

Historic Resource Documentation

Vermont Army National Guard Ammunition Storage Bunkers at Camp Johnson

Vermont National Guard Road, Colchester



Prepared for:

Vermont Military Department
Vermont Division for Historic Preservation

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Project Summary

This report will document the ammunition storage area at Camp Johnson, the headquarters of the Vermont Army National Guard (VTARNG). This area includes five early 1940s ammunition storage bunkers, also known as earth covered magazines. Three of these bunkers, #2821, 2822 and 2823, are slated for demolition. Bunkers #2824 and 2825 will be retained in order to preserve examples of the historic bunkers, and the VTARNG will continue to maintain these bunkers to prevent deterioration. Five new ammunition storage bunkers will be constructed in the same ammunition storage area; four will be built in a row in the field behind/northwest of the row of the three existing bunkers to be removed, and one will be built south of Bunker #2824.

The project will be conducted in two phases. Phase I will occur in 2023 and will include the construction of two bunkers. Phase II will be conducted 2023-2024 and will include the construction of three bunkers, the removal of the row of three historic bunkers, and the construction of a new earthen berm in the location of the three removed bunkers. The ammunition storage area also includes a historic ca. 1900 Rifle Butt and two non-historic buildings that will be removed: a small metal storage shed and a 1990s concrete ammunition storage building.

The ammunition storage area has been identified in the 2000 “Building Inventory and Evaluation Report for Camp Johnson” and a 2004 Vermont Historic Sites and Structures Survey (VHSSS) form. The early 1940s ammunition storage bunkers have been determined eligible as contributing resources in a National Register of Historic Places historic district. The bunkers and their setting have not been altered since the 2000 report was produced.

The ammunition storage bunkers must be replaced as they no longer conform to today’s munition storage requirements and the operational needs of the VTARNG. They do not comply with the minimum safety standards for “Ammunition and Explosive (AE) storage magazines” specified by The Defense Ammunition Center and U.S. Army Technical Center for Explosives Safety (DACTCES), a division of the U.S. Department of Defense. Also, the standard VTARNG forklifts that transport ammunition into and out of the bunkers do not fit through the bunker doors, and the bunkers can no longer handle the capacity needed by the VTARNG. The amount of ordnance used by the VTARNG has increased by 500% since 2000, when the ammunition used at the Ethan Allen Firing Range – a separate site – was moved to the ammunition storage area at Camp Johnson.

The 2022 Section 106 Review consultation with the Vermont Division for Historic Preservation (VDHP) for this undertaking determined that the removal of the historic bunkers will cause adverse effect to the ammunition storage area. In addition to the physical removal of the bunkers, the two remaining bunkers will also be adversely affected as their integrity of setting, feeling and association will be reduced due to the loss of the historic bunkers and the construction of the new bunkers. The Rifle Butt will not be physically affected, and since it predates the ammunition storage area and is not associated with it, its integrity will not be affected.

As outlined in a Memorandum of Agreement between the Vermont Military Department (VMD) and VDHP, one mitigation treatment for the adverse effects is a Historic Resource Documentation Package, which includes this report as well as digital photographs. The package was produced by Paula Sagerman, Historic Preservation Consultant, for the VMD.

Physical Description

The bunkers are located off of Barnes Avenue, within an ammunition storage area in the northeastern section of Camp Johnson that is separate from its main campus. The storage area is enclosed by a chain-link fence, and includes a long driveway with a large looped end, a large field, and ammunition storage-related structures. The bunkers line the driveway, which begins at a security gate off of Barnes Avenue. Three bunkers (#2821, 2822, and 2823) are sited in a straight row along the road near the gate, and the other two are located on the loop section of the driveway (#2824 and 2825). There is a ca. 1900 Rifle Butt across from the row of three bunkers, which is a stone retaining wall supporting an earthen berm.

The ammunition storage area also has three non-historic buildings. One is small metal storage building located in between Bunkers #2821 and 2822. The other two were built in the 1990s and include an ammunition storage building located on the driveway loop, and a garage located on a short separate looped driveway that forks off the main driveway near the security gate. There is a large flat field behind the row of three bunkers and garage.

The five historic ammunition storage bunkers are “earth covered magazines.” They were built in the early 1940s – likely in 1941 or 1942 – and consist of Quonset-hut type, arched, pre-fabricated heavy-gauge corrugated iron ingot structures set on poured concrete pads. The iron arches were erected on-site using prefabricated materials produced by the American Rolling Mill Company. The bunkers are covered with grassy earthen mounds and have exposed front bulkheads that consist of truncated iron walls with hinged iron doors. At the crown of the earthen mounds above the rear walls of each bunker, there is a tall narrow metal ventilator. The iron arches and bulkhead interiors are stamped with “ARMCO” and “American Rolling Mill Company.” There are three different sizes of bunkers: Bunker #2821 is 20’ wide by 40’ deep and is oriented perpendicular to the driveway; Bunkers #2822, 2823 and 2824 are 20’ by 20’; and Bunker #2825 is 20’ wide by about 12’ deep and oriented parallel to the driveway.

The metal storage building between Bunkers #2821 and 2822 is a small front-gable rectangular shed that sits on a poured concrete pad. It has corrugated metal siding and roofing and a hinged corrugated metal double-leaf door in the front gable. Its construction date is unknown, but it appears to date to the 1950s. It was not originally located in the ammunition storage area and was likely moved there within the last fifty years. It has no architectural or historical significance and is a common type of structure used at Camp Johnson, Fort Ethan Allen, and the Ethan Allen Firing Range that was often moved from one place to another.

The 1990s ammunition storage bunker is a rectangular concrete block building with a side-gable shed roof that descends from front to rear. It has three regularly-spaced metal doors at the front elevation. The 1990s garage is set into a small bank and sits on a poured concrete pad with a front bulkhead. It is a square steel-framed building with ribbed metal siding and a flat roof that

cantilevers over the bulkhead, protecting the two large metal overhead garage doors at the front elevation. There is a concrete staircase with a metal railing adjacent to the bulkhead.

The Rifle Butt is an approximately 600 feet long by fifteen feet wide by six feet tall fieldstone retaining wall supporting an earthen berm. The wall is supported by battered stone buttresses spaced about fifteen feet apart. There is a square poured concrete roofless enclosure at the southwest end of the Rifle Butt.

Statement of Significance

Historical Background

The exact construction date of the ammunition storage bunkers could not be determined as the VTARNG has no record of their construction and the biennial reports of the Vermont Military Department (VMD) do not mention them. Previous documentation of the ammunition storage bunkers (1999 Feasibility Study and 2000 Historic Resource Report) provides a date of 1940, but the American Rolling Mill Company did not manufacture this type of structure until 1941. It is also believed that the bunkers were constructed in anticipation of the onset of World War II, so it is possible the bunkers date to 1941.

As it is known that the Rifle Butt was originally part of Fort Ethan Allen, it is possible that the subject bunkers were originally part of this military base as well. The VMD's 1948 biennial report provides a list of structures at the adjacent Fort Ethan Allen base that were transferred to the National Guard in 1946, as they were no longer needed for World War II purposes. These structures included six ammunition magazines: three "high explosive magazines" with consecutive identification numbers that indicate they are sited together, and three "small arms ammunition" magazines that have numbers that indicate they are sited separately from each other and not near the other magazines. In any case, for the past eighty or so years, the bunkers have remained in continuous use as ammunition storage magazines for the Vermont military.

Historic Context

The American Rolling Mill Company was founded in Middletown, Ohio, 1899. The subject bunkers are a type of ammunition storage structure now known as an "Armco hut", which was a commonly used prefabricated ammunition storage structure built on United States military bases just before and during World War II. ("Armco" is short for the name of the company. It was renamed the Armco Steel Corporation in 1948 and in 1978 renamed Armco.) As mentioned above, the construction of Armco huts began in 1941, in anticipation of the United States entering World War II. They were manufactured until 1948.

Armco huts are a type of Quonset hut, which is an arched prefabricated structure, but are sturdier than the freestanding, uncovered Quonset huts that had previously been designed for the military for non-ammunition storage purposes. Armco huts were based on earlier designs of sewer pipes and tunnels that could withstand thick earthen coverings. They are distinguished by their bolted-together arched panels of heavy-gauge corrugated steel, vertical standing-seam steel truncated bulkheads with double-leaf hinged doors, and earthen mounds that were eventually covered with

vegetation. This type of earth-covered arched storage structure is also called an “igloo” based on its resemblance to the traditional Eskimo dwelling. The arched design of bunkers prevents lateral explosions, avoiding a chain reaction with other structures. This not only protects adjoining magazines during an accidental explosion, but also in the event of enemy attack. Grass is planted atop the igloos in order to prevent erosion.

According to the Historic American Buildings Survey (HABS) documentation for the Armco hut at the Barbers Point Naval Air Station in Hawaii:

Armco huts are made of thick steel sheets with large corrugations so that an internal frame, required for a Quonset hut, is unnecessary... The steel sheets, termed Multi-Plate by the manufacturer, are shipped with predrilled holes, then are bolted together. Each side of the arch of plates bears on and is bolted to a longitudinal base channel that itself is bolted to the concrete floor.

Design standards for ammunition storage areas and their structures changed after a major explosion at a naval ammunition depot in New Jersey in 1926. New weapons magazines built after this had new quantity and distance requirements, leading to smaller storage structures that were well-spaced from each other. The idea of the segregated weapons storage area was also considered at this time, but since few military facilities were built, improved or expanded by the United States during the late 1920s and 1930s due to the budget constraints of the Depression and a period of peacetime, most of the new individual structure and site plan designs dated to World War II or afterwards.

Beginning in the early 1940s, new ammunition storage areas were sited in areas segregated from the other areas of a military complex and had separated smaller storage structures with quantity and distance standards. Most of the ammunition storage structures were underground igloo-type structures like the Armco hut, and by the 1950s concrete bunkers had become common, especially for structures housing nuclear weapons.

Significance

The ammunition storage bunkers retain their integrity of location, design, materials, setting, workmanship, feeling and association, and are eligible as contributing structures in a potential National Register of Historic Places historic district that combines Camp Johnson with the existing contiguous Fort Ethan Allen National Register historic district.

The bunkers meet National Register Criterion A for their association with Vermont's military history and National Register Criterion C for their distinctive features of a World War II ammunition storage bunker and Armco hut. The bunkers are the only intact World War II-related structures at Camp Johnson, and these and the 1955 concrete rocket storage bunkers (VHSSS 0404-47) at Camp Johnson are the only historic “earth covered magazines” in Vermont. The bunkers also represent a specific period of ammunition storage structures construction, the 1940s, when arched storage bunkers were constructed of metal. By the 1950s and thereafter, during the age of nuclear weapons, most bunkers were constructed of concrete.

Rifle Butt

The Rifle Butt was constructed as early as 1894 to support targets for long-range (1,000 yard) target practice and was originally associated with the adjacent Fort Ethan Allen, which was established as a cavalry training site.

The Rifle Butt is also a contributing resource in the potential historic district. It is the oldest historic resource at Camp Johnson and is unique as the only example of historic masonry rifle butt in Vermont associated with the U.S. Army.

Resources

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Figure 1. OpenStreetMap
Red Star indicates location of ammunition storage area.



Figure 2. Snippet of 1987 USGS Topo Map of Colchester
Red star indicates location of ammunition storage area.
Arrow points to dotted line that is approximate location of fence enclosure.



Figure 3. Vermont ANR aerial image showing location of ammunition storage area in relation to Camp Johnson.
Red star indicates location of ammunition storage area.



Figure 4. Inset of Vermont ANR aerial image on previous page.

Red line follows fence enclosure

Numbers correspond to ammunition storage bunkers

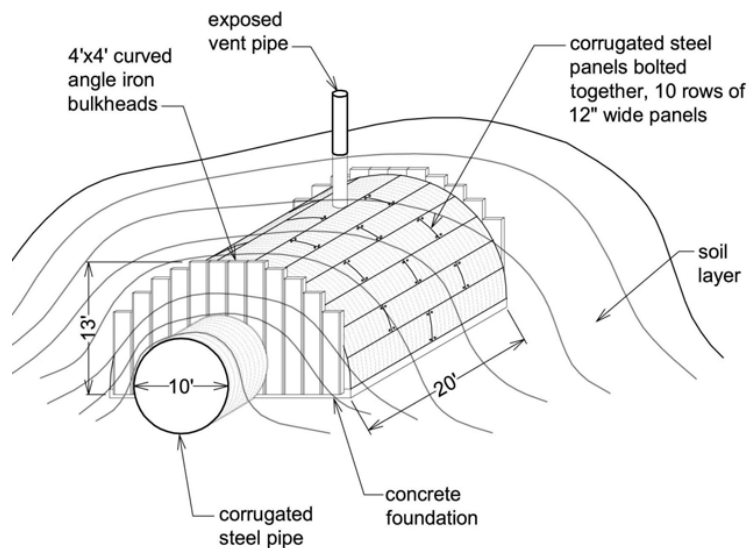


Figure 5. Armco hut from <https://www.nps.gov/thingstodo/aleu-route-5.htm>.



Figure 6. 1962 aerial image of ammunition storage area. Red arrows point to ammo bunkers.



Figure 7. Armco Hut, Naval Air Station Barbers Point, Hawaii. Source: HABS

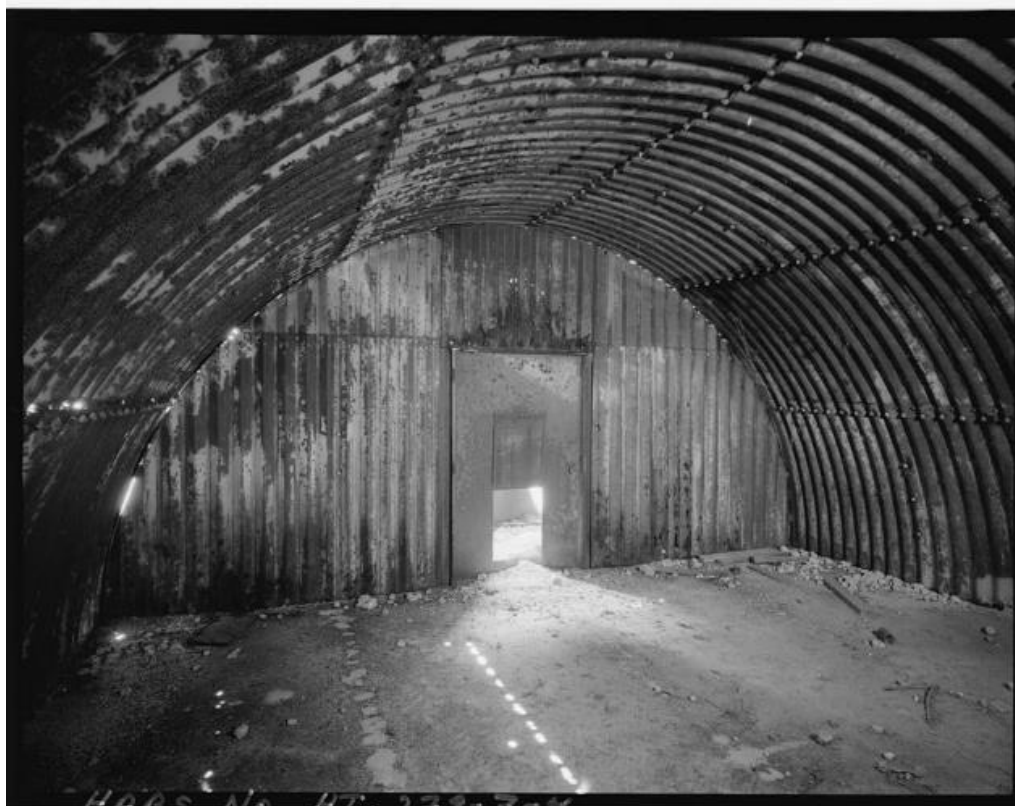


Figure 8. Armco Hut, Naval Air Station Barbers Point, Hawaii. Source: HABS



Figure 9. Armco Hut at U.S. Navy base, Brisbane, Queensland.
Source: www.ozatwar.com/ozatwar/jcslaughter.htm

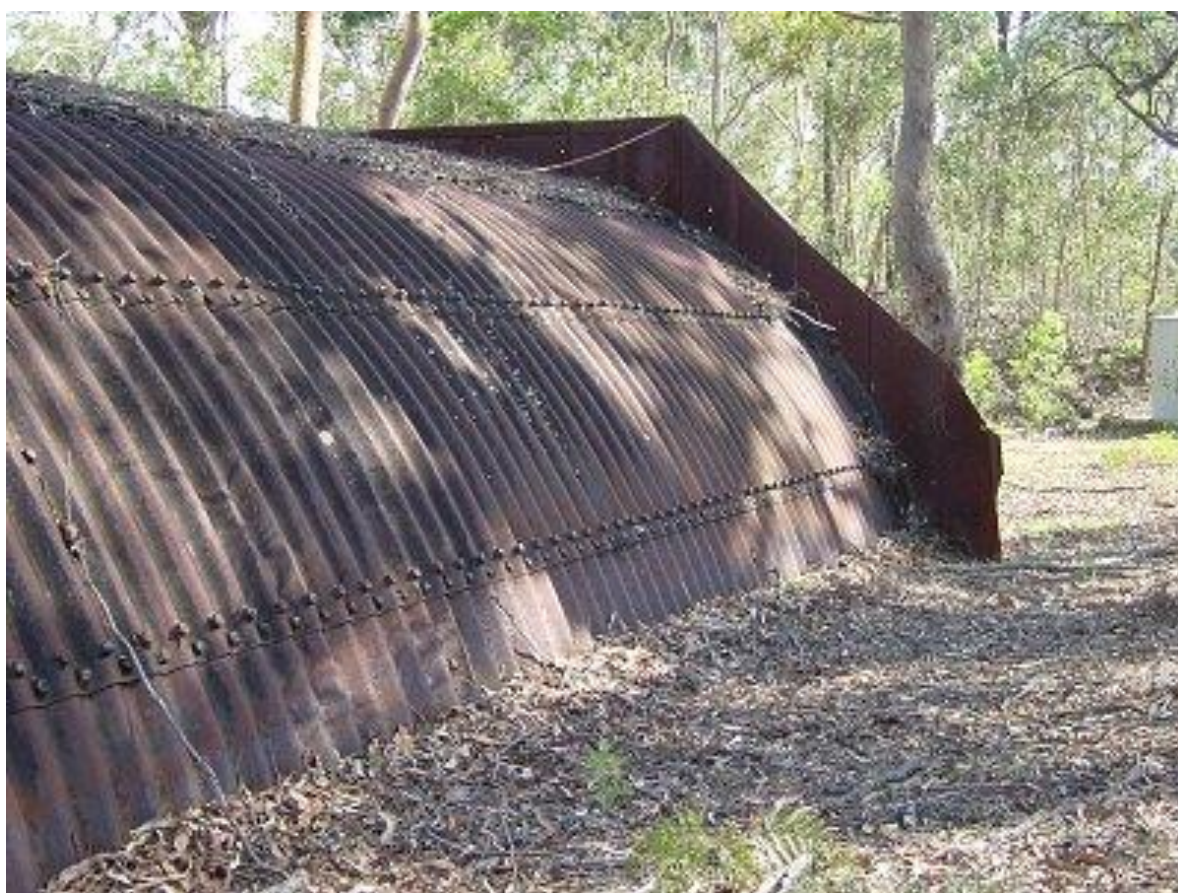


Figure 10. Armco Hut at U.S. Navy base, Brisbane, Queensland.
Source: www.ozatwar.com/ozatwar/jcslaughter.htm

Sketch Plan and Photo Key

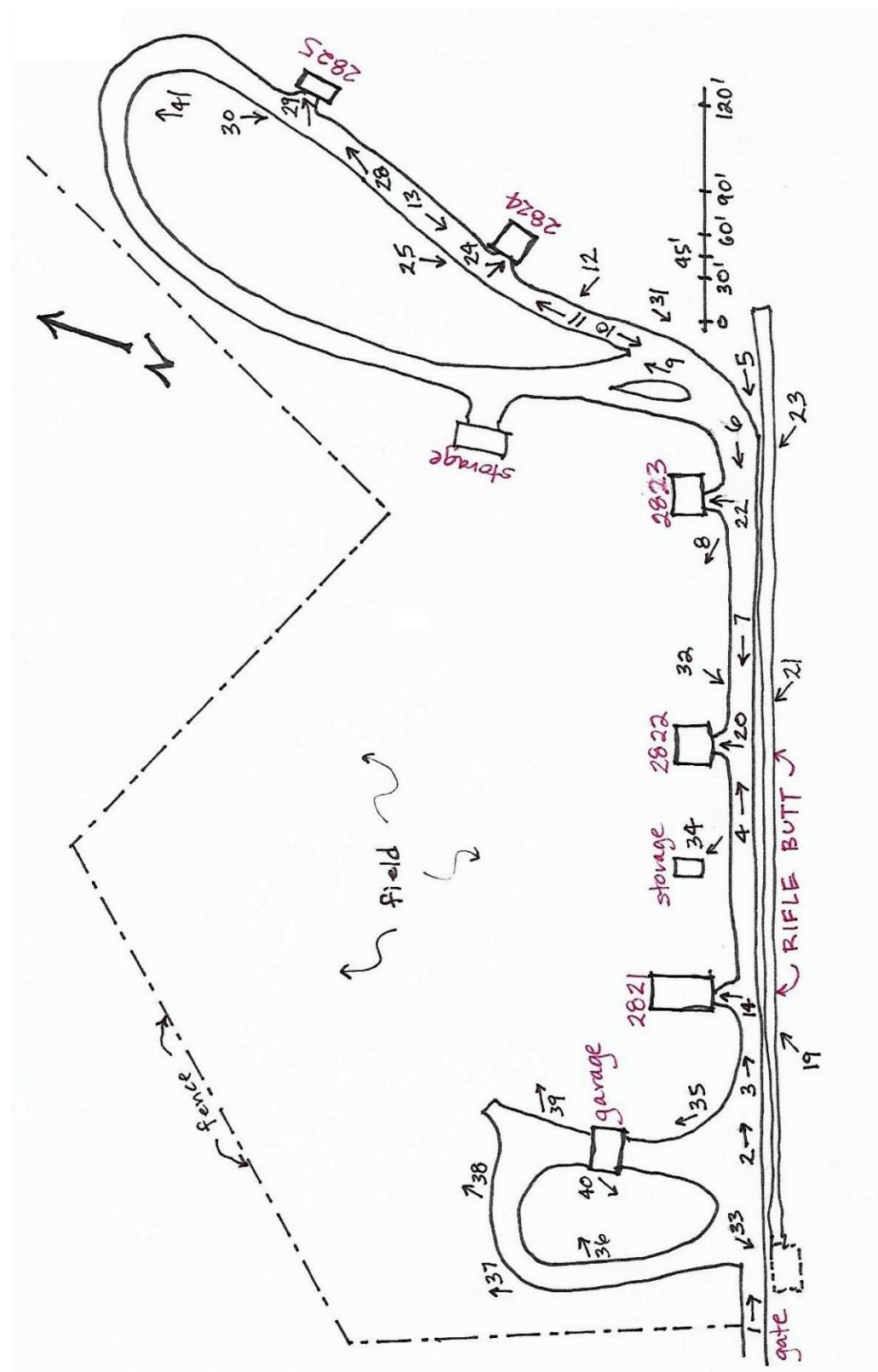




Photo 1. Facing northeast toward main driveway with Bunkers #2821, 2822 and 2823 and metal shed on left and Rifle Butt on right. Driveway loop to field and garage on left.



Photo 2. Facing northeast toward Bunkers #2821, 2822 and 2823 and metal shed on left and Rifle Butt on right.



Photo 3. Facing northeast toward Bunkers #2821, 2822 and 2823 and metal shed on left and Rifle Butt on right.



Photo 4. Facing northeast toward Bunkers #2822 and 2823.



Photo 5. Facing southwest toward Rifle Butt on left and Bunkers #2821, 2822 and 2823 and metal storage building on right.



Photo 6. Facing southwest toward Rifle Butt on left and Bunkers #2821, 2822 and 2823 and metal storage building on right.



Photo 7. Facing southwest toward Rifle Butt on left and Bunkers #2821 and 2822 and metal storage building on right.



Photo 8. Facing west toward Bunkers #2821 and 2822 and metal storage building and field where new bunkers will be constructed.



Photo 9. Facing northeast toward main driveway loop road. 1990s ammunition storage building on left and Bunker #2824 on right.

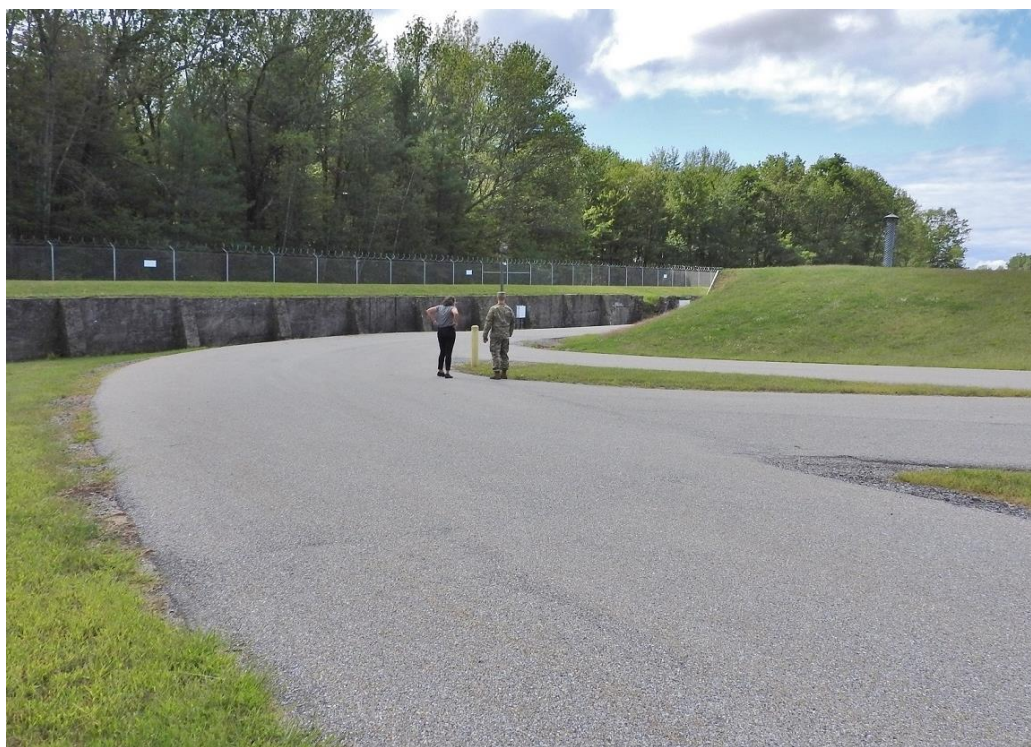


Photo 10. Facing south from main driveway loop road toward Rifle Butt on left and Bunker #2823 on right.



Photo 11. Facing north toward Bunkers #2825 and 2824.



Photo 12. Facing west toward field where new bunkers will be constructed and 1990s ammunition storage building.



Photo 13. Facing south toward Bunker #2824.



Photo 14. Facing northwest toward Bunker #2821.



Photo 15. Facing southeast toward front of Bunker #2821.



Photo 16. Facing northwest toward rear of Bunker #2821.



Photo 17. Facing northwest toward rear of Bunker #2821.



Photo 18. Stamp on front wall of all five historic bunkers.



Photo 19. Facing north toward Bunker #2821.



Photo 20. Facing northwest toward Bunker #2822.



Photo 21. Facing west toward Bunker #2822.



Photo 22. Facing northwest toward Bunker #2823.



Photo 23. Facing west toward Bunker #2823.



Photo 24. Facing east toward Bunker #2824.



Photo 25. Facing southeast toward Bunker #2824.



Photo 26. Facing west toward front of Bunker #2824.



Photo 27. Facing east toward rear of Bunker #2824.



Photo 28. Facing north toward Bunker #2825.



Photo 29. Facing northeast toward Bunker #2825.



Photo 30. Facing southeast toward Bunker #2825.



Photo 31. Facing south toward northeast end of Rifle Butt.



Photo 32. Facing south toward Rifle Butt.



Photo 33. Facing south toward structure at south end of Rifle Butt.



Photo 34. Facing west toward metal storage building.



Photo 35. Facing north toward 1990s garage.



Photo 36. Facing north toward field and location of proposed ammunition bunkers.



Photo 37. Facing north toward northwest corner of ammunition storage area and its fence enclosure.



Photo 38. Facing northeast toward field and location of proposed ammunition bunkers.



Photo 39. Facing east toward field and location of proposed ammunition bunkers. 1990s ammunition bunker is in the background.



Photo 40. Facing south from rear of 1990s garage toward entrance gate to ammunition storage area.



Photo 41. Facing north from north loop of main driveway toward northeast corner of ammunition storage area and its fence enclosure.

Photographic Index

Photographs were taken in September 2022 by Paula Sagerman.

TIFF digital files of the photographs are included in the documentation package.

Photo 1. Facing northeast toward main driveway with Bunkers #2821, 2822 and 2823 and metal shed on left and Rifle Butt on right. Driveway loop to field and garage on left.

Photo 2. Facing northeast toward Bunkers #2821, 2822 and 2823 and metal shed on left and Rifle Butt on right.

Photo 3. Facing northeast toward Bunkers #2821, 2822 and 2823 and metal shed on left and Rifle Butt on right.

Photo 4. Facing northeast toward Bunkers #2822 and 2823.

Photo 5. Facing southwest toward Rifle Butt on left and Bunkers #2821, 2822 and 2823 and metal storage building on right.

Photo 6. Facing southwest toward Rifle Butt on left and Bunkers #2821, 2822 and 2823 and metal storage building on right.

Photo 7. Facing southwest toward Rifle Butt on left and Bunkers #2821 and 2822 and metal storage building on right.

Photo 8. Facing west toward Bunkers #2821 and 2822 and metal storage building and field where new bunkers will be constructed.

Photo 9. Facing northeast toward main driveway loop road. 1990s ammunition storage building on left and Bunker #2824 on right.

Photo 10. Facing south from main driveway loop road toward Rifle Butt on left and Bunker #2823 on right.

Photo 11. Facing north toward Bunkers #2825 and 2824.

Photo 12. Facing west toward field where new bunkers will be constructed and 1990s ammunition storage building.

Photo 13. Facing south toward Bunker #2824.

Photo 14. Facing northwest toward Bunker #2821.

Photo 15. Facing southeast toward front of Bunker #2821.

Photo 16. Facing northwest toward rear of Bunker #2821.

Photo 17. Facing northwest toward rear of Bunker #2821.

Photo 18. Stamp on front wall of all five historic bunkers.

Photo 19. Facing north toward Bunker #2821.

Photo 20. Facing northwest toward Bunker #2822.

Photo 21. Facing west toward Bunker #2822.

Photo 22. Facing northwest toward Bunker #2823.

Photo 23. Facing west toward Bunker #2823.

Photo 24. Facing east toward Bunker #2824.

Photo 25. Facing southeast toward Bunker #2824.

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Photo 31. Facing south toward northeast end of Rifle Butt.

Photo 32. Facing south toward Rifle Butt.

Photo 33. Facing south toward structure at south end of Rifle Butt.

Photo 34. Facing west toward metal storage building.

Photo 35. Facing north toward 1990s garage.

Photo 36. Facing north toward field and location of proposed ammunition bunkers.

Photo 37. Facing north toward northwest corner of ammunition storage area and its fence enclosure.

Photo 38. Facing northeast toward field and location of proposed ammunition bunkers.

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Photo 40. Facing south from rear of 1990s garage toward entrance gate to ammunition storage area.

Photo 41. Facing north from north loop of main driveway toward northeast corner of ammunition storage area and its fence enclosure.