Madison, Prairie du Sac and Marshfield address "national problems which limit effective and efficient use of forage for production of milk; increase yields and quality of forage grown and harvested, reducing losses associated with harvesting, storage and feeding, and maximizing use of forage nutrients by dairy cows for milk production (USDA-ARS, 2008b)". Specifically, its mission is "to develop knowledge and tools needed to enhance sustainable and competitive dairy forage systems that protect the environment, promote animal health, and ensure a safe, healthy food supply (USDA-ARS, 2010)".

Efforts to establish a USDA dairy research facility date back to the late 1950s. Planning and programmatic development occurred from 1974 to 1979 and construction of the first buildings and feed storage units occurred in 1980 on the existing site. The UW-Madison established the foundation herd at the farm in the early 1980s (USDA-ARS, 2010).

Currently, the Research Center operates jointly with UW-Madison College of Agricultural & Life Sciences, Agricultural Research Stations (UW-ARS). UW-ARS uses revenues from the Research Center to offset operating costs and to pay the state employees who work there. In return the dairy herd and Research Center are made available for the faculty and students conducting research within UW-College of Agricultural and Life Sciences (USDA-ARS, 2010).

The USDFRC is on land that was previously owned by the U.S. Department of the Army's (Army) Badger Army Ammunition Plant (BAAP). In 1980, the USDFRC obtained a special





permit through the Army to farm, at no cost, about 1,500 acres of cropland and pastureland that were part of the 7,354-acre BAAP. In 1999, USDFRC began to make lease payments for the use of the land. On September 29, 2004, the USDA received custody of 1,943 acres of the BAAP to be used by USDFRC.

The active portion of USDFRC-PDS is comprised of 2,006 acres of which 520 acres are planted in corn for grain and silage; 300 acres are planted in alfalfa, 348 acres in soybeans, 90 acres in winter wheat, and 23 acres red clover. Approximately 40 acres are used for small research plots and 235 acres are used for pasture. The remaining 450 acres consist of buildings, roads, and woodlot. The current herd size consists of 350 cows, and 350 calves and heifers. Lactating cows at the center produce an average of approximately 27,345 lbs. of milk per year which is sold to Foremost Farms for public consumption.

Research activities undertaken at USDFRC focus on: improving dairy forage and manure management to reduce environmental risk; understanding how dairy cows digest and utilize forages; improving forages so they are better used by dairy cows; improving methods of harvesting and storing forages; and studying the impact of dairy systems on the environment to help dairy farmers know the best ways to protect the environment and efficiently recycle the nutrients in manure. Ongoing research projects at the USDFRC fall under the disciplines of: Agronomy, such as field studies on cropping systems and pasture quality and genetic studies on developing species and cultivars and genetic engineering for improved plants; Dairy Nutrition, such as rumen fermentation trials, digestion trials, feeding trials, and studies on protein, carbohydrates and fiber, non-fibrous carbohydrates, and rumen microbes; Engineering, such as harvest methods and equipment, feed storage methods and facilities; and the Environment, such as nutrient cycling, manure management, and ammonia emissions. The diversity of these studies offers opportunities for additional interdisciplinary research.

A.2 PURPOSE AND NEED FOR ACTION

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As stated in the Program of Requirements developed by HDR in combination with Curry Wille and Associates:

"The future needs of the dairy industry depend on research that increases economic and environmental sustainability of dairy farms. To better enable the U.S. Dairy Forage Research Center (USDFRC) to conduct research designed to find solutions to problems associated with the economic and environmental sustainability of dairy farms, the USDFRC is currently developing options for enhancing the research capacity of its research farm at Prairie du Sac, Wisconsin.

The main driver behind this project is the need to better understand how dairy cows digest and utilize feed so that forage plants and dairy cattle diets can be modified to improve digestibility and nutrient utilization; this will lead to greater







economic sustainability for dairy producers (more milk produced per unit of feed fed) and environmental sustainability (less manure produced per unit of milk produced).

To do this, the industry needs a highly specialized type of research facility that enables researchers to carefully monitor every aspect of digestion at every step of the way. To date, there are no publically funded research facilities of this type in operation; two exist at universities, but both have been unable to operate consistently due to soft funding.

The USDFRC has named this highly specialized research unit the **Intensive Animal Nutrition Research Facility** (IANRF). While determining the research capacity needed for this facility, it was determined that the current number of cows in the USDFRC herd would not be sufficient to populate both the IANRF and the more traditional nutrition research trials being conducted at the farm; therefore, building an IANRF would also require creating additional dairy housing and milking facilities to accommodate a total of 432 cows in milk.

Once the need for an increased herd size was determined, stakeholders suggested that building new dairy facilities might be more cost effective than renovating the current facilities – in terms of construction costs, future operating costs, and relevancy to the dairy industry. So the USDFRC began to study options for building new in addition to options for renovating the current facilities.

Enhanced research farm facilities would also enable the USDFRC to increase its capacity for conducting research on air emissions from dairy farms – essential information for policy makers, regulators, and the dairy industry. Current USDFRC research in the area of ammonia and other greenhouse gas emissions is conducted in a retrofitted 1980 tie-stall barn. Specially designed **air emission chambers** would allow research to be conducted more efficiently and timely.

The USDFRC also seeks to enhance its dairy grazing research by building a **grazing facility for lactating cows**; at present it can only conduct grazing research on heifers. Plans call for new research pastures for lactating cows in Badger.

The vision for enhanced research farm facilities at Prairie du Sac includes two other components desired by both the USDFRC and by local citizens (as indicated in the goals of the Badger Reuse Plan for the Badger Army Ammunition Plant (BAAP) and as voiced at several meetings with different groups in the Sauk Prairie area). One is to create facilities that are **energy neutral** and that **enhance the surrounding environment and landscape**. The other is to include facilities that **accommodate educational and historical displays and opportunities for the public** (HDR and Curry Wille, 2011)"







A.3 SCOPE OF PROPOSED ACTION

The USDFRC conducts research based on forage production and the utilization of the forage by the dairy cow. The proposed modernization of the USDFRC will enhance the quality and quantity of research produced. The following facilities are identified in the USDA-ARS Program of Requirements (dated August 19, 2011) as the critical components of the project. In accordance with the ARS NEPA compliance regulations found at 7 CFR 520, the action being assessed in this document is limited to facility construction and basic operation. Individual research projects will be subject to separate analyses under NEPA.

A.3.1 Milking, Transition, and Automated Cow Research Unit (MTACRU)

The MTACRU would provide housing and milking facilities for the 432 lactating cow dairy herd and would also provide housing for transition cows, non-lactating cows in the last three weeks of their dry period prior to and through calving. Space for management and special care of animals will also be provided. The facility will also feature an automated feeding system and individual cow intake research tubs.

Calf Barn

The calf barn would house calves in bedded pens in groups of eight as well as calves in individual pens. Calves would be utilized as replacement stock to the herd and would be housed in a separate building away from the downstream wind path of the other cows to assist in controlling health issues.

Dry Cows and Heifers

The dry cow/heifer housing space will provide housing for dry cows, heifers, breeding age heifers, and bred heifers. The animals in this facility would serve as replacement stock for the 432 cow milking herd. The space will also include automated manure collection and automated feeding systems with the option to feed with a modern grain wagon.

A.3.2 Intensive Animal Nutrition Research Facility (IANRF)

The IANRF would allow in-depth research of forage utilization at the individual animal level. Spaces will be provided for housing, care, and monitoring of small ruminants, sheep and goats, and large ruminants, dairy cows. Sample preparation and analysis space along with researcher office space will also be provided.

A.3.3 Administration & Personnel Support Facility

This area would provide the front door to the facility and will control access of visitors and employees. An education center will be included with viewing areas and conference room for outreach to the community and visitors. Employee break room, locker and restroom facilities will be included along with office space for USDFRC staff.







A.3.4 Emission Chambers

Four chambers with individual ventilation and monitoring systems will be used to measure ammonia and greenhouse gas emissions from dairy cows. Lactating cow rations, bedding, manure collection and other management practices would be assessed for their ability to reduce hazardous gas emissions from dairy barns.

A.3.5 Manure Treatment System

The manure system would handle collection, transport, and storage of all dairy manure for utilization as a fertilizer on the USDFRC crop land. Inclusion of an anaerobic digester into the system would allow the site to produce renewable energy from their manure stream; however, an anaerobic digester is not currently included in the system design. The majority of the manure will be sand laden and would therefore require manure sand separation through sand lanes (allows sand to settle) and mechanical sand separation. Additionally, manure solids and liquids will be separated with the liquid going to a 10,900,000 gallon manure storage basin with EPDM cover and the solids will be stored for further use. The majority of the manure at this facility will be collected automatically with some collection occurring manually and mechanically.

A.3.6 Feed Storage/Mixing and Support Facilities

These facilities would provide storage of silage, hay, and other feedstuffs produced from the USDFRC crop land and purchased from outside sources. The storage systems will be state-of-the-art facilities to minimize losses as well as allow research on optimal methods of preserving forage quality, handling silage leachate and reducing potential environmental concerns. Facilities for automating the mixing of the rations to the herd will also be provided along with storage for equipment and machinery.

A.3.7 Grazing Facility

This facility will enhance research into the study of grasses and legume sward management, and forage quality by lactating dairy cows. Research will measure performance gains from lactating cows grazing on new grass or legume variety releases.

A.3.8 Herd Makeup

The following table provides information an allocation of cow numbers to the planned spaces. The housing factor for other than the sub-categories of the lactating cows is a factor in sizing of housing for variations in group sizes from the average number of animals. These values are assumed based on typical management practices to account for variation in calving cycles. For the sub-categories of the lactating cows, the housing factor is the percentage of the lactating cow herd to be accommodated in each area. The following numbers are provided by the US Dairy Forage Research Center with a lactating herd size of 432 cows.







Dairy Animal Allocation Table

Avg.		Housing	
No. of	Housing	No. of	
Head	Factor	Head	Housing Location
432	100%	432	Free Stalls MTACRU
	6%	24	Tie stalls in IANRF
	6%	24	Tie Stalls
	7%	32	Free stalls in Emissions Chambers
	11%	48	Pasture at new Grazing facility in Badger Site.
	6%	27	Bedded pack MTACRU
	6%	27	Bedded pack MTACRU
37	162%	60	Bedded Pack in new MTACRU
88	100%	88	Dry Cow and Heifer Housing in Badger Site
·	·	·	
42	100%	42	Calf hutches in Badger Site
62	100%	62	Calf Housing in Badger Site
156	100%	156	Dry Cow and Heifer Housing in Badger Site
62	100%	62	Dry Cow and Heifer Housing in Badger Site
198	100%	198	Dry Cow and Heifer Housing in Badger Site
	Avg. No. of Head 432 I <	Avg. Housing Factor 432 100% 432 6% 6% 6% 10. 6% 10. 6% 10. 6% 10. 11% 10. 6% 10. 6% 10. 6% 10. 6% 10. 6% 10. 6% 10. 100% 100% 100% 156 100% 198 100%	Avg. Housing Housing No. of No. of Housing No. of 432 100% 432 432 6% 24 6% 24 7% 32 11% 48 6% 27 6% 27 6% 27 6% 27 6% 27 37 162% 88 100% 42 100% 42 100% 62 100% 156 100% 198 100%

1 – Based on 30% cull rate for total cow herd of 520 head (lactating herd and dry cows). All males sold at birth.







A.3.9 Utility Upgrades

Power and Heating

Power for the proposed facility will be provided by Alliant Energy. Alliant Energy has readily accessible infrastructure within the adjacent public rights-of-way for connection to the project. Multiple, high efficiency hot water boilers will provide hot water for the proposed facility.

Gas and Electric

Alliant Energy also provides natural gas service in the area of the proposed facility. Alliant Energy has readily accessible infrastructure within the adjacent public rights-of-way for connection and use.

The existing overhead electric is available at a nominal 13,000 volts and readily available for connection. An onsite generator will provide the facility with backup electrical power.

Fiber Optic

Fiber Optic facilities are located within the adjacent rights-of-way. These services will be extended to the site by the respective providers.

Water Supply

Currently, three (3) options are being considered for water supply for the proposed facility as follows:

- 1. Install or upgrade a well at the site.
- 2. Petition to join the existing Bluffview Sanitary District.
- 3. Petition to join the proposed Town of Merrimac sanitary district.

Installation of private, onsite high capacity wells may not be a desirable option due to past propellant dumping and burning on the BAAP that has contaminated the shallow sand and gravel aquifer. A groundwater contamination plume immediately down gradient of the proposed site location stretches south for several miles and includes Dinitrotoluene (DNT), carbon tetrachloride, trichloroethylene (TCE) and chloroform. Another plume of TCE generated by off base attributed non-BAAP sources is moving toward the site from the northwest in the shallow aquifer.

However, a separate, deeper water source in the sandstone layer (approximately 400 feet below ground surface) is a possible suitable source of potable water. This is the water source of the Badger Well water to the north and the adjacent Badger Well 5 not currently in use. A new well or recasing of the existing Well 5 to draw only from the lower aquifer is one possible option.

Another option is joining the Bluffview Sanitary District which uses the Badger Well House to the north (Badger Well 1). This well house is equipped with a 275 gpm submersible well pump and







a 10,000 gallon hydro pneumatic tank. It is routinely checked for contaminants and has the capacity to provide the required water supply needs for the USDA facility. A new public water main will need to be constructed to provide a connection adjacent to the USDA facility. This 8-10 inch water main will likely follow the newly constructed public sanitary sewer alignment from the well house to the USDA facility, approximately 8,500 linear feet in length.

A third possibility is connection to the proposed water district that is planned to serve homes to the south and east of the USDA facility. The Army will ask the Town of Merrimac to establish a Water / Sanitary District to manage and operate this facility. The boundaries of the proposed district have not yet been established. The USDA DFRC Project will have to petition the Town of Merrimac to join the proposed district.

Water Main

The proposed facility will connect to either the public water main or the high capacity well network for private water service.

Sanitary Sewer

Domestic waste from the proposed development will be conveyed by gravity to the sanitary sewer main. The Bluffview Sanitary District has given notice the maximum discharge to the public system from the site is approximately 150 gallons per minute with monitored organic content.

The animal manure will be manually collected and deposited within a manure storage facility located on the development property. None of this manure will be discharged into the public sanitary sewer system. The manure storage facility will be pumped and spread on production acreage in strict accordance with Wisconsin Department of Natural Resources requirements and the facilities Comprehensive Nutrient Management Plan.

Storm Sewers / Stormwater Management

Separate, exterior storm sewer systems will be designed and constructed to meet the facility needs and requirements. Each system will be designed to safely convey the 10-year storm event. Furthermore, identification of a safe conveyance, most likely overland flow, for the 100-year storm should be established in the final design documents.

- A conveyance swale system will capture the stormwater runoff from offsite and divert it around the development and into the existing downstream conveyance system.
- A storm sewer system will be installed which captures the runoff from the rooftops and discharges into a detention / infiltration basin. This basin will provide runoff rate control to establish a non-erosive velocity and reduce flooding potential and meet the existing capacities of the downstream culverts. Additionally, the detention / infiltration basin will be required to meet the performance standards of NR 151.121 to 151.128 for stormwater runoff generated by roadway, parking, and rooftop associated with visitor / research areas. Strictly agriculture impervious areas are exempt from the postconstruction performance standards pursuant to NR 151.121 (2)(b). Please refer to the







determination / applicability of these requirements as provided by the Wisconsin Department of Natural Resources for additional information.

- Stormwater runoff generated by the visitor / employee parking areas shall be captured and treated within bioretention basins at the edge of pavement and within landscape islands to meet the requirements of NR 151.121 to 151.128 and to meet the ARS objective for sustainable design. Furthermore, impervious surfaces free of organic waste should be conveyed to stormwater management features to promote infiltration and provide stormwater quality and quantity treatment in accordance with the Energy Independence and Security Act (EISA) Section 438.
- A swale around the manure storage facility will divert stormwater runoff away from the facility.
- A storm sewer system will capture the stormwater runoff from the paved surfaces exposed to organic materials and discharge it into the manure storage facility. The manure storage facility will be designed to include the volume of this stormwater runoff.

A.3.10 Parking and Transportation

The Badger Army Ammunition Plant is in the process of being released by the Army and reassigned to three main parties: the Bureau of Indian Affairs (no land transferred to date); USDA (land transferred in 2004); and the Wisconsin Department of Natural Resources (some land transferred in 2010). Some land was also transferred to the Wisconsin Department of Transportation for a rerouting of State Hwy. 78. Each of these parties will incorporate new land uses for their respective parcels. The USDA ARS is proposing new research and production facilities adjacent U.S. Hwy. 12. Ultimately, the revised land uses are not anticipated to create a significant increase in traffic. Therefore, it is unlikely that the existing transportation patterns for the transportation system in this area will vary significantly from current traffic flow.

The USDFRC will need easy road access and adequate parking for staff, visitors, and suppliers.

A.3.11 Permits Required

The following site related permits will be applied for as part of the design or associated with this project:

- NR 151 Runoff Management
- NR 243 Wisconsin Pollution Discharge Elimination System (WPDES) for Concentrated Animal Feeding Operations
- NR 216 Construction Site Soil Erosion and Stormwater Management
- DT1504 Application / Permit for Connection to State Trunk Highway
- Sauk County Manure Storage Facility Permit
- Wisconsin Department of Commerce General Plumbing (Private Water, Private Sanitary Building Sewer, Private Storm Sewer)







Additional permits may be applied for, if required, during the course of the proposed project. For example, should WDNR determine that jurisdictional wetlands are present where construction activities are proposed, a wetland permit application (NR 103) would be filed for review.





B. Description of Alternatives

Several workshops and planning meetings were held in Prairie du Sac and Madison, Wisconsin, to evaluate the needs of the USDFRC and to develop programming elements to meet those needs. Attendees included USDFRC Facilities Planning Committee members and their technical consultants, and project stakeholders including agricultural production stakeholders, a representative of the Natural Resource Conservation Service, a representative of the Ho-Chunk Nation, and three members of the Badger Oversight Management Committee who also represent the Army, the Wisconsin Department of Natural Resources (WDNR), and Citizens for Safe Water Around Badger (CSWAB).

Participants engaged in a series of discussions to address the project's scope, budget and technical issues, the users' functional requirements, the best re-use of the BAAP, and environmental concerns. During this process, five potential sites for development of a new USDFRC facility within the BAAP were identified in addition to the current site (Appendix E.4). The group developed a scoring system to compare the various sites relative to one another, and employed it to determine which site would be the most suitable overall for locating the new research facility. Scoring factors included site size, ownership, availability, soil types, roads, utilities, crop and grazing land, natural ventilation, visual impact, impacts on ground and surface waters, and demolition required.

A map indicating the location of each of the alternatives evaluated can be found in Appendix E.4, along with the scoring for each. Using this method, Site B emerged as the highest scoring potential site. This Proposed Alternative is compared with the No-Build Alternative in this environmental assessment.

B.1 NO BUILD ALTERNATIVE

This alternative consists of continuing to operate and maintain the existing USDFRC facility within the Township of Merrimac. Any improvements that may be made over time would occur within the existing development footprint.

B.1.1 Affected Environment

Geology and Soils

The Prairie du Sac USDFRC is located within an area of thin till east of the terminal moraine (Clayton and Attig, 1990). Bedrock is an estimated 300-350 feet below the ground surface (Gotkowitz and Zeiler, 2002a). Soil map units at the existing USDFRC site include McHenry silt loam and St. Charles silt loam (both are classified as Typic Hapludalfs). Both soils are very deep, well-drained Alfisols formed in loess and the underlying loamy or sandy loam till on till







plains. The slopes across the parcel are moderate to steep, ranging from 2-6% in the St. Charles series and up to 30% in the McHenry series. These soil map units have moderate to high susceptibility to erosion by water, and slight susceptibility to erosion by wind (NRCS, 1980). Both soil map units are upland soils with no hydric inclusions.

Chemical and Physical Quality of Ground or Surface Water

The USDFRC is located across from the southeast corner of BAAP and was historically part of the BAAP property. It is located within the Wisconsin River/Lake Wisconsin Watershed (WDNR, 2011b), adjacent to the cliffs of Lake Wisconsin, approximately 50 feet above the surface water. The water table is estimated to be approximately 780-800 feet above mean sea level (msl) throughout the majority of the site (Gotkowitz and Zeiler, 2002b). For reference, Lake Wisconsin is 774 feet above msl. The groundwater gradient dips to the southeast towards Lake Wisconsin. Recharge of groundwater comes from the topographic drainage basin created by the Baraboo Hills to the north of BAAP and gradual infiltration of surface water through the soil surface.

While in operation, BAAP produced acid, oleum, smokeless powder, rocket propellant, E.C. powder, and rocket grain (Goc, 2002). Hazardous wastes associated with this production that have been found in the groundwater include carbon tetrachloride, trichloroethylene, and chloroform. There have been 13 general areas of contamination identified at BAAP that have impacted groundwater, surface water, and sediment (The Louis Berger Group, 2002). The Central Plume of dinitrotoluene (DNT) contamination from BAAP skirts the northwestern portion of the existing USDFRC and 2010 samples from a well located along State Hwy. 78 north of the facility (RIN-1004B) were found to contain levels of DNT that exceeded the Enforcement Limit (Appendix E.8).

Surface water at the USDFRC drains to Lake Wisconsin. The majority of surface water is deflected around the site (MSA Professional Services, Inc., 2011); however, the parcel likely receives some surface water runoff from State Hwy. 78. This area of Lake Wisconsin (Grubers Grove Bay) is a Wisconsin 303(d) listed impaired water due to unspecified metals resulting in chronic aquatic toxicity (WDNR, 2010). Other portions of Lake Wisconsin are 303(d) listed impaired waters due to mercury and PCBs found in contaminated fish tissue.

Local Climate, Meteorological Conditions, and Air Movement Patterns

The USDFRC is located in Sauk County, which is a part of Wisconsin's Southwest Climate Division (Wisconsin State Climatology Office, 2010). The climate is generally described as continental, with wide variation in seasons, temperatures, and precipitation from year to year (NRCS, 1980). Storms generally travel from west to east or southwest to northeast. A U.S. Coop Network weather station is located at the Baraboo Wisconsin Dells Airport (Midwestern Regional Climate Center, 2011). Historical climate data is available from 1971-2000 (Table B.1). On average, the months of December, January, and February are below freezing with at







least eight inches of snow. The months of June, July, and August are on average above sixty degrees with more than four inches of rain. Summers typically have frequent brief hot and humid spells and heavy dew, with occasional cool periods (NRCS, 1980). The growing season averages 142 days and typically runs from the beginning of May through the end of September, with considerable variation depending on the last freeze date in spring and the first freeze date in fall.

Table B.1. Historical Climate Data Summary for Baraboo Water Works, Wisconsin (Midwestern Regional Climate Center, 2011).

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Mean °F	13.9	19.2	30.9	43.5	55.6	64.8	69.1	66.5	58.0	46.4	32.6	19.9	43.4
Precip (in)	1.08	1.03	2.08	3.61	3.48	4.16	4.44	4.45	3.53	2.48	2.32	1.13	33.79
Snow (in)	10.9	8.1	6.3	2.2	0.0	0.0	0.0	0.0	0.0	0.4	4.4	9.5	41.8

The facilities at USDFRC are located in a valley which restricts air movement patterns and airflow through the barns.

Release of Particulates or Toxic Substance to Air

The WDNR has a nearby air quality monitoring site at Devil's Lake State Park, which is adjacent to the northern boundary of BAAP. The present air quality within Sauk County for February 2011 has been rated as good to moderate, indicating the air quality index (AQI) is between zero and one hundred (i.e. 8 hr ozone is between 0-75 ppb and 24 hour average fine particle is between 0-35.4 μ g/m3) (WDNR, 2011a). During the four years of available air quality data (dating back to January 1, 2007), there have been several days where air quality has been considered "unhealthy for sensitive groups" (AQI 101-150), which was generally due to excessive fine particles.

According to the EPA an adult cow emits between 80-110 kilograms (kg) of methane per year. Although many factors affect methane production, a figure estimated between 76 and 105 kg/day can be assumed for a facility with 350 mature cows, such as that of the existing USDFRC.

Critical Habitat

The U.S. Fish & Wildlife Service (USFWS) website reports that five federally-listed or candidate species are recorded for Sauk County (Appendix E.7). The Prairie Bush Clover (Threatened) is the only one of those species for which suitable habitat could possibly be present at the existing USFDRC site. However, the USDFRC site has been intensively cultivated and pastured for many years and is unlikely to support this prairie species.







The Wisconsin Department of Natural Resources (WDNR) Bureau of Endangered Resources (BER) was consulted regarding the potential for threatened, endangered, and special concern species to occur within the project area. They reported that three bird species and one mammal species of Special Concern, two Endangered and one Threatened reptile species, one reptile species of Special Concern, nine listed species of fish (one Endangered, three Threatened and five Special Concern), two Threatened mussels, one beetle species of Special Concern, and four listed plant species (one Threatened and three Special Concern) are recorded as occurring in proximity to the USDFRC site (Appendix E.7). Due to confidentiality requirements of the WDNR BER and the sensitivity of the Natural Heritage Inventory (NHI) data, the names of species cannot be released in combination with their known locations. Potentially suitable habitat for the mammal and the birds WDNR listed may be available at the USDFRC site.

Species Balance

The USDFRC has been located at its current site since 1980, during which time the species balance in the area has presumably reached equilibrium. There is a great deal of edge habitat present along the margin between the open meadows surrounding the existing buildings, and the adjacent forested lands. This juxtaposition of diverse cover types supports a wide variety of wildlife from woodland birds and small mammals to grassland birds, raptors, and larger mammals such as deer, coyote and, possibly, bear. Within the agricultural portions of the site, however, wildlife use is limited to the grassland birds, passerines, and small mammals that are more adapted to such activities.

Wetlands and Floodplains

While riverine and palustrine wetland habitat associated with the adjacent Wisconsin River and Gruber's Grove Bay on Lake Wisconsin are located in the immediate project vicinity, there are no mapped wetlands or designated floodplains found within the existing site, which consists of rolling hills draining to the Wisconsin River (wetlands are shown on Appendix E.3 maps). The land elevation at the site ranges from 850-880 feet msl, while the adjacent base flood elevation for the Wisconsin River at this point is 774.

Land Use

The USDA began using land at BAAP in 1979, renting in 1999, and in 2004, the USDA became official landowners at BAAP. The majority of the 2,006 acres at the USDFRC Farm is used to produce feed for the dairy herd. About 868 acres are cropped with corn and soybeans; 413 acres are planted with alfalfa, winter wheat, and red clover; 235 acres are used for pasture; and 40 acres are used for smaller scale research plots. The remaining 450 acres are occupied by buildings, roads, and woodlands. Due to the cultivating and cropping of the landscape, most of the vegetation within the project area is non-native and highly altered from pre-settlement vegetation. A woodland buffer exists between the Farm and the Wisconsin River.







Facilities at the USDFRC consist of: a 72-cow tie-stall barn and 14 maternity pens (D Barn); a 72-cow tie-stall barn and 16 stalls in ammonia trial chambers (E Barn); a 196-cow free-stall barn (F Barn); a 40-stall, sand bedded, dry-cow barn (K4 Barn); 54 calf hutches; a 196-headfree-stall barn for heifers from 6-10 months until ready to breed (G-Barn).

The existing milking parlor consists of Double-8 herringbone with automatic take-offs, individual milk weights, and a crowd gate.

Feed storage facilities are as follows:

- 4 bottom-unloading, oxygen-limiting, glass-lined silos (14' X 50')
- 4 stave silos (14' X 55')
- 2 stave silos (24' X 70')
- 1 bottom-unloading, oxygen-limiting, concrete silo (24' X 78')
- 3 bunker silos (16' X 72' [sized for research])
- 2 bunker silos (32' X 124')
- 1 bunker silo (28' X 96' [one side] and 124' [other side])
- Silo bags in various locations
- 15 commodity bins

Land use to the west, across State Highway (State Hwy.) 78, is agricultural land associated with USDFRC activities and open space. Open space on former BAAP land currently held by WDNR is located to the west and north, while developing residential use lies to the south of the site. Lake Wisconsin borders USDFRC to the southeast.

Population

The population of Sauk County in 2010 was 61,976, which represents an increase of 12.2% since 2000 when the population was 55,225 (Table B.2). Of the total county population which gave race data (61,220), 58,588 (95.7%) of the population is white, 2,675 (4.4%) of the population is Hispanic / Latino, and 769 (1.3%) are American Indian (and Alaskan Native). Black / African American and Asian populations account for less than one percent of Sauk County's population in 2010. The Township of Sumpter (located west of existing USDFRC) had a population of 1,191 in 2010 (increase of 16.6% since 2000) and the Township of Merrimac (existing USDFRC site) had a population of 942 in 2010 (increase of 8.5% from 2000). Bluffview, an unincorporated area west of BAAP, had a 2010 population of 742 (U.S. Census Bureau).

Year	Population	Percent Change from Previous Decade
1990	46,975	
2000	55,225	17.6%
2010	61,976	12.2%

Table B.2.	Sauk Count	y Population	Estimates
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Source: U.S. Census Bureau







Sauk County is one of ten counties in Wisconsin that is expected to grow the fastest from 2000 to 2035 (WDOA, "Wisconsin Population 2035"). Sauk County is predicted to have a population of 80,563 by 2035, an increase of 46% from 2000. This increase is greater than the increase expected for the state of Wisconsin. The median population age of residents in Sauk County was 37.3 in 2000.

Public Health and Safety

Police protection in Sauk County is provided at the county and municipal level. The Sauk County Sheriff's Department is the first responder to incidence calls at BAAP and the USDFRC. Municipal police departments in Sauk County are located in Baraboo, La Valle, Lake Delton, Plain, Reedsburg, Sauk City, and Spring Green.

There are multiple fire departments located within Sauk County. The county is divided into jurisdictional units and fire departments respond to calls within the specific units. Sauk City Fire Department currently serves the BAAP, but Merrimac Fire and Rescue, Inc. serves the USDFRC. Sauk County has three medical facilities; Reedsburg Area Medical Center in Reedsburg, Sauk Prairie Memorial Hospital in Prairie du Sac, and St. Clare Hospital in Baraboo. The closest medical facility to BAAP and the Dairy Forage Research Center is the Sauk Prairie Memorial Hospital.

Employment, Labor Force and Income

Twenty-six employees currently work at USDFRC. The USDA operates the farm jointly with University of Wisconsin-Madison College of Agriculture and Life Sciences, Agricultural Research Station (UW-ARS), and the site is used by multiple research scientists.

The population of employed citizens age 16 and over in the work force in Sauk County was 31,808 (U.S. Census Bureau,"American Fact Finder"). The majority of employees (81.4%) were private wage and salary workers and 10.6% were government employees. Unemployment rates for this time period were slightly lower than the rest of the state and the US; however, per capita income is also lower (Table B.3). Of the Sauk County residents 25 years and older, 88.2% are at least high school graduates, which is slightly higher than 84.6% for the U.S. (U.S. Census Bureau, "American Fact Finder"). 19.6 % of Sauk County residents hold a bachelor's degree or higher, which is lower than 27.5% for the U.S.

Location	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate	Per Capita Income
Sauk County	33,599	31,808	1,791	3.9%	\$25,599
Wisconsin	3,060,803	2,873,396	187,407	4.2%	\$26,447
United States	152,273,029	141,303,145	10,969,884	4.7%	\$27,041

Table B.3. Employment and Income data from 2005-2009.

Source: U.S. Census Bureau, "American Fact Finder" (2005-2009 data).







Housing Supply and Demand

Sauk County Department of Planning and Zoning is the governing body for land use administration in Sauk County and the Township of Merrimac adheres to the County's policies and ordinances. The Township of Merrimac is primarily zoned for agricultural purposes, however, residential building activity in Sauk County is increasing and land use permits for new construction in Sauk County doubled from 1980 to 1990 (The Louis Berger Group, 2002). Sauk County land use permits have dropped from a high in 2003 back to levels seem commonly in the late 1990s, a trend that may be attributed to the economic recession (Sauk County, 2010).

There were 29,708 housing units in Sauk County in 2010, 84.8% or 25,192 of which were occupied (U.S. Census Bureau, "American Fact Finder"). Due to the presence of lake and river frontage in Sauk County, much of the vacant housing in certain areas, such as Merrimac with Lake Wisconsin, are seasonally occupied or used for recreational purposes. The number of housing units has increased by 22.3% from 2000 when there were 24,297 housing units. The percent increase in housing is twice as great as the increase in population, indicating the residents are building second homes or vacation getaways.

The average household occupancy in Sauk County from 2005-2009 was 2.32 residents and 72.8% of homes are owner-occupied. The median value of owner-occupied homes from 2005-2009 was \$161,100. The median value for occupied rental units was \$699 per month.

Industrial Activities

The economy of Sauk County is largely dependent on manufacturing and service industries (Table B.4). Service industries are those establishments that provide services to individuals, businesses, and other organizations. The Ho-Chunk Casino, Hotel, and Convention Center is considered a service industry and is the largest employer within the County, employing over 1300 persons. The two largest manufacturing employers in Sauk County as of 2009 are Grede Foundaries of Reedsburg, and Cardinal IG of Spring Green (Sauk County Development Corporation, 2009).

Occupation	Percent of Employed Civilians
Management / Professional	28%
Sales and Office	23.7%
Production / Transportation	18.9%
Service Occupations	17.1%
Construction / Maintenance	10.7%
Farming / Fishing / Forestry	1.7%

Table B.4. Sauk County employment by occupation

Source: US Census Bureau, "American Fact Finder" (2000 data)

Commercial Activities







The UW-ARS sells the milk produced to Foremost Farms, revenue from the milk receipts is used by UW-ARS and the USDFRC to help fund operations (including labor, but not facilities overhead).

Sauk County is the most popular rural destination in the state and offers a variety of activities that draw tourists; including recreational, gambling, and shopping opportunities. Wisconsin Dells is one of the oldest resort towns in the state and offers commercial activities such as waterparks, shopping and restaurant going. Kalahari Resort and Convention Center is the second largest employer in Sauk County and employs 1200 persons during non-peak seasons (Sauk County Webpage). Wilderness Lodge, another resort, employs 850 persons during non-peak seasons. The Ho-Chunk Casino in Delton draws over 3 million guests annually (The Louis Berger Group, 2002).

Cultural Patterns

The cultural pattern at USDFRC is limited to research and dairy operations. The farm is comprised of 2,006 acres and houses approximately 350 lactating dairy cows. The cows are housed in both tie-stall and free-stall barns to model different research needs. Current research falls into four main categories that include: 1) dairy cow digestion and utilization of forage; 2) forage improvement; 3) harvest and storage of forage; and 4) impacts of dairy systems on the environment (USDA ARS Webpage). Visiting scientists from around the globe tour the farm. Tour groups are also offered and the farm currently averages 500-1,000 visitors per year.

Recreational Resources

There are no recreational resources directly on the existing USDFRC site. A portion of the Sauk County snowmobile trail is located nearby, to the north and west, following State Hwy. 78 and the east fenceline of BAAP . The Wisconsin River and Lake Wisconsin are adjacent to the east-southeast of the site and are used recreationally for boating, camping, canoeing, and fishing. The Sauk Prairie dam can be seen from the southeast boundary of USDFRC and areas around the dam are used extensively for fishing. Just south of the dam boaters congregate on the 4th of July to watch the fireworks display. Tourists also watch eagles in the area; eagle watching is an important part of the local tourism industry. Land being transferred from BAAP to the Wisconsin Department of Natural Resources is expected to become the Sauk Prairie Recreation Area, managed by the Devil's Lake Park staff. Specific uses of the recreation area are to be determined via a master planning process.

Aesthetics

The USDFRC is a dairy research facility that has been in operation since 1980. Site aesthetics consist of rolling crop and pasture lands mixed with scattered woodlots. On the active portion of the site, aesthetic values are limited to that of a dairy operation, with its various outbuildings and material storage facilities. East of USDFRC is the Wisconsin River, an aesthetically pleasing water resource feature. Open space vistas are present in all directions except to the south, where there is a growing residential area.







Transportation and Parking

State Hwy. 78 was recently rerouted, creating a frontage road where the old State Hwy. 78 roadway connects to the existing USDFRC driveway. The improvements did not warrant a change to the existing driveway connection onto the created frontage road.

B.1.2 Public Reaction and Controversy

The existing facility currently operates relatively free of controversy, but the potential exists for complaints to begin as the number of homeowners increases with the construction of additional new homes within the residential development to the south of the existing USDFRC.

B.2 PROPOSED ALTERNATIVE

The Proposed Alternative would involve construction of a new USDFRC on an underutilized parcel that was formerly part of the BAAP. The project would involve construction of approximately 220,000 GSF of new facilities and would also result in an increase in total animal units from 720 to 1061, an approximate 31-32% increase to current numbers. (NOTE: a 1000-lb beef cow is the standard measure of an animal unit (AU). Other animals are assigned specific AU equivalents, based on this measure. AU's are used to determine forage requirements and manure production quantity.) Following construction of facilities at BAAP, as detailed in section A.3, the majority of facilities at the existing USDFRC would be deconstructed following all applicable regulations and the manure management facility would be abandoned. Two buildings would remain at USDFRC to be used for machine storage, allowing USDFRC to move equipment that is currently outdoors to an interior structure.

B.2.1 Affected Environment

Geology and Soils

Badger Army Ammunition Plant (BAAP) is located at the junction of three distinct geologic entities: the Baraboo hills, the unglaciated Driftless Area, and the area glaciated during the Wisconsin Glaciation (Clayton and Attig, 1990). The western-most extent of the Green Bay Lobe of the Laurentide Ice Sheet is marked by the Johnstown Moraine, which runs approximately down the center of BAAP. This terminal moraine was deposited by the receding glacier an estimated 14,000 years ago and is comprised of thick till consisting of unsorted particles ranging in size from clay to boulders. As the glacier melted, water poured over the Johnstown Moraine to the west, carrying with it stream sediment, which was deposited over unglaciated sandstone. This created a broad outwash plain that covers the western portion of BAAP where the Proposed Alternative is located. While the glacier receded, huge dust storms







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carried fine silt from west of the Mississippi into Wisconsin and deposited several feet of loess over the outwash plain and thin till at BAAP (Goc, 2002).

Prior to settlement, the western portion of BAAP was on the fringe of the Sauk Prairie (Goc, 2002). The annual inputs of organic matter from the dense herbaceous cover and deep-rooted, fibrous fine root systems of the prairie vegetation led to the development of deep, dark surface horizons with high fertility (Buol et al., 2003). The transformation from farmland to ammunitions facility required extensive soil and landscape disturbance by bulldozers, power shovels, and graders, including scraping, filling, leveling, digging, and reshaping (Goc, 2002). The process of re-shaping the ground surface stripped away topsoil in some areas, while adding fill to others, changing the native soils and hydrologic regime.

The Proposed Alternative site is located near the west-central boundary of BAAP where U.S. Hwy. 12 bends to the west within the outwash plain formed by stream sediment. At this location, bedrock is an estimated 250-300 feet below the ground surface. The western portion of BAAP lies within a broad outwash plain with nearly level relief. Within the proposed site, elevation ranges from 860-870 feet msl, with a small depressed area at 850 feet msl in the northeast corner of GSA parcel G. The eastern portion of BAAP lies within a moderately level till plain with hummocky topography in portions due to the deposition of stream sediment over stagnant ice (when the ice melted, a pitted landscape was created).

Soil map units within the proposed project site include Richwood silt loam, Toddville silt loam, and Pillot silt loam (all are classified as Typic Argiudolls). All three soils are very deep, welldrained Mollisols formed in 20 to 60 inches of loess over water-laid stratified sand and silt. The slopes across the parcel are shallow, ranging from 0-2%. There is a small area adjacent to the east boundary with more pronounced slopes of up to 6% that correspond with the toeslope of the Johnstown moraine. All three soil map units have moderate susceptibility to erosion by water (NRCS, 1980). Pillot silt loam is moderately erodible by wind, while Toddville and Richwood silt loams are slightly erodible by wind. The soil map units are all upland soils, with no hydric inclusions.

Contaminated material deposited on the surface of this site by recreational trap shooting activities has been cleaned up through removal and disposal of the contaminated sediments.

Chemical and Physical Quality of Ground or Surface Water

Surface runoff drains across the proposed site from the north and northeast (MSA Professional Services, Inc., 2011). Private interior roads form the north and south borders of the site, and agricultural fields are immediately north of the parcel. The Johnstown Moraine lies to the northeast, and surface water flows down its western slope towards the project site. Surface water currently exits the project site to the south, through a double culvert that carries flow across a fallow field before it reaches an intermittent waterway that meanders and ultimately flows south towards the southwest boundary of BAAP before emptying into the system of settling ponds that drain to Grubers Grove Bay and Lake Wisconsin (Wisconsin River).







Gruber's Grove Bay has been found to contain sediment contaminated with lead, mercury, zinc, and ammonia. Construction remediation began on this area in 2001.

Groundwater flow in the project area is from the west-northwest under U.S. Hwy. 12 (Appendix E.8). Of the numerous groundwater monitoring wells present throughout BAAP and in adjacent areas, two are pertinent to the proposed project site. Trichloroethylene (TCE) has been detected in one monitoring well (RIN-1006A) but below the WDNR groundwater Preventive Action Limit (0.5 micrograms-per-liter). RIN-1006A is screened at a depth of 90 to 100 feet. There is a deeper nested well, RIN-1006C, screened at a depth of 175 to 180 feet, that is located adjacent to RIN-1006A. TCE has not been detected in RIN-1006C. TCE, attributed to non-BAAP sources, has been detected above the WDNR groundwater Enforcement Standard (5.0 micrograms-per-liter) in monitoring well BGM-9103, located in the northwest corner of USDA Parcel D. BGM-9103 is screened at a depth of 90 to 100 feet. Groundwater flow near BGM-9103 is from the northwest to the southeast. The mapped contamination plumes begin south of the construction site, at the former burning grounds, and flow southward. Therefore, highly contaminated groundwater from sources originating at BAAP does not occur below the proposed building site. However, off-site sources of TCE have been detected at sentry wells north and west of the site. These levels have been declining since they were first detected ca. 2003, and are currently below the Preventive Action Limit (PAL) (Janssen, 2011).

Local Climate, Meteorological Conditions, and Air Movement Patterns

Climatic and Meteorological Conditions for the proposed project site are the same as at the existing USDFRC-PDS as described in Section B.1.1 above. The site varies in topography, but is generally flat and open to air movement. Airflow from the north, east, and south is interrupted by large planted pines partially lining those boundaries of the site.

Release of Particulates or Toxic Substance to Air

Air quality data from the WDNR's air monitoring station at Devil's Lake State Park, the closest monitoring station to the project site is provided in Section B.1.1, above. Generally, since 2007 monitored air quality surrounding BAAP has been in the good to moderate range. The Army no longer has any reportable air emissions. The major sources of air pollution at BAAP include emissions from vehicles, heating and cooling units, and industrial operations (The Louis Berger Group, 2002). There are currently no activities or operations at the proposed project site that would release particulates or toxic substances into the air.

Critical Habitat

A bald eagle's nest was confirmed along an interior road in BAAP, approximately 10,500 feet from the proposed project site, and 5,900 feet from the existing USDFRC. Additionally, of the species listed by USFWS for Sauk County, the







The WDNR BER was consulted regarding the potential for threatened, endangered, and special concern species to occur within the project area. Due to the sensitivity of the NHI data, the WDNR BER has strict confidentiality requirements that prevent the listing of species names covered by state regulations and their locations in the same public document. The redacted response from WDNR BER is included in Appendix E.7. One Special Concern mammal, one Threatened bird, one Special Concern bird, two Endangered snakes, one Special Concern fish species, and two special concern plant species are recorded in the Natural Heritage Inventory (NHI) database at locations in proximity to the Proposed Project site. One high-quality natural community was also indentified. Potential habitat exists at the Proposed Alternative site for the mammal and the bird species only.

Species Balance

Predators at BAAP include fox, raccoon, skunk, opossum, coyote, red tailed hawks, and owls. Predator populations are managed through habitat improvement and hunting. Mammalian predators, such as fox and coyote, are managed by hunting and trapping programs. No natural predators occur for whitetail deer.

Wetlands and Floodplains

One wetland less than two acres in extent has been mapped by the Wisconsin Wetland Inventory in the north central portion of the site, apparently in error (Appendix E.3). The location consists of a small depression dominated by Kentucky bluegrass, wild parsnip, and honeysuckle that resulted from former earth material borrow activities, but no field indicators of wetland conditions are present. Portions of the southeastern and south-central area of the site, however, have been subjected to topsoil stripping and may be saturated for portions of the growing season that are long enough to meet the wetland hydrology criteria for definition as a jurisdictional wetland. Reed canary grass, a wetland plant species, is the dominant vegetation in this area along with planted prairie cordgrass.

No waterways or stream channels are present on or adjacent to the site, including the parcel to the south on which WDNR mapping indicates an intermittent waterway (Appendix E.3).

Land Use

The BAAP was originally constructed as the Badger Ordnance Works in 1942 to provide ammunition propellant for World War II. The facility was additionally used for this purpose during the Korean and Vietnam Wars. It was determined by the U.S. Army in 1997 that the facility was no longer needed for the nation's defense purposes

The BAAP was decommissioned in 2003 and the Army began demolishing the plant infrastructure, which included over 1400 buildings, water and sewer lines, rail lines, and roadways. Agreements were reached over which parcels of land would be designated to the future property owners of BAAP in 2006. The three major land owners of the property are







WDNR (3,387 acres), the USDA (2,107 acres), and the Bureau of Indian Affairs/Ho-Chunk Nation (1,553 acres). Each of these parties will incorporate new land uses for their respective parcels.

The landscape at Badger is still largely composed of pasture and cropland. Of the 7,354 acre area, 4300 acres are pasture and cropland. Natural areas comprise roughly 1,700 acres of the landscape including 175 acres of restored prairie, 48 acres of wetland and ponds, 500 acres of shrubland, and 960 acres of woodland (http://www.saukprairievision.org/history). Dominant trees in the woodlands include oak, hickory, black walnut, cottonwood, black cherry, and box elder. Ammunition plant production facilities still account for up to 1,240 acres of the property, however, as decommissioning continues this acreage is decreasing. Roads and railroads cover 402 acres at BAAP. The community of Bluffview lies to the west of BAAP across US-12 and was developed in the 1940s to house BAAP workers (The Louis Berger Group, 2002). Bluffview currently covers 80 acres and is home to 600 residents living in single-story structures, multifamily units, and mobile homes.

In 2000, the Sauk County Board of Supervisors established a locally driven reuse planning process that sought to define a future for the Badger property. A 21-member Badger Reuse Committee was formed to identify the wide range of potential reuse options. The committee included representatives from neighboring communities, local, state, and federal governments, and the Ho-Chunk Nation. The committee reviewed 25 proposals from a variety of parties interested in the future use of the Badger property. One of the opportunities for the site that the board identified was continuing research to develop the knowledge and tools needed to enhance sustainable and competitive dairy forage systems that ensure a safe and healthy food supply, promote animal health, conserve soil, water, and wildlife resources, and protect the environment.

The eastern, southern, and northern boundaries of the proposed project site have been planted with an evergreen buffer consisting of white and red pine. The western portion of the site contains several buildings foundations formally constructed for BAAP operations. The majority of these structures, including old living quarters, have been deconstructed. Three buildings are still on site, one most recently been used by the conservation club which used the western portion of the site for trap shooting. In 2006 the USDFRC built a metal storage facility on the site, bringing the total number of buildings to 4. There is a walnut grove in the northwest corner of the site, an old rail bed in the southwest corner of the site, a former sewer trench running from the northeast corner southwest to approximately the middle of the site, and a borrow pit in the north-central portion.

Population

The population data for the general area of the proposed project site is the same as for the No-Build site, and is presented in Section B.1.1, above.







Public Health and Safety

Police and fire protection information is provided in Section B.1.1 above. The Sauk City Fire Department is operated by 40 on-call volunteers and responds to an estimated 4-5 calls at BAAP each year (Breunig Pers. Comm. 2011).

Employment, Labor Force and Income

General employment, labor force and income data is as provided in Section B.1.1 above.

Housing Supply and Demand

General housing supply and demand information for the area is provided above in Section B.1.1.

Industrial Activities

Industrial information for the area is provided above in Section B.1.1.

Commercial Activities

Information on commercial activities in the area is provided above in Section B.1.1.

Cultural Patterns

The Ho-Chunk Nation holds tribal lands within Sauk County via land grants from the Bureau of Indian Affairs. The Ho-Chunk Nation employed 1,907 people in Sauk County in 2000 (The Louis Berger Group, 2002). Ho-Chunk business ventures in Sauk County contributed over \$22 million of revenue to non-tribal businesses and vendors in the county from 1993 to 2000.

The proposed project site currently offers no cultural pattern; however the land is important to the Ho-Chunk Nation as mentioned above.

The Badger Reuse Committee Plan (Value 4) recognizes the importance of the future uses of the Badger property in contributing to the reconciliation of past conflicts that resulted in the displacement of Native Americans and Euro-American farmers (Badger Reuse Committee, 2001). The Reuse Committee advocates for protecting and enhancing the cultural and natural features present at Badger, including Native American sites, farmstead remnants, and cemeteries.

Recreational Resources

The landscape surrounding BAAP contains many natural areas such as the Baraboo Hills, Devil's Lake State Park, and the Wisconsin River that are open to public recreation activities such as hiking, canoeing, and bird watching. BAAP currently is open for hunting during specific







seasons and has a lot of recreation potential. As the property becomes more accessible to the public, BAAP can provide a great draw for hiking, bird watching, botany, and ecological restoration work parties. BAAP also has the potential to educate visitors about the natural history of the area; including prairie ecosystems, Native American heritage, and sustainable farming.

Recreational use exists to the north at Devil's Lake State Park, the most visited state park in Wisconsin, attracting 1.2 to 1.4 million visitors annually (Devil's Lake web site). Devil's Lake State Park is nearly 10,000 acres and offers 29 miles of hiking trails, swimming, boating, and camping.

The proposed building site was most recently used by the Conservation Club for trap shooting.

Aesthetics

The Badger Reuse Committee Plan (Values 7 and 8, 2001) recognizes the importance of protecting and enhancing Badger's natural features and providing open space that is characteristic of the rural landscape of the area. The Committee believed that future uses of Badger should work to enhance the aesthetic quality of the Badger property. It appears as though the three major landholders of Badger - USDA, National Parks Service/WDNR, and the Bureau of Indian Affairs - have intentions to retain the existing rural and natural landscape of Badger.

Transportation and Parking

The existing transportation system surrounding the proposed USDFRC includes U.S. Highway (U.S. Hwy.) 12, a Principal Arterial, State Highway (State Hwy.) 78, a Minor Arterial and several major and minor collectors. U.S. Hwy. 12 is located to the west of the proposed development and will serve as the main access route for the proposed USDFRC.

U.S. Hwy. 12 in this area is generally a north-south highway connecting Madison to the Interstate Hwy. 90-94 corridor and the Wisconsin Dells/Lake Delton Area. U.S. Hwy. 12 serves several communities in the area including Wisconsin Dells, Lake Delton, Baraboo, Prairie du Sac, Sauk City, Middleton and Madison. Wisconsin Department of Transportation estimates the 2008 Annual Average Daily Traffic on U.S. Hwy. 12 in this area is 12,000 vehicles per day.

State Hwy. 78 is located to the east of the proposed development. State Hwy. 78 in this area is generally a north-south highway connecting Prairie du Sac to the Interstate Hwy. 90-94 corridor and Portage. State Hwy. 78 also serves Merrimac. Wisconsin Department of Transportation estimates the 2005 Annual Average Daily Traffic on State Hwy. 78 in this area is 2100 vehicles per day.

Business Route 12 is the nearest road to the south. This major collector is approximately 2 miles south of the proposed site. The road runs east and west to connect U.S. Hwy. 12 and State Hwy. 78 north of Prairie Du Sac. State Hwy. 159, County Trunk Highway (CTH) DL and







State Hwy. 113 connect U.S. Hwy. 12 and State Hwy. 78 to the north of the site. This crossing is north of Devil's Lake State Park, approximately four miles north of the proposed site. There are no known average daily traffic counts on these roads.

The former BAAP as owned by the Army developed a large network of private local roads. These roads are typically rural sections with varying paved widths. The private roadway system is gated and no public traffic is allowed on these roads.

Proposed Roadway System Options

The proposed USDA DFRC facility is to be located on an existing private drive on the BAAP. This private drive has an existing access point on U.S. Hwy. 12. It is an east- west road collecting several smaller private drives. There are several options to consider for this existing private road:

Single Site Access: This option would make the existing private drive into a private entry only used for the USDA DFRC development. At a minimum, this would require installing a new access on U.S. Hwy. 12. The remainder of existing road could remain in place depending on its condition after construction is completed. All maintenance for the road within their respective parcel would be the responsibility of USDA.

Shared Private Access: This option would make the existing private drive into a private entry for the USDA and other entities which may want access at this location. Maintenance of the road would become a shared responsibility with the other entities that used it for access.

Public Road: This option would make the existing private drive into a public road. This would require right-of-way dedication for an access point onto U.S. Hwy. 12 and an access point onto State Hwy. 78. Furthermore, the roadway would need to be dedicated to the public as public right-of-way and reconstructed to meet the Town standards for rural roads. This would allow for a public east-west connection between U.S. Hwy. 12 and State Hwy. 78 which is limited in this area due to the Badger Army Ammunition Plant and Devils Lake State Park. This would allow for cost-sharing opportunities for roadway and intersection improvements. This road would be maintained by the Town and utilities could be installed within this public corridor. This option is consistent with the Township of Sumpter Comprehensive Plan goal of providing an efficient transportation connection between the Township of Sumpter and the Township of Merrimac

Parking Facilities

The proposed facility will have onsite surface parking for both employees of the facility and visitors. The two parking facilities will generally be separated. There will not be any on-street parking for this facility. Parking assumptions will generally follow the Sauk County Zoning Ordinance as applicable to this application. The employee parking is based on the assumption that the facility will be manned in several shifts. The parking lot will be designed to provide a total number of stalls equivalent to the number of people on the two largest back to back shifts.







This will include 40 stalls. The visitor parking lot includes room for four busses and 10 additional car stalls.

B.2.2 Public Reaction and Controversy

The majority of public reaction and controversy to constructing new facilities at the BAAP site have been related to conformance with the BAAP Reuse Plan, i.e. the addition of new structures on lands previously part of the BAAP and associated aesthetic impacts. Other issues include agricultural practice concerns related to expanding the herd size, primarily nutrient contamination of groundwater from the concentrated housing of a large number of ruminants and herd management that is not focused on grazing.





C. Environmental Consequences

C.1 PHYSICAL AND CHEMICAL ENVIRONMENT

C.1.1 Soil Stability

The construction site for the Proposed Alternative is generally flat and has sufficient vegetative cover to prevent major erosion events from occurring. Minor erosion can occur on farm fields and will be minimized by using crop rotation. The No-Build Alternative is also stable, but has rolling topography with a higher potential for erosion and sedimentation to occur.

C.1.2 Surface and Groundwater Quality and Quantity

Construction of the Proposed Alternative is not expected to have a significant impact on surface or ground water quality. Erosion control, stormwater management, and spill prevention plans will be developed and implemented in accordance with existing regulations, and will be put in place prior to construction to control and mitigate potential impacts. Further, there are no surface water resources in proximity to the site. A proposed system of swales and piping will convey stormwater from the site to a culvert centrally located on the site which runs under the east-west road south of the site, diverting relatively clean stormwater away from the manure storage areas and private wells. Drainage swales would run parallel to the MTACRU building on both the east and west side and the Manure Collection & Treatment area would be built up to allow water to run away from it in all directions.

Operation of the proposed facility will potentially increase the risk of groundwater and surface water pollution from the discharge of manure. However, the manure collection, treatment, and storage systems will be designed to minimize the risk of groundwater contamination and will not discharge to public waters. The increased volume of manure will be applied to USDA fields in strict accordance with an approved Nutrient Management Plan.

The Wisconsin Administrative Code NR 243 regulates water quality management at large scale livestock operations. The proposed action will bring the number of total animal units to over 1,000, which will result in a corresponding increase of animal manure (see Table C.1). Therefore, the facility will need to comply with Wisconsin Administrative Code NR 243, which applies to runoff management at concentrated animal feeding operations. Under these regulations, the proposed manure storage system is designed to store manure for one year, and an observation well will be included to monitor groundwater quality and detect problems to be addressed. Land application will not occur during the winter/spring period of highest risk of manure runoff events. The farm's existing Nutrient Management Plan, developed following Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) regulations, will be updated to reflect changes in the farm operation. Nutrient management plans are developed to minimize environmental impacts associated with land-spread manure. Appropriate land-application following the nutrient management plan will allow manure to be absorbed directly to







the soil; however there will still be an increase in the introduction of solids, nitrogen, phosphorus, potassium, and ammonia into the ecosystem.

Table C.1 - Manure Production for Lactating Holstein Cows

	Kg/day/animal	Kg/year/animal
Feces and Urine	69	25185
Total Solids	8.9	3248.5
Nitrogen	0.45	164.25
Phosphorus	0.078	28.47
Potassium	0.1	36.5

Source: ASAE D384.2 MAR2005

As a direct result of the increased number of livestock, there will be an increase in feed storage at the project site, and a correlated increase in leachate quantity. However, appropriate runoff management will minimize the risk of this affecting the watershed. Building new facilities as proposed will allow the USDFRC to more effectively manage runoff. The No-Build Alternative, while it does not propose an increase in herd size, also does not improve the current manure management facilities at the USDFRC, or move the manure storage basin away from the Wisconsin River.

The Proposed Alternative will require significant amounts of water to maintain cleanliness standards within the facility. The proposed facility would require approximately 20,000 gallons/day. Approximate water usage rates at the existing facility are estimated to be 12,000 gallons per day. In the event public water mains are constructed and readily available adjacent the proposed site that would supply potable water by the Township of Merrimac or the Bluffview Sanitary District existing wells would be properly abandoned.

The Proposed Alternative would involve an increase in the area of impervious surface. Stormwater management features will be designed to meet or exceed infiltration and detention requirements of applicable regulations; therefore, no significant impacts related to stormwater runoff quantity are expected.

In summary, although groundwater contamination has been a continued concern at BAAP, additional contamination is not expected to result from the Proposed Alternative, which will be operated in compliance with an approved nutrient management plan. Additionally, excavation for the manure storage facilities at BAAP or at USDFRC are not anticipated to reach depth to groundwater and dewatering is not expected. However, due to existing contamination in the groundwater under the proposed site, bringing clean water to the site is a concern. A public water main will be constructed and connect the site to the existing public water main approximately one mile north of the site in the Bluffview Sanitary District. This provides little opportunity for a looped system, but allows access to clean water. This may be problematic for







maintenance on the water main and providing adequate pressures for both fire flow requirements and meeting the required pressures for daily use.

C.1.3 Air Quality

The main hazardous gas emissions from dairy farms are ammonia, and the greenhouse gases methane and nitrous oxide. The urea nitrogen (N) contained in cow urine (which is 55 to 80% of the N contained in urine, depending on concentrations of crude protein in the ration) is the major source of ammonia and also may contribute to emissions of nitrous oxide from soils after manure land application. Urease enzymes, which are present in feces and soil, rapidly convert urea to ammonia gas (ammonia volatilization). Ammonia volatilization can be an environmental concern because it is the primary gas that neutralizes acids in the atmosphere produced from the combustion of fossil fuels; a reaction that produces aerosols that are a component of atmospheric haze, and implicated as a potential human health hazard. However, without significant sources of combustion in the project area, there is little cause for concern relative to increases in atmospheric haze.

Further, recent analyses (Powell et al., 2011) of relationships between concentrations of milk urea nitrogen (MUN) in the bulk tank and ammonia emissions from dairy farms determined that a decrease in MUN from 14 mg/dL (a general industry average) to 10 mg/dL (optimum level for healthy, high producing Holstein dairy cow) can result in a 10 to 20% decrease in ammonia emissions from dairy farms. Bulk tank MUN at the current USDFRC farm routinely are below 10mg/dL (Betzold, 2011) indicating very good feed management and low ammonia emissions.

Normal digestion in animals results in production of methane gas (CH₄). Rough forage such as grasses are broken down in the rumen by microbial process known as Enteric Fermentation and methane gas is released to the atmosphere through exhalation or eructation (gas release from digestive tract through the mouth). Digestion in ruminants, especially cattle, can result in significant methane production.

Many factors contribute to the amount of methane an individual cow produces daily, including animal size, diet, growth rate and production. The EPA uses the Cattle Enteric Fermentation Model (CEFM), which considers several population and herd management variables in order to accurately measure the methane production from cattle in the United States. Daily methane production per head is a product of gross energy and emission factors. Gross energy considers all of the energy requirements for animal maintenance, lactation, pregnancy, animal activity and other factors that contribute to the energy balance of the animal, while the emission factor is the amount of energy from the individual converted to methane (EPA Agstar Website).

Agricultural manure systems account for approximately 7% of national methane emissions. The increased number of animals on site, the proposed manure storage system, and the spreading of liquid manure, may increase the net local methane emissions into the atmosphere, potentially affecting long-term air quality. However, the USDFRC has recognized that significant research is needed to address greenhouse gas production and the carbon footprint of the dairy industry. Research on methane, other greenhouse gases and waste product production along with







continued improvement in forage and nutrient utilization will be essential components of the operations at the proposed facility, and this research will serve to reduce overall greenhouse gas emissions from agricultural practices locally and nationally in the future.

The No-Build Alternative, with its existing herd size, would continue to produce the current quantity and quality of air emissions. However, it would limit the means for conducting more extensive research into how the dairy industry can reduce greenhouse gas production and emission over the long-term.

C.1.4 Noise

There will be a long-term increase in noise above ambient levels due to new facilities, associated utilities, increased number of cattle, and equipment on a site that currently is underutilized. In the short-term, the increase in noise will be negligible in relation to the decommissioning and clean-up operations at BAAP (above-ground structural demolition at BAAP is expected to be complete in 2012 and below-ground in 2013). Even though there will be a new facility created at the proposed construction site, there are more noise receptors in close proximity to the existing USDFRC and the number of residences in that area is anticipated to grow.

There would be no increase in noise resulting from the No-Build Alternative; however, as the residential area south of USDFRC grows, there would be more receptors to the existing noise at the site than if it were relocated to BAAP.

C.1.5 Meteorological Conditions

The proposed actions are not anticipated to impact local climate. The net increase in impervious surfaces will be minimized once building deconstruction occurs at USDFRC and the heat islands from buildings and parking lots are not anticipated to be significant.

There would be no increase in impervious surface from the No-Build Alternative.

C.2 BIOLOGICAL RESOURCES

C.2.1 Fish and Game

Moving the Dairy Facility, herd, feed storage areas, and manure storage basin from the existing site to the BAAP site has the potential to benefit fish habitat in the Wisconsin River. Currently, leachate/ runoff from the existing site discharges to the Wisconsin River following detainment in a stormwater pond. The current manure storage basin is a concrete-lined depression with little opportunity for failure and subsequent discharge to the Wisconsin River; however, it is one of the features of the USDFRC that is located closest to the river. The proposed action will result in moving the manure storage basin much further away from the Wisconsin River and also result in improved food storage areas and leachate/runoff treatment. The No-Build Alternative could negatively affect fish habitat in the Wisconsin River, should failure of the current detention system occur.






C.2.2 Rare Species and Habitat

A consultation with U.S. Fish & Wildlife Service (USFWS) under Section 7 of the Endangered Species Act was conducted. In their letter dated June 14, 2011, USFWS concurred with the conclusion of the submitted analysis (Appendix E.7) that neither alternative was likely to affect any federally-listed species or their habitat. Although there is a Bald Eagle nest in the vicinity of the Proposed Alternative, it is located beyond the distance within which potential impacts could result. If this protected species were to establish a new nest within the impact area or in close enough proximity for construction to create a disturbance for nesting, immediate consultation with USFWS would take place to determine appropriate impact avoidance actions. Bald Eagle nests may also be present in the vicinity of the existing USDFRC, but the No-Build Alternative would not involve any activity that would be incompatible with this species' success.

Of the species reported by WDNR to occur in the vicinity of the Proposed Alternative, potentially suitable habitat exists for one mammal species of special concern, one threatened bird species and another bird species of special concern, but none of the other recorded species would favor the habitat that exists at the site. Nevertheless, specific surveys will be conducted prior to construction, if required by WDNR or if the timing of construction activities would be such as to negatively affect the species of interest. If such protected or rare species are identified, the WDNR-BER will be consulted to determine appropriate avoidance and mitigation measures to apply. One high-quality natural community was also reported from the project vicinity, but this type of forested habitat is not present at the construction site.

The No-Build Option would have no effect on rare or protected species that may be present at the site, but the potential exists for catastrophic failure of its manure storage facilities to substantially impact aquatic species of concern that are known to inhabit the Wisconsin River. The WDNR BER recommended follow-up actions to address potential impacts to listed species if construction occurred at the existing USDFRC site (Appendix E.7); however, as no action is proposed, follow-up measures are not needed.

C.2.3 Special Natural Areas

The Proposed Alternative does not pose any direct effect to special or sensitive natural areas. The proposed project location has been highly altered by human impacts associated with farming and the BAAP facilities. The vegetation is primarily composed of forage crops and row crops. Standard erosion control practices would be used regardless of the option chosen, and construction is not expected to impact Lake Wisconsin.

C.2.4 Aquatic Resources

The proposed action does not present significant opportunity for impacts to aquatic resources, except as noted in C.2.1.







C.3 SOCIOECONOMIC ENVIRONMENT

C.3.1 Cultural Patterns

Cultural patterns will change due to the proposed action; these changes are anticipated to be beneficial.

The USDFRC currently contributes important forage research to the farming community. The proposed expansion of the USDFRC will contribute to research on greenhouse gas and ammonia emissions from dairy cows. The proposed facility would assess a variety of dairy cow management practices to determine how to best reduce greenhouse gas emissions at dairy cow facilities. Building new facilities would also allow the USDFRC to conduct grazing research on lactating cows, not just heifers. The center will continue to develop research on forage quality and forage utilization for large and small ruminant animals. The proposed project would provide for an education center open to the community.

Farming continues to be an important livelihood for residents of Wisconsin and large expanses of the southern Wisconsin landscape are dedicated to farming. Research on farm management will assist farmers across the region in properly using forage crops, how to best manage manure, and understand how livestock contribute to greenhouse gas emissions. Due to the unique nature of the facility and the work it does, there would be more visiting scientists, both short-term (a few days) and long-term (a visiting scientist or grad student may stay weeks or months). USDFRC estimates approximately 200 visitor days a year for visiting scientists of varying group size. USDFRC also estimates that the new Education Center would increase the number of tour groups from 500 to 1,000 visitors to at least 1,200-1,500 per year.

There will be a cultural change with the addition of the robotic milking system. Robotic milking systems use an automated system that directs cows into a milking station where a robotic system connects to the cow's teats and automatically milks the cow and directs the milk to various holding tanks. There are many benefits to a robotic milking system including reduced labor time, milking efficiency and herd health. Electronically tagged cows can be computer monitored efficiently when milked with the robotic system. Information such as milk production and milk quality can provide valuable information to assist in herd health, milk quality and herd management.

C.3.2 Housing

The proposed action is not expected to impact housing.

C.3.3 Land Use

The proposed project will add new buildings in the BAAP landscape. Land that is currently old field vegetation and forage crops would be replaced by buildings.







The proposed building footprint for the Proposed Alternative affects some areas with trees and shrubs along the southern boundary, but primarily covers land that is in pasture or cropping systems.

C.3.4 Recreational Resources

The proposed actions are not expected to impact recreational resources.

C.3.5 Population and Employment

In the short-term employment would increase during construction. Construction of the new facility is expected to increase scientific staff by 14 people. Farm staff would decline from 26 employees to approximately 20 due to increased automation on farm. However, the new scientific staffs and their new labs would generate more local purchases and require some people to move to the area.

C.3.6 Income

Revenue and income derived from milk receipts to the UW-ARS would increase correspondingly with the increase in herd size.

C.3.7 Industrial and Commercial Activities

Construction of the new facilities is not anticipated to significantly impact local industrial activities. Long-term there would be a benefit to the commercial farming community through application of the research conducted.

C.3.8 Public Health and Safety

The expansion of the DFRC is not expected to have a significant impact on police, fire, and hospital services within the area. Public health and safety is not expected to be impacted.

C.3.9 Utilities and Services

The Proposed Alternative will require installing a new potable water service, a new sanitary sewer service and a stormwater management and pipe system. The Army has proposed installation of a water supply system to be managed by the Township of Merrimac that would potentially supply potable water to the site.

The new facilities will result in an increase in emissions from heating and cooling units. The new facility is expected to use two to two and one-half times the existing utility usage of the Dairy Forage Research Center, or approximately 1,800,000 kWh annually for the Proposed Alternative. The facilities are anticipated to use an estimated 19,400 Therms of natural gas annually for heating and gas burning equipment (Final Workshop Report).







C.3.10 Transportation and Parking

Expansion of the DFRC is not expected to impact the existing public roadway system due to the minimal volume of traffic entering/exiting the site in all options.

The No-Build Alternative does not address existing parking issues on the site. When large groups of visitors come to the site, there is not enough dedicated parking space. Temporary parking is either done in adjacent grassy fields, along the driveway and/or on the adjacent State Hwy.

The Proposed Alternative has been designed to provide adequate off-street parking for the 20 employees who will arrive in shifts. Additional parking will be included for bus parking and visitor vehicular parking with the assumption that no more than 10 vehicles and 4 buses will visit the facility at one time. In overflow situations, additional consideration will be given to parking in adjacent grassy fields.

C.3.11 Aesthetics

The facility will create a visual impact; however, efforts will be made on the site of the Proposed Alternative to retain many of the existing mature trees and to utilize building materials that blend into the existing landscape. This will partially block the view of the new facility from U.S. Hwy. 12 and from two neighboring residential areas: Bluffview (population 742), and the Maple Park Condominium at the U.S. Hwy. 12 curve.

Currently the USDFRC is located in a valley and blocked from view of State Hwy. 78; however, a housing development to the south of the site has grown in recent years and more growth is projected. The No-Build Alternative would eventually have a greater aesthetic impact on the surrounding community. Additionally, as the residential area surrounding the existing USDFRC site expands, odor emitted from the site would be in closer proximity to a greater number of residences in comparison to the number of residences in proximity to the BAAP site.

C.3.12 Other

Construction of the new facilities will improve overall living conditions and health of livestock at USDFRC. Currently, the majority of the bedding used is organic material including dried manure, with very few sand-bedded stalls provided. Sand bedding is proposed for the majority of the new free-stalls at the planned facilities which will improve overall sanitary conditions and should also increase comfort and health for the cows at the site. Organic bedding breeds the bacteria that cause mastitis, the dairy industry's number one disease, which can change the quality of milk and lower production. Inorganic sand is porous and allows water to drain rapidly, keeping cows dry and clean, and lowering rates of bacteria significantly. Sand also keeps cows cooler which improves reproductive efficiency, and reduces odor and fly quantity.

Because sand is abrasive it requires special manure handling equipment, which is not available to the No-Build Alternative.







C.4 ARCHEOLOGICAL / HISTORICAL ENVIRONMENT

In May 2011, Great Lakes Archaeological Research Center, Inc. performed Phase I archaeological survey of the proposed Dairy Forage Research Center Site. The methods and techniques utilized during the course of investigations conform to the standards and guidelines set forth by the National Park Service in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (1983) and by the Wisconsin Archaeological Survey in Guidelines for Public Archaeology in Wisconsin, as Revised.

Archival and literature search of the area revealed that seven previously reported archaeological and burial sites were located within one mile of the proposed project area. Of these, none are within the project area boundary; however, one site 47SK0311, the Big Badger Curve Site, is adjacent to the western boundary of the site. The site is an uncatalogued burial site (BSK0297), which was reported to consist of a group of four effigies and two linear mounds. No surficial evidence of the site has been located to date.

In the course of the Phase I archaeological investigations, the entirety of the project area was shovel tested, save for areas that were clearly disturbed such as roads, extant buildings, foundations of former buildings, the large borrow pit (an area where soil has been removed to be used elsewhere), and the open sewer trench. Despite all of the disturbances, intact soils were encountered throughout the project area. The mixing of disturbed and undisturbed areas suggests a lot of different ground-disturbing activities at different times for different purposes, but no systematic alterations of the project area as a whole. A corn field was surveyed using pedestrian survey and shovel tested because the area was said to have been scraped and then filled in again with imported material. The surface survey covered the entirety of the cornfield, while shovel testing avoided the edges that had been heavily disturbed by earth-moving equipment and areas that previous shovel tests had indicated did not have a layer of fill on the surface. In total, 4.3 acres were surveyed by shovel testing and pedestrian survey, 62.5 acres were shovel tested at a 15 meter interval, and 3.4 acres were determined to be disturbed.

Shovel testing of the area planted in corn recovered a large bifacial preform, similar in form to Late Archaic/Early Woodland types. The positive shovel test was bracketed at 5-meter intervals, but additional artifacts were not recovered. The shovel test yielding the preform exhibited a disturbed (fill) profile, indicating that the artifact is derived from a secondary context. The fill was brought in at an earlier date to replace the layer containing the lead shot in the conservation club trap shooting range. While the artifact will be reported to the Wisconsin Historical Society as an archaeological site, the site does not meet the criteria for listing on the National Register of Historic Places due to its loss of integrity. As such, no significant historic, cultural, archaeological resources are located within the project area. It is recommended that the project proceed as designed.







C.5 CUMULATIVE IMPACTS

Cumulative impacts refer to the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

For the Proposed Alternative, project actions adversely impacting the environment include the increase in cattle and building construction. Indirect impacts of those actions are both positive and negative, with adverse impacts related to the increase in manure, amplified methane emissions, and greater need for nutrient application – all corresponding to the increase in herd size. Beneficially, the research conducted at the site will benefit the socioeconomic environment and, in the long-term, off-set some of the environmental issues associated with agricultural practices. Much of the Sauk County is, and has been historically, used for agricultural purposes and the net increase in animal units is not anticipated to significantly change air, soil, or water quality. Increases in stormwater runoff by increasing impervious surfaces could impact water quality if appropriate stormwater and erosion control methods are not followed. Increases in paved areas for driveways and access to the site could result in heat islands.

The direct and indirect impacts of the project, as mentioned above, are not anticipated to have significant adverse impacts to the environment; however, in consideration of past, present, and foreseeable actions across the state and locally, cumulative impacts could result from the Proposed Alternative, as described below.

Past actions at BAAP have significantly impacted groundwater quality in and around Badger and on-going decommissioning is impacting air quality. Siting the project at BAAP, as in the Proposed Alternative, has the potential to amplify these local issues. However, both water and air quality impacts are avoided or minimized through system design and monitoring, which will be required as part of the CAFO permit process, whereas the No-Build Alternative may have undetected impacts.

In review of local planning and zoning maps plans near BAAP appear to be mostly public open space. Within 10-20 years Prairie du Sac would like to convert the abandoned rail line from the city north to BAAP into a pedestrian trail. It is unknown at this time what materials would be used, but if it is a paved trail this could add to impervious surfaces in the area and stormwater runoff concerns. Other local projects that could increase stormwater runoff and create heat islands, as well as create economic impacts include ongoing and future Wisconsin DOT projects such as:

 Hwy 90, Sauk County, Wisconsin Dells to Portage, 19.45 miles, 2011, improving/replacing deteriorated paved shoulders







- Hwy 12, Sauk County, LAKE DELTON SAUK CITY, Major upgrade of the existing two lane highway to a four lane highway. This includes a bypass around the City of Baraboo.
 - o 2011, 4.65 miles, \$7,000,000-7,999,999
 - o 2012, 11.41 miles, \$1,000,000-1,999,999
 - o 2013-2016, 4.74 miles, \$15,000,000+
 - o 2013-2016, 4.60 miles, \$15,000,000+
- Hwy 12, Sauk County, LAKE DELTON ROAD IH 90, 1.43 miles \$9,000,000-\$11,000,000; 2013-2016, Reconstruct the roadway and widen Dell Creek Bridge.
- Hwy 12, Sauk County, PHILLIPS STREET, VILLAGE OF SAUK CITY, 1.72 miles \$7,000,000-8,000,000; 2013-2016, Reconstruct the existing urban street. Construct sidewalk along Philips Boulevard between the East Village Limits and the WSOR Railroad Crossing.
- Hwy 12, Sauk County, WISCONSIN DELLS BARABOO, 2.66 miles \$1,000,000-1,999,999; 2013-2016, Maintenance mill and overlay of existing asphalt overlay.

State wide there are several other Dairy Expansion projects that have occurred or that are currently proposed such as:

- Rosendale Dairy Farm: Owners of the Rosendale Dairy farm in Fond du Lac County are nearly finished with phase I of their project to grow the 700-cow farm to about 4,000. As part of the original plan, the operation was to expand to about 4,000 cows (or 5,750 animal units) by 2010--then double to 8,000 within a few years. The Department of Natural Resources approved the dairy's request to modify its water protection permit to allow it to expand to 8,000 cows and to increase the land area to 12,000 acres, on which manure is spread.
- Rock Prairie Dairy has located a 160-acre piece of land at U.S. Highway 14 and rural Scharine Road in Bradford Township as a potential dairy site for 5300 cows including 4,600 lactating cows. Plans are to have it up and running by end of 2011. Manure would be stored in covered manure storage basins with a 14 month storage capacity spread on local farmers fields.

Other recent large-scale dairy operations, such as Blue Star Dairy in Columbia County, as well as those within the University of Wisconsin System (Marshfield, Arlington, and Platteville, have increased herd size as well. However, it should be noted that projects within the UW System are aimed at research opportunities and improving the impact of agricultural practices on the environment. Repeated dairy expansion projects across the state and additional cattle to the







area could cumulatively impact air, soil, and water quality by increasing methane emissions to the atmosphere. Landspreading of manure, if not conducted under a regulated nutrient management plan, could also increase nitrogen, phosphorus, potassium, and ammonia deposition. However, total cow numbers across the state are not significantly increasing and large, well managed dairies with high milk production may have less impact than the same number of cows on a smaller farm.







D. Conclusions and Recommendations

D.1 ALTERNATIVES EVALUATION

The future needs of the dairy industry depend on research that increases economic and environmental sustainability of dairy farms. This project will better enable the USDFRC to conduct research designed to find solutions to problems associated with the economic and environmental sustainability of dairy farms.

To better understand how dairy cows digest and utilize feed so that forage plants and dairy cattle diets can be modified, the industry needs a specialized research unit – the IANRF. Research conducted within IANRF will focus on improving digestibility and nutrient utilization leading to greater economic sustainability for dairy producers (more milk produced per unit feed fed) and environmental sustainability (less manure produced per unit of milk produced). To date, there are no publically funded research facilities of this type in operation; two exist at universities, but both have been unable to operate consistently due to soft funding.

While determining the research capacity needed for this facility, it was determined that the current number of cows in the USDFRC herd would not be sufficient to populate both the IANRF and the more traditional nutrition research trials being conducted at the farm.

Increasing the herd size and enhancing farm facilities would also enable the USDFRC to increase its capacity for conducting research on air emissions from dairy farms. Current USDFRC research in the area of ammonia and other greenhouse gas emissions is conducted in a retrofitted 1980 tie-stall barn. Specially designed air emission chambers will allow research to be conducted with greater efficiency and accuracy.

Currently, grazing research at USDFRC is only conducted on heifers. The new facility will enable grazing research on lactating cows.

Constructing new research facilities will also serve to create facilities that are better at conserving energy and that enhance the surrounding environment and landscape; and construct facilities that accommodate educational and historical displays and opportunities for the public.

When the current USDFRC facilities were built BAAP had not been decommissioned and the only option was to build at the current location, even though it was not ideal. Additionally, when the facilities were constructed, there were no houses immediately south of the property along the river. The Proposed Alternative offers the following benefits in comparison to the No-Build Alternative:

- Improved access to natural ventilation for better cow health.
- Reduced chance of contaminating Wisconsin River with manure spill or runoff







- Would make it possible to milk grazing cows in same parlor as other cows, thereby eliminating the need for a second milking parlor for the grazing cows.
- Closer to cropland base.
- Improved labor efficiency.
- Fewer miles driven between farm buildings and cropland.
- Better, more efficient layout of farm buildings reduces "travel time" between tasks and eases communication between workers.
- Away from housing development along Wisconsin River.
- Can continue research while building new; if build on current site, would have to reduce herd and shut down research for a time.

The No-Build Alternative would not meet the goals identified by the USDFRC and as such is not a viable alternative. The existing facilities are inefficient, outdated and will not sustain the environment necessary for the research proposed. The main driver behind this project is the need to better understand how dairy cows digest and utilize feed. To do this, the industry needs a highly specialized type of research facility that enables researchers to carefully monitor every aspect of digestion at every step of the way.

Although the No-Build Alternative would not expand the herd size, the following issues are still of concern:

- The frequent fog/moisture coming up from the Wisconsin River hinders ventilation in the barns; damp air is not good for animal health.
- The current manure storage is 750 feet away from the river bank.
- Currently distance between farm buildings and furthest field is 5 miles; need to drive this distance to haul crops back to farm and haul manure out to the fields.
- Currently have to cross Hwy. 78 to gain access to most of the cropland.
- Currently there are 21 homes at the Water's Edge development; potential for 80 homes total.

D.2 NEPA EVALUATION

Section 1.3.3 of the ARS Facilities Design Standards (Document 242.1-ARS, dated 7/24/2002) presents a "List of NEPA Issues for Potential Consideration When Developing [an] Environmental Assessment". The list consists of 27 questions for consideration (A through AA), each of which is presented below, along with a corresponding response. The responses are







derived from the analysis of Environmental Consequences presented in Section C of this Environmental Assessment with supplementary information derived from additional sources as needed.

Will the proposed construction action:

A. Cause or contribute to soil erosion by wind or water?

Based on the affected environment described in Section B.2.1 – Geology and Soils (pg. 19) the proposed action is not anticipated to contribute to soil erosion by wind or water. Mapped soils at the site are considered moderately to slightly erodible (NRCS, 1980) however, the proposed construction site is flat and has sufficient vegetative cover to prevent major erosion events from occurring. As noted on page 28 of Section C.1.2, best management practices incorporating industry standard devices will reduce the risk of erosion from occurring during construction.

B. Affect soil surface stability?

The proposed action is not anticipated to affect soil surface stability, for the answer stated above in question A, and as noted in Sections C.1.1 – Soil Stability (pg. 28) and C.1.2 – Surface and Groundwater Quality and Quantity (pg. 28).

C. Degrade water quality in a sole source aquifer?

The proposed action is not located in an area of a sole source aquifer (EPA, undated) and, as such, will not degrade water in a sole source aquifer.

D. Decrease aquifer yield or affect water rights?

As noted in Section A.3 – Water Supply (pg. 7) and on page 29 of Section C.1.2 – Surface and Groundwater Quality and Quantity, the proposed action will utilize a public water supply (HDR, CWA, 2011), which is managed to prevent these effects.

E. Affect aquatic life?

Aquatic life is not anticipated to be adversely impacted by project implementation because there is no aquatic habitat in the project vicinity (see pg. 22 of Section B.2.1 – Wetlands and Floodplains).

F. Cause or contribute flow variation in a stream or spring?

No waterways or stream channels are present on or adjacent to the site, including the parcel to the south on which WDNR mapping indicates an intermittent waterway (see page 22 of Section B.2.1 – Wetlands and Floodplains). Therefore, project implementation should not cause or contribute to flow variation in a stream or spring.

G. Degrade the aesthetic properties and/or potential uses of either ground or surface waters?

As noted in Sections C.1.2 (pg. 28) and C.3.11 (pg. 35) the action, as proposed, is not anticipated to degrade the aesthetic properties and/or potential uses of either ground or







surface waters. There is no surface water at or adjacent to the site (see pg. 22 of Section B.2.1). The Proposed Alternative will be designed and maintained in compliance with all water quality and quantity protection laws and regulations.

H. Affect chemical quality of ground or surface waters (pH, dissolved oxygen, nutrients, dissolved solids, pesticides, etc.)?

Per Wisconsin Administrative Code NR 243 development and strict compliance with an approved Nutrient Management Plan is required and expected to mitigate any such effects (see pg. 8 of Section A.3.9 and pg. 28 of Section C.1.2). A well will be drilled and monitored to test this expectation and provide an opportunity for relevant remediation, if needed (HDR, CWA. 2011).

I. Affect physical quality of ground or surface waters (suspended solids, turbidity, color, oil, temperature, etc.)?

Project implementation is not anticipated to have a significant adverse impact on the physical quality of ground or surface waters for the reasons stated above in the previous three items and as noted in Section C.1.2 – Surface and Groundwater Quality and Quantity.

J. Cause odors or release odoriferous substances to air or water?

As noted in Section C.1.3 – Air Quality (pg. 30) the proposed action will cause odors to the air; however, although there will be an increase in animal unit numbers of 32%, the corresponding increase in odor will be minimized by the use of non-organic bedding and better air flow (see Section C.3.12 – Other). Additionally, there will be fewer receptors in close proximity to the new facility in comparison to the No-Build Alternative.

K. Release toxic substances to the air in quantities that could affect human health or safety, or environmental quality?

During construction, increased CO will be released by construction equipment; however this will be a short term impact. Long-term there will be an increase in methane, CO2, and ammonia into the atmosphere; however this increase is not anticipated to affect human health or safety (see Section 3.1.3 – Air Quality).

L. Release particulate matter to the air?

Dust and other airborne particulates will be released during construction; however, practices, such as moistening the construction site with water during dry periods can be used to minimize this short-term impact (<u>http://commerce.wi.gov/bd/docs/BD-CA-PMEmissions.pdf</u>).







N. Change local meteorological conditions or air movement patterns?

The proposed action is not of the magnitude or type that would be necessary to change local meteorological conditions or air movement patterns (see pg. 31 of Section 3.1.5 - Meteorological Conditions).

- O. Release substances for which there is a National Ambient Air Quality Standard (i.e., sulfur oxides, nitrogen oxides, carbon monoxide, lead, particulate matter, etc.)?
 This project will release substances for which there is a National Ambient Air Quality Standard during and after construction (see pg. 30 of Section C.1.3 Air Quality). During construction increased carbon monoxide will be released due to construction equipment; however this will be a short term impact. Long-term there will be an increase in methane, CO2, and ammonia into the atmosphere (ASAE, 2005).
- P. Affect undisturbed natural areas or a wild and scenic river?

There are no such resources in close enough proximity to the site to be affected in any way (WDNR, 2010 and WDNR, 2010b). The South Range of the Baraboo Hills is located upgradient (from both ground and surface water perspectives) and a distance of almost 2 miles to the north (WDNR, 2010b).

Q. Affect game animals or fish or their taking?

There would be no effect on fish or angling, due to the lack of an adjacent resource (WDNR, 2010b). Game animals are not likely to be affected more than a negligible amount, if any (The Louis Berger Group, June 2002).

R. Affect rare, threatened, or endangered species, or a critical habitat?

A consultation with U.S. Fish & Wildlife Service under Section 7 of the Endangered Species Act was conducted. In their letter dated June 14, 2011, the U.S. Fish and Wildlife Service stated that the proposed action was not anticipated to affect any federally-listed species or their habitat. One state-listed special concern mammal, one threatened bird, and one special concern bird have the potential to inhabit the site, so further coordination with WDNR BER will take place to determine appropriate avoidance and mitigation measures (see Appendix E.7 – Agency Correspondence).

- S. Affect species balance, especially among predators?
 The proposed project is not anticipated to affect species balance as it is affecting such a small proportion of the available open space in the general area (see pg. 22 of Section B.2.1).
- *T. Involve special hazards, such as radioactivity or electromagnetic radiation?* The proposed project does not involve such special hazards (HDR, CWA. 2011).







U. Affect or to be located in a wetland, flood plain, or the coastal zone?

As discussed on page 22 and determined during a site visit, there is potential for a wetland to be located in the southeast corner of the construction site. This determination was made on vegetation alone, and a wetland delineation by a qualified wetland ecologist will need to be conducted to determine if a wetland is present.

- V. Affect a known or potential cultural, historical, or archaeological site, district, or area? Shovel testing of the area planted in corn recovered a large bifacial preform, similar in form to Late Archaic/Early Woodland types. The positive shovel test was bracketed at 5meter intervals but additional artifacts were not recovered. The shovel test yielding the preform exhibited a disturbed (fill) profile, indicating that the artifact is derived from a secondary context. The fill was brought in to replace the layer containing the lead shot in the conservation club trap shooting range. While the artifact will be reported to the Wisconsin Historical Society as an archaeological site, the site does not meet the criteria for listing on the National Register of Historic Places due to its loss of integrity. As such, no significant historic, cultural, archaeological resources are located within the project area. This is discussed in greater detail on page 36 of Section C.4.
- W. Affect local or regional systems related to:
 - Transportation?
 - Water supply?
 - Power and heating?
 - Solid waste management?
 - Sewer or storm drainage?

The proposed project is not anticipated to have more than a negligible effect on the listed systems (HDR, CWS. 2011).

- X. Affect local land use through effects on:
 - Flood plains or wetlands?
 - Location land use?
 - Aesthetics?
 - Access to minerals?

The proposed project is not anticipated to significantly affect the listed local land uses (see pg. 22 of Section B.2.1).

- Y. Affect socioeconomic aspects of an area including:
 - Population?
 - Housing supply or demand?
 - Employment?
 - Commercial activities?
 - Industrial activities?
 - Cultural patterns?







• Environmental justice?

The proposed project is not anticipated to significantly affect the socioeconomic aspects of the area (see pgs. 33 - 35 of Section C.3).

Z. Cause or contribute to unacceptable noise level?

As discussed on page 31 of Section C.1.4 - Noise, the proposed actions will increase noise at the site, both during and after construction, but are not anticipated to cause or contribute to unacceptable noise levels.

AA.Affect public health or safety?

As discussed on page 34 of Section C.3.8 – Public Health and Safety, the proposed action is not anticipated to have a significant adverse impact on public health and safety

BB.Cause public reaction or controversy?

The proposed action may cause public reaction or controversy (see pg. 27 of Section B.2.2). The majority of controversy to constructing new facilities at the BAAP site have been related to conformance with certain contested portions of the BAAP Reuse Plan (Badger Reuse Committee, 2001), i.e. the addition of new structures on lands previously part of the BAAP and associated aesthetic impacts. Other issues include agricultural practice concerns related to expanding the herd size, primarily nutrient contamination of groundwater from the concentrated housing of a large number of ruminants and herd management that is not focused on grazing.

D.3 RECOMMENDED ALTERNATIVE

It appears that construction of the proposed facility at BAAP (the Proposed Alternative) would have less environmental impact than the No-Build Alternative, primarily because the BAAP site is more remote from the Wisconsin River than the existing site. Also, development at BAAP would have less environmental impact on the planned and developing residential uses close to the present farm operations at Prairie du Sac. In addition, because of its higher elevation, the BAAP site would provide better natural ventilation for the new dairy facility than the existing, lower site. Finally, and most importantly, the No-Build Alternative cannot properly support the current research needs of the nation's dairy industry.

Although the Proposed Alternative would have the potential for impacts, both adverse and beneficial, on the local human and natural environment, these impacts would not be considered to be significant, and, as shown in Section C of the Environmental Assessment, the implementation of best management practices, environmental agency recommendations, and permit approval standards would eliminate, minimize or mitigate these insignificant impacts.

Based on the findings of this EA, it is believed that construction of the Proposed Alternative would have fewer individual and less cumulative adverse environmental impacts on the human







environment than the No-Build Alternative. It is also believed, based on the findings, that the proposed construction of the Proposed Alternative does not warrant the development of an Environmental Impact Statement, and that an issuance of a Finding of No Significant Impact is the appropriate Agency follow-on action to this EA.





E. Appendices

E.1 LIST OF PREPARERS

Stantec Consulting Services, Inc.

Elizabeth A. Day, M.S., PWS, PH Senior Environmental Project Manager

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Sarah Kraszewski, M.S. Restoration Specialist

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Stacy Foster, B.S. Environmental/GIS Analyst

JSD Professional Services, Inc. Wade P. Wyse, P.E. Senior Project Engineer

Great Lakes Archaeological Research Center, Inc.

Katherine Shillinglaw, M.S., RPA Rhiannon M. Jones, M.A.







E.2 LIST OF AGENCIES OR PERSONNEL CONSULTED

Robert M. (Mike) Sitton MBA, PMP, COR/PA/PLCO/Demolition Manager Badger Army Ammunition Plant

Ralph P. Jesse, Environmental Protection Specialist USDA-ARS-MWA

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Lori Steckervetz, ER Review Specialist Wisconsin Department of Natural Resources, Bureau of Endangered Resources

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Mike Mossman, Forest Community Ecologist Wisconsin Department of Natural Resources, Bureau of Integrated Science Services

Don Watson University of Wisconsin-Madison Environmental Health Program

Doug Breunig, Department Chief Sauk City Fire Department

Bill L. Quackenbush Ho-Chunk Nation

Jay Toth Ho-Chunk Nation







E.3 LOCATION MAPS

























E.4 **PROJECT ALTERNATIVES**



ALTERNATIVE SITES EVALUATED (A through E)





GREAT LAKES

JSD



Site Criteria	A	в	с	D	Е	Current
Land Factors			66	8		
Size of Site		5	5	5	5	2
Sujability for Potential Footprint		5	5	5	5	2
Ownership by USDA	1	5	5	3	2	5
Proximity/ Access to Outside Roads	4	5	4	4	4	5
Soil Suitability for Construction	3	3	3	3	3	2
Availability of Water (Potable)	4	4	4	4	4	5
Availability of Electricity		5	4	4	4	5
Availability of Natural Gas		4	4	4	4	5
Availablility of Sewage Treatment		5	4	3	2	1
Timing of Land Acquisition	2	5	1	2	2	5
Cost of Site Preparation	3	3	3	2	3	2
Drainage and Contour	4	4	4	4	4	3
Archeological (106)	5	5	5	5	5	5
Contaminants	3	3	3	3	3	5
Easements and right-of-ways		?				
Agricultural Factors						
Proximity to Cropland	3	4	4	3	1	1
Proximity to Suitable Grazing Land	3	5	5	3	1	1
Natural Ventilation Potential		4	5	4	4	1
Biosecurity		4	4	5	3	3
Removal of Usable Cropland		4	4	5	5	2
Expandability/Flexibility		5	3	5	5	1
Employee/Milk Truck Access		5	4	3	5	5
Public Perception Factors						
Visual Impact on the Landscape	3	3	1	1	1	3
Odor Concerns	2	2	2	2	2	2
Potential Risk to Surface Waters	4	4	4	4	2	1
Potential Impact on Groundwater	5	5	5	5	5	5
Controlled Accessibility to General Public	5	4	5	5	4	4
Farm/Public Interaction and Safety	3	3	3	3	3	3
Impacts of Hunting/Rec. Program	5	5	5	5	4	5
Employee Housing	4	4	4	4	5	5
Degree of Land Use Change	3	3	3	3	3	3
	113	125	115	111	103	97
5 = Advantageous						
3 = Neutral						
1 = Disadvantageous						

Point system for evaluating 5 new sites and current site of DFRC farm







E.5 SITE PLAN













E.6 FACILITIES PLAN



Stantec JSD

GREAT LAKES

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Main Level Block Diagram - Final POR Report



September 21, 2011



E.7 AGENCY CORRESPONDENCE







Final Environmental Assessment US Dairy Forage Research Center USDA Agricultural Research Service Prairie du Sac, Wisconsin

State of Wisconsin

DEPARTMENT OF NATURAL RESOURCES 101 S. Webster Street Box 7921 Madison WI 53707-7921 Scott Walker, Governor Cathy Stepp, Secretary Telephone 608-266-2621 FAX 608-267-3579 TTY Access via relay - 711



June 24, 2011

Elizabeth Day Stantec PO Box 128 Cottage Grove, WI 5327

> SUBJECT: Endangered Resources Review (ERR Log # 11-224) Proposed US Dairy Forage Research Center Project in Sauk County, WI

Dear Ms. Day:

The Bureau of Endangered Resources has reviewed the proposed project described in your Endangered Resources (ER) Review Request received May 12, 2011. The ER Review for the project is attached. Please keep in mind that the ER Review for the project does not exempt you from the requirements of state and federal endangered species laws. Rather, it is a tool to help you comply with state and federal endangered species laws. Additional consultation with the Department of Natural Resources (DNR) and/or US Fish and Wildlife Service may be necessary if follow-up actions are indicated.

The following page contains important information to help you better understand this ER Review. The ER Review itself is divided into four sections: A) Brief description of the proposed project, B) Endangered resources known or likely to occur in the proposed project area, C) Follow-up actions, including those that need to be taken to comply with state and federal endangered species laws, and D) Next steps.

This ER Review may contain <u>Natural Heritage Inventory data</u> (including specific locations of endangered resources) which are considered sensitive and are not subject to Wisconsin's Open Records Law. As a result, please remember that you may share information contained in the ER Review only with individuals who need this information to carry out specific roles in planning and implementation of the proposed project. <u>Specific locations of endangered resources should not be released or reproduced in any publicly disseminated documents</u>. To improve coordination regarding endangered resources issues for the proposed project, we are copying the ER Review to individuals and DNR staff who may be involved in permitting, licensing, or approval of the proposed project.

The attached ER Review is for informational purposes and only addresses endangered resources issues. This ER Review does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR.

Please contact me at (608)264-6057 or via email at lori.steckervetz@wisconsin.gov if you have any questions about this ER Review.

Sincerely,

Lori Steckervetz Endangered Resources Program

Cc: Jeff Schure – Fitchburg/SCR Laura Bub – Fitchburg/SCR

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dnr.wi.gov wisconsin.gov

Naturally WISCONSIN







September 21, 2011



Standard Information to help you better understand this ER Review

Endangered Resources (ER) Reviews are conducted using a standard six-step process in which we gather initial information about the project and site, determine if endangered resources are present or likely to be present on the site, determine if the proposed project is likely to affect endangered resources present on site, determine if potential impacts to endangered resources present on the site can be avoided, identify options for proceeding if impacts to endangered resources cannot be avoided, and confirm and document findings.

To determine what endangered resources are present or likely to be present on the site, we first query the Wisconsin Natural Heritage Inventory (NHI) database for endangered resources records for the proposed project area. The project area evaluated consists of both the specific project site and a buffer area surrounding the site. The size of the buffer considered varies depending on the size and nature of the project and the ecological and land use characteristics of the site and surrounding area. In all cases, at least a 1-mile buffer is considered. At least a 2 mile buffer is considered for large linear projects, projects in areas that are unlikely to have been surveyed (e.g., within large blocks of private land), and projects near wetlands and water bodies. Other circumstances may warrant use of a larger buffer. For example, for projects in a large patch of contiguous habitat, we look throughout the patch. Endangered resources records from the buffer area are considered because most lands and waters in the state, especially private lands, have not been surveyed. In addition, If the area has moderate to high-quality or extensive habitat or if we are aware that recent surveys have been conducted on or near the site, we consult additional online databases, species experts, or other sources of endangered resources information to complement information contained in the NHI database. Considering records from the entire project area (also sometimes referred to as the search area) as well as other endangered resources information and data whenever warranted provides the best picture of species and communities that may be present on your specific site if suitable habitat for those species or communities is present.

This ER Review is being provided to you as a tool to help you comply with state and federal endangered species laws. By following the process described above, we have provided you with the best information currently available about endangered resources that may be present in the proposed project area. However, endangered resources information is never perfect. The NHI database is not all inclusive; systematic surveys of most public lands have not been conducted, and the majority of private lands have not been surveyed. Occurrences of endangered resources are only in the NHI database if the site has been previously surveyed for that species or group during the appropriate season, and an observation was reported to and entered into the NHI database. As such, absence of a record in the NHI database for a specific area should not be used to infer that no endangered resources are present in that area. Similarly, the presence of new species does not imply that surveys have been conducted for other species. Evaluations of the possible presence of rare species on the project site should always be based on whether suitable habitat exists on site for that species.

Endangered resources considered in ER Reviews and protections for each:

Species listed as Threatened or Endangered under Wisconsin's Endangered Species Law (s. 29.604, Wis. Stats.):

- <u>State-listed animals</u> (vertebrate and invertebrate) are protected on all lands and waters of the state
- <u>State-listed plants</u> are protected on public lands and on lands that the person does not own or lease, except in the course of forestry, agriculture or utility actions (<u>s. 29.604, Wis. Stats.</u>).

Species protected by the <u>Federal Endangered Species Act of 1973 as amended</u>, including those federally-listed as Endangered or Threatened, those Proposed or Candidates for federal listing, and their Proposed or Designated Critical habitats:

- · Federally-protected animals are protected on all lands.
- <u>Federally-protected plants</u> are protected on federal lands and in the course of projects that include federal funding. They are also protected on other lands if they are removed, cut, dug up or damaged in knowing violation of any law or regulation of any state or in violation of a criminal trespass law.

<u>Special Concern species</u>, <u>high-quality examples of natural communities</u> (sometimes called High Conservation Value areas), and <u>unique natural features</u> (e.g., caves and animal aggregation sites) are not legally protected by state or federal endangered species laws. However, other laws, policies (e.g., related to Forest Certification or master planning), or granting/permitting processes may require or strongly encourage protection of these resources. The main purpose of the Special Concern classification is to focus attention on species about which some problem of abundance or distribution is suspected before they become endangered or threatened.</u>

<u>State Natural Areas</u> (SNAs) protect outstanding examples of Wisconsin's native landscape of natural communities, and significant geological formations. Endangered species are often found within SNAs. SNAs are protected by law from any use that is inconsistent with or injurious to their natural values (<u>s. 23.28, Wis. Stats.</u>).

Please click on hyperlinks for more information

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Endangered Resource Review for the Proposed US Dairy Forage Research Center Project in Sauk County (ERR Log # 11-224)

Section A. Brief description of the proposed project

Based on information provided by you on the Endangered Resources (ER) Review Request form and attached materials, I understand the proposed project to be as follows:

This project will consist of the construction of an animal housing facility, offices, other structures over an approximately 70-acre area from one of two potential sites from former Badger Army Ammunitions Plant land. The sites are located in T10N R07E Section 19 (Option A) and T10 R06 Section 11 (Option B) of Sauk County.

It is best to request ER Reviews early in the project planning process. However, some important project details may not be known at that time. Details related to project location, design, and timing of disturbance are important for determining both the endangered resources that may be impacted by the project and any necessary follow-up actions. Please contact me whenever project plans change or new details become available to confirm if results of this ER Review are still valid.

Section B. Endangered resources known/likely to occur in the proposed project area

	Project Site Option A
Mammals	
redacted	listed as State Special Concern
Birds	
redacted	listed as State Special Concern and Federally protected redacted
redacted	, listed as bird listed as State Special Concern listed as bird listed as State Special Concern
Reptiles	
redacted redacted	listed as State Endangered and is a Federal Candidate Species
redacted	are listed as State Threatened isted as State Special Concern and a State Protected Wild Animal
Fish	
redacted	as State Endangered , listed as State Threatened ed as State Threatened
redacted	, listed as State Threatened
redacted	, listed as State Special Concern
redacted	
redacted	listed as State Special Concern
Invertebrates	
redacted	a mussel, listed as State Threatened
redacted	a mussel, listed as State Threatened
redacted	, a beetle, listed as State Special Concern
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	14		1.5

redacted	, listed as a State Threatened
redacted	listed as a State Special Concern
redacted	listed as a State Special Concern
	Project Site Ontion B
Mammals	
redacted	, listed as State Special Concern
Birds	
redacted	listed as State Threatened sted as State Special Concern
Reptiles	
redacted	listed as a State Endangered and a Federal Candidate Species
redacted	, listed as a State Endangered
Fish	
redacted	listed as State Special Concern
Plants	
redacted	listed as a State Special Concern , listed as a State Special Concern
Communities	
Southern dry-mesic forests	
For additional information on above, please see <u>http://dnr.v</u>	the rare species, high-quality natural communities, and other endangered resources listed vi.gov/org/land/er/biodiversity/.

Section C. Follow-up actions

Actions that will need to be taken to comply with state and/or federal endangered species laws:

redacted are known to nest within 1 mile of the project site. Since not all nests sites are known, redacted could possibly also nest within the project boundary if there is suitable habitat. redacted redacted

vicinity please use the following guidance:

(1) Maintain a buffer of at least 660 feet (200 meters) between the project activities and the nest (including active and alternate nests).

(2) If an activity must be performed within the 660-foot buffer, restrict the activity to **outside of the nesting season** (late January through late July).

(3) Maintain established landscape buffers that screen the activity from the nest.

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Visit the following website for more information on *redacted* management guidelines and conservation measures *redacted*

- <u>redacted</u> a State Threatened species, as well as several State Special Concern bird species, have been recorded from the landscape surrounding the project site and could be present in the open and semi-open areas of the site. The <u>redacted</u> is protected by the Wisconsin endangered species laws, and all of the birds and their nests/eggs are also protected under the federal Migratory Bird Treaty Act (MBTA). To avoid impacts to the listed species, the project should follow one of the two options below:
 - Assume the listed species is present on the site, and avoid all disturbances to the project site from mid-May through late July. If disturbance is avoided in areas of suitable habitat for these species during this time period, there will not be any further project restrictions related to these species. If the project cannot completely avoid all areas of suitable habitat or take of the species, please contact me regarding the possibility of applying for an <u>Incidental Take</u> <u>Permit/Authorization</u> for the <u>redacted</u>
 - 2) Have an approved qualified biologist conduct surveys to determine if they are present (please submit the biologist name/survey protocols to the Bureau of Endangered Resources for approval prior to the initiation of surveys). If the bird species are NOT found on the site as a result of the surveys, there will not be any project restrictions related to these species. If surveys are conducted and the <u>redacted</u> is recorded, you must then follow the protocol listed above (option 1).

Please contact Kim Grveles (Kim.Grveles@Wisconsin.gov, 608-264-8594), DNR ornithologist, if you have any questions regarding any of the species listed above and/or survey protocols.

To avoid impact to the listed fish and mussel species as well as other rare and sensitive aquatic species
associated with the Wisconsin River and neighboring waterbodies and wetlands, strict erosion and
siltation controls should be practiced during the entire construction period to avoid impacts to neighboring
water bodies.

<u>Please note</u> that erosion control netting (also known as erosion control blankets, erosion mats or erosion mesh netting) used to prevent erosion during the establishment of vegetation can have detrimental effects on local snake and other wildlife populations. Plastic netting without independent movement of strands can easily entrap snakes moving through the area, leading to dehydration, desiccation, and eventually mortality. Netting that contains biodegradable thread with the "leno" or "gauze" weave (contains strands that are able to move independently) appears to have the least impact on snakes

- *redacted* is a listed plant species that have been recorded within the vicinity of the project area, as well as several State Special Concern plant species. This species may be present on site if suitable habitat exists. If any on the listed plants are present on private land it is highly recommended that measures are taken to avoid impacts to these species. *If any of the endangered/threatened plants are located on public property steps must be taken to avoid all impacts.*
- <u>redacted</u> was historically recorded in the vicinity of the project area; however, it is no longer present at either site and no impacts are expected.
- redacted was recorded in the vicinity of the project area; however, after consultation with the species expert it was determined that suitable habitat is no longer present, and therefore, no impact is expected. If any evidence of redacted is present onsite, please contact the Bureau of Endangered Resources for avoidance guidance.
- redacted was recorded in the vicinity of the project area; however, after consultation with the species expert it was determined that suitable habitat is no longer present, and therefore, no impact is expected. If any evidence of redacted is present onsite, please contact the Bureau of Endangered Resources for avoidance guidance.

Note that protection for plants varies with land ownership, project activity, and project funding. In general, plants are protected by endangered species laws only on public lands or if public funding is involved. See page 2 for details. If your ER Review Log # 11-216 Page 5





September 21, 2011



project changes (e.g., a change in location, size, design, disturbance footprint and timing, or construction sequence), please call me to confirm if these results are still valid:

Actions we recommend to help conserve Wisconsin's rare species and high-quality natural communities:

 <u>redacted</u> was recorded in the vicinity of the project area and may be present if suitable habitat is available. Protecting this Special Concern species now may help prevent future listing. If suitable habitat is found within the project area please contact the Bureau of Endangered Resources on how to avoid impact.

Section D. Next Steps

1) Evaluate whether the **'Brief description of the proposed project'** is still accurate. All recommendations in this ER Review are based on the information supplied in the ER Review Request. If the proposed project has changed, please call me to determine if the information in this ER Review is still valid.

2) Determine whether you are able to implement the 'Follow-up actions' identified above:

'Actions that will need to be taken to comply with state and/or federal endangered species laws' represent the Department's best available guidance for complying with state and federal endangered species laws based on the project information that you provided and the endangered resources information and data available to us. If the proposed project has not changed from the description that you provided us <u>and</u> you are able to implement <u>all</u> of the 'Actions that will need to be taken to comply with state and/or federal endangered species laws', your project should comply with state and federal endangered species laws. Please remember that if a violation occurs, the person responsible for the taking is the liable party. Generally this is the landowner or project proponent. If you have questions or concerns about your responsibilities related to Wisconsin's Endangered Species Law, please contact me.

If you are <u>not</u> able to implement one or more of the 'Actions that will need to be taken to comply with state and/or federal endangered species laws' identified above, your project may potentially violate state and/or federal endangered species laws. There may still options available to you. Please call me and I will work with you to identify options that may allow the project to proceed in compliance with state and federal endangered species laws.

'Actions we recommend to help conserve Wisconsin's rare species and high-quality natural communities' may be required by another law, a policy of this or another Department, agency or program; or as part of another permitting, approval or granting process. Please make sure to carefully read all permits and approvals for the project to determine whether these or other measures may be required. Even if these actions are not required by another program or entity for the proposed project to proceed, we strongly encourage you to implement these conservation measures on a voluntary basis to help prevent future listings and protect Wisconsin's biodiversity for future generations.

Thank you for helping to protect Wisconsin's endangered resources! Please call me if you have any questions about this ER Review.

ER Review Log # 11-216

Stantec JSD





GREAT LAKES





Stantec Consulting Services Inc. 209 Commerce Parkway P.O. Box 128 Cottage Grove WI 53527 Tel: (608) 839-1998 Fax: (608) 839-1995

May 17, 2011

U.S. Fish and Wildlife Service Green Bay Wisconsin Field Office 2661 Scott Tower Drive New Franken, WI 54229

Attention: Joel Trick

Dear Joel:

Reference: Section 7 ESA Consultation US Dairy Forage Research Center, Prairie du Sac, Sauk Co., WI US Department of Agriculture - Agricultural Research Service

We are requesting concurrence from the U.S. Fish and Wildlife Service with our conclusion that the abovereferenced project will have "no effect" on listed species, their habitats, or proposed or designated critical habitat. The proposed project is located in Sauk County, Wisconsin. Stantec is developing the EA for this USDA project, which has two alternatives: Option A: expansion at the existing site (NE and SE ¼ of NW ¼ and NW and SW ¼ of NE ¼, Sec. 19, T10N, R7E) and Option B: new construction (SW and SE ¼ of SW ¼, Sec. 11, T10N, R6E).

USDA is proposing to construct a new, automated dairy forage research facility on lands transferred to the agency from the Badger Army Ammunition Plant (BAAP). The BAAP site (Option B) is ~70 ac and will include: Rebuild of access off USH 12, grading for site preparation, constructing animal housing facility with attached research/office/visitor center, separate calf barn, feeding facility, storage buildings, feed bunkers, and manure storage lagoon, and installing ~8,500 linear feet of water main. The existing USDFRC Farm address is S8822 Sunset Drive, Prairie du Sac, WI 53578 (Option A). An option to expand and automate that facility in the same manner as described above (on adjacent USDA-owned land to north-northeast) is also under consideration. Attached location maps illustrate these descriptions. Stormwater management and erosion control BMPs will also be part of the project.

The expansion area at the existing farm (Option A) is currently pasture, and is well-buffered from the Wisconsin River by a broad band of hardwood forest. It has been in agricultural use at least for the last century.

Option B at the BAAP site is ~80% grassland (primarily bluegrass, fescue, and a small area of planted prairie cordgrass), ~10% forested (cottonwoods and planted red pines), and ~5% shrubby regrowth (honeysuckle, cottonwood). The remainder consists of buildings, old foundations and roadways. Native topsoil was removed and replaced, in a portion of the excavated area, with low quality (rocky, clayey) material during a recent effort to remediate lead shot resulting from former use as a shooting range. The pond/wetland shown within Option B site is actually a non-wetland borrow pit. Stormwater will be detained at the southern edge of the property prior to discharge to a swale leading eventually to the main unnamed tributary to the Wisconsin River. The proposed water main would follow the recently disturbed route of a sanitary sewer constructed in 2009, which follows existing fencelines and roadways.

We carefully reviewed (on May 17, 2011) your agency's Section 7 Consultation website for a list of species and critical habitat that "may be present" within the project area. There are five species listed as occurring in







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May 17, 2011 Joel Trick Page 2 of 3

Sauk County: Grus americanus, Lampsilis higginsii, Plethobasus cyphyus, Aconitum noveboracense, and Lespedeza leptostachya.

The evaluations in Table 1 indicate why we expect no effects on these species to result from either project option. We request your concurrence with our determination. Thank you in advance for your assistance.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Elizabeth O. Way

Elizabeth A. (Betsey) Day, PWS, PH Senior Environmental Project Manager Tel: (608) 827-5668 Fax: (608) 839-1995 Betsey.Day@stantec.com

Attachments: Table 1, location maps

c. Wade Wyse, JSD Professional Services






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May 17, 2011 Joel Trick Page 3 of 3

Table 1. Analysis of Habitat Suitability – Federally Listed Species for Sauk County, US Dairy FRC (Options A and B)

Species	Status	Habitat	Action Area Evaluation
Whooping crane (<i>Grus americanus</i>)	**Non- essential experimental population	Open wetlands and lakeshores	No habitat at Option A or B. Assume these are listed due to location of the International Crane Foundation in Sauk County.
Higgins eye pearly mussel <i>(Lampsilis higginsii)</i>	Endangered	Wisconsin River	May be habitat or occurrences adjacent to Option A; No habitat present at Option B.
Sheepnose (Plethobasus cyphyus)	Proposed as Endangered	Wisconsin River	May be habitat or occurrences adjacent to Option A; none at Option B
Northern monkshood (<i>Aconitum</i> noveboracense)	Threatened	North facing slopes	No shaded slopes present at Option A or B
Prairie bush-clover (Lespedeza leptostachya)	Threatened	Dry to mesic prairies with gravelly soil	Potential habitat at Options A and B, but both sites are highly disturbed. Option A has been farmed for decades and Option B has had topsoil removed.

http://www.fws.gov/midwest/endangered/lists/wisc-cty.html

































United States Department of the Interior

FISH AND WILDLIFE SERVICE Green Bay ES Field Office 2661 Scott Tower Drive New Franken, Wisconsin 54229-9565 Telephone 920/866-1717 FAX 920/866-1710

June 14, 2011

Ms. Elizabeth Day Stantec Consulting Services Inc. 209 Commerce Parkway, P.O. Box 128 Cottage Grove, Wisconsin 53527

re:

Section 7 Consultation US Dairy Forage Research Center Sauk County, Wisconsin

Dear Ms. Day:

The U.S. Fish and Wildlife Service (Service) has received your letter dated May 17, 2011, requesting comments on the subject project. The project involves construction by the U.S. Department of Agriculture (USDA) of a new, automated dairy forage research facility on one of two alternate sites located in Sauk County, Wisconsin. Both of these sites are located on lands transferred to USDA from the Badger Army Ammunition Plant. We have reviewed the information provided in your letter and our comments follow.

Federally-Listed Species, Candidate Species, and Critical Habitat

Based upon a review of the information in our files, and the information provided with your letter, we concur that the proposed action would not affect federally-listed or proposed species or designated critical habitat. This precludes the need for further action on this project as required by the 1973 Endangered Species Act, as amended. Should additional information on listed or proposed species or their critical habitat become available or if project plans change or if portions of the proposed project were not evaluated, it is recommended that you contact our office for further review.

We appreciate the opportunity to respond. Questions pertaining to these comments can be directed to Mr. Joel Trick at 920-866-1737.

Sincerely,

Catherine Carnes Acting Field Supervisor





September 21, 2011



E.8 GROUNDWATER QUALITY







September 21, 2011











E.9 LITERATURE CITED

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