



Minuteman Missile National Historic Site

Historic Structure Report, Cultural Landscape Report and Environmental Assessment



JUNE 2010



Public Review Draft



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Chapter 1: Introduction

Chapter 1: Introduction

The Minuteman Missile National Historic Site (NHS), located in southwestern South Dakota, preserves one of the last remaining Minuteman II intercontinental ballistic missile systems in the United States. The site interprets the deterrent value of the land-based portion of America's nuclear missile defense during the Cold War era and commemorates the people and events related to this key period of American history.¹

The national historic site resources consist of the Delta-01 (Launch Control Facility) and Delta-09 (Launch Facility) sites. These facilities have changed little since President George H. W. Bush ordered the stand-down of nuclear forces following the signing of the Strategic Arms Reduction Treaty (START) on July 31, 1991.

The current draft of this report provides a public review version of Parts I and II. Part I includes a historical overview, existing conditions/affected environment, and analysis and evaluation of historic landscapes and buildings. Part II consists of: Management Philosophy and Management Issues, Treatment Alternatives, Impacts from Treatment Alternatives/Environmental Consequences, Consultation and Coordination, and a Bibliography. Chapter 8, Class "C" Cost Estimates, is not included in the current draft. When the preferred alternative has been accepted by the National Park Service, the cost estimates will be added to the report. This draft has been prepared by a project team consisting of Quinn Evans Architects (QEA), Fitzpatrick Structural Engineering (FSE), and Woolpert, Inc., to fulfill a contract with the Midwest Regional Office of the National Park Service.

Scope of the Report

The intent of this combined Historic Structures Report, Cultural Landscape Report, and Environmental Assessment (HSR/CLR/EA) is to provide an overview of the site history, document existing conditions, evaluate integrity, and guide treatment and use of the resources associated with the significant historic landscape and buildings within Minuteman Missile National Historic Site. A thorough investigation and evaluation of the historic landscapes and buildings has been conducted using the Secretary of the Interior's Standards.² The documentation of historic significance and evaluation of integrity of the buildings and historic landscapes provides a framework for the development of treatment recommendations. The report will provide site managers with a comprehensive understanding of the physical evolution of the historic buildings and landscapes and guidance for their future management.

¹ National Park Service, "General Management Plan/Environmental Impact Statement, Minuteman Missile National Historic Site," 3.

² National Park Service, "Secretary of the Interior's Standards for the Treatment of Historic Properties."

Report Methodology (Applicable Regulatory Requirements)

This report has been prepared according to federal guidelines addressing cultural landscape reports, historic structures reports, and environmental assessments including: *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, *Preservation Brief 43: The Preparation and Use of Historic Structure Reports*, federal regulations (40 CFR 1500-1508) implementing the *National Environmental Policy Act of 1969* (NEPA), regulations of the *Council on Environmental Quality* (40 CFR 1508.9), *NPS Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-Making*, and the *National Historic Preservation Act of 1966* (as amended). Other applicable regulatory requirements include: the *National Park Service Organic Act*, the *American Indian Religious Freedom Act*, the *Act for the Preservation of American Antiquities of 1906*, the *Historic Sites Act of 1935*, the *National Park Service Director's Order #28, Cultural Resource Management*, and the *Archeological Resources Protection Act*.

The *General Management Plan/ Environmental Impact Statement* (GMP/EIS) for Minuteman Missile National Historic Site provides clear direction for future management of the park, including buildings and sites. The GMP/EIS thoroughly evaluated four treatment alternatives that included use of the buildings and sites associated with the park. The preferred alternative from the GMP/EIS provides specific guidance for the programming of the buildings and landscapes at Delta-01 and Delta-09, and serves as a foundation for the HSR/CLR/EA. Possibilities for treatment of the buildings and landscapes were scrutinized according to the GMP/EIS preferred alternative. This led to the elimination of HSR/CLR/EA alternatives that did not completely meet the GMP/EIS requirements and the ultimate evaluation of only one viable action alternative as part of the HSR/CLR/EA.

The recent *Historic Resources Study* (HRS) for Minuteman Missile National Historic Site provides substantial background information regarding the facilities.³ This information is not repeated herein; rather, a historic summary (founded on the HRS) and chronological timeline of the physical development of the two units is included to document changes made to the properties related to periods of significance. Additional primary documentation was gathered from the archival collections at Minuteman Missile National Historic Site (stored at Badlands National Park) and Ellsworth Air Force Base in June of 2008. Maps illustrating physical changes over time are provided.

Conditions surveys have been conducted on the buildings, systems, and landscapes at each facility. These are described in the existing conditions section, Chapter 3, which includes assessments of the overall condition of the properties and the condition of

³ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study).

individual buildings, structures, and landscape features. Field inventories of existing conditions were conducted by Quinn Evans | Architects in June 2008 and June 2009.

Although the federal government has standards for the preparation of Historic Structures Reports, Cultural Landscape Reports, and Environmental Assessments, there are no guidelines for preparing these reports in combination. Merging the documents requires some adjustments to the standard formats for each, to streamline the presentation and legibility of the document. This report is organized into two parts and nine chapters. The current submittal includes the 95% draft of chapters one through nine, excepting chapter eight.

Part I

Chapter 1: Introduction (Purpose and Need)

Chapter 2: History Summary

Chapter 3: Existing Conditions/Affected Environment

Chapter 4: Building/Landscape Analysis and Evaluation

Part II

Chapter 5: Management Philosophy and Management Issues

Chapter 6: Treatment Alternatives

Chapter 7: Impacts from Treatment Alternatives/Environmental Consequences

Chapter 8: Class "C" Cost Estimates

Chapter 9: Consultation and Coordination

Bibliography

The *Environmental Assessment (EA)* portions of the report analyze the impacts of each of the treatment alternatives on natural and cultural resources. The EA portion of the project has been coordinated by Woolpert, Inc., a consulting firm that specializes in environmental planning. Quinn Evans Architects assisted in the preparation of this portion of the report.

Purpose and Need for the Project

The purpose of this report is to provide information regarding the physical development, existing conditions and analysis of integrity for the buildings and landscape features within the two units of the Historic Site. The report provides treatment recommendations, and cost estimates for the historic landscapes and structures at the Delta-01 and Delta-09 sites. Finally, an Environmental Assessment is included to meet National Environmental Policy Act (NEPA) requirements. Prior to the completion of this report, little information was available about the cultural landscapes at Minuteman Missile National Historic Site. This report provides critical information to help plan the preservation and management of the park's resources, including condition assessments and baseline documentation and analysis of integrity and significance for the landscapes and buildings of the missile sites.

The HSR/CLR/EA is needed to determine how best to achieve four major goals for the park. These include: preserving the integrity of the cultural resources within the park, improving the visitor experience at the park, providing expanded facilities for visitors, and enhancing interpretive opportunities related to the historic resources.

Project Objectives

The overall goal of this combined Historic Structures Report, Cultural Landscape Report, and Environmental Assessment (HSR/CLR/EA) is to provide an overview of the history, document existing conditions, evaluate integrity, and guide treatment and use of the resources associated with the significant historic buildings and landscapes within Minuteman Missile National Historic Site.

Specific objectives of the report include:

Part I

1. Evaluation of viewsheds from and to Delta-01 and Delta-09.
2. Assessment of conditions of modern building materials and systems.
3. Documentation of physical changes that illustrate shifting responses to military technology. Include documentation of phases of physical change to the landscapes and buildings.
4. Identification of missing features.
5. Identification of changes in paint schemes and interior/exterior finishes and small scale features such as security elements, antennae, structures and fence configurations.
6. Identify contributing and non-contributing landscape characteristics.

Part II

1. Recommended approach for site interpretation, including placement of wayside exhibits and site signage.
2. Development of schematic site planning for providing visitor services (including universal access, parking, pedestrian circulation, and restroom facilities).
3. Recommendations for addressing missing building or landscape features.
4. Recommended approach(es) for maintaining or replacing mid to late 20th century building materials and systems.
5. Recommended method for maintaining historic HVAC and Cathodic protection systems.
6. Recommendations for paint schemes and interior/exterior finishes and treating small scale features such as security elements, antennae, structure and fence configurations.
7. Recommendations for protecting significant views.
8. Recommendations for vegetation management and control.
9. Recommendations for erosion control at Delta-01 and drainage at Delta-09.
10. Recommendations for interpreting the overall missile project, other missile sites and the historic connection between Delta-01 and Delta-09.

Park Purpose and Significance

The purpose of Minuteman Missile National Historic Site is to

- preserve, protect, and interpret for the benefit and enjoyment of present and future generations the structures associated with the Minuteman II Intercontinental Ballistic Missile (ICBM) system,
- interpret the historical role of the Minuteman II Intercontinental Ballistic Missile (ICBM) system as a key component of America's strategic commitment to preserve world peace, and in the broader context of the Cold War, and
- Complement the interpretive programs relating to the Minuteman II Intercontinental Ballistic Missile (ICBM) system offered by the South Dakota Air and Space Museum at Ellsworth Air Force Base.

Minuteman Missile National Historic Site was nominated for inclusion in the National Register of Historic Places upon congressional authorization and presidential signature of its enabling legislation dated November 29, 1999. On May 5, 2005, a thorough National Register Nomination was completed. The nomination includes identification of historic district boundaries and contributing features. The nomination also establishes a national level of significance for Minuteman Missile National Historic Site. The nomination recognizes important elements of the sites including associated features, recreational

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equipment, mechanical and electrical equipment, historic objects, furnishings, and landscape elements.

Minuteman Missile National Historic Site is significant because of the following:

- The Minuteman II intercontinental ballistic missile (ICBM) facilities known as Delta-01 and Delta-09 are the best preserved examples of the operational character of American history during the Cold War.
- The facilities are symbolic of the dedication and preparedness exhibited by the missileers of the U.S. Air Force stationed throughout the upper Great Plains in remote and forbidding locations during the Cold War.⁴
- The facilities provide a unique opportunity to illustrate the history and significance of the Cold War, the arms race, and ICBM development.
- Delta-01 and Delta-09, as represented through the 44th Strategic Missile Wing, highlight the traditional values, training, and esprit de corps of military personnel from the U.S. Air Force, the Strategic Air Command, and Ellsworth Air Force Base, and their undeterred commitment to defend the country.
- The facilities represent unparalleled engineering feats and collaboration between military personnel and civilian contractors in the design, construction, activation, and maintenance of the upper Great Plains missile fields.
- Delta-01 and Delta-09 remain as examples of the ability of the American people to construct, in a short period of time, complex facilities that would not only serve as a protection against others that have similar power but also to withstand the test of time.
- Although the Minuteman system was a catalyst for rural electrification, road improvements, and economic development, the facilities also exemplify the historic concerns among rural South Dakota communities and ranchers towards landownership issues and potential disruptions of their traditional “western” way of life.
- The facilities offer the opportunity for civic engagement, discussion, and debate on past, present, and future ramifications of the Cold War era and the country’s missile defense program.
- Delta-01 and Delta-09 allow access, for national and international visitors, to seldom-seen military technology and the powerful tangible cultural resources that may have had a profound impact upon their political and social ideals.⁵

⁴ Although the term **missileer** is most often used to refer to the operations officers on 24- hour alert in the underground capsules responsible for launching the missiles, in the broader context it includes the missile maintainers, security forces, chefs, civil engineers, communications personnel, and others that directly supported the strategic alert mission.

⁵ These are taken from the Minuteman Missile NHS “Draft General Management Plan/Environmental Impact Statement,” pp. 9-10.

Description of the Study Area

The region surrounding the Minuteman Missile NHS includes numerous visitor destinations including Mount Rushmore National Memorial, Badlands National Park, Black Hills National Forest, Jewel Cave National Monument, Custer State Park, and Deadwood National Historic Landmark. The two Delta sites are located approximately ten miles north of Badlands National Park, which is about seventy miles east of Rapid City, South Dakota. Both Delta sites are adjacent to Interstate 90, which is a major east-west tourist route. The nearest communities are Cactus Flats to the east at Interstate 90 Exit 131, and Wall to the west at Interstate 90 Exit 110.

The landscape within view of the Delta sites and the highway between them consists of rolling ranch land with steep badland rock formations in the background. Billboards, utility poles and lines, an occasional house, outbuilding, or fenced area, and road signs along the highway are the few other features within sight. In addition to the Delta-01 and -09 facilities, the general area includes visible remnants of other Minuteman Missile sites that may be interpreted to assist visitors in comprehending the overall contextual background of the National Historic Site.

The Launch Control Facility, Delta-01, is situated on a 6.35-acre site and includes two support buildings aboveground and one belowground facility. Delta-01 is in Jackson County, about one-half mile north of Interstate 90 on County Road CS23A at exit 127. The site is bordered on the north, west, and south sides by private property and on the east by a county road and the Buffalo Gap National Grassland.

Delta-09, the Launch Facility, contains a training model of a Minuteman II missile in its silo and an underground utility support building. The 1.5-acre site includes a viewing enclosure allowing visitors to see the model missile. Delta-09 is about eleven miles west of Delta-01 in Pennington County, about three quarters of a mile south of Interstate 90 Exit 116 on 239th Street. Delta-09 is bordered on the north, west, and south by the national grassland and on the east by private property.

The temporary NPS project office housing the superintendent and staff is located on private property in Cactus Flats, just south of exit 131 on Interstate 90. The eventual location for the park headquarters and visitor center will be at the northwestern corner of exit 131 on Interstate 90.

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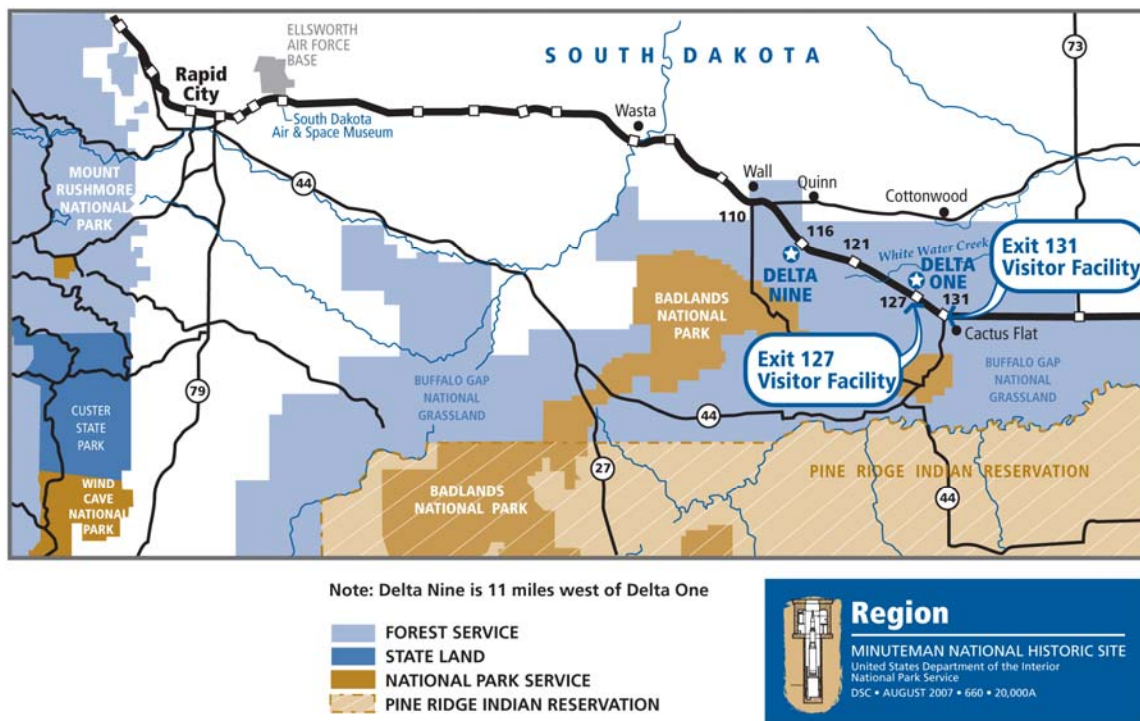


Figure 1- 1: Location map of Minuteman Missile NHS

(source: Minuteman Missile NHS Draft General Management Plan, page 7).

Environmental Assessment Impact Topics

The NPS manages park resources to maintain them in an unimpaired condition for future generations in accordance with the NPS-specific statutes, including the Organic Act of 1916 and the National Parks Omnibus Management Act of 1998, general environmental laws such as the Clean Air Act, the Clean Water Act, the Endangered Species Act of 1973, NEPA, and the Wilderness Act, Executive Orders, and applicable regulations. NEPA is the basic national charter for protection of the environment. NEPA requires federal agencies to use all practicable means to restore and enhance the quality of the human environment and to avoid or minimize any possible adverse effects of their actions upon the environment.

Specific impact topics are identified for analysis and to allow comparison of the environmental consequences of each alternative. Impact topics that are analyzed for this project are: cultural resources (cultural landscapes, historic buildings and structures), socioeconomics, and visitor experience and park operations. Impact topics that were dismissed from further analysis for this project are: geology and soils, paleontological resources, archeological resources, prime and unique farmlands, floodplains, water quality, wetlands, air quality, environmental justice, soundscape management, lightscape

management, Indian trust lands, ethnographic resources, museum collections, special status species and wildlife.

These impact topics were identified based on federal laws and regulations, including Section 106 of the *National Historic Preservation Act of 1966* (as amended) and Executive Orders, *NPS Management Policies 2006*, and NPS knowledge of limited or easily impacted resources. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

Impact Topics Selected for Analysis

Cultural Resources

Minuteman Missile NHS is listed in the National Register of Historic Places. The environmental analysis will include buildings, structures, and landscape characteristics (spatial organization, circulation, land use, vegetation, topography, buildings, structures, small-scale features, and views).

Implementation of any treatment alternative could affect cultural resources at Minuteman Missile NHS; therefore this topic will require analysis in this document.

Socioeconomics

Tourism as a component of the regional economy of Jackson and Pennington Counties is growing and the retail and government sectors are important for employment of local residents. Substantial contributors to the tourism revenue in the region include Wall Drug, Minuteman Missile NHS, Badlands National Park, the Black Hills, the Lakota Heritage and Education Center and other area attractions. Potential treatments to the historic structures and cultural landscapes of Minuteman Missile NHS, when evaluated within the greater context of the region, could have effects on the regional economy; therefore, this topic will be addressed in this document.

Visitor Experience

Although Minuteman Missile NHS is a relatively new NPS unit, site staff provide ranger-led interpretation at both sites and operate a visitor information desk at the temporary Visitor Contact Station and park headquarters at exit 131 of Interstate 90. The NPS has recently completed a Long-Range Interpretative Plan for the park and the implementation of this plan has been initiated.

Because implementation of any treatment alternatives could affect the visitor experience at Minuteman Missile NHS this topic will be addressed in this document.

Park Operations

Minuteman Missile NHS is open year-round, although there are few visitors during the winter. Park staff are currently based in the temporary park headquarters, which is approximately four miles east of Delta-01 and approximately 15 miles east of Delta-09. Implementation of potential treatment alternatives could affect staffing levels, logistics and costs for maintenance and interpretation at Minuteman Missile NHS; therefore, this topic will be addressed in this document.

Impact Topics Considered But Eliminated from Further Analysis

Geologic Features and Soils

Bedrock in northern Jackson County is within the Pierre Shale Formation with loamy terraces occurring as mesas and tableland. Bedrock in northeastern Pennington County is composed of the Pierre and Fox Hills formations. Because the proposed action would not disturb bedrock, there would be no impacts to geologic resources. Therefore, further analysis of geology will be dismissed from this document.

Soils at the Delta-01 site consist of Nunn loam and Pierre Clay. At the Delta-09 site, Whitewater clay underlies the area. Because proposed cultural landscape treatment alternatives would result in short-term, direct negligible impacts, further analysis of soils will be dismissed from this document. However, all soil disturbing activities are subject to applicable regulations, including the National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan (SPPP) requirements, such as implementation of NPS Best Management Practices (BMPs).

Cultural Resources

Paleontological Resources

There are no known paleontological resources at Minuteman Missile NHS. As noted in the archeology discussion the construction of the facilities at Minuteman Missile NHS resulted in extensive ground disturbance in and around the site. The actual limits of ground disturbance are not known, but ground disturbance would certainly have extended beyond the current perimeter fence for both Delta-01 and Delta-09. Surveys and literature searches would be conducted prior to any ground disturbance for construction of parking lots, cathodic protection or other cumulative actions such as the visitor center, which is proposed in the Minuteman Missile NHS General Management Plan. If any significant resources are found then mitigation measures would be implemented. The project would be redesigned or relocated to avoid any impacts to the resource. If the project could not be redesigned or relocated, then data recovery would be conducted and the resources would be curated at an appropriate facility. If surveys and literature searches reveal no

resources within the project area then there would be no impact to the resource. If resources are identified the negative impacts would be mitigated through redesign, relocation of the project or data recovery. The resulting mitigated impacts would be minor, therefore paleontological resources were dismissed from further analysis in this report.

Archeological Resources

Construction of aboveground and subsurface facilities at Delta-01 and Delta-09 required extensive excavation and ground disturbance in the immediate vicinity of each site. Although the exact extent of ground disturbance is unknown, some area beyond each site's perimeter fence was likely disturbed. Due to the extensive disturbance of Delta-01 and Delta-09 it is unknown if any archeological sites existed at these locations prior to construction and those construction activities would have completely destroyed any resources, if they existed. The potential for historic archeological resources resulting from daily military operations would likely be very limited because virtually all materials on the ground would have been removed to maintain the site to military standards. Taking cumulative actions into consideration would include the potential for construction of a visitor center at a site southeast of Delta-01. The Preferred Alternative in the Minuteman Missile NHS General Management Plan identified an area north of Exit 131 for the visitor center.

Any ground disturbance resulting from treatment alternatives proposed in this report, in addition to any cumulative actions such as construction of a visitor center would be addressed through the NHPA Section 106 consultation process. Archeological surveys of the proposed areas of ground disturbance would be conducted as part of that process. If archeological resources eligible for listing in the National Register of Historic Places are found, then, as part of the Section 106 process, mitigation measures would be identified. The NPS and the South Dakota SHPO would consult on the mitigation measures and work toward agreement on those measures. Because archeological inventories would be conducted and Section 106 consultation would be implemented for any ground disturbing action associated with the preferred alternative, archeological resources was dismissed from *further* analysis in this report.

Ethnographic Resources

Ethnographic resources are defined by the National Park Service as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. The preparation of the General Management Plan for Minuteman Missile National Historic Site included consultation with Native American tribes with cultural affiliations with the land in the vicinity of Delta-01 and Delta-09. The tribes expressed no issues or concerns with the proposed use of Delta-01 or Delta-09. The National Park Service has conducted an ongoing process for acquiring the stories and personal histories of military personnel, construction workers and others that have knowledge of daily

operations and management of Delta-01 and Delta-09. This knowledge is invaluable in determining management direction to ensure the resources at Delta-01 and Delta-09 best represent the conditions that make this site important to this era of United States history. The HSR/CLR/EA will be provided to affiliated Native American tribes, and individuals and organizations with ethnographic ties to military operations at Delta-01 and Delta-09 for review and comment. This consultation process is described in Chapter 9: Consultation and Coordination. Treatment alternatives in the HSR/CLR/EA would take relevant ethnographic information into consideration to avoid adverse impacts to these resources; therefore, this topic was dismissed from further analysis.

Museum Collections

The museum collection for Minuteman Missile NHS currently stands at 54,479 objects and archived materials and will likely grow in the coming years. Currently museum objects are at Delta-01 and Delta-09 or in storage at Ellsworth Air Force Base and Badlands National Park. Over time, the museum objects will be removed from Ellsworth Air Force Base and Badlands National Park and brought to Minuteman Missile NHS for interpretive purposes. Other materials will be stored in the Museum Collection Storage Building at Badlands National Park. The preferred alternative in the Minuteman Missile National Historic Site General Management Plan proposes construction of a visitor center for Minuteman Missile National Historic Site; however, this visitor center would not include a curatorial facility to accommodate museum objects. In addition to Badlands NP storage facilities, Mount Rushmore National Memorial also serves as a multi-park storage facility. Although the park's collections will continue to grow, it is not anticipated that implementation of any treatment alternative would result in a large number of new items that require storage and curation in excess of current and proposed storage capacity. Implementation of any treatment alternative would result in negligible impacts to museum collections; therefore, this topic has been dismissed from further analysis in this document.

Prime and Unique Farmlands

In August 1980, the Council on Environmental Quality (CEQ) directed that Federal agencies assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) as prime or unique. Prime farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed, unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to the NRCS, there are no prime or unique agricultural soils at Minuteman Missile NHS. Therefore, this topic was dismissed from further consideration in this document.

Air Quality

Minuteman Missile NHS does not conduct air quality monitoring. The effects of air pollution on this park's natural resources and historic structures are unknown. Badlands National Park, which is in proximity to Minuteman Missile NHS, does monitor air quality and the air quality in the park is considered good. However, there have been impacts to air quality in and near Badlands National Park in the past including occasional short-term air pollution from wildfire smoke and blowing dust. Local air quality could be temporarily affected by dust and vehicle emissions during the period of construction for any alternative; however, appropriate BMPs would be implemented to mitigate potential short-term impacts to localized air quality. Implementation of treatment alternatives would result in negligible impacts to cumulative sources of air emissions. Therefore, air quality is not addressed as an impact topic in this document.

Floodplains

Executive Order 11988 (Floodplain Management) directs Federal agencies and their actions to avoid to the extent possible the long-term and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

As floodplains do not occur within the project area, floodplains will be dismissed as an impact topic in this document.

Wetlands

Section 404 of the Clean Water Act (CWA) and Executive Order 11990 requires federal agencies to avoid impacts on wetlands where possible. The NPS *Management Policies 2006*, section 4.6.5, *Wetlands* and DO-77-1 (Wetland Protection) provide guidelines on developments proposed in wetlands.

No wetlands have been delineated, nor are there any areas that meet the definition of wetlands within the Delta-01 and Delta-09 project sites. Implementation of proposed treatment alternatives would not impact wetlands; therefore, wetlands will not be addressed in this document.

Water Quality

Section 404 of the CWA also requires federal agencies and their actions to avoid impacts to “other waters of the U.S.,” which includes lakes, ponds, streams, and rivers. There are no USGS-mapped streams or rivers within the boundaries of Minuteman Missile NHS. There are intermittent streams in the vicinity of Delta-01 and Delta-09; however, direct impacts to those streams are not planned. Also, because soil disturbing activities are subject to applicable regulations, including the National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan (SPPP) requirements, such as implementation of NPS Best Management Practices (BMPs), any indirect effects to surface water quality will be minimized. Therefore, water quality will not be addressed in this document.

Environmental Justice

Under a policy established by the Secretary of the Interior, to comply with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, departmental agencies should identify and evaluate, during the scoping and/or planning processes any anticipated effects, direct or indirect, from the proposed project or action on minority and low-income populations and communities, including the equity of the distribution of the benefits and risks.

Although there are residents in the region that are minority and low income, any proposed treatment alternative would not result in disproportionately direct or indirect impacts on minority or low-income populations. As discussed in the Socioeconomics section, there could potentially be positive impacts to the region as a whole, which could then benefit minority and low-income populations. Therefore, environmental justice will not be included as an impact topic in this document.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaskan Native tribes.

There are no Indian trust resources at the park. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit on Indians due to their status as Indians. Therefore, Indian trust resources are dismissed as an impact topic in this document.

Lightscape

In accordance with NPS *Management Policies 2006*, the NPS strives to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human-caused light. Minuteman Missile NHS is located within a rural setting with minimal ambient light. Existing light sources are limited to security lighting associated with Delta-01 and Delta-09 and vehicles on Interstate 90 and county roads. Military personnel stationed at Delta-01 would have been exposed to very similar levels of human caused light.

Other than lighting associated with safety and security at each site, there are no sources of light associated with treatment alternative; therefore, lightscape management was dismissed as an impact topic in this document.

Soundscape

In accordance with NPS *Management Policies 2006* and Director's Order #47, *Sound Preservation and Noise Management*, an important part of the NPS mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and duration of human-caused sound considered acceptable varies among NPS units, as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

Human-caused noise at Delta-01 and Delta-09 is what a visitor would expect from a rural area. Visitors should expect to hear occasional sounds from vehicle traffic along Interstate 90 and the roads leading to each site. Military personnel stationed at Delta-01 would have been exposed to very similar levels of human caused noise. Construction associated with any treatment alternative would be consistent with the normal background of noise of a rural area and would only occur during length of construction. Therefore, soundscape management was dismissed as an impact topic in this document.

Special Status Species

According to correspondence from the U.S. Fish and Wildlife Service (USFWS) in 2002, the federally-endangered whooping crane and least tern and the federally-threatened bald eagle were listed to occur in Jackson and Pennington Counties. However, since 2002, the bald eagle has been delisted. The 2002 letter also listed the federally-listed black footed ferret as possibly occurring in these counties.

The latest USFWS species list for Pennington and Jackson Counties (dated September 2008) was also reviewed to determine the potential presence of listed species. The current

list notes the Federally-endangered whooping crane in Jackson County and Pennington County and the Federally-endangered least tern in Pennington County. The black footed ferret is listed as a known, but proposed/experimental population in both counties.

In addition to federally-listed species, NPS Management Policies and Director's Order 77 Natural Resources Management Guidelines require the NPS to examine the impacts on state-listed threatened, endangered, candidate, rare, declining and sensitive species. Potential impacts to special status species or their habitats were evaluated based on species presence and the potential effects of actions related to treatments to the cultural landscape at the Minuteman Missile NHS. An updated request for information on the presence of state-listed species was submitted to the state of South Dakota in March 2010 and a response has not yet been received. However, based on the 2008 EIS/GMP, the whooping crane, peregrine falcon, and black footed ferret are noted to be listed as a state endangered species. The mountain lion is noted to be listed as a state threatened species.

The black-footed ferret (*Mustela nigripes*) is listed by the state government as endangered and is one of the most endangered mammals in North America. In 1987 only 18 individuals survived. An aggressive captive-breeding and reintroduction program has made progress in recovering the ferret population. There are no known ferrets on or near either of the locations proposed for the visitor/ administrative facility or at or near Delta One or Delta Nine because there are no prairie dog towns (the ferrets' primary habitat) near these sites.

The federally and state endangered whooping crane (*Grus americana*) is a migrant that uses shallow, sparsely vegetated wetlands, wet meadows, and agricultural fields. No actions are being proposed in the alternatives proposed in this management plan that would be expected to detrimentally affect the areas that the cranes use. With their very limited use of the area, no impacts are expected to occur to whooping cranes under any of the alternatives under consideration.

The peregrine falcon (*Falco peregrinus*) is listed by the state as endangered. The peregrine falcon lives mostly along mountain ranges, river valleys, coastlines, and increasingly in cities where they launch attacks on their prey from cliff-like perches. The national historic site does not include suitable nesting habitat for the falcon. Therefore impacts on the peregrine falcon are not anticipated.

The mountain lion (*Felis concolor*), a state-listed threatened species, is believed to be expanding out from the Black Hills. However, mountain lions are not believed to frequent the national historic site. There have been only 37 documented mountain lion observations in nearby Badlands National Park since 1960, averaging less than one sighting per year between 1960 and 1995. Although sightings have increased within nearby Badlands National Park to an average of two or three per year since 1995, most of the sightings throughout the park appear to be young transient males that are probably emigrating from the expanding Black Hills population. Mountain lions have extremely large home ranges (territories can be greater than 500 square kilometers depending on the

mountain lion's age, sex, and season of the year), and there is a large land base in the region for them to use, if disturbed. Consequently, impacts due to the actions proposed at the Minuteman Missile NHS likely would be negligible to this species.

Further, according to a 2007 National Park Service survey at the site, only one special status species (or habitat) was observed at the site. For that survey, a den of swift foxes (a state-listed threatened species in South Dakota) was observed along the embankment of the sewage lagoon at Delta-01. The den of swift foxes has since vacated this site.

Swift Fox Affect Determination

The swift fox resides primarily in deserts and short-grass prairies and form their dens in sandy soil on open prairies, in plowed fields, or along fences. The species is native to the Great Plains region of North America, and its range extends north to the central part of Alberta, Canada, and south to Texas. It reaches from western Iowa to Colorado, Kansas, Wyoming, and Montana. The swift fox nearly became extinct in the 1930s because of eradication programs aimed at eliminating foxes, wolves, and coyotes from the region. Populations have returned but are not yet fully thriving since they only inhabit less than forty-percent of their historic range.

None of the treatment alternatives are proposing modifications to the sewage lagoon embankment at Delta-01. Therefore, none of the treatment alternatives will impact the known den for this species. Further, although the disturbance envelopes vary between the various treatment alternatives, the loss of potential habitat is minimal compared with the adaptability of the species and the large area of available habitat in the region. Therefore, given these considerations, all of the proposed treatment alternatives will have no effect/no adverse effect on this species. This conclusion is reached when the proposed action and its interrelated and interdependent actions will not directly or indirectly affect listed species or destroy/adversely modify designated critical habitat. Because the species is state-listed, Section 7 consultation with the U.S. Fish and Wildlife Service is not required. The no-action alternative and the various treatment alternatives are not anticipated to contribute to cumulative adverse impacts to swift fox or its habitat because direct impacts to this species' known habitat are not proposed. Any direct impact loss to potential swift fox habitat would be offset by the availability of habitat in the region.

Based on the file records research, on-site species surveys, and affect determination on the swift fox, further analysis of federally-listed and state listed species has been dismissed from this document.

Wildlife

The existing landscape exhibits species typical of wildlife adapted to mixed grass prairies. Several large game species are known to occur in the badlands area of South Dakota, outside the property boundaries of Minuteman Missile National Historic Site. These include pronghorn antelope, mule deer, and white-tailed deer. Deer and pronghorn

travel throughout the lands adjacent to the NHS and are seasonally hunted. Other common mammals in the region include coyote, bobcat, least chipmunk, eastern cottontail rabbit, and muskrat. According to the 2007 National Park Service species survey at the site, the species present include deer mice, thirteen-lined ground squirrel, 29 bird species (including killdeer, mourning dove, horned lark, western meadowlark, brown headed cowbird, and lark bunting), and three reptiles/amphibians. The reptiles/amphibians included the Great Plains toad, painted turtle, and gopher snake.

Minuteman Missile NHS has been previously affected through decades of disturbance associated with military operations of the Minuteman Missile program and any wildlife in the area have unquestionably been long habituated to human activity, noise, or departed entirely. Larger wildlife would probably avoid the project area to a certain extent during excavation activities. Overall, populations of affected species might be slightly and temporarily lowered during implementation of any alternative, but no permanent negative effects on wildlife would be anticipated, and wildlife usage in the area would return to pre-project conditions and adverse impacts would not be measurable. Therefore, special status species and wildlife were dismissed as impact topics in this document.

Recommendations for Further Investigation

Recommendations for Future Investigation

1. Testing for lead based paints.
2. Paint analysis to expose the painted quotes in the Capsule vestibule.
3. Paint analysis to determine how many episodes there are on the blast door.
4. Paint color analysis in the Capsule and vestibule.
5. Identification of the equipment removed from the Capsule.
6. Oral confirmation of what the Coke machine looked like in the Dining Room.

Chapter 2: History Summary

Chapter 2: History Summary

Introduction

The Minuteman Missile Launch Control Facility (Delta-01) and Launch Facility (Delta-09) are the only remaining intact examples of the original Minuteman Missile configuration. The Minuteman Missile program was developed as part of the massive retaliation deterrent strategy that characterized American nuclear policy during the early Cold War period. After the entire Minuteman II force was deactivated following the START treaty of 1991, Delta-01 and Delta-09 were preserved as a static display to interpret the history of the Minuteman Missile program and the history of the Cold War.

Preconstruction¹

The Minuteman Missile program had its origins in the beginning of the Cold War between the United States and the Soviet Union following the end of World War II. Following its overthrow of the Russian monarchy during World War I, the Communist government of the Soviet Union was considered a threat by the United States. The tenuous alliance between the two countries during World War II had been only a temporary measure in the face of the mutual threat of the Nazis. When the Soviet Union began making satellite states of its Eastern European neighbors after the close of the war, the United States saw this as aggressive expansionism designed to eventually overthrow western capitalism.

In the late 1940s and early 1950s, the United States embarked on an effort to contain and neutralize the Soviet threat. At first, it was able to exploit its position as the sole possessor of the atomic bomb. After the Soviets broke the American nuclear monopoly by developing an atomic bomb of their own in 1949, the “arms race” was born: escalating efforts to build bigger bombs with longer ranges in order to stay ahead of the enemy. By the mid 1950s, both sides were developing Intercontinental Ballistic Missiles (ICBMs), designed to deliver a thermonuclear bomb to the other country. In America, the top secret program literally created an entire new industry from the ground up to support its development.

The first generation of long-range missiles developed by the program was the Atlas rocket – essentially a highly evolved version of the German V-2 liquid-fuel propelled missile that had been used against the allies in World War II. Engineers reduced its

¹ Unless otherwise noted, the information in this chapter is condensed from Slattery, Schill and Squiteri, “Minuteman ICBM Launch Control Facility Delta-01 and Launch Facility Delta-09, Ellsworth Air Force Base” (National Register of Historic Places Nomination) and Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study).

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weight through an innovative, ultra-light airframe, greatly increasing the missile's range. Concerns about the durability of this design, however, meant that while the developers went ahead with the Atlas program, they also went to work on a backup missile, the Titan. The Titan also used liquid propellants, but its advanced two-stage design would allow the missile to utilize a conventional - and more reliable - airframe.

The Soviet launch of Sputnik in October 1957, utilizing a liquid-fueled ICBM, shook the United States. The Soviets boasted they were turning out missiles "like sausages" and the US military feared it was falling behind in the arms race. One factor limiting the use of liquid-fueled ICBMs was their complexity. In addition to requiring frequent maintenance, the liquid fuel was volatile and had to be loaded immediately before launching, a process that could take hours, and made it necessary to keep a highly trained crew ready at all times. The solution was to create the second generation of ICBMs, simplified missiles utilizing solid-fuel rocket engines that could essentially sit and wait for someone to turn a key. The solid-fuel research program, which had been a relatively low priority in the early years of missile development, became the basis of a new missile program. The goal was a three-stage, solid-fuel missile that could be stored in underground silos and be deployed nearly instantaneously. Authorized in February 1958, the new missile program would be named the "Minute Man," serving as a symbolic reminder of the Revolutionary War soldiers, as well as reflecting the quick response time designed into the missile system.

Led by the Seattle-based Boeing Airplane Company, the team to produce the new missile system was in place by late 1958 and early 1959. By early 1961, the first complete Minuteman was undergoing flight testing.

The compact new missile was only six feet in diameter and 53 feet high -- about half the size of a Titan. Its three cylindrical, steel-cased propulsion stages were stacked one atop the other, with each stage slightly smaller in diameter than the one beneath it. Each stage was filled with a rubbery mixture of fuel and oxidizer, molded around a hollow, star-shaped core. The star-shaped core allowed for the propellant to have an initial large burning surface and therefore, an increased thrust, and to decrease as the points burned away. The Minuteman's inertial guidance system, designed to deliver a single warhead to a preprogrammed target, occupied a small compartment above the third stage. The "reentry vehicle" at the tip was identical to the nose cone that would eventually contain the missile's thermonuclear warhead.

With the success of the rocket itself assured, the focus turned to constructing facilities to house the envisioned arsenal of missiles. The missile program would be under the control of the Air Force, which described the ideal missile locations as sited inside fixed, underground facilities hardened to withstand blast pressures, and stored in the launch position ready for a quick launch reaction. The launch site would require minimal support, and the launch units were to be self-supporting for two weeks. The Air Force had been refining this system throughout the Atlas and Titan programs, and would finally achieve its goal in the Minuteman Missile program.

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Air Force planners organized the nation's Minuteman force into a series of administrative units called "wings," each with three or four 50-missile "squadrons." Each squadron was further subdivided into five smaller units, called "flights." A flight consisted of a single, manned, underground launch control center, linked to ten unmanned, underground launch facilities (silos). The silos were physically separated from the control center and from each other by a distance of several miles. The Air Force initially considered deploying the Minuteman as far south as Georgia, Texas, and Oklahoma, but when it became apparent that the early models of the missile would fall short of their intended 5,500-mile range, planners quickly determined that they could solve the problem by selecting sites "in the northern part of the United States relatively close to the Soviet Union."

The first Minuteman deployment area was near Malmstrom Air Force Base near Great Falls, Montana. Locating the missile facilities near an Air Force base would provide crucial logistical support, and the remoteness of the location minimized the chance of civilian casualties in the event of an accident or attack. Other reasons for locating the facilities there included an established network of improved roads, and an abundance of easily acquired land. Shortly before construction began at Malmstrom, in January 1961, Ellsworth Air Force Base was selected as headquarters for the second wing of Minuteman Missile deployments.

Ellsworth had all the advantages that Malmstrom AFB had offered. The base had been established in 1941 as the Rapid City Army Air Field to train B-17 bomber crews. After the Strategic Air Command was established in 1946, the Air Force became a separate branch of the military in 1947, and Ellsworth Air Force Base became a Strategic Air Command base. In 1960, Titan I ICBM facilities were built as part of the Ellsworth AFB command.

The announcement that a wing of Minuteman Missiles would be built on the plains of South Dakota east of Rapid City created both concern and anticipation among local residents. Landowners, concerned that national security would become an excuse to pay below market value prices, formed the Missile Area Landowner's Association to negotiate fair land prices. At the same time, the South Dakota State Highway Department spent \$650,000 from the Federal Bureau of Public Roads to improve 327 miles of gravel roads leading to the prospective missile sites. By mid-June 1961, Boeing was also busy with infrastructure improvements. Anticipating that the project would bring more than 3,000 workers into the area, the company raced to erect mobile-home camps and cafeterias near Wall, Sturgis, Belle Fourche, and Union Center, as well as in Rapid City.

By early summer, more than three-quarters of all area landowners had agreed to give the government access to their land. Once the sites had been finalized, the Ralph M. Parsons Company, an architectural/engineering firm from Los Angeles, began to prepare detailed plans for the South Dakota installations. The Air Force had assigned responsibility for actual construction of Minuteman facilities nationwide to the U.S. Army Corps of Engineers Ballistic Missile Construction Office. In mid-June, the Corps sent out a request

for construction bids, and within a month, four of the nation's largest contracting firms had submitted proposals for the project. The low bid came from Peter Kiewit Sons' Company of Omaha, whose estimate of \$56,220,274 was nearly \$10 million below government projections. On August 1, the Corps gave Kiewit a fixed-price contract for "digging and pouring 150 underground silos 12 feet in diameter and 80 feet deep, plus fifteen control centers." The construction sites would be distributed across an area of nearly 13,500 square miles located to the east, north, and northwest of Rapid City. Kiewit set to work immediately, hiring construction crews and moving heavy equipment onto the job sites.

The official groundbreaking ceremony for Ellsworth's Minuteman complex took place at Site Lima-06 near Bear Butte on September 11, 1961. Despite extreme cold, high winds and heavy snowfall, construction activity proceeded at a furious pace through the winter of 1961-62. At a press briefing in mid-December, a Corps of Engineers spokesman told reporters that "men are working seven days a week, three shifts a day on Minuteman construction...Crews...are able to dig five silo emplacements simultaneously. Each takes from four to ten days [depending on soil conditions]." Work on the first squadron, near Wall, was "well underway," he said, and work on the second squadron, near Union Center, had already been started.

The Rapid City Daily Journal explained how a hardened silo was built (figure 2-1):

Conventional earthmoving equipment scoops an open cut 12 feet deep. A backhoe perches on the edge of a large hole in this cut and digs a hole 20 feet deeper. The remaining 52 feet of depth is 'mined' by a clamshell.... When each hole is at the full depth of 84 feet, a steel 'can' 12 feet in diameter is carefully positioned in it. Reinforced concrete is poured between the can and earth.

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Figure 2- 1: Delta-09 Launch facility under construction, ca. 1962

(source: Library of Congress, Prints and Photographs Division, Historic American Engineering Record, Reproduction Number HAER SD-50-39).

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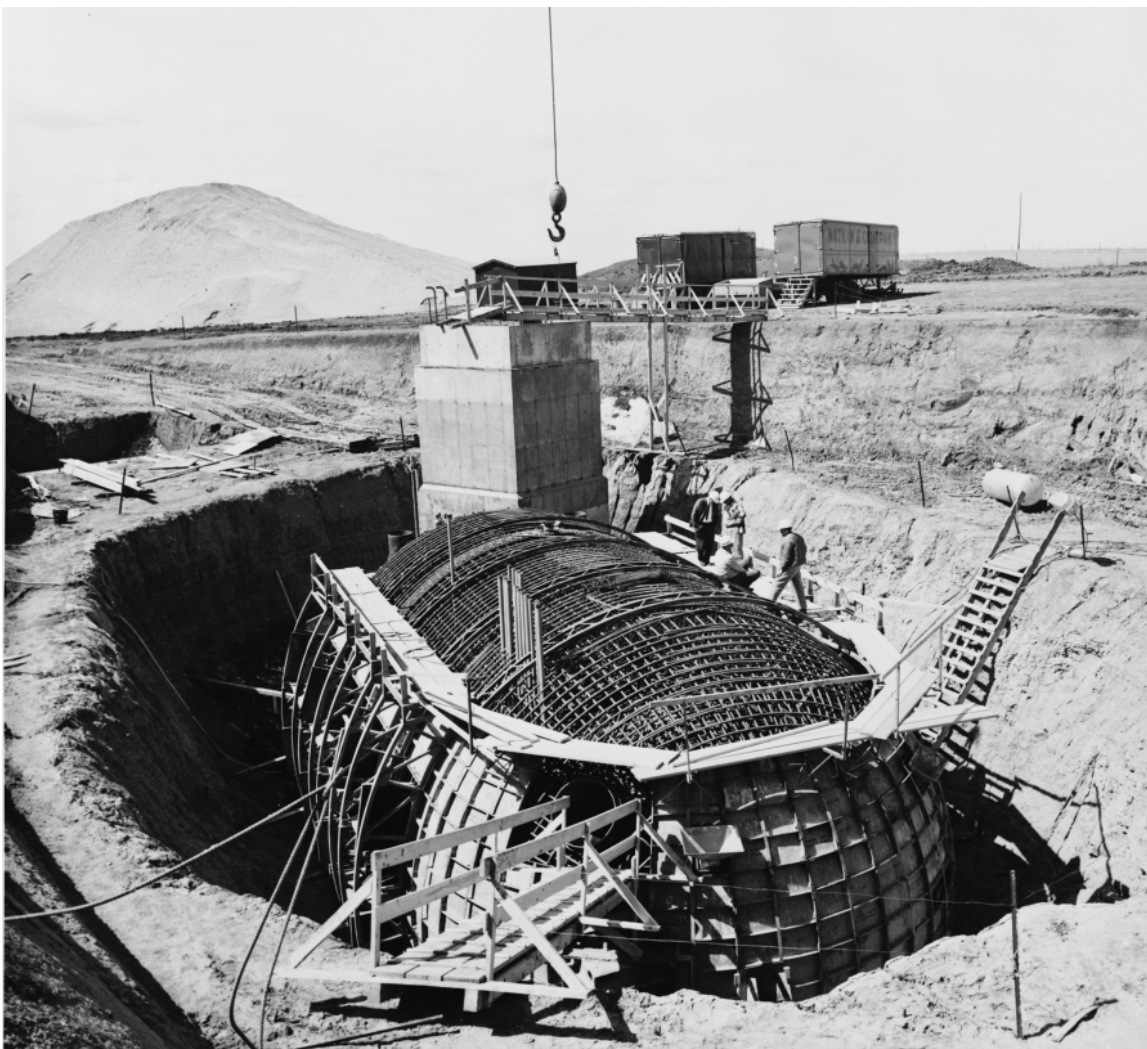


Figure 2- 2: Delta-01 Launch Control Capsule under construction, ca. 1962

(source: Library of Congress, Prints and Photographs Division, Historic American Engineering Record, Reproduction Number HAER SD-50-24)

As construction continued at the Ellsworth AFB sites, Air Force crews at Malmstrom AFB began to lower the weapons into their silos at the end of July 1962. The first ten-missile Minuteman flight was activated on 27 October 1962, at the height of the Cuban Missile Crisis.

Construction continued at Ellsworth into the summer of 1963. To provide personnel and support for the Minuteman Missile facilities at Ellsworth AFB, the Air Force redesignated the 44th Bombardment Wing at Lake Charles AFB, Louisiana, as the 44th Strategic Missile Wing (SMW) and moved it to Ellsworth AFB. Initially in control of maintenance and operations for the Titan missiles at Ellsworth AFB, the 44th SMW eventually took control of the Minuteman Missile flights as they came online.

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The launch facility at Delta-09 was completed on November 26, 1962, and the Delta-01 Launch Control Facility was completed three days later (see figures 2-2 to 2-4 and Period of Change Plan “Pre-1963” at the end of this chapter).² The cost to construct Delta-01 was \$800,000, and Delta-09 was \$354,500. By the following summer, steel fabrication was finished at all 165 sites, and crews were completing the launchers at the rate of one per day. In April 1963, Boeing began emplacing the first missiles in the Ellsworth AFB silos. On the last day of June, Ellsworth's first twenty launchers, included Delta-01 and Delta-09 were turned over to the Strategic Air Command. On 23 October, the nation's second wing of Minuteman ICBMs was declared fully operational. The work had been completed nearly three weeks ahead of schedule.



Figure 2- 3: Oblique aerial view of Delta-01 Launch Control Facility under construction, facing southeast, circa 1962

(source: Library of Congress, Prints and Photographs Division, Historic American Engineering Record, Reproduction Number HAER SD-50-32).

² See Delta-01 and Delta-09 Pre-1963 period plans at the end of this chapter.



Figure 2- 4: Aerial oblique view of Delta-01 launch control facility under construction, parking area and approach road completed, sewage lagoon at lower right, ca. 1962

(source: Library of Congress, Prints and Photographs Division, Historic American Engineering Record, Reproduction Number HAER SD-50-33).

Episode 1: Minuteman I (1963-1971)

Reflecting the fact that the Minuteman Missile program was in the forefront of missile technology, the history of the Delta-01 and Delta-09 facilities is one of continuous improvement and refinement. In the first few years after its construction, the Air Force concentrated on improving the site and adding necessary equipment. At the Launch Control Facility (Delta-01), an area from the perimeter fence to twenty feet outside and five feet inside the fence was denuded of vegetation and stabilized with an asphalt emulsion soil stabilization material, in order to provide clear security around the perimeter of the site. All other soil areas, including the area around the radial antenna, were sown with perennial rye grass.³ Later in 1963, a security surveillance antenna system was added at Delta-01.⁴ During that first year, the first sewage pond at Delta-01 was also constructed.⁵ There are indications that water infiltration was a concern at the

³ MCL 1789, July 1963.

⁴ Parsons-Staven, "Plot and Utility Plan, Launch Control Facility Site D-1 (199)," revisions.

⁵ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

launch facilities; in November 1963 a high water level alarm was installed in the Delta-09 equipment room.⁶

Communications between the launch control facilities and their associated launch facility silos were crucial to the success of the missile program. The original communication system was a series of underground blast-proof cables run between sites, known as the Hardened Intersite Cable System (HICS) (figure 2-5). While this system was used until the Minuteman Missile sites were deactivated in 1993, other communications systems were also added over the years. Separate blast-hardened HF transmit and receive antennas were constructed at Delta-01 in 1963. Both of these consisted of reinforced concrete cylinders with telescoping antenna poles. The receive antenna had four backup antennas in the event that the main pole was damaged. In addition, a survivable low-frequency communication system (SLFCS) antenna was installed in 1968 as part of the facility's EWO (Emergency War Order) communication system, providing further backup in the event of war. In the same year, a hardened UHF antenna was installed at Delta-09.⁷

⁶ MCL 1991, November 22, 1963.

⁷ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II; Parsons-Staven, "Plot and Utility Plan, Launch Control Facility Site D-1 (199)," revisions.

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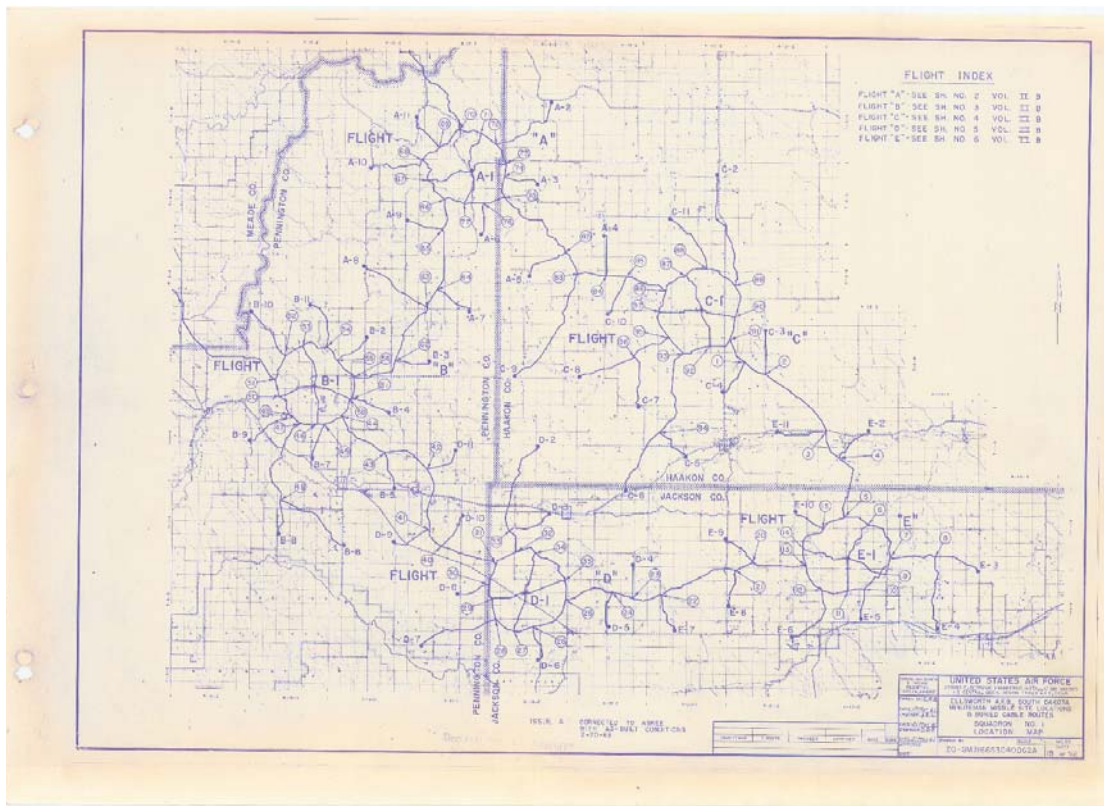


Figure 2- 5: 1961 Map of HICS Cabling, Flights A-E (source: Minuteman Missile archives, Records of the 44th Strategic Missile Wing, Ellsworth Air Force Base, United States Air Force, MIMI 2864).

More significant improvements occurred at Delta-01 in the mid to late 1960s. A separate Vehicle Heated Storage Building was constructed at the northwest corner of the main building around 1968.⁸ A helicopter pad was added to the site along the access road in 1966, and later replaced with one at the southwest corner of the site in late 1970 or early 1971.⁹ Also in 1970-71, a second sewage lagoon was dug at the southeast corner of the original structure (see Period of Change Plan “1963-1971” at the end of this section).¹⁰

From 1963 to 1967, Minuteman complexes were added at Minot and Grand Forks Air Bases in North Dakota, Whiteman Air Force Base in Missouri, and F.E. Warren Air

⁸ Parsons Company, “Contract documents for Vehicle Heated Storage Building,” March 19, 1965. A 1961 D-1 plot and utility plan shows the garage in place as does an operational as-built of the site. Parsons-Staven, “Plot and Utility Plan, Launch Control Facility Site D-1 (199),” revisions.

⁹ Parsons-Staven, “Plot and Utility Plan, Launch Control Facility Site D-1 (199),” revisions; Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II and Parsons-Staven, “Plot and Utility Plan, Launch Control Facility Site D-1 (199),” revisions.

¹⁰ Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II. Parsons-Staven, “Plot and Utility Plan, Launch Control Facility Site D-1 (199),” revisions.

Force Base in Wyoming, as well as an additional squadron at Malmstrom. By 1967, there were 1,000 Minuteman Missiles on alert nationwide.

The original Minuteman installations, such as those at Ellsworth AFB, had been designed for mass attacks, launching all the missiles at once with a very limited survival time built in to the system. In the early days of the Kennedy administration, while the installation at Ellsworth AFB was already designed and under construction, this policy shifted to a more controlled response, allowing missile crews to fire missiles selectively. To meet the requirement of greater survivability, the Air Force decided to install the power generators at Minuteman sites in hardened underground capsules located next to each of the control centers. Although the Air Force investigated the feasibility of incorporating hardened generator capsules into the facilities at Ellsworth AFB, construction had already started there by the time the decision was made, making the change impractical. Consequently, the generator capsules were introduced with the third Minuteman deployment area at Minot Air Force Base, North Dakota. Thus, the only Minuteman sites to reflect fully the nation's original Cold War strategy of massive retaliation were those at Malmstrom and Ellsworth.¹¹

Episode 2: Minuteman II (1971-1993)

By the time planning began for the final Minuteman deployment area, the Air Force had developed a vastly improved version of the missile itself. The new missile, called the Minuteman II, offered improved range, greater payload, more flexible targeting, and greater accuracy, leading one Air Force spokesperson to estimate that its "kill capacity" was "eight times that of Minuteman I." In early 1964, Secretary of Defense Robert McNamara told the House Armed Services Committee that the Defense Department was planning to upgrade the first five deployment areas by replacing their Minuteman I missiles with the more advanced Minuteman IIs. The project was approved in the spring of 1965, and the first of the new missiles were deployed at Grand Forks Air Force Base, North Dakota, in 1966. In the fall of that year, South Dakota Congressman E.Y. Berry announced that the retrofit program would also be employed at Ellsworth. According to Berry, the new missiles would help Ellsworth maintain its position as "one of the nation's most important military installations." The new missiles arrived in South Dakota in October 1971, when Boeing began to refit the Ellsworth silos to accommodate the Minuteman II system. By March 1973, the modifications for Minuteman II were completed at Delta-01 and Delta-09.¹²

¹¹ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

¹² Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II. A third version, the Minuteman III, was deployed at F.E. Warren, Minot, Grand Forks, and Malmstrom AFBs by 1975, constituting over half the ICBM force in the US. The remaining sites at Malmstrom, Ellsworth, and Whiteman AFBs

The modifications to the missile silos for the Minuteman II force was accompanied by a number of minor alterations in 1971 to the living quarters in the Launch Control Facility at Delta-01. These alterations included new soundproof partitions and a single interior solid core wood door in the corridor between bedroom 116 and toilet room 115 and window air conditioning units in bedrooms 116, 118, 120, and 124; and replacement of the base cabinets in the kitchen, and new stainless steel covers for the sink units in the south counter.¹³ In addition it appears that the facilities all underwent a completely new interior paint campaign, consisting chiefly of shades of green, grey, and white.¹⁴

Other alterations to the living quarters in the 1970s included the replacement of the exterior doors with hollow metal doors with metal thresholds (1976),¹⁵ the replacement of the kitchen base cabinets with a sink base and three drawer unit, with black rubber cove base installed in the toe space (1976),¹⁶ replacement of all the windows with wood insulated windows (1976),¹⁷ and the replacement of the fascia and soffits with in-kind wood (1979).¹⁸ In 1974, the existing shoring device in the launch control center was replaced with a permanent floor shoring device, and in 1978, the cot in the center was replaced with a curtain system and bunk.¹⁹

There were also numerous alterations to the sites of Delta-01 and Delta-09 during the 1970s. Vegetation control was an ongoing effort at both sites, with a new three-year campaign proposed in 1975.²⁰ At Delta-01, the HF transmit antenna was deactivated in the 1970s, probably replaced with the hardened UHF antenna that was installed there in

retained the Minuteman II missiles (National Register of Historic Places nomination, section 8, page 21).

¹³ Strategic Air Command, "Missile Alert Environment," ELS-M-2-70, April 9, 1971; Strategic Air Command, "Replace LCF Kitchen Cabinets," ELS-M-13-76, April 13, 1976.

¹⁴ 44th Strategic Missile Wing Paint Plan, March 1, 1973. A preliminary paint analysis was initiated in selective rooms of the Launch Control Support Building to determine a general palette of colors used over time; see laboratory data sheets in Appendix A. Two episodes will be selected to do additional laboratory color matching to the Munsell color system during the next phase of Part 2.

¹⁵ Strategic Air Command, "Replace LCF Doors," ELS-M-11-76, March 17, 1976.

¹⁶ Strategic Air Command, "Replace LCF Kitchen Cabinets," ELS-M-13-76, April 13, 1976.

¹⁷ Strategic Air Command, "Replace LCF Windows," ELS-M-12-76, April 7, 1976. Subsequent drawings indicate the windows are Anderson Perma-Shield Narrowline vinyl-clad double hung windows with combination storms/screens by Anderson.

¹⁸ Strategic Air Command, "Launch Control Facility Replace and Paint Fascia and Soffit 10 LCFs," ELS-M-1-79, August 7, 1979. The exception was the detached garage where existing trim was painted. Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

¹⁹ MCL 6066, November 29, 1974; MCL 6152, January 19, 1978.

²⁰ "Proposal to Apply Vegetation Control to 150 Missile Sites," October 22, 1975. Treatments were applied the first year in March-April, and in the late fall in the 2nd and 3rd years; the accompanying drawing showed the graveled areas to be spot sterilized at typical LFs, dated Dec 17 1975. An 18" band of sterilant was centered on the fence line of the LCFs.

1976.²¹ In January 1976, the gates at Delta-01 were repaired.²² The Air Force registered a complaint in 1977 from the neighbor “immediately west” of Delta-01 that concrete rubble from the construction of the site had been discarded on their land and buried so shallowly that 5 to 6 ton pieces had been exposed. Maintenance removed the pieces and filled the holes.²³

At both Delta-01 and Delta-09, signs were installed at the nearby highway exits identifying the site locations in 1976.²⁴ At Delta-09, lanyard attachment points were installed on the Launch Facility walls and between the T.E. pylons.²⁵ In the same year, the unused sight control tubes from the personnel access hatch to the silo were permanently closed. These were originally designed to allow guidance technicians to establish visual references to a pair of azimuth makers located on the surface, but were apparently not being used. They were welded shut top and bottom and filled with sand.²⁶

Improvements to Delta-01 and Delta-09 continued into the 1980s. Women were assigned to topside duty for the first time in the 1980s, and a women’s latrine was added to accommodate them in the living quarters at the Launch Control Facility in 1985.²⁷ By the following year (1986), women were allowed on crews in the launch control centers, but only as part of all-female crews.²⁸

Exterior work to the topside quarters at Delta-01 in 1983-84 included replacement of the exterior asbestos siding with new ½” CDX Plycore sheathing where the existing sheathing was damaged, preformed polystyrene insulation board, steel siding and trim, and aluminum soffit and fascia, painting the remaining exposed wood surfaces, replacing all the windows with new wood windows, adding new exterior metal doors to the garage/rec room, and the addition of hoods to the louvers on the north elevation.²⁹ At the interior, the kitchen and baths were improved with new upper kitchen cabinets, replacement of the shower enclosures, toilet partitions, counters and lavatories as well as

²¹ Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II.

²² Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II.

²³ “Real Property Maintenance Request,” August 24, 1977.

²⁴ “Missile Site Indicator Signs,” December, 1976; Sign installed at exit 116 of I-90 for D-9; Signs installed at exit 127 of I-90 for D-1.

²⁵ MCL 6158, June 17, 1976.

²⁶ MCL 6165, July 29, 1976; Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II.

²⁷ Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II; Contract Documents for new women’s latrine, December 20, 1985.

²⁸ Slattery, Ebeling, Pogany, and Squiteri, “The Missile Plains: Frontline of America’s Cold War,” (Historic Resource Study), Chapter 4, Section II.

²⁹ Strategic Air Command, “Launch Control Facility Upgrade,” ELS-B-684, August 5, 1981; Strategic Air Command, “Replace Siding 15 Launch Control Facilities,” ELS-B-735; Strategic Air Command, “Install New Brine Chiller Hoods at LCFs,” ML-MH-005, January 15, 1982.

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new tile flooring, new paper towel dispensers, and a new waste unit. Carpets were replaced, bedroom walls at the corridor, toilet room, and kitchen received acoustic panels, and new suspended acoustic ceilings and fluorescent lighting with emergency lighting was installed in the bedrooms, hallways, dining room, dayroom, vestibule, and security office.³⁰ Un-faced batt insulation was installed in the attic, and all domestic lines were relocated to the interstitial space between the old ceiling and the new suspended ceiling. The attached garage was enclosed to create a recreation room; the walls were insulated and finished with painted drywall and wood wainscot, except on the east wall, where plywood paneling was reinstalled.³¹



Figure 2- 6: Delta-01 looking northwest, ca. 1982

(source: Minuteman Missile archives, Wilderman Collection, MIMI 2363).

Historic photographs from the early 1980s suggest that the greens and greys of the 1974 paint campaign had been replaced by varying shades of blue in the vestibule of the launch control center. The upper half of the LCC vestibule walls were painted white, while the lower half was a dark blue. These photos also are the first evidence of the decorative paintings done by various members of the missileer crew, which became a tradition at the launch control facilities (figure 2-7 to 2-9). At Delta-01 in the 1980s, these included a painting of the Strategic Air Command shield on the south wall of the vestibule. At the

³⁰ Strategic Air Command, "Launch Control Facility Upgrade," ELS-B-684, August 5, 1981; and Strategic Air Command, "Replace Siding 15 Launch Control Facilities," ELS-B-735.

³¹ Strategic Air Command, "Replace Siding 15 Launch Control Facilities," ELS-B-735.

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blast door, the exterior was painted with a representation of a monkey smoking a cigar and holding a Minuteman Missile in its right hand, as well as the words “Welcome – Delta Launch Control Center.” The side of the blast door was painted blue with white stars, and the wide jamb of the door had a silhouette of a Minute Man soldier. On the wall above the blast door, “Peace is our Profession” was stenciled above the door, and to the right of the blast door was a sign noting that “No Lone Zone – Two Man Policy Applies”. On the southwest wall of the vestibule adjacent to the elevator, several “leadership” quotes by generals were painted within red, white and blue bordered boxes.

Interior photos appear to show the equipment and other surfaces within the launch control center as also painted blue; however, we believe that this is a problem with the colors of the image (perhaps discoloration of the slides), as later photographs from circa 1990 show the equipment as green, as it is currently (figure 2-10).



Figure 2- 7: LCC Vestibule ca. 1982

(source: Minuteman Missile archives, Wilderman Collection, MIMI 2363).

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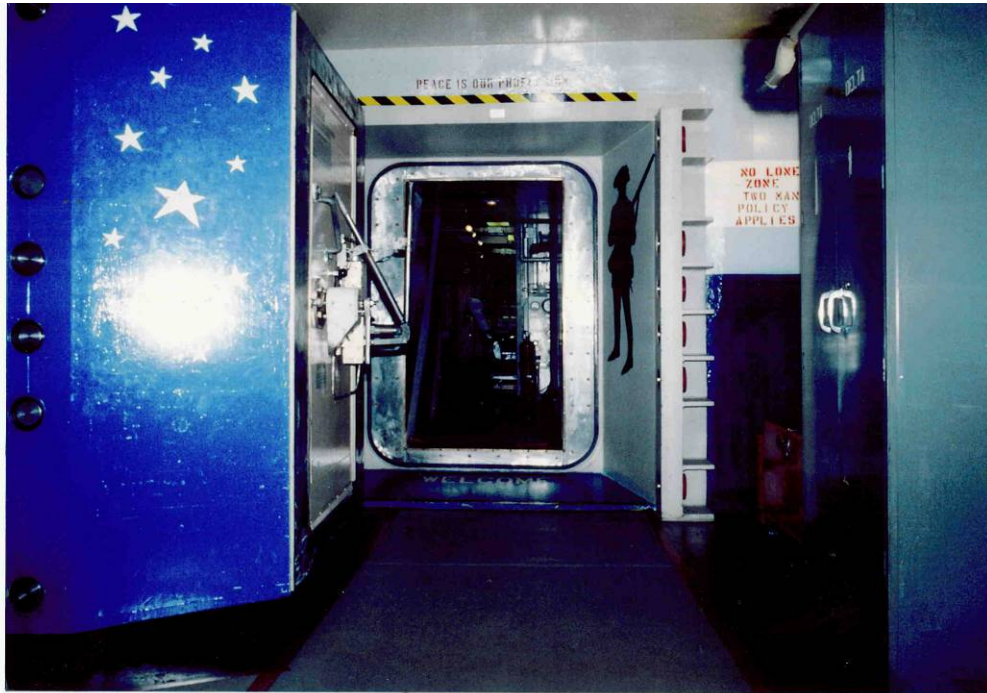


Figure 2- 8: LCC blast door and tunnel circa 1982

(source: Minuteman Missile archives, Wilderman Collection, MIMI 2363).

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Figure 2- 9: LCC Vestibule ca. 1982

(source: Minuteman Missile archives, Wilderman Collection, MIMI 2363).



Figure 2- 10: Launch Control capsule ca. 1982

(source: Minuteman Missile archives, Wilderman Collection, MIMI 2363).

The launch control centers were hardened to withstand a nuclear blast, so even the most trivial equipment had to be specially ordered and installed, such as the replacement of the refrigerator and toaster oven units in 1984, the upgrade of the latrines in 1988, the installation of microwave ovens and coffeemakers in 1989, and the addition of a modular bed storage unit assembly in 1990.³²

Another round of improvements to the topside living quarters in 1985 included new counters in the security office, the aforementioned women's latrine, new east and south walls to create the serving room (114), new sewer connections, new fan coil units in the

³² MCL 6611, June 15, 1989 (Microwave oven and coffeemaker installation); MCL 6654, October 1, 1990 (Modular Bed Storage Unit Assembly and Instructions).

bedrooms, serving room, living room, garage/rec room, and security office along with a new chiller and condensing unit, and the addition of a vision window in the corridor door.³³ In 1986, an enclosed storage room was constructed in the heated vehicle storage building.³⁴

With so many metallic surfaces at both Delta-01 and Delta-09, corrosion was a constant issue. In 1981, a new cathodic protection system was designed for the Minuteman Missile sites. Cathodic protection systems, including the rectifiers (which provided the DC power) were completed at Delta-01 and Delta-09 by the end of 1982.³⁵

In 1985, the Air Force inaugurated the Rivet MILE (Minuteman Integrated Life Extension) program. While the Minuteman force had been in place for over 20 years, the Rivet MILE program was designed to expand the life of the system into the 21st century. The most significant improvement as a result of Rivet MILE was the installation of the IMPSS (Improved Minuteman Physical Security System). It replaced troublesome older security systems so sensitive that they could be set off by "elk, rabbits, even high-jumping grasshoppers." The IMPSS antennas were installed on the sites by the end of 1989.³⁶

Other improvements in the late 1980s included the installation of a cover with pipe extension on the Launch Facility (Delta-09) support building air intake to prevent snow from entering the shaft in March 1985,³⁷ the addition of a flagpole at Delta-01 in January 1986,³⁸ and the regrading of the site at Delta-09. In 1987-88, the hardened HF receive antenna at Delta-01 was deactivated, and a television satellite dish was installed (figures 2-11 and 2-12).³⁹

³³ Strategic Air Command, "Alter 15 LCFs," 84-6003B, December 20, 1985.

³⁴ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

³⁵ MCL 6355, April 1982 (Cathodic Protection for 49 LFs); MCL 6315, March 1981 (Install Cathodic Protection for 14 LCFs)

³⁶ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II; Ellsworth 88-6004, IMPSS prep at Delta 09, Parsons-Staven, "Launch Facility Site D-9 (276) Grading Plan, 129/103," revisions, June 5, 1961.

³⁷ MCL, March 11, 1985.

³⁸ Parsons-Staven, "Plot and Utility Plan, Launch Control Facility Site D-1 (199)," revisions.

³⁹ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

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Figure 2- 11: Aerial view of Delta-01 from the northeast, ca. 1990
(source: Minuteman Missile Digital Collection, Loughney Collection).

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Figure 2- 12: Launch control support building from the south, ca. 1990

(source: Minuteman Missile Digital Collection, Loughney Collection).

A set of photographs from 1990 show changes that had taken place in the launch control center and vestibule after 1982 (figures 2-13 to 2-14). The equipment and surfaces in the capsule itself are painted in shades of green. The vestibule still had the upper half white and lower half blue, although the shades appeared somewhat lighter than before. The painting on the side of the blast door and the jamb were painted over with grey paint and the stenciling over the door was painted over as well. The warning to the side of the blast door now reads “No-Lone Zone: Two-man Concept Mandatory.” The painting on the exterior of the blast door was now a depiction of Wile E. Coyote and the Roadrunner and the saying “Go Ahead – Make My Day.” Sometime after 1990 and before the site was decommissioned, the blast door was painted with a depiction of a Domino’s pizza box showing a Minuteman Missile and the word Minuteman II. Above and below the box are the words “World-Wide Delivery in 30 Minutes or Less or Your Next One is Free.” This painting is still present. On the northeast wall adjacent to the elevator cage was a depiction of a Minuteman Missile blasting through the remnants of a Soviet flag (this painting is still present). On the interior of the capsule above the blast door was painted a skull and crossbones with the phrase “Kick Ass” below. Also on the interior of the capsule to the right side of the blast door was painted the emblem of the 44th Missile Wing. The latter two images had been painted over by 1990.

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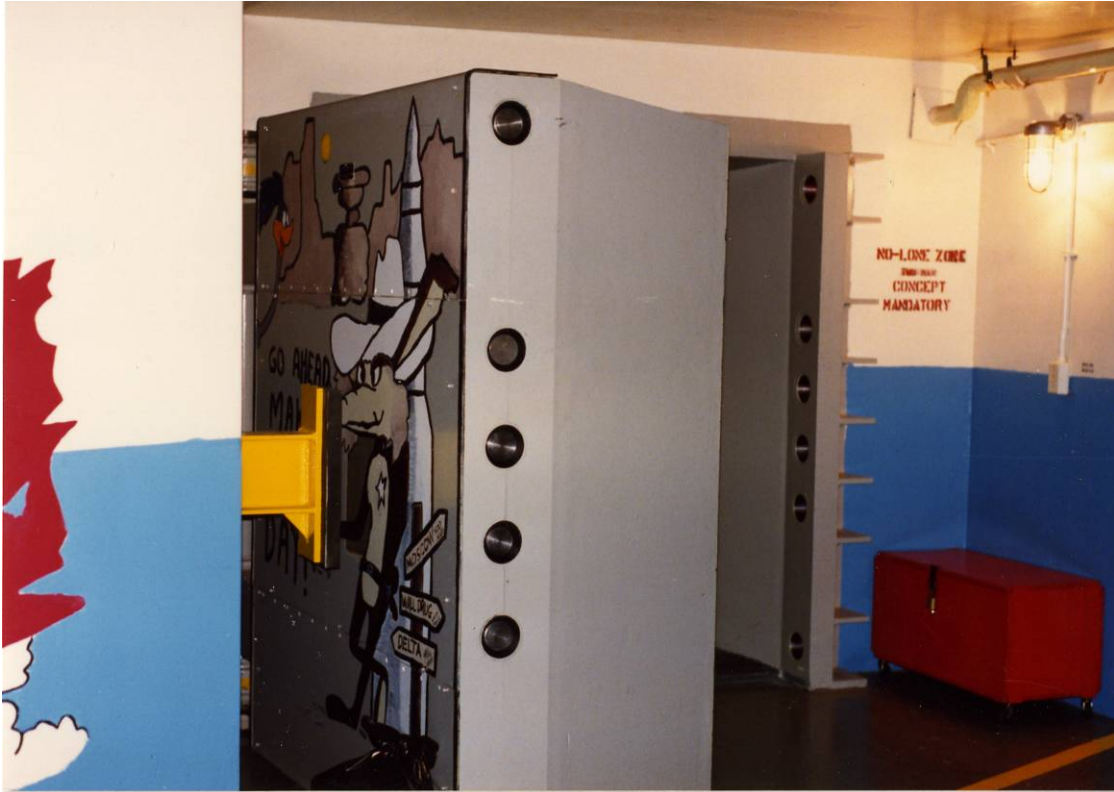


Figure 2- 13: LCC Vestibule ca. 1990 (source: Minuteman Missile Digital Collection, Loughney Collection).



Figure 2- 14: Launch control capsule, ca. 1990 (source: Minuteman Missile Digital Collection, Loughney Collection).

The last significant improvement to the Minuteman complexes at Ellsworth AFB was the installation of a super high frequency satellite terminal and antenna in 1990-1992 (see Period of Change Plan “1971-1993” at the end of this section).⁴⁰

Episode 3: Deactivation and National Historic Site (1993- Present)

During the late 1980s, the world saw unmistakable signs that the lengthy Cold War period was coming to an end. By the end of the decade, the Berlin Wall had been dismantled, Germany had been reunified, and a number of former Eastern Bloc nations had replaced their Communist regimes with democratically elected governments. As the new decade began, the Soviet Union disintegrated rapidly as its constituent republics declared their independence one by one. When the Warsaw Pact was dissolved in March 1991, the enemy that President Ronald Reagan had once called "the evil empire" essentially ceased to exist. Four months later, on July 31, 1991, President George H.W. Bush and Soviet Leader Mikhail Gorbachev signed the *Treaty Between the United States of America and the Union of the Soviet Socialist Republics on the Reduction and*

⁴⁰ MCL 6653, February 1, 1990 (RPIE Interface – ICBM Super High Frequency Satellite Terminal (ISST) Installation).

Limitation of Strategic Offensive Arms (START Treaty), which placed a limit on the number of ICBMs and prescribed a process for the destruction of their launch facilities.⁴¹

The START Treaty coincided with growing Air Force disenchantment with escalating costs associated with repairing and maintaining the older Minuteman II system. Rather than upgrade Minuteman II facilities with Minuteman III, the Pentagon decided to deactivate the entire Minuteman II force to help comply with provisions of the arms-reduction treaty. On September 27, 1991, Bush appeared on national television to announce a dramatic "plan for peace," designed to reduce the tensions of the nuclear age. As one component of his plan, he called for "the withdrawal from alert within 72 hours, of all 450 Minuteman II intercontinental ballistic missiles," including the missiles at Ellsworth Air Force Base.⁴²

Five weeks later, on December 3, 1991, an Air Force crew arrived at Launch Facility Golf-02, located near Red Owl, about 60 miles northeast of Rapid City. They had come to remove the first of Ellsworth's 150 Minuteman IIs:

Disarmament began with snow shovels at dawn...as Airman 1st Class James Comfort and his colleagues cleared the launch-door rail...Six hours later, a Minuteman II intercontinental ballistic missile was stored safely in its transporter/erector truck. G-2 was just a high-tech hole in the ground.⁴³

According to the *Rapid City Daily Journal*, the Ellsworth deactivation process would continue for at least three more years:

First, warheads and guidance systems [will be] removed. Then the missiles will be pulled...The headframes of the missile silos will be destroyed and the tubes will be filled with rubble. The launch control capsules will be buried under rubble and a thick concrete cap. The land and aboveground buildings at launch control centers will be sold.⁴⁴

By late 1996, 149 of the original 150 launch facilities at Ellsworth had been imploded in accordance with terms of the START Treaty. Only one launch complex remained intact, consisting of Minuteman ICBM Launch Control Facility Delta-01 and Launch Facility

⁴¹ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

⁴² Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

⁴³ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

⁴⁴ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

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Delta-09. These sites were spared with the intention of converting them into interpretive museum facilities open to the general public.⁴⁵

Although Delta-01 and Delta-09 remained intact, the deactivation process required the removal of certain equipment in order to comply with the terms of the START treaty and to protect classified equipment. Beginning in May 1993, removals included classified information, hazardous materials, some military communications equipment, diesel storage tanks, and of course, the missile itself. The remaining communications equipment and alarm systems were disconnected, non-functioning radio control panels were installed, and exposed drawer openings were covered. According to the terms of the treaty, the HICS cable was severed and a one foot section was removed to ensure it could not function. All other equipment and furnishings remained as they had been when the last crew left the facility.⁴⁶ Delta-01 and Delta-09 were placed on caretaker status.

Although the United States Congress established the Minuteman Missile National Historic Site on November 29, 1999, the United States Air Force retained ownership and control of the sites until 2002. In 2001, a training model of a Minuteman Missile was installed in the Delta-09 silo, and a glass viewing enclosure was constructed over the silo (see Existing Conditions Site Plan in Chapter 3).

On May 21, 2002, a Russian team visited the sites of Delta-01 and Delta-09 to confirm that the deactivation of the site was complete and done in accordance with the START treaty. The following September, the USAF officially turned over Delta-01 and Delta-09 to the National Park Service. With the installation of security and fire suppression systems at both sites in 2003,⁴⁷ the Park Service began offering tours of the facilities to visitors, providing them with a glimpse into life at one of the sites that protected Americans throughout the Cold War.

⁴⁵ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

⁴⁶ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

⁴⁷ Slattery, Ebeling, Pogany, and Squiteri, "The Missile Plains: Frontline of America's Cold War," (Historic Resource Study), Chapter 4, Section II.

Next pages:

Figure 2- 15: Delta-01 Site, Pre-1963 Conditions (source: QEA 2010).

Figure 2- 16: Delta-01 Site, 1963-1971 Conditions (source: QEA 2010).

Figure 2- 17: Delta-01 Site, 1971-1993 Conditions (source: QEA 2010).

Figure 2- 18: Delta-01 Floor Plans, 1963-1971, Episode 1 (source: QEA 2010).

Figure 2- 19: Delta-01 Floor Plans, 1971-1993, Episode 2 (source: QEA 2010).

Figure 2- 20: Delta-01 Floor Plans, 1993-present, Episode 3 (source: QEA 2010).

Figure 2- 21: Delta-01 Elevations, 1963-1971, Episode 1 (source: QEA 2010).

Figure 2- 22: Delta-01 Elevations, 1971-1993, Episode 2 (source: QEA 2010).

Figure 2- 23: Delta-01 Elevations, 1993-present, Episode 3 (source: QEA 2010).

Figure 2- 24: Delta-09 Site, Pre-1963 Conditions (source: QEA 2010).

Figure 2- 25: Delta-09 Site, 1963-1971 Conditions (source: QEA 2010).

Figure 2- 26: Delta-09 Site, 1971-1993 Conditions (source: QEA 2010).

Figure 2- 27: Delta-09 Floor Plans, 1963-1971, Episode 1 (source: QEA 2010).

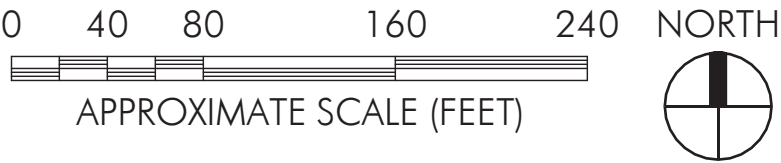
Figure 2- 28: Delta-09 Floor Plans, 1971-1993, Episode 2 (source: QEA 2010).

Figure 2- 29: Delta-09 Floor Plans, 1993-present, Episode 3 (source: QEA 2010).

MINUTEMAN MISSILE
NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

HSR/CLR/EA
DRAFT JUNE 2010

DELTA-01 PRE-1963 CONDITIONS



MAP KEY

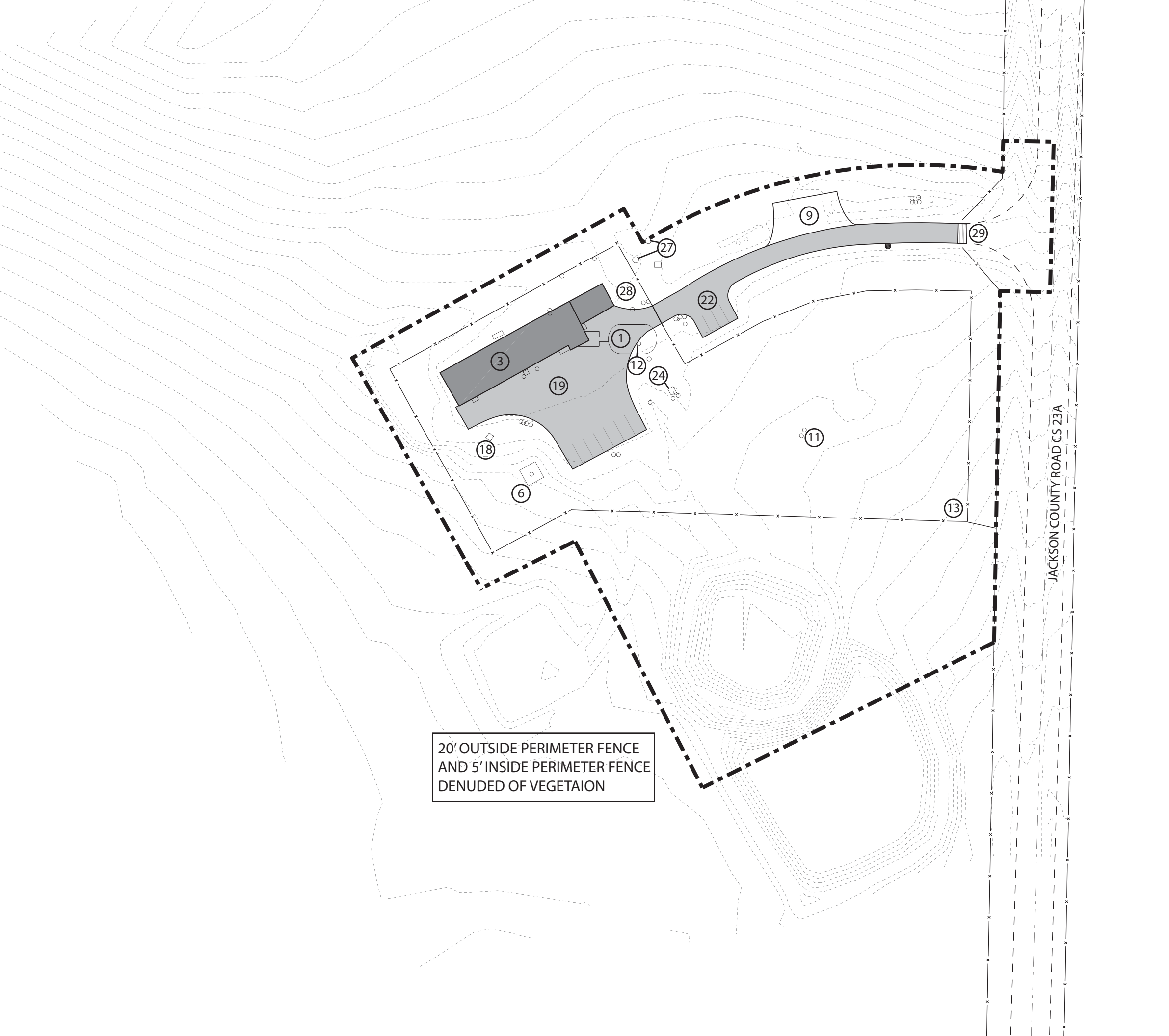
- | | | |
|------------------------------------|--|-------------------------------------|
| 1 Launch Control Center | | Building |
| 3 Launch Control Facility | | Property Line/
Historic Boundary |
| 6 Hardened UHF Antenna | | Gravel Boundary |
| 9 Helicopter Pad | | Security Fence |
| 11 Code Burner | | Contour Line |
| 12 Basketball Goal | | Low Density
Gravel |
| 13 Security Fencing | | High Density
Gravel |
| 16 Bollards | | Asphalt |
| 18 Well & Water Tanks | | Concrete |
| 19 Access Road & Parking Area | | |
| 22 Gas Pump | | |
| 24 Diesel Fuel Tank | | |
| 27 Utility Poles | | |
| 28 Underground Diesel Storage Tank | | |
| 29 Cattle Guard | | |
| 30 Gravel Access Roads | | |

SOURCES

LAUNCH FACILITY SITE D-9 (276) PLOT PLAN, AS
BUILT DRAWINGS, 1961
MINUTEMAN ICBM LAUNCH FACILITY DELTA-01,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009



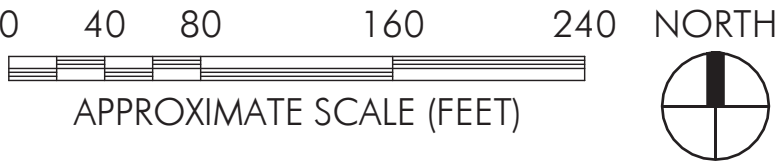
QUINN EVANS
ARCHITECTS



MINUTEMAN MISSILE
NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

HSR/CLR/EA
DRAFT JUNE 2010

DELTA-01 1963-1971 CONDITIONS



MAP KEY

- | | | |
|--|--|----------------------------------|
| 1 Launch Control Center | | Building |
| 2 Heated Vehicle Storage Building (late 1960s) | | Property Line/ Historic Boundary |
| 3 Launch Control Facility (1963) | | Gravel Boundary |
| 4 Hardened HF Transmit Antenna (1963) | | Security Fence |
| 5 Hardened HF Receive Antenna (1963) | | Contour Line |
| 7 SLFCS Antenna (1968) | | Low Density Gravel |
| 8 Sewage Lagoon (1963) | | Asphalt |
| 9 Helicopter Pad (1966) | | Concrete |
| 11 Code Burner | | |
| 12 Basketball Goal | | |
| 13 Security Fencing | | |
| 16 Bollards • | | |
| 18 Well & Water Tanks | | |
| 19 Access Road & Parking Area | | |
| 22 Gas Pump | | |
| 24 Diesel Fuel Tank | | |
| 25 Sewage Lagoon Fencing (1963) | | |
| 27 Utility Poles | | |
| 28 Underground Diesel Storage Tank | | |
| 29 Cattle Guard | | |
| 30 Gravel Access Roads | | |
| 31 Concrete Driveway (late 1960s) | | |
| 34 Underground Diesel Tank | | |

SOURCES

TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009
MINUTEMAN ICBM LAUNCH FACILITY DELTA-01,
LCS, 2009



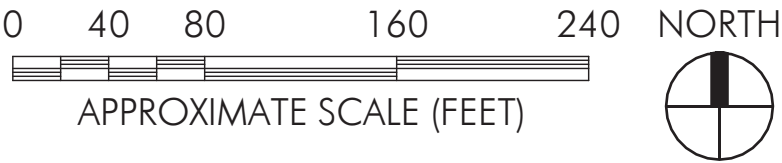
QUINN EVANS
ARCHITECTS

20' OUTSIDE PERIMETER FENCE
AND 5' INSIDE PERIMETER FENCE
DENUDED OF VEGETAION AND
SOIL STABLIIZED WITH ASPHALT
EMULSION

MINUTEMAN MISSILE
NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

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DRAFT JUNE 2010

DELTA-01 1971-1993 CONDITIONS



MAP KEY

- | | |
|---|-------------------------------------|
| 1 Launch Control Center | Building |
| 2 Heated Vehicle Storage Building | Property Line/
Historic Boundary |
| 3 Launch Control Facility | Gravel Boundary |
| 4 Hardened HF Transmit Antenna
(Deactivated 1970s) | Security Fence |
| 5 Hardened HF Receive Antenna
(Deactivated 1988) | Contour Line |
| 6 Hardened UHF Antenna (1976) | Low Density
Gravel |
| 7 SLFCS Antenna | Asphalt |
| 8 Sewage Lagoon | Concrete |
| 9 Helicopter Pad | |
| 10 Cathodic Protection Rectifier (1982) | |
| 11 Code Burner | |
| 12 Basketball Goal | |
| 13 Security Fencing | |
| 14 Horseshoe Court | |
| 15 Volleyball Court | |
| 16 Bollards • | |
| 17 Warning Signs ■ | |
| 18 Well & Water Tanks | |
| 19 Access Road & Parking Area | |
| 20 Flagpole (1986) | |
| 21 Television Satellite Dish (1988) | |
| 22 Gas Pump | |
| 23 Sidewalk | |
| 24 Diesel Fuel Tank | |
| 25 Sewage Lagoon Fencing | |
| 26 ISST Antenna | |
| 27 Utility Poles | |
| 28 Underground Diesel Storage
Tank (Removed 1993) | |
| 29 Cattle Guard | |
| 30 Gravel Access Roads | |
| 31 Concrete Driveway | |
| 34 Underground Diesel Tank | |

SOURCES

TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009
MINUTEMAN ICBM LAUNCH FACILITY DELTA-01,
LCS, 2009



QUINN EVANS
ARCHITECTS

CONCRETE RUBBLE FROM
CONSTRUCTION REMOVED FROM
THIS AREA, HOLES FILLED (1977)

MINUTEMAN MISSILE

NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

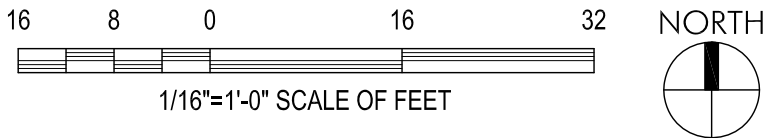
HSR/CLR/EA

DRAFT JUNE 2010

DELTA-01 FLOOR PLANS

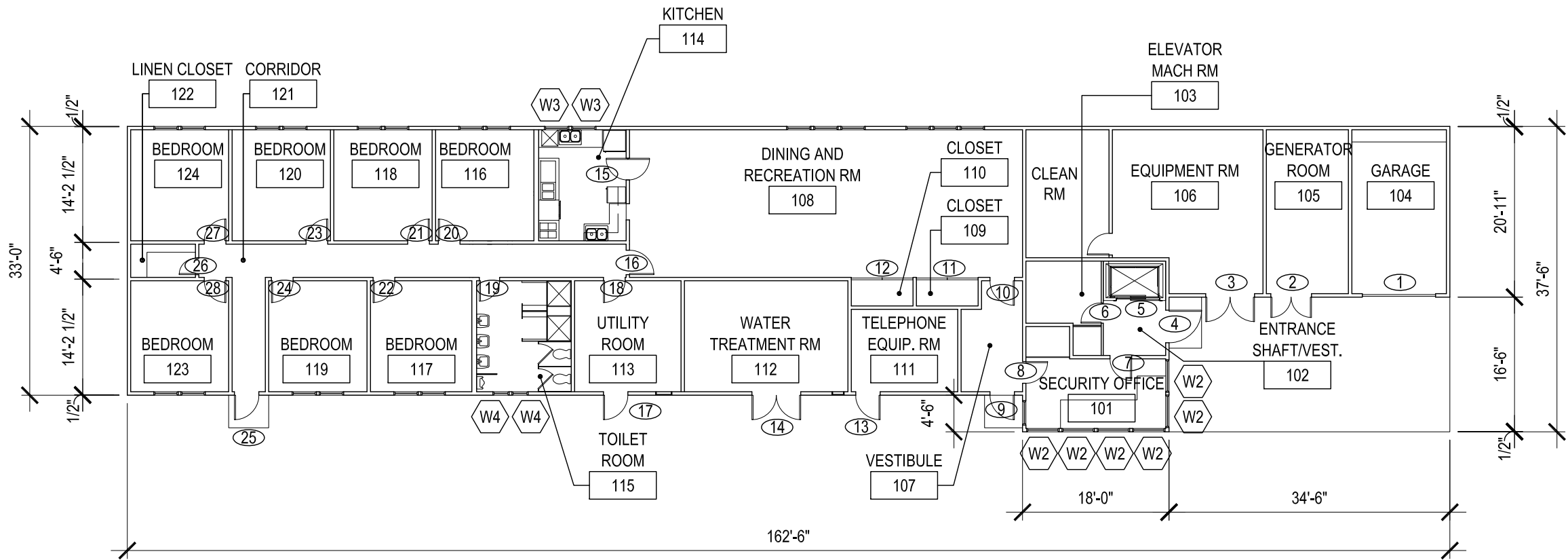
1963 - 1971

EPISODE 1

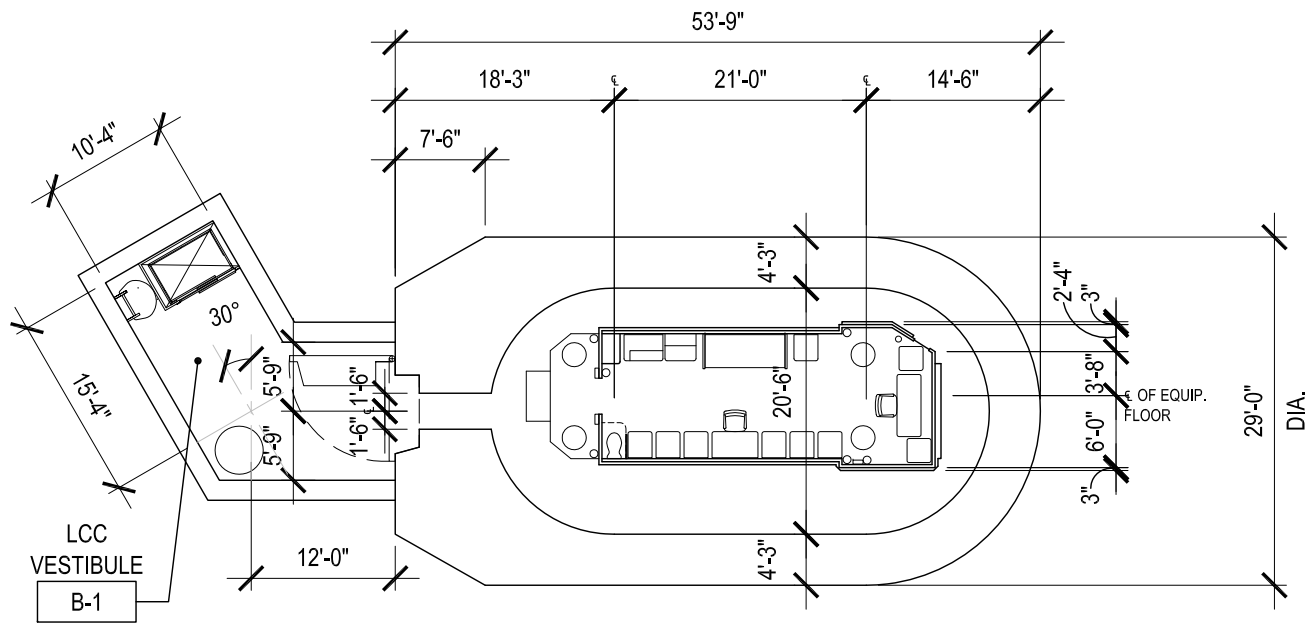


GENERAL NOTES

1. ALL WINDOWS ARE WINDOW TYPE W/1 UNLESS NOTED OTHERWISE.



1 LAUNCH CONTROL SUPPORT BUILDING FLOOR PLAN



2 LAUNCH CONTROL CENTER FLOOR PLAN



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NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

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DELTA-01 FLOOR PLANS

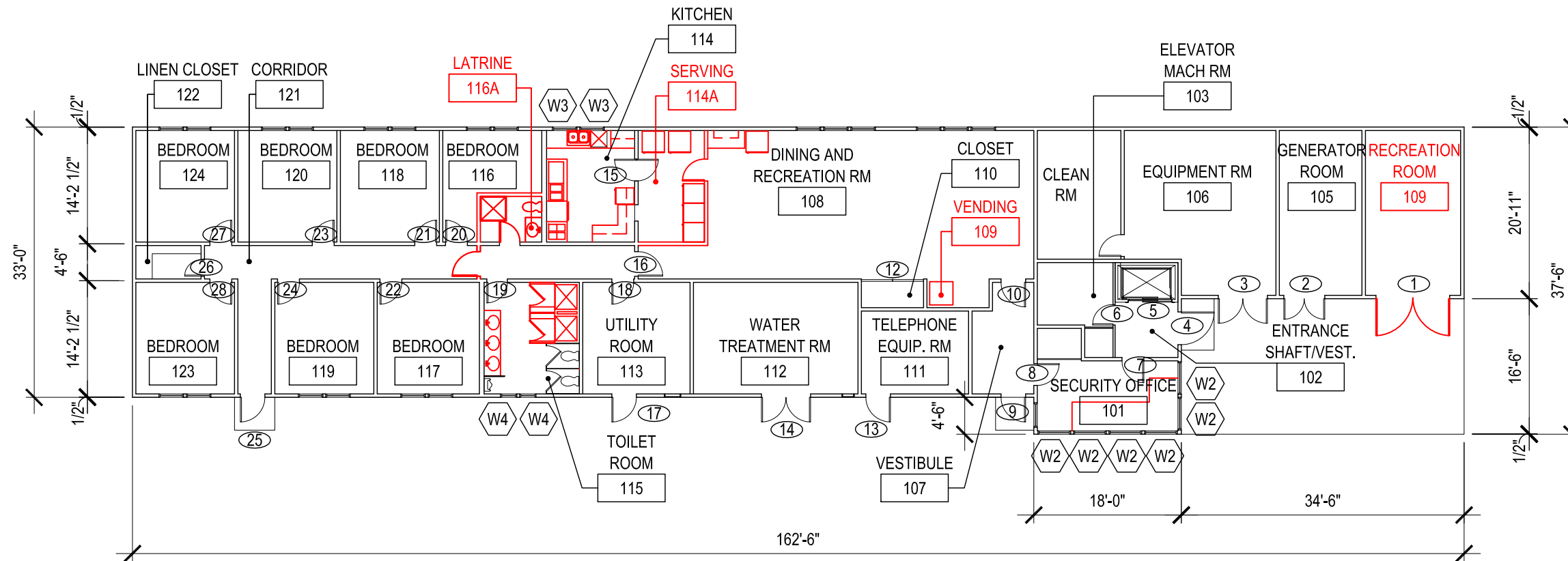
1971 - 1993

EPISODE 2

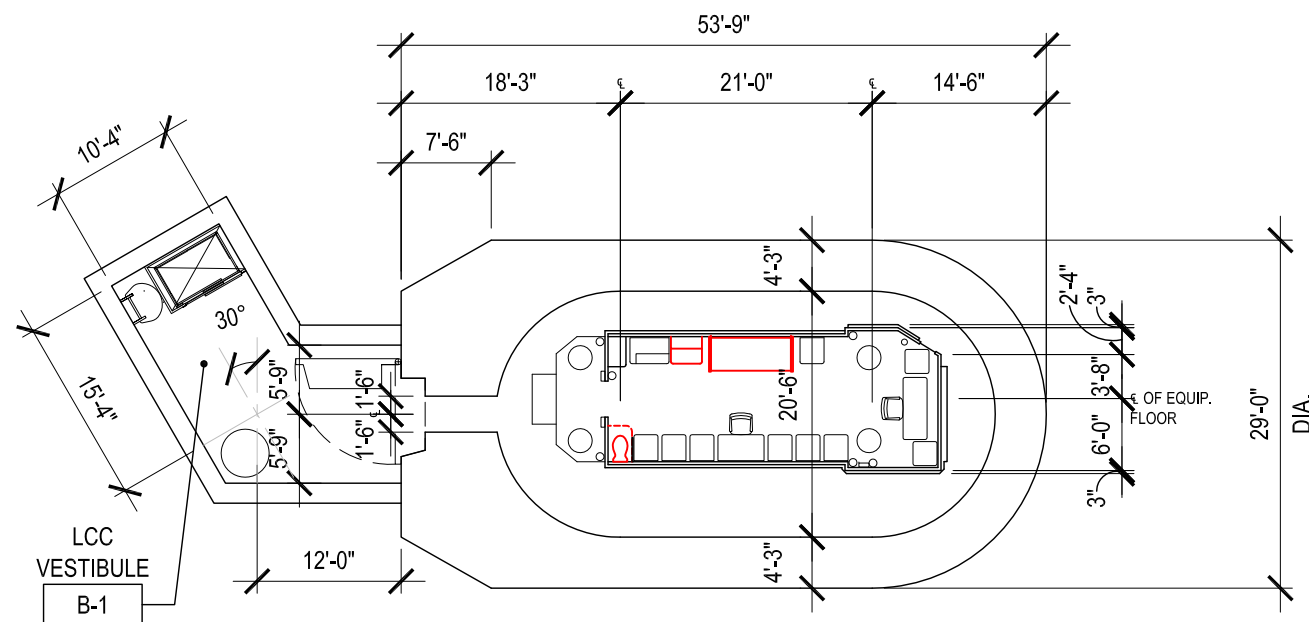


GENERAL NOTES

1. ALL WINDOWS ARE WINDOW TYPE W/1 UNLESS NOTED OTHERWISE.



1 LAUNCH CONTROL SUPPORT BUILDING FLOOR PLAN



2 LAUNCH CONTROL CENTER FLOOR PLAN



QUINN EVANS
ARCHITECTS

MINUTEMAN MISSILE

NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

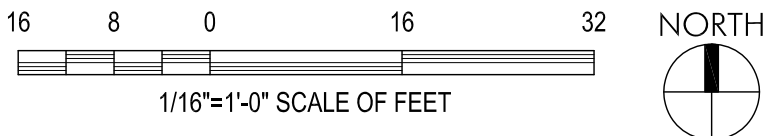
HSR/CLR/EA

DRAFT JUNE 2010

DELTA-01 FLOOR PLANS

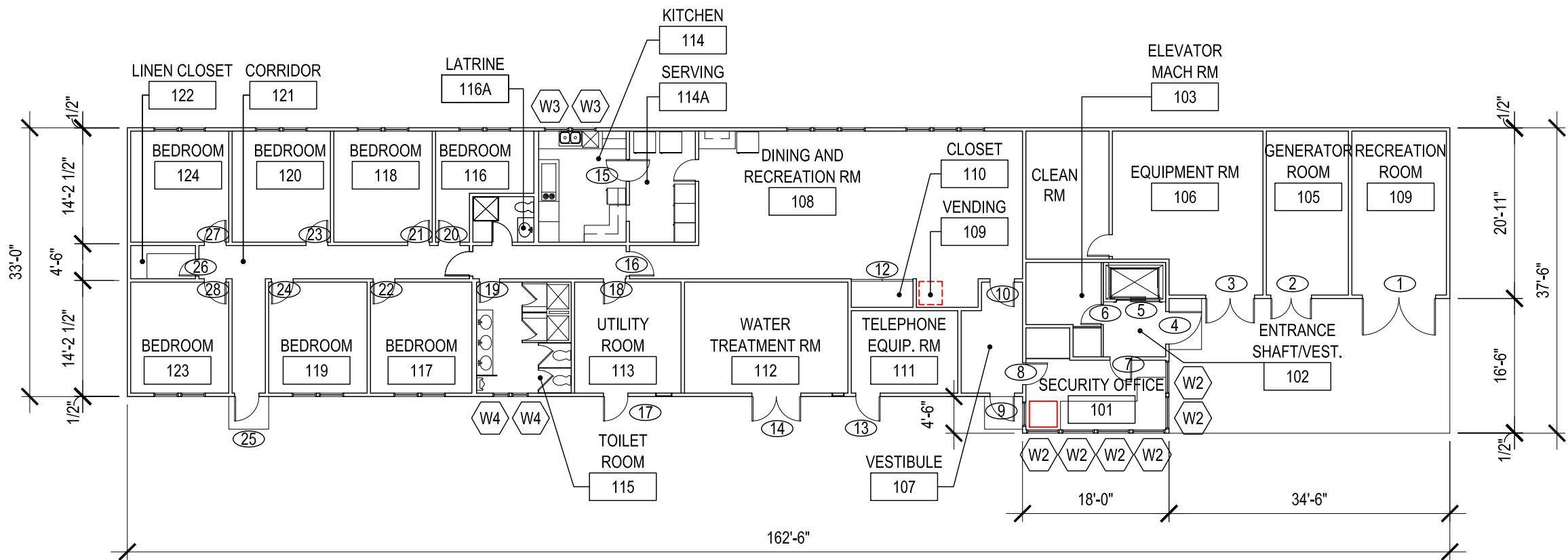
1993 - PRESENT

EPISODE 3

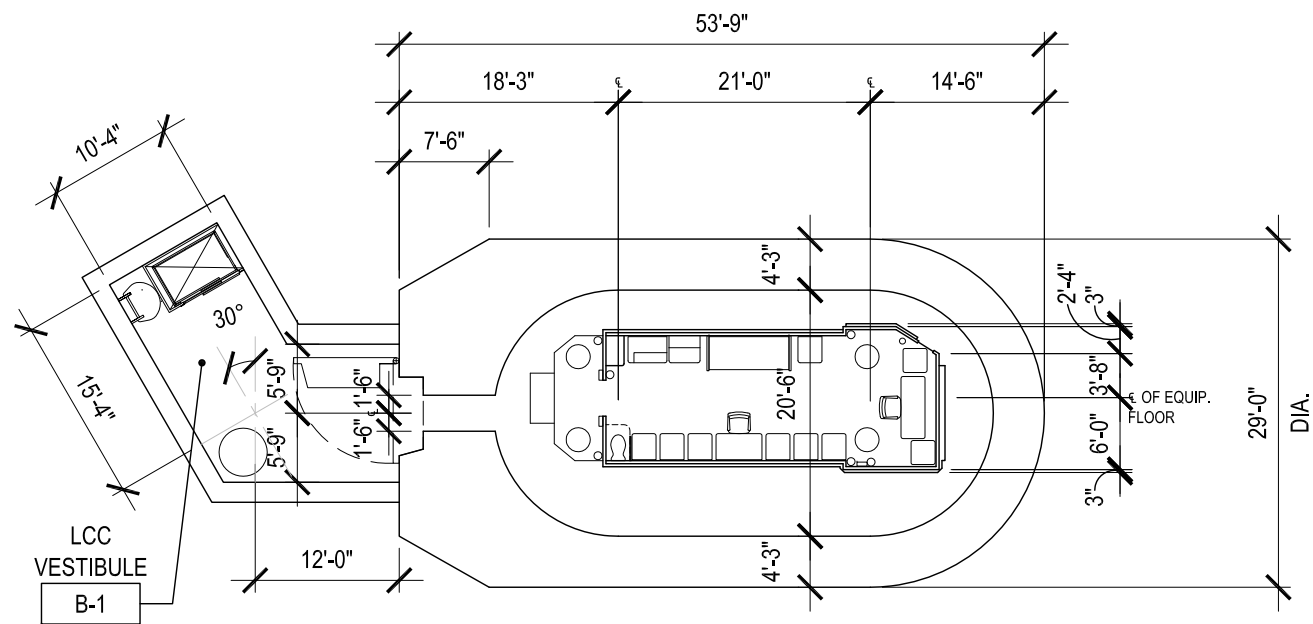


GENERAL NOTES

1. ALL WINDOWS ARE WINDOW TYPE W/1 UNLESS NOTED OTHERWISE.



1 LAUNCH CONTROL SUPPORT BUILDING FLOOR PLAN



2 LAUNCH CONTROL CENTER FLOOR PLAN



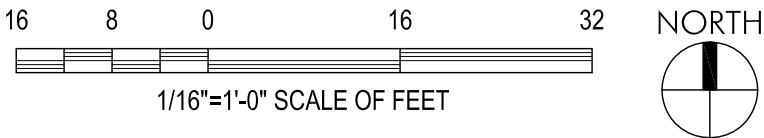
QUINN EVANS
ARCHITECTS

MINUTEMAN MISSILE
NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

HSR/CLR/EA
DRAFT JUNE 2010

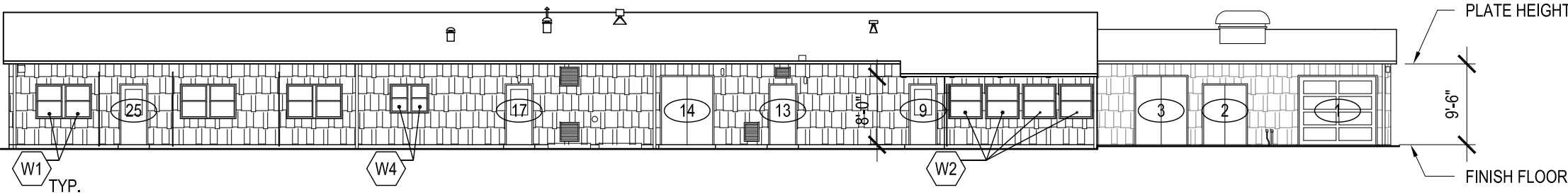
DELTA-01 ELEVATIONS

1963 - 1971
EPISODE 1

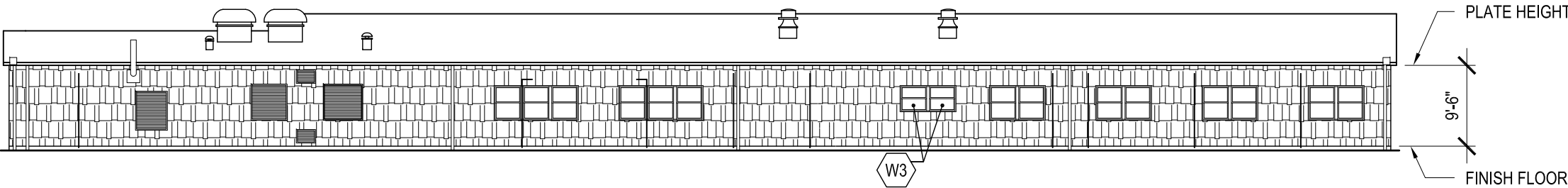


GENERAL NOTES

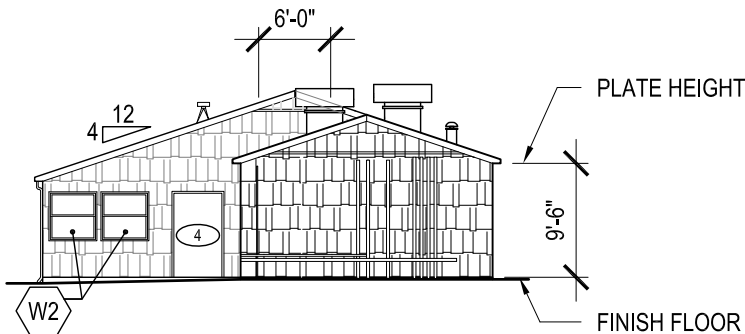
1. ALL WINDOWS ARE WINDOW TYPE W/1
UNLESS NOTED OTHERWISE.



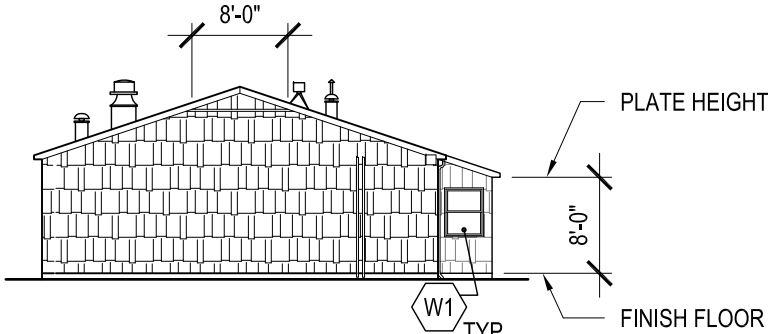
1 SOUTH ELEVATION



2 NORTH ELEVATION



3 EAST ELEVATION



4 WEST ELEVATION

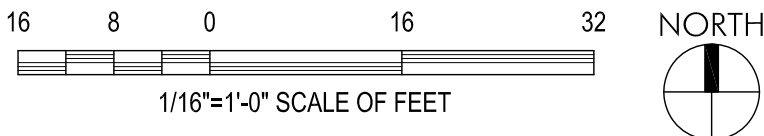
MINUTEMAN MISSILE

NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

HSR/CLR/EA
DRAFT JUNE 2010

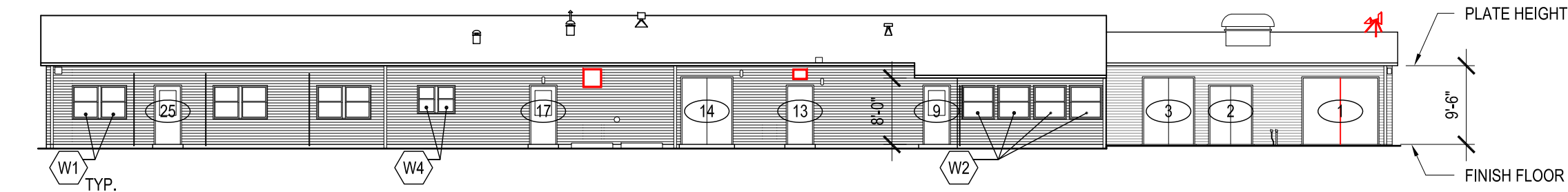
DELTA-01 ELEVATIONS

1971 - 1993
EPISODE 2

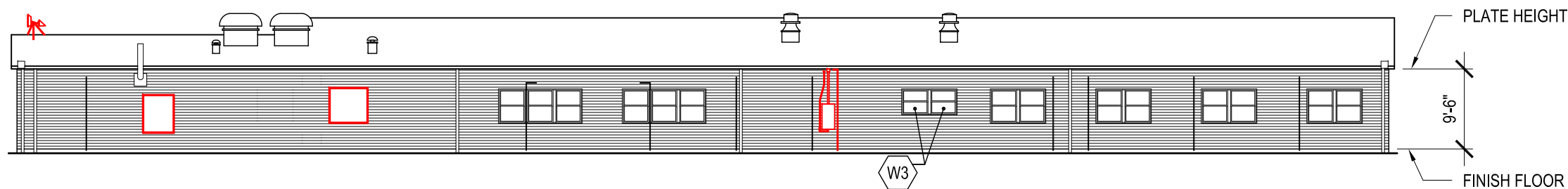


GENERAL NOTES

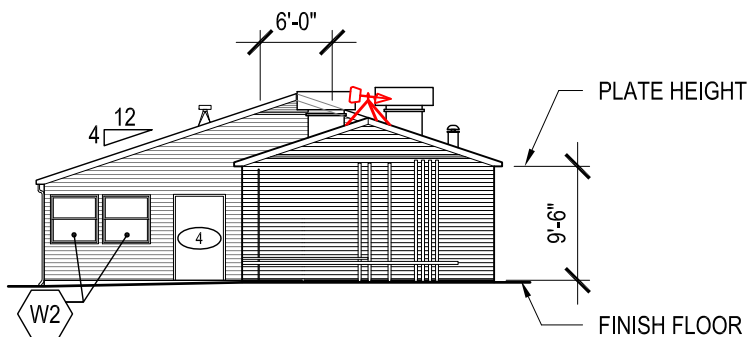
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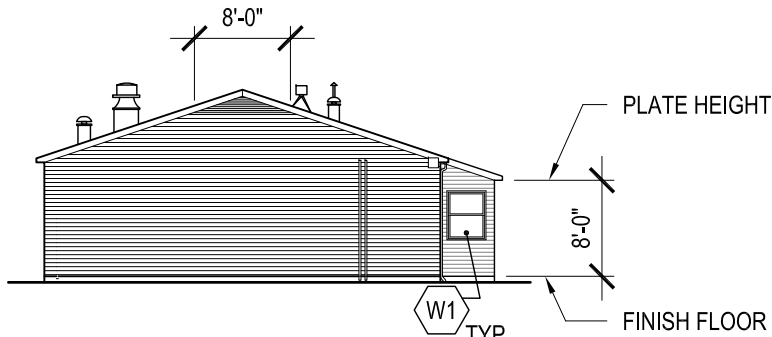
1 SOUTH ELEVATION



2 NORTH ELEVATION



3 EAST ELEVATION



4 WEST ELEVATION



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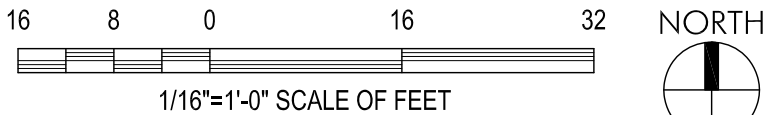
MINUTEMAN MISSILE

NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

HSR/CLR/EA
DRAFT JUNE 2010

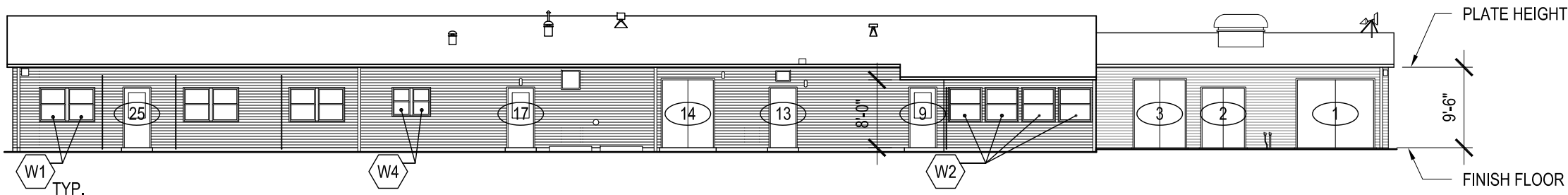
DELTA-01 ELEVATIONS

1993 - PRESENT
EPISODE 3

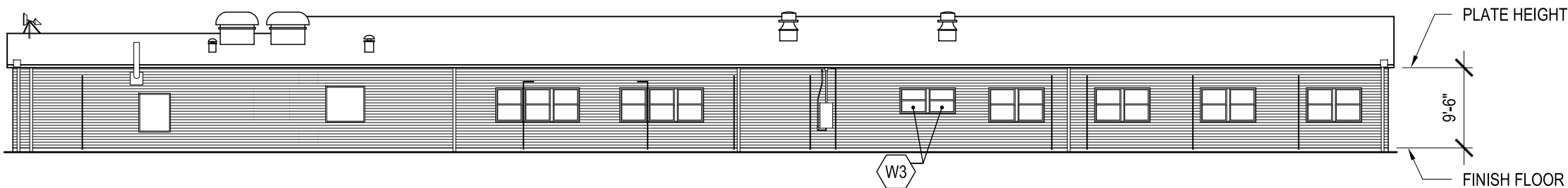


GENERAL NOTES

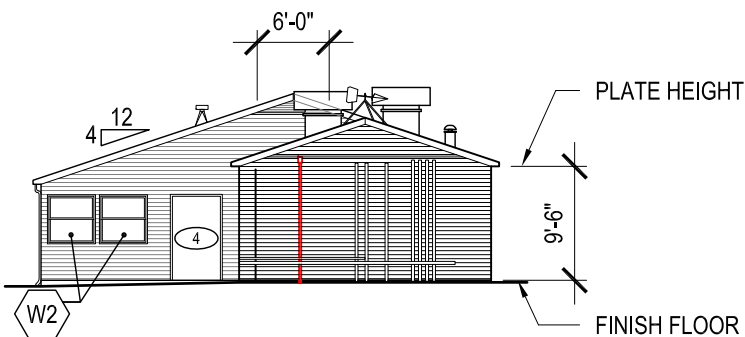
1. ALL WINDOWS ARE WINDOW TYPE W/1 UNLESS NOTED OTHERWISE.



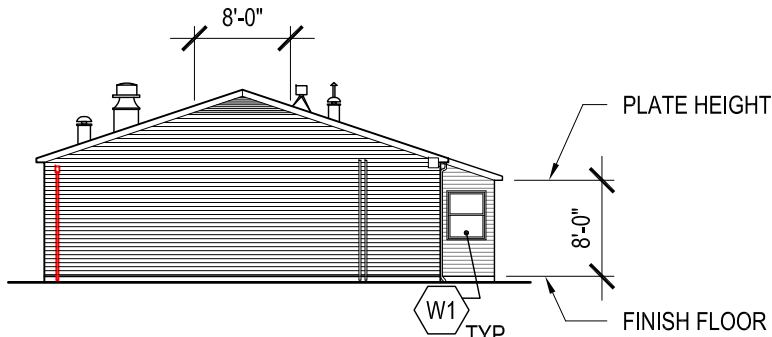
1 SOUTH ELEVATION



2 NORTH ELEVATION



3 EAST ELEVATION



4 WEST ELEVATION



QUINN EVANS
ARCHITECTS

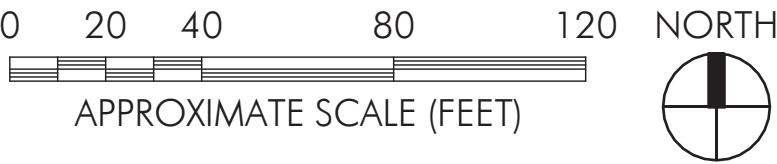
MINUTEMAN MISSILE

NATIONAL HISTORIC SITE

JACKSON COUNTY, SOUTH DAKOTA

HSR/CLR/EA
DRAFT JUNE 2010

DELTA-09 PRE-1963 CONDITIONS



MAP KEY

- | | | |
|------------------------------------|--|-------------------------------------|
| 1 Missile Launcher | | Building |
| 2 Launch Facility Support Building | | Property Line/
Historic Boundary |
| 5 Azimuth Marker | | Gravel Boundary |
| 6 Security Fencing | | Security Fence |
| 7 HICS Marker | | Contour Line |
| 8 Light Posts | | Low Density
Gravel |
| 9 Bollards | | High Density
Gravel |
| 10 Helipad & Markers | | Asphalt |
| 11 Access Road & Maneuvering Area | | Concrete |
| 13 Antenna Piers | | |
| 14 Transporter Erector Pylons | | |
| 15 Launch Facility Signs | | |
| 16 Monument Set by Woolpert, 2009 | | |
| 17 Culvert | | |

SOURCES

LAUNCH FACILITY SITE D-9 (276) PLOT PLAN, AS
BUILT DRAWINGS SHEET C-48A, 1961
MINUTEMAN ICBM LAUNCH FACILITY DELTA-09,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009

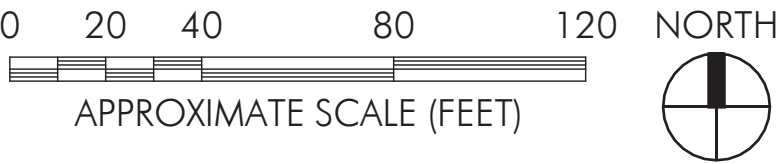


QUINN EVANS
ARCHITECTS

MINUTEMAN MISSILE
NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

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DELTA-09 1963-1971 CONDITIONS



MAP KEY

- | | |
|---|----------------------------------|
| 1 Missile Launcher (1962) | Building |
| 2 Launch Facility Support Building (1962) | Property Line/ Historic Boundary |
| 4 Hardened UHF Antenna (1968) | Gravel Boundary |
| 5 Azimuth Marker | Security Fence |
| 6 Security Fencing | Contour Line |
| 7 HICS Marker | Low Density Gravel |
| 8 Light Posts | High Density Gravel |
| 9 Bollards | Asphalt |
| 10 Helipad & Markers | Concrete |
| 11 Access Road & Maneuvering Area | |
| 13 Antenna Piers | |
| 14 Transporter Erector Pylons | |
| 15 Launch Facility Signs | |
| 16 Monument Set by Woolpert, 2009 | |
| 17 Culvert | |

SOURCES

LAUNCH FACILITY SITE D-9 (276) PLOT PLAN, AS
BUILT DRAWINGS SHEET C-48A, 1961
MINUTEMAN ICBM LAUNCH FACILITY DELTA-09,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009



QUINN EVANS
ARCHITECTS

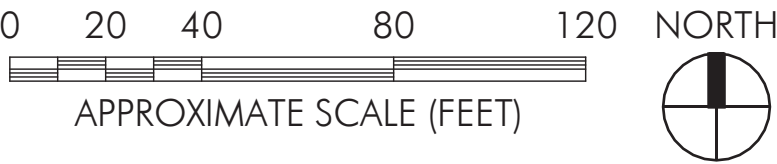
MINUTEMAN MISSILE

NATIONAL HISTORIC SITE

JACKSON COUNTY, SOUTH DAKOTA

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DELTA-09 1971-1993 CONDITIONS



MAP KEY

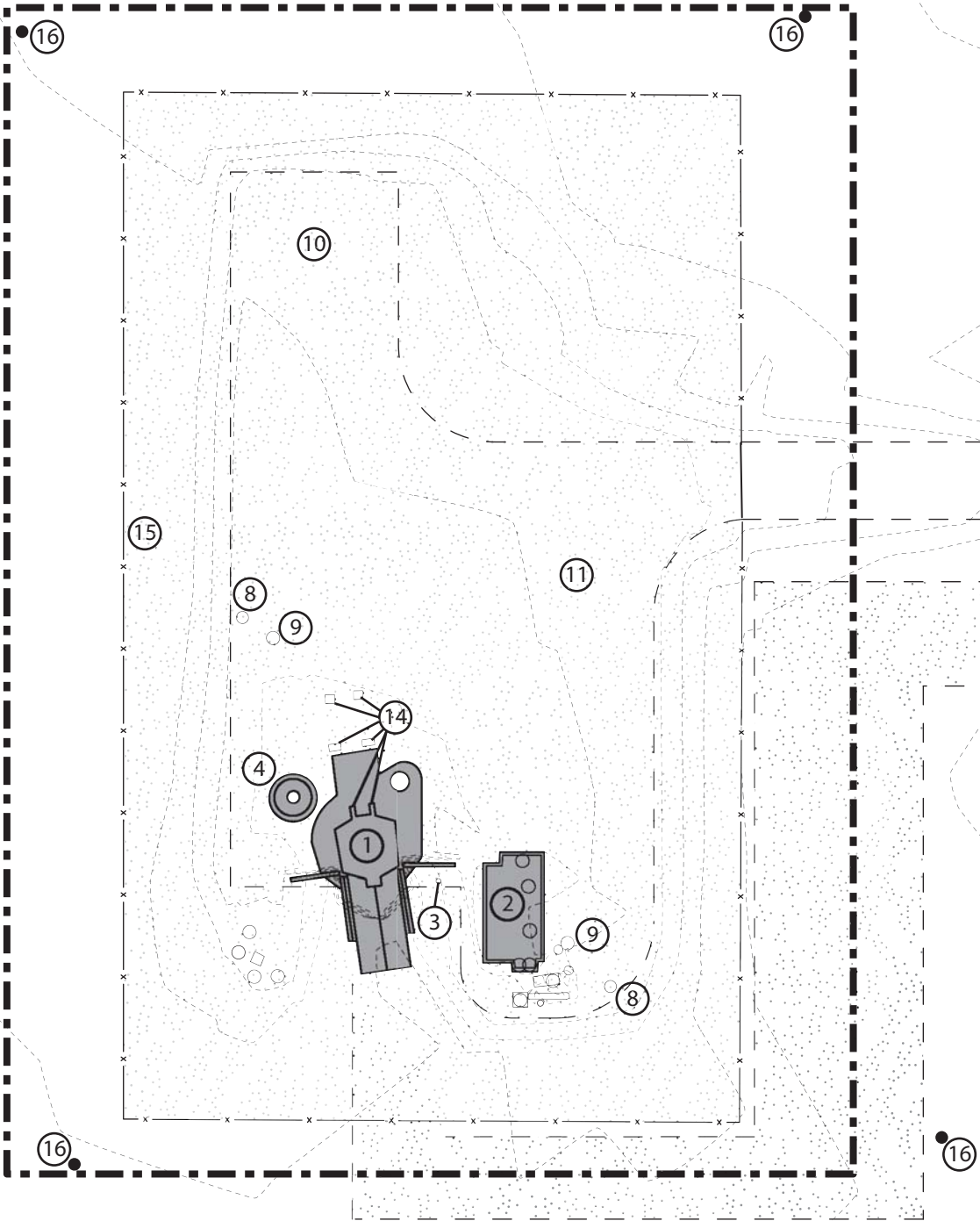
- | | | |
|---|--|-------------------------------------|
| 1 Missile Launcher (1993 - Removed)
(2001 - Trainging missile installed
and glass viewing enclosure
constructed over the silo) | | Building |
| 2 Launch Facility Support Building
(1962) | | Property Line/
Historic Boundary |
| 3 IMPSS Antenna (1989) | | Gravel Boundary |
| 4 Hardened UHF Antenna (1968) | | Security Fence |
| 5 Azimuth Marker | | Contour Line |
| 6 Security Fencing | | Low Density
Gravel |
| 7 HICS Marker | | High Density
Gravel |
| 8 Light Posts | | Asphalt |
| 9 Bollards | | Concrete |
| 10 Helipad & Markers | | |
| 11 Access Road & Maneuvering Area | | |
| 12 Cathodic Protection Rectifier (1982) | | |
| 13 Antenna Piers | | |
| 14 Transporter Erector Pylons | | |
| 15 Launch Facility Signs | | |
| 16 Monument Set by Woolpert, 2009 | | |
| 17 Culvert | | |

SOURCES

LAUNCH FACILITY SITE D-9 (276) PLOT PLAN, AS
BUILT DRAWINGS SHEET C-48A, 1961
MINUTEMAN ICBM LAUNCH FACILITY DELTA-09,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009



QUINN EVANS
ARCHITECTS

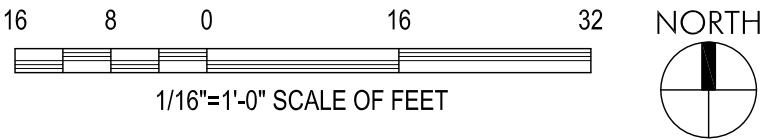


1980s SITE REGRADED

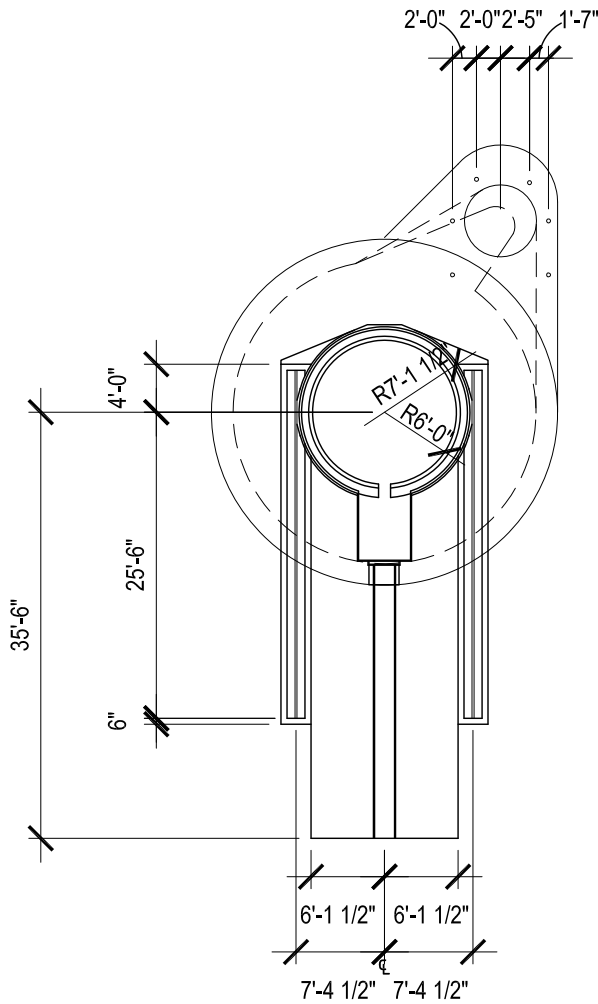
HSR/CLR/EA
DRAFT JUNE 2010

DELTA-09 FLOOR PLANS

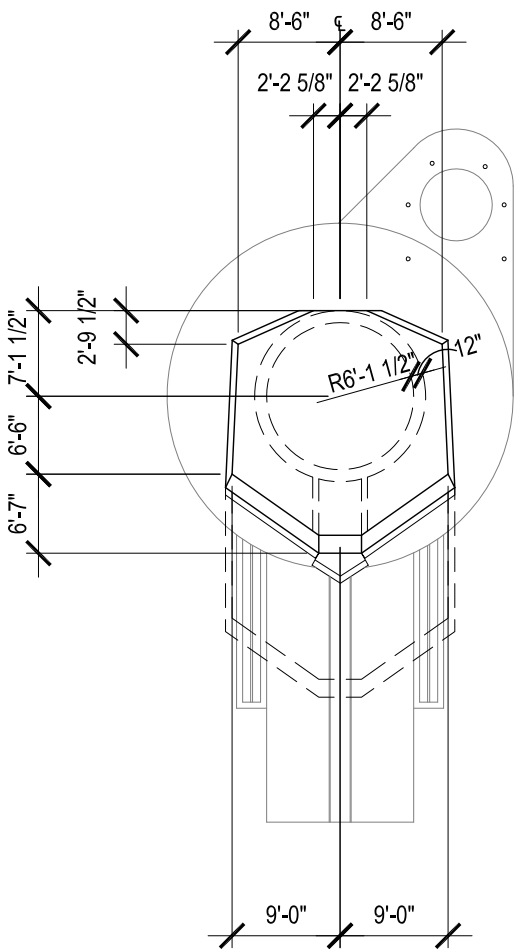
1963 - 1971
EPISODE 1



GENERAL NOTES



1 FLOOR PLAN



2 ROOF PLAN

MINUTEMAN MISSILE

NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

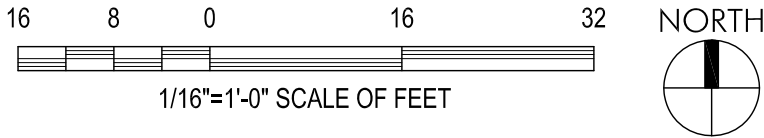
HSR/CLR/EA

DRAFT JUNE 2010

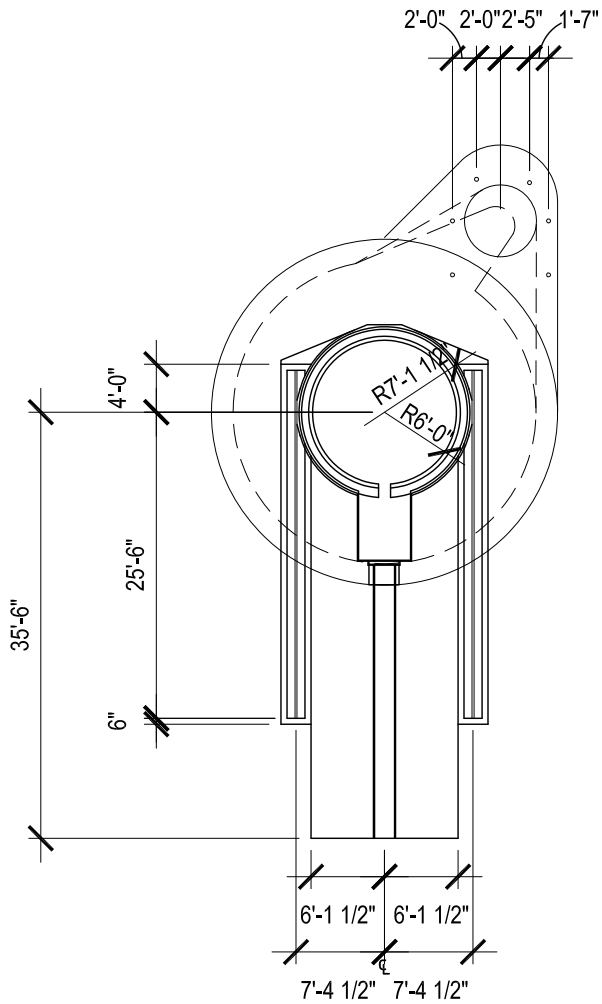
DELTA-09 FLOOR PLANS

1971 - 1993

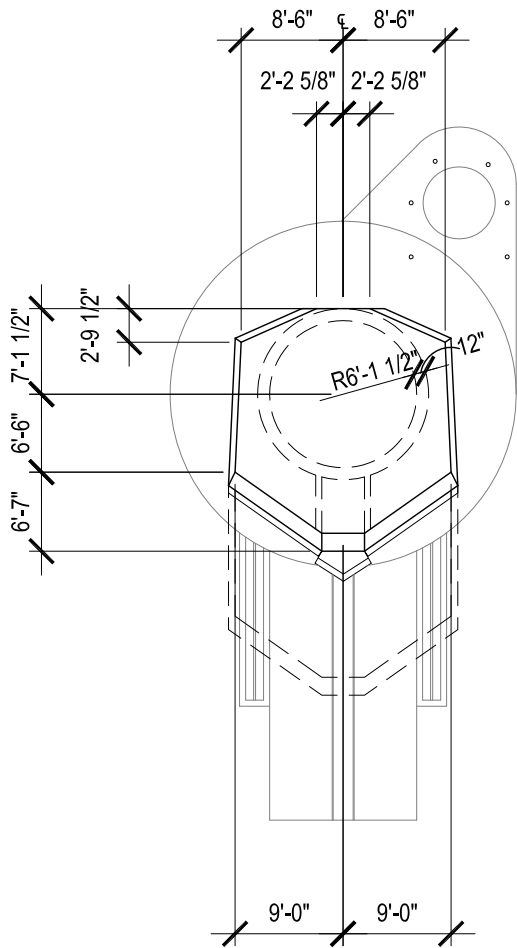
EPISODE 2



GENERAL NOTES



1 FLOOR PLAN



2 ROOF PLAN

MINUTEMAN MISSILE

NATIONAL HISTORIC SITE
JACKSON COUNTY, SOUTH DAKOTA

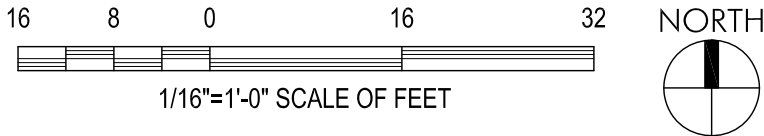
HSR/CLR/EA

DRAFT JUNE 2010

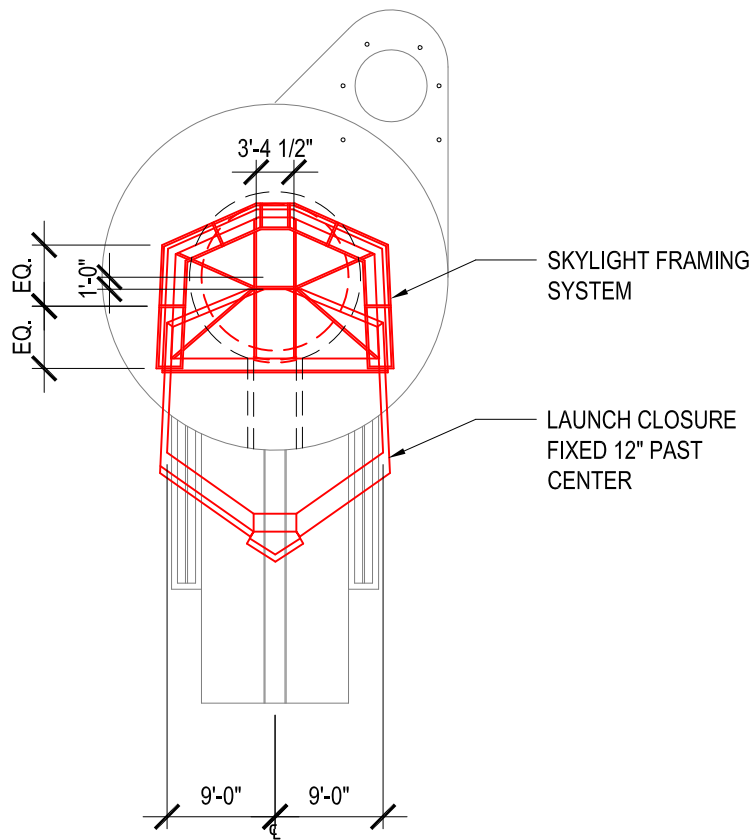
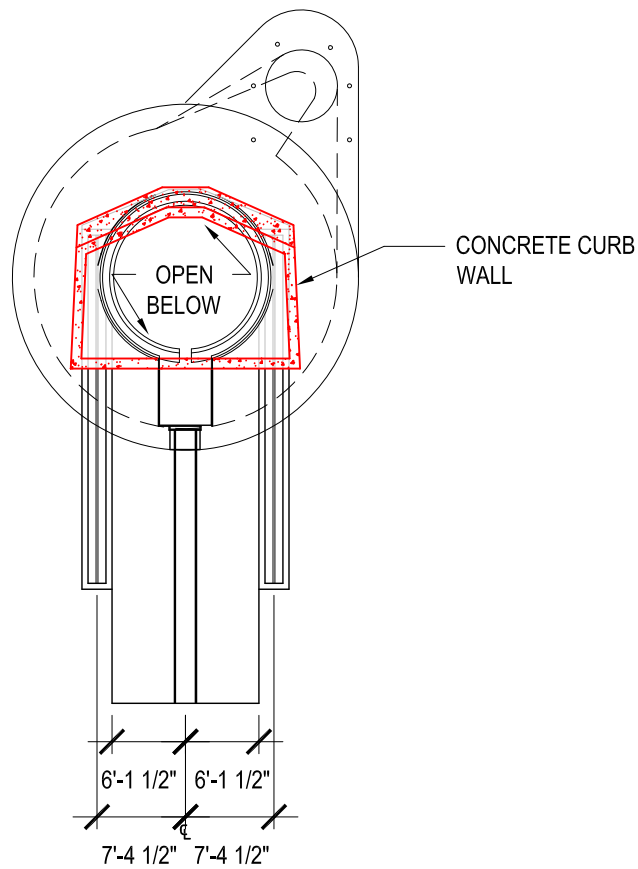
DELTA-09 FLOOR PLANS

1993 - PRESENT

EPISODE 3



GENERAL NOTES



1 FLOOR PLAN

2 ROOF PLAN