Table of Contents

Introduction

Purpose of the Guidelines
Washington State Parks and Recreation Commission Direction
Acknowledgements
A History of Building at Fort Worden
Secretary of the Interior's Standards for Rehabilitation
Guidelines for Rehabilitating Historic Buildings
How to Use these Guidelines

Building Site and Landscape
Brick and Stone Masonry
Concrete
Wood
Architectural Metals
Roofs
Windows
Entrances and Porches
New Additions and Structures
Structural Systems
Interior Spaces
Mechanical and Electrical Systems
Sustainability & Energy Efficiency
Accessibility Considerations
Safety and Health Concerns
Appendix

Individual Resource Statements for Six Buildings
Fort Worden Vision, Mission, Values, and Principles
National Historic Landmark designation/application
Purpose of the Fort Worden Guidelines for Rehabilitation

Fort Worden at the beginning of the 21st century looks remarkably like it did a century before. The overarching purpose of the Fort Worden Guidelines for Rehabilitation is to help ensure that the notable appearance remains intact as new uses are found for the buildings.

The history of the Fort Worden area begins well before the army arrived to build its fort. Prior to the arrival of Europeans, Point Wilson was within the sphere of the S'Kallam peoples and was visited by other Native Americans as well. The evidence of archaeological sites that have been located on the sand spit suggest the presence of a large encampment, and historic photographs show that settlers came to trade there in the 19th century. Later these lands were taken up by the federal government and private landowners, and portions of what would become Fort Worden were platted as part of the City of Port Townsend.

Fort Worden has experienced significant change over time. Those changes should have had a profound and lasting effect on the historic qualities of the military post, however, they have proven to be surprisingly impermanent. During World War I and World War II, building programs associated with the mobilization and training of soldiers for those conflicts transformed the Fort Worden landscape. Scores of wood frame buildings were wedged into every available building site, transforming the carefully ordered plan into a confusing warren of almost identical one- and two-story quarters, storehouses and mess halls. Yet those additions were cleared away, leaving the original buildings and plan little altered. Another sweep came in 1957 when the Washington State Department of Institutions remodeled many of the buildings in the conversion of the post to a treatment center for youth. That use significantly altered many interiors, but had little impact on the exteriors and grounds.

In short, Fort Worden has been lucky. Among its contemporaries (Forts Casey, Flagler and Ward on Puget Sound, Fort Lawton in Seattle and Fort George Wright in Spokane), it alone retains an appearance that easily recalls the period between 1904 and 1917 before World War I. It is one of the best preserved military posts in the Pacific Northwest, a quality recognized and reinforced by its designation as a National Historic Landmark, a designation reserved for the nation’s most significant properties.

We should not trust to luck as a guarantor of Fort Worden’s future appearance. Understanding and thoughtfully implementing the Guidelines for Rehabilitation will help protect critical character-defining features as the years pass by. If we do our job well, Fort Worden will always be a distinct and memorable representative of the past in our present.

By Commission policy, work on historic structures and landscapes at Fort Worden State Park must adhere to the US Department of Interior Secretary’s Standards for the Treatment of Historic Properties. While these standards provide guidance on the treatment of historic properties in general, they provide little specific direction on how to preserve the integrity of a particular historic property.

Site-specific guidelines for rehabilitation provide a critical intermediate step between the Secretary’s Standards and the construction of a particular feature in a particular historic site. Guidelines for Rehabilitation provide architects, builders, property managers, tenants, maintenance staff and others with parameters on how much change can be introduced in adapting an historic building or feature to a new use. Their overall purpose is to ensure that an historic property retains its authenticity and integrity while allowing flexibility to adapt the site and structures to address evolving needs of the park. In some cases however, additional investigation may be necessary to ensure that a particular site, building or feature is preserved. Additional preservation planning may be necessary.
Washington State Parks and Recreation Commission Direction

In January 2007, the State Parks and Recreation Commission (Commission) adopted a vision for Fort Worden as a center for life-long learning. As envisioned, the Fort will become a full-service, year round destination providing a diverse array of meaningful experiences for people of all ages, backgrounds, skills, and interests through its programs, events, services, and facilities. A multitude of resident partners will create a shared economy that supports state of the art programming in the arts and culture, health and wellness, natural science, outdoor recreation, and historic preservation. With a variety of conference facilities and accommodations ranging from camping to residences and single guest rooms, plus high quality food service focused on locally grown ingredients, the new Fort Worden will allow visitors to design their stay around their needs and preferences.

As part of its adoption of the life-long learning center vision, the Commission recognized that it alone does not have the resources required to achieve the vision. Park management will need to work with its nonprofit and business partners not only to provide programs and services, but also to care and improve the Fort’s extensive collection of historic structures, landscapes, and small-scale features.

Asking partners to care for historic structures carries with it two principle necessities. First, prospective partners need to know what they can or can’t do with a structure and what preservation activities will be required in order to thoughtfully plan and commit financial resources to large-scale rehabilitation project. Second, the Commission must be assured that the partners’ efforts will not compromise the structures’ historical integrity.

To address these needs, as well as ensuring overall preservation of the park’s historic properties, the Commission directed agency staff to prepare design guidelines. This document represents the fulfillment of the Commission’s direction and its on-going commitment to stewardship of Fort Worden.
Acknowledgements

The Fort Worden Guidelines for Rehabilitation draw heavily on the existing text of the Secretary of the Interior’s Standards for Rehabilitation as well as the Guidelines for Rehabilitating Buildings at the Presidio of San Francisco, published by the National Park Service in 1995. The principal preparer of the Presidio guidelines was the Architectural Resources Group, San Francisco, aided by the contributions of many subject matter experts from the National Park Service.

The Presidio guidelines were important in formulating the Fort Worden guidelines in several ways. They tailored and expanded the broad perspective of the Secretary of the Interior’s Standards for Rehabilitation and demonstrated how the general statements of the Secretary’s Standards were applicable to the specific instances at the Presidio. The authors of the Fort Worden Guidelines for Rehabilitation, consisting of David Hansen, architectural historian, principal, Outworks, with the assistance and project coordination of Charlyn Wingard, project architect, BCRA, had the same goal: make the information directly applicable to Fort Worden to improve the clarity of the guidance. In addition, the Presidio and Fort Worden are in some ways very similar historic properties. Their histories overlap with the creation in the 1890s of the national coast defense system and they share a common heritage of military architecture. The individual designs may differ but the family resemblance is strong.

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A History of Building at Fort Worden

This overview of the construction history of the garrison buildings supplements the information in the 1976 National Historic Landmark designation. The narrative addresses the development of the post over a 60 year period through World War II and the reuse of Fort Worden by the Department of Institutions.

Fort Worden is one of the best preserved historic military ports in the Pacific Northwest. Despite the impact of several different campaigns of construction, demolition and alteration, its appearance today is much as it was in the early years of the 20th century.

The announcement that the federal government would establish fortifications and a new military post at Point Wilson brought enormous relief to the citizens of Port Townsend. The city had never recovered from the financial depression of 1893, and the new building program meant jobs for local men and increased commerce for local businesses. Work on the concrete gun and mortar batteries began in 1898, but the construction of the associated garrison post -- the barracks, quarters, storehouses and other buildings that would house and support the troops -- would have to wait. A reservation of 640 acres had been set aside by Executive Order in 1866, but most of the property was already covered by private claims. The government owned lands sufficient only for the fortifications themselves; a good portion of the property needed to complete the reservation was held by owners who were reluctant to sell. It was not until 1902 that most of those lands were aggregated and the boundaries of the reservation took on much of their permanent form.

By that time, many of the fortifications were complete and the men who were to put them into service were already on their way. The question was where to put them when they arrived, and for the first time, the army officers in charge of Fort Worden faced a recurring problem: the post was chronically under-built, and there was a greater demand for building stock than had been planned for.

The only place for the new arrivals was the collection of light wood-frame boarding houses and outbuildings that had been put up by the Corps of Engineers and its contractors. They had served the...
men working on the fortifications and were now vacant. They were never intended to be more than temporary – as little more than shanties, they were not painted and the inside walls were not finished in anyway – however the army added to their number until all the features of a military post appeared on top of the hill. Barracks, mess hall, bakery, administration building, guardhouse and even a library clustered around the Ordnance Storehouse, which was the first permanent building of the new post. Even at that there was not enough accommodation for all of the soldiers, and some of them had to stay in tents until the permanent barracks were completed.

As presented in the pages of the *Port Townsend Leader*, there was immediate recognition that a new government installation would be a benefit to the city. There was certainly the advantage of a substantial payroll – that of the tradesmen putting up the buildings as well as that of the soldiers who would later occupy them – but there was also a good measure of civic pride in having as a neighbor what the paper promised to be one of the finest posts in the west.

The newsmen paid special attention to what was being built and steadily reported events ranging from the award of construction contracts to the final occupation of the buildings. What they saw impressed them both in terms of style and quality, making Fort Worden “perhaps the prettiest post in the country with an ideal location and everything favorable.” They could not have been surprised when an army official completing an inspection in 1904 “was lost in admiration when he saw the magnificent and complete buildings [that] included not only every convenience for the soldier but also a most liberal provision for his health and comfort.”

A reader of the time would likely be left with the impression that Fort Worden was something out of the ordinary and representative of a special commitment. That was not the case; the buildings going up at Fort Worden were fashioned from the standard plans of the army’s Quartermaster Department and were used on posts throughout the nation. The buildings represented a new commitment by the federal government to permanence and durability that had not characterized the facilities of earlier military reservations. That perspective was summed up in the army’s regulations of 1901. The direction of those regulations was that most military posts had been selected “for occupation as long as the Government shall exist” and that they were not only to be “made useful and healthful to the garrisons, but be made attractive homes for the Army by every means possible for the purpose.” Fort Worden and its sister installations regionally and nationally were expressions of that vision. The effect locally was transfiguring and by 1910, the post was on its way to having “more the appearance of a metropolitan city than a coast defense fortification.”

By the spring of 1904, 19 buildings had been completed, the product of a work force of some 150 carpenters, stone cutters and masons. The builders left a key in every lock in every door except the front; the front door keys were handed directly over to the post quartermaster. But nineteen buildings were not enough.

Two unanticipated circumstances altered the future appearance of Fort Worden. The first was the shift of the headquarters for the coast defenses of Puget Sound from Fort Flagler to Fort Worden. Fort Flagler seems to have been selected as the headquarters by military planners because of its central position in Admiralty Inlet and thus its valuable role in directing the course of a future defense of the waterway. That advantage aside, Fort Flagler was inconveniently located and difficult to get to, and the Port Townsend Chamber of Commerce began a concerted effort to persuade the army to change its mind, never an easy thing to do. In addition to noting the many advantages offered by shifting the headquarters to Fort Worden, the Chamber suggested that it had all been a mistake in the first place: the army officers in charge of laying out the defenses had used the wrong map. In the nation’s capital, Washington’s senators and members of Congress met with the Secretary of War and high-ranking officers, and whatever their arguments were, they were ultimately successful. By September, 1904, the headquarters were moved to Fort Worden.
That meant more officers, more men, more animals, and musicians – the headquarters came with a band. Work began on a band barracks, the quartermaster stable was remodeled to hold 20 animals instead of 12, and 75 feet were added to the end of the quartermaster storehouse, completed only a scant three months earlier.

The second circumstance was a changing view of the value of fortifications at Point Wilson as well as a separate investment in making the defenses more effective. Army planners had decided early on that Fort Worden would be a two company post – not more than 250 officers and men. But more batteries were added to strengthen the defenses, there was a new and elaborate system of aiming the guns, there were new searchlights and the power plants that came with them, there were newly-formed coast artillery units of the state militia coming for training, all of which meant that the years between 1904 and 1910 were a period of superheated construction. By 1908, Fort Worden was a six-company post that several years later numbered 900 officers and men, working and living in about 40 stoutly constructed one- and two-story wood frame buildings that rested on foundations of stone, brick or concrete and featured roofs of black slate. It was not enough.
By the end of the first decade of the 20th century, investment in the garrison posts of the national coast defense system was slowing, and local commanders would have to look beyond the appropriations of the Quartermaster Department to meet many of their building requirements. Some types of buildings were specialized and came from other parts of the army. The hospital was an example, being designed and funded through the Office of the Surgeon General, and several other army departments also supported the construction of dedicated buildings at Fort Worden. Improvisation was the rule for anything else.

One way to meet pressing needs was to modify what was already in use, with the result that a stables and wagon shed were converted to storehouses and a coal shed was modified to serve as an ordnance machine shop. Another solution was to adapt vacant buildings or use their lumber for new construction. The temporary buildings of 1902-03 sat unused on top of the hill, and by 1910 they had been converted to a number of storehouses, shops, sheds as well as an amusement hall. They would have been pressed into service earlier save for Col. George Grimes, Fort Worden’s commander in 1905, who denied the proposed relocation of one of the temporary buildings because it would have been out of harmony with the more handsome permanent structures.
An officer’s quarters mobilization building from World War I in a photograph dating to the 1920s or 30s. After the war, this building and ten others were retained as quarters for non-commissioned officers. All were removed in the 1950s except for the one shown here; it was relocated by the Department of Institutions to a site west of Alexander’s Castle and is now known as Bliss Vista. It is the only World War I mobilization building extant at Fort Worden.

The same army regulation that emphasized the attractiveness of army posts also gave direction about the appearance of the grounds. Shrubbery and trees were to be kept pruned, brush removed and vines, fruit and ornamental trees planted, and the grounds drained and ditched. Larger reservations were to be “stocked with game, and all native singing birds protected.” There does not seem to have been a formal landscape plan for Fort Worden although there were hints that the gist of the regulation had been heard: a fenced deer park was built in the vicinity of the future location of the balloon hangar, and trees and shrubs were planted around the newly seeded building sites. There was no need for any specific drainage improvements other than the cobblestone ditches that bordered one side of the roads. In retrospect, the cobblestone ditches seem an attractive feature but they were very unpopular with the troops at the time. In 1909, the post commander complained that they were kept constantly at work digging out grass from between the stones with a knife blade, a task that was “looked upon by the men as unnecessary, and produces discontent.”

After 15 years of developing the garrison post, Fort Worden had achieved a distinctive character marked by carefully spaced clusters of buildings that looked very much like a comfortable combination of neighborhood and college campus. All that would change with the 1917 entry of the United States into World War I.

There was little reason to fear a naval attack on Puget Sound, and in common with American coastal fortifications elsewhere, Fort Worden was expanded as a training facility for heavy mobile artillery. Two main areas were cleared, graded and made ready for the new buildings, some 75 in number, that would house the sudden influx of recruits. The first site was an L-shaped parcel that lay on the sloping ground to the north and east of the hospital, and the second was immediately west of the non-commissioned officers’ quarters. Additional buildings were placed where space allowed. The structures put up during the mobilization were simple one- and two-story wood frame single-wall buildings with gable roofs of asphalt shingles; barracks, separate lavatories and mess halls featured a continuous ridge ventilator. The uniformity of design that had contributed so much to the appearance of Fort Worden was altered by a wholly new category of building that came not from the heritage of permanence but from the new requirements of a national emergency.
After the war, the future of the nation’s coast artillery posts seemed dim. The military lessons of the conflict provided little support for the need for big guns in concrete fortifications to protect important harbors and sea-coast cities. Many installations – Fort Casey and Fort Flagler among them – were stripped of their troop assignments as the army shrank during the peace-time years of the 1920s and 1930s. Buildings were left to rot and many were torn down.

The contraction had little effect on the building stock of Fort Worden. It became an important regional training center for both the National Guard and units of the Reserve Officers Training Corps, not only on the big coast defense guns but also mobile anti-aircraft weapons and the automotive equipment associated with them. Most of the inventory remained intact and continuing uses were found for the original permanent buildings as well as the additions of the war years. For example, the double row of small officers’ quarters that extended north from Alexander’s Castle became quarters for non-commissioned officers. Certainly not all of the World War I mobilization buildings were retained, but it appears that many were, at least until 1931 when some were converted to other functions. That was the same year that the Red Cross Service Club, perhaps the most important building of the World War I era because of its central role in recreation at the post, was destroyed by fire. Its loss led to a campaign for its replacement, realized in 1932 with the completion of the War Department Theater (Building 25).

Another important construction event of the 1930s was the addition of a camp for the Civilian Conservation Corps. The first assignment of a CCC company to Fort Worden was in 1933, however a permanent camp was not built until 1935. It was a cluster of single-story buildings west of the non-commissioned officers’ quarters on a site now occupied by a campground. The same area also had been the location of a group of World War I mobilization buildings; it appears that the CCC constructed a wholly new complex and did not adapt the older facilities.
On the eve of World War II, Fort Worden constituted a collection of about 100 buildings, most of which had been built after 1915 and differed distinctly in appearance from those buildings erected prior to that year. Areas in the landscape that had been open originally were now filled with buildings, and the visual character of the post had shifted. Another infusion of mobilization buildings was about to work an even greater transformation.

Beginning in 1941 and in common with the massive military construction program all across the nation, a new category of building soon appeared at Fort Worden. These were the 700- and 800-series buildings that came to typify the army posts of World War II. They were similar in design and materials to the World War I mobilization buildings but they were larger, with the result that they took up much more land. The two-story barracks block was the most common version and there were other designs for other purposes as well. The buildings were put up on most of the same sites that were used during World War I, many of the surviving buildings of 1917 being torn down to make room for the new replacements. They also occupied the ball field behind the permanent barracks, the hillside around Alexander’s Castle and the area on the beach north of the Ordnance Machine Shop.
The military use of Fort Worden continued into the 1950s. More buildings were added and others were modified so that by the time the federal government left the post, there were more than 200 wood-frame structures. Only the immediate area of the parade ground was left unaltered; in other locations it was difficult to recall the army regulation of 1901 and its instruction that military posts be made attractive homes for their occupants. The permanent buildings that had been built before 1917 comprised less than 25 percent of the building inventory of 1951. What the local paper had once called “the prettiest post in the country” was still there for those who knew where to look but it would have been difficult to see past the clutter of decades of construction that had placed need and efficiency ahead of graceful architecture.

After standing empty in the middle years of the 1950s, Fort Worden would unexpectedly recover much of its earlier appearance beginning in 1955.

In that year, the Washington State Department of Institutions acquired a significant portion of the former military reservation and one that included most of the buildings. The plan was to establish a treatment center for youth, and the facilities selected for the center were almost exclusively the distinctively styled structures that dated from before the two world wars. Between 1959 and 1967, many of the later buildings were sold or demolished. The original barracks of the coast artillery companies were remodeled to serve as housing for boys and girls, and the hospital became a school and library. The former officers’ quarters became residences for the staff. The treatment center closed in 1971 and was acquired by the Washington State Parks and Recreation Commission.

At that time, Washington State Parks housed the newly-minted state historic preservation program (now the Department of Archaeology and Historic Preservation) and the agency director, who was also the State Historic Preservation Officer, emphasized the inclusion of those state parks that met the criteria for the State and National Registers of Historic Places. Fort Worden was listed in the National Register in 1974. The American Association of State and Local History, acting under a contract with the National Park Service, identified Fort Worden as a potential National Historic Landmark and prepared a nomination for the designation, which was made in 1976.

The World War II-era buildings were excluded from both the National Register and National Historic Landmark listing. They were of too recent a vintage, and would not reach the 50-year guideline for consideration until the 1990s. In 1991, the Department of Defense in conjunction with the National Park Service completed a nation-wide assessment of World War II mobilization buildings and concluded that they were significant for their design, construction and technological innovation. As a result of that finding, the mobilization buildings have been included in the scope of these guidelines for rehabilitation. Any future revision of the National Historic Landmark listing should include changing the period of significance from the existing 1898 to 1920 by extending it through the end of World War II in 1945.
Bibliography

Archival Sources
Department of Institutions, Fort Worden Diagnostic and Treatment Center, correspondence files, Washington State Archives

Record Group 77, Records of the Office of the Chief of Engineers, Fort Worden Historical Property Record, National Archives and Records Service.

Record Group 92, Records of Office of the Quartermaster General, Fort Worden Construction Correspondence, National Archives and Records Service.

Public Documents


Newspapers
Port Townsend Daily Leader

Port Townsend Morning Leader

Port Townsend Sunday Leader
The Secretary of the Interior’s Standards for Rehabilitation

The Department of the Interior and the National Park Service have provided leadership and guidance for the identification, evaluation and protection of historic properties for many years. To help determine the courses of action that could best ensure the retention of the distinctive character of many different kinds of historic properties, the Secretary of the Interior created the Standards for the Treatment of Historic Properties.

The Standards address several different treatments, and the one that is most applicable to work at Fort Worden is the standard for rehabilitation. The Standards define rehabilitation as “the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values.”

The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and the interior, related landscape features and the building’s site and environment as well as attached, adjacent, or related new construction. The Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

Although the Standards originate with the federal government and are employed most often in conjunction with federally-owned historic properties or federal programs, they are in use throughout the United States by cities, counties and states. The value and the flexibility of the Standards led to their adoption by the Washington State Parks and Recreation Commission under its Cultural Resources Management Policy (2004).

The Secretary of the Interior’s Standards for Rehabilitation, from Title 36, Code of Federal Regulations, Part 68 (36CFR68), follow below, with comments illustrating how the standard has been applied at Fort Worden.

1. “A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.”

   A good example at Fort Worden is the use of the officers’ and non-commissioned officers’ quarters as vacation housing. Both types of buildings were intended to be occupied by families, the major difference now being in the length of stay. Most of the changes have been limited to kitchens and baths, rooms that often undergo revision in the life of a residence.

2. “The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.”

   A good example at Fort Worden is the rehabilitation of one of the barracks, Building 204. New uses such as the restrooms and an elevator were added carefully so that the major historic spaces of the building remained undisturbed.

3. “Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.”

4. “Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.”

   A good example at Fort Worden is the enclosed porches on the rear of the officers’ quarters. Constructed originally as open porches, they were framed in and sided before Word War I and they have become an element that contributes to the historic appearance of the homes.
5. “Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.”

A good example at Fort Worden is the effort to retain early and distinctive sidewalks. When trenching for new utility systems intersected the sidewalk next to Building 223 (former Post Headquarters and now Centrum’s administrative office), the sidewalk was carefully lifted, placed aside, and then returned to its original position when the work was completed.

6. “Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.”

A good example at Fort Worden is the replacement of the original roofing slate with new slate. No substitute material has the look of slate or its durable quality, and the slate roofs of Fort Worden are an important and distinctive feature of the historic district.

7. “Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.”

A good example at Fort Worden is what was not done during the rehabilitation of Alexander’s Castle. Cleaning brick buildings is a common part of their rehabilitation, often in an effort to make them look newer, but project managers decided that it was not necessary or appropriate at Alexander’s Castle. The harsh effects of water blasting are still visible on the Band Barracks (Building 205).

8. “Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.”

A good example at Fort Worden was the inadvertent discovery of an archaeological feature during the excavation for the foundation of the Commons. It appeared to be the remnant of a wicker panel of the type used to build trenches during World War I. It was documented and work to complete the foundations continued.

9. “New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.”

A good example at Fort Worden is the addition of the Commons. A large and modern structure, its design and location were carefully considered to ensure compatibility with the historic property.

10. “New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.”

A good example at Fort Worden is the addition of a sheltered entry to Building 502 (former Ordnance Machine Shop and now a classroom for the Marine Science Center). The construction of the shelter did not alter the historic qualities of the building, and should the entry be removed, the building would look as it did before the shelter was added.
Introduction to the Guidelines

The Guidelines for Rehabilitating Historic Buildings were initially developed in 1977 to help property owners, developers, and federal managers apply the Secretary of the Interior's Standards for Rehabilitation during the project planning stage by providing general design and technical recommendations. Together with the Standards for Rehabilitation, they provide a model process for those with an interest in or responsibility for the continued use of important historic properties.

The Fort Worden Guidelines for Rehabilitation are intended to assist in applying the Standards to projects at Fort Worden and they may not be very helpful in other instances. The guidelines do not anticipate all possible circumstances and try to anticipate generally. Reflecting the Secretary’s Standard, the guidelines are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility. Additionally, the National Park Service Technical Preservation Services maintains a series of preservation briefs, technical notes, and technical reports to guide treatment of particular features (www.nps.gov/history/hps/tps/). Examples of preservation briefs include: Repair and Thermal Upgrading of Historic Steel Windows, Use of Substitute Materials on Historic Building Exteriors, and Preparation and Use of Historic Structure Reports. The Association for Preservation Technology also maintains an on-line archive of “Practice Points”, a series of instructional articles on the latest advances in preservation technology (www.apti.org/publications/practice-points.cfm). These materials and others should be referenced to ensure that any preservation project uses the most up to date preservation practices.

Supplementing the guidelines is the Individual Resource Statement. The Individual Resource Statement outlines which character-defining features of a historic building are the most intact and should be preserved, and which features are the most altered and would probably be least impacted by a new use. Six properties were selected by the park manager to be covered by the statements: Buildings 7, 202, 225, 298, 304 and 305. They were chosen because they represented a variety of types and (with the exception of Building 7) were the subject of current discussions about reuse potential. Individual Resource Statements provide a format for collecting useful information in a single document and should be prepared for all historic properties at Fort Worden.

The Guidelines pertain to historic buildings of all sizes, materials, occupancy and construction types; and apply to interior and exterior work as well as new exterior additions. Those approaches, treatments, and techniques that are consistent with the Secretary of the Interior’s “Standards for Rehabilitation” appear under the “Recommended” section in each topic area; those approaches, treatments, and actions which could adversely affect character are listed in the “Not Recommended” section.

The "Recommended" courses of action in each section are listed in order of historic preservation concerns so that a rehabilitation project may be successfully planned and completed -- one that, first, assures the preservation of a building's important or character-defining architectural materials and features and, second, makes possible an efficient contemporary use. Rehabilitation guidance in each section begins with protection and maintenance, that work which should be maximized in every project to enhance overall preservation goals. Next, where some deterioration is present, repair of the building's historic materials and features is recommended. Finally, when deterioration is so extensive that repair is not possible, the most problematic area of work is considered: replacement of historic materials and features with new materials.

Character-defining is a term that refers to the visual cues in a property that help us recognize it as historic. It can be something as large as the size and shape of a building or as subtle as the contour of the picture molding. The shape of the windows, the arrangement of the interior rooms, the construction materials, even original door knobs and hinges are all character-defining features and altering or removing them reduces the integrity or wholeness of an historic property. If there are too many changes to the features, the property can lose its historic identity. Rehabilitation often results in alterations to character-defining features, and the Guidelines emphasize the importance of keeping the modifications to a minimum.
The Guidelines also refer to the **period of significance**. The period of significance is the length of time that the property was actively associated with the events, persons, or trends that enabled it to satisfy the criteria for listing in the National Register of Historic Places. As stated in the building history narrative, the period of significance established for Fort Worden in the 1974 National Register nomination as well as the later National Historic Landmark designation is 1898 to 1920. Because many World War II buildings are now considered eligible for listing, the period of significance should be considered to extend through 1945. Many of the buildings constructed in the 1940s have been removed, and as a result the historic district today has an appearance that is similar to an earlier period that ended about 1917.

To further guide the owner and developer in planning a successful rehabilitation project, those complex design issues dealing with new use requirements such as alterations and additions are included at the end of each section to underscore the need for particular sensitivity in these areas.
How to Use the Guidelines

IDENTIFY, RETAIN, AND PRESERVE

The guidance that is basic to the treatment of all historic buildings -- identifying, retaining, and preserving the form and detailing of those architectural materials and features that are important in defining the historic character -- is always listed first in the "Recommended" area. The parallel "Not Recommended" area lists the types of actions that are most apt to cause the diminution or even loss of the building’s historic character. Remember, however, that loss of character is just as often caused by the cumulative effect of a series of actions that individually may seem to be minor interventions. Thus, the guidance in all of the "Not Recommended" areas must be viewed in that larger context, e.g., for the total impact on a historic building.

PROTECT AND MAINTAIN

After identifying those materials and features that are important and must be retained in the process of rehabilitation work, then protecting and maintaining them are addressed. Protection generally involves the least degree of intervention and is preparatory to other work. For example, protection includes the maintenance of historic material through treatments such as rust removal, caulking, limited paint removal, and re-application of protective coating; the cyclical cleaning of roof gutter systems; or installation of fencing, protective plywood, alarm systems and other temporary protective measures. Although a historic building will usually require more extensive work, an overall evaluation of its physical condition should always begin at this level.

REPAIR

Next, when the physical condition of character-defining materials and features warrants additional work repairing is recommended. Guidance for the repair of historic materials such as masonry, wood, and architectural metals again begins with the least degree of intervention possible such as patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading them according to recognized preservation methods. Repairing also includes the limited replacement in kind – or with compatible substitute material -- of extensively deteriorated or missing parts of features when there are surviving prototypes (for example, brackets, dentils, steps, plaster, or portions of slate roofing). Although using the same kind of material is always the preferred option, substitute material is acceptable if the form and design as well as the substitute material itself convey the visual appearance of the remaining parts of the feature and finish.

REPLACE

Following repair in the hierarchy, guidance is provided for replacing an entire character-defining feature with new material because the level of deterioration or damage of materials precludes repair (for example, an exterior cornice; an interior staircase; or a complete porch). If the essential form and detailing are still evident so that the physical evidence can be used to re-establish the feature as an integral part of the rehabilitation project, then its replacement is appropriate. Like the guidance for repair, the preferred option is always replacement of the entire feature in kind, that is, with the same material. Because this approach may not always be technically or economically feasible, provisions are made to consider the use of a compatible substitute material.

It should be noted that, while the National Park Service guidelines recommend the replacement of an entire character-defining feature under certain well-defined circumstances, they never recommend removal and replacement with new material of a feature that, although damaged or deteriorated, could reasonably be repaired and thus preserved.
DESIGN FOR MISSING HISTORIC FEATURES

When an entire interior or exterior feature is missing (for example, an entrance or a principal staircase), it no longer plays a role in physically defining the historic character of the building unless it can be accurately recovered in form and detailing through the process of carefully documenting the historical appearance. Where an important architectural feature is missing, its recovery is always recommended in the guidelines as the first or preferred, course of action. Thus, if adequate historical, pictorial, and physical documentation exists so that the feature may be accurately and reasonably reproduced, and if it is desirable to re-establish the feature as part of the building's historical appearance, then designing and constructing a new feature based on such information is appropriate. However, a second acceptable option for the replacement feature is a new design that is compatible with the remaining character-defining features of the historic building. The new design should always take into account the size, scale, and material of the historic building itself and, most importantly, should be clearly differentiated so that a false historical appearance is not created.

ALTERATIONS/ADDITIONS TO HISTORIC BUILDINGS/NEW STRUCTURES

Some exterior and interior alterations to an historic building are generally needed to assure its continued use, but it is most important that such alterations do not radically change, obscure, or destroy character-defining spaces, materials, features, or finishes.

Alterations may include providing additional parking space on an existing historic building site; cutting new entrances or windows on secondary elevations; inserting an additional floor; or installing an entirely new mechanical system. Alteration may also include the selective removal of buildings or other features of the environment or building site that are intrusive and therefore detract from the overall historic character.

The construction of a new structure or an exterior addition to an historic building may seem essential for a new use, but the guidelines emphasize that such new structures or additions should be avoided, if possible, and considered only after it is determined that needs cannot be met by adapting an existing structure or by altering secondary, non character-defining interior spaces, within an existing structure. If, after a thorough evaluation of interior solutions, an exterior addition or a new structure is still judged to be the only viable alternative, it should be designed and constructed to be clearly differentiated from historic buildings and so that the character-defining features are not radically changed, obscured, damaged, or destroyed.

SUSTAINABILITY/ACCESSIBILITY/SAFETY AND HEALTH CONSIDERATIONS

These sections of the Guidelines for Rehabilitation address work done to meet accessibility requirements and health and safety code requirements; or retrofitting measures to conserve energy. Although this work is quite often an important aspect of rehabilitation projects, it is usually not a part of the overall process of protecting or repairing character-defining features; rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to radically change, obscure, damage, or destroy character-defining materials or features in the process of rehabilitation work to meet code and energy requirements.

The approach recommended in these guidelines is that all three considerations – historic preservation, accessibility, and sustainability are important. Historic preservation is the process through which the hard work is done to find solutions that don't compromise any of these goals. In those rare circumstances where no solution that satisfies all three needs is feasible, the State Parks Historic Preservation Officer or other designated preservation official will work with the facility manager to develop an appropriate compromise.
INTERPRETATION OF GUIDELINES AND PLAN REVIEW

The State Parks Historic Preservation Officer (SPHPO) should provide on-going interpretation and plan review for proposed projects until such time as a Commission-approved non-profit management entity appoints a qualified on-site preservation official to fulfill this function. Alternatively, the Commission may appoint a qualified on-site preservation official prior to approval of a non-profit management entity. The qualifications for the on-site historic preservation official should be agreed upon in a Memorandum of Understanding or other formal agreement between the Commission and the non-profit management entity.

Appointment of an individual, as opposed to a committee, is preferred to promote responsive, timely and predictable decision-making. A review committee may be formed at the discretion of the SPHPO or appointed on-site preservation official, but should only serve in an advisory capacity.

State Parks should develop a formal process for review and approval of proposed new construction and rehabilitation projects at Fort Worden. Agency staff should prepare this process for approval by the Director within about six months of Commission adoption of the Guidelines for Rehabilitation. The approved process should include a “pre-application meeting” where the SPHPO or on-site historic preservation official can meet with a project proponent and identify any technical investigation necessary to proceed (e.g., Historic Structure Report, see National Park Service Preservation Brief #43) and establish review requirements, schedule, and other considerations related to the proposed project.

The approved review process should also set a series of review thresholds based on a project’s magnitude and the extent of change to historic structures, landscapes, or small-scale features expected to result. This should include a minimum threshold under which no formal review is necessary for work completed by someone with basic training in historic preservation (e.g., routine maintenance and minor improvements). Intermediate and higher thresholds requiring review by the on-site historic preservation official, SPHPO, the Commission, or others should also be established where helpful in fostering predictability, efficiency, or timeliness of review while ensuring the park’s historical integrity is preserved.

REVISIONS/ADDITIONS TO THE GUIDELINES

Historic preservation is not a static endeavor. The Guidelines for Rehabilitation will likely require revision to reflect significant changes in the Commission’s historic preservation policies, accepted preservation practices, accessibility requirements, and other mandates, or to correct any errors or omissions. Putting the guidelines into actual practice may also reveal situations where additional or more refined guidance on appropriate rehabilitation is necessary or where guidelines lead to an erroneous result.

To ensure they retain their usefulness and remain state of the art, the guidelines should be reviewed on a two-year cycle. As part of regular review, the Fort Worden State Park Manager or non-profit management entity should solicit input from stakeholders (e.g., Advisory Committee, Partners, and City departments/boards) and transmit proposed amendments through the historic preservation officer (either the SPHPO or on-site preservation official) to the State Parks Director and ultimately to the Commission for approval. Commission approval will require an opportunity for public comment as well as environmental review in compliance with SEPA.

Any amendment of the guidelines will require close coordination with the City of Port Townsend, particularly once the City adopts the guidelines into its zoning code as envisioned. Proposed amendments may require separate approval by the City. Amendment of the guidelines will also include consultation with the National Park Service National Historic Landmark Program to ensure consistency with and retention of Fort Worden’s National Historic Landmark designation.

In extraordinary circumstances, changes to the guidelines necessary to respond to an emergent issue/need may be proposed for Commission approval outside of the regular review cycle.
Site and Landscape
Introduction

Most Guidelines for Rehabilitation in this document focus on building details – windows, roofs, mechanical systems and so on. Equally important is the building site, which means not only the area immediately surrounding the building but the broader collection of natural and designed features that constitute the setting for the architectural elements. How these features are organized, how they connect with each other and how they have evolved over time constitute the cultural landscape. The cultural landscape is the physical record of human impact on the land. It too conveys significance, and its preservation and rehabilitation is part of the stewardship of Fort Worden as a historic district.

The concept of the cultural landscape has developed to the extent that it has its own set of distinct guidelines within the larger Secretary of the Interior’s Standards for the Treatment of Historic Properties. Those guidelines were being developed as the Presidio guidelines were being written. Drafts of the guidelines for cultural landscapes were available to the authors of the Presidio guidelines and much of the sense of the drafts was incorporated into the Presidio text. In their final form (available on the National Park Service cultural resources web site), the National Park Service cultural landscape guidelines are applicable across a broad range of landscape types, and tend to emphasize what we would recognize as traditional landscapes rather than the specialized landscape of an early 20th century military post.

For that reason, the authors of the Fort Worden Guidelines for Rehabilitation have opted to use the older Presidio guidelines as a starting point. They are helpfully specific. The treatment emphasis is on preservation and the need to identify, retain and protect since those actions seem the most appropriate for the conservation of cultural landscape elements. Unlike other topical divisions of the Fort Worden Guidelines for Rehabilitation, repair and replacement do not have their own sections and instead are included in the general guidance text.

The treatment options for cultural landscapes are preservation and rehabilitation. While significant changes in use can be accommodated, the character of the Fort Worden landscape is sensitive to change, and inappropriate decisions can erode its exceptional historical integrity.
Natural Systems – General

Natural systems include topography and vegetation, each of which is treated separately. There are some general considerations that apply broadly.

RECOMMENDED

Identify the natural systems of the site. Consult with federal, state, and local natural resource agencies and compile existing inventories that identify rare, threatened or endangered species, unique or natural communities or other environmentally sensitive resources and systems.

Evaluate existing or potential threats to natural resources before undertaking any work.

Protect the subsurface geological and hydrological systems. Consider the restoration of hydrological or geological features that have been covered over.

Protect natural drainage areas and swales.

Minimize access, traffic and development in areas that are the habitat of sensitive species.

Provide boardwalks or alternative designs to protect sensitive areas such as sand dunes from heavy public use.

NOT RECOMMENDED

Protecting one landscape feature or system without considering the effect on others; for example, installing barriers that control one natural system but that cause damage to other landscape elements.

Introducing into environmentally sensitive areas new construction or intensive uses that cause an adverse effect on important natural features.

Allowing heavy equipment, debris, contaminated runoff or similar activities to damage sensitive natural features.

Disturbing the ecological balance by insensitive grading, digging, plant collecting or introducing inappropriate vegetation.

Locating and constructing new additions or site features in a way that adversely affects natural systems and features.
Natural Systems – Topography

The topography of Fort Worden is characterized by the Point Wilson sand spit, the high ground to the west of the spit (often called Artillery Hill although the term does not appear to have been used historically), the gentle gradient occupied by the post buildings, and the moderate slopes of the western boundary that merge with the Chinese Gardens wetland. On the north, a sheer bluff in excess of 200 feet in height drops to the narrow beach below, on the shoreline of the Strait of Juan de Fuca.

At the time the federal government acquired the property, the sand spit was marked by dunes, grasses and a forested area that extended east from the foot of the bluff. There was also a small lake at the northern margin of the foot of the bluff. Army engineers built a complex of service related buildings at the shore end of a wharf and sometime later, a rifle range was built nearby. Both of these uses required leveling the dunes, removing much of the forest and filling in the lake. After World War II, most of the remaining dunes were leveled to allow for the storage of an extensive inventory of amphibious equipment.

The top of high ground was extensively altered by the construction of the fortifications and associated structures, and few natural contours remained. Construction sites for gun and mortar batteries were excavated and then back-filled; the area to the front of the batteries was graded flat with a gentle slope toward the head of the bluff. Elsewhere, berms and depressions were created to hide other buildings from view.

Prior to its acquisition for military use, the general area of what would become the parade ground was in use as a pasture. Photographs show it to have much the same topographical character with its shallow trough shape and slight roll from east to west and a significant depression at its western extremity. These natural lines were graded and the western depression filled to achieve its present appearance. Flanking the parade ground, terraces were constructed for building sites. During World Wars I and II, the area behind the hospital was also graded for additional roads and building sites.

Today, most of the historic changes to the topography are intact. Some dunes on the sand spit have been reconstructed by State Parks although it as a whole appears as a generally flat expanse. Almost no changes have been made to the topography on top of the hill or in the garrison area.
RECOMMENDED

Identify historic and existing conditions and any immediate or potential threats to the stability of the topography.

Identify and protect known and potential archaeological features or sites.

Arrest conditions that contribute to topographic instability in a manner that retains the historic character. For example, provide adequate drainage access and erosion control so that landforms do not erode.

Preserve natural as well as designed grades.

Design new features such as paths and ramps, if required, in a manner that is unobtrusive and that preserves the historic character.

NOT RECOMMENDED

Stabilizing soils in a manner that alters the historic character.

Constructing new additions in a manner that severely alters the historic grade, such as significant cutting and filling.

Regrading the site to provide new circulation or access when it is not compatible with the historic character.

Radically altering the spatial character of the topography, such as changing the character of the slope through terraced garden development.

Failing to maintain drainage systems and to install new ones if required such that erosion or damage to landforms results.
Natural Systems – Vegetation

A forest typical of western Washington – mixed conifers interspersed with deciduous trees – covered most of the high ground west of Point Wilson and the sand spit supported its own forest cover. A few acres appear to have been cleared in association with the construction and occupation of Alexander’s Castle. The area of the future parade ground is believed to have been a natural prairie.

With acquisition of the property by the military, and perhaps beginning before that time, logging removed much of the merchantable timber and a good deal more was converted to cord wood to feed the fires of the many steam engines employed during the construction of the fortifications. There was some reforestation during the same period, and native grasses were planted in disturbed dunes, but the extent is not known. In the years subsequent to construction, much of the natural vegetation in undeveloped portions of the post re-established itself. These forested areas were also used for troop training.

The military introduced new plant materials but there does not appear to have been a formal landscape plan. Early photographs of the post show an extensive expanse of grass but little else. Over time, more plant materials appear in these images amounting to an occasional holly tree or rose bush but little else. During the 1930s, photographs show the results of individual gardeners in the area of the World War I officers’ quarters (then in use as non-commissioned officers quarters and now removed) but nothing that constituted an integrated post-wide landscaping effort. There may have been more than one attempt to plant trees bordering the parade ground. Early views show staked saplings in the area, yet photos taken decades later depict trees that seem unaccountably small for their presumed age. It is possible that the present parade ground trees were planted in the late 1930s or early 1940s. The many poplars were planted at the end of World War II or soon thereafter.

A photo of Alexander’s Castle dated to 1898 depicts a greenhouse on the south side and what appears to be an orchard nearby. The greenhouse appears to be in disrepair, and it is not known if it was part of the Rev. Alexander’s original design or if it was an addition made by a later owner. Once the building was in army ownership, the greenhouse was removed and replaced by a porch. Still later, the army constructed a greenhouse behind officers’ row. Given its location, the greenhouse may have had more to do with the beautification of the officers’ homes than a more comprehensive landscape scheme.
Fruit trees – apple, cherry and a single pear tree – also appear as a continuation of what seems to have been a largely informal approach to landscaping. Some of these examples may well have sprouted from seeds transported by birds or animals rather than the result of a human endeavor. Most seem to be from a period no earlier than World War II and perhaps much later. Grasses were planted on all the grades and disturbed soils associated with the post buildings, fortifications and related structures.

Today, native plant materials predominate. On the western portion of the park, there is a well-established growth of tall slender firs interspersed with cedar, alder and ash; the sub-story is composed of such shrubby plants as ocean spray, snowberry, salal, elderberry, huckleberry, thimbleberry and several varieties of ferns and blackberries. To this mix can be added at higher elevations a significant population of madrone, and in and around the disturbed areas of the fortifications there are patches of bitter cherry as well as big leaf maple and willow of considerable size. There are also scattered examples of mountain ash, holly and hawthorne.

Only a small stand of firs survives on the sand spit, and the dunes support a number of groundcovers associated with the beach environment. Large and small-scale native plants have grown over most of the grass-seeded slopes on top of the hill.

Poplars and other ornamental deciduous trees are common throughout the building complex, as are mature firs. A rhododendron garden occupies the space between the former Chapel and the Theater. The Commanding Officer’s Quarters has been given foundation plantings that recall plant materials characteristic of the early 20th century. Foundation plantings elsewhere are more contemporary and diverse.

**RECOMMENDED**

Research the history of the landscape as a whole, and in particular, the history, location, species and character of the vegetation, and its relationship to other landscape features.

Identify, protect, restore and enhance undisturbed native plant communities, taking into account the possible presence of sensitive species and possible habitat enhancement opportunities.

Identify and retain the historic, character-defining form, arrangement and species of vegetation through regular and cyclical maintenance. For example, maintain the appropriate height and shape of foundation plantings through pruning or removing volunteer or invasive plant material.

Control pedestrian and vehicle traffic across planted areas by providing appropriate barriers or alternative routes to minimize deterioration of plant material.

Protect vegetation from damage or destruction from adjacent activities such as construction. Protect root systems below ground from grading or soil compaction.

Replace vegetation when necessary with suitable plant material that replicates the intent and function of the historic vegetation feature, including the possible replacement with the same genetic stock material.

Replace vegetation with mature stock when feasible to maintain uniformity with neighboring trees and shrubs.

Evaluate the condition of vegetation to determine appropriate maintenance practices such as pruning, integrated pest management or environmentally sensitive fertilization.

Identify and investigate historic methods of vegetation maintenance and consider them where appropriate.

Consider adding vegetation features to screen visually intrusive, non-historic elements or new construction. New vegetation features need to be compatible with the historic character of the landscape.
Plant replacement trees in an alternative location when the historic trees are missing and the original location is technically or environmentally unsuitable. For example, plant a replacement tree farther away from the historic building if the original location caused damage to the structure. The new location should be as close as possible to the original and should preserve the relationship between the planting and the built elements.

Use water-conserving methods when irrigating the landscape: use reclaimed water, minimize evaporation from wind and sun by watering at appropriate times of the day, and use the most effective watering techniques.

**NOT RECOMMENDED**

Allowing vegetation to grow beyond its intended design scale such that it alters the character of the landscape.

Pruning a tree excessively and without regard for its health or shape, particularly when trimming to retain or secure a view.

Replacing a deteriorating vegetation feature with inappropriate plant material such that an inaccurate historic appearance or inconsistent design is conveyed.

Introducing an incompatible new vegetation feature, such as planting annuals where they were never used historically so that an inaccurate historic appearance is presented.

Replanting replacement trees in an alternative location when the original location is usable.

Planting new vegetation in a character-defining vista, open field or lawn such that the historic character of the site is diminished.

Adding new vegetation where it would not have existed historically, such as window planters or vegetable gardens.

Selecting a restoration period for the landscape and its vegetation features that presents a time frame than its associated historic resources or conversely, restoring a building to a different period than the landscape.

Planting screening vegetation too close to utility structures so that access is diminished.

Locating replacement trees in a historic location that is environmentally unsuitable so that damage occurs to the trees or nearby structures.
Natural Systems – Views and Vistas

The military value of the high ground at Point Wilson was recognized before the Civil War when portions of the site were retained by the federal government for future defense needs. Its elevation of almost 300 feet gave it superb views extending from the western end of the Strait of Juan de Fuca, over Admiralty Inlet and south to Puget Sound.

When the post was constructed many years later, the buildings of the garrison were laid out along the perimeter of an existing open area that had a broad and unrestricted view to the east and Whidbey Island. The plan for the post created a significant view across the parade ground with the barracks of the enlisted soldiers facing the quarters of the officers. One of the considerations for siting of the hospital was that it have a view of the water, and elsewhere in the park the views of the defended waterway from the fortifications is one of the most historically significant.

Most important views and vistas remain intact although some are obscured by large and small scale vegetation. The reduction of the view-scape is particularly notable on the hill where decades of plant growth have in many locations completely shut off sight of the water.

RECOMMENDED .................................................................

Identify the historic and existing views of the property, both distant and close-range, and the landscape features associated with them. Ensure their retention and the retention of the historical relationship to each other.

Retain historic views through the control or removal of invasive or volunteer plant materials or by pruning overgrown vegetation that obscured the historic view.

Enhance views, especially historic views, by removing non-historic site elements.

Identifying important views and keeping them free of obstructing vegetation is an important part of maintaining the character of the historic district.
NOT RECOMMENDED

Allowing historic vistas to be altered or lost through incompatible development or inadequate maintenance and control of vegetation.

Locating new additions in areas that block views important to the historic character of the landscape.

Altering visual connections that are important to the spatial character of the landscape by removing key elements, screening important views or constructing visual barriers or intrusions.

Exposing non-historic views through the removal of extant vegetation.

Changing the visual orientation or directional axis of an area or view-shed.

Spatial Organization

The relationship of the landscape to one another and to the topography establishes the three-dimensional organizational patterns of Fort Worden. The placement of buildings, building clusters, plant material and site objects create spatial sequences much like the rooms of a house. The spatial organization is readily recognizable around the parade ground with the barracks and quarters facing each other on the north and south sides and the theater anchoring the western edge. The placement of buildings at Fort Worden was heavily influenced by the few roads already in place when construction began on the fort and the platted streets of the City of Port Townsend that were incorporated into the military reservation by purchase.

RECOMMENDED

Identify the historical spatial relationships and related features and materials as part of an overall site analysis prior to undertaking physical work, particularly with regard to building clusters or groups.

Identify features and materials that constitute the spatial relationships of the landscape, and protect them from alteration or loss.

Retain important visual connections between spaces within the landscape by maintaining vegetation, roads, paths and topography that define the visual relationships.

Reestablish vanished spatial relationships by replacing the components that historically shaped the landscape spaces. For example, replace a significant but missing row of trees or a section fence.

NOT RECOMMENDED

Removing, moving or altering features that define the spaces in a landscape such that the historic spatial relationship between features is changed.

Changing existing or creating new spatial divisions of the landscape that contribute to its historic character, such as topographic changes or vertical and horizontal elements such as vegetation, fences or walls.

Placing or designing new additions in a way that affects the spatial relationships of the landscape, such as locating new construction in a character-defining open space (e.g. area historically cleared for some purpose or natural open area retain for some purpose).
Circulation

The circulation system is the way that people and materials move through the park along roads, walks and paths. The organizational pattern, grade, width, edge condition and paving material all contribute to the character of the circulation system. Modifications to the system should respect historically established corridors and the hierarchy between the many roads and paths.

The circulation system at Fort Worden includes roads, sidewalks and trails; historically it also included railroad and a marine connection. It was a big task to organize and implement a network that would allow hundreds of men and a constant stream of supplies to move to every part of the complex, especially in the era before motorized vehicles when walking was the chief means of getting from one point to another.

Formal concrete sidewalks replaced earlier wooden boardwalks and most important roads were flanked by sidewalks. The first sidewalks are distinguished by a distinctive surface pattern that is a character-defining feature. One important walk connected the garrison area with the fortifications on the hill; it ran north from the vicinity of Alexander’s Castle and was carried on a trestle to the top of the hill. Later sidewalks, often more narrow than those of the early post period and without the distinctive surface pattern, were constructed during World War II.

By the 1880s, an extension of Cherry Street ran from Port Townsend into the area of what would become Fort Worden and continued up to the high ground behind Point Wilson. Another road led south from the Eisenbeis brick plant to a point near the present dock where it divided: one branch led along the beach and continued into town and the other led up from the beach and turned inland where it intersected the wagon track of Cherry Street. This same road branched with a fork that led to the upper hill.

The existing road network provided the circulation framework for the garrison area plan of Fort Worden. The roads (with the exception of the beach track) were retained and improved. The roads outlined in the city plat were constructed as part of the development of officers’ row and defined the southern margin of the parade ground. The east-west road defined the northern margin and established the alignment for the barracks. The roads were crowned and graded, and bordered on one side by a cobblestone gutter.

During the years of use by the military, more roads were added and earlier roads were often improved. Typically roads were made wider, grades were reduced, and paving changed from compacted gravel to asphalt.

A narrow-gauge railroad operated briefly during the construction of the fortifications. It ran from the dock and up the face of the bluff, and then extended to the several construction sites at the top of the hill. The tracks were removed when the work was complete and often the rail beds were then used as roadways.
The rails remained intact in the vicinity of the dock where they served as a tramway that connected the various warehouse and shop buildings in the area. Because of the distance between the dock and the top of the hill, there was some interest in creating an electric railway to help move supplies, but it remained an idea only.

The engineer dock was the first structure built by the military at Fort Worden. It provided the connection necessary for the transshipment of goods and supplies from vessels for the construction of the fortifications. It was joined in 1910 by the quartermaster dock which took on much of the day-to-day business as serving as the marine terminal of the post. The docks and pilings were frequently repaired, being subject to damage by both storms and marine organisms. In 1943, the engineer dock was removed and the quartermaster dock was rebuilt, being then referred to as the post wharf.

Today much of the original circulation system is intact and in use. Sidewalks continue to serve park visitors as they did soldiers a century ago and the network of concrete sidewalks is unchanged. The walk to the hill that was carried on trestles is no longer extant, although a set of concrete steps that was part of the route is still in place near Building 277. The trail that traversed the bluff is still intact and is now accessed by the concrete steps.

The historic road net is little changed. Most of the differences are on the top of the hill as disused roads have become trails or have disappeared altogether; perhaps surprisingly, a small section of cobblestone gutter remains intact along the road immediately to the east of Memory’s Vault. Based on period site plans, a large number of unimproved roads were built during the period 1940 – 1953, and almost all have reverted to forest. The sole reminders of the railroad are segments of the road pattern on top of the hill and the grade for the incline up the bluff face. The latter is heavily overgrown but easily discernable at several locations.

The post wharf is in use for boating and as the site of the Marine Science Center. Its presence reinforces the importance of marine access in the history of Fort Worden and also helps to reinforce the industrial character of the historic buildings constructed in the vicinity. Low tides reveal the remnant pilings of the earlier wharves.
RECOMMENDED

Identify and preserve the hierarchy of circulation paths. Primary and secondary routes each have their own character-defining features.

Identify and preserve the experiential nature of the circulation system and its sequence of approach, arrival and entry. Any new design that changes the historic circulation system, such as the provision of barrier-free access, should preserve the historic character of the sequential experience.

Identify related features – such as retaining walls, fences, hedges, rocks, borders, light fixtures, curbs, gutters and ditches – that define enclose or support historic roads and paths and therefore contribute to the character of the circulation system.

Limit the introduction of new paths and access points such as curb cuts and driveways. Reuse, re-establish and restore character-defining circulation routes and features as the landscape may be modified for contemporary use. Follow historic and established trails in providing paths between areas where sensitive resources are not affected.

Control use on historic roads and paths so that damage to historic materials and features is minimized.

Protect the remnants of partially lost historic circulation features for their archaeological value.

Retain the historic spatial and functional relationship of the road corridor by maintaining the massing of adjacent vegetation, topographical features, vistas or other associated features.

Protect the historic roads and paths from erosion by providing adequate drainage and keeping the system in good working order. Where not otherwise hazardous, retain the historic drainage systems adjacent to roads and paths even when they have been superseded by more modern drainage systems.

Retain historic edge features during resurfacing by maintaining the historic finish elevation of the road or grade of the path.

Retain historic surface materials. Repair existing materials whenever possible. If replacement is necessary, replacement material should be compatible in color, texture, composition and scale. Some historic surface materials and site features are buried below later surface materials, the cobblestone gutters being a good example. These features should be exposed when feasible.

Provide the highest level of barrier-free access to the historic landscape with the lowest level of impact by carefully selecting areas where the least alteration to historic features and materials is required. Study a range of alternatives in order to provide access while minimizing any adverse impacts.
Convert historic road corridors to pedestrian and bicycle use when no longer necessary for vehicular use.

Considering use of “Grasscrete” or other similar engineered pervious surfacing for overflow parking areas to preserve the appearance of formal landscapes.

**NOT RECOMMENDED**

Neglecting historic circulation patterns in planning building activities or new landscaping over historic paths.

Removing or paving over historic edge materials or adding additional height or thickness of paving that alters the relationship between the road surface and edge materials.

Patching with materials that do not match the historic surface, such as repairing a brick walk with asphalt.

Neglecting historic circulation patterns in planning new routes rather than reusing or modifying historic paths. Examples would include providing barrier-free access by removing or paving over steps in a historic path or by insensitively regrading a character-defining slope.

Using a constructed berm or terrain feature as a source of dirt fill.

Paving over a historic path with a new, incompatible material instead of preserving its historical character.

Painting pavement, except to define parking or traffic requirements.

Upgrading historic roads and paths to modern standards by removing historic features such as curb stones, drainage systems and surface materials.

Adding new roads, paths or parking areas when historic ones could be used.

Adding additional height or thickness of paving that alters the relationship between road surface and edge materials.
Small-scale Features

It is easy to forget the many small elements that help complete Fort Worden as a cultural landscape. Fences, street lamps, retaining walls and other modest structures bring a unique texture to the more easily recognizable historic features.

Fences were common at Fort Worden. Photographs of Alexander’s Castle and the surrounding area taken before the construction of the military post show a tall board fence in the immediate vicinity of the castle. The same type of board fence was used during the construction of the fortifications. The top of the hill was compartmentalized with board fences as was the beach-side warehouse area. Large gates in the fences permitted the locomotives to move from one area to another.

There were also a variety of metal fences. Smooth, barbed and woven wire fences were the usual means of separating areas within the Fort Worden reservation. Strands of barbed wire nailed to posts demarked the limits of government ownership while smooth wire was used to surround the deer park (the area that became the site of the balloon hangar); woven wire enclosed the space between the stable and the wagon shed. Some photographs taken prior to World War I appear to show a woven wire fence supported by wooden posts and a single top rail at the southern boundary with the city.

While not exactly a fence, entanglements of barbed wire were constructed during World War II and perhaps earlier as well. Elsewhere, a fence and gate of iron palings surrounded the cemetery, setting it off from both the town and the military reservation proper. And finally, chain link fencing was erected late in the period of military use and into the occupation of the post area by the Department of Institutions.

Fences formed the largest single category of small-scale features yet there were many others, including:

Street Lights – A slender cast-iron shaft curving downward at the top held a radial reflector and a single bulb as a standard fixture for the major streets. Later, and certainly by the mid-1920s, the cast-iron shafts were removed and replaced by hexagonal vertical concrete columns with a glass lantern that enclosed the light. Secondary streets were illuminated by radial reflectors held by an arm attached to a vertical wooden post.

Concrete Stairs – Although most steps to individual buildings are made of wood, concrete stairs are a notable feature at officer’s row where they are a distinctive component of the streetscape. Building 225, the last barracks of the pre-World War I period, also has concrete stairs leading to its first floor porch. Concrete steps were also part of the walk that led to the batteries on the hill.

Fire Hydrants – Several series of hydrants were installed and replaced during the historic period, probably as upgrades to existing equipment.

Stone Retaining Walls – Field stones were in ample supply and were used in several locations including the foundation for Alexander’s Castle, the retaining wall behind officer’s row, and in several locations associated with World War II construction.
**Gate Posts** – Symbolic gate posts were built at both the west gate and the Cherry Street entrance. At Cherry Street, they were first built as square column made up from mortared stones; at some later time, they were rebuilt in brick masonry protected by a sheet metal cap.

Obsolescent artillery projectiles set on end mark off a parking area near the Gymnasium (Building 310) in this pre-World War II photograph. No examples of this common historic treatment survive.

**Decorative Elements** – A number of materials were used to identify parking areas, walkways or planting beds. These could take the form of bricks set at an angle in the earth to form a saw-tooth border, white-washed field stones, low pipe-rail corner guards at walkway intersections and obsolete artillery projectiles set on end as bollards.

Many of the small-scale features have disappeared, most notably the variety of fences. Unsurprisingly, the vertical board fences are gone and were taken down at a very early date. The present wood fence of posts and horizontal rails that defines the southern boundary of the park is recent, and probably dates from the post-World War II period. The smooth and woven wire fences do not remain, portions of a barbed wire fence can still be found on the former western boundary of the military reservation, and a chain-link fragment of uncertain length survives in the vicinity of Battery Stoddard. The iron fence and gate surrounding the cemetery are still intact. None of the decorative landscape treatments remain.

The concrete street lights are still in place and are operational, and the concrete stairs also remain as do the brick gate posts and some of the stone retaining walls. Modern fire hydrants compatible with the equipment of the Port Townsend Fire Department have been installed in many areas of the park. Earlier and perhaps original hydrants survive in scattered areas of the park and were intentionally retained on officers’ row.
RECOMMENDED

Identify historic and compatible site furnishings and objects and the materials of which they are made, and establish maintenance guidelines for protecting them in place from vandalism, environmental factors or future site work.

Repair deteriorated parts of historic site furnishings and objects through limited replacement in kind. If using historic materials is not feasible, substitute materials may be used if they have the same appearance.

Install new site furnishings and objects, if necessary for the new use, as long as their design, placement, color and quantity do not alter the character of the landscape.

Maintain consistency in lighting design throughout the district with attention to fixtures, height, color, glare, direction and spread. Attach lighting to supports appropriate for the purpose.

Preserve historic lighting and keep added site lighting to the minimum necessary. When additional lighting is required for security or safety, it should be provided by contemporary light standards that are compatible with the historic character of the site and distinguishable from the existing historic fixtures.

Maintain discreet and minimal signage. Signage should be easily removable and compatible with the architecture of the historic district.

Limit the introduction of new small-scale features and install only those that are consistent with historic prototypes and that are visually subordinate to the setting.

The fence around the Hospital Steward’s Quarters (Building 270) is a modern addition; no picket fences surrounded any building at Fort Worden. It is an inappropriate addition to the historic landscape and should be removed.
NOT RECOMMENDED

Failing to identify, evaluate and treat the cumulative effects of the environment so that site furnishings and objects are lost.

Adding new features such as planters, fences or window boxes that intrude upon the character of the setting.

Introducing new site furnishings or objects such as artwork or memorials that alter the historic character of the landscape.

Illuminating landscape or architectural features that were never illuminated historically.

Adding historic-looking or reproduction-design furnishings such as lights and benches that never existed in the landscape.

Introducing new elements that are incompatible in size, scale, form, shape, material and color with the setting and historic precedents.

Simple designs work best in an informal landscape. The classical detailing of this concrete bench is out of character with its wooded setting.

A less embellished bench serves the same purpose and does not suggest any historic period.
Brick & Stone Masonry
Introduction

Although there are only four masonry buildings at Fort Worden (Alexander’s Castle, the Family Quarters, the Theater and the Radio Station), some form of brick and stone construction is included in almost every structure that dates from the period before World War I. The sandstone foundations of many buildings comprise an obvious example, and less apparent are the brick walls and piers in the basements of those same quarters and storehouses.

The brick for Alexander’s Castle most probably came from the Eisenbeis Brickyard at Point Wilson, which was located near the present campground. It was the source for much of the brick in the buildings of Port Townsend, and Eisenbeis brick can be recognized by its slight irregularities in size, shape and hardness. For its work at Fort Worden, the army purchased brick from the Seattle Brick Exchange. The Brick Exchange represented seven of the nine brickyards in Seattle and could deliver large quantities of brick of uniform size and hardness.

The best examples of high-quality machine-made brick are in the Theater (Building 25) and the Family Quarters (Building 16). The brick in the Radio Station (Building 414) is unusual in that it appears to be cement based rather than a fired clay product.

The sandstone was taken from the Chuckanut quarry near Bellingham, a source of much building stone in the northwest section of the state. There are also a number of features constructed of field stone. As the name suggests, field stone is found rather than quarried. Army builders remarked on the large quantity of small boulders lying on the surface of the ground in the vicinity of the parade ground, and they gathered it up to make way for construction. It may be that the collected stone was used to create the retaining wall behind the quarters at the west end of officers’ row. Other intact examples include a roadway retaining wall near Alexander’s Castle, much of the foundation of the castle itself, and an unidentified feature behind and uphill from Building 296.

Mortar is used to bond masonry units. Historic mortar was generally quite soft, consisting primarily of lime and sand with other additives. After about 1880, portland cement was usually added resulting in a more rigid and non-absorbing mortar.

Brick and stone should never be painted unless they were painted historically, and there are no examples of that practice at Fort Worden save for the possible exception of the Radio Station. It is a big job to remove paint from masonry, and the process and products necessary may have an impact on the surrounding environment. Common cleaning methods such as high pressure water, dry abrasives and chemicals all carry potential harmful effects on the surface being cleaned, the operator of the equipment and adjacent areas. Peel-away paint stripping products may be a possible solution since they help prevent the dispersion of toxic materials and help simplify their removal from the immediate site.
Identify, Retain, and Preserve

**RECOMMENDED** .................................................................

Identify, retain and preserve masonry features that are important in defining the overall historic character of the building such as walls, brackets, railings, cornices, window architraves, door pediments, steps, and columns; and details such as tooling and bonding patterns, coatings, and color.

Identify all masonry building materials, such as the type of stone or brick and its corresponding mineral composition or manufacturing process, porosity, solubility and hardness. Appropriate treatments will vary depending on these properties.

Identify, retain and preserve mortar composition. A mortar analysis will be required to identify and match the original binder, aggregate, pigment and strength.

Identify, retain and preserve the original techniques for tooling stone and striking joints.

Carefully study the construction of a building to identify possible problem areas, such as the locations of potential spalling because of corroded metal anchors.

Retain masonry chimneys in place even when they no longer function; chimneys contribute significantly to the historic character of a building.

The bricks used in the buildings at Fort Worden are different and represent changes in manufacturing technology over time. The first photo is of Alexander’s Castle. The bricks are probably from the Eisenbeis brickyard at Point Wilson. They are all a little irregular, the result of wooden brick molds of slightly different shape; notice too the narrow mortar joints. The second photo is of the Family Quarters (Building 16); built in 1915 of machine made bricks, the appearance is more regular and uniform. The mortar joints are much wider than the joints of the masonry at Alexander’s Castle. The last photo is of the Theater (Building 25). Built in 1932, the bricks are modern and very precisely sized.
NOT RECOMMENDED

Removing or radically changing masonry features which are important in defining the overall historic character of the building so that the character is diminished.

Replacing or rebuilding a major portion of exterior masonry walls that could be repaired so that the building is no longer historic and is essentially new construction.

Applying paint or other coatings such as stucco to masonry that has been historically unpainted or uncoated to create a new appearance.

Removing paint from historically painted masonry.

Radically changing the type of paint or coating or its color (although it is not required to remove outmoded coating systems).

The brick foundation of this NCO Quarters (Building 353) was painted during the rehabilitation of the building. It was never painted historically. Painting changes the appearance of masonry, and paint is difficult to remove.
Protect and Maintain

**RECOMMENDED** .................................................................

Protect and maintain masonry by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features.

Clean masonry only when necessary to halt deterioration or remove heavy soiling.

Conduct masonry surface cleaning tests after it has been determined that such cleaning is appropriate. Tests should be observed over a sufficient period of time so that both the immediate and the long range effects are known to enable selection of the gentlest method possible.

Clean masonry surfaces with the gentlest method possible, such as low pressure water and detergents, using natural bristle brushes.

Inspecting painted masonry surfaces to determine whether repainting is necessary.

Remove damaged or deteriorated paint only to the next sound layer using the gentlest method possible (e.g., hand-scraping) prior to repainting.

Evaluate the overall condition of the masonry to determine whether more than protection and maintenance are required, or if repairs to the masonry features will be necessary.

Protect and maintain masonry by providing site drainage that does not negatively affect other site features.

Brace chimneys to improve their seismic resistance using unobtrusive internal bracing and/or reinforcing.

Locate test cleaning patches in a representative and inconspicuous location. If there are different types of masonry or widely dissimilar substances to be removed, several test patches may be necessary.

Clean in clearly defined areas that are delineated by structural or architectural features to minimize the visual impact of variations in the effects of cleaning.

Prune plants regularly and brush off surface growths by hand, using a stiff nonmetallic brush and water. Consider chemical cleaners only if these gentle cleaning methods are inadequate.

If bird debris is a problem, remove it regularly by washing with cold water supplemented with a mild detergent. Use nonmetallic brushes or scrape with a wood scraper if necessary. Those doing the cleaning should guard against exposure to potential health hazards by wearing protective masks, gloves and clothing.

Identify the specific material to be removed and select a cleaning solvent that is appropriate for that material. Use a poultice with the solvent for the most effective result.
**NOT RECOMMENDED**

Failing to evaluate and treat the various causes of mortar joint deterioration such as leaking roofs or gutters, differential settlement of the building, capillary action, or extreme weather exposure.

Cleaning masonry surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.

Cleaning masonry surfaces without testing or without sufficient time for the testing results to be of value.

Sandblasting brick or stone surfaces using dry or wet grit or other abrasives. These methods of cleaning permanently erode the surface of the material and accelerate deterioration.

Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.

Cleaning with chemical products that will damage masonry, such as using acid on limestone or marble, or leaving chemicals on masonry surfaces.

Applying high pressure water cleaning methods that will damage historic masonry and the mortar joints.

Removing historic paint layers that are firmly adhering to, and thus protecting, masonry surfaces.

Using methods of removing paint which are destructive to masonry, such as sandblasting, propane torches, caustic solutions, or high pressure water blasting.

Failing to undertake adequate measures to assure the protection of masonry features.

Failing to repair leaky roofs, deteriorated flashing, rain leaders or loosely fitting windows in a timely manner, allowing moisture to enter the masonry and increase the risk of deterioration.

Cleaning masonry without first sealing the paths of water entry into the interior.

Cleaning masonry without first shielding adjacent materials that can be etched or damaged by chemical cleaners.

Applying herbicides as a means of controlling biological growth. They can introduce salts and acids into the masonry and contribute to environmental impacts.

Planting flowers and shrubs that require frequent watering adjacent to masonry walls.
**Repair**

**RECOMMENDED**

Repair masonry walls and other masonry features by repointing the mortar joints where there is evidence of deterioration such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls, or damaged plasterwork.

Duplicate old mortar joints in width and in joint profile.

Repair masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind -- or with compatible substitute material -- of those extensively deteriorated or missing parts of masonry features when there are surviving prototypes.

Apply new or non-historic surface treatments such as water-repellent coatings to masonry only after repointing and only if masonry repairs have failed to arrest water penetration problems.

Duplicate old mortar in strength, composition, color, and texture.

Use mortar of an appropriate strength to relieve stresses due to thermal expansion, settlement, or seismic activity. The mortar must be less strong than the stone or brick so that stresses can be relieved by cracks in the mortar rather than through the masonry unit.

Use mortar of an appropriate density to allow the water within the wall to migrate and escape.

Fill cracks in masonry units to reestablish structural integrity and prevent water penetration. Use a structural grout formulated to match the original masonry in strength and vapor transmission rate; use a mortar-like composite material that matches the original masonry in color, texture and vapor transmission rate for surface treatment, including superficial cracks. Patch material should be weaker than the original. This type of repair should only be carried out under the supervision of a qualified architectural conservator.

*Repairs to masonry should use the same materials as the original. This photo of the foundation of Alexander’s Castle shows the intrusive repair that followed the installation of a water and sewer line sometime in the past. During the rehabilitation of the Castle in 2002, the inappropriate work was removed and the area finished with brick and stone units that were more sympathetic to the original construction.*
Patch deteriorated or missing portions of a stone masonry unit by cutting back to sound material and either piecing in a matching stone replacement or patching with a composite material formulated to match the original material in color, texture, strength and vapor transmission rate. Chemically consolidate deteriorating masonry only if such treatment is deemed appropriate by a professional conservator. Always test materials and procedures in an inconspicuous location before attempting full-scale treatment. Different types of stone will require different consolidation materials. Consolidation should not alter the appearance or vapor transmission rate of the original masonry.

Mock-up test areas for repointing or patching to serve as a quality-control standard. Locate the test patch in a representative and inconspicuous place. The test patch should be approximately one yard square.

**NOT RECOMMENDED**

Removing non-deteriorated mortar from sound joints, then repointing the entire building to achieve a uniform appearance.

Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repointing.

Repointing with mortar of high portland cement content (unless it is the content of the historic mortar). This can often create a bond that is stronger than the historic material and can cause damage as a result of the differing coefficient of expansion and the differing porosity of the material and the mortar.

Repointing with a synthetic caulking compound.

Using a "scrub" coating technique to repoint instead of traditional repointing methods.

Changing the width or joint profile when repointing.

Replacing an entire masonry feature such as a cornice or balustrade when repair of the masonry and limited replacement of deteriorated or missing parts is appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving part of the masonry feature or that is physically or chemically incompatible.

Applying waterproof, water repellent, or non-historic coatings such as stucco to masonry as a substitute for repointing and masonry repairs. Coatings are frequently unnecessary, and may change the appearance of historic masonry as well as accelerate its deterioration.
Using a chemical bonding agent to increase the bond of new mortar to old mortar rather than hand-raking the joints to a sufficient depth to guarantee mechanical keying. These agents are generally unnecessary and can be harmful to the masonry.

Overfilling mortar joints when repointing.

Patching masonry with portland cement. Aside from being visually compatible, the material is too strong and dense for most masonry and will lead to deterioration.

Patching historic brick with modern brick that is different in dimensions, edge detail, finish and color.

Surface mounting elements such as metal conduits or downspouts onto a masonry unit. The action can destroy historic fabric and provide direct access for moisture to enter a masonry wall. If any attachment must be made, it should be made at the mortar joint and not the masonry unit.

Failing to recognize the historic character of masonry can lead to damage and loss. This view of Alexander's Castle shows the effect of power saws used to cut out the joints as well as inappropriate repointing. The bricks have been made more regular by widening the joints, and the joints themselves were then overfilled with mortar. The work was halted before more harm was done.
Replace

RECOMMENDED

Replace in kind an entire masonry feature that is too deteriorated to repair -- if the overall form and detailing are still evident -- using the physical evidence as a model to reproduce the feature. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be used.

In the decision to use a substitute material, consider such sustainability factors as resource depletion, toxicity, maintenance levels and resource recovery.

Replace brick and stone units with material matching the original in size, color, texture, density and profile. Salvaged materials merit consideration as replacement materials.

The darker stone in the photo is a replacement for a damaged stone in the foundation wall of the Guardhouse (Building 300). The replacement stone was cut from waste stone found buried on the site. As salvaged original material, it was the best choice for the job. Note too that the surrounding joint has been struck in a manner that duplicates the existing original joint work.

NOT RECOMMENDED

Removing a masonry feature that is not repairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.
Design for Missing Historic Features

RECOMMENDED

Design and installing a new masonry feature such as a stair or a door pediment when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

NOT RECOMMENDED

Creating a false historical appearance because the replaced masonry feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new masonry feature that is incompatible in size, scale, material and color.
Concrete
Introduction

The notion of concrete as a building material at Fort Worden naturally shifts our focus to the fortifications, yet concrete was also important for other uses. Foundations, footings, sidewalks and individual buildings were also made of concrete. Prior to 1910, there was no large-scale cement manufacturing industry in the Pacific Northwest and almost all of the cement was imported. It commonly came from Europe on ships designated for the purpose, and when emptied, they returned with timber from Northwest forests.

Concrete is a composite material that is a mix of aggregate and a cement binder. When water is added, the mix becomes plastic, undergoes a chemical reaction and hardens permanently in the shape of the form into which the mix was placed. The earliest surviving examples of concrete date from the time of the Romans. Air entrainment was used in Roman times yet seemingly not again until about 100 years ago. There is no information on its use at Fort Worden.

Concrete varies in strength depending on its components; it is typically strong in compression and weak in tension unless metal reinforcing is added. The deterioration of concrete can be the result of environmental factors, inferior materials, poor workmanship, inherent design defects and inadequate maintenance. Workmanship deficiencies often included uneven mixing and inadequate tamping, both of which could leave voids within the body of the concrete. Common design flaws include insufficient depth of material over reinforcing bars and a lack of expansion joints to relieve stresses caused by thermal movement.

Environmental factors can be a principal source of concrete deterioration. As a porous material, concrete readily absorbs moisture. When the absorbed water freezes, it expands with sufficient strength to dislodge spalls of concrete from the surface. Moisture also moves soluble salts and atmospheric pollutants into the body of the concrete which then initiate corrosion of the metal reinforcing bars. Corrosion continues until moisture and oxygen are removed. Just as with the force of freezing water, corrosion produces great expansive pressure and can cause large cracks and spalls in the concrete, leading to a loss of bond between the bars and the concrete as well as the delamination of concrete layers.

Concrete should be cleaned only when it is necessary to halt deterioration. Most methods of cleaning concrete carry with them some risk of impacting the environment. Water cleaning methods consume large amounts of water and can damage concrete by driving moisture into the material, which then can promote the corrosion of the reinforcing metal. Most chemical agents are toxic and can endanger people and the environment. If solvents are used, special attention should be paid to their collection and safe disposal, and they should be used only with the full understanding of the Material Safety Data Sheet. Concrete repair may also involve treatment of the reinforcing metal, and grit blasting will need to be carefully controlled to avoid damage to adjoining surfaces and to control the generation of dust.
Identify, Retain and Preserve

**RECOMMENDED** ..............................................................

Identify, retain and preserve concrete features that are important in defining the overall historic character of the building.

Identify finished surface texture, color and any coatings.

*Not all of the older buildings at Fort Worden have stone foundations, a case in point being the annex to the Hospital. The builders used concrete but textured the surface and scored it so that it resembled stone. A similar technique was used on the Firemen’s Quarters (Building 336).*

Identify the age and potential inherent preservation problems in original material or construction methods and include the possible need for laboratory analysis. Any rehabilitation plan must be based on a thorough knowledge of the properties of the original materials.

Identify the type and location of reinforcing bars.

**NOT RECOMMENDED** ..........................................................

Removing or radically changing concrete features that are important in defining the overall historic character of the building.

Specifying the treatment of a building without a thorough understanding of the composition of the concrete.

*The two sets of concrete steps in front of the Double Barracks (Building 225) were character-defining features, however they had settled badly and were hazardous to visitors. Instead of demolishing them, the steps were carefully removed and placed aside. A better foundation was put down and the steps were then returned to their original position.*
Protect and Maintain

RECOMMENDED ...........................................

Protect and maintain concrete by ensuring that water is not absorbed. Appropriate actions may include drainage improvements, repairing and filling cracks and spalls, or installing flashing at flat surfaces.

Clean concrete only when necessary to halt deterioration. Heavy soiling, bird debris, ferrous stains, graffiti, and biological growth can trap moisture and damaging chemicals against the concrete, initiating and sustaining deterioration.

Conduct cleaning tests if cleaning is appropriate. Tests should be observed over a sufficient period of time to assess both the immediate and long-term effects of the product. Clean concrete with the gentlest means possible, and use more rigorous methods only if the initial cleaning is inadequate. After treatment, thoroughly rinse the surface of all residual chemicals.

Inspect painted and parged concrete surfaces to determine if recoating is necessary.

Remove damaged or deteriorated coating only to the next sound layer using the gentlest means possible prior to recoating.

Apply compatible coating systems following proper surface preparation. Testing is mandatory to ensure that replacement material is compatible with the character-defining features and physical properties of the existing fabric as well as to determine the short- and long-term effects.

Recoat with materials, textures and colors that are historically appropriate to the building and district.

Evaluate the overall condition of the concrete to determine if protection and maintenance are sufficient, or if material analysis and repairs are necessary.

Locate areas of delamination and incipient spalls by sounding.

Determine the cause and mechanisms of deterioration, which can include settlement, cracks, corrosion or evidence of chemical reactions. Crack monitors and laboratory analysis (petrographic analysis, chloride analysis and compressive strength tests) may be necessary to determine if the deterioration is active or stable.

Correct the cause of deterioration before proceeding with the repair.

This spall on a pilaster at the Militia Storehouse (Building 413) has revealed the interior reinforcing. The concrete here is in poor condition, probably the result of a fire that burned away the roof in the 1980s and the subsequent exposure of the unprotected walls to the weather.
NOT RECOMMENDED

Failing to evaluate and treat the causes of deterioration, such as leaking roofs and gutters, differential settlement, rising damp, or chloride contamination.

Cleaning concrete surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.

Cleaning concrete surfaces without testing or without sufficient time for the test results to be of value.

Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.

Cleaning with chemical products that will damage concrete or failing to rinse the surface clean of chemicals.

Applying high-pressure water cleaning methods that can damage the historic surface treatment or coating and can promote the corrosion of metal reinforcing by driving moisture into the material.

Grit blasting concrete surfaces using wet or dry abrasives that can erode the surface and accelerate deterioration.

Removing paint or parging from historically coated concrete.

Removing sound parging then recoating the entire building to achieve a uniform appearance.

Removing paint or stucco by methods that destroy concrete, such as grit blasting, caustic solutions or water blasting.

Applying paint or other coatings to concrete in a manner that creates a non-historic appearance.

A corroding steel member has expanded and spalled off portions of this door opening at the Power House (Building 315). A portion of the decorative lintel above has also broken away. The repair will require halting the corrosion of the steel before the concrete can be patched. In addition, repairs to the lintel will require duplicating the form and appearance of the surviving feature.
Repair

RECOMMENDED

Coordinate all repairs and treatments with any structural intervention that may be necessary.

Repair cracked, spalled or otherwise damaged concrete to prevent water penetration.

Fill all cracks that are wide enough to admit water; the repair mix should match the chemical and physical properties of the original concrete. Any structural cracks should be evaluated by an engineer and any structural repairs should be undertaken only by qualified professionals.

Provide drip grooves at the underside of overhanging eaves, edges of sills, belt courses, cornices and projecting slabs if necessary.

Remove deteriorated concrete and incipient spalls to the next sound surface. The area of incipient spall or delamination may be visible (a bulge outlined by cracks) or it may be detected by sounding.

Patch spalls and fill stable cracks with material that duplicates the original concrete mix in strength, composition, color and surface texture. To ensure a strong connection, key the patch into the existing sound concrete.

Match color to that of cleaned sound adjacent concrete (not dirty or mossy concrete).

NOT RECOMMENDED

Removing and not replacing a concrete feature that is beyond repair, or replacing it with a new feature that does not have the same appearance.

Patching concrete without removing the source of deterioration.

Applying rigid patching material in active cracks that move seasonally.

Applying patch or paint over corroded reinforcing bars or anchors without first cleaning all corrosion from the metal.
Replace

RECOMMENDED

Reproduce in kind an entire concrete element that is too deteriorated to repair, using physical evidence as a model. If a similar and non-deteriorated piece can be found on the building, a mold can be made for casting the replacement piece.

NOT RECOMMENDED

Replacing or rebuilding a major portion of repairable concrete features, which is essentially new construction, so that the building is no longer historic.
Replacing an entire concrete feature when repair and limited replacement of a deteriorated or missing part is appropriate.

Design for Missing Features

RECOMMENDED

Design and install a new concrete feature when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial and physical documentation, or an entirely new design compatible with the size, scale, material and color of the historic building.

NOT RECOMMENDED

Creating a false historical appearance because the replacement concrete feature is based on insufficient historical, pictorial and physical documentation.
Introducing a new concrete feature that is incompatible in size, scale, texture or color.
Introduction

Because it can be easily shaped by sawing, planing, carving, and gouging, wood is used for architectural features such as clapboard, cornices, brackets, entablatures, shutters, columns and balustrades.

These wooden features, both functional and decorative, are important in defining the historic character of the building. Their retention, protection, and repair are essential in rehabilitation projects at Fort Worden because wood is the preeminent building material, and is found in almost every building from structural systems to finish work.

After briefly considering the possibility of erecting the many buildings in brick masonry, the army's Quartermaster General opted to render the permanent buildings of Fort Worden in wood. It was an understandable and traditional choice in a region of dense stands of Douglas fir, one of the most desirable species of commercial building timber.

Years before work began on the permanent buildings, the engineers constructing the fortifications put up wooden warehouse buildings on the beach as well as two large bungalows on the bluff. When the first troops arrived, they were quartered in simple and unpainted board barracks. Those plain buildings demonstrated the flexibility of wood as a construction material by providing the lumber (and in some cases the whole building) for other uses as the post grew.

World War I and World War II both brought the addition of scores of new wooden buildings. Much more lightly built than the barracks, quarters and storerooms erected before 1910, the basic soundness of their wooden construction coupled with good maintenance practices have ensured that many of them remain in use today.

Exterior wood trim on historic buildings performs the dual functions of protection and decoration. Moldings, siding and trim not only create visual interest with highlights and shadows, but they also have practical value. In addition to covering joints and protecting wood end-grain, they direct rainwater from one component to the next and eventually to the ground.

Moisture, usually in combination with other influences such as insects and fungi, weakens the structure of wood and is the main cause of wood deterioration. Paint is one of the most effective means of waterproofing a wood surface, and most of the exposed wood at Fort Worden has been painted.

Wood that is damp and located in areas of limited ventilation is prone to both rot and insect attack. Preventative measures include treating wood with insecticides and preservatives, treating the surrounding soil and fumigating. However, each of these methods is also harmful to the environment and can damage certain types of metal, paint and interior finishes. There are alternatives. Providing adequate ventilation and installing metal flashing to separate wood from possible sources of moisture are measures that can help prevent decay. Similarly, clearing gutters and drains of debris and maintaining painted surfaces will significantly prolong the life of a wood structure.

Many products associated with preserving wood or stripping and refinishing wooden components are toxic or otherwise dangerous. They are to be handled and used in a manner consistent with the manufacturer's Material Safety Data Sheet and all applicable laws, codes and regulations.
Identify, Retain, and Preserve

RECOMMENDED

Identify, retain, and preserve wood features that are important in defining the overall historic character of the building such as siding, cornices, brackets, window architraves, and doorway pediments; and their paints, finishes, and colors.

Identify the species of wood, grain pattern, dimensions, millwork, shaping, joining, finishing techniques and means of fastening.

Determine if a wood element functions as a structural, decorative or finish material, and select the appropriate treatment.

Scroll-cut rafter ends on the Civilian Teamsters Quarters (Building 325) and the Firemen's Quarters (Building 336) are unusual at Fort Worden. They are important in defining the character of these buildings.
NOT RECOMMENDED

Removing or radically changing wood features which are important in defining the overall historic character of the building so that the character is diminished.

Removing a major portion of the historic wood from a facade instead of repairing or replacing only the deteriorated wood, then reconstructing the facade with new material in order to achieve a uniform or "improved" appearance.

Radically changing the type of finish or its color or accent scheme so that the historic character of the exterior is diminished.

Stripping historically painted surfaces to bare wood, then applying clear finishes or stains in order to create a "natural look."

Stripping paint or varnish to bare wood rather than repairing or reapplying a special finish, i.e., a grain finish to an exterior wood feature such as a front door.

Removing all paint layers without retaining samples for analysis and documentation.

These porch columns are structural as well as decorative and their continued good condition is important for both reasons. They rest on a cast iron base that helps keep moisture from wicking up into the wood grain.
Protect and Maintain

RECOMMENDED

Protect and maintain wood features by providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features.

Protect and maintain wood features by providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features.

Retain coatings such as paint that help protect the wood from moisture and ultraviolet light. Paint removal should be considered only where there is paint surface deterioration and as part of an overall maintenance program which involves repainting or applying other appropriate protective coatings.

Inspect painted wood surfaces to determine whether repainting is necessary or if cleaning is all that is required.

Remove damaged or deteriorated paint to the next sound layer using the gentlest method possible (hand-scraping and hand-sanding), then repaint.

Use with care electric hot-air guns on decorative wood features and electric heat plates on flat wood surfaces when paint is so deteriorated that total removal is necessary prior to repainting.

Use chemical strippers primarily to supplement other methods such as hand-scraping, hand-sanding and the above-recommended thermal devices. Detachable wooden elements such as shutters, doors, and columns may -- with the proper safeguards -- be chemically dip-stripped.

Apply compatible paint coating systems following proper surface preparation.

Repaint with colors that are appropriate to the historic building and district.

Evaluate the overall condition of the wood to determine whether more than protection and maintenance are required, that is, if repairs to wood features will be necessary.

Correct conditions that allow moisture intrusion. This includes repairing damaged or missing gutters and downspouts, and providing adequate ventilation and separation from the ground and surrounding vegetation.

Inspect wood surfaces and structural elements regularly for signs of moisture retention and insect or fungi attack. Sills and wood joints or members bearing on masonry are particularly susceptible to rot because of continued dampness at the point of contact.

Protect wood floors and structural members from damage by heavy equipment.

Prune plant growth away from the sides of wooden buildings and prevent soil from accumulating around wooden skirting. Both conditions promote deterioration by keeping surfaces damp and restricting ventilation.
NOT RECOMMENDED

Failing to identify, evaluate, and treat the causes of wood deterioration, including faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect or fungus infestation.

Using chemical preservatives that can change the appearance of wood features unless chemical preservatives were used historically.

Stripping paint or other coatings to reveal bare wood, thus exposing historically coated surfaces to the effects of accelerated weathering.

Removing paint that is firmly adhering to, and thus, protecting wood surfaces.

Using destructive paint removal methods such as a propane or butane torches, sandblasting or water-blasting. These methods can irreversibly damage historic woodwork.

Using thermal devices improperly so that the historic woodwork is scorched.

Failing to neutralize the wood thoroughly after using chemicals so that new paint does not adhere.

Allowing detachable wood features to soak too long in a caustic solution so that the wood grain is raised and the surface roughened.

Using new colors that are inappropriate to the historic building or district.

Failing to undertake adequate measures to assure the protection of wood features.

Relying on brush- or spray-applied insecticides or preservatives, or those same materials incorporated into paint coatings. Penetration is superficial and the interior of the member is unprotected.

Using chemical preservatives that alter the appearance of wood. Many preservatives release objectionable odors, can stain or corrode adjacent materials, and may affect future paint applications.

Applying sealants as a substitute for good detailing of joints and flashings.

Wood is very prone to deterioration when exposed to water. With the failure of the gutter system, this soffit on the Radio Station (Building 414) has begun to rot; the failing paint is a sure sign that something is wrong.

Fungus and rot have severely deteriorated this sill on the Guardhouse (Building 300). It was replaced during a 1999 rehabilitation project.
Repair

RECOMMENDED .................................................................

Repair wood features by patching, piecing-in, consolidating, or otherwise reinforcing the wood using recognized preservation methods. Repair may also include the limited replacement in kind -- or with compatible substitute material -- of those extensively deteriorated or missing parts of features where there are surviving prototypes such as brackets, molding, or sections of siding.

Strengthen weakened wood members by adding new members alongside the original. If the original member has been weakened by rot, the affected area must be removed and repaired in an appropriate manner before installing a new surface material.

Because exterior wood components are usually designed and joined to prevent water penetrating the joints, replace any missing wood features in a timely manner.

Repair voids left after removing damaged wood by inlaying a dutchman to precisely fit the void. The repair material should match the original in species, grade and grain pattern.

Use galvanized or stainless-steel nails to reduce metal stains on wood. Where appropriate, wood filler applied over countersunk finish nails also prevents staining.

Pre-drill holes and use screws in old brittle wood to reduce cracking and splitting.

Although damaged by the repeated attachment of various types of hardware, this door can still be repaired. Deteriorated features should be repaired rather than replaced.
Replacing an entire wood feature such as a cornice or wall when repair of the wood and limited replacement of deteriorated or missing parts are appropriate.

Using substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the wood feature or that is physically or chemically incompatible. Using non-galvanized fasteners in moist conditions since they can discolor the surface and chemically attack certain woods, including Douglas fir.

Nailing old brittle wood, causing it to split.

The porch columns on the Fort Worden buildings are hollow and built up with specially shaped pieces that are fitted together with a tongue-and-groove joint. The columns in the photo are one hundred years old and in excellent condition. If a portion of the column was deteriorated, the right action would be to remove only the deteriorated portion and replace it with a matching piece of wood called a Dutchman.
Replace

RECOMMENDED

Replacing in kind an entire wood feature that is too deteriorated to repair -- if the overall form and detailing are still evident -- using the physical evidence as a model to reproduce the feature. Examples of wood features include a cornice, entablature or balustrade. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Where repair and restoration are not possible, match the original wood in species, grade, grain direction, dimensions, finish texture and coating.

Replace wood features using the same joining techniques as found in the original feature.

NOT RECOMMENDED

Removing a feature that is not repairable and not replacing it; or replacing it with a new feature that does not convey the same appearance.

Replacing exposed milled lumber with plywood.

Design for Missing Historic Features

RECOMMENDED

Design and install a new wood feature such as a cornice or doorway when the historic feature is completely missing. It should be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

NOT RECOMMENDED

Creating a false historical appearance because the replaced wood feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new wood feature that is incompatible in size, scale, material and color.

Introducing inappropriate materials that mimic historic materials, such as composite shingles or aluminum siding. These materials substantially alter significant visual characteristics.
Architectural Metals
Introduction

Most architectural metals at Fort Worden are on the first-floor ceilings of many buildings and on porch roofs. Pressed metal ceiling panels of galvanized steel or zinc appear in most of the residential and administrative buildings erected before 1910. They are a common decorative feature of the time and were selected as being more resistant to the concussive effects of cannon fire than lath and plaster. Porch roofs were fitted with standing-seam metal panels of galvanized metal, and the porch posts typically sat on base plates of cast iron. The interior columns in the barracks and the step railings on some of the officer’s row dwellings were also of iron.

Also worthy of note are the heavy iron and steel doors on the Power House (Building 315). They are of the same design and construction as the doors used on the fortifications.

There are several all-metal buildings. The original corrugated iron panels of the Balloon Hangar (Building 26) were removed during the 1990 rehabilitation when asbestos was discovered in the exterior coating. The Gas Generator House (Building 356) is associated with the balloon hangar and also features corrugated iron panels, but without the asbestos cladding. The gas station is partially constructed of metal panels in steel frames and is the only building of its type at Fort Worden.

Metal features do not have to be large to be significant or character defining. Shown here is a cast-iron shoe that protects a column base at the Wagon Shed (Building 372)
Identify, Retain, and Preserve

**RECOMMENDED** .................................................................

Identify, retain, and preserve architectural metal features such as columns, capitals, and ceilings that are important in defining the overall historic character of the building; and their finishes and colors. Identification is also critical to differentiate between metals prior to work. Each metal has unique properties and thus requires different treatments.

Identify methods of assembly. Metal features are often assembled together from smaller elements bolted, screwed, riveted or welded together. Joints must be sealed to prevent moisture from penetrating to the interior and causing corrosion from within.

**NOT RECOMMENDED** ...........................................................

Removing or radically changing architectural metal features that are important in defining the overall historic character of the building with the result that the character is diminished.

Removing a major portion of the historic architectural metal instead of repairing or replacing only the deteriorated metal, then reconstructing the feature with new material in order to create a uniform, or "improved" appearance.

Radically changing the type of finish or its historic color or accent scheme.

*The Gas Station (Building 309) is one of several all-metal buildings at Fort Worden. The army favored all-metal buildings for the storage of flammable materials; almost all of them have been removed.*

*Many of the older buildings at Fort Worden retain their original pressed-metal ceilings, as in this example at the Hospital (Building 298). They are distinctive features that require only conscientious maintenance for their continued use.*
Protect and Maintain

RECOMMENDED

Protect and maintain architectural metals from corrosion by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved, decorative features.

Clean architectural metals, when appropriate, to remove corrosion prior to repainting or applying other appropriate protective coatings.

Identify the particular type of metal prior to any cleaning procedure and then testing to assure that the gentlest cleaning method possible is selected or determining that cleaning is inappropriate for the particular metal.

Clean soft metals such as lead, tin, copper, terneplate, and zinc with appropriate chemical methods because their finishes can be easily abraded by blasting methods.

Use the gentlest cleaning methods for cast iron, wrought iron, and steel--hard metals--in order to remove paint buildup and corrosion. If hand-scraping and wire brushing have proven ineffective, low-pressure grit blasting may be used as long as it does not abrade or damage the surface.

Apply appropriate paint or other coating systems after cleaning in order to decrease the corrosion rate of metals or alloys.

Repaint with colors that are appropriate to the historic building or district.

Applying an appropriate protective coating, such as lacquer to an architectural metal feature.

Evaluate the overall condition of the architectural metals to determine if protection and maintenance are sufficient, or if repair is necessary.

Remove accumulated plant material from metal elements such as roofs and gutters. Acids from decomposing plants will cause metals to corrode.

Replace deteriorated caulking between assembled components of metal elements to prevent moisture from entering internal voids and causing corrosion.

Strengthen loose metal railings by tightening all bolts and screws. Remove and replace corroded fasteners and screws with stripped threads. Match the design of the replacement fastener with the design of the original.

Clean and lubricate or replace in kind missing hinges and fasteners.

Check ferrous metal components annually; remove and refinish any areas that show corrosion.

Remove all rust before repainting; it is not necessary to remove paint that is well adhered.

Select primer and finish coats that are chemically compatible with the metal being treated.

Choose a primer that contrasts with the color of the prepared metal surface when treating painted metals to allow the uniform application of coats and easy detection of wear.

Consider whether layers of paint need to be removed to restore crispness to the details of metal features, such as decorative railings or ceiling panels.
Wire brush and hand scrape where paint buildup and rust are not severe. Brushes should be of like metals (such as bronze wool or brass wire for cleaning copper alloys). Steel wire brushes or steel wool can initiate corrosion of copper alloys by depositing minute pieces of iron onto the object being cleaned.

Protect any adjacent materials – such as masonry, wood or glass – when using chemical cleaning agents or low-pressure grit blasting or when repairing architectural metals.

Cast and wrought iron railings at officers’ row. Ferrous metals require regular cleaning, prepping and repainting with the right products to remain in good condition.
Failing to identify, evaluate, and treat the causes of corrosion, such as moisture from leaking roofs or gutters.

Placing incompatible metals together without providing a reliable separation material. Such incompatibility can result in galvanic corrosion of the less noble metal, e.g., copper will corrode cast iron, steel, tin, and aluminum.

Exposing metals that were intended to be protected from the environment.

Applying paint or other coatings to metals that were meant to be exposed, such as copper, bronze, or stainless steel

Using cleaning methods that alter or damage the historic color, texture, and finish of the metal; or cleaning when it is inappropriate for the metal.

Removing the patina of historic metal. The patina may be a protective coating on some metals, such as bronze or copper, as well as a significant historic finish.

Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with grit blasting which will abrade the surface of the metal.

Failing to employ gentler methods prior to abrasively cleaning cast iron, wrought iron or steel; or using high pressure grit blasting.

Failing to re-apply protective coating systems to metals or alloys that require them after cleaning so that accelerated corrosion occurs.

Using new colors that are inappropriate to the historic building or district.

Failing to assess pedestrian use or new access patterns so that architectural metal features are subject to damage by use or inappropriate maintenance such as salting adjacent sidewalks.

Failing to undertake adequate measures to assure the protection of architectural metal features.

Filling voids in hollow metal balusters, newel posts and other elements with concrete.

Cleaning or treating metals before ensuring compliance with environmental safety requirements.

Using heat applied with a propane torch or similar device to remove paint or rust from architectural metal. Localized heat can shatter cast iron. Heat can also distort most metals, and intense heat will vaporize lead in old paint and release toxic fumes.
Repair

RECOMMENDED

Repair architectural metal features by patching, splicing, or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind -- or with a compatible substitute material -- of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balusters, column capitals or bases.

Select metal used for patching or reinforcing that closely matches the original material to prevent galvanic corrosion.

Fill small holes and nonstructural cracks using recognized preservation methods to prevent water penetration to the interior.

NOT RECOMMENDED

Replacing an entire architectural metal feature, such as a column or a railing, when repair of the metal and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the architectural metal feature or that is physically or chemically incompatible.

Applying bituminous (tar or asphaltic) patching materials, which are visually inappropriate and will initiate corrosion in some metals.

If allowed to deteriorate, heavy steel doors like those on the Power House (Building 315) often have to be removed for repair off-site because of the special equipment that is required. Good maintenance practices regularly applied will prevent the need for costly repairs.
Replace

RECOMMENDED .................................................................

If the overall form and detailing are still evident, replace in kind an entire architectural metal feature that is too deteriorated to repair using the physical evidence as a model to reproduce the feature. If use of the same kind of material is not technically or economically feasible, a compatible substitute material may be considered.

Replace materials in kind. Always use recycled materials before attempting to reproduce the original feature.

NOT RECOMMENDED ...........................................................

Removing an architectural metal feature that is not repairable and not replacing it; or replacing it with a new architectural metal feature that does not have the same appearance.

Replacing a metal element with a less durable metal.

Selecting aluminum as a replacement material. Aluminum is usually an inappropriate substitute because it differs from the historic metals in color and dimension.

A replacement steel attachment angle was riveted into place during the repair of deteriorated metal at the Balloon Hangar (Building 26). The original piece was too deteriorated for reuse, however it served as a template for the fabrication of an accurate replacement.
Design for Missing Historic Features

**RECOMMENDED**

Design and install a new architectural metal feature such as a metal ceiling or cast iron column when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

**NOT RECOMMENDED**

Creating a false historical appearance because the replaced architectural metal feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new architectural metal feature that is incompatible in size, scale, material and color.
Introduction

While the roof performs the obvious function of protecting the structure beneath it, it is also an important design element. Most of the roofs at Fort Worden are simple gables or cross-gables, and there are a few hipped forms, the Guard House (Building 300) and the Cable House (Building 501) being examples. The older buildings – those built before World War I – were finished with black slate roofs and later buildings were roofed with black composition shingles. Early buildings and temporary structures had roofs of re-sawn cedar shingles.

Beyond the cladding material itself, the roof can present other important character-defining features. Dormers, chimneys and ventilators appear on many roofs and it is essential that they remain intact and in good repair.

The same materials should be used to reroof a building as were used originally: slate for slate, composition shingle for composition shingle. Antennas, modern ventilator jacks, mechanical equipment or other intrusive additions should be avoided on roofs where not historically installed.

Gutters are built into the eaves of many of the buildings and some buildings never had gutters; if a building did not have gutters historically, new gutters should only be installed where necessary to protect the structure or to provide an otherwise appropriate public use. Downspouts were round, never square, and most were corrugated. Half-round metal gutters sometimes appeared on porches and service buildings.

Maintenance of the roof itself and its drainage system is the most significant factor in assuring the long-term sustainability of the building as a whole. The energy-conserving performance of many roofs may be significantly enhanced by the addition of insulation. If well maintained, slate roofs can last 100 years or more. The life of composition roofs is much shorter, and the best quality products will provide longer lasting protection. Materials selected for roof drainage systems should be just as long-lived as the roofing material itself. Some roofing materials, notably slate, may be selectively reused.

Identify, Retain, and Preserve

RECOMMENDED

Identify, retain, and preserve roofs -- and their functional and decorative features -- that are important in defining the overall historic character of the building. Important features include the shape, chimneys and ventilators as well as the type, size, color and patterning of the roofing material.

Maintain roof elements that help unify buildings into groups. Most Fort Worden buildings form a part of a cluster or group, and roofs are an important unifying feature. Maintain the unity when any replacement, repair or alteration work takes place on one or more buildings in the group.

Preserve the overall roof-scape character with its black slate or composition shingles, dormers, chimneys, ventilators and other significant features.
Use all available information, including physical evidence and investigation, to determine what roof features are character defining. There is ample information in the form of historical photographs and construction drawings to assist in the effort.

Evaluate the existing condition of roofs and their structural connection to walls in consideration of their important role in the seismic strength of a building. Although the Pacific Northwest is seismically active, no damage specifically associated with a seismic event has been identified at Fort Worden. However, the structural connection of the roofs of most buildings is unknown. Connections should be improved where necessary to resist future seismic events.

**NOT RECOMMENDED**

Radically changing, damaging, or destroying roofs which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Removing a major portion of the roof or roofing material that is repairable, then reconstructing it with new material in order to create a uniform, or “improved” appearance.

Changing the configuration of a roof by adding new features such as dormer windows, vents, or skylights so that the historic character is diminished.

Stripping the roof of sound historic material such as slate and architectural metal.

Applying paint or other coatings to roofing material which has been historically uncoated.

Changing material types, such as replacing a slate roof with composition shingles.

Removing roof materials when undertaking repairs to a building without considering and carefully documenting the historic features of the roof.

The unusual routing of the downspout on the back porch of the Hospital Steward’s Quarters (Building 270) probably dates to 1918 when the porch was converted to a room. It is a character-defining feature that is not duplicated elsewhere in the district.
Protect and Maintain

**RECOMMENDED**

Protect and maintain a roof by regularly inspecting and cleaning internal drainage systems, gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture condensation and water penetration; and to insure that materials are free from insect infestation.

Provide adequate anchorage for roofing material to guard against wind damage and moisture penetration.

Protect a leaking roof with plywood and building paper until it can be properly repaired.

Provide support for parapets, chimneys and other rooftop elements.

Install unobtrusive removable weatherproof caps over unused chimneys to protect them from water, debris and animals.

**NOT RECOMMENDED**

Failing to clean and maintain gutters and downspouts properly so that water and debris collect and cause damage to roof fasteners, sheathing, and the underlying structure.

Allowing roof fasteners, such as nails and clips to corrode so that roofing material is subject to accelerated deterioration.

Permitting a leaking roof to remain unprotected, allowing accelerated deterioration of historic building materials.

Removing important roof-scape elements such as chimneys and ventilators.
Repair

RECOMMENDED

Repair a roof by reinforcing the historic materials which comprise roof features. Repairs will also generally include the limited replacement in kind -- or with compatible substitute materials -- of those extensively deteriorated or missing parts or features when there are surviving prototypes on a main roof.

Use compatible metals or proper isolating methods in making roof repairs; galvanic action can cause deterioration of metal roofing, fasteners and flashing.

Patch built-in gutters when necessary with an appropriate, flexible and UV-resistant material. Asphalt patches are not effective and should be removed and replaced.

Repair historic flashing in kind or with a similar modern substitute of equal dimension. Flashing failure is a frequent cause of leaks and damage to the roof structure and building interior.

Repair damaged, disconnected and missing gutters and downspouts.

Slate that is still in sound condition can be salvaged and reused. To prevent damage, salvaged slate must be stored on its edge, not laid flat as shown here in Building 365.
NOT RECOMMENDED

Replacing an entire roof feature such as a dormer when repair of the historic materials and limited replacement of deteriorated or missing parts are appropriate.

Failing to reuse intact slate when only the roofing substrate needs replacement.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the roof or that is physically or chemically incompatible.

Overloading the roof support system when repairing or replacing roof elements, when performing seismic strengthening or introducing new elements such as mechanical equipment.

Patching a slate roof with tar, mastic, metal or other inappropriate material.

Patching a built-in gutter with asphalt, which cracks under movement and corrodes some metals.

Undertaking roof repairs without assessing the condition of underlayment and structure below. Making repairs to damaged interior surfaces prior to resolving roof problems.

Downspouts for many buildings terminated in a cast-iron pipe that in turn connected to a subsurface drain. The cast-iron pipe has been removed from many locations and in some instances, the downspout empties directly onto the ground adjacent to the foundation. Roof drainage should be routed away from the building.
Replace

RECOMMENDED  ...........................................................................................................

Replace in kind an entire feature of the roof that is too deteriorated to repair -- if the overall form and detailing are still evident -- using the physical evidence as a model to reproduce the feature. Examples can include a large section of roofing, or a dormer or chimney. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be used.

Use existing historical sources and physical evidence to determine the details of a deteriorated feature.

Replace a seriously deteriorated roof in conjunction with necessary seismic repairs to the underlying structure.

Replace roofing material when partial replacement of a historic roof is required, using material that matches the original in color, texture, pattern, profile and dimension. Salvaged material should be used for replacement whenever possible and warranted by the installer.

Carefully record details and retain character-defining elements when replacing a roof, and salvage materials that can be reused.

Construct all new roofs with the best quality materials available to ensure long life and low maintenance costs. The roof materials should conform to the principles of sustainable design, making use of recycled, nontoxic, locally-produced materials whenever possible.

Use metals for flashing, gutters and downspouts that are compatible in quality and longevity with the roofing materials.

Introduce or increase insulation where possible at the time of reproofing. All new work should attempt to improve the building’s thermal performance.

NOT RECOMMENDED  ...........................................................................................................

Removing a feature of the roof that is not repairable, such as a chimney or dormer, and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Replacing built-in gutters or internal downspouts with new gutters at the eaves or exterior downspouts.

Replacing copper or lead flashing with galvanized metal or other material.
Design for Missing Historic Features

RECOMMENDED

Design and construct a new feature when the historic feature is completely missing, such as a chimney or ventilator. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

Consult historical photographs and building plans to determine what original historic features are missing and use them as models for the reconstruction of missing elements.

Replace composition roofs with different materials only when the composition roofing is not historically significant and when there is clear evidence of the original materials and details. Replacement material and detailing should be based on historic research and physical history of the building.

Verify historic roofing using physical or documentary evidence. If there is no clear evidence of the original roofing material or if later roofing material has gained significance, the material should be replaced in kind.

NOT RECOMMENDED

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new roof feature that is incompatible in size, scale, material and color.
Alterations/New Additions & Structures for the New Use

RECOMMENDED

Install mechanical and service equipment in attic or on a new transitional roof addition, such as air conditioning or transformers when required for the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

Design additions to roofs such as dormers or skylights when required by the new use so that they are inconspicuous and do not damage or obscure character-defining features.

Plan for new equipment in the context of the overall roofscape and the local topography. Most buildings at Fort Worden can be seen from many vantage points, including from above, making the task of locating equipment more complicated.

Place equipment at another site when an inconspicuous location on a roof is not possible.

Design the roof of any addition to a historic building to be compatible in form, materials and details with the historic roof, ensuring as well that it is distinguishable as modern addition. Wherever possible, install any new element so that it is reversible.

NOT RECOMMENDED

Installing mechanical or service equipment so that it damages or obscures character-defining features; or is conspicuous from the public right-of-way.

Radically changing a character-defining roof shape or damaging or destroying character-defining roofing material as a result of incompatible design or improper installation techniques.

Altering the simple roof features of utilitarian buildings. Such features are character defining, and although utilitarian buildings are often good candidates for reuse, their original qualities should be maintained.

Raising a roof to add floor area or volume to a building, thereby changing the proportions of the building and the character of the roof form.
Windows
Introduction

Almost all of the windows at Fort Worden are double-hung wooden sash with lights arranged typically in combinations ranging from one over one to eight over eight. At the hospital, the size of the lights was kept to a maximum of 18 inches on a side, anything larger would be considered more prone to shatter during target practice. The precaution was not taken in other buildings.

Some steel sash exists, notably on the Balloon Hangar (Building 26), the former Gas Generator House (Building 356), the Theater (Building 25) and the Gas Station (Building 309). The fully-glazed half-walls of the gas station mark the origin of the building with automobile-related commerce rather than the conventional designs of the Quartermaster General.

Many original windows were removed during the Department of Institutions era and replaced with steel security sash. Some of these windows in turn have been removed and sensitively replaced during later rehabilitation projects. It is a goal of the design guidelines to encourage the removal of the remaining steel security sash and to replace them with double-hung wooden windows that duplicate the appearance of the originals.

The primary cause of window deterioration is rain driven against and into the sash, coupled with standing water on the sills; and also poor maintenance such as infrequent painting or glazing compound replacement. Extended periods of damp weather prevent windows from drying out and encourage expansion and rot. Settlement over the years, paint build-up, broken glazing, deteriorated putty, and in some cases interior condensation, also contribute to window deterioration.

Windows admit light and air into a building. And while heat gain is not a significant issue at Fort Worden, heat retention is, and weather stripping and regular maintenance will increase thermal efficiency. Air conditioning is not necessary and well-maintained operable windows are the preferred means of creating a well-ventilated building.

Identify, Retain, and Preserve

RECOMMENDED

Identify, retain, and preserve windows -- and their functional and decorative features -- that are important in defining the overall historic character of the building. Such features can include frames, sash, muntins, glazing, sills, heads, hoodmolds, paneled or decorated jambs and moldings, and interior and exterior shutters and blinds.

Conduct an in-depth survey of the condition of existing windows early in rehabilitation planning so that repair and upgrading methods and possible replacement options can be fully explored.

Consider the place of the window as a component of the principal exterior façade and its contribution to an interior space when determining its historic significance.

Replace damaged glazing with historically compatible glazing.

The windows on the south wall of the former first floor ward of the Hospital (Building 298) have been covered on the inside; however the openings and sash are in place when viewed from the porch. Retaining and reusing the existing windows would help bring air and light into the interior.
Preserve all original glazing. Historic glass often has distortions and imperfections that are not found in modern glass; consequently, historic glazing is often a character-defining element.

Preserve transoms in operating condition. Transoms are frequently character-defining features of corridors and other interior spaces, and provide ventilation and natural light.

Almost all the windows at Fort Worden are wooden sash. Two of the exceptions are shown here: the steel sash in Building 356 and Building 25. The Balloon Hangar (Building 26) also has steel sash that was historically operated by a system of gears and shafts.

NOT RECOMMENDED .................................................................

Removing or radically changing windows which are important in defining the historic character of the building so that the character is diminished.

Changing the number, location, size or glazing pattern of windows, through cutting new openings, blocking-in windows, and installing replacement sashes that do not fit the historic window opening.

Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes, or colors that noticeably change the sash, depth of reveal, and muntin configuration; the reflectivity and color of the glazing; or the appearance of the frame.

Obscuring historic window trim with metal or other material.

Stripping windows of historic material.

Replacing windows solely because of peeling paint, broken glass, stuck sash, and high air infiltration. These conditions, in themselves, are no indication that windows are beyond repair.

Removing salvageable, original sash locks, lifts or other window or shutter hardware.

Removing salvageable, existing textured, leaded, curved, colored or early wire glass.

Blocking or covering interior transom windows.
Protect and Maintain

RECOMMENDED

Protect and maintain the wood and architectural metal that comprise the window frame, sash, muntins, and surrounds through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.

Making windows weather tight by re-caulking and replacing or installing weather stripping.

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, i.e. if repairs to windows and window features will be required.

Preserve operating systems for historic windows (e.g., weights on double-hung windows), repairing or replacing components as needed.

Attempt to salvage any original glass if removal is ever necessary.

Remove rust and paint from steel windows by hand scraping. Grit blasting may be used to remove heavy corrosion, carefully protecting the glass and surrounds or removing the glass if possible.

Consider using interior or exterior shutters or blinds with existing windows as a means of improving energy performance. Such treatments should be employed only when appropriate to the building and should be fully reversible.

Consider the use of interior storm windows, providing that their impact on historic interior features would be minimal and reversible.

Replace damaged glazing with historically compatible glazing.

The original buildings at Fort Worden were designed before the general availability of electricity and modern electric lamps. Daylight was the preferred form of illumination and the windows were sized accordingly.
The quarters for the commissioned and non-commissioned officers all had a full set of shutters and screens. They all disappeared over time and a new set of shutters was fabricated for the Commanding Officers Quarters (Building 1) when it was placed in use as a house museum. The shutters originally were operational, and were used to help control the interior environment.

NOT RECOMMENDED

Retrofitting or replacing windows rather than maintaining the sash, frame, and glazing.

Failing to undertake adequate measures to assure the protection of historic windows.
Repair

RECOMMENDED

Repairing window frames and sashes by patching, splicing, consolidating or otherwise reinforcing. Such repair may also include replacement in kind -- or with compatible substitute material -- of those parts that are either extensively deteriorated or are missing when there are surviving prototypes such as architraves, hoodmolds, sash, sills, and interior or exterior shutters and blinds.

Repair defective sills to permit positive drainage. Window deterioration usually begins on horizontal surfaces and at joints where water collects, saturating wood and corroding steel.

Clean and oil hardware that has been painted over.

Remove built-up paint that causes sashes to be inoperable.

Remove earlier repairs that have been insensitive to the historic features, and repair according to accepted standards.

The original windows are essential in establishing the historic character of the buildings constructed during World War II; replacing them with another type of window would have a significant impact. Ongoing repair and maintenance have kept these windows in good working order.

NOT RECOMMENDED

Replacing an entire window when repair of materials and limited replacement of deteriorated or missing parts are appropriate.

Failing to reuse serviceable window hardware such as sash lifts and sash locks.

Using substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the window or that is physically or chemically incompatible.
Replace

RECOMMENDED

Replace in kind an entire window that is too deteriorated to repair using the same sash and pane configuration and other design details. If using the same kind of material is not technically or economically feasible when replacing windows deteriorated beyond repair, then a compatible substitute material may be considered.

NOT RECOMMENDED

Removing a character-defining window that is unrepairable and blocking it in; or replacing it with a new window that does not convey the same visual appearance.

Replacing historic windows solely as a means to enhance the energy conservation performance of a building.

Design for Missing Historic Features

RECOMMENDED

Design and install new windows when the historic windows (frames, sash and glazing) are completely missing. The replacement windows may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the window openings and the historic character of the building.

Restore windows that were blocked in or boarded up after the historic period and where adequate documentation exists.

Viewed from the exterior, the basement windows appear to have been removed from Building 225 and the openings blocked up. It is true that the openings are closed, however the original sash is still extant behind them. Removing the concrete blocks will return the original sash to use and illuminate the basement.
NOT RECOMMENDED

Creating a false historical appearance because the replaced window is based on insufficient historical, pictorial, and physical documentation.

Introducing a new design that is incompatible with the historic character of the building.

Reopening blocked windows and reconstructing windows without adequate historic documentation.

Many windows on the barracks were replaced with steel security sash when Fort Worden was operated by the Department of Institutions. It is a priority to replace these windows with new wood sash that more closely represents the appearance of the original windows.
Alterations/New Additions & Structures for the New Use

RECOMMENDED ..................................................

Design and install additional windows on rear or other-non character-defining elevations if required by the new use. The design should be compatible with the overall design of the building, but not duplicate the fenestration pattern and detailing of a character-defining elevation.

Provide a setback in the design of dropped ceilings when they are required for the new use to allow for the full height of the window openings.

Consider the effect of any interior changes on historic windows and trim, and the appearance of these changes from the outside as may be seen through the window.

NOT RECOMMENDED .............................................

Installing new windows, including frames, sash, and muntin configuration that are incompatible with the building’s historic appearance or obscure, damage, or destroy character-defining features.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are changed.

Planning for a new building use that will require the addition or blocking of windows on important facades or in locations that will compromise the building’s historic character.

Constructing new interior partitions or floors that intersect the windows, damaging their historic fabric and compromising the appearance of the window when viewed from the exterior.

Removing historic windows partially or completely or damaging them to install mechanical equipment or vents.

Furring interior walls to accommodate insulation or other contemporary changes in a manner that damages or compromises the character-defining elements of an historic opening.
Introduction

Entrances and porches are often the focus of most historic buildings, particularly on primary elevations. Together with their functional and decorative features such as doors, steps, balustrades, pilasters, and entablatures, they are important in defining the overall character of a building.

That is certainly true at Fort Worden where the building without a porch or a formal entry is the exception. Grand two-story porches extend across the primary elevation of the barracks and the distinctive porches of officer’s row with their sloping standing-seam metal roofs embrace the sides as well as the front. The porch detail on these two building types recalls the social hierarchy of their military origin: the entrances and porches on officers’ row are detailed with cast iron railings and turned balusters while simple pipe rail fulfills the same purpose on the barracks and the non-commissioned officers’ quarters.

Some entrances and porches have been altered. The original central entries on Buildings 202 and 203 are no longer intact, and the rear porches on the same buildings have been changed substantially. The front entry to the Hospital (Building 298) suffered significant loss of integrity with the conversion of the building to a school house. On the other hand, Building 298 retains much of the enclosed porches surrounding the original ward wing, a modification made in 1908 that has acquired significance in its own right. The rear porches on officers’ row were framed in and enclosed with wood siding in 1912, and some the rear porches on the barracks were similarly enclosed in 1916.

Some service buildings also had their own distinctive entrances in the form of loading docks that ran their full length. The loading dock is no longer in place on the Quartermaster Storehouse (Building 305) and a deteriorating remnant survives on the Ordnance Storehouse (Building 409).

The enclosed porch is an important feature of Alexander’s Castle although it no longer serves as the primary entry to the building. It is shown here prior to its repair as part of the 2002 rehabilitation of the Castle.
Identify, Retain, and Preserve

RECOMMENDED

Identify, retain, and preserve entrances -- and their functional and decorative features such as doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades, and stairs -- that are important in defining the overall historic character of the building.

Identify the importance of alterations prior to considering changes. For example, the enclosed porches on the Hospital and the Captains’ Quarters (Building 4) have acquired significance and should be maintained as currently configured.

Retain and preserve formal entrances even if they no longer provide primary pedestrian or vehicular access to the structure.

Threaded pipe rail and the accompanying connectors are distinctive components of many building porches at Fort Worden. No current manufacturer of the distinctive connectors is known, meaning that care has to be taken to ensure their continued good service.

NOT RECOMMENDED

Removing or radically changing entrances and porches that are important in defining the overall historic character of the building so that the character is diminished.

Stripping entrances and porches of historic material.

Cutting new entrances on a primary elevation.

Altering utilitarian or service entrances so they appear to be formal entrances by adding paneled doors, fanlights, sidelights or other architectural features.

The pipe railing on some of the back porch entry steps at officers’ row was removed when code-compliant railings were added. The pipe railing has been retained and is stored in the basement. It remains in place at the basement steps because there is no visitor access to that location.
Protect and Maintain

RECOMMENDED

Protect and maintain the masonry, wood, and architectural metal that comprise entrances and porches through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.

Evaluate the overall condition of materials to determine whether more than protection and maintenance are required, that is, repairs to entrance and porch features will be necessary.

Identify porch maintenance problems caused by general wear or by inappropriate changes and find solutions that are compatible with the character-defining features. Wood porches require a high degree of maintenance because of their frequent exposure to weather and traffic. Maintain existing materials with protective systems appropriate to those materials.

Distinguish between historic materials and inappropriate past maintenance interventions and remove inappropriate alterations and materials. Inappropriate materials may also contribute to increased deterioration.

This 1978 photo of the Guardhouse (Building 300) shows a partially enclosed front porch, work that was probably carried out in the 1940s or 1950s. State Parks identified it as an inappropriate alteration and removed it as part of an early historic preservation project and restored the porch to its earlier appearance.

NOT RECOMMENDED

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of entrances and porches results.

Failing to undertake adequate measures to assure the protection of historic entrances and porches.
Repair

RECOMMENDED

Repair entrances and porches by reinforcing the historic materials.

Repair will also generally include the limited replacement in kind -- with compatible substitute material -- of those extensively deteriorated or missing parts of repeated features where there are surviving prototypes such as balustrades, cornices, entablatures, columns, sidelights, and stairs.

Repair deteriorated elements of porches, such as wood stairs, decking, joists or roofing, rather than replacing the entire porch. In many cases only a small part of an element need be replaced, such as a column base instead of an entire column.

Improve the structural capacity of a porch, where needed, by adding additional concealed supports and shoring existing members rather than replacing entire structural systems.

NOT RECOMMENDED

Replacing an entire entrance or porch when the repair of materials and limited replacement of parts are appropriate.

Using a substitute material for the replacement parts that does not convey the visual appearance of the surviving parts of the entrance and porch or that is physically or chemically incompatible.

The doorway to the Gymnasium (Building 310) is among the best detailed at Fort Worden with its impressive fanlight and flanking entry sidelights. The doors, however, are replacements.
Replace

**RECOMMENDED**

Replace in kind an entire entrance or porch that is too deteriorated to repair -- if the form and detailing are still evident -- using the physical evidence as a model to reproduce the feature. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Check archival sources as well as available physical evidence before designing a replacement entrance or porch. Many resources exist for Fort Worden buildings including historic photographs and drawings.

Give careful consideration to hardware, security equipment, signage and lighting to ensure that they do not detract from the character-defining features.

*Two views of the same porch on the rear of officers' row. New steps and handrails have been added to the porches, which serve as the primary entry for most visitors. The new handrail and landing meet current accessibility standards. The handrail is of a compatible design and color, and it is not attached to the historic structure itself but to the steps and landing.*

**NOT RECOMMENDED**

Removing an entrance or porch that is not repairable and not replacing it; or replacing it with a new entrance or porch that does not convey the same visual appearance.

Changing the doors, door openings, surrounds, hardware or other character-defining elements; or changing the location of the doors.
Design for Missing Historic Features

RECOMMENDED

Design and construct a new entrance or porch when the historic entrance or porch is completely missing. The new feature may be a restoration based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character of the building.

NOT RECOMMENDED

Creating a false historical appearance because the replaced entrance or porch is based on insufficient historical, pictorial, and physical documentation.
Introducing a new entrance or porch that is incompatible in size, scale, material and color.

Alterations/New Additions & Structures for the New Use

RECOMMENDED

Design enclosures for historic porches when required by the new use in a manner that preserves the historic character of the building.

Design and install additional entrances or porches when required for the new use in a manner that preserves the historic character of the buildings, i.e., limiting such alteration to non-character-defining elevations.

Take particular care with additions to utilitarian buildings where contemporary elements may be confused with the simple historic elements.

Use the State Historic Building Code and the IBC Existing Building Code to evaluate the actual hazards or deficiencies of porches and stairways that do not meet current code requirements for guardrails, handrails and stair details. Develop interventions or alterations only as required for public safety. Alterations should be done in such a way that there is no damage done to the historic materials. Consider adding additional elements where necessary while retaining original elements. Where new elements are added, they should be compatible with the existing fabric and differentiated from original elements and be reversible.

Design access to buildings for people with mobility-related disabilities in a manner that, to the degree possible, preserves character defining features of porches and entrances.

The historic industrial-scale entry was retained at Buildings 315 and Building 532 when both structures were adapted for new uses. In each case, an entry of a scale more suitable for the new use was inserted into the original opening, retaining in place the original and character-defining doors.
NOT RECOMMENDED

Enclosing porches in a manner that results in a diminution or loss of historic character by using solid materials when glazing is more appropriate.

Installing secondary service entrances and porches that are incompatible in size and scale with the historic building or obscure, damage, or destroy character-defining features.

Introducing new elements to utilitarian buildings that disregard the significance of loading docks, oversized entry doors or other character-defining features.

Adding multiple stairs to porches that originally had only one stair, even if the current function may benefit from multiple stairs; cutting additional stairs into a grand porch so that the scale and formality of the porch is diminished.

Changing the doors and entry details or changing the location of character-defining doors and entries.

_The entrance to the new restroom in the Guardhouse (Building 300) was made accessible by changing the grade in front of the double entry doors. Many buildings may require improved accessibility, and the necessary changes need to be designed and built with care so that character-defining features remain intact._
New Additions & Structures
Introduction

An attached exterior addition to a historic building creates a new profile. Because that new profile can radically change the historic appearance, an exterior addition should be considered only when a new use cannot be successfully met by altering non-character-defining interior spaces. If the new use cannot be met within the limits of the historic building, then an attached exterior addition can be an acceptable alternative. New additions must be designed and constructed so that the character-defining features of the historic building are not compromised, obscured, damaged, or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition does not appear to be part of the historic resource.

Designing a new addition is challenging. An addition should be compatible with the existing structure and appropriate for its particular location; at the same time, character-defining features must be preserved and the new addition differentiated from the existing structure.

The buildings of Fort Worden represent a major investment in embodied energy and it will usually make sense to use existing space before constructing additional space. If a new addition is the right choice, the principles of sustainable design can govern its construction. To the extent possible, an addition must be designed to be reversible. It should have minimum impact on historic fabric, particularly when the new structure comes into contact with the historic. Sustainability will require analyzing the impact of additions on the existing building, as well as on ventilation, weather protection, fire protection and access to adjacent buildings.

A wholly new structure within the historic district can be an appropriate response for a use that cannot fit within an existing historic structure. Because the plan of Fort Worden is itself historic, any new building will have to be located where it will have the least impact on the character of the district: a void in the landscape is not necessarily an indication of a potential building site. A new building will have to be designed to be distinctive enough to be understood as a new component in the district but in a way that allows it to appear as if it belonged in its place.

*This older structure on the Theater demonstrates several features of a successful addition: it is on an inconspicuous elevation, it could be removed without damaging the historic building, and it is easily distinguished as a new element.*
RECOMMENDED

Consider and attached exterior addition in terms of both the new use and the appearance of other buildings in the historic district.

Design additions that are compatible with that larger context of Fort Worden and that also respond to the immediate surroundings and the building group.

Thoughtfully integrate a new addition into the building as well as the site, if feasible. Preserve natural features and pay particular attention to changed drainage patterns, existing trees and grading. Address the change of circulation routes to and around the building. Maintain the original sense of arrival and entry.

Identify if a building is part of a cluster of similar repetitive building types. Consider how a new addition will affect the whole building group and maintain the uniformity that characterizes the group.

Identify the character-defining features of the building. Examine its stylistic complexity to help make informed decisions about changes. Most buildings at Fort Worden have simple detailing and massing. Design of an even more restrained addition requires special consideration and calls for a creative solution so that the already understated design of the original is not altered.

Design new additions so that it is clear what is historic and what is new. Allow the historic building to predominate.

Reflect the original massing and scale of the existing building. Simple, rectangular additions will fit in better with the simple rectangular forms of the World War II-era buildings. Additions to the buildings from the earlier years may use more complex forms. Gable or hipped roofs on original buildings provide a precedent for roof lines of the addition.

Another addition, this one between the Hospital (Building 298) and Hospital Annex. Its chief recommendation is that it has been placed where it cannot be easily seen.
Achieve a balance between imitation and contrast. The degree of similarity to the original will be different in each case; some buildings will allow for more abstraction and variation.

Distinguish between new and existing elements.

Construct a new addition to minimize the loss of historic materials and so that character-defining features are not obscured, damaged or destroyed. Design an addition so that the impact on significant features is minimized. Where the existing building joins the new addition, preserve existing exterior details even though they will occur on the new interior. Limit the size and number of new openings between old and new to minimize the destruction of historic fabric.

Any effect of the new structure on the existing should be reversible, if feasible. If the addition is removed in the future, impact on the essential form and integrity of the original structure should be minimized.

Locate an attached exterior addition to the rear or on a side (preferably the least conspicuous) of the historic building, if feasible.

Consider setbacks and reveals in the wall or roof plane to differentiate the new from the existing. The setback could become a connector that could help minimize the impact to the existing structure.

Use materials compatible with the existing structure.

Provide compatibility in plan as well as in elevation. Pay attention to interior features at transitions from old to new, such as floor level changes and variations in ceiling height.

Relate to existing character-defining lines or elements established by the original building, such as window sizes, cornice lines or belt courses, to provide continuity with a new addition. For example, if wide moldings are used on the original building, it would be appropriate to use a similar design on the addition.

The construction of the Commons demonstrates that new buildings can be added to the historic district if they are well designed and sympathetically placed.
Use similar sizes, massing, placement and scale for the windows.

Consider replacement of an existing structurally inferior addition or a non-historic addition that is clearly inappropriate to the historic character of the building. Such additions may no longer satisfy the functional needs for which they were initially designed, and their careful demolition may reveal intact significant features of the original building.

Limit any new excavation or regrading adjacent to historical foundations to avoid undermining the structural stability of the building and potential archaeological resources that may be located in the builder’s trench. Ground-disturbing activities need to be reviewed by the Washington State Parks archaeologist or designated qualified archaeologist.

Plan for a new building only after effectively demonstrating that the proposed use cannot be placed in an existing historic and appropriately rehabilitated building.

Select the site for a new building where it will have the least impact on the character-defining features of the historic district while still accommodating the functional relationships necessary for the viability of the proposed use. For example, in order to be functionally effective, the Fort Worden Commons needed to be centrally located and in close proximity to on-site accommodations and meeting spaces. Similarly, a boat shelter would need to be located near the shoreline.

Ensure that the appearance of a new building belongs within the existing historic building stock and landscape of the district by providing compatibility of setback, orientation, scale, proportion, rhythm, massing, height, materials, color, roof shape, details and ornamentation, and site features.

Design a new building so that it appears to be a product of its own time rather than duplicating the design of an historic building.

**NOT RECOMMENDED**

Expanding the size of the historic building by constructing a new addition when the new use could be met by altering an interior space that is not character defining.

Attaching a new addition so that the character-defining features of the historic building are obscured, damaged, or destroyed.

Constructing temporary additions for permanent functions as opposed to carefully planned and designed additions that have a potential to become part of the history of the building.

Demolishing any part of an existing building, including an existing addition, to make way for a new addition without first determining if the part is significant and if there are feasible use alternatives.

Contrasting materials inappropriately, such as a brick addition on a wood-sided structure.

Recreating a historic building addition based on insufficient information.

Altering the character and the perception of the original building by placing an addition where it is highly visible.

Using the same wall plane, roof line, cornice height, materials, siding lap or window type to make additions appear to be a part of the historic building.
Designing a new addition so that its size and scale in relation to the historic building are out of proportion, thus diminishing the historic character.

Designing and constructing new additions that result in the diminution or loss of the historic character of the resource, including its design, materials, workmanship, location, or setting.

Designing new additions that obscure, damage, or destroy character-defining features of the historic building.

Constructing additional stories, penthouses or other rooftop additions so that the historic appearance of the building is radically changed.

Duplicating the exact form, material, style, and detailing of the historic building in the new addition so that the new work appears to be part of the historic building.

Attaching historical detail to an otherwise modern addition in an attempt to make it compatible with the historic building. The ornament of the addition should be an integral part of the building design.

Deciding to construct a new building without thoroughly examining the opportunities to place the new use in an existing and appropriately rehabilitated historic building.

Siting a new building in a location where it conflicts with existing character-defining elements, thereby reducing the integrity of the historic district.

Designing a new building without sufficient regard for compatibility of setback, orientation, scale, proportion, rhythm, massing, height, materials, color, roof shape, details and ornamentation, and site features.
Introduction

The structural system of a building should always be examined and evaluated early in the project planning stage to determine both its physical condition and its importance to the building's historic character or historical significance. If features of the structural system are exposed such as load-bearing brick walls, cast iron columns, roof trusses, posts and beams, or stone or brick foundation walls, they may be important in defining the building's overall historic character. Unexposed structural features that are not character-defining or an entire structural system may nonetheless be significant in the history of building technology.

The types of structural systems found at Fort Worden include, but certainly are not limited to the following: wooden frame construction, balloon frame construction, load-bearing masonry construction, brick cavity wall construction, heavy timber post and beam industrial construction, and skeletal steel construction.

SEISMIC ISSUES

Buildings at the Fort were built to the best standards of their time, but codes before 1922 did not include earthquake-resistant design and seismic technologies have continued to improve since that time. Many buildings at Fort Worden were built in the 1904 era and many others in the 1941 era. Requirements to strengthen historic buildings to reduce seismic hazards will depend on a number of factors specific to each building. The evaluation of the need for seismic strengthening and the performance objective required will be made by the City of Port Townsend under the provisions of the International Existing Buildings Code, with special attention to Appendix A: Guidelines for the Seismic Retrofit of Existing Buildings for each building and occupancy situation.

Once the decision is made to make seismic improvements to a building, an appropriate design response must be developed. The many different building systems, as well as the variety of proposed uses for the structures, require a wide range of structural interventions for rehabilitation. Seismic strengthening measures appropriate for one situation may not be appropriate for another. Although solutions will vary, the methodology for evaluation and implementing solutions should be similar in each situation. A consistent design process is essential to the development of appropriate solutions and to obtaining approval from the review agencies, including the National Park service and the state Office of Historic Preservation. Structural strengthening and seismic hazard reduction measures are inherently consistent with the policy of sustainable design, working to limit hazards to life safety while also assuring the building’s future life.

A two-story barracks being built in 1903 at Fort Casey on Whidbey Island, showing the full-length studs that characterize a balloon frame. The barracks at Fort Worden and Fort Casey were identical and were built at the same time.
Process for Evaluating and Implementing Seismic Improvements:

1. Evaluate need for seismic improvements:
   a. Initial survey for seismic rehabilitation requirements
   b. Investigation may include Infrared Camera survey
2. Assemble Design Team: Architect, Engineer, Owner, Contractor
3. Define applicable codes and ordinances: consult jurisdiction having authority
4. Understand the risk
   a. General structural response expected
   b. Occupancy and use
   c. Special hazards
5. Identify the building’s existing capacity
   a. Exploratory demolition (minimal)
   b. Material tests
   c. Soils testing and analysis
6. Develop criteria
   a. How much damage is acceptable?
   b. How strong should the building be?
7. Define preservation objectives
   a. Define areas of the building that are most significant
   b. Identify areas of lesser significance (potential for alteration)
   c. Identify existing voids and hidden areas within the building
8. Develop conceptual strengthening alternatives
   a. Identify appropriate alternative methods
   b. Identify alternative geometries/locations of new structure
   c. Consider mixture of structural methods as appropriate in different locations
9. Evaluate alternatives
   a. Life Safety
   b. Preservation
   c. Level of Acceptable Damage
   d. Design
   e. Cost
10. Select preferred scheme or combination

Much lighter and more economical structural systems characterized World War I and later building at Fort Worden. Shown here is a two-story frame barracks under construction in 1941; the location appears to be about the present site of the Commons.
Identify, Retain, and Preserve

RECOMMENDED

Identify, retain, and preserve structural systems—and individual features of systems—that are important in defining the overall historic character of building, such as post and beam systems, trusses, wood beams, cast iron columns, above-grade stone foundation walls, or load-bearing brick or stone walls.

Prior to designing any seismic interventions:

1. Conduct an existing conditions survey to understand existing components of the building system. Exploratory demolition should be done only when there is no other means to obtain necessary information. As much as possible it should occur in non-character-defining location with low visibility. Repairs should be performed by an appropriate tradesperson.

2. Conduct an adequately detailed testing program to evaluate and understand the physical capabilities of the existing materials. The program should incorporate masonry push tests, concrete core samples, pachometer tests, x-ray scanning, wood density tests, or other appropriate tests.

3. Evaluate or develop geotechnical information specific to the building site.

Establish the construction history of the building. Alterations may have compromised original structural system; earlier strengthening campaign may have added capacity.

Assemble a complete design team in order to evaluate the structure. This should include, in addition to a qualified engineer, architect and contractor who are experienced with historic structures.

Define applicable codes as established by the City of Port Townsend.

Identify existing capacity of the structural system, levels of hazard, and type and extent of damage expected. Include analysis of elements such as chimneys, cornices, and parapets, as well as the overall building.

Define applicable performance objectives. How strong does the building need to be in order to protect the life safety of its occupants? How much damage is acceptable? Should the building be repairable after a major earthquake (or just still standing)? These questions should be posed in each instance, and the response may be quite different for different structures and different uses.

Establish preservation objectives. Define the most significant areas of the building interior, and less significant areas that may be available for alteration. Attempt to limit intervention to areas of lesser significance. The architect should assume a key role in assisting the engineer in the development of alternative. Coordinate this process with other rehabilitation/preservation objectives for the building, which may include improved egress, accessibility, heating, ventilation and air-conditioning, or other planned programming alternatives.
NOT RECOMMENDED

Removing, covering, or radically changing features of structural systems which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Putting a new use into the building which could overload the existing structural system; or installing equipment or mechanical systems which could damage the structure.

Demolishing a load-bearing masonry wall (i.e., brick or stone) that could be augmented and retained, and replacing it with a new wall using the historic masonry only as an exterior veneer.

Leaving known structural problems untreated such as deflection of beams, cracking and bowing of walls, or racking of structural members.

Utilizing treatments or products that accelerate the deterioration of structural material such as introducing urea-formaldehyde foam insulation into frame walls.

Making structural assumptions or discounting the building’s capacity without a complete understanding of the existing structural system.

Protect and Maintain

RECOMMENDED

Protect and maintain the structural system by cleaning the roof gutters and downspouts; replacing roof flashing; keeping masonry, wood, and architectural metals in a sound condition; and ensuring that structural members are free from insect infestation.

Examine and evaluate the physical condition of the structural system and its individual features using non-destructive techniques such as X-ray photography.

NOT RECOMMENDED

Failing to provide proper building maintenance so that deterioration of the structural system results. Causes of deterioration include subsurface ground movement, vegetation growing too close to foundation walls, improper grading, fungal rot, and poor interior ventilation that result in condensation.

Utilizing destructive probing techniques that will damage or destroy structural material.
Repair

RECOMMENDED

Repair the structural system by augmenting or upgrading individual parts or features. For example, weakened structural members such as floor framing can be paired with a new member, braced, or otherwise supplemented and reinforced.

Develop alternative conceptual schemes for seismic strengthening alterations. The schemes should consider both alternative structural methods and different potential areas for locating reinforcing elements.

Evaluate the alternative conceptual schemes for their relative impact on or loss of historic material, impact on other building systems and for their relative cost. They should also be evaluated with respect to other building needs, such as egress.

Consider structural schemes which are appropriate to their building type. For example, exposed braces may be very appropriate in an industrial building. If structural strengthening is required in a more finished interior space, furring out walls to conceal the brace may be appropriate. Material and details should also be developed to be physically compatible with the surrounding original materials.

In cases where exterior and interior significance are both great and conventional methods will result in extensive loss of historic material, consider options for “blind” strengthening, such as masonry core drilling.

In highly sensitive areas of a façade, where anchorage of walls to floors and roof is necessary, consider epoxy-grouted concealed anchors.

Where exposed bolt plates are necessary, carefully consider their location and placement on the building and potential architectural treatment, detail, or the possibility of recessing them below stucco or other existing material.

Where possible, seismic strengthening measures should be designed to be reversible. This is frequently impossible due to the nature of the work, but it should be considered as a goal. Alternative schemes should be evaluated for their relative reversibility.

NOT RECOMMENDED

Upgrading the building structurally in a manner that diminishes the historic character of the exterior, such as installing strapping channels or removing a decorative cornice; or damages interior features or spaces.

Replacing a structural member or other feature of the structural system that could be augmented and retained.

Ignoring the inherent capacity of the existing structural system, and installing an entirely new structural system in the building shell.
Replace

RECOMMENDED

Replace in kind--or with substitute material--those portions or features of the structural system that are either extensively deteriorated or are missing when there are surviving prototypes such as cast iron columns, roof rafters or trusses, or sections of load-bearing walls. Substitute material should convey the same form, design, and overall visual appearance as the historic feature; and, at a minimum, be equal to its load-bearing capabilities.

NOT RECOMMENDED

Installing a visible replacement feature that does not convey the same visual appearance, like replacing an exposed wood beam with a steel beam.

Using substitute material that does not equal the load-bearing capabilities of the historic material and design or is otherwise physically or chemically incompatible.

The Double Barracks (Building 225) contains two large open rooms on the second floor. As shown in this view of the room on the west side, four iron columns support transverse ceiling beams, however the columns have been removed from the room on the east side. Further investigation will be necessary to determine if the missing columns need to be replaced.
Alterations/New Additions & Structures for the New Use

RECOMMENDED

Limit any new excavations adjacent to historic foundations to avoid undermining the structural stability of the building or adjacent historic building. Studies should be done to ascertain potential damage to archeological resources.

Correct structural deficiencies in preparation for the new use in a manner that preserves the structural system and individual character-defining features.

Design and install new mechanical or electrical systems, when required for the new use, which minimize the number of cutouts or holes in structural members.

Add a interior new floor level when required for the new use if such an alteration does not damage or destroy the structural system or obscure, damage, or destroy character-defining spaces, features, or finishes.

Create a light well to provide natural light when required for the new use in a manner that assures the preservation of the structural system as well as character-defining interior spaces, features, and finishes.

NOT RECOMMENDED

Carrying out excavations or regrading adjacent to or within a historic building which could cause the historic foundation to settle, shift, or fail; could have a similar effect on adjacent historic buildings; or could destroy significant archeological resources.

Radically changing interior spaces or damaging or destroying features or finishes that are character-defining while trying to correct structural deficiencies in preparation for the new use.

Installing new mechanical and electrical systems or equipment in a manner which results in numerous cuts, splices, or alterations to the structural members.
Introduction

An interior floor plan, the arrangement and sequence of spaces, and built-in features and applied finishes are individually and collectively important in defining the historic character of the building.

Their identification, retention, protection, and repair should be given prime consideration in every rehabilitation project. In evaluating historic interiors prior to rehabilitation, it should be kept in mind that interiors are comprised of a series of primary and secondary spaces. This is applicable to all buildings, from courthouses to cathedrals, to cottages and office buildings. Primary spaces, including entrance halls, parlor, or living rooms, assembly rooms, and lobbies, are defined not only by their features and finishes, but by the size and proportion of the rooms themselves - purposely created to be the visual attraction or functioning "core" of the building. Care should be taken to retain the essential proportions of primary interior spaces and not to damage, obscure, or destroy distinctive features and finishes.

Secondary spaces include areas and rooms that "service" the primary spaces and may include kitchens, bathrooms, utility spaces, and secondary hallways and stairs. Often changes can be made in these less important areas without having a detrimental effect on the overall historic character. The kitchen and baths of the officers' quarters are a good example of how changes to service areas can have a minimal effect on the greater interior. Care should be taken to retain original fixtures and other rare interior elements whenever possible.

Most of the residential buildings at Fort Worden reflect the highly structured society of the army in the early twentieth century. Officers' housing is larger, crafted more carefully, and of more expensive materials than housing constructed for non-commissioned officers. Both were built to house families and are traditional in plan and details. In the officers' housing, formal living patterns are indicated by the arrangement of the interiors and the provision of separate stairs and attic living spaces for servants. By contrast, the barracks were large open dormitories with specialized spaces for group dining, recreation, and amenities such as a tailor and barber shop. These distinctions blurred in the buildings erected during World War I and World War II, when officers, non-commissioned officers, and enlisted soldiers were quartered in buildings with no distinctive interior finishes, features or amenities.

The interiors of warehouse buildings and shops are open-plan spaces often with exposed structural elements; the former Ordnance Machine Shop (Building 502) includes skylights that allow the maximum amount of light into the center of the building. The open interior of the ground floor of the Wagon Shed (Building 372) is defined by regularly placed wood columns and diagonal bracing at the individual bays.

Many buildings have been altered over time to accommodate new uses, and most often with little regard for the distinctive architectural features. Certainly, the greatest number of changes, as well as the changes with the most profound impact came in the 1960s with the conversion of Fort Worden to a treatment center for young people. The hospital and several of the barracks lost almost all of their historic interiors as a result of extensive modifications to floor plans, stairways and finishes. Often the only historic detail remaining is the pressed metal ceiling, obscured by a lowered ceiling of acoustical tiles and institutional lighting.

Any new use for Fort Worden's historic buildings should be chosen so that minimal change is introduced, especially for those buildings with intact interiors. Greater freedom for new design can be taken with those buildings whose interiors have been compromised by large-scale changes.

For all buildings, sustainable design requires that finishes and treatments be environmentally sound and not depend on nonrenewable materials. Solvent-based or non-biodegradable coatings and cleaning agents must be avoided, as should such materials as adhesives and synthetics containing toxins or off-gas volatile organic compounds that contribute to indoor air and atmospheric pollution. The use of flexible elements in the design of the space, such as furniture systems as opposed to permanent partitions, may extend the usefulness of an interior and eliminate the need for further alterations. In addition, it is important that the changes introduced into historic spaces be reversible, if feasible.
Interior Spaces – Identify, Retain, and Preserve

RECOMMENDED

Identify, retain, and preserve floor plans or interior spaces that are important in defining the overall historic character of the building. This includes the size, configuration, proportion, and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves.

Determine a compatible use for the building that will require only minimal alteration. The new use must not require substantial alteration of the historic plan, distinctive spaces or character-defining architectural features or finishes.

Identify secondary spaces or non-significant areas and features that can be altered.

Conduct research as necessary to identify original floor plan configurations.

NOT RECOMMENDED

Radically changing floor plans or interior spaces -- including individual rooms -- that are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Altering the floor plan by demolishing principal walls and partitions to create a new appearance.

Altering or destroying interior spaces by inserting floors, cutting through floors, lowering ceilings or adding or removing walls.

Relocating an interior feature such as a staircase so that the relationship between features and space is altered.

Blocking natural light sources that contribute to the character of the interior spaces by altering floor plans.

An interior view of one of the barracks, dating to about 1953. Looking from the mess hall on the first floor toward the entry foyer and the day room beyond, the photograph gives us a sense of the relationship of rooms and spaces, and their configuration and proportion, to the architectural character of the barracks. These relationships have been extensively altered in Buildings 202 and 203. University of Washington Libraries, Special Collections, UW18516
Interior Features and Finishes – Identify, Retain, and Preserve

**RECOMMENDED**

Identify, retain, and preserve interior features and finishes that are important in defining the overall historic character of the building. Such features include columns, cornices, baseboards, fireplaces and mantels, paneling, light fixtures, hardware, and flooring; and wallpaper, plaster, and paint, or any other decorative materials that accent interior features and provide color, texture, and patterning to walls, floors, and ceilings.

Conduct on-site investigations and research as necessary to identify original elements, including those hidden by remodeling.

Identify significant features that must remain in place as well as those areas of finish that can be dismantled and reconstructed with minimal damage.

Retain the original exposed finish in warehouse and shop buildings. Areas of new finish should be carefully detailed and separated from existing exposed finishes.

**NOT RECOMMENDED**

Removing or radically changing features and finishes which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Installing new decorative material that obscures or damages character-defining interior features or finishes.

Removing paint, plaster, or other finishes from historically finished surfaces to create a new appearance (e.g., removing plaster to expose masonry surfaces such as brick walls or a chimney piece).

Applying paint, plaster, or other finishes to surfaces that have been historically unfinished to create a new appearance.

Stripping paint to bare wood rather than repairing or reapplying grained or marbled finishes to features such as doors and paneling.

Radically changing the type of finish or its color, such as painting a previously varnished wood feature.

Removing historic hardware and replacing it with a modern substitute of different appearance.

*The interior of the Theater has a finer degree of finish than most buildings at Fort Worden. Retaining the decorative treatment will be important in any future rehabilitation.*
Protect and Maintain

RECOMMENDED

Protect and maintain masonry, wood, and architectural metals that comprise interior features through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coatings systems.

Protect interior features and finishes against arson and vandalism before project work begins, erecting protective fencing, boarding-up windows, and installing fire alarm systems that are keyed to local protection agencies.

Protect interior features such as a staircase, mantel, or decorative finishes and wall coverings against damage during project work by covering them with heavy canvas or plastic sheets.

Install protective coverings in areas of heavy pedestrian traffic to protect historic features such as wall coverings, parquet flooring and paneling.

Remove damaged or deteriorated paints and finishes to the next sound layer using the gentlest method possible, then repainting or refinishing using compatible paint or other coating systems.

Repaint with colors that are appropriate to the historic building.

Limit abrasive cleaning methods to certain industrial warehouse buildings where the interior masonry or plaster features do not have distinguishing design, detailing, tooling, or finishes; and where wood features are not finished, molded, beaded, or worked by hand. Abrasive cleaning should only be considered after other, gentler methods have been proven ineffective.

Evaluate the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to interior features and finishes will be necessary.

Undertake paint analysis to determine historic finishes for historically significant spaces. Paint samples should be taken from the least obtrusive location possible.

Consider stripping old layers of paint before repainting. Multiple paint layers may have dulled molding profiles and patterns on some significant features such as pressed-metal ceilings. Stripping methods should be gentle enough to remove paint without damaging the substrate. Observe all precautions against exposure to lead-based paint.

Once an operating room in the Hospital, there are almost no character-defining features left in this second floor space in Building 298, which has also been enlarged by incorporating an earlier hallway. Even heavily modified interiors should be examined to ensure that important surviving historic features are not lost when additional work is carried out.
NOT RECOMMENDED

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of interior features results.

Permitting entry into historic buildings through unsecured or broken windows and doors so that the interior features and finishes are damaged by exposure to weather or through vandalism.

Stripping interiors of features such as woodwork, doors, windows, light fixtures, copper piping, and radiators; or of decorative materials.

Failing to provide proper protection of interior features and finishes during work so that they are gouged, scratched, dented, or otherwise damaged.

Failing to take new use patterns into consideration so that interior features and finishes are damaged.

Using destructive methods such as propane or butane torches or sandblasting to remove paint or other coatings. These methods can irreversibly damage the historic materials that comprise interior features.

Using new paint colors that are inappropriate to the historic building.

Changing the texture and patina of character-defining features through sandblasting or use of abrasive methods to remove paint, discoloration or plaster. This includes both exposed wood (including structural members) and masonry.

Using harsh cleaning agents that can change the appearance of historic materials such as wood.

Attaching new materials to historically significant elements, such as carpeting over wood or tile floors, in a manner that is either destructive to the original material or in any way that is not fully reversible.
Repair

RECOMMENDED

Repairing interior features and finishes by reinforcing the historic materials. Repair will also generally include the limited replacement in kind -- or with compatible substitute material -- of those extensively deteriorated or missing parts of repeated features when there are surviving prototypes such as stairs, balustrades, wood paneling, columns; or decorative wall coverings or ornamental metal ceilings.

Identify sources of moisture infiltration and correct the deficiencies.

Repair damaged plaster or replace it in kind whenever possible.

Consider removing partitions and restoring the rooms to their original proportions if rooms have been subdivided through an earlier insensitive renovation.

Examine existing fabric and original floor plans closely to determine if alterations have covered historic features without destroying them. If the changes themselves have not acquired significance, alterations may be removed and repairs made to return the interior to its historic appearance.

Remove non-historic carpet, vinyl tile or other floor covering that obscures historic wood.

NOT RECOMMENDED

Replacing an entire interior feature such as a staircase, paneled wall, flooring, or cornice; or finish such as a decorative wall covering or ceiling when repair of materials and limited replacement of such parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts or portions of the interior feature or finish or that is physically or chemically incompatible.
Replace

RECOMMENDED

Replace in kind an entire interior feature or finish that is too deteriorated to repair -- if the overall form and detailing are still evident -- using the physical evidence as a model for reproduction. Examples could include wainscoting, a metal ceiling, or interior stairs. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Replace inappropriate additions that have deteriorated with historically appropriate features and finishes.

NOT RECOMMENDED

Removing a character-defining feature or finish that is not repairable and not replacing it; or replacing it with a new feature or finish that does not have the same appearance.

Design for Missing Historic Features

RECOMMENDED

Designing and installing a new interior feature or finish if the historic feature or finish is completely missing. Examples could include missing partitions, stairs, lighting fixtures, and wall coverings; or even entire rooms if all historic spaces, features, and finishes are missing or have been destroyed by inappropriate previous work. The design may be a restoration based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character of the building, district, or neighborhood.

NOT RECOMMENDED

Creating a false historical appearance because the replaced feature is based on insufficient physical, historical, and pictorial documentation or on information derived from another building.

Introducing a new interior feature or finish that is incompatible with the scale, design, materials, color, and texture of the surviving interior features and finishes.
Alterations/New Additions & Structures for the New Use

RECOMMENDED

Accommodate service functions such as bathrooms, mechanical equipment, and office machines required by the building's new use in secondary spaces such as first floor service areas or on upper floors.

Reuse decorative material or features that have had to be removed during the rehabilitation work including wall and baseboard trim, door molding, paneled doors, and simple wainscoting; and relocating such material or features in areas appropriate to their historic placement.

Install permanent partitions in secondary spaces; removable partitions that do not destroy the sense of space should be installed when the new use requires the subdivision of character-defining interior space.

Enclosing an interior stairway where required by code so that its character is retained. In many cases, glazed fire-rated walls may be used.

Placing new code-required stairways or elevators in secondary and service areas of the historic building.

Document existing interior spaces and features photographically prior to rehabilitation.

Recycle materials whenever possible. If historic materials must be removed, they should be stockpiled and made available for other projects.

Design dropped ceilings to be set well back from the windows so they do not obstruct them and are not visible from the exterior. Dropped ceilings are appropriate only in spaces that are not character defining.

Retain the original floor-to-ceiling height in primary spaces when installing fire protection, mechanical systems or electrical systems. Locate new work in less significant secondary spaces.

Make a clear distinction between new and old construction. New work should be compatible with the historic character of the interior but should be distinguishable from the original material. New work should also be reversible.
NOT RECOMMENDED

Dividing rooms, lowering ceilings, and damaging or obscuring character-defining features such as fireplaces, niches, stairways or alcoves, so that a new use can be accommodated in the building.

Discarding historic material when it can be reused within the rehabilitation project or relocating it in historically inappropriate areas.

Installing permanent partitions that damage or obscure character-defining spaces, features, or finishes.

Enclosing an interior stairway with fire-rated construction so that the stairwell space or any character-defining features are destroyed.

Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding new code-required stairways and elevators.

Destroying character-defining interior spaces, features, or finishes; or damaging the structural system in order to create an atrium or light well.

Inserting a floor within a building that alters or destroys the fenestration; radically changes a character-defining interior space; or obscures, damages, or destroys decorative detailing.

Cutting through floors, ceilings or walls in any way that changes character-defining spaces, features or finishes.

Furring out perimeter walls for insulation or other purposes since it requires the unnecessary removal of window trim and can change the proportions of a room. Consider alternative means of improving thermal performance, such as increasing insulation in attics and basements if these spaces are not historically significant or reducing air infiltration by adding storm windows or weather stripping.
Mechanical & Electrical Systems
Introduction

Mechanical, lighting and plumbing systems improved significantly with the coming of the Industrial Revolution. The 19th century interest in hygiene, personal comfort, and the reduction of the spread of disease were met with the development of central heating, piped water, piped gas, and network of underground cast iron sewers. Vitreous tiles in kitchens, baths and hospitals could be cleaned easily and regularly. The mass production of cast iron radiators made central heating affordable to many; some radiators were elaborate and included special warming chambers for plates or linens. Ornamental grilles and registers provided decorative covers for functional heaters in public spaces. By the turn of the 20th century, it was common to have all these modern amenities as an integral part of the building.

The greatest impact of the 20th century on mechanical systems was the use of electricity for interior lighting, forced air ventilation, elevators for buildings, and electric heat. The new age of technology brought an increasingly high level of design and decorative art to the functional elements of mechanical, electrical and plumbing systems.

The visible decorative features of historic mechanical systems such as grilles, lighting fixtures, and ornamental switch plates may contribute to the overall historic character of the building and should thus be retained and repaired, whenever possible. Their identification needs to take place together with an evaluation of their physical condition early in project planning. On the other hand, the functioning parts of many older systems, such as compressors and their ductwork, and wiring and pipes may often need to be upgraded or entirely replaced in order to accommodate the new use and to meet code requirements.

Although mechanical and electrical systems at the Fort may range from rudimentary to sophisticated, the majority are relatively basic. Over the years, the Army made improvements to building systems based upon the changing functional needs of the occupants. Systems were augmented or replaced as technological advances or changes in occupancy occurred. Electric lights replaced gas lamps; gas-fired heaters replaced coal furnaces; internal plumbing replaced outhouses, pumps and cisterns; and new systems were introduced, such as the telephone; unit or central air conditioning; computer networks’ and cable and satellite communications. With each advance came new equipment, with new wires, pipes, and controls, often installed without removing outdated equipment. The Army made little attempt to conceal systems, so in many Fort Worden buildings the developments remain clearly visible, and historic elements have been to some degree preserved. Attempts to conceal systems are frequently the cause of significant damage to historic fabric, but at the Fort Worden the minimal damage incurred can generally be repaired and restored.

These guidelines emphasize issues of existing non-historic mechanical and electrical systems in historic buildings, which is a typical characteristic of buildings at the Fort. They augment the Secretary of Interior’s Standards for mechanical and electrical systems, which are orientated toward preserving historic systems and incorporating new systems in historic buildings.

- Many Fort Worden buildings have insufficient electrical service for their current uses.
- Many buildings have inadequate lighting for their present occupancy. In addition, the lighting, whether historic or non-historic, is not energy efficient.
- HVAC systems are frequently hybrids (e.g., gas boilers, electric baseboard heaters, and window air conditioning units) that are both inefficient and redundant.
- Supply and distribution systems (ducts, pipes, conduit, and wiring) are generally exposed, and in many cases, deteriorated.
- Much of the equipment, thought currently functional, is well past its designed life span.
• Most importantly, many Fort Worden systems are not currently compliant with the current International Codes adopted by the City of Port Townsend. Any major remodel or change of use would require upgrades to meet current Codes. The extent of work required must be coordinated with the Park Service. Although all safety hazards must be eliminated, full code compliance may not be required in every case.

The State Parks & Recreation Commission intends to showcase its commitment to sustainable design at Fort Worden and a major component of sustainable design is energy conservation. Mechanical and electrical systems are major consumers of energy and they can be upgraded to reduce consumption. Among the many strategies for reducing energy, consumption is the following general guidelines:

• Carefully match the proposed building program to the existing building so the need for additional light, ventilation, or heating is minimized.
• Since most Fort Worden buildings were originally designed to take advantage of natural light and ventilation, there should be little need for air conditioning for most uses if windows are operable and adequate ventilation is provided. Some uses may have special needs.
• Explore the use of storm windows and insulation to reduce demand on existing mechanical systems.
• Perform routine maintenance, such as cyclical cleaning of filters to assure the optimal efficiency as well as longevity of a system.
• Rehabilitate and reuse existing equipment whenever possible with the exception of inefficient HVAC systems, motors and hot water heaters.
• Recycle elements that must be replaced. Any new equipment should be highly efficient and have low maintenance requirements.
• Carefully consider specific building uses when planning for new building systems; heating and illuminating the entire building may not always be necessary when zoned heating and task lighting may satisfy the occupant’s needs.

A thorough understanding of both preservation and sustainable design will inform the design solution for these issues.
Suggested Process for Evaluation and Implementation

A. Survey the System
   1. Evaluate the acceptability of the system(s) and whether the system follows NPS efficiency guidelines
   2. Evaluate its functional use requirements, and the adequacy of its size and operational ability.
   3. Evaluate its energy and sustainability abilities per the Energy/Sustainability Section

B. Establish Significance
   1. Determine significance of the system and its components
   2. Determine significance of the space the system is in
   3. What is not significant may be removed and replaced to permit installation of an appropriate system.

C. Assess the Impact
   1. Assess whether needed improvements will adversely affect significant features of the building or system.
   2. Make alterations or improvements as needed that do not adversely affect the building.

D. Identify Alternatives
   1. The preferred option is to reuse significant features/elements.
   2. Leave significant elements in place even if not part of a new system if possible
   3. Any new system or components should have minimal impact on significant features
   4. Reduce impacts as much as possible
   5. Where impact is substantial, consider other uses more suitable to the limitations of the building.

E. Make Selection
   1. Select system alternatives that provide adequate solutions while minimizing impact on significant features

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Some buildings contain elements of earlier heating and ventilating systems, such as this boiler in the basement of the Hospital (Building 298). The hospital heating plant was updated several times and the boiler is not considered a feature that is considered important in defining the overall character of the building. It is likely that original mechanical and electrical components would be considered character defining.
Identify, Retain, and Preserve

RECOMMENDED .................................................................

Identify, retain, and preserve visible features of early mechanical systems that are important in defining the overall historic character of the building, such as radiators, vents, fans, grilles, plumbing fixtures, switch-plates, and lights.

Analyze each existing system for safety, energy conservation, and cost effectiveness, as well as for historic significance. Review the building background data and confer with the Park Service to assess each system. Many systems have some components that may be considered historically significant.

Employ professional engineering consultants with experience in retrofitting systems in historic buildings. Ensure mechanical and electrical subcontractors are qualified and experienced in such work.

NOT RECOMMENDED .................................................................

Removing or radically changing features of mechanical systems that are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Many buildings at Fort Worden are heated with the original radiators. The radiators are character-defining features and should be retained in place even if other heating systems are installed.
Protect and Maintain

RECOMMENDED

Protect and maintain mechanical, plumbing, and electrical systems and their features through cyclical cleaning and other appropriate measures.

Prevent accelerated deterioration of mechanical systems by providing adequate ventilation of attics, crawlspace, and cellars so that moisture problems are avoided.

Improve the energy efficiency of existing mechanical systems to help reduce the need for elaborate new equipment. Consideration should be given to installing storm windows, insulating attic crawl space, or adding awnings, if appropriate.

Analyze the condition of existing systems. The Army has carried out inspections and maintenance fairly regularly, but many obsolete mechanical and electrical systems have been abandoned in place. Assess how they may be preserved and adapted to new uses.

Keep systems in good working order with regular and careful maintenance. The microclimate of Fort Worden is periodically very damp and affected by marine air providing an ideal environment for corrosion.

Secure all equipment, gas, water, and electric lines for safety, as Fort Worden lies in an active earthquake zone.

Retain attic louvers for passive attic ventilation; where appropriate, they may be incorporated into new heating, ventilation, and air conditioning systems.

Retain and maintain system components that visually contribute to the character of a room or space, such as light fixtures, radiators, and floor or wall air distribution grilles. If this is not possible, rehabilitate or replace them in kind.

Consider remodeling of bathrooms on a case-by-case basis, retaining original fixtures where possible.
**NOT RECOMMENDED**

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of mechanical systems and their visible features results.

Enclosing mechanical systems in areas that are not adequately ventilated so that deterioration of the systems results.

Installing unnecessary air conditioning or climate control systems which can add excessive moisture to the building. This additional moisture can either condense inside, damaging interior surfaces, or pass through interior walls to the exterior, potentially damaging adjacent materials as it migrates.

Proposing uses for a building that cannot be adapted to the building’s thermal limitations (e.g., lack of insulation).

Installing new vents or louvers rather than adapting existing ones.

Allowing existing plumbing systems to deteriorate. Water infiltration from leaks is a major cause of deterioration of building materials.

**Repair**

**RECOMMENDED**

Repairing mechanical systems by augmenting or upgrading system parts, such as installing new pipes and ducts; rewiring; or adding new compressors or boilers.

Provide proper venting for heating and plumbing systems. Existing skylights, transoms, and clerestories may be used to ventilate spaces naturally.

Return all originally operable windows to functional condition.

Remove paint from painted-over skylights or transoms to restore natural light to the interior.

Provide mechanical ventilation for interior rooms and spaces that currently have inadequate ventilation.

Establish the elimination of fire hazards as a priority. Some existing systems pose fire hazards due to their composite nature, lack of clearances, or overloading.

**NOT RECOMMENDED**

Replacing a mechanical system or its functional parts when it could be upgraded and retained.

Replacing equipment or pipes that may simply require cleaning and treatment for continued use. Corrosion, frequently found in plumbing and heating equipment and piping, may be only a surface condition.
Replace

RECOMMENDED

Replace in kind--or with compatible substitute material--those visible features of mechanical systems that are either extensively deteriorated or are prototypes such as ceiling fans, switch plates, radiators, grilles, or plumbing fixtures.

Replace inappropriate light fixtures with energy-efficient fixtures that are compatible with the historic spaces, finishes, and character.

Remove surface-mounted elements such as pipes, wires, conduits, ducts, and cables that have been surface-mounted over historic finishes. Where there are necessary components of operational systems, replace them or reinstall them in a manner appropriate to the particular building.

NOT RECOMMENDED

Installing a replacement feature that does not convey the same visual appearance.

Replacing in kind non-historic systems or equipment. Many systems at Fort Worden have no historic value and are, in fact, detrimental to the historic character of a building, particularly its exterior facades. Such equipment should be removed and alternate locations of alternative systems should be provided.

These lighting fixtures are inappropriate for the space and they should be replaced with fixtures that are more compatible.
Alterations/New Additions & Structures for the New Use

**RECOMMENDED** .......................................................... ..........................................................

Install a completely new mechanical system if required for the new use so that it causes the least alteration possible to the building’s floor plan, the exterior elevations, and the least damage to the historic building material.

Provide adequate structural support for new mechanical equipment.

Install the vertical runs of ducts, pipes, and cables in closets, service rooms, and wall cavities.

Install heating units in the window frames in such a manner that the sash and frames are protected. Window installations should be considered only when all other viable heating/cooling systems would result in significant damage to historic materials.

Carefully determine new uses to ensure that a building is suitable for conversion to the new use without serious impact on the historic fabric due to the introduction of necessary system. All new systems added to a historic building must be reversible.

Design all new systems with a view toward their life span. By using the best components and planning for future growth and technological changes, future alterations and possible further damage to the historic building can be avoided.

Determine whether adding heating systems is appropriate. Some originally designed for storage or industrial use were not intended for full-time human occupancy... If the building’s internal environment is altered through the addition of heat or air conditions, historic building materials may be adversely affected. Keep alteration to the minimum necessary for the occupancy.

Bring utility services into a building underground, where possible. Penetrations for ducts, vents, or fans, when required, should be located in existing openings on secondary facades or rear roof planes.
NOT RECOMMENDED .................................................................

Installing a new mechanical system so that character-defining structural or interior features are radically changed, damaged, or destroyed.

Failing to consider the weight and design of new mechanical equipment so that, as a result, historic structural members or finished surfaces are weakened or cracked.

Installing vertical runs of ducts, pipes, and cables in places where they will obscure character-defining features.

Concealing mechanical equipment in walls or ceilings in a manner that requires the significant removal of historic building material.

Installing a “dropped” acoustical ceiling to hide mechanical equipment when this destroys the proportions of character-defining interior spaces.

Radically changing the appearance of the historic building or damaging or destroying windows by installing heating/air conditioning units in historic window frames.

Locating necessary new equipment rooms, elevators, or toilet facilities without carefully assessing their impact on historic spaces. Choose locations that allow maximum preservation of historic features.

Designing new systems before the actual use and occupancy of a building are known, to prevent overdesign of systems and unnecessary damage to the historic fabric.
Introduction

Some character-defining features of a historic building or site, such as shutters, transoms, sunrooms, porches, large overhangs, attics, ventilators and plantings, also play a major energy conserving role. Prior to retrofitting historic buildings to make them more energy efficient, the first step should always be to identify and evaluate the existing historic features to assess their inherent energy conserving potential. If it is determined that rehabilitation and retrofitting is necessary, then such work needs to be carried out with particular care to ensure that the building’s historic character is preserved in the process.

The State of Washington has mandated certain sustainability goals for State owned or funded projects which exceed a certain project size. RCW 39.35D should be reviewed and evaluated regarding Leadership in Energy and Environmental Design (LEED) requirements and Life Cycle Cost Analysis for each particular project. Buildings rehabilitated with private funds do not require LEED certification, however certification or at least targeting LEED goals is strongly encouraged. All projects must comply with the Washington State Energy Code (Chapter 51-11 WAC).

The rehabilitation and adaptive reuse of Fort Worden’s large quantity of historic buildings will provide a great opportunity to introduce and enhance sustainability and energy conserving measures on a large scale to create an entire sustainable campus.

The climate of Port Townsend is relatively moderate with temperatures that rarely reach into the teens or the 90’s; with only a few inches of rain a month; with a fare amount of wind from time to time but averaging only a few miles per hour; with morning fog in the Summer; and pretty much smog free. The Fort Worden campus can take advantage of an excellent amount of sunlight and air movement, a great combination.

Many of the historic Fort Worden buildings have (or had) passive energy conserving features including stone and masonry walls and raised foundations which hold temperatures for long periods of time; roof top ventilators which carried the air up and out of the building by thermal and wind action in coordination with louvers under the windows; tall windows which provide natural day lighting; and some enclosed porches for control of weather conditions. But, many buildings lack insulation, have antiquated inefficient heating and electrical systems and single pane windows, many of which have been made inoperable.

Sustainability means that systems and products are evaluated (measured) from the source of the product to through any manufacturing processes, to its installation in a building, to its ongoing use to conserve and preserve our natural resources (dust to dust). This means that even demolished materials should be recycled if at all possible. When new products are necessary, durable locally produced, natural and recycled materials will usually prove more energy efficient than low-quality, imported or manufactured materials.

Energy conservation or sustainability goals for Fort Worden can be summarized as follows:

1. Improve energy efficiency without sacrificing historical features
2. Employ passive strategies as the first choice for energy conservation
3. Promote energy awareness among staff, partners, facilities managers and visitors using signage, training, educational programs, incentives, etc
4. Prevent waste and restrict/manage energy use
5. Recycle all materials possible
6. Replace unsalvageable fixtures with water conserving fixtures whenever possible
7. Consider collection of rainwater for on-site irrigation
8. Consider energy collection (e.g. solar and wind) only where necessary structures and fixtures not diminish the integrity of historic structures landscapes.
9. Limit or eliminate use of chemical herbicides

Note: Although the work in this section is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of preserving character-defining features (identify, protect, repair, replace); rather, such work is assessed for its potential negative impact on the building’s historic...
character. For this reason, particular care must be taken not to obscure, radically change, damage, or destroy character-defining features in the process of rehabilitation work to make the building more energy efficient.

### Identify, Retain and Preserve

**RECOMMENDED**

Identify and evaluate existing historic features to assess their inherent energy conserving potential prior to retrofitting historic buildings to make them more energy efficient. Some character-defining features of a historic building or site—such as shutters, ventilators, transoms, sunrooms, porches and plantings—may also play a major energy conserving role. If retrofitting is necessary, it needs to be carried out with particular care to ensure that the building’s historic character is preserved in the process of rehabilitation.

Choose all new products, materials, or systems for buildings in light of their life-cycle costs. Although some may initially be more expensive, they may be more cost effective because of longevity or energy efficiency.

Educate building users regarding energy conservation.

Take advantage of cool breezes, natural light or passive solar energy available due to a building’s orientation.

Consider masonry’s or stone’s inherent ability to store thermal energy when assessing the need for wall insulation. Depending on orientation and exposure, a building’s high level of thermal inertia can be an important energy conserving feature that might be compromised by the addition of insulation. The relative effect of wall insulation needs to be studied on a building-by-building basis.

Retain plant materials, trees, and landscape features which perform passive solar energy functions such as wind breaks and summer sun shading.

*The porch on the Hospital was enclosed as part of a health regimen that emphasized the benefits of fresh air and sunshine, however it functions today as a feature that contributes to the energy efficiency of the building. The enclosed porch on the Commanding Officer’s Quarters (Building 1) performs similarly.*
NOT RECOMMENDED

Assigning an inappropriate building use that requires high energy consumption.

Planning a new use for an uninsulated building that requires the installation of an air conditioning system without first considering the suitability of the building for such use.

Painting over or blocking a window that provides daylight or ventilation.

Removing historic interior features that play a secondary energy conserving role.

The entry vestibule at one of the entries of the Quartermaster Storehouse (Building 305) is not an original feature, however it provides protection from the wind and helps conserve heat in the building.
Protect, Maintain, Repair and/or Replace

RECOMMENDED ..............................................................

Utilize the inherent energy conserving features of a building by maintaining or restoring windows and blinds in good operable condition for natural ventilation.

Restore blocked or painted-over windows to allow daylight and ventilation wherever possible.

Consider the use of thermal glazing per the Washington State Energy Code for new or rehabilitated windows. Alternatively, apply a reversible coating to existing glazing to reduce the penetration of ultraviolet rays and heat gain.

Removable devises such as blinds and external shutters, should be used to control the level of light.

Retain, repair, restore or replace (only if necessary) historic transoms for their inherent energy-conserving features.

Maintain porches and restore double vestibule entrances so that they can block the sun or retain heat and provide natural ventilation.

Maintain those existing landscape features which moderate the effects of the climate on the setting such as seasonally shading deciduous trees and evergreen wind-blocks.

Install thermal insulation and vapor barriers in attics, unheated cellars, crawl spaces and ...walls to conserve energy by increasing efficiency of mechanical systems. Carefully consider the impact of proposed wall or ceiling insulation on interior finishes and features. Buildings must breathe to allow moisture to be removed from cavities. A complete evaluation of the envelope will be necessary.

Ensure that louvers and ventilators are functional; rehabilitate and upgrade ventilators and the delivery system. Where adequate documentation exists, restore missing ventilators and their delivery systems in their historic locations rather than installing modern equipment.
Consider cyclical maintenance as one of the most important components of energy conservation design. Regular maintenance is a preventive measure against poor operation of systems, deterioration of materials, and their subsequent replacement.

**NOT RECOMMENDED**

Replacing windows or transoms with fixed thermal glazing or allowing windows and transoms to remain inoperable rather than using them for their energy conserving potential.

Replacing historic multi-paned sashes with new thermal sashes using false muntins.

Removing historic shading devices rather than keeping them in operable conditions.

Closing off transoms when dropping a ceiling or to increase acoustic privacy.

Enclosing porches located on character-defining elevations to create passive solar collectors or airlock vestibules. Such enclosures can destroy the historic appearance of a building.

Failing to regularly clean and maintain mechanical equipment and distribution systems. Lack of maintenance of mechanical systems is a major contributor to their inefficiency.

To ensure that heat is not escaping up the chimney, fireplace dampers should be checked to be sure that they are operating correctly.
Alterations/New Additions & Structures

RECOMMENDED

Cap unused chimneys with a reversible device to minimize heat loss from within.

Install insulating material on the inside of masonry (or stone) walls to increase energy efficiency where there is no character-defining interior molding around the window or other interior architectural detailing and where the integrity of the walls will be maintained.

Install thermal insulation in attics and in unheated cellars and crawspaces to increase the efficiency of the existing mechanical systems. Use reversible, environmentally friendly insulation products.

Evaluate possible use of day-lighting as a strategy for energy conservation.

Improve thermal efficiency with weather-stripping, storm windows on fixed windows, caulking, interior shades, and blinds.

Install interior storm windows on fixed windows with air-tight gaskets, ventilating holes, and/or removable clips to insure proper maintenance and to avoid condensation damage to historic windows.

Install appropriate exterior storm windows which do not damage or obscure the windows and frames.

Replace glazing with insulating type glazing on operable windows wherever possible.

Provide zoning and operational controls for all systems: regularly assess the system’s performance and level of energy use.

Add timers, sensors or other control systems to help reduce energy consumption.

Replace inefficient mechanical and electrical system with a more efficient system wherever applicable.

Use energy efficient lighting systems combined with a lower level of ambient lighting.

Implement controls to limit lighting use.

Carefully select energy-efficient equipment, computers and appliances.

Place a new addition that may be necessary to increase energy efficiency on non-character-defining elevations.
NOT RECOMMENDED

Applying thermal insulation with high moisture content into wall cavities which may damage historic fabric.

Installing wall insulation without considering its effect on interior molding, casings, trim or other architectural detailing which will be affected by increased wall thickness.

Applying thermal insulation (like urea formaldehyde foam) with potential water content that may cause the collection of moisture in wall cavities.

Removing historic shading devices rather than keeping them in an operable condition.

Replacing historic multi-paned sash with new thermal sash utilizing false muntins.

Installing interior **storm windows** that allow moisture to accumulate and damage the window.

Installing new exterior storm windows which are inappropriate in size or color and that are inoperable.

Installing tinted or reflective glazing.

Replacing **windows** or **transoms** with fixed thermal glazing or permitting windows and transoms to remain inoperable rather than utilizing them for their energy conserving potential.

Removing historic **interior features** which play a secondary energy conserving role.

Changing the historic appearance of the building by enclosing **porches**.

Replacing existing historic energy efficient **mechanical systems** that could be repaired for continued use.

Removing **plant materials**, trees, and landscape features, which perform passive solar energy functions.

Stripping the setting of **landscape** features and landforms so that effects of the wind, rain, and sun result in accelerated deterioration of the historic building.

Installing additions such as solar greenhouses, which obscure, damage, or destroy character-defining features.

Designing new addition which obscures, damages, or destroys character-defining features.
Introduction

It is often necessary to make modifications to a historic building to provide equitable access to people with disabilities. The most extensive modifications are frequently those necessary to provide access for people with limited mobility (e.g. ramps, elevators, and travel routes and passages with widths necessary to accommodate wheelchair use). Fort Worden’s purpose as a center for life-long learning makes accessibility an especially critical need in addition to simply complying with accessibility codes. Beyond accommodating park visitors, accessibility is also critical to providing equal access to employment for people with disabilities.

Accessibility to certain historic structures is required by three specific federal laws: the Architectural Barriers Act of 1968, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Federal rules, regulations, and standards have been developed which provide guidance on how to accomplish access in historic areas for people with disabilities. Also refer to ICC/ANSI A117.1 and Chapter 11 (which notes certain exceptions) of the International Building Code as adopted by the State of Washington. Work must be carefully planned and undertaken so it does not result in the loss of character-defining spaces, features, and finishes. The goal is to provide the highest level of access with the lowest level of impact.

The majority of buildings at Fort Worden have accessibility problems, many of which present serious obstacles to use by people with mobility-related disabilities. Washington State Parks and Recreation Commission intends that most of the buildings intended for public use, as well as those used by employees for routine administrative functions, be accessible. This includes exterior and interior routes, ramps, entrances, kitchens, toilets, parking, displays and signage.

Although the work in this section is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of preserving character-defining features (identify, protect, repair, replace); rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to obscure, radically change, damage, or destroy character-defining features in the process of rehabilitation work to meet accessibility requirements.

Accessibility is important in determining proposed use; some residences are more appropriate than others for modification. For example, the need to add an elevator may preclude public uses for some smaller, multistory buildings.

Accessibility design must strike a balance between equal access and sustainability, especially the preservation and conservation of existing built resources. Barrier-free access not only promotes independence for people with mobility-related disabilities, but also minimizes the need for duplicate facilities. Providing ramps to existing entries, accessible parking, barrier-free travel routes, and appropriate reach distances to fixtures should be accomplished sensitively to prevent adverse effects to the historical integrity of the site. Simple solutions and additive elements should be considered before the abandonment or replacement of existing components. Whenever possible, modifications to structures to improve accessibility should be reversible if use by the public is no longer necessary or technology provides a better solution.

Inherent characteristics of the Fort site and buildings pose the following challenges:

1. On site slopes make some areas difficult for disabled access.
2. Buildings have access several feet above grade with grand formal significantly historic entrance stairs.
3. Features that inhibit movement through the building, such a changes of floor level, narrow doors and corridors, obstacles, lack of elevators, and noncompliant stairways.
4. Toilet, bath and kitchen deficiencies due to age and design.
5. Lack of required accessibility aids, such as amenities, signage and warning and control systems.
Accessibility Considerations

RECOMMENDED

Consult with jurisdiction having authority.

Identify the historic building’s character defining spaces, features, and finishes so that accessibility code-required work will not result in their damage or loss.

Comply with barrier-free access requirements, in such a manner that character-defining spaces, features, and finishes are preserved.

Work with people with disabilities, accessibility specialists, and historic preservation specialists to determine the most appropriate solution to access problems.

Provide barrier-free access that promotes independence for people with disabilities to the highest degree practicable, while preserving significant historic features.

Design new or additional means of access that are compatible with the historic building and its setting.
NOT RECOMMENDED

Undertaking code-required alteration before identifying those spaces, features, or finishes which are character-defining and must therefore be preserved.

Making changes to buildings or sites without first seeking expert advice from access specialists and historic professionals to determine solutions.

Making access modifications that do not provide a reasonable balance between independent, safe access and preservation of historic features.

Designing new or additional means of access without considering the impact on the historic property and its setting.

The lighter area in the foundation wall of the Double Barracks (Building 225) is the location of a former entry. Re-establishing the entry at this location provides an opportunity for greater accessibility to the building as a whole.

Wheelchair lift at the Hospital (Building 298). The visual impact is significant and difficult to mask; in locations where a conventional lift is highly visible, consideration should be given to lifts that are stored at ground level.

Although a wheelchair lift at the front entry of Building 298 provides access to the building, movement is restricted to portions of the first floor only because of stairways intervening between other levels.
Introduction

Complying with current health and safety codes is part of almost every rehabilitation project, and often code-required changes can have an impact on character-defining spaces, features, and finishes.

Special coordination with the responsible code officials at the state, county or municipal level may be required. Securing building permits and occupancy licenses is best accomplished early in work project planning. It is often necessary to look beyond the “letter” of code requirements to their underlying purpose; most modern codes allow for alternative approaches and reasonable variance to achieve compliance.

From the point of view of sustainable design, the need to remove and properly dispose of toxic materials and alter a building to meet current standards must be balanced with the need to preserve and conserve the existing built resource. If a feature must be modified to meet code, additive methods rather than wholesale replacement should be used to preserve the historic resource. Selecting the most appropriate reuse for a building can also limit the impact of code-required changes.

Some historic building materials, such as asbestos insulation and lead paint, contain toxic substances that are potentially hazardous to building occupants. There has been some abatement of these materials at Fort Worden; however rehabilitation project proponents should anticipate the need for careful investigation and analysis of suspect materials as well as the possibility that some form of abatement may be required. All workers involved in the encapsulation, repair, or removal of known toxic materials should be adequately trained and should wear proper personal protective gear. Finally, preventive and routine maintenance programs for historic structures known to contain such materials should also be developed to include proper warnings and precautions.

As Fort Worden buildings are rehabilitated for new uses, Washington State Parks and the City of Port Townsend require that they be brought to a level of safety and compliance consistent with current nationally accepted model building codes as mandated by law. Rehabilitation projects will comply with the followings codes and standards:

- Americans with Disabilities Act (ADA)
- Uniform Federal Accessibility Standards (UFAS)
- International Building Code
- International Existing Buildings Code
- National Electric Code (NEC)
- Uniform Mechanical Code (UMC)
- Uniform Plumbing Code
Considerations Safety and Health

RECOMMENDED

Consult with jurisdiction having authority.

Identify the historic building’s character-defining spaces, features, and finishes so that code-required work will not result in their damage or loss.

Comply with health and safety codes, including seismic code requirements, in such a manner that character-defining spaces, features, and finishes are preserved.

Remove toxic building materials only after thorough testing has been conducted and only after less invasive abatement methods have been shown to be inadequate.

*The construction of an exterior stair as a secondary exit is difficult at Fort Worden because most buildings are visible at all their elevations. In those buildings with heavily modified interiors, a better approach would be to place the exit stair within the body of the building.*
Assess the building, the site, zones within the building, and individual features for fire and life safety. Incorporate this survey into an assessment of the building’s historically significant features.

Provide workers with appropriate personal protective equipment for hazards found in the worksite.

Work with local code officials to investigate systems, methods, or devices of equivalent or superior effectiveness and safety to those prescribed by code so that unnecessary alterations can be avoided.

Upgrade historic stairways and elevators to meet health and safety codes in a manner that assures their preservation, i.e., so that they are not damaged or obscured.

Install sensitively designed fire suppression systems, such as sprinkler systems that result in retention of historic features and finishes.

Apply fire-retardant coatings, such as intumescent paints, which expand during fire to add thermal protection to steel.

Add a new stairway or elevator to meet health and safety codes in a manner that preserves adjacent character-defining features and spaces. Because almost all the buildings at Fort Worden are visible from many perspectives, new stairs or elevators should be accommodated within the building rather than placed on the exterior.

Minimize necessary alterations to the original building through careful planning for reuse. Code requirements may make some reuse proposals impractical.

Enclosing detailed stairways for fire safety would destroy their historic character. Property managers, architects and code officials need to work together to ensure that the needs of public safety are met while ensuring that important building features are not lost.
NOT RECOMMENDED .................................................................

Undertaking code-required alterations to a building or site before identifying those spaces, features, or finishes which are character-defining and must therefore be preserved.

Altering, damaging, or destroying character-defining spaces, features, and finishes while making modifications to a building or site to comply with safety codes.

Destroying historic interior features and finishes without careful testing and without considering less invasive abatement methods.

Removing unhealthful building materials without regard to personal and environmental safety.

Making changes to historic buildings without first exploring equivalent health and safety systems, methods, or devices that may be less damaging to historic spaces, features, and finishes.

Damaging or obscuring historic stairways and elevators or altering adjacent spaces in the process of doing work to meet code requirements.

Covering character-defining wood features with fire-resistant sheathing which results in altering their visual appearance.

Using fire-retardant coatings if they damage or obscure character-defining features.

Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding a new code-required stairway or elevator.

Constructing a new addition to accommodate code-required stairs and elevators on character-defining elevations highly visible from the street; or where it obscures, damages, or destroys character-defining features.
Individual Resource Statement

Resource: Double Officers’ Quarters

Location/Building No. 07

Historical Summary: Building 07 was built in 1904 as part of the initial complement of permanent buildings at Fort Worden. It was intended to house two officers and their families and also had provision for servants’ quarters. The back porch was enclosed in 1912 and the kitchen received some remodeling in 1920. Although there are no records to indicate the frequency of changes, the bathrooms and kitchens have been remodeled several times.

Integrity Summary: Building 07 is largely intact. Its floor plan is unchanged and the most noticeable changes are in the modern fixtures and appliances in the kitchen and bathrooms. Some restoration of the interior trim has taken place. A new heating plant is in place that serves the original radiators.
Refinished cabinet work.

Looking from dining room to parlor.

Bath with newer contemporary fixtures

Kitchen showing new cabinets and flooring. Kitchen and bath cabinets and fittings have been changed several times in the past.

Distinctive sash in gable end of attic
Individual Resource Statement

Resource: **Barracks**  
Location/Building No. **202**

**Historical Summary:** Building 202 (originally Building 10) was built in 1904 as a standard 109-man coast artillery barracks and it served initially as home for the 106th Company, Coast Artillery Corps. It received modest utility upgrades in its years of service and remained largely intact until it was adapted by the state Department of Institutions as a residence unit for youth. At that time the interior was thoroughly remodeled and it remains in that condition today.

**Integrity Summary:** The basic form of the building is intact however the interior has undergone extensive and significant change. Bearing walls have been rearranged, stairways removed and reinstalled, and both floors divided into spaces that bear little relationship to the original floor plan. The central entry has been removed and the wood sash windows have been replaced with steel security windows.

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**EVALUATION MATRIX**

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<th>STRUCTURAL SYSTEM</th>
<th>DEGREE OF CHANGE IN HISTORIC FEATURE</th>
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<td>MECHANICAL SYSTEMS</td>
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<td>MASSING</td>
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**EXTERIOR**

- HIGHLY ALTERED
- NOT NOTABLE
- MOSTLY INTACT

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<th>FLOOR PLAN</th>
<th>FINISHES</th>
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<tbody>
<tr>
<td>TRIM AND CABINETRY</td>
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<td>RELATIONSHIP OF SPACES</td>
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<td>PROPORTION AND VOLUME</td>
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**INTERIOR**

- HIGHLY ALTERED
- MOSTLY INTACT
Steel security windows have replaced the original double-hung wooden sash.

A restroom has been added to the center of the first floor, displacing the original hall and stairway at the location.
Individual Resource Statement

Resource:  **Double Barracks**  
Location/Building No.  **225**

**Historical Summary:** The Double Barracks was built in 1908 and completed the episodic addition of barracks to accommodate growing troop assignments at Fort Worden before World War I. It was called a double barracks because it was actually two separate L-shaped buildings sharing a common wall in the front center. The layout was slightly different than the other barracks and it was not popular with the troops, who felt that it was a smaller, less roomy building.

**Integrity Summary:** Building 225 retains intact its general exterior integrity, however the interior has been greatly altered and only a few rooms recall the original appearance. Most of the large open areas have been partitioned into small spaces and the ceiling has been lowered in many locations. The windows no longer effectively illuminate major portions of the interior. Only fragments of historic interior finishes remain. The basement retains the greatest integrity of spaces and finishes.

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**EVALUATION MATRIX**

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RESOURCE STATEMENT / BLDG 225  
August 2008 / PAGE 1 of 3
The interior character of the building has been altered with the introduction of lowered ceilings and small rooms in most areas of the building.

Original fabric such as metal ceilings and wooden wainscot, shown here, survive only in a few locations throughout the building.
Individual Resource Statement

Resource: Hospital and Annex
Location/Building No. 298

Historical Summary: The Hospital (originally Building 18) was built in 1904 with a capacity of 24 beds on two floors that extended eastward from the central pavilion. In response to growing troop assignments to Fort Worden, the attic was enlarged and a dormer added in 1908 and then a full annex in 1910. The annex housed the medical personnel who had formerly lived in the pavilion section. The hospital received regular improvements in its utilities and facilities, and was heavily remodeled during its use by the Department of Institutions as a school.

Integrity Summary: The hospital and annex are largely intact on the exterior however the interior of both buildings have been changed significantly. The floor plan is intact in its basic parts although rooms and hallways have been reconfigured, the ward windows on the south side of first floor have been closed up, the surgeon's office fireplace has been covered, the hall between the main building and the annex enlarged to two stories, the stairways enclosed, and details and finishes largely changed. Doors and hardware have been replaced. Most metal ceilings remain although some are covered by suspended acoustical tile.
Rear entry detail on main building.

Tile detail, main floor restroom.

Enclosed sun porch on south side of ward wing.
Individual Resource Statement

Resource: **Warehouse**  
Location/Building No. **304**

**Historical Summary:** Building 304 is an example of a non-insulated warehouse, a mobilization building designed in 1937 as plan 700-324. The example at Fort Worden differs from type in that it has a loading dock and freight doors running the length of only one side. A further difference is that the interior features two large cold storage lockers and a ceiling trolley. The lockers and trolley appear to date from an early period, but they may have been installed in the 1950s.

**Integrity Summary:** Designed as a large volume with modest architectural detailing, the warehouse is largely intact. Several partitions and interior structures have been added as have ovens associated with a bakery that operated in the building in the 1980s, but it is still perceptible as a large room interrupted only by supporting columns.
 Cooler with ceiling rail.

 Typical interior showing support columns and light partitions.

 View of Building 304 looking from the west side of the building.
Individual Resource Statement

Resource: Quartermaster Office and Storehouse
Location/Building No. 305

Historical Summary: Completed in April, 1904, the building was expanded three months later by adding 75 feet to its length, the result of an increased garrison at Fort Worden because of the relocation of the coast defense headquarters from Fort Flagler. The building housed clothing and equipment, and would have been the primary source for the issuing of these items to soldiers at the fort.

Integrity Summary: Building 305 (originally Building 13) is largely intact. The most noticeable changes are the absence of the loading dock from the length of the east elevation and the addition of a shed roof extension on the west. A kitchen has been added to the interior of the main floor as well as several partitions, however the building is still perceptible as one long interconnected space. The basement and the attic are uninterrupted in their original length. A notable feature is the freight elevator; it appears that there was a second elevator in the north end of the building but it has been removed.

EVALUATION MATRIX

| DEGREE OF CHANGE IN HISTORIC FEATURE |
|------------------------|------------------------|
| HIGHLY ALTERED         | MOSTLY INTACT          |
| STRUCTURAL SYSTEM      |                        |
| MECHANICAL SYSTEMS     |                        |
| MASSING                |                        |
| FENESTRATION           |                        |
| ENTRANCES, PORCHES     |                        |
| SURFACE MATERIALS      |                        |
| ORNAMENTATION          | NOT NOTABLE            |
| ROOF, ROOF MATERIALS   |                        |
| FLOOR PLAN             | HIGHLY ALTERED         |
| FINISHES               | MOSTLY INTACT          |
| TRIM AND CABINETRY     |                        |
| RELATIONSHIP OF SPACES | HIGHLY ALTERED         |
| PROPORTION AND VOLUME  | MOSTLY INTACT          |
Open shop space showing ceiling boards and center support columns.

Interior looking from south to the north through open doorways.

Brick pier and capstone in basement.

Freight elevator in basement.
Attic showing upper end of freight elevator.

Historic sign in attic stairwell.
Fort Worden Vision, Mission, Values, and Principles

Vision

Fort Worden is a legendary gathering place where people are transformed through retreat, renewal and discovery.

Mission

Fort Worden is Washington's state park conference center for recreation, arts, culture, history and the environment. It is a confluence of creative learning, recreation, and retreat opportunities for people of all ages, abilities, and backgrounds.

Fort Worden is a partnership of the Washington State Parks and Recreation Commission, the Washington State Arts Commission, resident cultural institutions and businesses and major funders, achieving financial vitality through coordination and collaboration. The partnership
1. promotes personal growth and professional development through conferences, workshops, performances, exhibitions and special events for individuals and groups.
2. develops and manages businesses that fund annual operations; and
3. attracts public-private funding for capital projects and endowment.
4. restores, preserves and interprets the significant historical, cultural and natural resources of the area

**Values**

**Stewardship**
Fort Worden State Park develops, cares for and manages the park and serves visitors, volunteers and donors through local, native and sustainable environments and economies. Activities, programs and individual visitor experiences at the park are framed around discovery of, attentiveness to, education about and deep appreciation of its specific natural, cultural and historic environments.

**Integration**
The economic vitality of the park is a direct function of the economic vitality of all Fort Worden State Park partners and the Port Townsend community. All businesses, programs and services at the park are dynamically integrated in demonstration of shared and interrelated core values and economic strategies.

**Learning: Creativity & Discovery**
Fort Worden State Park serves individuals and gatherings dedicated to preserving and revitalizing cultural traditions, taking creative risks and generating new practices, ideas, and conversations.

**Culture of Hospitality**
Programs, services and facilities are designed, developed and promoted to attract, welcome and be accessible to all individuals whose interests are aligned with the missions, visions and values of the park partners.

**Play**
A commitment to individual health, renewal and transformation is enhanced by maintaining open space and facilities for retreat and enjoyment, as well as self-directed and organized outdoor programs that heighten respect for natural and cultural environment.

**Site Use and Development Principles**

To reflect continued commitment to the exceptional character and public use of Fort Worden, staff recommends the Commission adopt principles and objectives to guide site and facility use and development. These principles and objectives augment State Parks’ natural and cultural resource management policies and provide guidance for the location, function and approach to site and facility redevelopment and use in the implementation of the Long Range Plan.
General
First and foremost, Fort Worden State Park should continue to function as a park for public use, including day-use recreational activities, camping, meetings, reunions and vacations.

The park should accommodate increasing park demand in the future.

Any organizations and businesses operating at the park should have missions and values that support the vision, mission and values of Fort Worden State Park. Organizations offering the same visitor services should be consolidated under a single management structure.

Organizations operating at the park should work collaboratively to foster symbiotic relationships. The physical use and design of the site and buildings should support these relationships.

Site and Facilities

1. When addressing needs for additional indoor programs, lodging, visitor services or administrative spaces, first consideration should be given to the adaptive reuse of existing historic structures before construction of new facilities. Proponents of new construction must demonstrate that reuse of existing structures cannot reasonably satisfy programmatic needs or that the nature of construction would unacceptably compromise the historical integrity of existing structures.

2. In addition to complying with the State Parks and Recreation Commission’s (Commission) cultural resources policy and the standards the policy adopts, any new buildings and facilities should be designed and sited so that the form, scale, massing and materials, is in keeping with the historic character of the park. As early as practical, site and architectural design guidelines specific to the park should be developed to inform rehabilitation and new construction activities.

3. Fort Worden State Park should provide access to programs, activities, and supporting facilities to people with disabilities consistent with Commission’s policy on implementation of the Americans with Disabilities Act. Rehabilitation of the site and facilities should integrate accessibility and historic preservation goals, using creative approaches to provide programs, activities and alternative access routes to amenities. Development of new facilities will use a universal design approach.

4. Consistent with the Commission’s sustainability policy, cultural resources policy, and within the context of the fort’s historic district designation, rehabilitation of historic structures, as well as, construction of new facilities should integrate sustainable design and historic preservation goals, using “green building” practices whenever possible.

5. Rehabilitation and the location of accommodations should foster increased interaction among visitors and provide an expanded range of lodging choices, including guestrooms with private bathrooms. Reuse of facilities should be based on historic land use patterns.

6. Common-use facilities and amenities should be located within the central historic park area to foster interaction and cross-fertilization among park visitors and programs. An example of this would be the co-location of a lending library with business center and coffee shop. These shared amenities should be located geographically throughout the park area to provide convenient access. They should
be located to allow visitors to have multiple levels of interaction with each other. Possible facilities could include a cafe, meeting space, library, gym, laundry and museums.

7. Within the context of the historic district designation and Commission cultural resources policy, ecological function of the main campus and surrounding areas should be restored and enhanced. Existing plant communities should be assessed for health and restoration, including planning for the removal and control of invasive species. When possible, unneeded impervious surfaces should be removed. These surfaces should be rehabilitated with drought-tolerant grasses or grass pavers to meet event parking, native vegetation and forested landscape requirements, as appropriate.

8. Permanent on-site parking should be provided to meet typical summer and weekend parking demand. All event parking should be evaluated and located in specifically designated areas using grass pavers for greater ecological function. Designated areas should be those that do not limit other concurrent uses of the park and should be located to concentrate impact in areas of the park, such as the Industrial Zone that could accommodate event parking (Appendix I). This retains the original conception of the historic fort as a village where parking is located in pods and users move on foot from facility to facility.

9. A well-developed and environmentally-friendly pedestrian and traffic circulation plan is core to enabling people access to buildings and activities. The circulation plan should consider a park-wide shuttle (perhaps using alternative fuel), bike/walking lanes, links to city bike trails and use of Jefferson County Transit to connect visitors to the city and other modes of transportation, such as the ferry. City of Port Townsend, Port of Port Townsend, Jefferson County, State Ferries, and Fort Worden State Park planners should closely coordinate transportation planning to seamlessly integrate the park into the city’s transportation network and minimize traffic-related impacts on surrounding neighborhoods.

10. Park headquarters and administrative offices should be consolidated and moved closer to the visitor information center and park entrance to provide an earlier point of contact with visitors and better orient visitors to the park.

11. Housing for both full-time staff and temporary service level employees could ensure a positive and sustainable business environment. New housing should be constructed for full-time staff in the least historically significant areas of the park, if possible. This would create more privacy while allowing use of historic structures by park visitors. Service level employees should be provided dormitory housing in existing or new facilities in the least historically significant areas of the park, if possible.

12. Changing the use of some existing dormitories to single-room lodging, program, and administrative spaces would result in a reduction of modestly-priced bunkhouse accommodations for price-conscious visitors (e.g., school groups). Space in one or more existing barrack-type building should be reserved to retain this opportunity.
NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS.
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

NAME
HISTORIC
Fort Worden

AND/OR COMMON
Fort Worden Historic District; Fort Worden State Park

LOCATION
STREET & NUMBER
Cherry Street at W Street

CITY, TOWN
Port Townsend

STATE
Washington

CLASSIFICATION
CATEGORY
X DISTRICT
OWNERSHIP
PUBLIC

STATUS
X OCCUPIED

PRESENT USE
AGRICULTURE
COMMERCIAL
EDUCATIONAL
ENTERTAINMENT
GOVERNMENT
INDUSTRIAL
MILITARY
OTHER:

CONFERENCE CENTER

OWNER OF PROPERTY
NAME
State of Washington--Parks and Recreation Commission

STREET & NUMBER
P.O. Box 1128

CITY, TOWN
Olympia

STATE
Washington

LOCATION OF LEGAL DESCRIPTION
COUNTY
Jefferson County Courthouse

STREET & NUMBER
Jefferson and Cass Streets

CITY, TOWN
Port Townsend

STATE
Washington

REPRESENTATION IN EXISTING SURVEYS
TITLE
National Register of Historic Places

DATE
1973

DEPOSITORY FOR SURVEY RECORDS
National Register of Historic Places

CITY, TOWN
Washington

STATE
D.C.
DESCRIPTION

CONDITION

- EXCELLENT
- GOOD
- FAIR
- DETERIORATED
- RUINS
- UNEXPOSED

CHECK ONE

- UNALTERED
- ALTERED
- ORIGINAL SITE
- MOVED

DATE_____

DESCRIPT THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Situated on the northeastern tip of Quimper Peninsula, Fort Worden overlooks the Strait of Juan de Fuca to the north and Admiralty Inlet to the east. Conforming to the same immediate boundaries as when erected (between 1898 and about 1910), the post covers 503.14 acres and retains nearly all its original permanent structures, most of which were completed in 1904-5. Altogether, 8 designated structures, including one pre-1898 and six post-1910 buildings, compose the historic district. During the First and Second World Wars, the Army erected a number of temporary buildings at Fort Worden, and in contrast to the carefully placed original edifices, these newer structures were rather casually distributed. The State of Washington has demolished most of them and thereby returned the post to virtually the same stately configuration and appearance that it exhibited initially.

Near the south side of the reservation, a long east-west row of little-altered, 2 1/2-story, mostly frame, officers' quarters face northward toward the grassy parade opposite a row of south-facing, 2 1/2-story, frame, enlisted men's barracks. While most of the barracks' originally large bay rooms have been compartmentalized, the buildings' exteriors appear much as they did before World War I. Rear of the barracks is a large, generally open area, where many of the now-raised temporary buildings once stood. Less than 20 remain, and most of these form a cluster several hundred feet northeast of the barracks. Before the temporary structures in this area came down, they surrounded the original hospital, hospital steward's quarters, and administration building, which now, once again, are visually linked with the barracks. Immediately west of this area of the post are three short north-south rows of support buildings, including quartermaster's warehouses, commissary, gymnasium, and guard house. Farther west are two north-south rows of little-altered, 2 1/2-story, frame, noncommissioned officers' quarters, and still farther west is the site of another razed group of temporary structures.

With the exception of Batteries Putnam and Stoddard (which stand a short distance north of the parade and front eastward toward Admiralty Inlet and Batteries Kinzie and Vicars (which rest on a sand spit near Point Wilson, the peninsula's extreme northeastern tip), Fort Worden's massive defensive works and their support structures stand on wooded high ground north of the residential and administrative complex. Deceptively modern in appearance, the works look more like products of World War I or II than edifices visualized, as they were, in the 1880's. Like all extant Endicott-period fortifications, their armament has been removed, but thanks largely to the State, they stand free of the clutches of the area's vegetation and are in sound, little-altered condition.

The structures that form Fort Worden Historic District are:
Building #1, Commanding Officer's Quarters (1904)
Building #4, Officers' Duplex (1904)
Building #5, Officers' Duplex (1904)
Building #6, Officers' Duplex (1904)
Building #7, Officers' Duplex (1904)
Building #9, Officers' Duplex (1905)
Building #10, Officers' Duplex (1905)
Building #11, Officers' Duplex (1905)
Building #15, Field Officers' Quarters (1905)
Building #16, Officers' Quadruplex (1915)
Building #25, War Department Theatre (1932)
Building #26, Balloon Hangar (1921)
Building #200, Administration Building (1908)
Building #201, Enlisted Men's Barracks (1904)
Building #202, Enlisted Men's Barracks (1904)
Building #203, Enlisted Men's Barracks (1904)
Building #204, Enlisted Men's Barracks (1904)
Building #205, Band Barracks (1904)
Building #223, Administration Building (1904)
Buildings #224A, B, C, & D, Battery Stoddard (1903)
Building #225, Enlisted Men's Barracks (1908)
Building #229, Alexander's Castle (1880's)
Buildings #234A & B, Battery Putnam (1903)
Building #270, NCO Hospital Steward Quarters (1904)
Building #298, Hospital (1904)
Building #300, Guard House (1904)
Building #305, Quartermaster Office and Warehouse (1904)
Building #306, Commissary and Office (1910)
Building #308, Storehouse (1905)
Building #310, PX and Gymnasium (1908)
Building #313, Corps of Engineers Workshop (1905)
Building #315, Power House (1907)
Building #324, Quartermaster Storehouse (1909)
Building #325, NCO Duplex (1905)
Building #331, NCO Duplex (1909)
Building #332, NCO Duplex (1905)
Building #333, NCO Duplex (1904)
Building #334, NCO Duplex (1904)
Building #335, NCO Duplex (1909)
Building #336, NCO Duplex (1909)
Building #352, NCO Duplex (1915)
Building #353, NCO Duplex (1915)
Building #372, Wagon Shed and Teamsters Quarters (1910)
Building #409, Ordnance Storehouse (1899)
Building #413, Militia Storehouse
Building #414, District Signal Station (1909)
Building #426, Primary Dormitory, Gun and Observation Crews (1905)
Building #427, Combined Primary Fire Control Station (1903)
Building #433, Switchboard (Pre World War I)
Buildings #484, 485, 486, and 487, Concrete Storehouses
Building #490, Battery Commander's Station, Battery Benson (1905)
Building #492, Searchlight Shelter (1910)
Buildings #493, A & B Battery Powell
Buildings #493, C & D Battery Brannan
Buildings #493E, Plotting Room (1912)
Buildings #494A & B, Battery Randol (1898)
Buildings #495A & B, and 496C, Battery Quarles (1898)
Buildings #496A & B, Battery Ash (1898)
Buildings #497A & B, Battery Benson (1904)
Buildings #498A, B, C, & D, Battery Tolles (1903)
Building #498E, Searchlight Powerplant (1910)
Building #499, Battery Walker (1903)
Building #501, Artillery Engineer Cable House (1905)
Building #502, Ordnance Machine Shop (1905)
Building #594, Searchlight Powerplant (1910)
Building #596, Searchlight Shelter (1910)
Buildings #598A & B, Battery Kinzie (1908)
Buildings #599A & B, Battery Vicars (1900)

Descriptions of the most significant of these structures follow.

Commanding Officer's Quarters (building #1). Completed in April 1904, this north-facing, 2 1/2-story, frame house is one of Port Worden's finest structures. The building's cross-gabled slate roof has three single-stack, gray brick chimneys and denticulated cornices with returns. On the top story of the red-painted building, a palladian window is located on the front, and a set of arched windows are located on the east and west sides. Windows on the bottom two stories are either square or rectangular. A ground floor veranda supported by pillars extends across the front and east sides of the building. The east portion of this veranda, which opens onto an excellent view of Admiralty Inlet, is enclosed—an alteration. At the rear of the building are side and back porches that were also evidently

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Many of the descriptions are taken in part from Washington State Office of Archaeology and Historic Preservation (David M. Hansen), "Fort Worden Historic District" National Register Nomination, November 1, 1973. In each such instance, however, the AASLH representative verified the descriptive details during an on-the-spot inspection.
enclosed at a later time. The interior has a central hall plan, pressed tin ceilings, elaborate woodwork, and 4,040 square feet of living space.

Officers’ Duplex (building #4). Also completed in 1904, this 2 1/2-story, cross-gabled, U-shaped, gray-painted, frame duplex sits next to, and directly west of, building #1. Building #4 has hip-roofed verandas on both the west and east sides, with the latter evidently enclosed at a later date. A palladian window is located on the front of the top story, and decorated elliptical windows adorn the east and west gables. This home has 10,314 square feet of living space.

Officers’ Duplexes (buildings #5, 6, & 7). Each of these identical duplexes has 5,907 square feet of floor space. A decorated chimney is located at the center of the cross-gabled roofs. Porticoes and entrance ways are located on the northwest and northeast corners of the buildings, and a ground story veranda extends across the front facades. The usual palladian window is located beneath the front eaves, and decorated elliptical windows are located high on the east and west walls. A pedimented boxed cornice is located above each front porch entrance way. The cut-stone foundations have been left exposed, and each structure has two rear wings.

Officers’ Duplexes (buildings #9 & 10). These structures lack the decorated oval or elliptical windows found on the upper east and west walls of the previously mentioned residences. Instead, exterior walls present an attractive and assorted arrangement of square and rectangular openings. Verandas extend across the fronts of the dwellings, and entrance ways are located at the northwest and northeast corners. Both homes contain 6,464 square feet of living space and have two rear wings.

Officers’ Duplex (building #11). This quarters is almost identical to building #4 but has a larger back porch and lacks an enclosed veranda on the seaward side.

Field Officers’ Quarters (building #15). Although this structure has 2,000 feet more floor space than building #1, the two are erected on the same basic plan. Except for the fact that on building #15 the east portion of the veranda is not enclosed, the houses are visually similar.

Officers’ Quadruplex (building #16). Unlike the other officers’ quarters, which have stone foundations and clapboard siding, this edifice has a concrete foundation and is of brick construction. Occupying the far western end of officers’ row, building #16 has a slate roof and enclosed back
porches. The parapet gabled roof has base-linked chimneys at both the east and west ends and a shed dormer with double windows is located in the middle of the front slope of the roof. Most of the windows on the front and the two sides of the building are segmentally arched; the other windows are rectangular. All the windows on the front and sides have lug sills. A pier-supported, two-story gallery is located on the front of the building between a pair of two-story bay windows.

Administration Building (building #200). Situated amid the row of barracks this structure was formerly headquarters of the Harbor Defenses of Puget Sound. The building is similar in appearance to the nearby barracks and has a stone and brick basement, a slate roof, and clapboard siding. It is two-stories high, has a low hip roof, and is painted white with green trim, as are so many other buildings at Fort Worden. All openings are rectangular and a columned portico with balustrade is located at the entrance. The cut-stone foundation is exposed; and the cornices are frieze decorated. The office rooms of the interior remain much the same as they were in 1908, and the structure encloses 11,223 square feet of floor space.

Enlisted Men's Barracks (buildings #201, 202, 203, and 204). These 2 1/2-story structures are white-painted with green trim, and have cut-stone basements, wood frame construction, two rear wings, and slate roofs. All have been altered on the interior except building #204, which remains much the same as when built. On the exterior, all of these handsome and well-proportioned buildings are practically identical. On the front of each building is a full-length, two-story veranda with a pedimented portico featuring an attractive palladian window. All other openings are rectangular. A veranda also extends across the rear of each building between the two wings.

Band Barracks (building #205). Situated adjacent to barracks #204, this structure is almost identical to it in design but is only about one-third as large.

Enlisted Men's Barracks (building #225). Completed in 1908, this H-shaped, white-painted frame edifice is larger than the other enlisted men's barracks. It has a slate-covered, gable roof and a two-tiered veranda that passes across the front facade, connecting end wings. There is a similar veranda along the inner facade of each rear wing. All openings are rectangular.

Administration Building (building #223). Completed in 1904, this gable-roofed, 2 1/2-story structure has a wood floor, slate shingle roof, wood frame, and cut-stone foundation. Palladian windows are located on
each of the two gables and a decorated single stack chimney straddles the roof ridge at each end of the building, which has plain boxed cornices with returns. A square-pillar-supported one-story portico crosses the front and shelters the east-facing entrance.

Alexander's Castle (building #229). Erected in the 1880's, Alexander's Castle predates Fort Worden and is listed in the State Register of Historic Places. Composed of brick, this unusual structure has a large central tower with two small wings plus a small wood frame extension on a third side. The top of the brick tower has decorated battlements. Further down on the tower, as well as on the two main wings, are segmentally arched window openings with lug sills. Bedrooms are located in the tower; and a living room and kitchen are located on the ground floor.

Hospital (building #298). This white-painted, 2 1/2-story, frame structure has a stone basement, gable roof covered with slate shingles, and 20,603 square feet of floor space. Verandas are located on several sides, and all openings are square or rectangular. An unusually large chimney protrudes from the west roof. With the exception of the enclosing of a front veranda and a few other minor changes, the exterior of the Hospital appears the same as in 1904. In recent years, the interior has been altered to house a school.

NCO Hospital Steward Quarters (building #270). Completed in April 1904, this 1 1/2-story residence has a stone basement, slate roof, is of wood frame construction, and has a front porch and a one-story rear extension. All windows are rectangular. Although not quite as decorative or as large as most of the other prominent buildings at Fort Worden, the Steward Quarters is well maintained and attractive. It is painted yellow.

Guard House (building #300). This 1 1/2-story, white-painted frame building has a medium hip roof with a decorated chimney at the apex. Completed in 1904, it has the usual slate shingles and stone basement with partly exposed foundation. A gable with a palladian window is centered above the main entrance, and a half enclosed front porch extends across the front of the structure. The rear portion of the building was the cell block, and although the barred cells have been removed, the sloping concrete floor remains with arcs cut into the concrete by the swinging of cell doors.

Quartermaster Office and Warehouse (building #305). Long, low, gable-roofed building #305 was completed in 1905, and has a stone base-
ment, slate roof, and clapboard siding. It has recently been refurbished and freshly painted white with the characteristic green trim around the windows and doors. The attractive and functional structure is now a maintenance shop. It remains much the same as when built, with its loading dock extending along the full length of the east side.

Commissary and Office (building #306). This structure is connected to building #307, a smaller storehouse erected in 1922. Building #306, completed in 1910, has a brick foundation, clapboard siding, and a slate roof and stands 1-1/2 stories high. It has a decorated brick chimney on the roof crest and a round window in each of the two gables. Today, both building #306 and the adjoining building, #307, are used for storage.

PX and Gymnasium (building #310). Intended for use as the post exchange, this T-shaped, frame building was completed in 1908 and has a brick foundation and slate roof. The structure is little-altered, and the gym remains in excellent condition.

Corps of Engineers Workshop (building #313). This 1 1/2-story, frame building has a slate-covered, gable roof and stone foundation and was completed in May 1905.

Power House (building #315). This 1 1/2-story, white-painted concrete building was completed in June 1907 and has 4,356 square feet of floor space and green-painted iron shutters and doors.

NCO Duplexes (buildings #331, 332, 333, 334, 335, 336, 352, and 353). These frame residences, with the exception of squat, H-shaped building #336, are identical in appearance. They stand 2-1/2-stories high, have cross gabled roofs, two decorated chimneys that straddle the main roof ridge, plain boxed cornices with returns, and slate shingles. Decorative double windows are set in the front and rear gables; column-supported one-story porches extend across the front facades; and one-story porches extend across the front facades; and one-story enclosed porches extend across the rear of the houses. All openings are rectangular, and there are two entranceways in both the front and the rear facades. All have concrete foundations except building #335, which has a stone foundation. Each dwelling is painted a different shade of brown, blue, green, or yellow, and together they present an attractive street scape.
Wagon Shed and Teamsters' Quarters (building #372). Completed in July 1910, this long two-story building has a slate roof, clapboard siding, and concrete foundation. There are chimneys at each end and one-story wing extensions at the ends. On the front facade are a row of seven gables, each enclosing a rectangular window. All the cornices are plain boxed. The top floor was formerly the teamsters' quarters. Most of the ground story is taken up by open bays, but in the center is an enclosed area with two doorways. This building has been altered on the interior.

Batteries Ash, Quarles, and Randol (buildings #496A and B; 496C and 495A and B; and 494A and B). These three batteries, on which construction began in 1898, are actually a single continuous, 1/4-mile-long unit 10 to 12 feet high. Designed for seven guns, it is divided into three tactical batteries. As with all Fort Worden's defensive works, the lines of this unit are clean and utilitarian but well proportioned and thoughtfully executed. The rear face is broken by iron doors, ventilator openings, and, in batteries of two stories, by vertical supporting pillars or columns. The structures appear mottled, due to applications of various materials over the years to reduce the visibility of the concrete and improve water shedding abilities. These materials have included lamplack dissolved in kerosene, tar, locally manufactured paints of a green drab color and linseed oil base. Also applied were a variety of red, green, brown and yellow paints for camouflage. Along this gigantic work, positions for 10- and 12-inch guns are marked by the depressed sections of working platforms, and the circles of bolts which formerly held the carriages in place. Maneuvering rings are located on traverse walls and a stairway adjacent to one traverse wall in each emplacement leads to interior rooms. An angular concrete traverse separates each gun position, although there is an earthen traverse between Batteries Randol and Quarles and between Quarles emplacements Number Two and Three. A Taylor-Raymond projectile hoist was located beneath a splinter shield on the flank of each gun position. The actual hoists have been removed, but the delivery tables remain. The rear of the three-section battery has several openings to the interior, which is arranged in a series of corridors and rooms designed for ammunition storage and service. Although some are cluttered with debris, all interiors are in good condition. Some of the iron beams supporting the ceilings are badly rusted and some of the rooms have been modified slightly to adapt the structure to other than original purposes. Some trolley rails remain fixed to the ceilings.

Batteries Stoddard and Tolles (buildings #224A, B, C, and D; and 498 A, B, C, and D.) These batteries were built in 1903 for 6-inch guns
mounted on disappearing carriages. Each work is about 400 feet long and 12 feet high from the battery parade to the interior crest and is marked by four gun positions. An earthen traverse separates each gun. A magazine is located between each two gun positions and the truck platform is separated from the leading platform by a small banquette. These batteries are unusual for disappearing batteries in that all facilities are located on a single level as opposed to the more typical two-story design. Two emplacements of Battery Tolles were converted to barbette mounts in 1937.

Battery Benson (buildings #497A and 497B). Designed for two 10-inch guns on disappearing carriages, Battery Benson is typical of disappearing gun batteries throughout the Endicott system. Begun in 1904, the work is about 300 feet long and 20 feet high and has a distinctive two-story appearance. The gun positions are located on the top story and are separated by a flat concrete traverse. The truck corridor and delivery tables are located beneath a splinter shield to the rear of the traverse. Stairways behind the center of each loading platform lead down to the battery parade. The lower story contains ammunition storage and service rooms as well as other spaces designated for office and tool storage. A row of columns along the rear of the lower story supports the loading platform above. The metal railings from the stairways and the rear of the loading platforms have been removed. The battery has very strong horizontal lines, but the supporting pillars and arched stairways provide relief.

Battery Kinzie (buildings #598A and B). This is the largest single battery at Fort Worden and the largest of all the fortifications located in Puget Sound. It was the last Endicott-period battery built in Washington State (1908) and one of the last on the west coast. It is about 350 feet long and 25 feet high and is very similar in appearance to Battery Benson with its pillared, two-story appearance. Battery Kinzie is singular, though, in that it represents one of the final evolutionary forms of the disappearing battery. The loading platform is extremely commodious and all interior rooms are large. Many have windows for natural light, a feature unheard of in earlier batteries. An air space surrounds all the interior rooms and provides for a much drier facility. In its final design and arrangement of spaces, Battery Kinzie resembles more the 14-inch batteries in the Hawaiian and Philippine Islands than it does a typical 12-inch battery. An interesting feature is the Battery Commander's station located centrally on the traverse. A ladder leads from the station to the plotting room below.
Batteries Brannan and Powell and Battery Brannan Plotting Room (buildings #493A B, C, D, and E). Situated rear or south of Batteries Ash, Quarles, Randol, and Benson, these two batteries were begun in 1894. They consist of two U-shaped pits about 50 feet wide and 100 feet deep with positions for four 12-inch seacoast mortars in the forward end of each pit. The pits are sunk into the side of the hill and lie on an axis which runs approximately northwest-southeast. They are separated by a high earthen traverse about 200 feet wide. The sides of each pit are about 12 feet high and serve as a retaining wall for the traverse. Within the traverse and following the interior perimeter of the pit are ammunition storage spaces. Entrance to these spaces is by two large iron doors located on each side of the pit. The mortar batteries are in good condition although some are cluttered. Adjacent to each pit is a small concrete structure about 8 feet square with small viewport opening onto the pit. This was a data booth and it was from this position that firing data would be relayed to the guns via small sliding blackboards located on one side of the booth. The sliding doors to all booths are rusted in place and most of the sliding blackboards are missing. The Plotting Room (building 493E) for Battery Brannan still remains between the two pits. It is a small single-story building of frame construction covered with stucco, and has a low hip, composition roof. It was here that the positions of ships were plotted and computed into information usable to the gun crews. The structure is now in poor condition; windows and doors have been broken out, and the stucco is cracked and scaling in many places.

Battery Vicars (buildings #599A and B). This work was designed in 1900 for two 5-inch guns on balanced pillar mounts. It is about 100 feet long and 7 feet high. An iron collar from the gun carriage remains set in concrete at each gun position. The working platform is level with the battery parade and extends to the rear of the traverse and connects both gun positions. In the rear of the traverse, stairways lead down to ammunition storage rooms. A latrine has been built into the left flank of the battery, and a walkway connects the left flank of Battery Vicars with emplacement Number One of Battery Kinzie.

Batteries Putnam and Walker (buildings #234A and B; and 499). These are the smallest batteries at the post and were made to mount two 3-inch guns each. Identical in design, they are about 75 feet long and 12 feet high. The gun positions are marked by a series of short stairways leading down to the battery parade. The traverse is covered with earth and the rear wall of the battery has three sets of double iron doors leading to interior storage rooms. Both batteries were begun in 1903.
Fortified Area Support Structures (buildings #409, 414, 426, 427, 433, 484, 485, 486, 487, 492, and 596). Situated in the fortified area of Fort Worden are a variety of structures essential for the adequate functioning of the batteries. One of the oldest of these is the Ordnance Storehouse (building #409). At one time prior to 1904, most of the post structures were situated southeast of the mortar batteries, but apparently, as the post reached its planned configurations, most of these buildings were taken down. This is the only one that survives. It is a large, rectangular, frame building 75 feet long and about 30 feet wide with an uncovered loading dock running the length of the building face. The entire structure rests on 3-foot-high brick piers. It has a medium hip, slate roof and several large, circular, galvanized iron ventilators. The north side has two large central doors of diagonal tongue and groove boards. The windows are small, and most are still fitted with iron bars.

One Primary Fire Control Station (building #427) survives. The 1 1/2-story, hip-roofed stucco-covered, frame structure consists of three separate sections, each with a central concrete pillar rising from the ground to the top or observation level of the building. The concrete pillar and the building are on separate foundations and no part of the structure rests on the pillar. The pillars were used as the base for the observation instruments which would provide target information to the guns. The lower story of each section contains a room that could be used for either the observing-crew relief or as a plotting room. Reached by narrow staircases, each observation room has a narrow slit with a view of the water approaches to the fort. The building is in fair condition but it has suffered repeated vandalism.

Northwest of building #427 is the Primary Dormitory (building #426) for gun and observation crews. It measures 75-feet by 40-feet, has a low hip, composition roof, and is set low in the ground with a parados on the northwest side. Crews lived here when attack was thought to be imminent. The structure has been severely vandalized. Immediately rear of building #427 is the Telephone Switchboard (building #433). This is a concrete structure located underground and reached by a narrow approach tunnel and an iron door. The switchboard is surrounded by an air passage to reduce the possibility of condensation. South of buildings #427 and #433 is the District Signal Station (building #414), built in 1909. This is a small, single-story, masonry structure with a slate roof. A single flight of iron stairs leads to a wooden platform on the roof. The building is in good condition, although doors and windows have been somewhat damaged by vandals.
Each battery in the fortified area had a Commander's Station, a structure that housed the officer in charge of the conduct of the battery. To the rear of Batteries Ash, Quarles, and Randol are Concrete Storehouses (buildings #484, 485, 486, and 487), which were built as part of the original battery, and attached to each is a small concrete box that housed the command post for the corresponding battery. Each box is equipped with a post for an optical instrument and a narrow slit. The slit and the entry way are closed with iron doors which are still intact, although suffering from rust. The Commander's Station (building #490) for Battery Benson is sunk into the hillside immediately to the rear of that battery. An important part of a coastal fort of the Endicott period was its potential to combat ships at night. In an era without electronic equipment of any kind, this was done by using large searchlights 5 feet in diameter. Many of these lights were carefully distributed among the forts in Puget Sound. Only two searchlight stations are included in the main Fort Worden area, although others were included in a variety of secondary sites. Building #492 is a typical Searchlight Shelter. The light itself was housed on a small rail car in the concrete structure. Two large iron doors opened out onto a set of railroad tracks that led to the operating position of the light near the edge of the bluff. When no longer required, the light was simply rolled back into the shelter. Constructed about 1910, building #492 is in good condition, and the doors and rails are still intact, although the light itself and its rail car are gone. Power for the light was supplied by a 25-kilowatt gasoline generator in the Searchlight Powerplant (building #498E) located at Battery Tolles.

Boundary Justification. The district boundary delineated below roughly corresponds with the original immediate post boundary and therefore not only includes all the principal historic structures that compose this important and well-preserved Endicott-period installation but insures their preservation as a relatively complete example of that kind of fort.

Boundary Description. As indicated in red on the accompanying maps [(1) U.S.G.S. 7.5' Series, Washington; Port Townsend North Quad., 1953; (2) Fort Worden Reservation Boundary and Land Use Map, U.S. Army Corps of Engineers, Seattle, Washington, Drawing No. 18-02-01, Sheet 2 of 27, November 1951; and (3) Fort Worden Topography Map, U.S. Army Corps of Engineers, Seattle, Washington, Drawing No. 18-02-01, Sheet 27 of 27, November 1951], a line "commencing at a Point on the Meander Line of the Strait of Juan de Fuca in Sec. 25 T31N, R1W, WM, thence S-92.98 ft. to Witness Mon. J. Co. No. 40°, thence continuing S-1786.0 ft.,..."
thence N89°54' E-208.5 ft., thence S0°07' W-835.5 ft., thence N89°52' E-232.3 ft., thence S0°05' E-544 ft., thence S38°45' E-128.4 ft., thence S10°40' W-356.95 ft., thence S79°30' E-2733.4 ft. to Witness Mon. J. Co. No. 29, thence S79°30' E-161.6 ft. to a Point on the Meander Line, thence northerly and westerly along Meander Line (excluding Pt. Wilson L. H. Reservation) to Point of Beginning, containing 503.14 acres plus Tide Lands." (Description Source: Fort Worden Reservation Boundary and Land Use Map, U.S. Army Corps of Engineers, Seattle, Washington, Drawing No. 18-02-01, Sheet 2 of 27, November 1951.)
SIGNIFICANCE

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SPECIFIC DATES 1898-1920  

STATEMENT OF SIGNIFICANCE

Of the several coastal forts designated as National Historic Sites or National Historic Landmarks, none specifically commemorates the remarkable Endicott defense system constructed in the 1890's and early 1900's. Based on the recommendations of a board appointed by President Grover Cleveland in 1885 and headed by Secretary of War William C. Endicott, the system was the most extensive and complex that the United States had ever attempted. Furthermore, as distinguished military historian Russell F. Weigley has observed, "the Endicott program offered the feeling that the country now possessed a kind of military policy looking toward foreign war, and this feeling was so reassuring that in the War Department reports and the military publications of the 1890's interest in the coastal defenses became almost obsessive." When completed, the new system constituted a hallmark of American military thought and design.

Due to geographical and fiscal considerations, many Endicott fortifications were superimposed over existing defensive works. Unaltered Fort Worden, one of the largest posts in the new system, is a rare example of an Endicott installation built on previously unfortified ground; its plan accurately reflects the precepts of the system without making concessions to older works. In addition, the post's monolithic reinforced concrete fortifications mirror both the typical and the unique of the era; its barracks, quarters, and administration buildings offer a virtually unchanged illustration of a late-19th-century, single-purpose military reservation; and its location on the Strait of Juan de Fuca makes it the only Endicott fort to have been erected within sight of a base of a potential adversary.

Situated on the northeastern tip of Quimper Peninsula, Fort Worden overlooks the Strait of Juan de Fuca to the north and Admiralty Inlet to the east. Conforming to the same immediate boundaries as when erected (between 1898 and about 1910), the post covers 503.14 acres and retains nearly all its original permanent structures, most of which were completed in 1904-5. Altogether, 8 designated structures, including one pre-1898 and 6 post-1910 buildings, compose the historic district.

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NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY MAP FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES. ENCLOSE WITH MAP

NAME
HISTORIC
Port Worden
AND/OR COMMON
Port Worden Historic District

LOCATION
CITY
Townsend
VICINITY OF
COUNTY
Jefferson
STATE
Washington

MAP REFERENCE
SOURCE
U.S.G.S. 7.5' Series
SCALE
1:24,000
DATE
1953

REQUIREMENTS
TO BE INCLUDED ON ALL MAPS
1. PROPERTY BOUNDARIES
2. NORTH ARROW
3. UTM REFERENCES
History

During much of the second half of the 19th century, the United States saw no likelihood of a foreign war and, as military historian Russell F. Weigley has pointed out, had "virtually no military policy at all." The Nation's scheme of defense differed little from that of George Washington's era—reliance on coastal fortifications to protect the American seaboard and on the Navy to guard the forts and the country's maritime commerce. As the century drew toward a close, however, U.S. foreign policy grew more adventurous, and interest in sea power quickened. Efforts to begin building a modern steel fleet revealed both that American industry could not produce armor plate and armor-piercing guns comparable to those appearing in Europe and that development of these heavy breech-loading, rifled artillery pieces had rendered the United States' vertical, masonry, seacoast forts obsolete. No foreign power threatened America's shores, but nevertheless much of the public, a sizable group in Congress, and most officers of the Army and Navy clamored for corrective action. Thus, in 1885 President Grover Cleveland appointed a special board, headed by Secretary of War William C. Endicott, to review the entire system of coastal defense and recommend a new program.

The Endicott Board presented its proposals early in 1886. Although well-received by the military, they were somewhat extravagant, calling for erection of new earthwork and steel-plated masonry fortifications at 27 (later 28) principal harbors, development and installation of floating batteries, torpedo boats, and submarine mines. Estimated cost of the program equalled almost $127 million. Congress approved an initial appropriation for the Endicott system in 1888, but construction did not get underway until 1890. Then, despite proceeding slowly, the work, says Weigley, "offered the feeling that the country now possessed a kind of military policy looking toward foreign war, and this feeling was so reassuring that in the War Department reports and the military publications of the 1890's interest in the coastal defenses became almost obsessive." Since there still was no menace to American security from overseas, it seems clear, therefore, that the Endicott program both reflected and contributed to the rise of American imperialism.

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2 Ibid., 281.
3 Ibid., 284.
Physically, the new defense system was, in the view of Fort Worden historian David M. Hansen "a hallmark of military design." Because the unexpectedly high performance of the new armament made it possible to reduce the number of weapons and installations needed and thereby lower the cost of the program, the Endicott Board's report "formed the basic framework around which," according to historian Emanuel Raymond Lewis, "a new and completely modern generation of seacoast defenses took shape." As emphasis shifted from fortification structures to the weapons contained therein, the stark, vertical-walled fortresses of America's "Third System" of coastal defense gave way in importance to massive, reinforced concrete works designed to blend, so far as possible, into the surrounding landscape.

The new weapons developed for these works were so much larger and so painstakingly assembled that armament accounted for 50 to 75 percent of the cost of a new fortification, compared to about 17 percent of a Third System fort. Rifled guns of 8-, 10-, and 12-inch caliber constituted the chief armament of the Endicott period. The largest of these could hurl a 1,000-pound projectile 7 to 8 miles. Many of these guns rested on newly invented disappearing carriages that allowed an individual weapon to be lowered by its own recoil to a position behind a parapet where artillerymen could reload it in relative safety. At emplacements considered safe from low-level naval fire, some of the giant guns sat on a new kind of barbette carriage. In both types of emplacement, ammunition magazines were situated adjacent to the weapons, usually at a lower level under a minimum of 12 feet of reinforced concrete. Mechanical hoists of various kinds moved the huge shells to the gun platforms.

Endicott-period batteries generally mounted two to four weapons, but "in certain rare instances," notes Lewis, "as many as six or seven pieces were grouped together in a continuous row of emplacements." Fort Worden's Batteries Ash, Quarles, and Randol—which actually compose a continuous unit divided only for tactical purposes—present an excellent example of this kind of arrangement. They mount a total of seven 10- and 12-inch guns. At most forts, including Worden, these large rifles were complemented by smaller, rapid-fire guns—not specified by the Endicott Board but installed nevertheless—and large 12-inch mortars, which were

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6 Ibid., 79.
capable of lofting shells in high arcs for descent onto the decks of enemy ships.

As the Government chose sites for the new fortifications, it created a few new military reservations but most often erected elements of the new system upon existing reservations next to older works, such as at Forts Adams and Taber. In some instances, when no other space was available, military engineers merely installed Endicott emplacements within or on top of existing Third System forts, like at Fort Warren in Boston harbor, Fort Sumter in Charleston harbor, and Forts Morgan and Gaines near Mobile. Unaltered Fort Worden is a rare extant example of an Endicott-period fort built on previously unfortified ground.

Situated on the northeastern tip of Quimper Peninsula, Fort Worden formed part of, and served as headquarters for, the harbor defenses of Puget Sound. Almost two-thirds of the post's 500-plus acres was designated a fortified zone, and its guns overlooked both the Strait of Juan de Fuca and Admiralty Inlet. The Army commenced construction of the post by 1898, and by 1910 workmen had completed 12 batteries, which mounted a total of 41 guns and made Fort Worden one of the largest in the Endicott system. Most excavation for the cavernous works was done by hand or horse-drawn scrapes. Operating on specially laid narrow guage track, a steam donkey engine hauled concrete and other materials to the hilly construction sites. When the digging was finished and the concrete poured, the builders removed the railroad equipment, graded and sowed grass on the slopes in front of the batteries, and washed the exposed rear faces of the light-colored structures with lampblack to reduce glare. Once the armament had been put in place, the monstrous works, with their underground tunnels and concealed observation posts, sprawled over some 300 acres and stood almost completely invisible from ships at sea.

Batteries Ash, Quarles, and Randol constituted the main installation at Fort Worden. Almost a quarter mile long, these emplacements mounted their seven guns on barbette carriages, which held them over the edge of the emplacement at all times. On each carriage a narrow loading platform extended behind the gun about 10 feet. Half-ton projectiles had to be winched up to this level before they could be rammed home by a crew of men standing on the platform. When originally designed in 1898, this series of batteries represented an experimental solution to an annoying problem. A basic difficulty in coast defense was the handling of ammunition, which had to be kept both safe from enemy bombardment behind thick walls and readily accessible to gun crews. The typical approach was to build the battery two stories high with ammunition rooms at ground level and the gun itself above. This meant that the ammunition had to be
brought to the gun by elevator. If the elevator was broken or damaged, the gun itself would be rendered useless. In an effort to solve this problem, Fort Worden engineers decided to put everything on a single level. Shells and powder would be brought out on trolleys suspended from the ceilings of the ammunition rooms and corridors and placed on low carts that ran on circular tracks around the guns. The carts would be brought to the raised platforms and the ammunition winched up to the gun by cranes. This design seemed to eliminate the need for elevators and get the ammunition from storage to gun in an efficient manner—at least on paper. When actually tested the method proved inefficient. For this reason and because of early indecision about which of the three batteries should hold the 12-inch guns and which the 10-inch, all three structures were rebuilt, beginning in 1904, and the ammunition magazines were placed below the guns.

The last and most modern battery built at Fort Worden was Battery Kinzie. Its impressive size, together with a number of improvements over earlier designs, made it the most sophisticated battery for a large caliber disappearing weapon in the continental Endicott system. In the dozen or so years between the construction of the first batteries on the east coast and the construction of Battery Kinzie in 1908, a great deal had been learned. The emplacements of Battery Kinzie offered gun crews far more room than earlier batteries for guns of the same caliber. Interior chambers were also larger, better ventilated, and surrounded with air passages to reduce condensation on interior walls. Ammunition service was simplified and equipment storage improved. Overall, the design of Battery Kinzie resembled the batteries of 14-inch guns then being built at the Panama Canal.

Despite the tremendous technological achievements and fiscal expenditures that the Endicott system represented, and the political and diplomatic policies that it indicated or reflected, it almost reached obsolescence before it reached completion. Even before World War I, ships' armament regained superiority over land-based weaponry, and the advent of the airplane as an effective war machine rendered Endicott fortifications virtually defenseless. The Army placed a few antiaircraft batteries at Fort Worden and other Endicott posts, but the guns were far too few to be of any real value. During the First World War, the War Department removed many coastal weapons throughout the system and converted them to railway guns, siege artillery, or deck guns on transport ships. In World War II the authorities had most of the remaining armament cut up for scrap. At Fort Worden only small-caliber rifles were left, as only they might prove effective against maneuverable torpedo boats, which officials believed would be a major threat during an invasion.
By the end of the Second World War, all coastal guns at Fort Worden and the other Endicott fortifications were gone. In 1947 Fort Worden became a military engineering post and continued in that capacity until 1953. Declared surplus property, it was then acquired by the State of Washington and used for a time as a youth center. During those years, the State removed most of the temporary buildings that had been erected over the years, leaving with few exceptions only the original Endicott-period structures, including the gigantic batteries. Now a State park and conference center, Fort Worden offers its visitors an exceptional view of the philosophy and technology of the military defense system upon which the Nation depended at the turn of the century.


MAJOR BIBLIOGRAPHICAL REFERENCES


GEOGRAPHICAL DATA

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VERBAL BOUNDARY DESCRIPTION

(See last page of description.)

FORM PREPARED BY

NAME / TITLE  George R. Adams, Managing Editor

ORGANIZATION  American Association for State and Local History  April 1976

ADDRESS  1400 Eighth Avenue South  615-242-5583

CITY OR TOWN  Nashville  Tennessee

STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL  STATE  LOCAL

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION ATTEST:

KEEPER OF THE NATIONAL REGISTER
Fort Worden Historic District
Port Townsend, Washington

Fort Worden Reservation Boundary
and Land Use Map
U.S. Army Corps of Engineers
Seattle, Washington
Drawing No. 16-02-01
Sheet 2 of 27
November 1951
Port Worden Historic District
Port Townsend, Washington

U.S.G.S. 7.5' Series
Wash.; Port Townsend North Quad.
Zone 10
A: E. 516,740  N. 5,332,060
B: E. 518,340  N. 5,332,180
C: E. 517,760  N. 5,330,740
D: E. 516,880  N. 5,330,900
E: E. 516,730  N. 5,331,400

PORT TOWNSEND NORTH, WASH.
NE/4 PORT TOWNSEND 15' QUADRANGLE
N 4907.5 - W 12245.7
1953

AMS 1480 III NE-SERIES V891
NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- ENCLOSE WITH PHOTOGRAPH

1. NAME
HISTORIC
Fort Worden

AND/OR COMMON
Fort Worden Historic District

2. LOCATION
CITY, TOWN
Port Townsend

VICINITY OF

STATE
Washington

COUNTY
Jefferson

3. PHOTO REFERENCE
PHOTO CREDIT
George R. Adams, AASLH
NEGATIVE FILED AT
Historic Sites Survey, NPS

DATE OF PHOTO
October 1975

DESCRIPTION
Batteries Ash (building #496), Quarles (#495), and Randol (#494).
Rear, or open side. View to southeast.

4. IDENTIFICATION

PHOTO NO.
5

Armament emplacement, Battery Ash (building #496A). View to east.
NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

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AND/OR COMMON
Fort Worden Historic District.

2 LOCATION
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Fort Townsend
VICINITY OF

STATE
Washington
COUNTY
Jefferson

3 PHOTO REFERENCE
PHOTO CREDIT
George R. Adams, AASLH
DATE OF PHOTO
October 1975
NEGATIVE FILED AT
Historic Sites Survey, NPS

4 IDENTIFICATION
DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET
Battery Tolles (building #498). View to east. Strait of Juan de Fuca in background.

NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
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DATE OF PHOTO
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Historic Sites Survey, NPS

4 IDENTIFICATION
DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET
Battery Kinzie (building #598). Topside. View to east.
NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- ENCLOase WITH PHOTOGRAPH

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Fort Worden Historic District

LOCATION
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Port Townsend
VICINITY OF
State
Washington
County
Jefferson

PHOTO REFERENCE
PHOTO CREDIT
George R. Adams, AASLH
NEGATIVE FILED AT
Historic Sites Survey, NPS
DATE OF PHOTO
October 1975

IDENTIFICATION
DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET
Fort Worden barracks (center), parade, and officers' quarters (background). View to south.

NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- ENCLOase WITH PHOTOGRAPH

NAME
HISTORIC
Fort Worden
AND/OR COMMON
Fort Worden Historic District

LOCATION
CITY, TOWN
Port Townsend
VICINITY OF
State
Washington
County
Jefferson

PHOTO REFERENCE
PHOTO CREDIT
George R. Adams, AASLH
NEGATIVE FILED AT
Historic Sites Survey, NPS
DATE OF PHOTO
October 1975

IDENTIFICATION
DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET
Battery Kinzie (building #598). View to north, showing south facade.
NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- ENCLOSE WITH PHOTOGRAPH

1 NAME
HISTORIC
Fort Worden
AND/OR COMMON
Fort Worden Historic District

2 LOCATION
CITY, TOWN
Port Townsend
VICINITY OF
STATE
Washington
COUNTY
Jefferson

3 PHOTO REFERENCE
PHOTO CREDIT
George R. Adams, AASLH
DATE OF PHOTO
October 1975
NEGATIVE FILED AT
Historic Sites Survey, NPS

IDENTIFICATION
DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET
Officers' Quarters (buildings #9, 10, and 11). View to west, showing east sides and north (front) facades.

NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY MAP FORM

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- ENCLOSE WITH MAP

1 NAME
HISTORIC
Fort Worden
AND/OR COMMON
Fort Worden Historic District

2 LOCATION
CITY, TOWN
Port Townsend
VICINITY OF
COUNTY
Jefferson
STATE
Washington

3 MAP REFERENCE
SOURCE
Fort Worden Topography Map
U.S. Army Corps of Engineers, Seattle
Scale
1 inch=100 feet
Drawing No. 18-02-01
DATE
November 1951
Sheet 27 of 27

4 REQUIREMENTS
TO BE INCLUDED ON ALL MAPS
1. PROPERTY BOUNDARIES
2. NORTH ARROW
3. UTM REFERENCES
NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM
(Type all entries - attach to or enclose with photograph)

1. NAME:
   COMMON: Officers' Row (Fort Worden Historic District)
   AND/OR HISTORIC:

2. LOCATION
   STREET AND NUMBER: Near Port Townsend
   CITY OR TOWN:
   STATE: Washington
   CODE: 53
   COUNTY: Jefferson
   CODE: 031

3. PHOTO REFERENCE
   PHOTO CREDIT: David Hansen
   DATE OF PHOTO: 1972
   NEGATIVE FILED AT:
   Washington State Parks & Recreation Commission

4. IDENTIFICATION
   DESCRIBE VIEW, DIRECTION, ETC.
   View looking west. Building #1, the Commandant's House, is on the left. Note the palladian windows, a common trait at Port Worden.
| 1. NAME | Building #372, Wagon Shed & Teamsters’ Quarters (Fort Worden Historic District) |
| 2. LOCATION | Near Port Townsend |
| CITY OR TOWN | |
| STATE | Washington |
| CODE | 53 |
| COUNTY | Jefferson |
| CODE | 031 |

3. PHOTO REFERENCE:

- PHOTO CREDIT: David Hansen
- DATE OF PHOTO: 1972
- NEGATIVE FILED AT: Washington State Parks and Recreation Commission

4. IDENTIFICATION:

- DESCRIBE VIEW, DIRECTION, ETC.: View looking southwest.
**1. NAME:**

COMMON: Building #310, PX and Gvm (Fort Worden Historic District)

**2. LOCATION:**

STREET AND NUMBER: Near Port Townsend

CITY OR TOWN:

STATE: Washington

**3. PHOTO REFERENCE:**

PHOTO CREDIT: David Hansen

DATE OF PHOTO: 1972

NEGATIVE FILED AT: Washington State Parks & Recreation Commission

**4. IDENTIFICATION:**

Describe view, direction, etc.

View looking southwest. A home on NCO Row can be seen at far right. The PX Gas Station can be seen on the far left behind the trees.
**United States Department of the Interior**  
**National Park Service**

**National Register of Historic Places**  
**Property Photograph Form**

(Type all entries - attach to or enclose with photograph)

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<td>Jefferson</td>
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<td>NEGATIVE FILED AT:</td>
<td>Washington State Parks &amp; Recreation Commission</td>
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<th>4. IDENTIFICATION</th>
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<tbody>
<tr>
<td>DESCRIPTION, VIEW, DIRECTION, ETC.</td>
<td>View looking southwest. Occupying the far western end of Officers' Row, this home is one of three brick structures at Fort Worden.</td>
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</table>
1. NAME
   COMMON: Battery Kinzie (Fort Worden Historic District)
   AND/OR HISTORIC:

2. LOCATION
   STREET AND NUMBER: Near Port Townsend
   CITY OR TOWN: 
   STATE: Washington
   CODE: 53
   COUNTY: Jefferson

3. PHOTO REFERENCE
   PHOTO CREDIT: David Hansen
   DATE OF PHOTO: 1972
   NEGATIVE FILED AT: Washington State Parks & Recreation Commission

4. IDENTIFICATION
   DESCRIBE VIEW, DIRECTION, ETC.
   View looking northwest. The Strait of Juan de Fuca, which cannot be seen in the photo, is on the opposite side of the battery. The majority of the other gun emplacements are on top of the bluff which can be seen on the left margin of the photo. Battery Kinzie's condition and state of preservation is typical of all the batteries at Fort Worden.
NATIONAL REGISTER OF HISTORIC PLACES
PROPERTY PHOTOGRAPH FORM

1. NAME
COMMON: Enlisted Men's Barracks (Fort Worden Historic District)

2. LOCATION:
STREET AND NUMBER: Near Fort Townsend
CITY OR TOWN: 
STATE: Washington

3. PHOTO REFERENCE:
PHOTO CREDIT: David Hansen
DATE OF PHOTO: 1972
NEGATIVE FILED AT: Washington State Parks & Recreation Commission

4. IDENTIFICATION
VIEW, DIRECTION, ETC.
View looking northwest. Building #202, Barracks 109 Men, is in center; Building #203 is on the left. Parade Ground is behind the photographer.
1. NAME
   COMMON: Building #26, Balloon Hangar (Fort Worden Historic District)
   AND/OR HISTORIC: 

2. LOCATION
   STREET AND NUMBER: Near Port Townsend
   CITY OR TOWN:
   STATE: Washington
   STATE: Washington
   CODE: 53
   COUNTY: Jefferson
   COUNTY: 031

3. PHOTO REFERENCE
   PHOTO CREDIT: David Hansen
   DATE OF PHOTO: 1972
   NEGATIVE FILED AT: Washington State Parks & Recreation Commission

4. IDENTIFICATION
   DESCRIBE VIEW, DIRECTION, ETC.
   View looking southwest. Note the building's height, which nearly equals that of the surrounding trees.
10" BC, Ft. Woodell
Contur. by Paulette Island Historical Society
Battery Asu, Ft. Worden
Contrib. by San Juan Island Historical Society
THE COAST ARTILLERY MUSEUM

AT FORT WORDEN

Fort Worden, an integral part of the history of Port Townsend, was established at the turn of the twentieth century to defend Puget Sound. Here was the home of the 14th Coast Artillery Regiment of the regular army and the 248th Regiment of the Washington National Guard. In turn the U.S. Navy and Combat Engineers were stationed here until deactivation of the post in 1953.

This museum was created to pass on to future generations the knowledge and lore of the World's First Weapon System - Modern Sea Coast Artillery (1881-1948).

Modern Sea Coast Artillery was a deterrent force that denied entrance by foreign navies to our harbors, and particularly in the region of the harbors of Puget Sound. This was done by the use of: Massive rifled cannons, twelve inch rifled mortars, and shore controlled mines.

Veterans who served here and volunteers have created exhibits and operate the museum to tell the story of American Coast Artillery.

This museum is a nonprofit, tax exempt organization and all donations are tax deductible.

FORT WORDEN

Fort Worden is named for a famous Civil War Naval officer Admiral John L. Worden. Worden, who commanded the U.S.S. Monitor in its famous battle with the Confederate ironclad Merrimac in 1862, is the only member of the U.S. Navy for whom an Army post has been named.

Construction of Fort Worden began in 1903. In the following year she was designated Headquarters for the Harbor Defenses of Puget Sound.

Fort Worden and her sister posts Fort Flagler and Fort Casey, at their peak, carried a total of 84 pieces of modern artillery. These forts controlled an area at the entrance to Puget Sound which was labeled the Deadly Triangle, through which no intruder could safely pass.

Sea Coast Artillery was anti battleship. When battleships became obsolete with the end of World War II, Sea Coast Artillery also became obsolete and the three forts became Washington State Parks.

THE EXHIBITS

Greeting one at the front steps are two 16 inch target practice projectiles weighing 2340 pounds. Heavier than a small compact car these projectiles could be fired 53,000 yards or 30 miles using 750 pounds of powder.

Lying on the floor inside the museum is a 600 pound 10 inch target practice projectile which was fired and later recovered. The key to the deterrent capabilities of coast artillery, however, was the means of plotting the precise location of a hostile target. This was done in the Plotting Room where calculations were made to intercept an invading force. Working within a system of 30 second bell soundings the plotting crew calculated the location and speed of the target, then informed the gun crew so they could accurately fire upon the intruder.

Full color reproductions of regimental insignia of various coast artillery regiments that served in continental as well as overseas possessions of the United States garnish the walls of the museum.

Upon the walls of the main room are photographs of the big guns that were once in place at Fort Worden. In addition there is a map showing the range and angle of fire from the various coast defense establishments on both sides of the Strait of Juan de Fuca during the period of World War II.

Adjacent to the main room display is a room devoted to the display of rifles and a machinegun. These weapons are identified in a notebook provided.

Also on display are mannequins in uniforms of the period of World War II, the Regimental Flags of the 14th and the 248th Coast Artillery, a 48 star American Flag, guidons from some of the units posted at the fort, a collection of photographs and artifacts depicting recreational functions at the post during its years of activity, and artifacts from the Second World War.

In the Old Army Room is a uniform display of the period of the Blue Army with accompanying photographs. Here also are memorabilia of the Coast Artillery in the First World War.
In the area leading to Regimental Hall are charts and diagrams from Fort Worden's companion post at Fort Casey as well as a collection of smaller calibre artillery shells.

In regimental Hall are group photographs of Artillerymen who served at Fort Worden through the 1930's and 1940's.
THE COAST ARTILLERY MUSEUM at FORT WORDEN is dedicated to preserving and presenting the knowledge and lore of Modern Coast Artillery (1888-1948).

A working model of a 12 inch Disappearing Cannon demonstrates how the 77 ton barrel was lifted into firing position and after firing "disappeared" behind the protective parapet wall.

Visitors always ask, "Why are three bells ringing every thirty seconds? The answer is that it is the T1 (Time-Interval) System which coordinated time between observance of the position of the moving battleship, computation of where to aim the cannons, and the firing of the cannons so the projectiles would hit the battleship.

Another part of the Aiming System was the Plotting Board. On the Plotting Board, in simple, straight forward steps, the aiming of the cannons was worked out so the projectiles would hit the moving battleship some 10 to 90 seconds after the projectile left the muzzle of the cannon.

Another exhibit demonstrates the "Windshield" on the armor piercing projectiles and explains why they were used.

Most visitors leave the Museum knowing that they haven't seen all the exhibits or understand all they saw. But they are sated with new knowledge.

They will come back another day to learn more about why the Coast Artillery forts, including, Fort Lawton, were built. How they were a deterrent force that kept all foreign navies out of Puget Sound. And how the disappearing cannons were operated.

More and More People are finding Fort Worden State Park to be a Destination Point. A full day can be spent viewing the four major attractions:

- The Commanding Officer's House (A turn of the century home).
- The Marine Science Center (An aquarium).
- The massive, awe inspiring Battery Kinzie emplacement.
- The Coast Artillery Museum at Fort Worden.
MODEL OF 12" DC - FORT WORDELL
MADE BY CLAIRE MCDOWELL
MODEL OF 12'' DC - FORT WORTH
MADE BY CLAIRE MCDOWELL
WILHELM
WILHEIM *1
ALL FT. WORDEW
PHOTOS TAKEN
MARCH 12, 1987
THE WORLD'S FIRST WEAPON SYSTEM
SEACOAST ARTILLERY 1881 - 1948

A.R. CUNNINGHAM
Formerly of the 14th Coast Artillery
Fort Worden, Washington

6552 34th Ave. S.W.
Seattle, WA 98126
206 937 0592
INTRODUCTION

A weapon system is two or more things or ideas brought together with the whole being more than the sum of its parts.

The bringing together of the breach loading, rifled cannon (1881) with the Vertical Position Depression Range Finder (1874) and the hydraulic recoil system first used in battle on the Monitor in 1862 resulted in a new era for seacoast artillery. It now was invincible. No naval force every ran a modern seacoast artillery tort nor destroyed one. With superior accuracy in aiming, hitting power and range, it was supreme.

Cannon are artillery pieces that fire in a near horizontal position. Typically between the horizon and 20 degrees of elevation.

Historically muzzle loading cannons reacted the forces of recoil by letting the cannon on its carriage be driven to the rear. Aboard naval vessels the range of the cannon and size of the projectile (bullet) were limited by the distance the cannon could recoil.

A ship's width on the gun deck frequently was 30 feet or less. Thus limiting naval gun fire to a range of about 880 yards or half a mile.

The size of a cannon used in field artillery in support of infantry was limited by the weight which a team of six horses could pull. The caliber of the cannon was three inches. The range of field artillery was about 440 yards or a quarter of a mile.

By the 1800's, metallurgy had advanced to the point where larger cannon barrels could be cast. However neither naval vessels nor field artillery could take advantage of them. For one thing naval vessels could not handle the added weight above the water line nor the increase length of recoil generated by the heavier charge.

Only seacoast artillery could use the larger cannons. By the time of our Civil War, cannons had grown to 15 inch caliber firing a four hundred pound ball 5000 yards or three miles.

Aiming seacoast artillery was a problem. Seacoast cannon like naval cannon were mounted on four wheeled carriages. The navy aimed their cannons by aiming the ship. The gun crew could use hand spikes to make minor adjustments.
Field artillery cannons were mounted on two wheels and a "trail." The trail being the ball at the rear of the carriage which was the third point of support for the cannon. Aiming consisted of the gun crew picking up the trail and rotating the cannon to the desired direction.

Seacoast cannons were mounted on land which could not be moved as a naval ship. Also seacoast cannons were too heavy for a crew to pick up and move to the desired direction.

The answer was to mount seacoast artillery on a platform. The platform was pivoted at the front and at the rear ran on two wheels on a circular track. To aim the cannon the cannoneers simply pushed the rear of the platform to the desired azimuth (direction).

To limit the length of the recoil the platforms were designed as ramps so some of the energy of recoil was dissipated in the cannon running up the ramp.

As cannons got bigger, the cannon balls larger and powder charges heavier, the recoiling forces became too great to be reacted on a reasonable length platform.

The answer was to mount the carriage on eccentric wheels. When recoiling the carriage rode on rails which transferred some of the forces of recoil to the platform which the cannon rode on. The platform was now called the lower carriage to differentiate it from the upper carriage which cannons had always been mounted on. At the end of recoil, the cannoneers serviced the cannon, swabbed the barrel and reloaded. Then they rotated the wheels on the upper carriage so the cannon was resting on the wheels and rolled it back into firing position called "battery." The upper carriage was lowered to the rails and the cannon was fired.

Again cannons became larger, cannon balls heavier and powder charges larger. At first the answer was to widen the rails the upper carriage recoiled on. Soon the recoil forces reacted into the lower carriage were so great that they literally tore the lower carriage apart.

The solution was to mount a hydraulic cylinder between the pivot and the lower carriage. This resulted in the recoil forces being dissipated in three ways. Some of the recoil forces were dissipated in the movement of the cannon and upper carriage to the rear; some was dissipated in movement of the hydraulic cylinder; and some was absorbed in the lower carriage.
This was the recoil system which was first used in battle in 1862 by the Monitor. Over the years hydraulic recoil systems have become more complicated and sophisticated.

Prior to 1874, it was impossible to determine accurately the range of a moving target. By the Fourteenth Century, artillerist routinely surveyed a right triangle and found the range from an artillery piece to a fixed target. This process was too slow for use against moving targets.

Then the Vertical Depression Position Range Finder was invented in 1874. In the last century descriptive names were given to devices. This is one of them. This device measured in the vertical plane by depressing from the horizontal to the position of the target (ship) and then finding the range by measuring the very small angle and then looking up the value of the angle in trigonometric tables and multiplying it by the height of the device above the level of the sea. To eliminate the errors inherent in the multiplying and the time of calculation, the later models were designed for a specific level above sea level.

Rifling of a gun permits the shooting of a larger projectile farther than in a smooth bore cannon. Late in the 1700's rifling first came into use in hand held weapons. The first rifled hand guns were muzzle loaded. Later cartridges were developed with the projectile, powder charge and primer mounted together. This permitted breech loading which was must faster than muzzle loading. Upon firing the cartridge case expanded and sealed the breech so no gas from the powder charge could escape to the rear.

In artillery the breech block did not effectively seal the breech against leaking gas from the powder charge. This had two disadvantages. First to permit the determination of the distance the projectile will travel at a given elevation one must know the muzzle velocity. To know the muzzle velocity one needs to know that all the gas generated by the powder charge is used in pushing the projectile out the barrel. Leakage of gas around the breech block was unpredictable. Another problem was that the powder gases were noxious. They not only made the cannoneers ill but gas in large quantities killed them.

The British solved the problem the problem by developing a system of split rings in the breech which effectively sealed the gas from the powder charge from leaking out of the breech.

A parallel development was the redesign of the cannon from a single piece of cast metal to a "built up" canon composed of
many pieces. Typically now a cannon would consist of eleven pieces. The "tube" contained the rifling and was about two inches thick. Surrounding the tube were hoops and jackets. Hoops went around the entire barrel, jackets went part way around. The hoops and jackets were heated and sweated into place. The state of manufacturing modern seacoast cannons was so primitive that between 1890 and 1910 the United States was able to build only 15 primary cannons (8 inch or larger) a year for the army.

With a hydraulic recoil system, a system for determining the range of a moving target and breech loading rifled cannon, the modern seacoast weapon system was born.

Though the U.S. Army Ordnance Department developed and tested modern seacoast cannons, it was to be 1890 before the U.S. Army started building new forts and new gun emplacements for them.
GENERAL HISTORY

After the American Civil War the U.S. Army reverted to being an Indian Police Force. The 25,000 officers and men were garrisoned in 292 forts with an average of 90 officers and men per fort. As the Indian Wars drew to a close in 1890, the senior army officers were concerned that many field officers who commanded 350 men or more had never been in a formation consisting of 350 officers and men, either in combat, in the field, or on the parade ground. They were strongly recommending that the Army be garrisoned in posts large enough for a garrison of battalion of 350 men.

In 1873 and 1874, the Surgeon General visited every army fort to evaluate sanitation. He was most unhappy about the unsanitary barracks the men were quartered in. When asked by the Quartermaster General to design a sanitary barracks, the Surgeon General provide a plan for a two ward hospital building of the Mexican War era. Thus we have the barracks of the 1890-1915 era.

A squad consisted of eight men. The men's sleeping quarters were called squad rooms. In fact the two main squad rooms slept 43 men.

Prior to 1913, the nation's currency was issued by national banks. A bank could issue ten times the amount of bank notes as it owned of U.S. bonds. With the national budget running a surplus, the U.S. Treasury was paying off the bonds which meant that the banks had to reduce the amount of currency outstanding. This interfered with commerce and led to the Panic of 1893.

There were two solutions. The first was to reduce taxes. Unthinkable! The second was to increase federal spending. This the Army was ready, willing and able to do.

With all these justifications, the Army was able to build or rebuild 26 harbor defenses with breech loading, rifled cannons in new emplacements and to build new barracks for the men. Of the 300 major cannons built, 250 were built on disappearing carriages. The seacoast cannon mounted on a disappearing carriage was the corner stone of the U.S. Army's
Coast Defenses.

EVOLUTION OF THE MODERN SEACOAST ARTILLERY FORT

In 1856 General Miles made a study of seacoast defenses at the various harbors in the country and prepared recommendations for improvements. The result was another study for the files.

In 1866 another study was made and another study for the files. However public lands for future forts were reserved. On Puget Sound some 20 sites were reserved. Half of these were between Point Wilson at Fort Townsend and the ocean 90 miles to the west. These were for defending small harbors which a ship could sail into if an English naval force should attack from Victoria. (A major problem of securing funds for seacoast artillery was identifying a potential enemy to defend against.)

Both studies saw the wisdom of the three forts which became Fort Worden, Casey and Flager at the junction of the Straits of Juan de Fuca and Admiralty Inlet. The 1856 study recommend the construction of a mole (island) in the middle of the channel with a fort on it so the entire channel, four miles wide, could be covered by artillery fire. By 1866 the range of service artillery had reached three miles and a mole was no longer needed.

In 1885 another study was made to update seacoast artillery needs to the modern era of breech loading cannon. This was called the Endicott Board. It recommended the construction of harbor defenses at 26 harbors on the East and Gulf Coasts and two on the Pacific Coast. Only San Francisco and the Columbia River were of sufficient commercial significance to warrant the cost of modern seacoast defenses.

Construction of modern forts with modern cannons commenced in 1890 at San Francisco and New York.

A typical harbor defense fort consisted of one battery of primary cannons (eight inch or larger), a battery of five inch guns and one battery of 12 inch mortars. A cannon battery consisted of six or seven guns side by side. The mortar battery consisted of 16 mortars, four each in four mortar pits. There were two guns in a five inch battery.

To every gain in the offense in war, there is usually a
counter in defense. The counter by the defense against modern seacoast cannon was armor plating the hulls of battleships. This resulted in a draw. As the caliber of seacoast artillery increased, armor plating on the hulls increased to resist penetration. The general rule was that an armor piercing projectile could pierce armor of its caliber. In other words a 12 inch armor piercing projectile would pierce 12 inches of armor.

While it was feasible to place armor on the hull of a naval vessel, it was infeasible to place it on the decks. So much weight so far above the water line would cause the vessel to capsize.

Cannon firing almost horizontally could not pierce decks. However mortars could. Mortars shot projectiles up into the air arcing forward before the force of gravity caused them to fall and penetrate the deck of a ship and cause the boilers and magazines to explode.

As cannons developed in the twentieth century, carriages were developed which made them in fact a combination of cannons and howitzers. A howitzer was actually a cross between a cannon and a mortar. Whereas the cannon's elevation was limited to an elevation of 20 degrees above the horizontal, a mortar fired at an angle of 45 to 85 degrees. Using a small powder charge, the forces of recoil were reacted directly into the earth.

The howitzer normally fired at an elevation between 15 and 65 degrees. It had an upper carriage that moved in recoil taking the horizontal component of the recoil while the vertical component was reacted into the ground.

In the Battle of Jutland in the First World War all of the German battleships sunk were sunk by projectiles which penetrated their decks.

The Endicott forts were essentially completed by 1910. In 1908 the Taft Board was appointed to update the sea coast plan. The result was fortification of Los Angles, Panama Canal Zone, Hawaii and the Philippines. A second result was the construction and installation of 14 and 16 inch guns with ranges of 60,000 yards for a 2100 pound projectile.

For the Second World War, seacoast artillery concentrated on six inch cannons and 16 inch cannons. The pre 1910 seacoast cannons and mortars had a range less than that of World I and World II battle ships, but they were superior in accuracy of firing and effectively denied all naval forces access to any water their artillery would reach.
In the First World War the British attempted to force the Dardanelles in the Gallipoli campaign. The Turks had eight inch cannon circa 1881 for seacoast defense. The British battleships mounted 14 inch cannons. The British lost. Never again was a naval force ever to challenge a manned seacoast fortification.

In the Second World War, the American battleship Tennessee was ordered to tease the forts at Cherbourg. When the Germans opened fire with the 8 inch cannons, circa 1881, the Tennessee reversed course without firing its 14 inch cannons. Three projectiles hit the Tennessee causing eight deaths and 20 wounded.

At Guam the Japanese had three six inch guns concealed in caves. The U.S. Navy knew their general location but not well enough to fire at them effectively. They offered the Colorado as bait at 5,000 yards (three miles) with the Tennessee at 12,000 yards. The Japanese killed thirty and wounded 200 on the Colorado before the two battle ships could destroy the Japanese guns. The Colorado was afloat but so badly damaged that it was a hulk and taken out of service.
HISTORY OF THE HARBOR DEFENSES OF PUGET SOUND

In 1856 Puget Sound was studied and recommendations made to build fortifications to defend it. The original thinking was three lines of defense. The first line of defense was to be three forts at the junction of Admiralty Inlet and the Straits of Juan de Fuca where the channel narrows to about four miles. Later Fort Worden, Casey and Flager were to be built on these sites. The second line was to be three forts at the mouth of Hood Canal and the third line was to be three forts at Fort Defiance.

A study was made in 1866 updating the previous study and ratifying its recommendations. In 1885 the Endicott Board met to identify needs for modern seacoast defense. Twenty-six harbors were identified as worthy of defense. Only two on the Pacific Coast were of sufficient commercial and/or military value to justify seacoast defenses - San Francisco and the Columbia River.

In 1895 the Board reconvened and decided to delete four of the previous harbors recommended for seacoast defense and add four. San Diego and Puget Sound were added at this time.

The recommendation was to construct the three first line forts at the junction of Admiralty Inlet and the Straits of Juan de Fuca. An additional three were constructed. Fort Lawton was constructed first to give Seattle an army post. It was the first headquarters for the Harbor Defense of Puget Sound. However it was built as an infantry post and no artillery was ever installed.

The Navy believing in its power to run enemy seacoast artillery forts insisted that enemy naval forces could run U.S. Army seacoast forts at Fort Worden, Casey and Flager. They insisted that their navy yard at Bremerton be protected by torpedoes (mines) laid in rich passage on the south side of Bainbridge Island. The result was Fort Ward on the southeast corner of Bainbridge Island.

Fort Ward was constructed with a mine wharf, mine storage and support and two five inch guns on towers to protect the torpedo fields from sweeping by small vessels. This was supplanted by 3 eight inch guns on disappearing carriages. The fort consisted of one barracks for 115 men and 2 officers quarters.

Historically the word torpedo has the used to identify all underwater explosive devices. With the coming of the
submarine with a self propelled torpedo, passive torpedoes were renamed mines. Farragut at Mobile Bay in our Civil War shouting, "Damn the torpedoes! Full speed ahead!" was referring to what would now be called mines. These mines were electrically controlled from the shore and could permit friendly vessels to pass while sinking enemy ships.

As these mines could sink any ship afloat, the mine planters were rated as "ships of the line" the same as battle ships. In 1939 on the eve of the Second World War the Coast Artillery Branch of the Army had twelve ships of the line in twelve mine planters and the U.S. Navy had only ten battleships rated as ships of the line.

To prevent small enemy ships from bypassing the main line of forts by going through Deception Pass, Fort Whitman was built on Goat Island two miles south of Laconner. Being on a very small island of 164 acres, the garrison could readily defend itself against landing parties from an enemy fleet. Fort Whitman was protected by four six inch cannons mounted on disappearing carriages. No permanent buildings were constructed here. It was only garrisoned after Pearl Harbor in 1941.

The original fortifications at Fort Worden, Fort Casey and Fort Flager were typical first line forts consisting of one battery of six or seven cannons and one battery of 16 twelve inch mortars supplanted by one two gun five inch tower battery per fort. Each had a Fortress Headquarters which determined range of the target for each battery and telegraphed the information to the batteries for firing. For the mortars azimuth (direction) also was supplied.

The cannon battery at Fort Worden consisted of three ten inch guns mounted on barbette carriages and four twelve inch guns mounted on barbette carriages. Fort Casey's cannon battery consisted of six ten inch guns mounted on disappearing carriages. At Fort Flager the cannon battery consisted of twelve inch cannons mounted on barbette carriages and 4 ten inch guns mounted on disappearing carriages. At Fort Flager the mortar battery consisted of only eight mortars.

A barbette carriage reacts the forces within the recoil system limiting travel of the cannon to about forty inches prior to returning the cannon to battery (firing position). The firing of a cannon mounted on a disappearing carriage drives the cannon and its upper carriage backwards about fifteen feet and downward about ten feet. The result is that the range of a twelve inch cannon on a barbette carriage is 30,000 yards or about eighteen miles. The same cannon mounted on a disappearing carriage had a range of about 17,600 yards or ten miles.
All of the original artillery emplacements at all five forts are still extant. Each fort, except Fort Whitman, has become a park and is open to the public for visiting.

Each of the three main forts was built as a one battalion fort with three barracks for 115 men each and officers' quarters and other housekeeping buildings. Each gun emplacement was built with its own electrical power plant. The garrison buildings as built were wired for electricity but it was 1907 before an electrical power plant was constructed at each fort to serve the garrison.

With the completion of Fort Flager in 1903, the Headquarters of the Harbor Defenses of Puget Sound were moved there.

While these forts were under construction two other elements were added to the Seacoast Artillery System. Determination of a "set forward point" and ballistic adjustments.

When cannoneers started firing the modern cannons, they discovered that between the time the cannon was fired and the projectile (bullet) reached the target that the target had moved. As the "time of flight" for a projectile was ten to ninety seconds and a target could travel at twenty miles per hour, a target moving 20 miles per hour was moving ten yards per second times ninety seconds equals nine hundred yards or a half mile while the projectile was in the air.

The answer was to correct azimuth (direction) by inserting a movable pointer in the telescopic sight. The first round would be fired with the pointer in the center. When the projectile splashed in the water, the gun pointer would move the pointer to the point of the splash and would have his correction.

Correction in range required calculation. This was done on a "relocator" board later called a "plotting" board. These boards were nothing more than scale models of the battle field or in this case the gun sites, the observation posts and the adjacent waters. The course of the ship was plotted on the board and then the "set forward" point was projected. The "set forward" point being the location of the ship when the projectile hit.

To do this required coordination of time between the observation of the ships position and the firing of the artillery. A T1 (Time Interval) system was invented to do this. A T1 system was nothing more than a set of three bells which rang every 30 seconds. The third bell was the action bell. The first two bells were warnings that the action bell was coming. In practice thirty seconds elapsed between the
observation of the target and the firing of the artillery pieces so in calculating the set forward point one projected not only the travel during time of flight but in addition 30 seconds for calculations.

Some thirty factors which could affect the projectile's flight were identified and corrected for. There were the old ones from the days of muzzle loading smooth bore cannons such as weight of projectile, weight of powder and temperature of powder. But also there were new ones such as curvature of the earth, rotation of the earth and ballistic wind.

Firing a 16 inch cannon due west at Panama at target 20,000 yards, twelve miles, the earth will rotate out from underneath the projectile requiring that the range be shortened 200 yards.

The ballistic wind was determined by observing a weather balloon as it floated in the wind. At different elevations the direction of the wind and its force differed. This difference was calculated and then applied to the path through the air that the projectile would take to the target.

With these adjustments included in the weapon system, seacoast artillery became a precision weapon system. Six or seven cannons firing as a battery was over kill. The primary cannon battery of six or seven cannons were separated into three batteries. The mortar battery of 16 mortars was divided into two batteries of eight mortars. Later mortar batteries were reduced to two mortar in two pits.

An evaluation of the placement of primary artillery revealed that the original emplacements were very well placed to prevent a naval force from "running" them but poorly placed to engage an approaching force. The result was in 1904 the construction of Battery Benson consisting of two ten inch cannons mounted on disappearing carriage faced to fire northwest into the Strait of Juan de Fuca. This was followed in 1909 with the construction of the mammoth twelve inch cannon emplacement for two cannons called Kinzie.

Evaluation of the five inch guns was that with a range of only 1800 yards that they were worthless. These were replaced by three inch guns on pedestal mounts, two to a battery; and by six inch cannons mounted on disappearing carriages, four cannons to a battery. A battery of three inch and six inch cannons were installed at all three main forts with a set placed to fire at an approaching target and a set to fire at a "going away" target. Thus placed small, fast vessels such as cruisers, destroyers and "E" Boats under fire for both a long time and a long distance.
In 1906 Fort Worden was made the headquarters for the Harbor Defenses of Puget Sound. Three barracks were added, the double company barracks on the south end and at the opposite end around the corner a single barracks and the band barracks. The hospital was enlarged from six beds to 24 beds.

The Harbor Defenses were now essentially completed and were in reality as effective in 1948 when the artillery was scrapped as in 1910. More sophisticated instruments were installed, anti aircraft was installed but the weapons system was the same.

Fort Worden is unique in that it is the only Army Fort named for a Naval Officer. It was named for Admiral John Lorimer Worden. His claim to fame is that he commanded the Monitor in its famous battle with the Merrimac.

The World's First Weapon System - Modern Seacoast Artillery was complete. It consisted of five elements working together:

- Hydraulic recoil systems
- Ranging system for moving targets
- Breech loading, rifled cannon and mortar
- Determining a "set forward" point
- Correction for 30 ballistic factors
12 INCH MORTAR FIRING

This picture was taken .2 second after the mortar was fired. Note the 900 pound projectile at the top of the picture.

It is an axiom of war that as the offense advances, so does the defense. This was true of cannons and battleships after 1862. As shore-based cannons became more powerful, the armor plating on battleships became thicker, making battleships seem relatively safe from cannon fire.

A person suggested that mortars be used which would fire at an angle of 45 to 85 degrees. Thus lobbing a projectile up into the air and then have it pierce the deck of a naval target and destroy the ship.

While it was feasible to protect the sides of a battleship with armor plating, if the decks were protected with thick coats of armor, the weight high above the water line would cause the battleship to capsize.

About 1900 methods were developed so that cannons could fire not only horizontally, but also at an angle of up to 45 degrees. In the Battle of Jutland, in the First World War, all the German battleships sunk were sunk by high angle projectiles piercing the decks.

These mortars were designed so that they were muzzle heavy when unloaded and breech heavy when loaded. After firing, releasing the lever holding the mortar in firing position permitted it to return by gravity to the horizontal position for loading. Then when loaded the release of the lever holding the mortar in loading position would let gravity return it to firing position.

Mortars had very low muzzle velocities in comparison with cannons - about 550 feet per second versus 2200. This permitted smaller powder charges and shorter barrels.

When designed in 1890, sixteen mortars were placed in a battery because of the lack of a proven system for aiming them. A decade later with the relocater board and ballistic corrections, a battery was reduced to eight mortars. Then in World War I, a battery was reduced to four mortars.

Many 12 inch mortars were converted to railroad mounts. None were converted and in use in battle in the First World War. However in the Second World War, a battery of railroad mounted 12 inch mortars were emplaced at Ocean Shores, Washington and another battery on the Lower Elwa Indian Reservation west of Fort Angeles.
COAST ARTILLERY MUSEUM
Fort Worden, Washington
LOADING A 12 INCH DISAPPEARING CANNON

This is the Number 2 Cannon in Battery Kinzie at Fort Worden.

The projectile (bullet) has been rammed home and the ram has been with drawn. Note that the ramming detail has raised the ram over their heads so the powder truck (behind rammers) can come up to the breech.

The powder will be rammed into the powder chamber, the breech block closed and the primer inserted in the center of the breech block. Then the Chief of Breech will shout "Loaded!" The gun commander will shout "Trip!"

Then the man running on the right will trip the lever and release the 82 tons of counter weight to pull the 77 ton barrel up into Battery (firing position). See previous picture.

The bulletin board behind the cannon with the man wearing the telephone head set posts the range the cannon is to be fired at. It is very noisy so the range setter reads the range rather than listening to it being called out.

On the next bell, the gun pointer will activate the magneto which will produce the electricity to cause the primer to ignite and fire the gun.

The recoil will drive the cannon backward and downward to this position. The Primer man will remove the spent primer; the breech operator will open the breech and the powder chamber will be swabbed out. The Chief of Breech will inspect the powder chamber to ensure that no material remains in the powder chamber.

The shot truck in the foreground with its 900 hundred pound projectile will be wheeled to the breech and rammed home.

This is a target practice firing. The target round contains no explosives. The splash it makes when it hits the water will be very visible. On the cat walk peering into the telescope is the Safety Officer. He is checking to see that the cannon is properly aimed. Behind him is the gun pointer.

Standard powder charge was 226 pounds. Range of cannon is 17,600 yards (ten miles).

The Cannon mounted on a Disappearing carriage was preferred before World War I because it permitted the gun crew to work safely behind the parapet wall.

No modern U. S. sea coast artillery (1881-1948) every fired in anger. All navies recognized that they dominated any waters their cannons could reach. Sea Coast Artillery was invincible.
12 INCH DISAPPEARING CANNON IN BATTERY

No. 2 cannon at Battery, Kinzie in battery (firing) position.

When fired, the cannon will recoil to the rear and downward to the loading position. The primer man will remove the spent primer, the breech operator will open the breech and the ramming detail will swab the powder chamber.

Then the chief of breech will inspect the interior of the cannon to ensure that there is no debris in the cannon.

Then a projectile will be rammed home. This is the position the cannon is in in the previous picture.

Note man on right holds on to the swab with the swab in the bucket.

In front of him is the breech operator with the primer man in front of him.

Note shot truck and crew at the left.

The black board to the left of the cannon has Deflection numbers listed. The gun pointer's telescope has a scale from zero to six inside it with a movable pointer. He sights on the moving pointer. The pointer is pointed at the latest deflection number.

The doorway to the immediate left is a storage area for a shot truck. The next doorway leads to the magazines below. Normally the powder was brought up by hand through this doorway.

The black board to the right of the ladder has the ranges posted there. Operators of both blackboards wear telephone headsets connected directly with the plotting room.

A firing cycle was thirty seconds long.

In 1939, National Guard troops firing this cannon at a range of nine miles, destroyed the target on the second round and its replacement on the sixth. Target projectiles carried no explosives. They were loaded with sand to achieve service weight. The targets were rafts 20 feet by 12 feet made of three 2 x 12's 20 feet long held together by other 2 x 12's. They could only be destroyed by direct hits.

This was unusual accuracy. However no navy attacked a seacoast artillery fort after the British failed in their assault of the Dardanelles in the First World War.
APPENDIX 5

FORT WORDEN TASK FORCE
RECOMMENDATIONS ON GOVERNANCE

June 2008

In 2007, the State Parks and Recreation Commission (Commission) adopted a publicly supported vision for Fort Worden as a center for life long learning. As envisioned, Fort Worden will become a full-service, year-round destination providing a diverse array of meaningful experiences for people of all ages, backgrounds, skills, and interests through its programs, events, services, and facilities. A multitude of resident partners will create a shared economy that supports state of the art programming in the arts and culture, health and wellness, natural science, outdoor recreation, and historic preservation. With a variety of conference facilities and accommodations ranging from camping to residences and single guest rooms, plus high-quality food service focused on locally grown ingredients, the new Fort Worden will allow visitors to design their stay around their needs and preferences.

As part of its adoption of the life-long learning center vision, the Commission recognized that it alone did not have the resources required to achieve the vision. It needed to find a way for non-profits and businesses operating at the Fort to participate fully – sharing resources, expanding program offerings, caring for facilities, building financial support, and better collaborating with one another.

Task Force Composition
As a first step toward this vision, the Commission chartered a task force to evaluate applicable governance structures and recommend the one best suited to manage a life-long learning center. The Director appointed members to the Fort Worden Task Force experienced in organizational development and governance and from a variety of organizational perspectives including:

- State Parks and Recreation Commission Member
- State Arts Commission Staff/Commissioner
- County Commissioner/City Councilmember
- Fort Worden Advisory Committee (2)
- Experienced Former State Legislator
- Philanthropic Community
- Washington Federation of State Employees (WFSE)

Evaluation Process
In developing its recommendation, the Task Force first identified characteristics and capabilities necessary or desirable to manage and develop the envisioned life-long learning center. Identified characteristics and capabilities fell into four major areas: Mission-Related; Structural; Resources and Operations; and External Relations.

Mission-Related
- Achieve life long learning center vision
- Nurture and sustain programming
- Effectively address state priorities in government
Structural
- Relative ease to establish
- Focus on Fort Worden
- Agility and Flexibility

Resources and Operations
- Partner with State
- Achieve predictability in state resources
- Behave entrepreneurially
- Generate capital and operating funds (public, philanthropic, enterprise)
- Embrace socially responsible business practices

External Relations
- Attract and integrate partner organizations
- Incentive to address statewide constituency
- Collaborate with local community

The Task Force then evaluated the status quo and a range of applicable governance structures in relation to identified management characteristics and capabilities to determine the best fit. Applicable governance structures included:

General Purpose Government
- State (status quo)
- Local (e.g., City Parks Department)

Special Purpose Government
- State Chartered (e.g. State Trade and Convention Center, Safeco Field Public Facilities District, or Qwest Field Public Stadium Authority)
- Locally Chartered (e.g., Pike Place Market Public Development Authority)

Non-Profit Corporation
- Public Benefit Organization (e.g., Educational or Scientific Institutions, Arts and Culture Organizations, Churches, and Charities)

A for-profit corporation and a limited charitable foundation were two additional potential governance structures ultimately not considered by the Task Force for lead management at Fort Worden. The previous phase of conceptual planning specifically eliminated a for-profit corporation in the lead management role. A limited charitable foundation was considered best suited to a supporting role to the other governance structures under consideration.

Task Force Recommendation
From its analysis, the Fort Worden Task Force recommends that a non-profit corporation is best suited to manage a life-long learning center (Table 1). This management structure combines the fund raising capability and flexibility of non-profits with the potential for investment by private
enterprise, and the financial capacity, stability and public accountability of state government. Lead management by a non-profit also breaks down isolation among the Fort’s resident partners and creates an incentive for them to work together and share in the long-term care of the park and its facilities.

While the Task Force recommends that a non-profit is best suited to manage, it is important to assure the public that Fort Worden will always remain a state park and operate according to the vision, mission, values, and principles the Commission has adopted for Fort Worden State Park.

**Recommended Management Transition Process**

Should State Parks leadership and ultimately the Commission concur with the Task Force’s recommendation, the Commission would then direct agency staff to identify a prospective non-profit organization with which to negotiate a formal memorandum of understanding (MOU) to guide management transition. During the transition, the Commission would expect the non-profit to demonstrate it is capable of assuming management responsibility. Likewise, the Commission must demonstrate to the prospective non-profit that it would be willing to transition significant management authority and has put in place financial commitments and administrative provisions needed to help realize the Commission’s and public’s vision for Fort Worden. This may take several years to accomplish (Table 2).

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**Table 1: Fort Worden Task Force Governance Evaluation Matrix**

<table>
<thead>
<tr>
<th>ISSUES/ATTRIBUTES</th>
<th>General Purpose Government</th>
<th>Special Purpose Government</th>
<th>Not-For-Profit Corporation</th>
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<tr>
<td>STRUCTURAL:</td>
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<td>(City or County)</td>
<td>(WSC/TC; Safeco PFD; Quest PSA)</td>
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<td>How Established/Relative Ease</td>
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<td>Ability to Prioritize/ Focus on Fort Worden</td>
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<tr>
<td>Flexibility/Agility in Responding to New Opportunities or Changed Circumstances</td>
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<td></td>
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<tr>
<td>Ability/Incentive to Operate Transparently and Accountably</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>MISSION:</td>
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<td></td>
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<tr>
<td>Ability to Develop and Implement 3LC Vision/Mission/Business Plan</td>
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<tr>
<td>RESOURCES/OPERATIONS:</td>
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<tr>
<td>Ability to Effectively Partner with State</td>
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<tr>
<td>Ability to Achieve Predictability in State Resources</td>
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</tr>
<tr>
<td>Capital</td>
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<td>X</td>
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<tr>
<td>Operating</td>
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<tr>
<td>Ability/Incentive to Behave Entrepreneurially</td>
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<tr>
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<td>Ability/Incentive to Embrace Socially Responsible Business Practices, Including Employee Issues</td>
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<td>EXTERNAL RELATIONS:</td>
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<td>Ability to Attract and Integrate Partner Stakeholders</td>
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<td>Ability Incentive to Address Needs of Statewide Constituency</td>
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<td>Ability to Collaborate with Local Community</td>
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<td></td>
</tr>
<tr>
<td>Local Businesses</td>
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</tr>
</tbody>
</table>

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Staff should ask the Commission to authorize execution of a MOU with specific, measurable commitments that it and the prospective non-profit must satisfy in order for a management transfer to occur. Similarly, the non-profit’s board of directors should also be asked to authorize execution of the MOU, thereby committing itself to the transition. Both the Commission and the non-profit’s board must approve the final MOU.

Both parties would agree that if respective milestones and commitments are met, transfer of management authority and responsibility would be negotiated. Ultimate transfer of management would likely take the form of a long-term master lease.

MOU Negotiation Framework
The Task Force spent a lot of time discussing the kind of accomplishments needed to assure the Commission, Governor, Legislature, and the public that a non-profit could manage Fort Worden in the public interest – and achieve the life-long learning center vision. To that end, the Task Force recommends that a MOU between the Commission and prospective non-profit include provisions in the following areas: Leadership and Governance; Business Development; Program and Partner Development; Operating Funding; Capital Funding; Community and Constituent Relations; and Employee Relations, some elements of which are summarized below.

Program and Partner Development (Life-Long Learning Center)
The non-profit will:
1. Work with all organizations operating at the Fort to adopt a classification system and selection criteria to guide recruitment, retention, and development of long-term contractual relationships with non-profit and business partners.
2. Coordinate and manage new program offerings by new and existing partners to a level to be determined consistent with the life-long learning center vision.
3. Develop with all partners a marketing and communications (media) plan that promotes “Fort Worden” as a unifying brand.

Leadership and Governance
The non-profit will:
1. Develop organizational capabilities and capacities necessary to enter into a long-term master lease with the Commission, including hiring an executive team with skills/experience in management of a historic facility and the envisioned programs of a life-long learning center.
2. Recruit board members with widely recognized profiles, appropriate business acumen, and philanthropic capacity, and including a State Park representative.
3. Establish opportunities for engagement by partners in management of the Fort.
4. Put in place administrative and reporting systems that ensure management of the Fort is conducted fairly, ethically and transparently, consistent with State and Commission policy.

The Commission will work with the non-profit to establish ways for the public to continue to provide meaningful input into management and development of the Fort.

**Business Development**

The non-profit will:
1. Develop and implement a start-up business plan that is informed by the Business and Implementation Plan completed by PROS.
2. Develop and manage equitable means for all partner organizations to contribute to the long-term sustainability of programs and facilities.
3. Adopt a business strategy to develop and manage accommodations.
4. Work with the Commission to develop and implement a park-wide information management system.
5. Work with partners to align their organizational planning with that of overall Fort Worden program goals.
6. Increase concession and other earned revenues to levels to be determined.

The Commission will:
1. Confirm authority to establish long-term business relationships (e.g., long-term lease terms that encourage capital investment and concession agreements of longer than seven years).
2. Work with the non-profit to develop and implement the park-wide information system.
3. Work with the non-profit to develop a funding strategy for transition activities (i.e., completing milestones outlined in this document).

**Operations Funding**

The non-profit will:
1. Secure from all partners increased commitments that meaningfully contribute to on-going operation of the Fort (includes both monetary and non-monetary commitments to a level to be determined).
2. Complete a fund raising feasibility analysis/plan and secure donations to levels over time to be determined.
3. Assist individual partner organizations in raising donated funds.
4. Establish operating reserves, endowment and/or line of credit to demonstrate long-term financial stability.

The Commission will remain committed to the financial stability of Fort Worden and explore mechanisms through which it can provide it a predictable level of on-going operations support, provided this support does not result in significant financial impacts to the rest of the state park system.
**Capital Funding**
The Commission and the non-profit will:
1. Develop a shared long-term facility development plan that combines philanthropic, enterprise, and state funding.
2. Prepare 10-year capital plan approved by OFM to help ensure a multi-biennium capital and planned maintenance commitment to Fort Worden State Park.

**Community/Constituent Relations**
The non-profit will:
1. Develop park-wide data collection system to inform business decision making.
2. Develop and enhance volunteer and docent opportunities to a level to be determined.

The Commission will:
1. Work with City of Port Townsend to complete requisite environmental review for adoption of Fort Worden’s Site and Facilities Use and Development Plan and Design Guidelines into the City’s zoning code (SEPA Planned Action).
2. Work with the non-profit and City of Port Townsend and other local jurisdictions to address development of the transportation and utility infrastructure serving the fort.

**Employee Relations**
The Commission and non-profit will:
1. Work with current state employees at Fort Worden and their representatives to achieve mutually acceptable resolution of any employment and benefit issues associated with the management transition.
2. Create an organization plan that includes coordinating the working relationship between state employees and employees of the non-profit.