

5353

**Center for
Historic Architecture and Engineering**



**University of Delaware
Newark, Delaware**

**Sponsored by the
Colleges of Urban Affairs and Public Policy,
Arts and Science, and Engineering**

FORT DUPONT, DELAWARE:
AN ARCHITECTURAL SURVEY
AND EVALUATION

prepared for
Department of Natural Resources and Environmental Control
Division of Parks and Recreation
Dover, Delaware

by

David L. Ames
Dean A. Doerrfeld
Allison W. Elterich
Caroline C. Fisher
Rebecca J. Siders

Center for Historic Architecture and Engineering
University of Delaware
Newark, Delaware

June 1994

The University of Delaware is committed to assuring equal opportunity to all persons and does not discriminate on the basis of race, creed, color, gender, age, religion, national origin, veteran or handicapped status, or sexual orientation in its educational programs, activities, admissions, or employment practices as required by Title IX of the Educational Amendments of 1972, Executive Order 11246 as amended, 38 USC 4212 of the Vietnam Era Veterans Readjustment Assistance Act of 1974, Section 503 of the Rehabilitation Act of 1973, Title VI of the Civil Rights Act of 1964, and other applicable statutes. Inquiries concerning Title IX, Section 503 compliance and information regarding campus accessibility and Title VI should be referred to the Affirmative Action Office, 307 Hullihen Hall (302) 831-2835.

MEMO

To: Cara Blume, Mark Chura, and Michael Lane

From: Caroline Fisher

Date: June 21, 1994

RE: Fort DuPont Survey and Evaluation

I am finally delivering the long awaited **Fort DuPont, Delaware: An Architectural Survey and Evaluation**. How shall we celebrate?

Along with the report, I am leaving you the microfilm copies of the *Fort DuPont Construction and Maintenance Log*, the standard construction plans for all buildings except the residential ones (see below); and the series of battery construction and gun photographs used in the report. The maps are being copied so that the Center will have copies for use there; I will have Becky Siders mail you the originals when the copying is complete. Becky will also have the survey forms and photographs, which the Center is copying for the files. Please call her to arrange for delivery of them.

I am using the drawings of the residential buildings for my research. Per our discussions, I would like to keep them for awhile. I will make sure that you get them when I am finished. Should you need them before then, please call me at 366-8475 and we can arrange something.

cc: Becky Siders

Contents

List of Figures	iv
Abstract	viii
I. Introduction	1
Research Design and Survey Methods	2
II. Definition of an Historic Context for Fort DuPont	6
The Elements of an Historic Context	6
III. Federal Coastal Defense Strategy	14
IV. The Technology of Coastal Artillery and Emplacement Construction	24
The Technology of Coastal Artillery: 1850-1900 +/-	25
The Technology of Battery Construction	28
Traditional Forts and Fortifications	36
Early Open-Plan Forts and Fortifications	43
Forts and Fortifications of the Endicott Board	44
V. Fort DuPont as Military Landscape and Property Type	53
Coastal Fortifications as Military Landscapes and Property Types	53
The Evolution of Fort DuPont as a Military Landscape	58
Description and Evaluation of Fort DuPont as a Planned/Designed Landscape	69
VI. Evaluating the Architectural Resources of Fort DuPont	77
Architectural Descriptions and Evaluations	88
Reference Bibliography	216

List of Figures

1	Location of Fort DuPont	8
2	Permanent System of Fortifications	17
3	Map of Cantonment and Mobilization Buildings	23
4	Batteries Reed and Gibson, 1899	29
5	Emplacement Construction, 1898	31
6	Temporary Rail System, 1899	32
7	Laying New Track, 1899	33
8	Dynamo in Batteries Reed and Gibson, 1899	34
9	Moving Twelve-inch Rifle Up Trestle, 1899	35
10	Installation of Gun Carriage, 1899	37
11	Mortar Battery Construction, 1898	38
12	Cross-section of Permanent Fort	39
13	Plan of Ten Gun Battery, 1864	41
14	Detail of Brewerton's Plan	42
15	Plan of Proposed Twenty Gun Battery, 1864	45
16	Plan to Accompany Armament Report, 1897	46
17	Map of Fort DuPont Area and Gun Traverse, 1903	49
18	Map Detailing Land Defenses, 1903	51
19	Historic Resources of Fort DuPont	54
20	Proposed Masonry Battery for the Delaware Shore, 1819	60
21	Map of Fort DuPont, 1901	62
22	Landscape of Fort DuPont, 1898	63
23	Map of Fort DuPont, 1902	64
24	Map of Fort DuPont, 1913	66
25	Map of Fort DuPont, 1943	68
26	Aerial Photograph of Fort DuPont, 1937	81
27	Illustration of Standard Plan #145D	82
28	Floor Plan of Standard Plan #145D	83
29	Illustration of Standard Plan #147	85
30	Floor Plan of Standard Plan #147	86
31	Twenty Gun Battery	90

32	Twenty Gun Battery	91
33	Twenty Gun Battery	92
34	Twenty Gun Battery	93
35	Twenty Gun Battery	94
36	Batteries Reed and Gibson	96
37	Batteries Reed and Gibson	97
38	Mortar Battery	98
39	Mortar Battery	99
40	Mortar Battery	100
41	Pump House	102
42	Rapid Fire Gun Emplacement	103
43	Battery Elder	105
44	Officers' Quarters (Single)	106
45	Officers' Quarters (Single)	108
46	Ordnance Storehouse	109
47	Non-Commissioned Officers' Quarters (Double)	111
48	Non-Commissioned Officers' Quarters (Double)	112
49	Guard House	113
50	Administration Building	115
51	Ordnance Repair Shop	116
52	Flagstaff	118
53	Fire Apparatus Building	119
54	Quartermaster's Storehouse	120
55	Post Exchange	122
56	Non-Commissioned Officers' Quarters (Double)	124
57	Firemen's Quarters (Double)	125
58	Band Barracks	127
59	Field Officer's Quarters	128
60	Officers Quarters (Double)	130
61	Officers Quarters (Double)	131
62	Non-Commissioned Officers' Quarters	133
63	Non-Commissioned Officers' Quarters	134
64	Non-Commissioned Officers' Quarters	135
65	Bakery	136

66	Motor Repair Shop	138
67	Quartermaster's Stable	140
68	Service Club	141
69	Coastal Artillery Corps Warehouse	143
70	Coastal Artillery Corps Warehouse	144
71	Water Storage Tank	146
72	Tool House	147
73	Carpenters' Quarters	149
74	Water Pumping Plant	150
75	Quartermaster's Warehouse	152
76	Field Officer's Quarters	153
77	Field Officer's Quarters	154
78	Swimming Pool	156
79	Non-Commissioned Officer's Quarters	157
80	Officer's Quarters (Double)	159
81	War Department Theater	161
82	Gasoline Filling Station	163
83	Garage	164
84	Truck Scale	165
85	Garage	167
86	Storm Water Pump House	168
87	Barracks	169
88	Barracks	171
89	Recreation Building	173
90	Chapel	175
91	Warehouse	176
92	Motor Repair Shop	177
93	Carpenters' Stores	179
94	Hospital Mess Hall	180
95	Tent Pads	182
96	Office	183
97	Pole Shed	185
98	Tennis Courts	186
99	Coastal Artillery Corps Tower	188

100	Coastal Artillery Corps Radio Shelter	189
101	Pontoon Repair Shed	190
102	Pontoon Shed	192
103	Warehouse	193
104	Incinerator	195
105	Cistern	196
106	Quartermaster's Office	198
107	Pumping Station	199
108	Engineering Building	201
109	Post Engineering Supply	202
110	Well House #1	204
111	Garage	205
112	Transformer House	207
113	Storage Building	208
114	Storage Building	209
115	Fourteen Stall Garage	211
116	Hospital Barracks	212

Abstract

Commissioned in 1899 as a part of the nation's coastal defense system, Fort DuPont headquartered the Coastal Artillery Corps that commanded the coastal artillery installations defending Wilmington, Philadelphia, and the Delaware Valley from naval attack. Military officials recognized the strategic importance of the Reedy Point site as early as 1819 when they proposed the construction of a three-tiered fortification. Located on the western shore of the Delaware River at a point where it narrows through a bend, the site allowed a clear line of fire downstream. The earliest armament at the site came in the form of a defensive position constructed during the Civil War when "Ten Gun Battery" was built to support Fort Delaware and to protect the river's western channel. In the early 1870s, the Army replaced Ten Gun Battery with a larger emplacement planned for twenty guns. Along with a regunned Fort Delaware and the new Fort Mott on the eastern New Jersey side, the new battery defended the Delaware River and Valley against foreign attack. Construction began on Fort DuPont in 1899 and was completed about 1913. In 1922 as its importance to coastal defense declined, the fort became the headquarters for the First Engineers Regiment. After the engineers moved out in 1939, it became a training facility, a role that continued until the end of World War II when the State of Delaware acquired the fort.

This report describes and evaluates the historic significance of Fort DuPont and determines the eligibility of the fort and its historic resources for the National Register of Historic Places. The work was undertaken by the Center for Historic Architecture and Engineering (CHAE), University of Delaware, for the Delaware Department of Natural Resources and Environmental Control, Division of Parks and Recreation, as part of their evaluation of the feasibility of Fort DuPont as a state park. The survey, evaluation, and context research were conducted between April 1993 and March 1994.

I. Introduction

Project Description

The purpose of this project was to conduct an intensive level survey of the buildings, structures, military works, and landscape elements located within the boundaries of Fort DuPont and to evaluate each of these historic resources to determine their potential eligibility for nomination to the National Register of Historic Places. The significance of historic resources, such as those making up Fort DuPont, can be judged and explained only when evaluated within a larger historic context. An historic context defines the important national, state, and local themes that a resource represents. The development of an historic context for Fort DuPont was the second purpose behind this project.

Level and Reason for the Survey

Determining the eligibility of a class of resources for the National Register, such as those at Fort DuPont, requires what is called an "intensive" level survey. The methods for determining a resource's eligibility for the National Register of Historic Places are set out in the U.S. Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (1983) and in the Delaware State Historic Preservation Office's Guidelines for Architectural and Archaeological Surveys in Delaware (1992). The Secretary's Standards require that the registration of a property on the National Register of Historic Places be the product of systematic identification and evaluation activities and sets standards for each of those activities. Identification activities--archival research, informant interviews, field survey, and analysis--locate historic properties and collect information about them. An "intensive" level survey, in contrast to a more general "reconnaissance" survey, collects information detailed enough to make decisions about each property's eligibility for the National Register, and about its treatment or actual preservation. The Secretary's Standards also require that the objectives and design of an intensive survey as well as the types of properties to be surveyed be guided by an historic context.

Project Location

Fort DuPont consists of 321.6 acres located in New Castle County, just south of Delaware City. Its northwest boundary is the Delaware City branch of the Chesapeake and Delaware Canal; the Delaware River forms its northeast property line. Land owned by the Delaware Department of Natural Resources and Environmental Control and Delaware Route 9 delineate the fort's southwest boundary.

Dates of Identification Activities and Historic Context Development

The project was carried out between March 1, 1993, and April 30, 1994. The identification activities included archival research, field survey, and oral history interviews. Documentary research in the Delaware State Archives occurred in May and June, 1993, and in the National Archives from September through November, 1993. A preliminary historic context outline to guide fieldwork was developed in May 1993 and the complete historic context written between September and December, 1993. The intensive level survey was carried out in June and July, 1993, with field checks completed during September and October.

Research Design and Survey Methods

According to the Secretary's Standards, a research design consisting of objectives, methods, and expected results must guide all identification activities. The Guidelines for Architectural and Archaeological Surveys in Delaware lists the steps in the survey process: background work, survey, and analysis. The background work includes, among other things, developing an historic context, defining the property types associated with the context, identifying expected resources in the survey area, and delineating research goals for the survey. Survey and analysis includes designing and implementing the survey and developing a method for analyzing the collected survey information.

Survey Methods and Research Objectives for the Historic Context

The Secretary's Standards envision an historic context being developed before undertaking identification and survey activities so that the property types found to be associated with the historic context identify the types of resources that should be surveyed. This approach minimizes the importance of field work and survey as a

primary data source in the development of an historic context and places a heavy reliance on archival sources and existing survey. Project staff based the research design for Fort DuPont on the premise that the intensive level survey is an essential data source in the development of a complete historic context.

Therefore the research objective was to develop the historic context and undertake the intensive level survey for Fort DuPont simultaneously as a mutually refining process. The research and survey method included the following steps:

1. **Historic Context Framework Development:** Define the major elements of the Fort DuPont historic context by historic theme, chronological period, and geographic zone. Develop a preliminary list of property types adequate for designing the intensive level survey and defining a research design for archival research. Place special emphasis on determination of chronological periods in the fort's history and inventory of existing buildings and structures.
2. **Design of Intensive Level Survey for Military Resources:** Review the range of property types and design a survey form suitable for military buildings and installations in cooperation with the Delaware State Historic Preservation Office.
3. **Executing Intensive Level Survey:** Survey all buildings at Fort DuPont using cultural resource survey forms of the Delaware State Historic Preservation Office.
4. **Archival and Bibliographic Research for Historic Context:** Preliminary research for the Historic Context Framework revealed that, aside from a detailed log of the buildings at Fort DuPont, very little work had been done on the history of the fort and some of the existing information was incorrect. Therefore archival and bibliographic research focused on six areas:
 - a. Placing Fort DuPont in the context of national defense policy, including its relationship with Forts Delaware and Mott, from 1860 to 1945 using military histories and U.S. Army archival sources.

- b. Determining the weapons and fortification technologies of coastal defense from 1860 to 1945; tracing the construction history of the concrete gun emplacements constructed from 1870 through 1905.
 - c. Tracing the physical development of the fort's landscape through maps.
 - d. Locating the standard military plans for the buildings at Fort DuPont to develop property types and National Register evaluation criteria.
 - e. Identifying the chronology of military units that served at Fort DuPont between 1898 and 1945.
 - f. Identifying the relationship between Fort DuPont and the surrounding community.
5. **Development of the Historic Context:** Write an historic context based on the intensive survey and archival and bibliographic research.
6. **Definition of Property Types and Criteria for Evaluation of Eligibility for the National Register:** Define functional and associative property types based on standard plans, construction drawings, the fort's building log, and the intensive survey. Develop criteria for the evaluation of property types.
7. **Determination of Eligibility for the National Register for Fort DuPont as a Historic Landscape and for all Resources Within the Fort:** Evaluate Fort DuPont as an historic landscape and determine its eligibility as a National Register Historic District. Conduct a comprehensive evaluation of all historic resources within the fort to determine those eligible for the Register, including the identification of contributing and non-contributing resources.

Expected Results and Constraints in the Research

The method used in developing an historic context and evaluating historic resources for Fort DuPont is an empirical one; project staff had no "expected results" other than expecting to find resources relating to various points in the fort's development. Context development is original historic research that should be based on primary resources, the central one being the field survey of the properties in

question. But far less information was found on the history of the fort than was expected given its role in U.S. military history. This was true not only of the fort as a physical structure but of its military history and of the larger system of coastal defenses in which it operated. The expectation that the U.S. Army maintained systematic archives on all aspects of its operations turned out not to be true, although the military plans section of the National Archives was rich in resources.

In Delaware, little research had been done or materials archived on Fort DuPont, especially compared to Fort Delaware. The popular appeal of Fort Delaware lay in its being a great stone fortress in the river, albeit one rendered obsolete within two years of completion, and its role as a prisoner-of-war camp for Confederate soldiers during the Civil War. As a result, conventional historic wisdom reduced Fort DuPont to playing a secondary role to Fort Delaware as a so-called "cross-fire" fort. Learning that Fort DuPont was actually built to replace and supersede Fort Delaware was an important and unexpected finding.

Relationship to State Plan

The Delaware Comprehensive Historic Preservation Plan (hereafter "the Delaware Plan") sets priorities for the evaluation of historic resources within the state. It also provides a historic preservation planning framework for evaluating those resources. The project staff conducted the development of this historic context, the intensive level survey, and the evaluation of resources within the framework of the Delaware Plan. As a state-owned property that had never been surveyed, the site of Fort DuPont represented a significant unidentified resource in the state.

Information Needs

During the course of the project, staff identified several areas of research beyond the scope of this project that would enhance understanding of the fort and its historic context. The first is the relationship between Fort DuPont and the surrounding local community, particularly the town of Delaware City. The second involves the late discovery of new sources at the Philadelphia branch of the National Archives. This source should be explored as soon as possible to determine whether it can add to the existing knowledge about the fort.

II. Definition of an Historic Context for Fort DuPont

The National Register of Historic Places requires that a historic resource be evaluated within its historic context. Historic contexts are those patterns, themes, or trends in history by which a specific occurrence, property or site is understood and its meaning and significance within history is made clear. This chapter explains the concept of an historic context and outlines the defining characteristics of the historic context for Fort DuPont. The context itself will be developed further in later chapters.

The Elements of an Historic Context

The significance of an historic resource, such as Fort DuPont, resides in what it manifests about important aspects of American history; specifically it lies in its historic context. The Secretary's Standards and the Delaware Plan define an historic context as an "organizational format that groups information about related historic properties, based on theme, geographic limits, and chronological period" and require that the context form the basis for decisions about identification, evaluation, registration, and treatment of historic resources related to the context.¹

The Delaware Plan identifies eleven elements that are necessary in a fully-developed historic context:

- *historic theme
- *geographic zone
- *chronological period
- *known and expected property types
- *criteria for evaluating existing or expected resources
- *distribution and potential distribution of property types
- *goals and priorities for the context and property types
- *information needs and recent preservation activity
- *reference bibliography
- *method for involving the general and professional public
- *mechanism for updating the context

This historic context on Fort DuPont addresses each of these elements with the exception of goals and priorities for the context and property types and

¹Federal Register, 9/29/83, p. 44716.

the **mechanism for updating the context**. These elements for the Fort DuPont historic context will be developed by the Delaware Department of Natural Resources and Environmental Control in a management and treatment plan for Fort DuPont.

The three defining elements of any context are the historic theme, geographic area, and chronological period. The Delaware Plan is organized around eighteen historic themes, five chronological periods, and five geographic zones appropriate to the state. The context for Fort DuPont is defined by the following themes, zone, and time frame.

Historic themes. After the War of 1812, President Monroe directed the United States Corps of Engineers to develop a plan for the coastal defense of the United States and its major cities. To defend Philadelphia, the plan laid out what became known as the Permanent System of National Defense and called for the construction of fortifications forty miles downstream from the city on the Delaware River near Reedy Point, Delaware. Fort DuPont was a part of the third generation of fortifications, along with Fort Mott in New Jersey, built in this vicinity to defend the Delaware Valley from foreign naval incursion. The first generation of defenses consisted of a succession of two brick fortresses, both named Fort Delaware, built on Pea Patch Island from the 1820s through 1859; the second generation of fortifications were two batteries constructed on the present site of Fort Dupont in the 1860s and 1870s. Fort Dupont, commissioned in 1898, comprised the final chapter in the history of this location as a strategic site for the coastal defense of the Delaware Valley in an era when naval power was supreme. By the end of World War I the fort was obsolete as a coastal defense installation.

Translated into the historic themes in the Delaware Plan, Fort Dupont reflects the theme of national coastal defense policy of the United States which will be treated under the theme of Government in Chapter III. As a physical property, Fort Dupont reflects the culmination of nineteenth century trends in military architecture and engineering. These are a part of the Delaware Plan theme of Architecture, Engineering and Decorative Arts; this theme is developed in Chapters IV, V, and VI.

Geographic Area. For purposes of our analysis, the geographic area has been restricted to the fort itself, which lies in the Coastal Zone, one of the five geographic zones in the Delaware Plan (Figure 1). The Coastal Zone is defined as the strip of land along the Delaware River and Bay and the Atlantic Ocean, extending inland only as far as the head of navigation on a particular river. Fort DuPont is

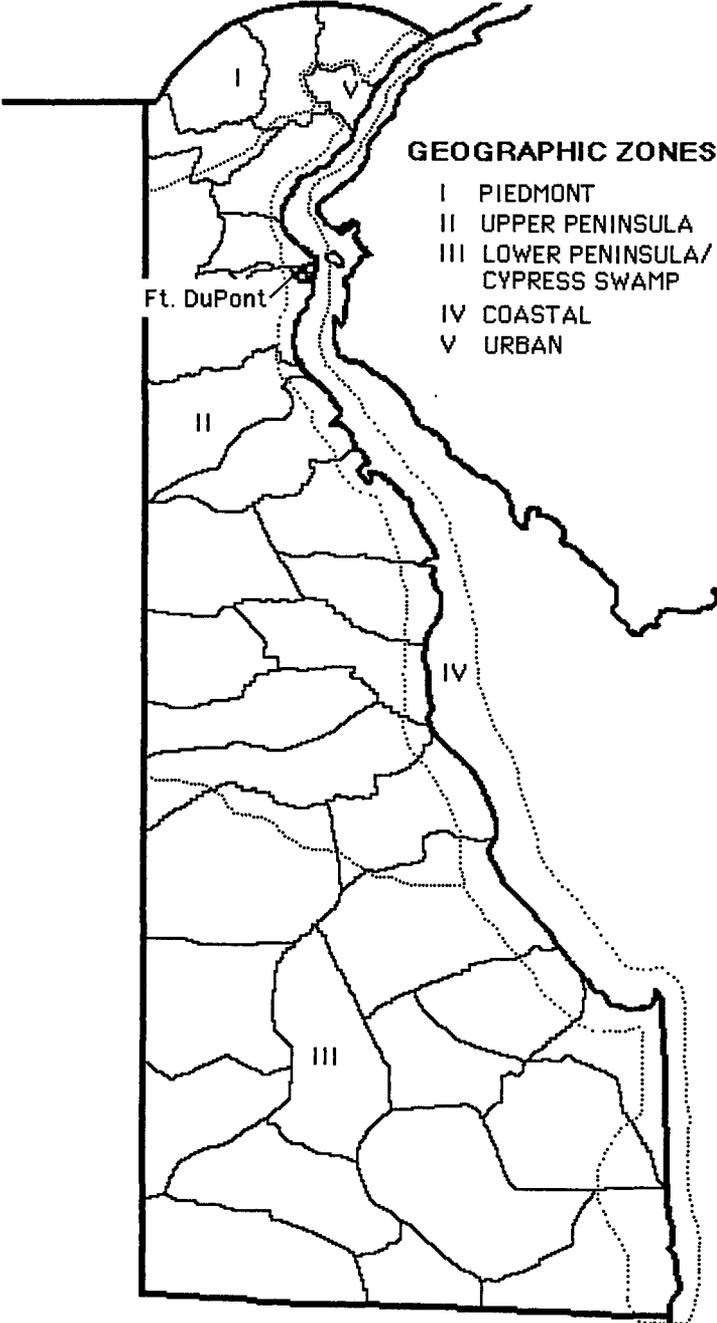


Figure 1: Location of Fort DuPont within the Geographic Zones in the Delaware Plan.

located just south of Delaware City and the original eastern mouth of the Chesapeake and Delaware Canal. It encompasses approximately 325 acres of land that was originally a combination of arable farmland and marsh. Bounded on the western side by State Route 9, the fort's southern boundary consists primarily of marshland. To the east the fort faces the Delaware River and the southern shore of New Jersey.

Chronological Periods. The Delaware Plan divides the state's history into five periods: exploration and frontier settlement, 1630-1730+/-; intensified and durable occupation, 1730-1770+/-; early industrialization, 1770-1830+/-; industrialization and early urbanization, 1830-1880+/-; and urbanization and suburbanization, 1880-1940+/- . Another set of chronological periods important to the evaluation of Fort DuPont are those associated with the evolution of the fortifications and armaments of coastal defense in the United States from the early nineteenth century though the end of World War II.

The periods associated with the development of coastal fortifications and armaments fall into two broad periods. The first one, dating from 1794 until 1886, consisted of fortifications made from earthworks and masonry armed with smooth-bore cannon.² This was followed by the so-called modern period (1886 to 1945) in which breech-loading coastal artillery were mounted in concrete emplacements. These general periods can be further subdivided as follows:

Early Systems

First System: 1794-1800

Second System: 1803-1809

Third System: 1816-1862

Post Civil War Interlude: 1865-1885

The Modern Era

Endicott Period: 1886-1905

Taft Period: 1905-1916

World War I Influence: 1917-1922

World War II: 1939-1945

The history of Fort DuPont cuts across both the early and modern periods because although the fort was not commissioned until the 1890s, batteries were built on the site as early as 1863. The combination of the stages in the development of

²Adapted from Emanuel Raymond Lewis, Seacoast Fortifications of the United States: An Introductory History, Washington, D.C.: Smithsonian Institute Press, 1970.

coastal fortifications in the United States with the chronological periods of the Delaware Plan creates a chronological context suitable for evaluating both the national and regional significance of Fort DuPont. In the 1920s, Fort DuPont's function changed from coastal defense to being headquarters for the First Engineering Battalion.

There are four chronological periods in the historic context for Fort DuPont:

1. The Fort Across from Fort Delaware: 1863-1898

- * 1a. Ten-Gun Battery: 1863 to 1870
- * 1b. Twenty-Gun Battery: 1870 to 1885

2. Fort DuPont Established as the Center of Coastal Defense for the Delaware Valley: 1898-1922

- * 2a. Construction of Rifle and Mortar Batteries: 1898 to 1901
- * 2b. Fort Achieves Maximum Development of Permanent Buildings and Modern Boundaries: 1901 to 1922

3. Fort DuPont as the Headquarters for the First Engineers: 1922 to 1939

4. Fort DuPont in World War II: 1939 to 1945

In terms of the significance of the physical landscape and existing emplacements and structures, the period from 1899 to 1922 was the most formative and significant. Indeed, by 1913 the present ground plan existed, the gun emplacements had been constructed, and most of the surviving structures built. Subsequent activities such as the occupancy by the First Engineers Corps from 1922 to 1939 and the training units and prisoner of war camp located at the fort during World War II left little physical trace on the land except potential archaeological sites.

Property Types

One purpose of developing the historic context was to identify the full range of property types associated with Fort DuPont. The Secretary's Standards state that the research design should predict known and expected property types for the context. While basic categories such as batteries, housing, and administration could be readily predicted, other property types arose from research once the project began. This research included archival resources and the evaluation and comparison of the physical buildings and structures.

When discussing property types related to military installations as defined in

this context, it is important to differentiate between "fort" as it applies to a military post, base, or reservation and "fortification." A fort was a military complex that contained a variety of buildings and structures and frequently served multiple functions. A fort might contain administrative, residential, support, and service structures both for the internal management of the base or as an extension of a regional command structure. The fort was the assemblage of buildings, structures, sites, and objects within the defined boundaries of the military reservation.

A **fortification** was a structure built to support and protect artillery or personnel during war. Fortifications could be as simple as an earthen mound or ditch, or as sophisticated as the concrete batteries present at Fort DuPont. It is possible that a fort and a fortification may be one and the same as in the case of fortresses such as Fort Delaware. Another example of this can be seen in installations like Ten Gun Battery, which not only served the basic defensive role of a fortification, but also defined the reservation and its associated buildings.

As a military installation, Fort DuPont is united by a plan and is therefore considered a historic designed landscape. The designed military landscape of a coastal defense fort can be divided into three parts, or major property types, for the purposes of description and evaluation:

A. **The fort as an historic military landscape.** An Endicott Coastal Defense Fort has, like other designed military landscapes, four elements: 1) purpose and function; 2) location and site; 3) land plan which includes land uses (artillery batteries and fortifications), circulation system, and spatial organization; and 4) building arrangements and scenic views and vistas.

B. **Artillery batteries and fortifications.** The significance of the fort is tied to its role as a coastal artillery installation and its design reflected the implementation of a new coastal defense strategy and weaponry as formulated by the Endicott Board.

C. **Buildings and structures.** Buildings and structures at Fort DuPont fall into four major property types:

1. **Administration:** buildings associated with administrative functions of the post.
2. **Service:** all buildings and structures associated with personal activities of personnel.
3. **Logistical Support:** all buildings associated with military support of the post.
4. **Residential:** all living spaces for post residents.

It is important to state here that there are a wide variety of property types related to military complexes overall. While we will discuss a number of these at a general level in order to give a broader context to Fort DuPont, detailed descriptions and evaluation criteria will only be developed for those property types that specifically relate to Fort DuPont.

The historic context is developed in Chapters III, IV, V, and VI, where the themes of government, military engineering, and military architecture will set the stage for the the development of the military landscape, including the artillery batteries and emplacements, administrative buildings, residential buildings, and various support structures. Chapter VI also contains descriptions and evaluations of all existing historic resources presently located within the fort.

Evaluation Criteria

Determining what Fort DuPont represents in terms of historic themes, geographical zones, and chronological periods provides the perspective from which to evaluate its significance. To be eligible for the National Register of Historic Places a historic property must meet one of four criteria of significance and possess a high degree of physical integrity. The criteria of significance are:

CRITERION A: Properties can be eligible for the National Register if they are associated with events that have made a significant contribution to the broad patterns of our history.

CRITERION B: Properties can be eligible for the National Register if they are associated with the lives of persons significant in our past.

CRITERION C: Properties may be eligible for the National Register if they embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and

CRITERION D: Properties may be eligible for the National Register if they have yielded, or may be likely to yield, information important in prehistory or history.

For an historic property to possess physical integrity it must retain several of the following seven characteristics: Location, Design, Setting, Materials, Workmanship, Feeling, and Association. The development of evaluation criteria for

historic resources comes from relating significant trends in the context to the National Register evaluation criteria.

The National Register of Historic Places includes significant resources classified as objects, buildings, structures, sites, or districts. Fort DuPont was evaluated as an historic district. To be eligible for the National Register, an historic district must possess a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically by plan or physical development. The specific criteria needed to evaluate Fort DuPont as an historic district, and as an historic designed military landscape, are established in the following chapters.

III. Federal Coastal Defense Strategy

As a maritime nation with long shorelines, the United States relied on its navy as its first line of defense and upon a system of coastal fortifications as its second line of defense from the 1790s through the 1930s. During that time, the United States government built eight different generations of coastal fortifications and armaments. Fort DuPont, Delaware, commissioned in 1898, represented part of the fifth generation of coastal fortifications--the last great program of fortification construction. From then until the early 1920s, Fort DuPont served as the headquarters and station of the "Coast Defenses of the Delaware River of the Middle Atlantic Coast Artillery District" of the United States Army. In addition to Fort DuPont, these defenses included Fort Delaware, Fort Mott and, later Fort Saulsbury near Milford, Delaware. But Fort DuPont existed as an active coastal defense fortification for only a short time. Its guns were removed in 1921, and in 1922 the post entered the second stage of its history as an Army post when it became headquarters for the First Engineers Corps. In 1939 the First Engineers moved to another location. During World War II Fort DuPont hosted a variety of training functions as well as serving as the site of a German prisoner-of-war camp. In 1946, the military career of Fort DuPont came to an end when it was declared surplus property by the federal government and transferred to the state of Delaware.

Fort DuPont existed under the historical shadow of Fort Delaware, the architecturally dramatic fortress on the Delaware River better known as a Union prisoner-of-war camp for Confederate soldiers than as a fortification. But in terms of the evolution of coastal fortifications in the United States, Fort DuPont is as significant as Fort Delaware as an example of one of the first coastal fortifications marked by steel-barrelled, breech-loading artillery in concrete emplacements. The Civil War witnessed revolutionary advances in weapons and armaments that changed warfare in significant ways. Improved weaponry helped produce the massive casualties on land that marked many Civil War battles; at sea, the first exchange of fire between the ironclad ships *Monitor* and *Merrimac* made wooden warships obsolete. The introduction of the rifled cannon pushed the great masonry coastal defense fortresses such as Fort Delaware into obsolescence as well.

The construction of Fort DuPont occurred as part of a federal program to

replace and modernize the American coast line fortifications made obsolete by the Civil War. The planning of a twenty-gun battery across from Fort Delaware on Reedy Point in the early 1870s marked the beginning of the implementation of this policy along the Delaware River. This battery, known as the Fort Across from Fort Delaware, was intended to be armed with the latest weapons and to supersede Fort Delaware as the primary defender of the Delaware Valley against foreign naval incursion. The importance of this location along the Delaware River as a point to defend Philadelphia and the Delaware Valley was first established after the War of 1812, when the War Department formulated a national plan for coastal defense. This plan designated the Reedy Point area on the Delaware River as an important strategic defensive position and called for the construction of Fort Delaware.

The significance of Fort DuPont is best understood in the context of a federal policy of coastal defense developed after the War of 1812. Known as the "Permanent System of National Defense," it promoted the construction of a chain of fortresses along the American coast from 1820 through the 1850s. Fort Delaware was one of these fortresses. Also known as the "Third System," the set of strategically located fortifications was intended to replace the earlier First and Second Systems of coastal defenses devised in the 1790s and between 1808 and 1812.³ The British invasion during the War of 1812 heightened Americans' fear of a war fought on home soil. The fortifications built before the War of 1812, for example, were poorly located and proved to be too close to the cities they defended; they could not intercept an enemy fleet before it reached the immediate vicinity of a city. Fort Mifflin, built just south of Philadelphia between 1798 and 1803, was an example of such a fort.⁴ Many in the federal government felt that a well-planned system of fortifications could prevent war on American territory. In 1816, Congress authorized the President to direct the Corps of Engineers to create a general system of national defense.

The Corps designed a system of fortifications that proved mutually supporting. Sea power represented the major instrument of war against the United States in the

³Willard B. Robinson, American Forts: Architectural Form and Function (Chicago: The University of Illinois Press, 1977), p. 85.

⁴Frank E. Snyder and Brian H. Guss, The District: A History of the Philadelphia District of the U.S. Army Corps of Engineers (Washington, D.C.: U.S. Government Printing Office, 1974), p. 111.

early nineteenth century as well as the country's primary defense. Therefore, the new fortresses were located to meet several goals. One set of fortresses denied a foreign fleet access to naval depots, harbors of rendezvous, or points of refuge along the American coast from which they could launch attacks. A second set strengthened coastal cities against attack. Military engineers placed these fortresses as far downstream as possible from the cities they defended, forcing an enemy to land troops at a significant distance from the city. Sited on strong defensive positions in marshes or rocky areas, these fortresses utilized natural barriers to protect their landward approaches.

The Permanent System included such forts as Hamilton defending New York, Washington guarding the nation's capital, Monroe protecting the port at Norfolk, and Forts Moultrie and Sumter shielding Charleston (Figure 2). In determining the location for Fort Delaware to replace Fort Mifflin as the protector of Philadelphia, military engineers considered both Pea Patch Island and the present site of Fort DuPont. The limited range of the smooth-bore cannon in use at the time also influenced the location of the forts. Fort Delaware, for example, although some distance from Philadelphia, sat at a point where the river narrowed enough to bring warships within the effective range of its cannons. The Permanent System contained three classes of forts. First class forts, like Fort Delaware, were designed to "protect the most important commercial cities and harbors, to defend naval arsenals, and to prevent an enemy from establishing a position in the country."⁵ Second and third class forts were smaller forts located on tributaries in positions to defend smaller cities and towns. As the military developed heavier and more powerful cannon, stone fortifications steadily increased in size and strength. In the new brick and stone forts of the Permanent System built between 1820 and 1860, the larger guns occupied casements or armored compartments within the walls and fired through embrasures in the masonry rather than sitting on top of the walls and firing over the parapets. This shift in the size, number, and location of armaments required that the defenses' stonework be reinforced to support the additional weight and to resist the recoil of large-bore cannon.⁶

⁵Robinson, American Forts, p. 88.

⁶Snyder and Guss, The District, p. 122.

Still, in a era of smooth-bore cannon shooting round shot, no matter how large the shot, the ability of a fortress to stand up to bombardment depended on the thickness of its walls. When completed in 1859, Fort Delaware was the largest masonry fort in the United States. Only three years later, on April 11, 1862, Fort Delaware and the other masonry forts in the Third System were rendered virtually obsolete when Union artillery from rifled cannon breached the walls of Fort Pulaski in Georgia. Considered the most impregnable of the first class forts, Fort Pulaski fell in just a day and a half. The implications of the new artillery for coastal defense were not fully realized until after the war. Articulated by a foreign engineer who served with the Confederacy in Mobile, the three new principles of coastal defense reflected recent changes:

- * Exposed masonry is incapable of withstanding fire of Modern Artillery.
- * Earth, especially Sand-works, properly constructed, [is] better Protection against Modern artillery than the permanent fortifications built on the old plan.
- * No Forts now built can keep out a large Fleet unless the Channel is obstructed.⁷

After the Civil War, changes in the design of coastal fortifications occurred rapidly: "all new batteries built for our seacoast defenses had earthen exterior slopes, and no additional masonry [fortifications] were built. Later, concrete emplacements were added to protect the increasingly heavy guns needed for seacoast defense."⁸

These principles were quickly put into effect along the Delaware River; Fort Delaware was modernized between 1871 and 1873 with concrete magazines and platforms for planned fifteen-inch guns. More significantly, on the New Jersey and Delaware shores opposite Fort Delaware, construction began on two new forts as a part of the modernization of coastal defenses for the Delaware Valley. On the New Jersey side, a ten-gun earthen battery with emplacements for two fifteen-inch guns was erected, called Fort Mott. On the Delaware side, at the site of a battery built during the Civil War (Ten Gun Battery), construction began in 1870 on a new fort.

⁷Robinson, American Forts, p. 131.

⁸Snyder and Guss, The District, p. 127.

Known first as "The Fort Opposite Fort Delaware," this battery later became part of the site of Fort DuPont. Designed according to the new principles governing the construction of coastal defense installations, its plan consisted of "an earthen battery to mount twenty guns, wharves and emplacements for two fifteen-inch Rodman guns."⁹ As planned with the new emplacements, "The Fort Across from Fort Delaware" would have become the most powerful fort on the Delaware estuary, but the full complement of guns never materialized and the fort never achieved its planned status.

The post Civil War period marked a transition from the early period of American coastal fortifications to the modern period.¹⁰ The design of coastal defenses has always been the product of an equation balancing the power of artillery or cannon, both defending on shore and attacking from sea, and the strength of fortifications. "In the entire history of warfare, few principles have been as durable or nearly as absolute as the one concerning the superiority of guns ashore over guns afloat."¹¹ The so-called "Early Systems" of fortifications, dating from 1794 until 1886, were constructed of earthworks and masonry and armed with smooth-bore cannon.¹² The "Modern Period" that followed was characterized by breech-loading coastal artillery mounted in concrete emplacements. These general periods can be divided as follows:

Early Systems

The First System: 1794-1800

The Second System: 1803-1809

The Third System: 1816-1862

The Post Civil War Interlude: 1865-1885

The Modern Era

The Endicott Period: 1886-1905

⁹Snyder and Guss, The District, p. 130.

¹⁰Emanuel Raymond Lewis, Seacoast Fortifications of the United States: An Introductory History, Washington, D.C.: Smithsonian Institution Press, 1970, p. ii.

¹¹Lewis, Seacoast Fortifications, p. 3.

¹²Adapted from Lewis, Seacoast Fortifications.

The Taft Period: 1905-1916

World War I Influence: 1917-1922

World War II: 1939-1945

During the Third System (1816 to 1865), the high, vertical-walled all-masonry fort, such as Fort Delaware, became a pinnacle of fortification technology of the early systems. Because these forts contained casemented gun emplacements firing from inside the fort through openings in the wall called embrasures, their cannon could be arranged in tiers to attain great volumes of concentrated firepower to defend against seaborne foes. The invention of rifled artillery (pointed projectiles that spun as they hit the target) stripped masonry of its protective strength against bombardment and the casemented, masonry forts were lost as a platform of concentrated defensive firepower. Thus, after the Civil War, separate batteries served as the primary elements of coastal defense for the first time since the Revolutionary War. Although the concentrated firepower disappeared, the dispersed batteries offered tactical benefits because "defensive armament could be grouped in any number of comparatively inexpensive works distributed among sites of maximum advantage along harbor entrances."¹³ Twenty-gun Battery was an example of such a dispersed battery.

By the 1880s, in spite of the improved coastal defenses, many civilian and military leaders in the United States considered important urban areas virtually defenseless because of rapid developments in the power of artillery, especially that of the new steel hulled warships.¹⁴ In response to these concerns, the President appointed the Endicott Board in 1885 to assist the Corps of Engineers with the design and implementation of a new system of defense. The program presented by the Endicott Board in 1886 called for a large number of "fortifications which included armaments of the heaviest rifles mounted on disappearing carriages...all of which were to be protected by massive works of reinforced concrete."¹⁵ Congress passed

¹³Lewis, Seacoast Fortifications, p. 69.

¹⁴Robinson, American Forts, p. 131.

¹⁵Robinson, American Forts, p. 130.

legislation based on these recommendations that authorized the construction of the new Fort DuPont in 1898.

In the fifteen years since ground had been broken for Twenty-Gun Battery, a revolution had occurred in the technology of coastal artillery. These developments included the first large-scale use of steel for guns, the perfection of breech-loading projectiles to replace the more cumbersome muzzle loading and the introduction of propellants more powerful than gunpowder. Taken together, these were the greatest advances in artillery since its invention in the fourteenth century.¹⁶ The weapons that became available in the 1890s could fire projectiles that were four times as heavy and possessed effective ranges three times as great as that of the best smooth-bore, muzzle-loading cannon of the Civil War.

In 1886, the Endicott Board recommended modernizing the coastal defenses of the United States with these new guns and associated emplacements. The program presented to the President by the Board called for "an enormous number of defensive works, including many with armored turrets and casements to be armed with weapons of unprecedented size and firepower."¹⁷ In their plan, fortifications were to be built at twenty-six coastal locations including three on the Great Lakes.¹⁸ Although the number of fortifications actually built were far fewer than the Board called for, the report became the framework for a new generation of coastal defenses, with Fort DuPont among them.

In preparation for the building of a modern masonry fortification at Ten Gun Battery in 1897, the outmoded guns were removed. In 1898 the site was formally commissioned as Fort DuPont; in 1899, construction began on the new fortifications which were completed in 1902.¹⁹ It was one of the few Army installations named in honor of a naval officer, Admiral Samuel Francis DuPont who was a Delaware hero of Civil War fame. When construction of the fortifications was completed in 1902, there

¹⁶Lewis, Seacoast Fortifications, p. 75.

¹⁷Lewis, Seacoast Fortifications, p. 77.

¹⁸Lewis, Seacoast Fortifications, p. 77.

¹⁹Robert B. Roberts, Encyclopedia of Historic Forts: The Military, Pioneer and Trading Posts of the United States, New York: MacMillan and Company, 1988, p. 130.

were two eight-inch and twelve-inch breech-loading rifles and sixteen twelve-inch breech loading motors.²⁰ The completion of the concrete gun and mortar emplacements with their armaments installed was only the first step in the completion of Fort DuPont as a coastal fort of the Endicott period. Unlike the self-contained stone fortresses of the earlier era, the gun and mortar emplacements of the Endicott forts were part of and supported by a larger traditionally laid out military reservation. Remaining after 1902 was the acquisition of additional land, the laying out of a land plan and construction of permanent buildings and supporting facilities. As detailed in later chapters, the physical fabric of Fort DuPont was largely completed by 1915.

Although the First Engineers Corps adapted the post to their needs after 1922, including the construction and storage of pontoons, they left little physical imprint on the landscape. Permanent new brick buildings were constructed in the early 1930s, as much a part of federal programs to relieve unemployment during the Great Depression as of military needs. In the late 1930s and early 1940s, in preparation for and during World War II, great numbers of temporary cantonment buildings were constructed (Figure 3). Nearly all of these buildings have been demolished, leaving Fort DuPont looking much as it did in the mid-1930s. Thus the significance of Fort DuPont resides primarily in its characteristics as one of the coastal fortifications of the Endicott period. It is part of a class of fortifications that represent the high point in armaments technology and military engineering of fixed-permanent fortifications in the time before the bomber and the missile.

From this discussion we can define two broad categories of property types for forts and fortifications: those from the pre-Civil War period and from the post-Civil War period. The resources at Fort DuPont relate to the second property type, which can be further divided into three subtypes: transitional forts, early open-plan forts, and forts of the Endicott Board. The physical characteristics of these property types are developed more clearly in the next chapter.

²⁰Roberts, Encyclopedia of Historic Forts, p. 130.

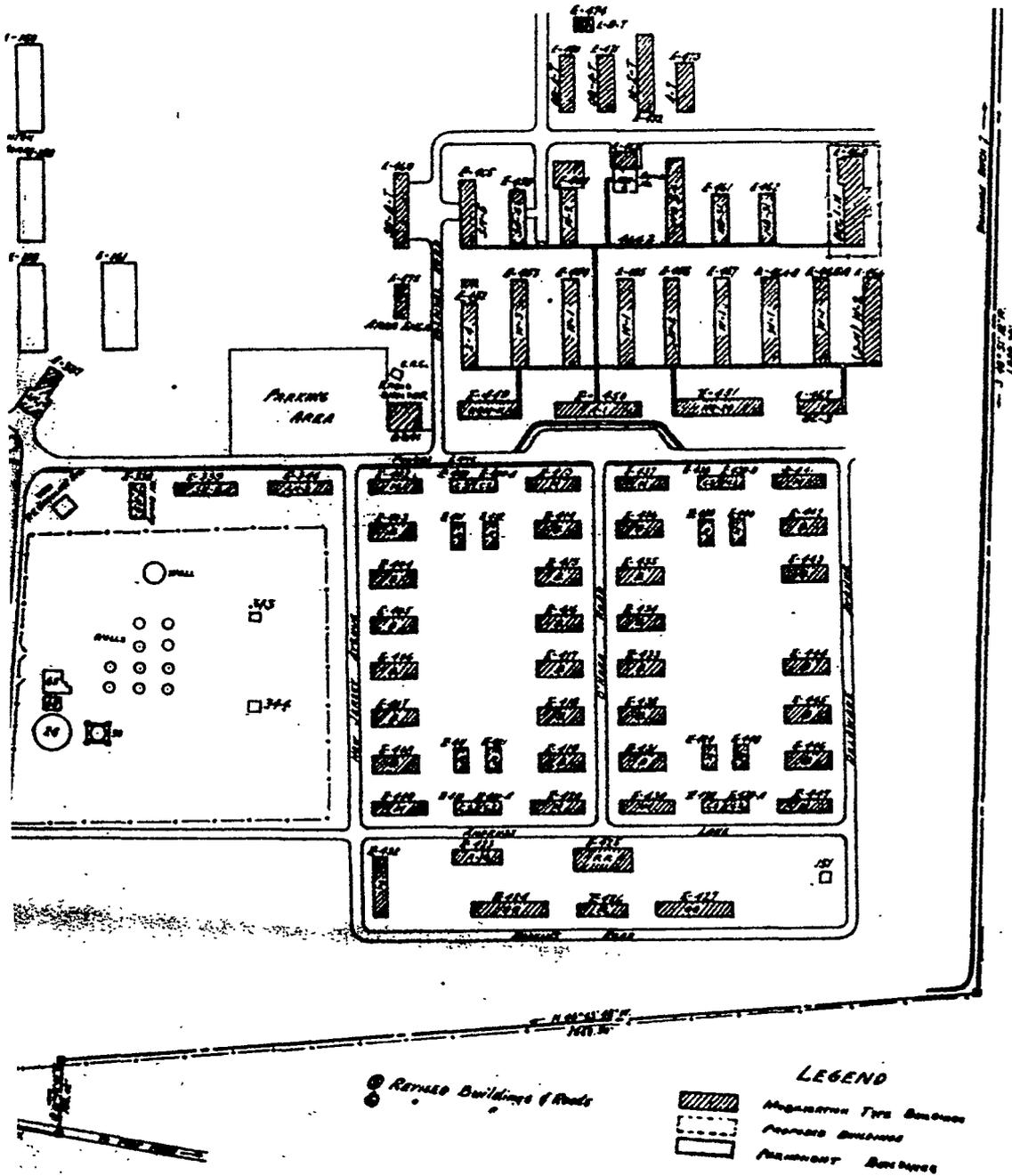


Figure 3: Detail of 1943 map showing cantonment and mobilization type buildings. Source: National Archives, Cartographic Division, Record Group 77.

IV. The Technology of Coastal Artillery and Emplacement Construction

In the entire history of warfare, few principles have been as durable as the one concerning the superiority of guns ashore over guns afloat...Only after World War II and the appearance of radically new forms of weaponry such as nuclear explosives and guided missiles did the major powers finally abandon conventional coast artillery.

Lewis, p. 3.

From the invention of artillery in the fourteenth century until the 1850s, military engineers responded to larger and more powerful cannon with fortifications of thicker walls, stronger materials, and new designs. During this long period, however, the mechanics of the cannon changed very little: round shot, loaded through the muzzle, was propelled from a smooth-bore barrel. Technology succeeded only in creating larger cannons. The great masonry fortresses, such as Fort Delaware, were designed to further intensify the firepower of cannons by positioning them in concentrated tiers.

The trends in artillery design associated with the construction of Fort DuPont start with the invention of new artillery technology in the 1850s which would bring an end to the era of the self-contained masonry fortress at Fort Pulaski in 1862. These trends culminate in the complex technology of the large ten-inch disappearing rifles that would revolutionize coastal artillery and arm Fort DuPont.

With regard to trends in fortification design, Fort DuPont documents the stages of post-Civil War efforts by the Corps of Engineers to respond to the new artillery and naval armament. Specifically, the fortifications built at Fort DuPont from 1863 through 1902 contain examples of the last of the Early Systems (Ten Gun Battery as a Civil War emplacement); Twenty Gun Battery from the Civil War Interlude: 1865-1885, a fortification design transitional between the vertical-sided, casemented stone fortresses of the Permanent System and the first of the fortifications of the Modern Era; Fort DuPont itself as an Endicott period fort; and very little physical influence from the post-Endicott period.

This chapter is organized in two sections: the first part describes trends in the technology of artillery that drove trends in fortification design culminating in the Endicott period fortifications; the second part details trends in the design of coastal

fortifications from the Civil War until World War I and how those are represented at the site of Fort DuPont. Thus this chapter addresses the first two of the four chronological periods in the history of Fort Dupont:

1. The Fort Across from Fort Delaware: 1863-1898
 - * 1a. Ten Gun Battery: 1863 to 1870
 - * 1b. Twenty Gun Battery: 1870 to ca 1885
2. Fort DuPont Established as the Center of Coastal Defense for the Delaware Valley: 1898-1922
 - * 2a. Construction of Rifle and Mortar Batteries: 1898 to 1901
 - * 2b. Fort Achieves Maximum Development of Permanent Buildings and Modern Boundaries: 1901 to 1922

The Technology of Coastal Artillery: 1850 to 1900 +/-

A major, and perhaps the greatest, technological advance in the design of cannons occurred in the 1850s with the introduction of the rifled barrel. Since the invention of the cannon in the fourteenth century, the barrel was smooth on its interior surfaces (smooth-bore). Spherical cannon balls exited the barrel and travelled through an often erratic trajectory before reaching their target.²¹ Rifled barrels contained long spirals on their interior surfaces. As the projectile moved down the barrel, the rifling imparted a spin to it. This provided a flatter trajectory, greater range, and higher muzzle velocity, all of which contributed to the accuracy of the weapon.²² Military science soon discovered that spherical, or "round-shot," failed to utilize the full potential of the new barrels. The projectile began to assume the conical appearance of the modern bullet. Conical projectiles exhibited less resistance as they moved through the air, and were less likely to be affected by wind. Furthermore, hollowed bases allowed the projectile to expand slightly from the force of the powder explosion, thereby seating itself firmly in the rifling. The advent of the rifled barrel altered even the nomenclature of military artillery. The term cannon, once generic for heavy weapons, now referred only to smooth-bore pieces.

²¹ *Trajectory* refers to the arc of the cannon ball, more appropriately called a projectile, as it travels upward from the barrel before falling back to earth. Similar to a rainbow in appearance, a high trajectory was needed to increase the range of older weaponry.

²² The *muzzle velocity* is the speed, measured in feet-per-second, of the projectile as it leaves the barrel.

"Rifle" became the accepted designation for the new generation of gun. Terms relating to the relative size of weapons also changed. A "thirty-two-pounder" referenced a cannon using thirty-two pound, round projectiles. The conical projectile used in rifles did not carry a consistent weight, and designations based on this factor proved meaningless. The length could be altered to suit a specific purpose. The projectile might be solid iron, or filled with powder and fitted with an impact detonator.²³ To standardize the terminology, military engineers began using the gun's bore, or internal diameter, to differentiate one from another. Ten-inch rifles rapidly replaced the outdated twenty-four-pound, smooth-bore cannon in the nation's coastal fortifications.

While the rifled barrel stands as the penultimate advance in weapon design, it emerged only after military engineering reached its limit in improving smooth-bore cannon. Throughout the first half of the nineteenth century, cannon grew progressively larger and more powerful. Cannon of eight, ten, fifteen, and even twenty-inch bores saw service in coastal fortifications. The difficulty engineers encountered in building these massive guns lay in the fact that cast iron provided the only suitable material from which to make barrels. Cast iron's greatest drawback was that it became brittle if it cooled too slowly or quickly after casting. These barrels occasionally failed with disastrous consequences. The first attempt at eliminating this problem took place in 1811 when New York's Columbia Iron Works began casting barrels with a reinforced chamber.²⁴ Throughout the nineteenth century, large seacoast weapons of this design received the generic designation "Columbiads." Another significant innovation in heavy weapons manufacture is attributed to U.S. Ordnance Lieutenant (later Major) Thomas J. Rodman. Rodman's technique used a water-cooled core, as opposed to a core of packed sand, that allowed for the careful regulation of the cooling rate of the fresh casting. Assuring that the molten metal cooled evenly resulted in a barrel of great strength. Initially issued

²³Round shot also used exploding rounds, but these contained unpredictable powder fuses ignited by the main charge. The reliability of conical projectiles, and the fact that the tapered end always struck an object first, allowed for the use of *impact detonators*. These detonators used a percussion cap, a device containing a substance ignited by a sharp blow, to set-off the primary charge.

²⁴The *chamber* is that portion of the barrel that contains the powder and shot after loading. It is the portion of the gun that absorbs the greatest stress during firing.

circa 1861, Rodman's manufacturing process earned him limited notoriety as the inventor of the "Rodman-Type Columbiad."

Although barrels of over 50,000 pounds could now be produced with some degree of confidence, cast iron never satisfied the needs of the ordnance engineers. Cast iron was difficult to machine, and accurate rifling required precise tooling. Even if ways to successfully machine the grooves of a rifled barrel into cast iron were developed, the inherent weakness of the metal made it imprudent to attempt to construct ever larger tubes with this material. The answer lay in the use of steel. Although steel existed as early as the eighteenth century, the ability to produce large quantities of high-grade material, and then work it into usable components, eluded armament manufacturers until the later part of the nineteenth century. At that time, the development of the blast furnace by Sir Henry Bessemer and advances in drop-forging and tooling machinery allowed seacoast weapons to reach their zenith.²⁵ With an ample supply of pure steel and a collection of the most massive machinery ever created, armories now produced gun tubes weighing more than 100,000 pounds.

With rifled, steel barrels the "perfect" weapon lay within reach of the military. The powder, or propellant, needed to cast projectiles distances of several miles proved the only impeding factor remaining. Black powder--composed of saltpeter, charcoal, and sulphur--served as the propellant throughout most of the nineteenth century, yet provided the needed force through deflagration rather than by a true explosion.²⁶ To propel the increasingly large projectiles of nineteenth-century weapons, a propellant that generated immense pressure was needed.²⁷ As early as 1846, the first step in obtaining this appeared in the form of guncotton or cellulose nitrate. Guncotton was similar to black powder except that the nitrates (the potassium nitrate obtained from saltpeter in making black powder) were highly concentrated, allowing the material to burn much more quickly and produce higher

²⁵In *drop forging*, semi-molten steel is forged between dies by using a drop hammer or press.

²⁶*Deflagration* is a type of rapid combustion that creates pressure by the presence of heated, expanding gases.

²⁷A propellant that created pressure through *detonation*, or the generation of intense heat and pressure through the nearly instantaneous conversion of a solid to a gas.

pressures. Guncotton is still used today to produce modern "smokeless" powders. While this propellant exceeded the performance of black powder, and saw service throughout the second half of the nineteenth century, the development of cordite near the turn of the century gave military engineers the product they sought. Cordite use guncotton as its base product, but enhanced its characteristics through the addition of nitro-glycerin and petroleum distillates. Cordite was an extremely powerful propellant that detonated in the chamber of the weapon with immense force. By 1900, new technology provided the Army with the metals, propellants, and designs with which to enter the twentieth century.

It is important to realize that these advances in weapons technology took place in a very short span of time. From the development of rifled barrels to the production of cordite, only fifty years transpired. The military landscape--the forts that housed the weapons and withstood their assaults--developed at a comparable rate. The structures that stood at the beginning of this half-century of discovery, masonry forts like Fort Delaware, quickly faded into obsolescence. The opening years of the Civil War illustrated the ineffectiveness of massive masonry fortifications. The rapid destruction of installations like Fort Pulaski pointed out that technologically superior weaponry could reduce twelve-foot-thick brick walls to rubble in a matter of hours. The inability of the Permanent System of fortifications to withstand long sieges prompted the construction of numerous earthenworks to support and supplant the existing coastal defenses.

The Technology of Battery Construction

The fortifications that dominate the landscape of Fort DuPont today were products of the last decade of the nineteenth century. Batteries Reed and Gibson occupy the southeastern corner of the military reservation and mounted the eight- and twelve-inch rifles (Figure 4). Constructed of reinforced concrete and heavily backfilled, the batteries represented state-of-the-art military engineering and the most advanced armament of the time. Fort DuPont's batteries contained a steel substructure, encapsulated by concrete, that served as a supplementary load-bearing element across the ceilings of interior spaces. Wooden forms provided the framework for vertical surfaces while interlocking terra-cotta tiles formed a base



Figure 4. Batteries Reed and Gibson as seen from the abandoned Twenty Gun battery, 1899. Source: Delaware State Archives.

for the installation of roofs and ceilings (Figure 5). Concrete pours utilized a "slip-forming" technique.²⁸ The installation of sheet-metal dividers a few inches from the forms provided three distinct cavities within each wall. The central core received a concrete mix comprised of cement and large aggregate. Where exposed by deterioration, this aggregate ranged in size from pea-gravel to rocks three or four inches in diameter. A second pour of finer mix concrete, providing a smoother more weather-resistant finish, then filled the cavities next to the form itself. After stripping the forms, these areas made up the batteries' exposed surfaces. With the concrete still liquid, workers removed the slips separating the successive pours, allowing the concrete to bond together.

After the concrete cured and all forms and centering removed, backfilling took place with the help of a precarious rail system (Figure 6). A small tank locomotive hauled side-dump gondolas to the top of the fortification. As backfilling progressed, new track was laid and the process continued (Figure 7). This rail system served an additional purpose during the installation of the heavy weapons. Stretching from the wharf to all parts of the military reservation, the rail system allowed for the transportation of the batteries' heavy components from barges to their final location. The bulk of this system served a temporary function and was dismantled soon after the completion of the batteries, but segments of it remained running from the wharf to each of the major installations. Batteries Reed and Gibson contained their own power-generating equipment with a boiler, engine, and dynamo centrally located in the structure (Figure 8). Electricity powered munitions elevators and overhead lights, but military preparedness dictated that all contingencies be met so winches and ordnance contained hand cranks and wheels for manual operation. Corridors and operations rooms contained wall niches for the placement of oil or kerosene lamps.

While the engineering involved in the Reed and Gibson batteries represented the highest level for its time, actual construction techniques seem rather archaic even by early twentieth-century standards. Wooden derricks and portable steam engines provided the power for light lifting, but the heaviest loads, such as rifle barrels, required substantial wooden ramps where parts moved along wooden rollers (Figure 9). Despite these apparent limitations, the installation of a disappearing gun

²⁸Personal Communication from Michael Henry, Watson and Henry Associates, Bridgeton, New Jersey.

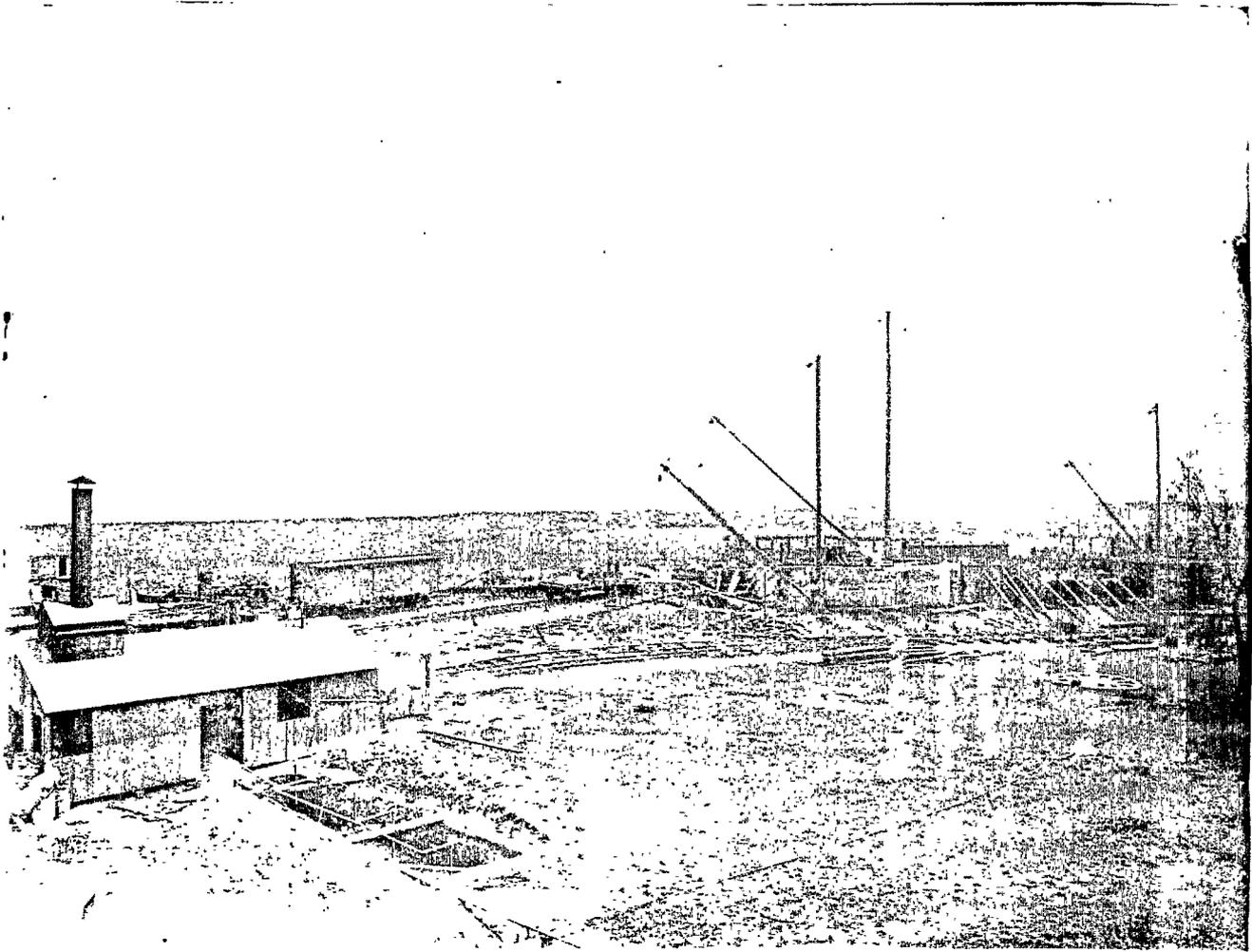


Figure 5. The southern eight-inch gun emplacement under construction at Batteries Reed and Gibson, 1898. Source: Delaware State Archives.

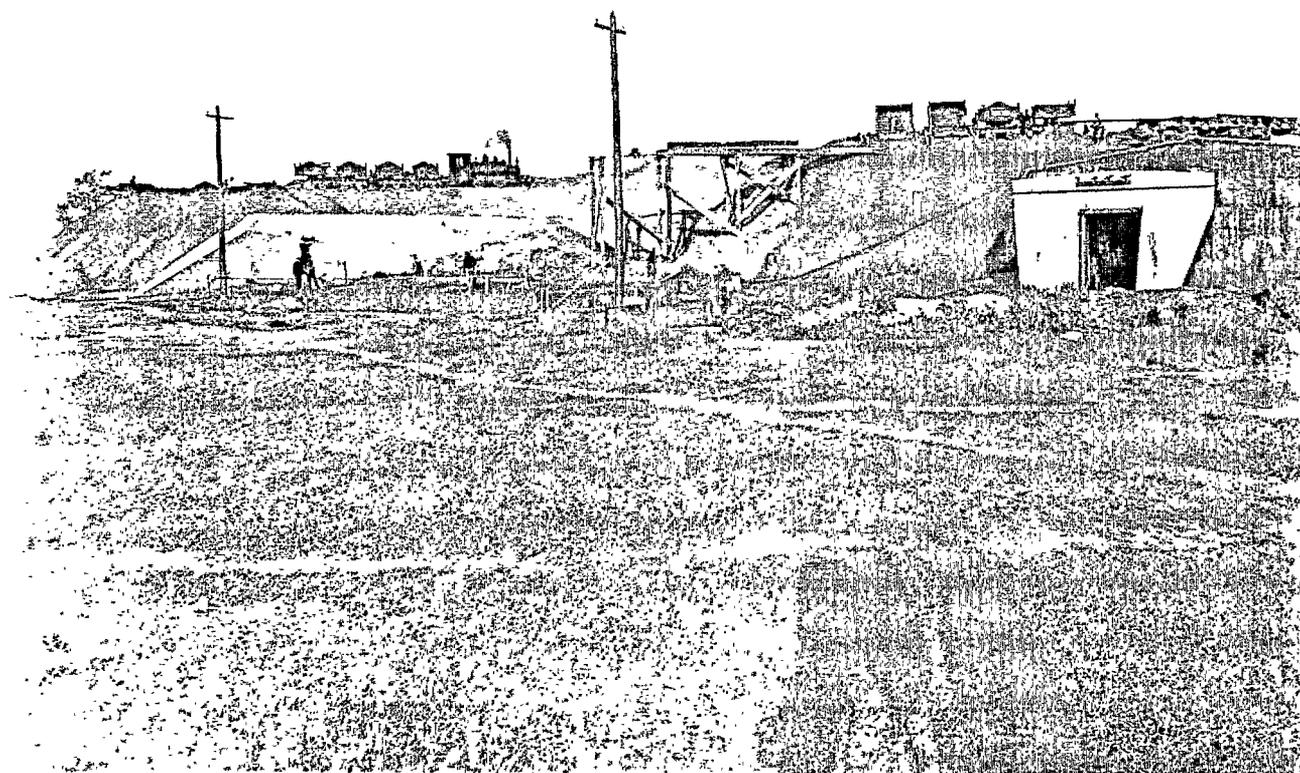


Figure 6. A temporary rail system provided a way to move tons of fill material, 1899.
Source: Delaware State Archives.

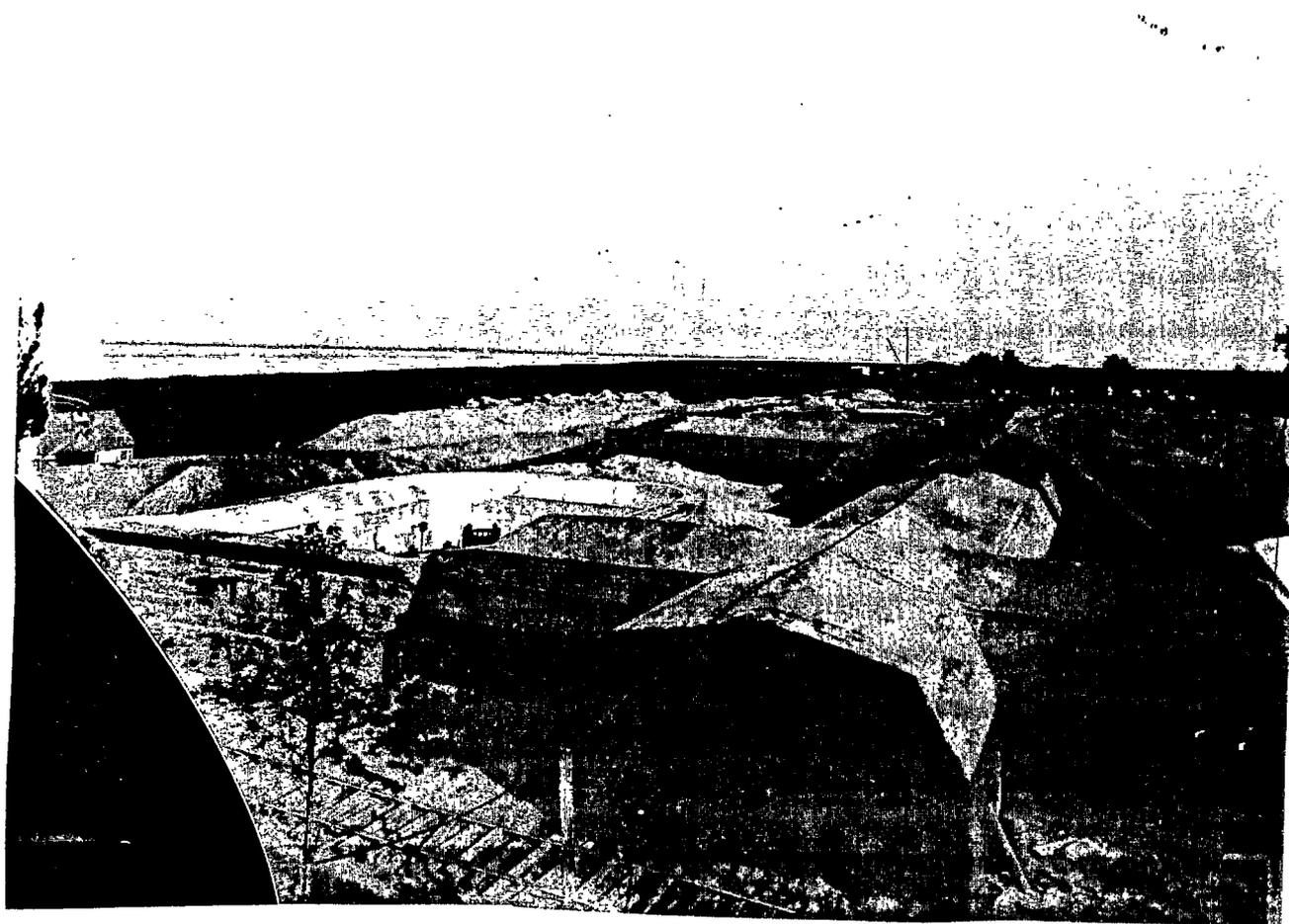


Figure 7. Rails laid directly on fill are seen to the right of center in this view taken in 1899. In the distance are the derricks used in constructing the rifle batteries. Source: Delaware State Archives.

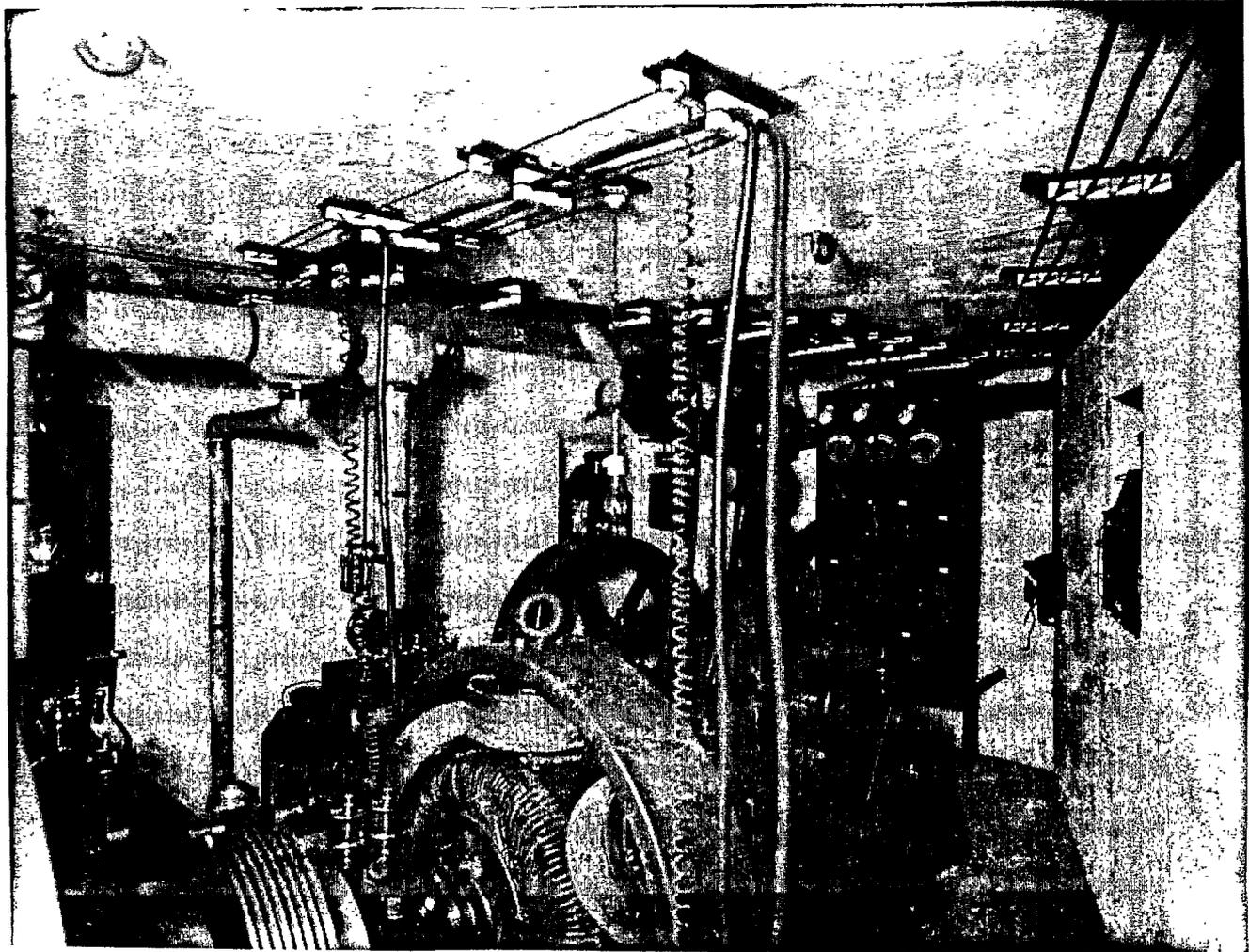


Figure 8. Dynamo installed in batteries Reed and Gibson, 1899. Source: Delaware State Archives.

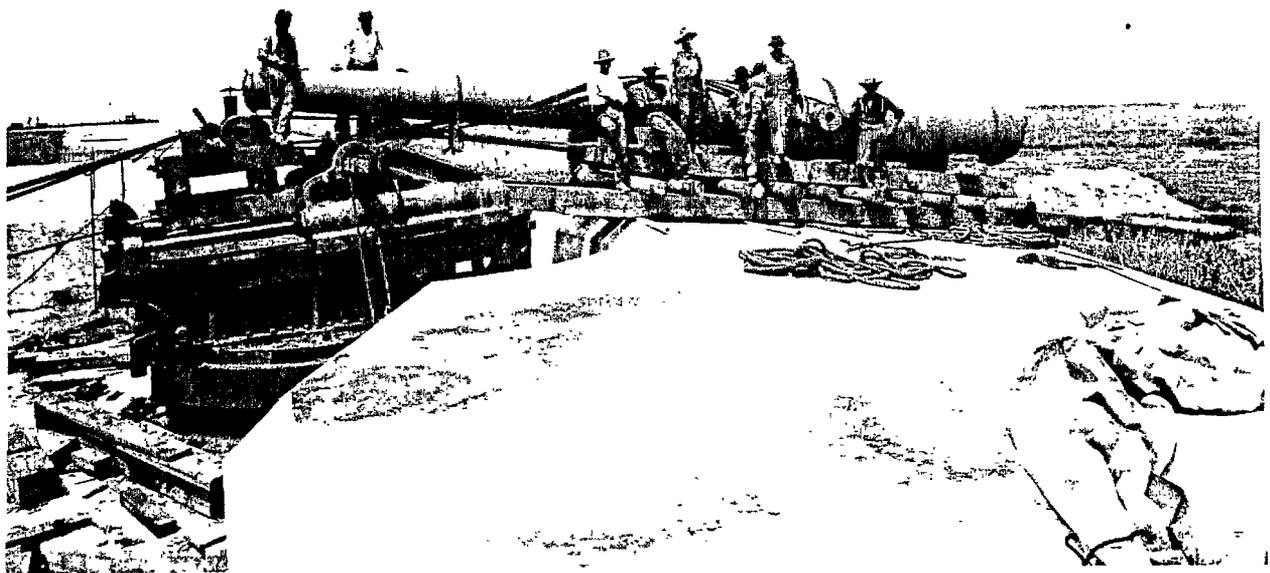


Figure 9. "Moving 12" Rifle up inclined trestle to Terrepleine, July, 1899." Source: Delaware State Archives.

with a total weight of several hundred tons took a relatively short time. A series of photographs taken by the Philadelphia District of the Corps of Engineers depicted the erection sequence of a disappearing gun. From the placement of the base ring to the final installation of ladders and levers, a gun could be operational in only eighteen days (Figure 10).

Construction of the mortar battery followed the same general sequence of events, but differed in the fact that most of this installation occurred underground (Figure 11). While work progressed steadily at the rifle fortification--with concrete work, backfilling, and ordnance installation often taking place simultaneously--the subterranean nature of the mortar battery required that all work on portion of the installation, such as gallery construction, be completed prior to initiating the next step. The completion of the central and transverse galleries allowed work on the mining casement, and in turn, work could commence on the individual mortar pits. Backfilling and weaponry followed soon thereafter. This concluded the construction of the weaponry portion of the fort.

Transitional Forts and Fortifications

The first new type of fortification appeared as a transitional phase between the enclosed masonry structures of the Permanent System and the open plans that followed. While retaining the pentagonal shape of earlier fort plans and encircling supportive buildings such as barracks and kitchens, these fortifications employed earthen banks as the primary means of defense from artillery fire. Constructed around a timber framework, sand or earth formed both the structural foundations for gun emplacements and the bulk of the installation's form. Moats or ditches protected the land and sea approaches and a simple bridge provided access to the installation. Palisades often replaced earthen banks on the sides of the fort least in danger of assault by heavy weapons. The guns were placed *en barbette*, or fired through openings in the works called embrasures (Figure 12).²⁹ The terrepleine was narrow and frequently covered with a wooden deck. While this phase of fortification design

²⁹*Barbette* mounting of a gun refers to a position on the top of the fortification. No roof or other form of protective covering is provided, and *transverses*, earthworks constructed at right angles to the parapet, offered limited safety from hostile artillery originating at either side-raking or flanking fire.

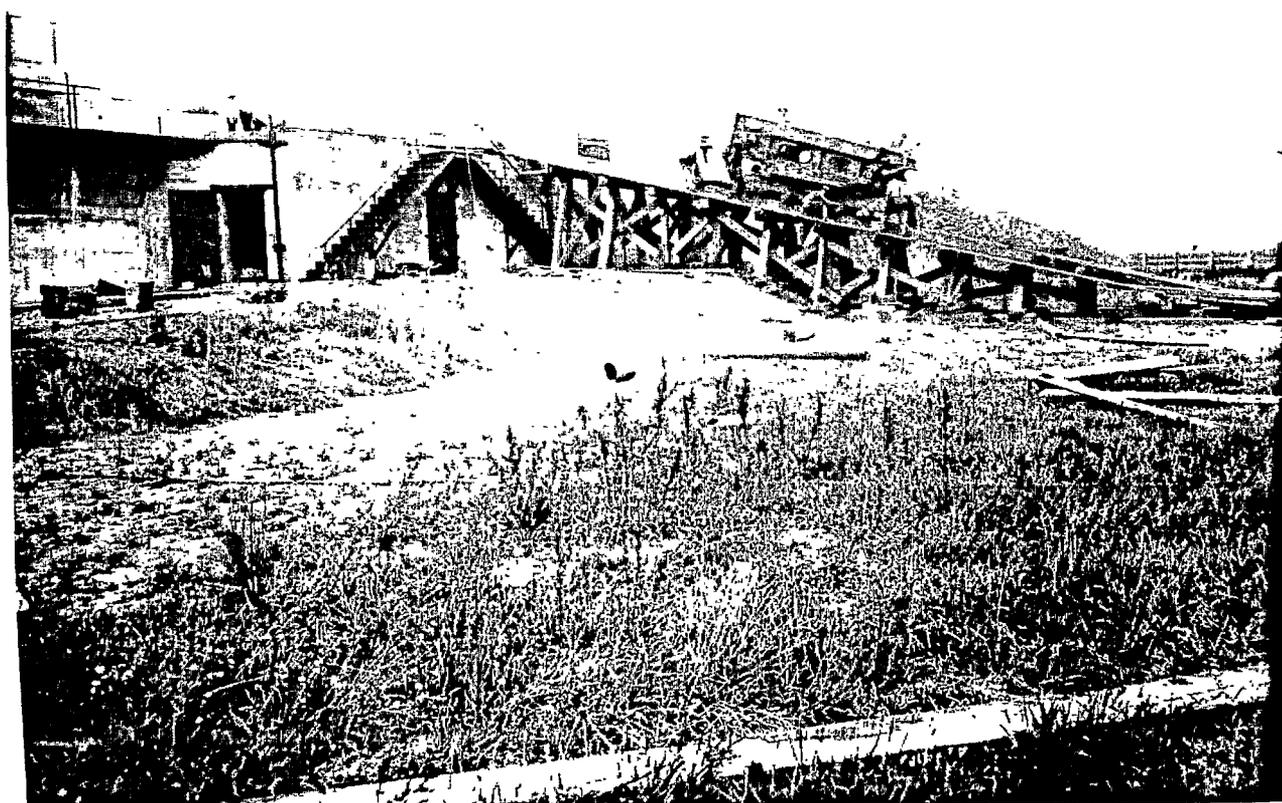


Figure 10. Cables and wooden rollers move a twelve-inch barbette carriage into position in 1899. Source: Delaware State Archives.

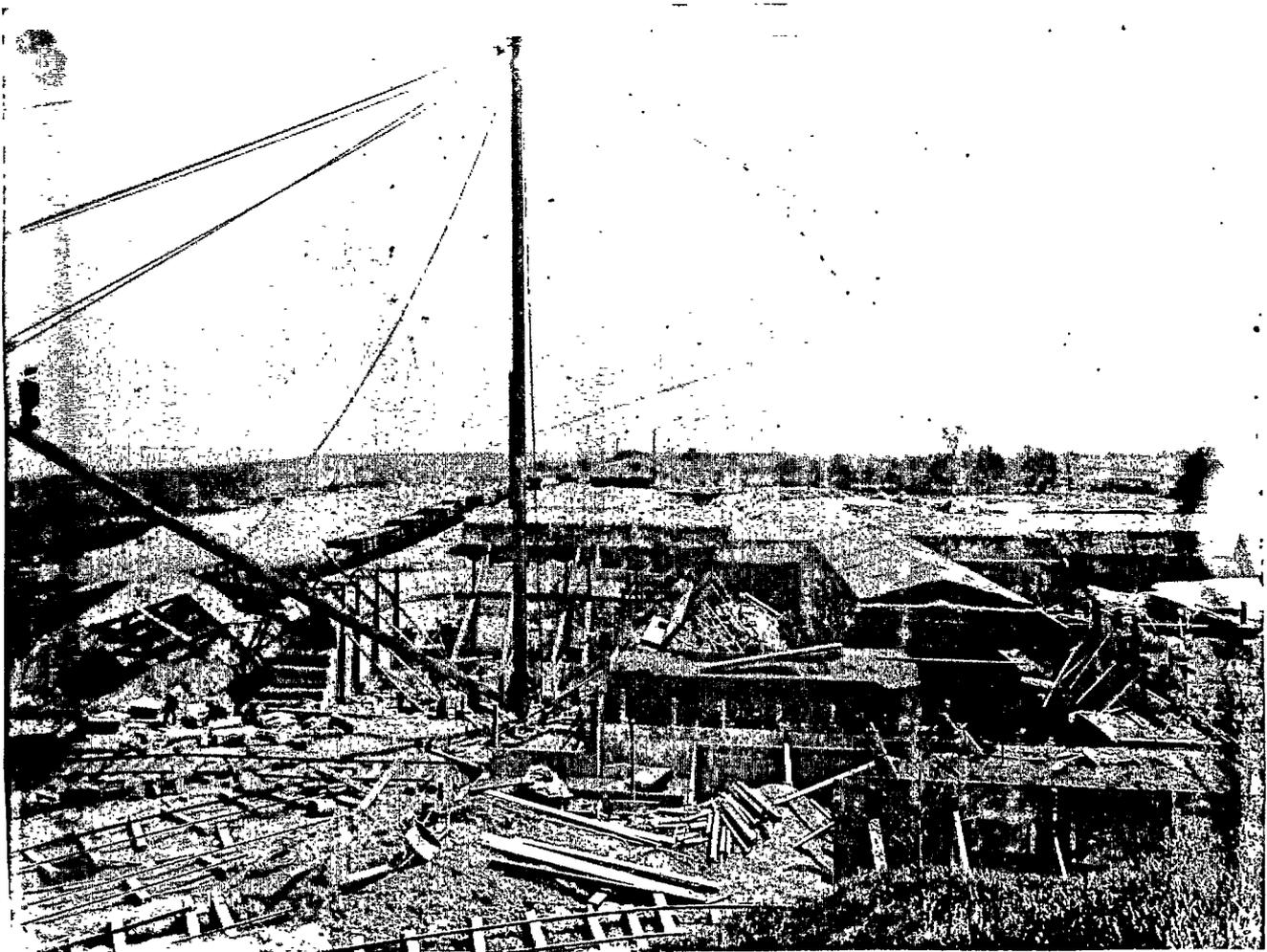


Figure 11. In this view from 1898, forms remain in place for the two northern mortar pits, and central and transverse galleries. Compare this image to Figure 7 which shows the battery after completion of concrete work. Source: Delaware State Archives.

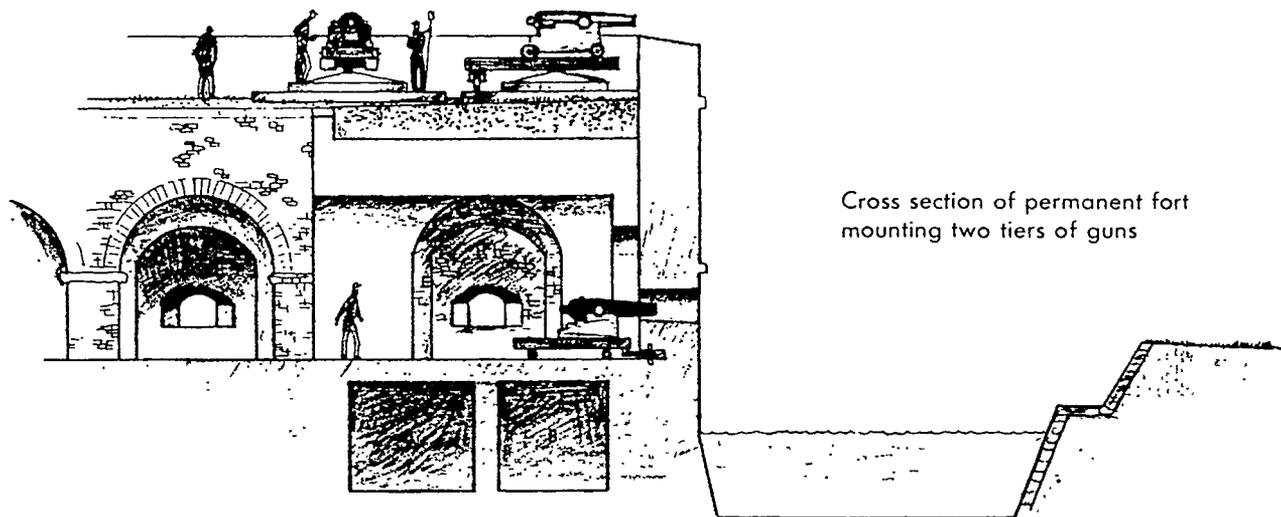


Figure 12. Cross section of a permanent fort mounting two tiers of guns. Source: Coggins, Jack, Arms and Equipment of the Civil War, Wilmington, North Carolina: Broadfoot Publishing Company, 1989, p. 100.

proved suitable for hastily erected field works, the dependence on wood and earth limited the useful life of the works. The next phase of fortification design saw both an increased use of masonry and the emergence of an open plan. Perhaps due to a reduced threat of lengthy sieges or landward assault, coastal defensive installations began to break away from the bastioned form reminiscent of the Middle Ages.

Ten Gun Battery: 1863-1870

The first military installation on the land that became Fort DuPont was a transitional fort built in 1864. Known as Ten Gun Battery, this earthen and frame redoubt served as an ancillary battery to Fort Delaware, and as a primary fort resilient to the devastating effects of rifled cannon fire. Constructed in a pentagonal shape, with its forward apex pointing almost due east, the fort's defenses consisted of heavy earthenworks on its front with a trench and palisade on its three landward sides (Figure 13). Almost 250 feet in width, Ten Gun Battery contained a heavily reinforced magazine, parade ground, kitchen, and quarters for both officers and enlisted men (Figure 14). The battery's design called for the installation of six ten-inch Rodman-type-Columbiads and four fifteen-inch guns of similar design.³⁰ The measurement of ten-inch or fifteen-inch refers to the internal diameter of the barrel. The ten-inch Rodmans, with a range of about 1800 yards, faced northeast and served as a cross-fire battery with Fort Delaware protecting the western channel of the Delaware River. The fifteen-inch guns covered a southern and easterly field of fire. The massive guns, weighing nearly 50,000 pounds and stretching almost sixteen feet in length, launched a 300-pound projectile over two and a half miles. This range afforded Ten Gun the capability of independent fire against vessels well downstream. At the close of the Civil War, Ten Gun Battery mounted six cannon, two fifteen-inch and four ten-inch Columbiads, with an additional pair of each size held in reserve. The military importance of Ten Gun Battery declined with the surrender of the Confederacy, and the installation was abandoned by 1870.

³⁰The Columbiad designation of artillery, named after the Columbia Iron Works of New York, refers to the large weaponry used in seacoast defense. Introduced in 1811, Columbiads went through several improvements culminating in the Rodman-type introduced just prior to the Civil War. Developed and named for U.S. Ordnance Lieutenant (later Major) Thomas J. Rodman, Rodman's cannon represented a new method of manufacture resulting a stronger, more powerful weapon (Dean S. Thomas, Cannons: An Introduction to Civil War Artillery, Gettysburg, Pennsylvania: Thomas Publications, 1986, p. 55).

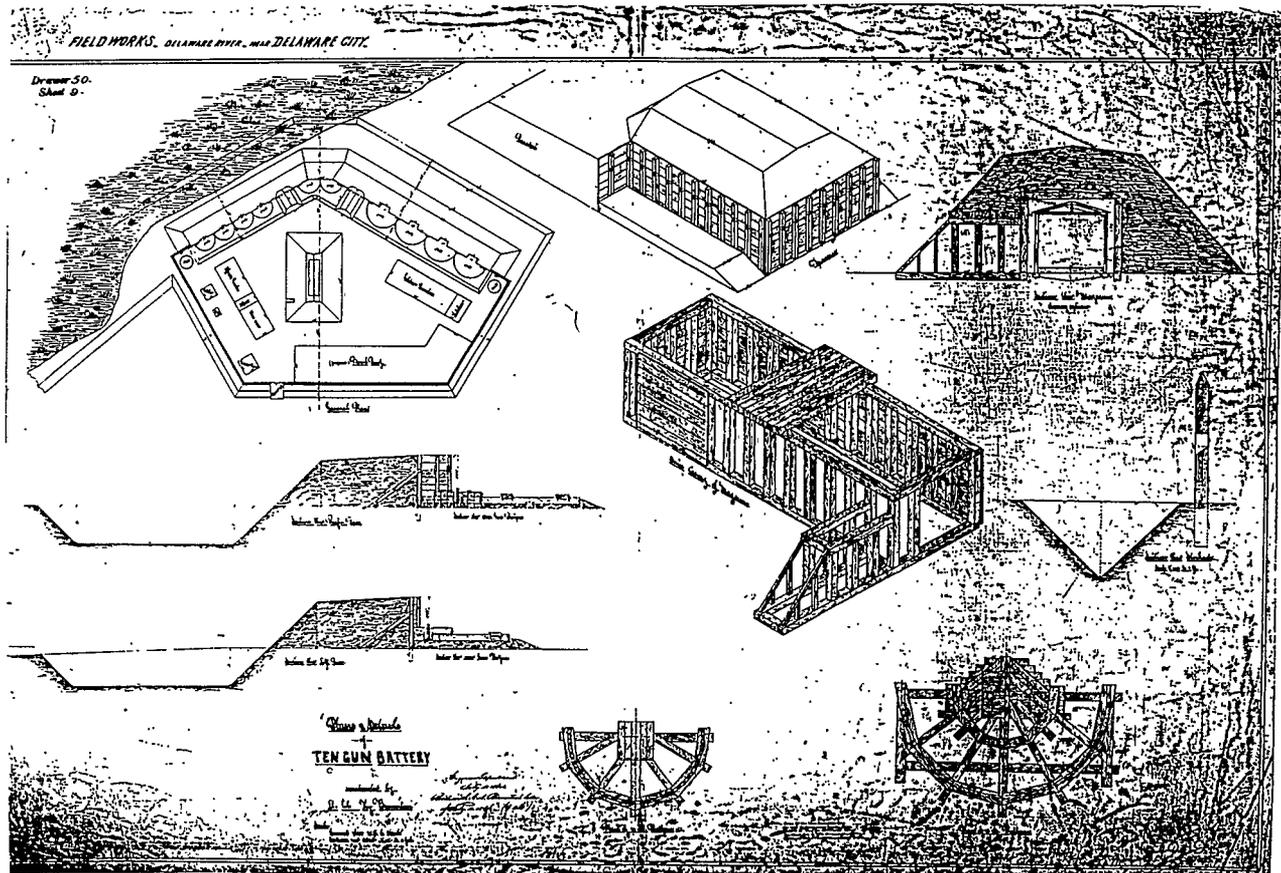


Figure 13. Plan of Ten Gun Battery prepared by Lt. Col. Hy. Brewerton, 1864. Source: National Archives, Cartographic Division, Record Group 77.

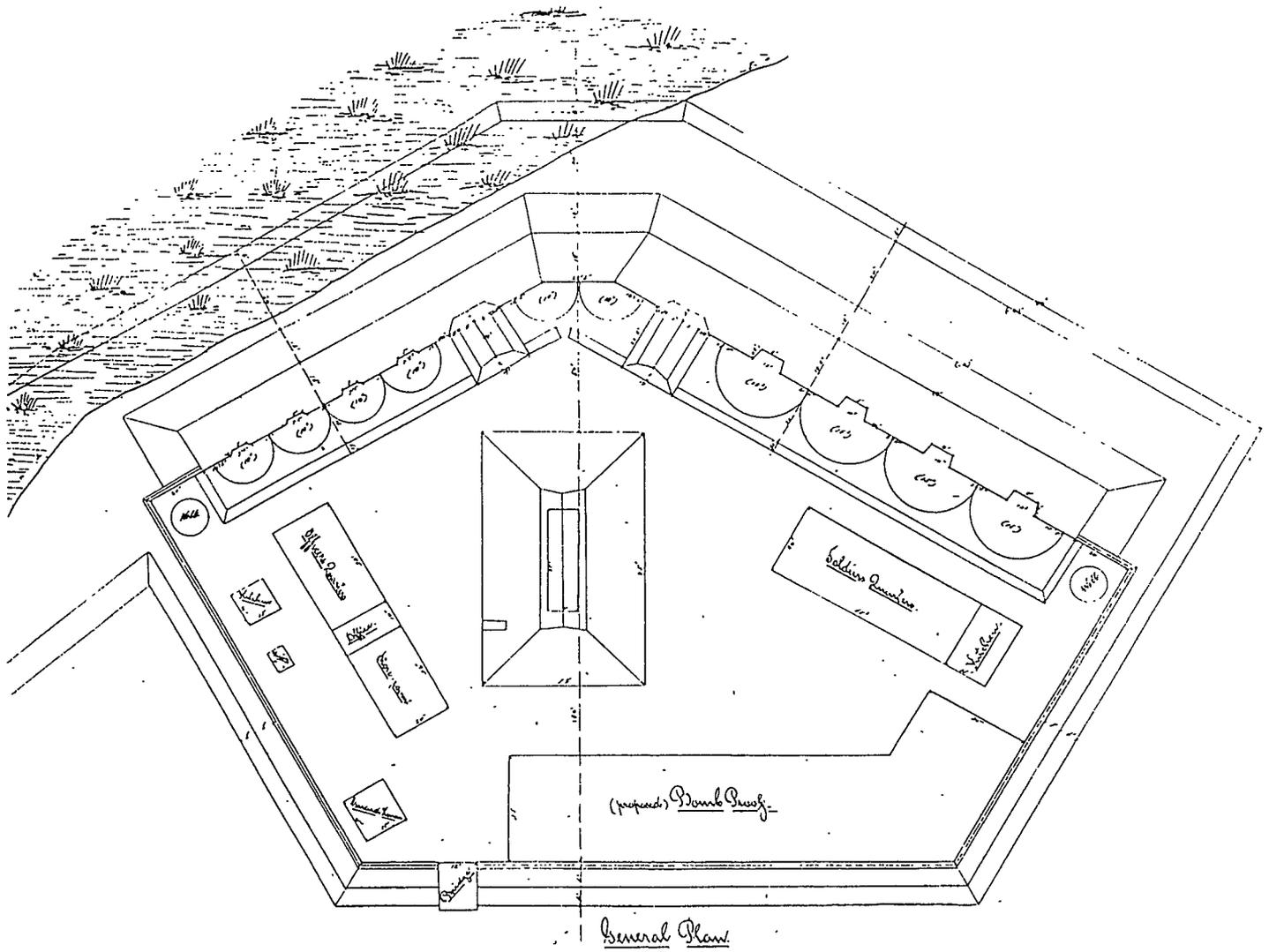


Figure 14. Detail of Brewerton's plan. Source: National Archives, Cartographic Division, Record Group 77.

Early Open-Plan Forts and Fortifications

Following the Civil War, fortification design shifted to a more open plan. This type of fort was characterized by defensive works only on those exposures most open to attack or to protect artillery batteries. For coastal locations this meant that defensive works faced the water and shielded the seacoast weaponry. Inland forts, especially those in the west, faced little threat of ground assault and mounted no permanent batteries that contained earthen or masonry defenses. These landlocked installations evolved a landscape similar to that of an urban area. Orderly arrangements of streets provided movement while the fort's structures were clustered by function (e.g. residential) or hierarchically (e.g., the separation of enlisted men from officers). Coastal locations maintained the same arrangement of space with ancillary structures occupying the open space surrounding the batteries. Barracks, guard houses, kitchens, and storehouses flanked the installation's roads.

The physical construction of the batteries also changed after the Civil War. Masonry replaced wood as the material of choice for constructing magazines and gun emplacements. Layers of brick interspersed with layers of concrete comprised the retaining walls. Vaulted brick chambers, encapsulated by concrete and subsequently buried, served as powder magazines within the fortification. Earthen fill protected the battery's water exposure. Despite these improvements over the masonry forts of the early nineteenth century and the wooden and earth forts of the Civil War, guns still occupied *barbette* mounts atop the parapets and transverses still provided gunners the only protection from flanking fire. Ten- and fifteen-inch Columbiads of the 1860s served as the battery's weaponry. The first open plan forts of the 1870s served only a short time. Documentary evidence suggests that many never mounted weapons, and that optimistic construction plans never materialized. The rapid improvements taking place in the design and manufacture of weapons had yet to fully impact the fort itself. Twenty Gun Battery at Fort DuPont presents many of the characteristics of this type of fortification design.

Twenty Gun Battery: 1870 to 1897

A larger battery, replacing the one constructed during the Civil War, was planned for the site in the early 1870s. As proposed, Twenty Gun Battery appeared as

a long east-facing earthenwork with angled gun emplacements on the north and south flanks (Figure 15). The northern parapet passed through the "Remains of Ten Gun Battery." Additional recommendations called for the construction of fortifications to the south, possibly mortar batteries.³¹ Although grandiose in scale, Twenty Gun Battery never assumed this configuration. Throughout the remainder of the nineteenth century, the firepower of Twenty Gun Battery never exceeded three operable guns. In 1883, the Corps of Engineers reported on the readiness of the fortification: emplacements one through four, eleven, and twelve could now receive fifteen-inch Rodmans; emplacements five through ten thirteen-inch mortars, although three ten-inch guns occupied that space; emplacements thirteen and fourteen not yet ready for weapons; and work not started on emplacements fifteen through twenty-seven. By 1897 Twenty Gun Battery showed serious signs of neglect although it still sported three cannon (Figure 16). While the outline of the entire battery survived, only the southern third of the structure seemed serviceable, and even that appeared worn by erosion. Faint traces of Ten Gun Battery still marked the landscape, and appeared to the north and east of the level plain envisioned as the battery's works. Three ten-inch guns remained in position during construction of later works, but by 1900 even these weapons were removed. The final military reference to Twenty Gun Battery occurred in an armament report of 1901, listing mounts for four fifteen-inch Rodmans, five ten-inch Rodmans, and the locations of two additional "pintle stones." No cannon appeared on the report, and the listed installations were deemed unserviceable.

Forts and Fortifications of the Endicott Board

In the 1890s, the ambitious plans of the Endicott Board took shape on the military landscape. Realizing the urgent need for a system of coastal defenses that matched the firepower of the world's navies, the Board proposed a system of seacoast fortifications that utilized the latest in weapons technology as well as the most advanced civil engineering of the time. Steel guns of eight- and twelve- inch bores mounted on disappearing carriages and installed in concrete structures offered the

³¹A mortar is a type of cannon used to lob heavy projectiles, in a high arc, through the decks of a ship.

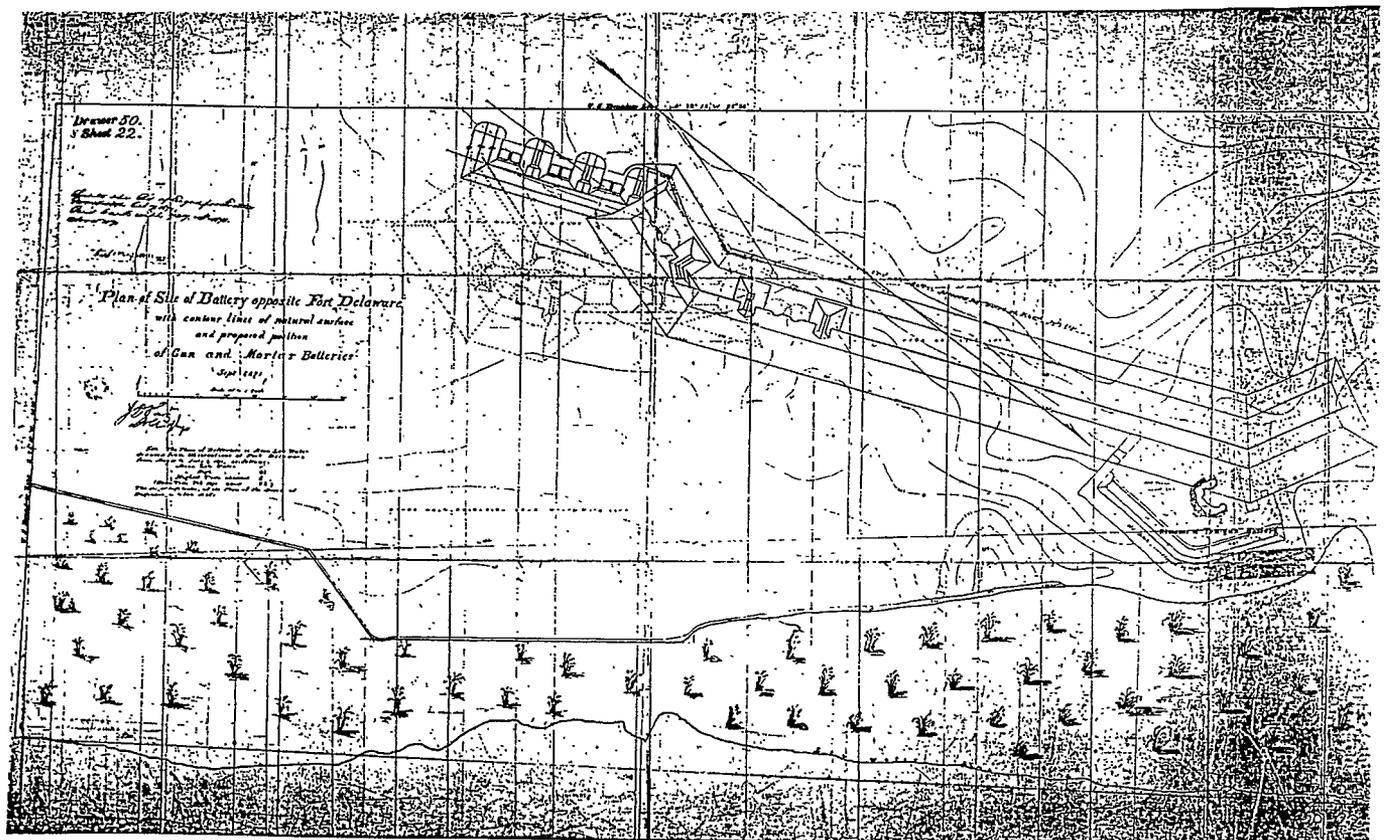


Figure 15. After the acquisition of land from Clement Reeves, the Corps of Engineers proposed a battery mounting twenty cannon and at least six sea-coast mortars. Note the remains of the Civil War battery to the north. Source: National Archives, Cartographic Division, Record Group 77.



Figure 16. Drawing prepared to accompany armament report of 1897 showing deteriorated condition of battery as well as proposed works. A masonry sea wall stretches along the rivers' edge and also provides a foundation for the fort's wharf. Source: National Archives, Cartographic Division, Record Group 77.

greatest chance of defending the nation's coast from attack.³² The concrete structures of these batteries served a dual purpose. First, they offered protection to both the gun's crew and its ammunition stored in reinforced magazines. More importantly, the immense weight of the rifles and the intense backward force, or recoil, of these weapons when fired required a substantial mounting platform. To provide additional protection from naval assault, earth or sand once again served as fill. While these large rifles proved effective against vessels at long range, other weapons could be brought to bear in the event a fleet managed to successfully steam upstream. Rapid-fire rifles and mortars were an integral part of the Endicott period fortification.³³

The size and complexity of the weaponry present in Endicott fortifications required large numbers of men. While a ten-inch Columbiad needed a crew of only five men, a twelve-inch mortar needed a dozen and a twelve-inch rifle required thirty. In addition to those needed to operate the guns, a growing number of support personnel became a necessity in the operation of an installation. Personnel from the signal corp maintained communications between adjoining batteries. Engineers and observers coordinated fire. Quartermasters and ordnance personnel serviced the weapons. A simple barracks, privy, and small kitchen no longer served the needs of a growing complement. Following the plan of western forts, the bases constructed under the auspices of the Endicott board occupied extensive tracts of land. A road system comprised of two main arteries meeting near the center of the reservation, combined with numerous secondary streets, provided the template on which the functional organization of the base was constructed. Structures that supported the batteries occupied a specific area. Specific areas within the complex also served as locations for residential, administrative, and service buildings. In many cases, a single fort served as the regional headquarters for several batteries. These facilities also accommodated regional command functions.

³²A *disappearing carriage* is a rifle mount that retracts below the level of the parapet for loading, but then rises above the defensive works for firing. The recoil of the weapon forces it back to the terrepleine where it is reloaded.

³³*Rapid-fire rifles* are guns that can be loaded, fired, and reloaded in a short time. Large rifles such as twelve-inch disappearing guns take several minutes to go through the cycle. *Mortars* are large bore guns, usually in excess of twelve inches, that can be pointed steeply upward and used to lob shells in a high arc through the decks of ships. Both types of weapons are effective only at short distances.

The forts of the Endicott period reflected the greatest development of coastal defense on American soil. For about twenty-five years, from the turn of the century till the early 1920s, these facilities housed the largest land-based weapons in existence. Ironically, few of the weapons ever fired a single volley, and in many cases the rifles were removed from the batteries to protect them from the elements. In the early 1920s, new technology allowed for the construction of larger, more accurate rifles. With the ability to accurately hit targets on the open sea, defensive installations moved even further downriver to the mouths of major estuaries. Many Endicott period installations lay abandoned, their structures razed or moved to those posts that served regional administrative or training purposes. Although the ultimate fate of the Endicott bases varied, the survival of various buildings and structures represent trends in military engineering that emerged in the first half of the nineteenth century.

Fort DuPont as an Example of the Endicott Fort Property Type

Advances in weapons technology again rendered the fortifications on the Delaware shore obsolete, and in the closing years of the nineteenth century military engineers undertook the most ambitious building project yet for the protection of the Delaware River. Improvements of Fort Delaware on Pea Patch Island consisted of the installation of three twelve-inch disappearing guns. Fort Mott on the New Jersey shore near Finn's Point also became a major battery with three twelve-inch disappearing guns of its own. It was at this time that the site across from Fort Delaware became what is known today as Fort DuPont, the major defensive position on this portion of the Delaware River. It contained two eight-inch disappearing guns, two twelve-inch guns on barbette mounts, and sixteen twelve-inch mortars. To provide additional firepower at close range, Forts Delaware and DuPont received five-inch rapid-fire guns installed in forward positions.

The location and traverse of the three forts offered a variety of firing alternatives. While the orientation of armaments allowed limited cross-fire capabilities, weapons concentrated on downstream targets (Figure 17). Although the heavy twelve-inch guns mounted at all three forts fired larger projectiles than the eight-inch disappearing guns of Fort Du Pont, large-bore rifles were inaccurate at long range. High, arching trajectories made target acquisition problematic,

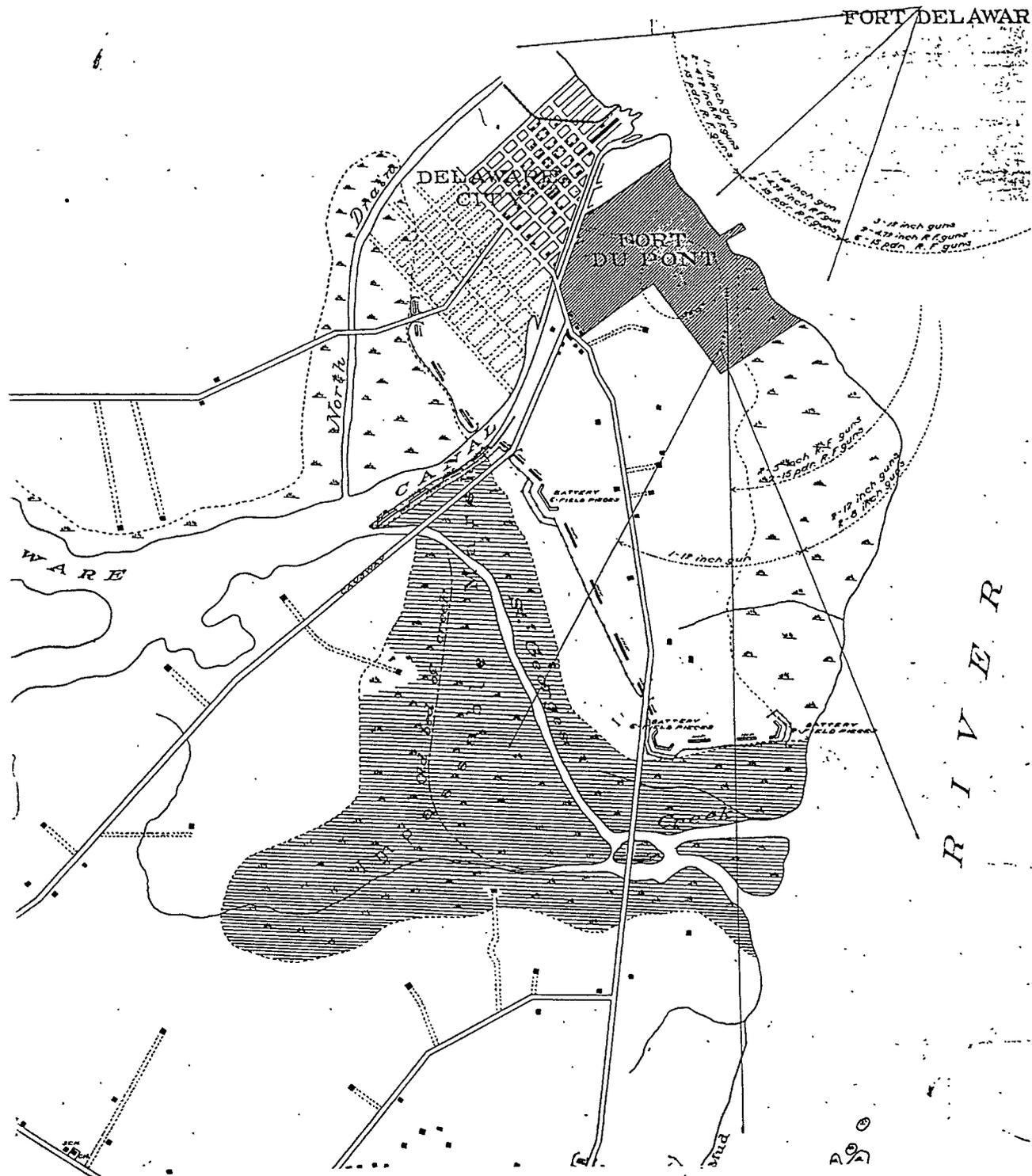


Figure 17. The traversing arcs of Fort Du Pont's batteries appear on this 1903 map detailing the fort's landward defenses. Source: National Archives, Cartographic Division, Record Group 77.

especially when dealing with ships steaming directly upriver--a relatively narrow object at ranges of several miles. The eight-inch disappearing guns at Fort DuPont, firing small, high velocity projectiles with comparatively flat trajectories, offered the best opportunity to inflict damage on hostile vessels while in the lower portions of the Delaware estuary. With a range of over ten miles, Fort DuPont's guns could be brought to bear on targets steaming past the mouth of the Smyrna River and possibly as far south as Bombay Hook. If vessels managed to pass through the long-range fire of Fort DuPont's eight-inch guns, and the intermediate-range bombardment of the combined firepower of all three batteries, the fort's mortars came into play. A seacoast mortar utilized a heavy, explosive projectile propelled through an extreme trajectory to penetrate decks and detonate in the interior of enemy ships. Trained on the main channel opposite Reedy Point, the western channel between Pea Patch Island and the Delaware shore, or cast over Fort Delaware towards the river's eastern channel, Fort DuPont's mortar battery offered intense firepower while minimizing the hazards of large-bore rifles at close range.

While Fort DuPont protected the river, a complex system of inland fortifications protected the fort itself (Figure 18). Stretching from Delaware City to south of Port Penn, a series of works fortified with heavy, field artillery served as a line of defense in the event that ground assault threatened the river-front defenses. Although there is no conclusive evidence as to the final configuration and extent of these works, the plan displayed the intentions of the engineering corps and the military importance of Fort DuPont.

Property Types

This chapter has identified three specific property types for the forts and fortifications constructed at Fort DuPont: **transitional** (1862-1870 +/-), **early open plan** (1870-1890 +/-), and **Endicott Period** (1890-1925 +/-). Just as a single resource may represent both a fort and a fortification property type, resources may also have significance to two or more of the smaller categories. Fort DuPont exists primarily as a fort of the Endicott Period, but it also contains the remnants of fortifications from both the transitional and early open plan periods. When assessing the significance of a resource as a fort or fortification property type, it is necessary to relate it to a specific historic period and place it within the appropriate contextual construct. The following section describes the characteristics that are

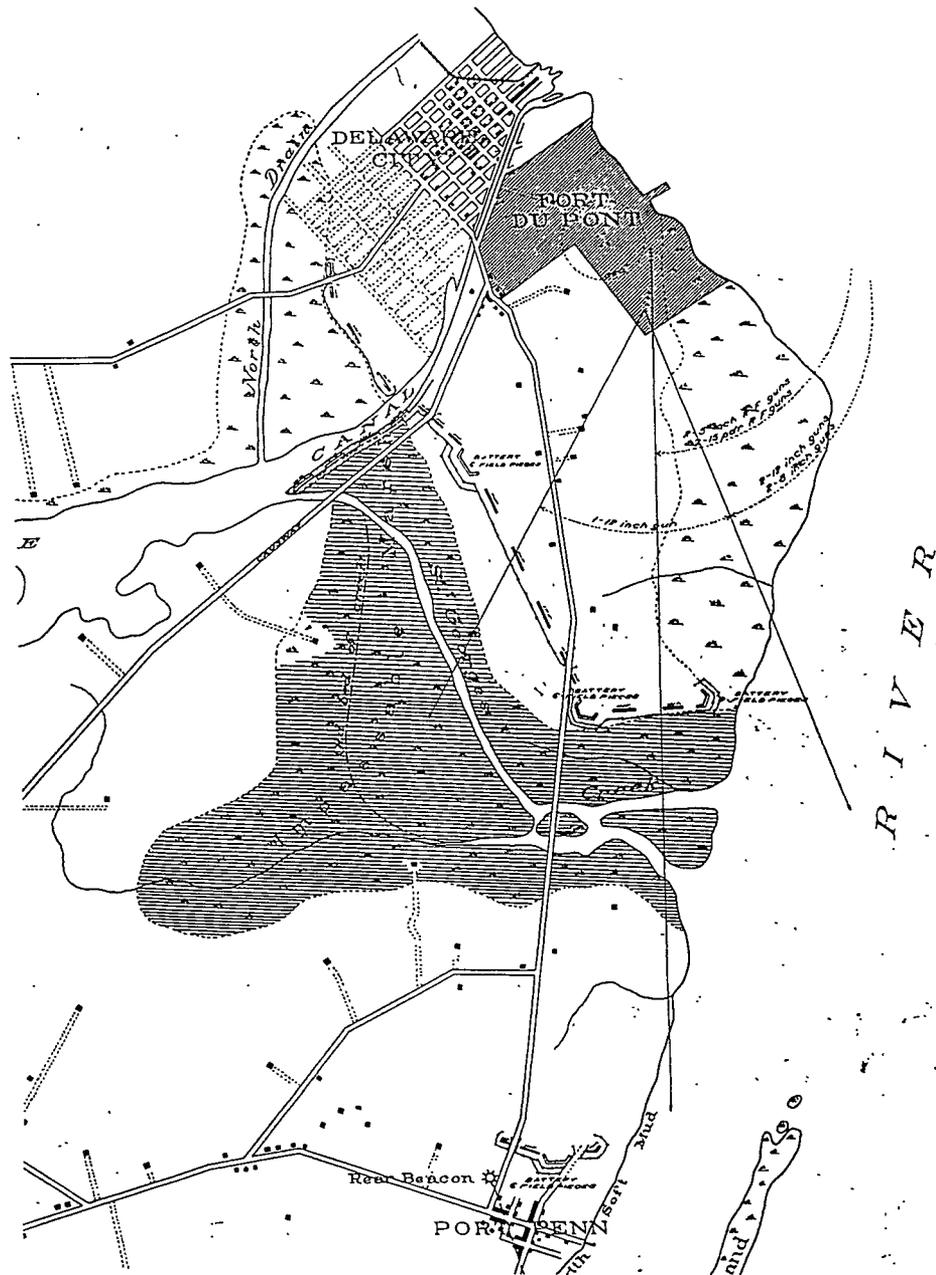


Figure 18. Field batteries and infantry redoubts encircled Fort Du Pont and Delaware City, and extended south of Port Penn protecting the beaches near Augustine Landing, 1903. Source: National Archives, Cartographic Division, Record Group 77.

required to be present in each of the property types in order for the resource to retain sufficient integrity to be considered for nomination to the National Register of Historic Places under the historic context of the development of Fort DuPont.

Transitional forts and fortifications are characterized by construction technique and elemental design. Resources of this type usually combined fort and fortification. In most cases, support structures were located within the protective earthenworks. A possible exception to this may be an ancillary redoubt that provided support to the primary fort. The construction of transitional forts included earthen fortifications with a wooden framework, reinforcement, and retaining walls. Earthen transverses projected from the main parapet, and the terrepleine was narrow. Wooden palisades protected the less vulnerable exposures of the fort, and a ditch surrounded the entire installation. Archaeological evidence of Ten Gun Battery would represent the transitional fort or fortification property type.

The second category within the fortification property type is the **early open plan fortification**. Fortifications of this type were characterized by a combination of construction materials. Brick, concrete, or stone served as the framework and reinforcement for this type of fortification. Early open plan fortifications were basically linear with long ramparts and angled flanking parapets. Gun emplacements used heavy iron pintles and attachment bolts with wooden decks and iron traverse rails. Powder magazines were integral to the fortification and constructed of brick, concrete, or a combination of materials. Mortar emplacements may constitute an element of early open plan fortifications.

An assemblage of buildings, structures, and objects constructed during this developmental period is an **early open plan fort**. Forts of this type contained the fortification itself and any structures used in support or maintenance. The actual size and configuration of the fort varied depending on the available space and geographical limitations. To be eligible under this context, the fort must contain structures representing the essential purpose of the fort (i.e., batteries) as well as streets and support buildings. The linear or axial street plan was essential to this type of fort and should be present. The survival of all buildings is not requisite to resources of this property type, but sufficient physical and documentary evidence must exist that allows for evaluation of the fort's plan and composition. Representative structures of each type (i.e. residential or support) must be present to identify the spatial relationships of function and hierarchy.

V. Fort DuPont as Military Landscape and Property Type

The engineering and armament of Fort DuPont represents only a portion of its historical significance. Elements that form the fort's landscape and the individual architectural resources both contribute to the fort's eligibility for inclusion in the National Register of Historic Places. The National Register of Historic Places defines a designed historic landscape as "a landscape that has significance as a design or work of art; was consciously designed and laid out...to design principles...using a recognized style or tradition."³⁴

Neither the National Register of Historic Places or the Delaware State Historic Preservation Office specifically address a method for evaluating military forts as designed landscapes. They do, however, define the elements of a landscape in a manner that, with some modification, can be applied to Fort DuPont while taking into consideration the principles of military land planning. The Delaware State Historic Preservation Office defines ten elements in a landscape: 1) style/design school, 2) scenic views/vistas, 3) circulation system, 4) spatial subdivisions, 5) minor structures, 6) paving materials, 7) furnishings, 8) utilities, 9) water elements, 10) vegetation, and 11) other. The National Register of Historic Places, in its technical bulletin entitled "Guidelines for Evaluating and Documenting Rural Historic Landscapes," suggests that landscapes reflect four processes and seven components. From these two sources we can identify the essential elements of the military landscape as they apply to Fort DuPont.

Fort DuPont as a planned landscape represents the accretion of land over a period of some sixty years. Its architecture is the product of standardized building design that began in the 1860s and continued through the completion of construction at Fort DuPont. With the engineering works and armament, these elements form the basis for Fort DuPont as a designed historic landscape (Figure 19).

Coastal Fortifications as Military Landscapes and Property Types

A property type is a group of individual properties that share physical or

³⁴ National Register Bulletin 18: How to Evaluate and Nominate Designed Historic Landscapes (Washington, D.C.: National Park Service, U.S. Department of the Interior), p. 2.

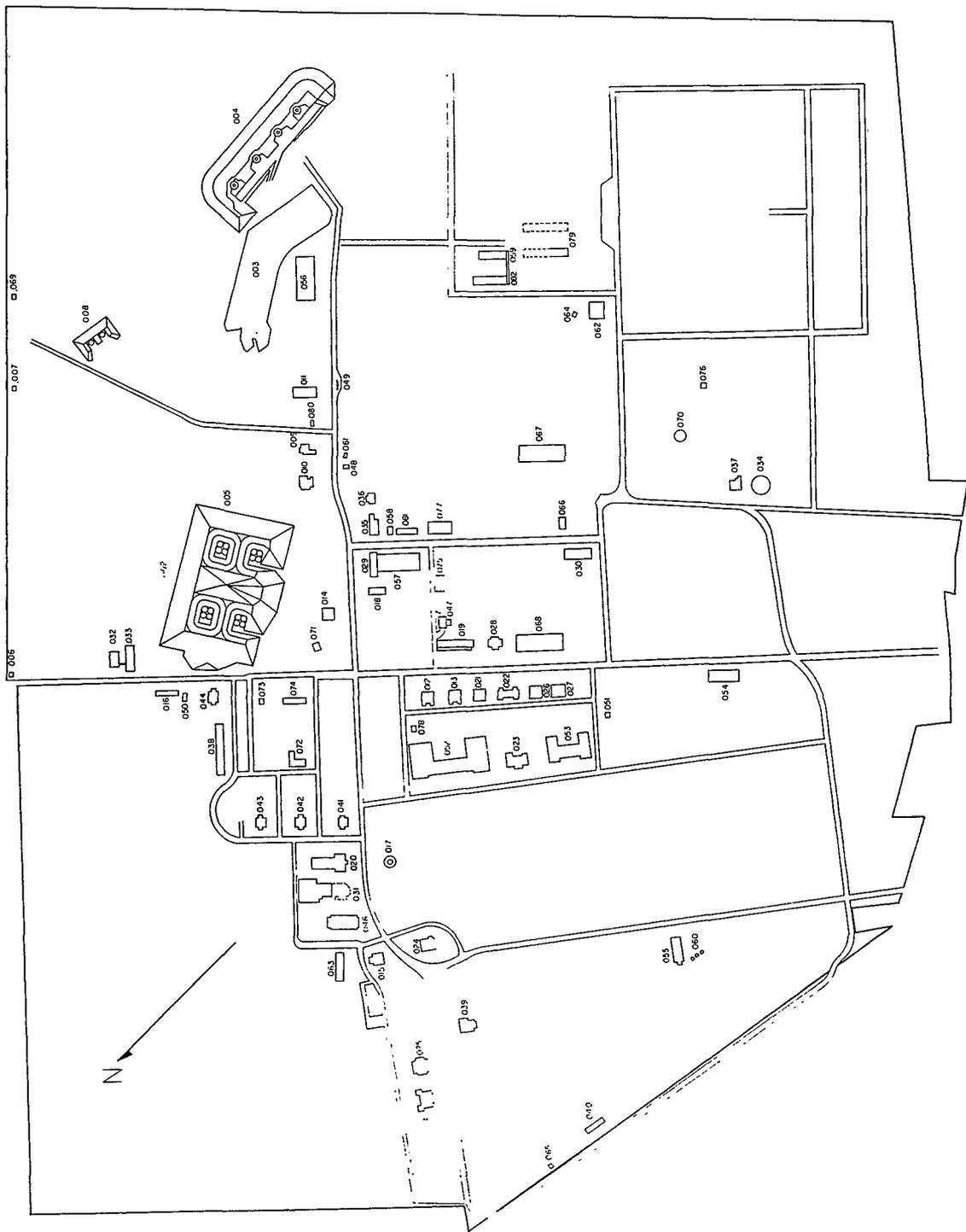


Figure 19: Historic Resources of Fort DuPont. Dean Doerrfeld, 1993.

associative characteristics. It is the property type that links the historic context to tangible historic resources. Physical characteristics may relate to structural forms, architectural styles, building materials, or site types (related to Criterion C). Associative characteristics may relate to the nature of associated events or activities (related to Criterion A) or individuals or groups of individuals (related to Criterion B).

American forts historically fall into two broad property types: coastal forts and frontier forts found on land. Coastal fortifications evolved in two general stages, or property types, the first being those fortifications built between the Revolution and the 1870s.³⁵ Early forts were constructed of earthworks and stone, armed with muzzle-loading cannon. The second property type, of which Fort DuPont is an example, were those built from the 1890s through World War II. The forts contained heavy long-range breech-loading rifles and mortars set in concrete emplacements reinforced with steel and further protected by earthen works. The following broad periods summarize five specific generations of coastal forts, each with its own associated property types for fortifications and armaments:

First and Second Systems (1794-1809): Generally bastioned or star-shaped stone and earthen fortifications with smooth-bore cannons mounted *en barbette* or on top of walls.

Third System (1816-1862): High, vertical-walled, polygonal, all-masonry forts with casemented gun emplacements (bomb-proof enclosures in the walls) which allowed cannons to be mounted within the fort and to fire through embrasures (fortified openings) in the walls. Armament consisted of increasingly heavier, larger caliber smooth-bore cannon. Third System forts possessed greatly increased firepower because armament could be arranged in multiple tiers within walls. These masonry forts were rendered obsolete by the introduction of rifled artillery during the Civil War.

Post Civil War Interlude (1865-1875): Marked by a return to separate, barbette-mounted batteries protected by earthenworks that were a more effective defense against rifled cannon than masonry. Forts were designed to be concealed from attacking ships and were armed with large smooth-bore cannon (Rodman) from the Civil War because new rifled artillery was never completed.

Endicott and Taft Periods (1886-1916): The previous emphasis on structures over weapons as the major components of fortifications was reversed during this period by the recommendations of the Endicott Board in 1886. Fortifications of this period were designed to mount large eight-, ten- and twelve-inch disappearing rifles invented in the 1880s. Revolutionary in

³⁵Lewis, Seacoast Fortifications, p. vii.

design, these guns were rifled, breech-loaded artillery with forged steel barrels that could fire 1000 pound shells to a range of seven to eight miles.

The invention of heavy breech-loading guns made it possible to mount the guns on ingenious carriages within emplacements of a design that allowed the guns to be lowered by their own recoil energy to positions behind the parapets where they were concealed until raised for the next shot. Batteries of four to six guns were mounted in massive emplacements whose crests were generally at ground level and whose concrete frontal walls were as much as twenty feet thick behind thirty more feet of earth. Secondary armament consisted of twelve-inch mortars designed to throw 700-pound projectiles in high arcs to penetrate the decks and hulls of attacking ships. Mortars were clustered in groups of four within square pit-like emplacements.

Because guns were no longer mounted in self-contained fortresses but in individual emplacements, new military reservations were acquired as weapons sites during the building program of the 1890s. These reservations also contained the supporting facilities for the emplacements and were laid out according to military planning practices.

World War I and World War II (1916-1945): Because of advances in the range and accuracy of naval weapons following the Russo-Japanese War, by 1916 several foreign battleships could outrange any harbor defense weapon in the United States. Advances in fire control enabled battleships to engage enemy ships at a greater distance. The range of naval guns on battleships was also extended by elevating their firing angle through the design of new turrets.

In response, modifications were made in existing weapons and a new generation of weapons was designed for coastal defense. The first consisted of a new high-angle carriage which nearly doubled the range of the Endicott-period twelve-inch guns. The second was to develop in the 1920s a new sixteen-inch gun with a range of thirty miles--the most powerful cannon of the time. The coastal defense strategy became one of mounting a few dispersed large guns at the mouths of harbors and bays. This so-called mobile artillery, which had been built for use in Europe during World War II, was mounted on railroads or other heavy mobile carriages. Such a gun was installed at Fort Miles near Milford, Delaware, in 1922 and two powerful batteries were installed on Cape Henlopen during World War II.

Endicott Period Coastal Fort as a Property Type

Fort DuPont as it exists today represents the Endicott Period Coastal Forts, a distinct physical property type. This type of fort merged characteristics of both the coastal and land fortifications. After the enclosed and self-contained fortress became obsolete for coastal defense, coastal defense strategy moved to placing the new artillery in individual dispersed batteries. These batteries were built as part of newly acquired reservations laid out with a traditional military land plan. In effect, the frontier land fort replaced the stone fortress as the platform for coastal artillery. The artillery emplacements can then be considered as one of a range of property

types within the Endicott period military fort.

The Endicott Coastal Defense Fort property type contains three parts. The first element, which distinguishes this fort from other American forts, is the coastal artillery batteries of disappearing guns and mortar clusters mounted in concrete emplacements. The second part is the larger military reservation supporting the coastal artillery emplacements. The principles guiding the land plan of the reservation, the designed military landscape, appears to have been derived from the land frontier forts of the American army that were in turn adaptations of long-standing design principles for military fortifications, garrisons and camps, and other regimented settlements such as monasteries and company towns. According to Spiro Kostof, the elements of a garrison, including the Roman *castrum* and Spanish *presidio*, are

barracks for the rank and file, separate and less spartan quarters for the officers, and ordinance depot, a church, a hospital; in the contemporary garrison, clusters of houses for married officers, often a regular suburb would be found outside the military diagram.³⁶

The plan of a garrison or military post such as Fort DuPont reflects the singular mission of such settlements and the stratified and regimented behavior required of their populations in order to carry out their mission.

The American land forts tended to be laid out around a large rectangular "parade" or parade ground around which buildings were positioned in an orderly fashion. In this regimented landscape, buildings were zoned to reflect the place of their occupants in the military hierarchy either by rank or functional importance. For example, the barracks for enlisted men and the quarters of the officers and non-commissioned officers usually flanked opposite sides of the parade ground. Headquarters generally headed the parade with support facilities such as stables, commissaries, and ordinance depots located away from the parade usually behind the barracks area. The third component of this property type is the buildings and structures themselves.

The three major elements then are 1) the Endicott period coastal artillery and mortar batteries and emplacements, 2) the land plan of the fort itself, and 3) the buildings and structures on the fort. Once built, many Endicott period forts, such as

³⁶Spiro Kostof, The City Shaped: Urban Patterns and Meaning Through History (Boston: Little, Brown and Company, 1991), p. 165.

Fort DuPont, continued to operate as military reservations long after the Endicott coastal artillery itself became obsolete around World War I. Some, such as Fort Mott, did not. In these instances, a fort could retain integrity as an Army fort even if the Endicott emplacements were demolished, but not as an Endicott period coastal defense installation.

The Evolution of Fort DuPont as a Military Landscape

Land acquisition and development took place at the same time during the development of Fort DuPont as a military landscape. Although construction of the batteries for Fort DuPont began in 1899 on land originally acquired for Twenty-Gun Battery in 1870, the entire site on which the fort would be completed was not acquired until 1910. Consequently the phases of land acquisition do not agree completely with the chronological periods of the history of the fort. The development of the landscape also took place over time. The development of Fort DuPont as a military landscape can be divided into four periods within its broad chronological phases.

1. The Fort Across from Fort Delaware: 1863-1898
Pre-1870: A Strategic Location
1870 to 1900: Twenty Gun Battery Site Acquired
2. Fort DuPont Established as the Center of Coastal Defense for the Delaware Valley: 1898-1922
1900 -1905: Acquisition of addition 111 acres
1906-1922: Acquisition of remainder of site and major construction completed
3. Fort DuPont as the Headquarters for the First Engineers: 1922 to 1939
1923-1930: 1st Engineers construct specialized facilities
1930-1939: Construction by Works Progress Administration
4. Fort DuPont in World War II: 1939 to 1945
1939 to 1945:

Although massive fortifications stand as the most impressive artifact of Fort DuPont, they represent a fleeting moment in its history. Like many military installations, changing technology and concepts of national defense soon rendered them obsolete. Engineers removed the batteries' weapons in 1922, less than twenty-five years after installation. The strategic importance of Fort DuPont as part of a

coastal defense system cannot be overstated, yet in its eighty-four years of military activity, this purpose accounts for only about one-third of its history. The evolution of the fort as a regional headquarters, training facility, and engineering post prove as vital to the significance of this installation as the placement of its weapons. The following describes the evolution of Fort DuPont as a military landscape.

Period 1: The Fort Across from Fort Delaware: 1863-1898

Pre-1870: A Strategic Location. Military strategists realized the importance of the land opposite the "Pea Patch" as early as 1819 when they proposed a massive masonry structure with three tiers of guns for the Delaware shore (Figure 20). This three-tier fortification never materialized, and the Reedy Point site saw no military activity for the next forty-five years. Fort Delaware became the primary defensive position on the Delaware River, and only when the inadequacies of this type of fort surfaced did the military direct any further attention to the Delaware shore. In its first incarnation, defensive fortifications at this site did not occupy a defined military reservation. Sandwiched between the Clement Reeves Farm on the west and swampland to the east, Ten Gun Battery represented a self-contained, military island in the midst of orchards and pastures. A single road provided limited access, and virtually all martial activities took place within the confines of the fort's walls. Although no above-ground evidence survives from this episode in Fort DuPont's history, it remains crucial as the beginning of over eighty years of military presence.

1870 to 1900: Development of the Twenty Gun Battery Site. In 1870 the federal government purchased sixty-six acres from Reeves and a permanent military post became a reality. This tract of land housed Twenty Gun Battery. No substantial building of ancillary structures took place, and it is likely that several of Ten Gun's buildings served as quarters and storehouses. Some of these buildings survived until the 1890s, and appear as "existing buildings to be removed" on the drawings prepared before construction of the heavy works in 1898. Another substantial change took place between 1870 and 1890 when the construction of an earthen or masonry dike along the property's eastern boundary allowed the draining of wetlands adjoining the river's edge.

The site returned to the forefront of military importance in 1890 with a proposal for major new batteries. Overlying the works of the 1860s and negating any

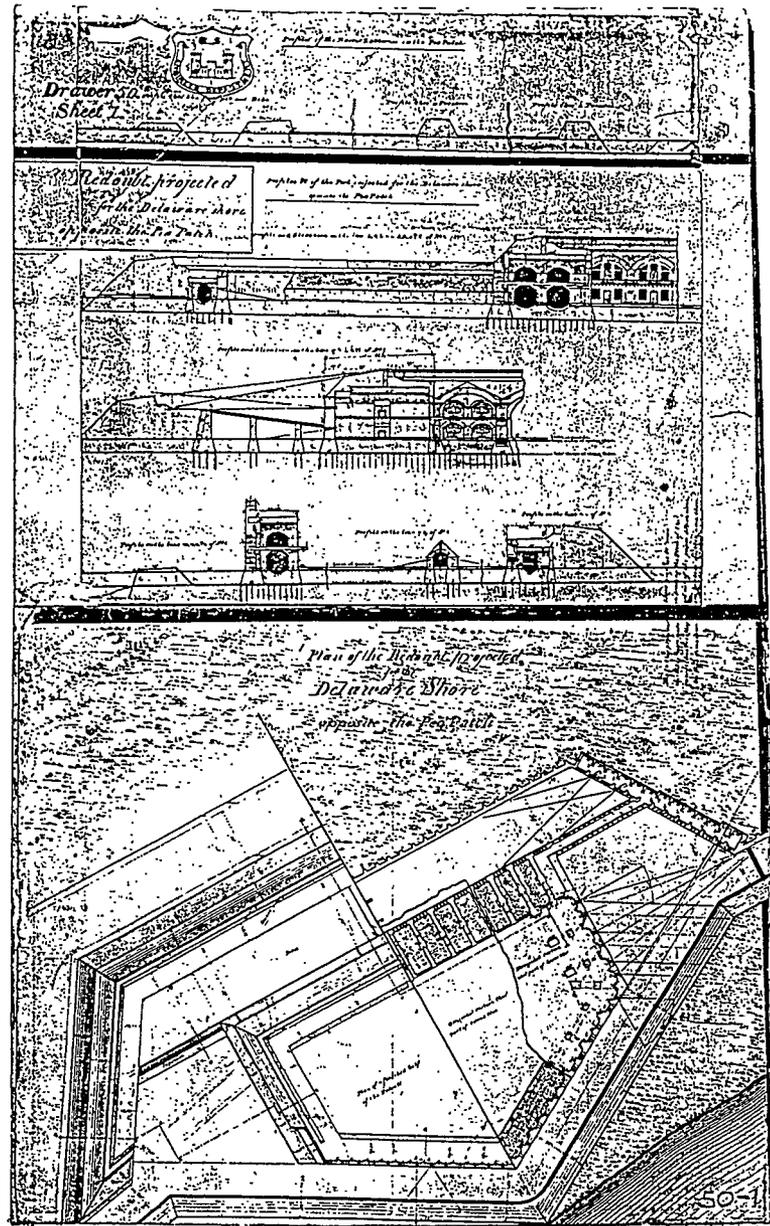


Figure 20. Masonry battery proposed for the Delaware shore in 1819. This fort represented the "Third System" of coastal fortifications. Source: National Archives, Cartographic Division, Record Group 77.

strategic value that the twenty gun battery possessed, the new works were confined to the original sixty-six acres. The fortifications consumed most of the available space leaving a narrow strip of land on which to construct dwellings, storehouses, and other buildings (Figure 21). The structures erected during the late nineteenth century included a guard house, school, post exchange, several storehouses, and a residence. Only two buildings survive--structures shown as both officer's quarters and quartermaster's offices during the fort's history. The earliest, constructed before 1899, existed during the photographic documentation of the mortar battery construction in 1898 (Figure 22).

Concomitant with the construction of dwellings and warehouses, the circulation system of the fort also emerged in this period. In addition to the permanent rail system, and various pathways connecting the batteries, two major roadways stretched along the northern and western boundaries of the fort. The western road served the group of service structures, while the northern one accessed the post's wharf. This facet of the transportation system survives to the present.

Period 2: Fort DuPont as the Center of Coastal Defense for the Delaware Valley: 1898-1922

1900 -1905: Acquisition of an Additional 111 Acres and Fort DuPont Takes Form. In 1900, the reservation increased in size with the addition of 111 acres. More than doubling the fort's size, a major building campaign ensued. Barracks, "officer's row," and non-commissioned officers' quarters were just a few of the structures erected between 1901 and 1905. In addition, a new guard house and school replaced those erected a few years earlier. By 1902, Fort DuPont assumed a configuration easily recognizable today (Figure 23). Roads began delineating space within the reservation as well as providing routes of movement. Although wetlands still restricted expansion to the north and west, a clearly defined hierarchy of space existed: to the east--batteries and support buildings; adjacent to this--enlisted man's barracks and non-commissioned officers' quarters; at the extreme west, bordering the canal and separated from the rest of the base by an expanse of open ground--administration buildings, officer's homes, and medical facilities.

The space that divided officers from the lower ranks later became the focal point of the fort. Surrounded by barracks, the post exchange, hospital, recreational buildings, headquarters, and commanding officer's house, the parade ground

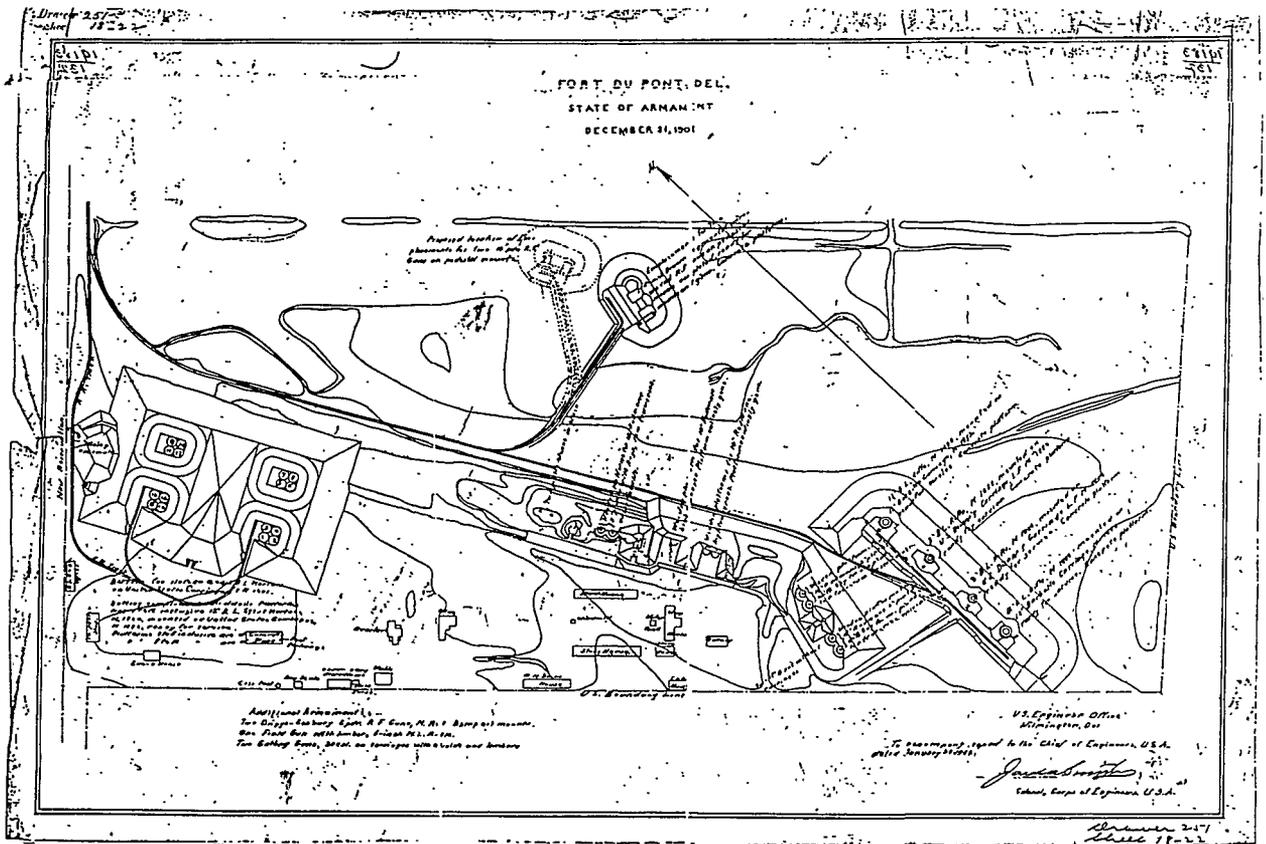


Figure 21. Armament report of 1901 showing status of fort's weapons, as well as the placement of structures and routing of the permanent rail system. Source: National Archives, Cartographic Division, Record Group 77.

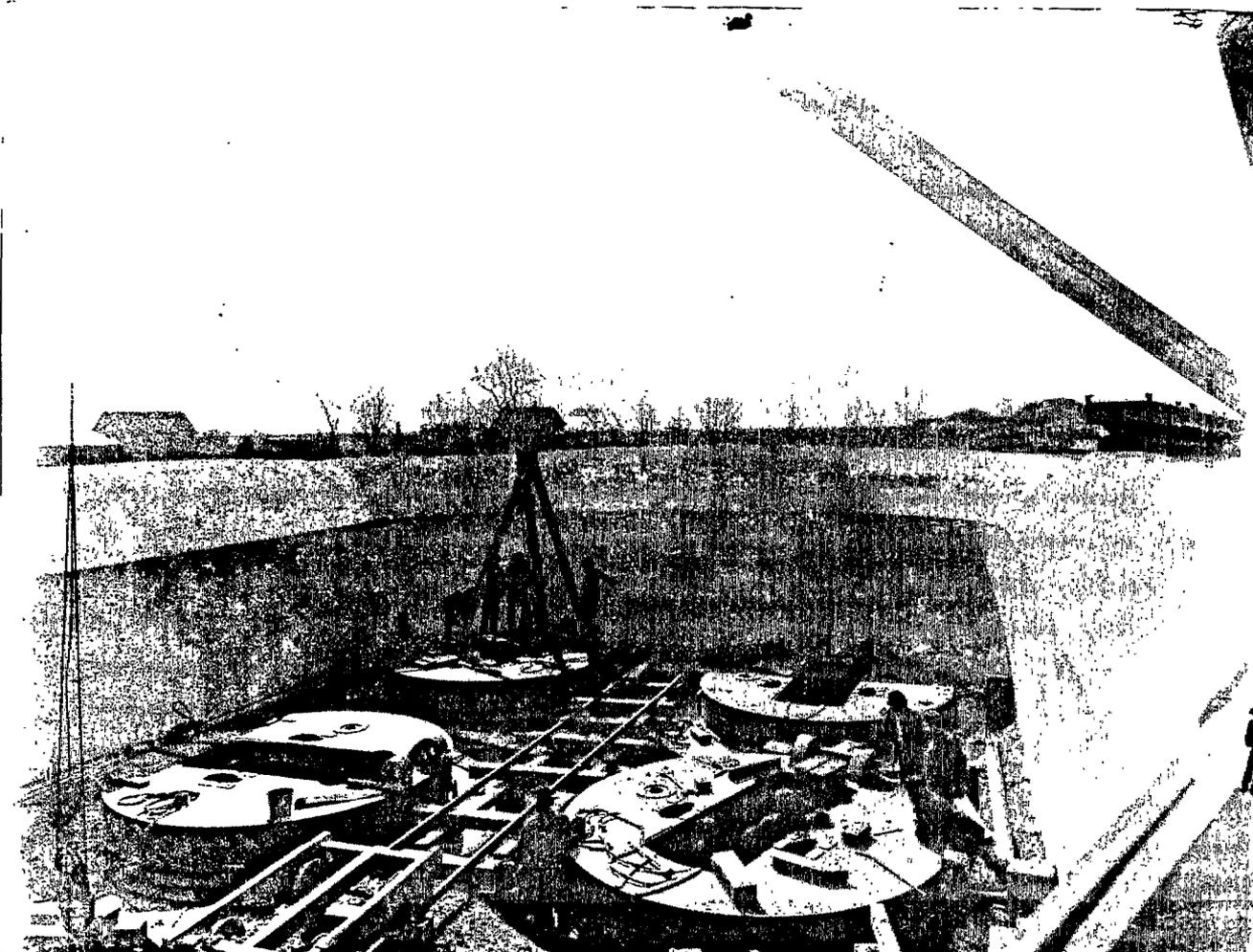


Figure 22. Landscape of Fort DuPont, 1898. The structures in the background match those shown on the 1901 armament report (Figure 21). The dwelling in the center of the photograph is N-1499.009. Source: Delaware State Archives.

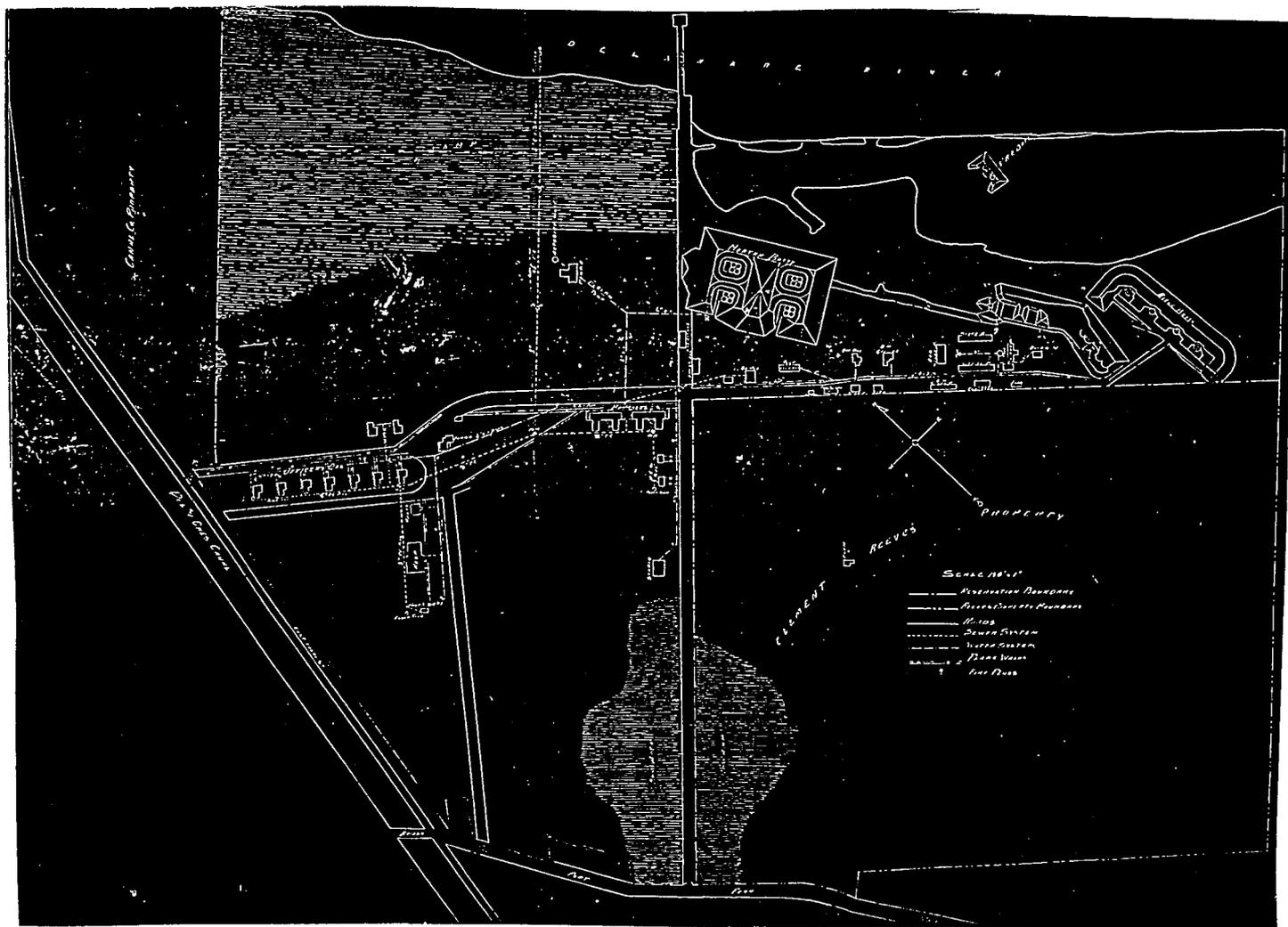


Figure 23. Fort DuPont in 1902. Source: National Archives, Cartographic Division, Record Group 77.

remained undeveloped throughout the history of the fort. Temporary buildings claimed virtually every square foot of the fort's area during World War II, yet the parade ground remained untouched. In 1906 the installation of the flag at the eastern edge of the parade ground confirmed the position of this open space as the base's core. As the first official symbol seen on entering any military installation, any subsequent construction on the parade ground would have negated this symbol's importance.

1906-1922: Acquisition of Remainder of Site and Major Construction Completed. Between 1906 and 1915 Fort DuPont experienced a second episode of intense building activity following the acquisition of additional land. The entire Reeves' farm became part of Fort DuPont as the fort expanded its boundaries to the present size (Figure 24). An idea of the size of the base can be obtained from looking at the buildings constructed during this period. A large bakery prepared breads for the post's growing number of personnel. The quartermaster corps housed its horses and mules in an impressive brick stable, and a new commander's house rose next to the parade ground. The greatest development of permanent buildings occurred in this period.

Expansion during this nine-year period re-affirmed the segregation of function established earlier. Roads that once skirted reservation boundaries now created an axial intersection near the fort's center. Utilitarian structures occupied the land to the south and west of this juncture, residential structures lay to the north and west, and recreational and community structures to the north and east. The erection of additional barracks along the parade ground's southern edge affirmed this open terrain, increasing the spatial separation of officers and enlisted men.

An increasingly complex system of roads allowed movement throughout the base. These roads not only received paving at this time, but many (primarily those fronting officers' row) were flanked by wooden walkways. Street lights and fire hydrants contributed another element to Fort DuPont's streetscape. In 1913 Fort DuPont portrayed an efficient, well-ordered military reservation. An equitation field provided a place to hone one's riding skills; the respective realms of officers, non-commissioned officers, and enlisted men appeared secure; and the parade ground offered a place for the assembly of the entire complement. Many of the landscape features that defined the visual appearance of the fort survive to this day.

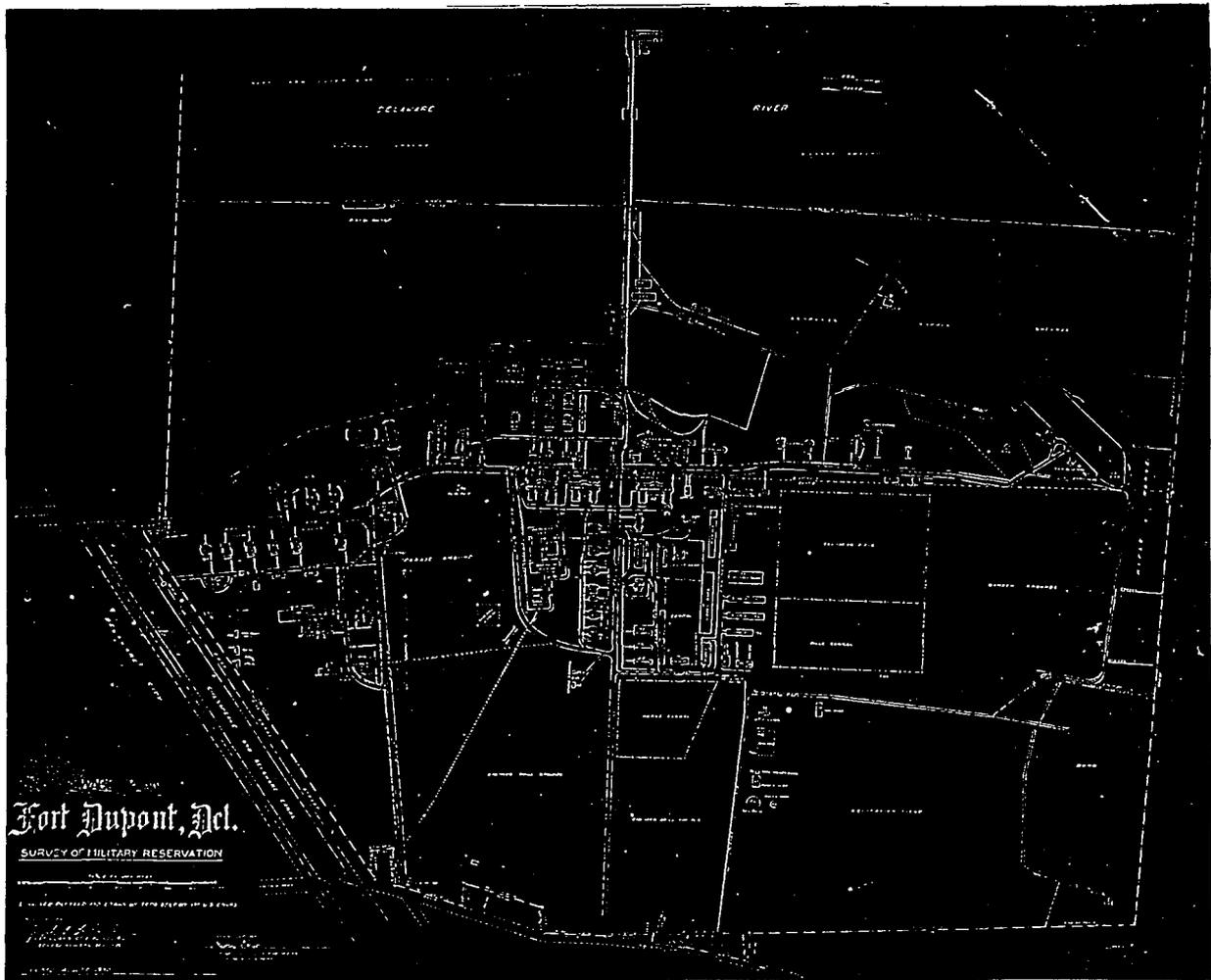


Figure 24. Fort DuPont in 1913. Source: National Archives, Cartographic Division, Record Group 77.

Period 3: Fort DuPont as the Headquarters for the First Engineers: 1923 to 1939

1923-1930: First Engineers Corps Construct Specialized Facilities.

1930-1939: Construction by Works Progress Administration. While the preceding period represented the greatest development of the fort in terms of permanent buildings and in the circulation system, the reservation was far from stagnant between 1923 and 1939. The fort did not expand its boundaries in this period, but added several additional structures. The Works Progress Administration constructed a theater bordering the parade ground. Additional non-commissioned officers' quarters filled the recently reclaimed wetlands to the north and east of the fort's central axis. With the abandonment of the batteries in 1922, Fort DuPont became a major training facility for the engineering corps. Buildings for the storage and repair of bridge pontoons filled the open fields to the west of the batteries.

Period 4: Fort DuPont in World War II: 1939 to 1945

The final stage in the development of Fort DuPont took place as a direct response to World War II. Scores of temporary, or "mobilization type" buildings sprang up throughout the fort (Figure 25). Primarily frame buildings supported by brick or concrete piers, barracks, pump houses, hospital wards, recreation buildings, and even a chapel were classified as temporary buildings. As the war progressed these structures continually changed their functions with hospital wards becoming prisoner-of-war barracks and stables becoming laundries. By 1943 Fort DuPont exhibited its greatest degree of development in terms of the total number of buildings, but few of those constructed after 1941 survive. Although few mobilization buildings remain, the system of roads and walks that connected them still remain. Scattered throughout the reservation, and completely overgrown, in many cases these corridors represent the only physical artifact of this developmental period.

Fort DuPont evolved through a series of changes that not only altered its physical shape but its very purpose. Coastal defense, once the primary reason for its existence, shifted to secondary importance as the national defense strategy moved to a global theater. The buildings of the Coastal Artillery Corps lay vacant. But throughout its evolution, Fort DuPont left behind a structural legacy that enables us

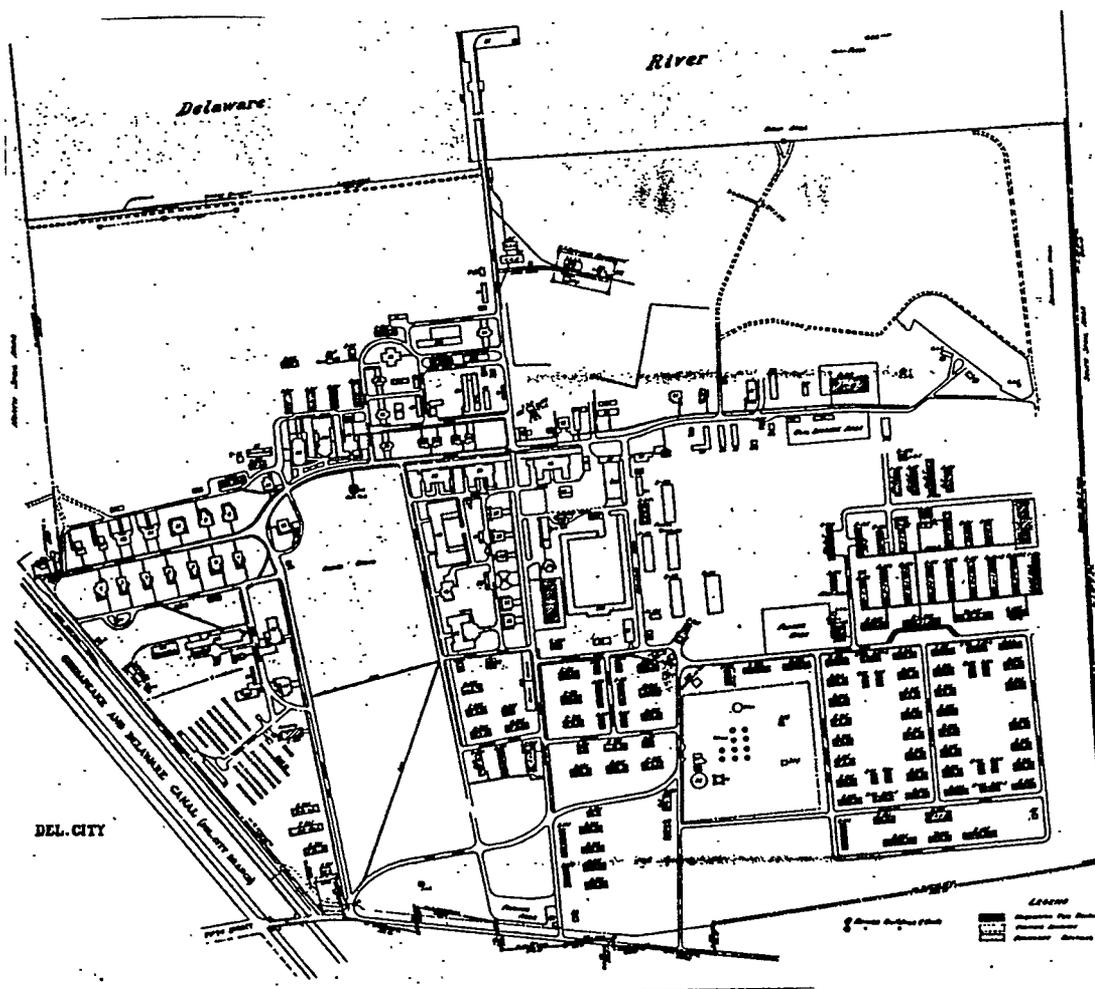


Figure 25. Fort DuPont in 1943. Source: National Archives, Cartographic Division, Record Group 77.

to visualize its substance. For the most part, the historic structures that remain still serve their original function and represent a tangible link between the fort's past and its future.

Description and Evaluation of Fort DuPont as a Planned/Designed Landscape

Fort DuPont can be evaluated as an historic landscape using six of the elements defined by the National Register of Historic Places and the Delaware State Historic Preservation Office: 1) purpose and function, 2) location and site, 3) land plan, 4) circulation system, 5) land uses and spatial organization, and 6) building arrangements and scenic views and vistas. Figure 19 will be a useful reference when reading this section.

1. Purpose and Function. Fort DuPont was planned as a coastal artillery defense installation in the late nineteenth century as part of a system of fortifications defending the Delaware River and Bay. As a military landscape its form reflected two elements: the massive concrete mortar and rifled cannon emplacements along the Delaware River in the southeast quadrant of the reservation, and the standard military planning principles used to build the supporting post north of them. As the need diminished for the fort to play a role in coastal defense and the emplacements were abandoned in the 1920s, Fort DuPont continued to serve as an Army post for the First Engineers after the First World War and then, during World War II, as a training site and prisoner-of-war camp.

2. Location and Site. The site for Fort DuPont reflects a strategic location at the narrowing of the Delaware River where Philadelphia and the Delaware Valley could best be defended from naval attack.

3. Land Plan. The development of Fort DuPont appears to have taken place under a fairly clear military plan after the fort was commissioned in 1898 and land acquisition completed by 1910. The circulation system of the plan and its organization of land use are described below.

4. Circulation System. The circulation system consists of both roads and a railroad. Two major streets intersect at right angles to divide the post into quadrants. Battery Lane, running roughly east and west, provides the north-south division while Maple Boulevard provides the east-west separation. Whereas Battery Lane divides the fort in almost equal halves, Maple Boulevard separates its eastern third

from the west two-thirds. Elm Avenue, a second major east-west street, parallels Battery Lane on the north, borders the parade ground, and is the entry road to the post. Elm Avenue meets Maple Boulevard at the point where the Boulevard, running north, becomes Officers' Lane. Sometime during the 1930s, a third major east-west street, Colter Road, was constructed along the southern boundary of the parade ground.

Maple Boulevard marked the western boundary of the reservation before 1900 and served as a support road for the artillery batteries in the southeast quadrant. The extension of Battery Lane east of the Boulevard is also an earlier road called Dock Road that provided access from the dock on the Delaware River to the emplacements during their construction. The military railroad also ran along Dock Road before swinging south to run behind the emplacements. Battery Lane also marked the northern boundary of the Clement Reeves Farm.

5. Land Uses and Spatial Organization. The artillery batteries along the Delaware River in the southeast quadrant are the *raison d'être* of Fort DuPont. They were designed to be self-sufficient when under attack, containing their own ammunition magazines, electrical generators, boilers, and communications systems. In addition, the only supporting facilities on the fort tied directly to the batteries are the railroad from the pier, and the Coastal Artillery Corps buildings which are believed to be ordinance repair and storage facilities. More generally, of course, the entire fort was intended to support the artillery emplacements.

North and west of the batteries, the spatial organization for Fort DuPont follows a modified standard axial military plan with land uses hierarchically arrayed around the parade ground, the functional and ceremonial center of the post. The parade ground separated officers' residential areas on the north from enlisted personnel and non-commissioned officers on the south and east. Administrative and service areas, including the post headquarters, post-exchange, and theater were located on the east end of the parade ground. Almost all of the logistical and support areas, with the exception of the quartermaster in the northeast, are in the southwest quadrant of the post between the enlisted barracks and non-commissioned officers' quarters, and the Delaware River.

Barracks lining the south side of the parade ground housed enlisted personnel. Except for one structure now gone, barracks for enlisted personnel were all located in a rectangular east-west block in the northwest quadrant of the post bounded by

Maple Boulevard on the east, Colter Road on the west and north, and Battery Lane on the south. The non-commissioned officers with families were housed in a row of duplexes behind the barracks along Battery Lane and another cluster just east of the barracks on the east side of Maple Boulevard. The officers' residential area--some ten buildings that included the commander's quarters--was located on the northern side of the reservation on Officer's Lane, an extension of Maple Boulevard.

The southwest quadrant, the logistical support area, evidenced more changes in land use than any other sector of the fort. Although some permanent functions currently flank the south side of Battery Lane, such as storage, the more open area south of that has successively been corrals, stables, and an equitation field before 1922, later motor pools and garages and, further south, pontoon assembly and storage areas after the arrival of the First Engineers in 1922. More changes in use occurred during World War II.

6. Building Arrangements and Scenic Views and Vistas. As important as reinforcing the military hierarchy through the separation of land uses was the use of architecture to signal gradations in rank and function. In the 1890s, and continuing through the 1930s, the U.S. Army designed a set of standard plans for buildings on their posts. These included residential quarters ranging from barracks to commanding officers' quarters and an entire array of buildings for services, administration, support, and logistics. To accomplish this, the Army adopted a uniform architectural style within which gradations in importance, whether in administrative buildings or residences, were reflected in the size of the building and elaborateness of architectural detailing. Although the style most commonly used was Colonial Revival, other revival styles were used at posts where they better reflected regional architectural heritages (e.g., Spanish Revival in the west). The choice of a revival style could well have been intended to present the United States Army as embodying the virtues and values of earlier period in the nation's history. Colonial Revival, for example, evoked the period of the Revolutionary War. In a way, the standard plans were the architectural equivalent of military uniforms in which the unity of the Army was reflected in clothes of the same color and style and rank was reflected by the elaboration of detail and badge of rank.

Virtually all of the permanent structures at Fort DuPont were built in the Army Colonial Revival style, lending visual coherence to the architectural landscape of the fort. This visual coherence was also reinforced by the placement and siting of

buildings, planted vegetation, and planned vistas. Surveillance and oversight of enlisted men by officers was assured by the location of residences and barracks. The enlisted men, and to a lesser extent non-commissioned officers, were concentrated in group quarters or barracks on the south side of the parade ground, clearly in sight from the commander's quarters on the north and from officers' row beyond. All of the officers' quarters were single family or duplex on fairly large lots. It was standard practice on military forts to shield the officers' quarters from the view of enlisted personnel with plantings of trees while placing far fewer plantings around enlisted mens' quarters to allow an unobstructed view by officers. The surviving trees on Fort DuPont confirm this practice, even evidenced in the name of the street--Elm Avenue--that bordered the north side of the parade ground and shielded the officers' residential area.

Hence the area of Fort DuPont north of the barracks along Colter Road viewed when entering along Elm Avenue, is the most formal, elaborate, ceremonial, and elite part of the post's military landscape. The large parade ground dominates the view as the ceremonial and symbolic center of the fort. The Colonial Revival brick barracks along the southeastern edge of the parade ground presented a vivid military architectural backdrop while emphasizing the parade ground as an enclosure. The flag and flag pole to the east symbolized both the national role of the fort and, in military geography, the location of the commander, drawing attention to the most important and most architecturally elaborate buildings on the post, the post-exchange and theater.

The commander's imposing house was sited on the northeast edge of the parade ground, creating a visual counterpoint to the barracks of the rank and file. Its position at the end of Elm Avenue controlled visual access to officers' row. The house possessed lines of sight over all the most important aspects of the fort, and not only housed a specific individual but presented a physical reminder of the commander's presence and architecturally symbolized the continuity of command. This area was in marked contrast to, and shielded from, the far more utilitarian southwestern quadrant of the fort. The defensive areas of the fort as represented by the mortar emplacements were also out of view, being dug in and hidden by earthen works.

Evaluating the Integrity of Fort DuPont as a Planned Military Landscape

For a property to qualify for the National Register it must meet one the four National Register Criteria and retain the historic integrity of those features necessary to convey its significance. The National Register criteria recognize seven aspects or qualities that, in various combinations, define integrity. They are location, design, setting, materials, workmanship feeling, and association. As a designed military landscape, Fort DuPont retains integrity in all seven categories and possesses an extraordinarily high degree of physical integrity. Its qualities of integrity in the seven categories can be summarized as follows:

Location is the place where the property was constructed or the place where the historic event took place. As a landscape, Fort DuPont has retained its original location and boundaries and has not been subject to encroachment or loss of territorial integrity.

Design is the composition of landscape elements comprising the form, plan, and spatial organization of a historic property. The organization of the military landscape of Fort DuPont remains almost intact from the period of its fullest development in the 1930s.

Setting is the physical environment of an historic property. Whereas location refers to the specific place where a property was built, setting refers to the character of place in which the property played its historic role. The immediate setting of Fort DuPont retains an unusually high degree of integrity especially given that it is in a rapidly urbanizing county along the shore line of a river that serves the principal access for Atlantic shipping to both Philadelphia and Baltimore.

The original Chesapeake and Delaware Canal and historic Delaware City still form the northern boundary of the post. State Route 9 bounds the northwestern edge of the fort's boundary while state-owned property and protected wetlands abut the remainder of the property on the west. The Delaware River forms its eastern and southern boundaries.

In the larger setting as a strategic location for the coastal defense of the Delaware estuary, the setting remains intact. The older Fort Delaware in the River and its sister Fort Mott on the New Jersey side of the River, form a defensive complex representing 120 years of the implementation of American coastal defense policy and military construction.

Materials with a military property include the construction materials of

military structures, such as gun emplacements, and other buildings, structures, roadways, and other means of access. Because it was maintained until the end of World War II and then decommissioned to the state of Delaware most of the original materials of the fort remain and are in good condition.

The poured concrete in the mortar and rifled cannon emplacements is of historic significance as an experimental material at the time of construction in 1899-1902. The gun emplacements provide a valuable resource for scientific and engineering research on the chemistry of the construction and the building of such complex concrete forms using a pouring technology without steel reinforcement.

Workmanship is the physical evidence of the planning principles and construction technology of the period of significance. Fort DuPont represents the workmanship of military engineering in the succession of gun emplacement and the subsequent construction of the post. This workmanship is exposed in its original form.

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. The visual landscape of Fort DuPont retains a wonderful sense of a quiet, early-twentieth-century Army post.

Association is the direct link between an important historic event or person and an historic property. In the massive concrete cannon and mortar emplacements fortifications well inland in the United States, one senses the fear of foreign naval power, especially the Spanish, that must have aroused Americans and motivated Congress to appropriate the (then) substantial appropriations for a massive coastal defense of which Fort DuPont was a small part.

Whereas an historic resource must possess integrity in only four of the seven characteristics to be eligible for the National Register, Fort DuPont retains integrity in all seven and hence possesses an extraordinary degree of physical integrity.

Evaluation of the Eligibility of Fort DuPont's Landscape for the National Register of Historic Places

When evaluated within its historic context, a property must be shown to be significant under one or more of the four National Register criteria for evaluation--A,B,C, or D--listed earlier in Chapter II. Based on the development of its historic context, Fort DuPont and its constituent resources represent significant national trends in National Coastal Defense Policy and Military Architecture and Engineering

making the site eligible for the National Register of Historic Places in two historic contexts under National Register Criterion A. The fort is also eligible under Criterion A for regional significance to Delaware and the larger Delaware Valley through its role as a fort defending the Delaware Valley and Philadelphia.

The fort possesses a significant concentration, linkage, and continuity of sites, buildings, structures, and objects united by a plan and qualifies for the National Register as a planned historic landscape and historic district under Criterion C, representing the distinctive characteristics of a coastal fortification of the late nineteenth and early twentieth century. Most of the buildings, structures, and objects within the fort qualify as contributing elements and many are eligible for the Register on their own merits.

The areas of significance that apply to each criterion can be summarized as follows:

Criterion A: Events

1. Significant embodiment of national coastal defense strategy
 - *as a outgrowth of the Permanent Defense or Third System of National Defense from 1815
 - * as part of major expansion of national coastal defenses as the implementation of new military technology in response to perceived foreign naval threat, especially from the Spanish
2. Significant association with five major wars including the Civil War, the Spanish-American War, the First World War and the Second World War.
3. Significant reflection of trends in military architecture and engineering including:
 - *representing the most advanced coastal fortification after the stone fortress characterized by heavy mortars and rifled disappearing guns in concrete emplacements covered with earthen works developed to protect against naval bombardment from heavy long range shipboard rifled cannon at long and close range.
 - * new construction methods and chemistry using poured concrete as a material for large structures

Criterion B: Persons

No association was found with a significant person at the national or state level.

Criterion C: Representative of a Type

1. Excellent representative of coastal defense fortification of late nineteenth and early twentieth century

2. Architecture significant example of buildings constructed from standard Army plans.

3. All gun and mortar emplacements are significant as representative of a type embodying distinctive characteristics of a type, period, or method of construction

Criterion D: Yield Important Information

Since the entire assemblage of historic resources that make up Fort DuPont have significance, properties lacking integrity may yield important information. No evaluation was conducted of the archeological potential of the site since that was not included in the scope of this study.

VI. Evaluating the Architectural Resources of Fort DuPont

The most readily visible of the historic themes that form the Fort DuPont Historic Context are the architectural resources: dwellings, barracks, warehouses, and recreational facilities. Although most of these buildings were not directly associated with the fort's armament capabilities, they are integral to the functioning of an Endicott Period fort, when fort design separated the batteries from all other functional areas of the fort. The arrangement and construction of buildings is also a product of careful planning, based on a national trend of standard U.S. Army construction. For the purpose of this historic context, buildings are broadly categorized into four property types: **administrative, residential, support, and service**. The surviving landscape of Fort Dupont contains each type of building; historic maps and records reveal those buildings that have not survived.

Standard U.S. Army Construction

The architecture of Fort DuPont represents a significant trend in building design and construction by the U.S. Army. Prior to and during the Civil War, housing conditions for servicemen and their families was not regulated and the conditions of houses were often deplorable. At seacoast fortifications, soldiers did not even have housing, but were "living in unsanitary conditions within the casements of the forts."³⁷ An 1868 ruling by the Secretary of War stated that

"no permanent barracks, quarters, hospitals, storehouses, offices, stables, piers or wharves shall be erected but by order of the Secretary of War . . . These restrictions do not extend to temporary huts . . .; but no contracts shall be entered into, nor purchases of material made, for the erection of such temporary buildings, unless specially authorized by the War Department."³⁸

Other inhibitors, such as a \$20,000 limitation on permanent structures in 1872 and a

³⁷Bethany C. Grashof, A Study of United States Army Family Housing Standardized Plans 1866- 1940, p. 11.

³⁸Annual Report of the Secretary of War, 1868. From Bethany C. Grashof, A Study of United States Army Family Housing Standardized Plans 1866 - 1940, Volume I, p. 7.

\$500 limit on expenditures to any building without approval by the Secretary of War in 1886, made the construction and maintenance of buildings difficult. However, the rapid growth of the Army from around 18,000 men just before the Civil War to 43,000 men in 1869 required substantial amounts of adequate housing.

By 1866 the concept of standardized plans for barracks, family housing, mess halls, bakeries, and jails was in place. Within the offices of the Quartermaster General, in charge of construction for the Army, a team of architects and experienced builders developed a stock of plans to fit all the needs of the Army. The plans were developed and distributed to various forts as construction needs arose. The ready availability of plans ensured that a post could be developed or expanded quickly and would meet a certain aesthetic code as well. When the concept was developed, the Colonial Revival style was chosen as representative of American architecture and became the guideline for most construction plans. By providing plans for all types of buildings in the same style, the Army could assure an homogenous appearance to an entire fort. This can be seen at Fort DuPont, where quarters, warehouses, the bakery and even a transformer house all reflect the features of the Colonial Revival style.

The social structure of the military was also shaped by buildings. Soon after the conception of standard plans, space allocation also became regulated using one of two methods. The first way provided all ranks with the same number of rooms but increased the room size with higher rank. This method is known to be used by 1870.³⁹ The second method of allocation allows uniformly sized rooms, but an increased number with a higher rank.⁴⁰ These methods of space allocation are significant because they are the basis for modern army housing practices. For residential buildings, the Army currently allows "a minimum of 950 square feet per unit with two bedroom for a noncommissioned officer family to a maximum of 2,100 square feet and four bedrooms for generals and their families. For commanding officers, 10 percent additional space is allowed."⁴¹

³⁹Grashof, Army Standardized Housing, p. 20.

⁴⁰Grashof, Army Standardized Housing, p. 21.

⁴¹Constance Werner Ramirez and Katherine Grandine, "Housing the Military," in Housing: Symbol, Structure, Site edited by Lisa Taylor, p. 110.

Although most buildings were constructed according to a standard plan, each fort was allowed to make modifications to the design, according to specialized needs. This information was sometimes recorded in a complete or partial set of new drawings for a building or the change was noted in the construction log for the fort. Changes to a plan were not necessarily made during initial construction, but sometimes when the use of the building changed. For example, the Band Barracks (N-1499.022) was modified in 1930 when the First Engineers Regiment occupied Fort DuPont.

The presence of this standard type of construction at Fort DuPont associates it with the national trend in military construction. With almost all of the buildings that still stand as confirmed standard buildings, the historic theme of United States Army architecture is significantly represented.

Property Types and Surviving Buildings

The surviving buildings on the Fort DuPont landscape are broadly categorized into four property types: administrative buildings, residential buildings, support buildings, and service buildings. **Administrative buildings** are those buildings that are associated with the military functioning of the fort, specifically command operations, ceremonial representation, and general safety. This property type is represented by only four standing buildings and objects: the administrative headquarters building, the flagpole, the guard house, and the fire house. Although this group is small, its importance should not be underestimated since the buildings included represent the "brains" and the order which maintained/commanded the rest of the fort.

The **residential buildings** property type includes all housing facilities at the fort. Semi-detached dwellings, or duplexes, which housed commissioned officers and non-commissioned officers, are the best represented housing type, with thirteen buildings. The four surviving detached dwellings were reserved for commissioned officers and the two barracks housed enlisted men. Three tent pads are also included in the residential property type.

Support buildings form the largest surviving property type at Fort DuPont. These buildings provided logistical support to the military functions and activities. The storage and repair of ordnance, pontoons and motor vehicles are a significant part of this group, as well as general storage of goods. Also included are facilities

associated with providing the fort with water: pump houses and water storage facilities. Other buildings used for engineering, electrical supply, and radio communications are included in this property type.

The **service buildings** property type represents those buildings that supported the needs of the fort's inhabitants: food service and preparation, recreation, personal vehicle storage, and religious meeting. This category contains sites that are not often associated with an historic landscape, specifically the tennis courts and swimming pool.

Demolished Buildings at Fort Dupont

Historic maps, aerial photographs, and the **Construction Log** indicate that many of the buildings that once filled the Fort DuPont landscape have been demolished. Demolition began with the construction of Twenty Gun Battery in 1899, when a map indicated that standing buildings were "scheduled to be removed." Change was inevitable as fire destroyed a residence in 1906 and some buildings were moved to other forts. The best indicator of building loss is in a comparison of a 1943 map of the fort during its maximum development and the current inventory of historic resources. This comparison reveals that there were approximately 150 permanent buildings and 135 mobilization type buildings in 1943; today there are 82 total buildings. An aerial photograph taken in 1937 by the Department of Highways provides a more visual assessment of the loss when compared with the existing historic resources (Figure 26). The two property types most affected by demolition are **support buildings** and **residential buildings**. An early headquarters building belonging to the **administrative buildings** property type can be seen on the 1902 map (see Figure 23). Located on Elm Avenue and facing the Parade Ground, the building was gone by 1913 when a new map was drawn (see Figure 24). **Support buildings** that once dotted the landscape include a clothing warehouse, a water pumping plant, and several coal sheds, mess halls and miscellaneous storehouses.

The **residential buildings** property type was the most affected in the demolition process. Among the largest buildings that do not survive are frame barracks that were located on Maple Boulevard. There were three of these barracks, which each held 99 or 109 men, approximately one company. Two of the barracks are believed to be constructed according to standard plan number 121 or 121-B. The other barrack was constructed according to plan number 147 (Figures 27 and 28).

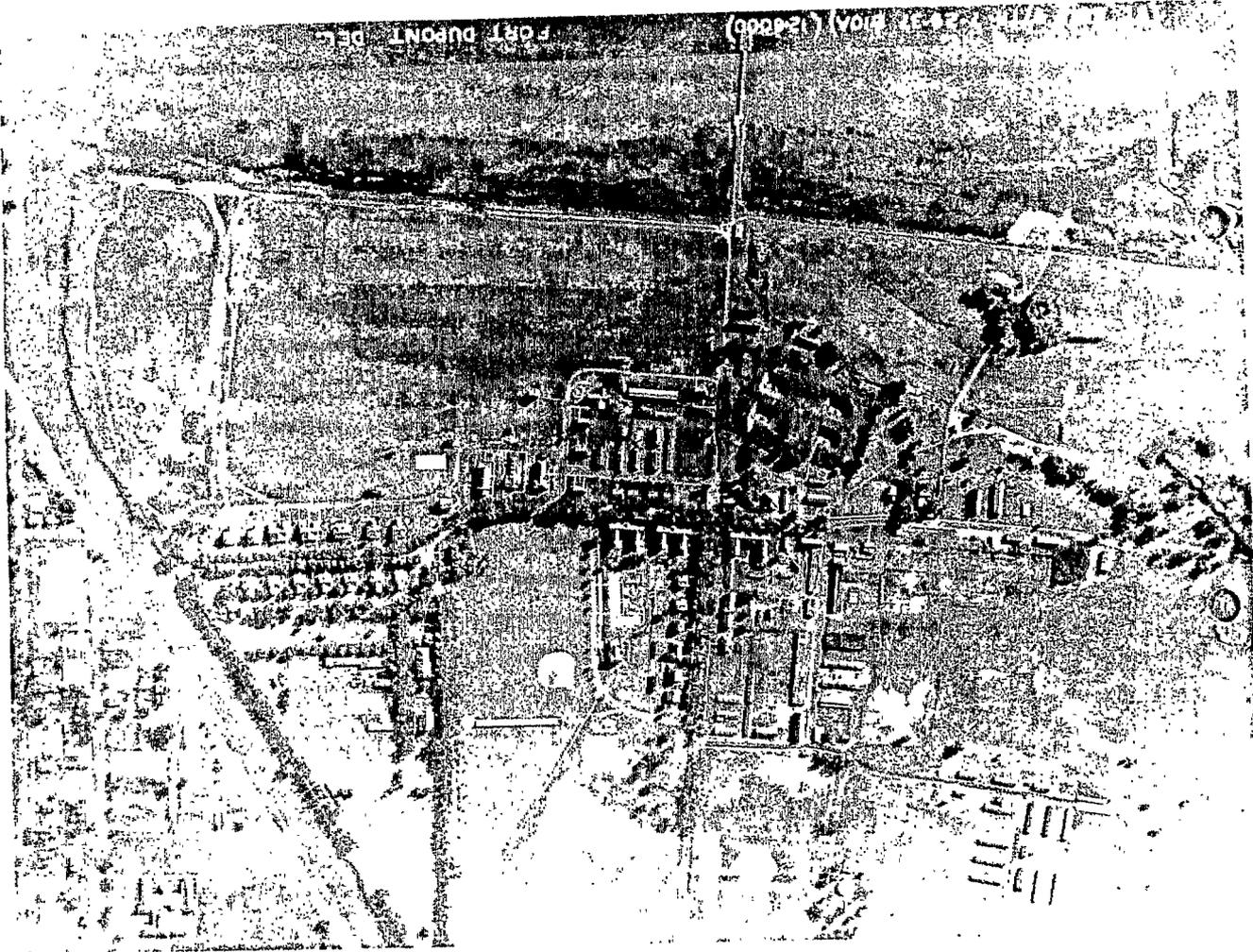


Figure 26. Aerial photograph of Fort DuPont, taken in 1937 by the Highways Department.



Figure 27. Photograph of United States Army Standardized Housing Plan #145 D.
Source: Delaware State Archives.

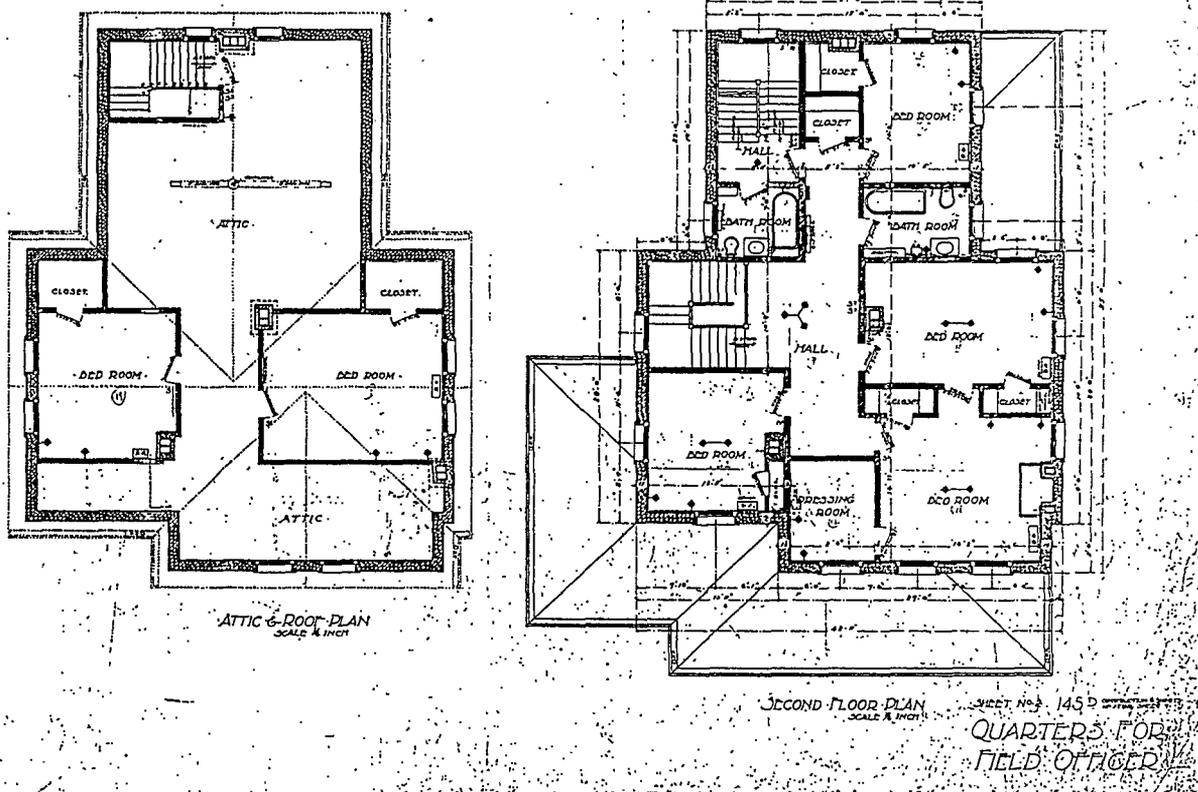


Figure 28. Floor plans for United States Army Standardized Housing Plan #145 D. Source: National Archives, Cartographic Division, Record Group 77.

Each of the plans indicate a layout of dormitory-like rooms with multiple beds, a day room, a mess room, a kitchen and several storerooms.

Other dwellings that do not survive are detached officer's quarters, which once lined Officers Row. A postcard in the Delaware Archives of officers' row indicates the former layout and attention to detail. A water fountain located directly in front of the brick Field Officer's Quarters illustrates the desire for an attractive setting that was not just functional. Several of these buildings were built primarily according to standard plan number 145D (Figures 29 and 30) although some matched the frame duplexes that still stand on the row.

Barracks constructed for use during World War II are also among those which do not survive. There were approximately 42 of these cantonment buildings built in 1941 according to standard plan number 700-1165. Each of the buildings housed 63 men and was constructed at a cost of \$9,000. Although the buildings were meant to be temporary quarters, the structures are still in use at many forts today, including the nearby Aberdeen Proving Ground.

Conclusion

The architectural landscape of Fort Dupont has been dramatically altered since its conception. Those buildings that survive are vital to the interpretation of the fort as a military installation active in the late nineteenth and early twentieth century. The second section of this chapter describes the surviving buildings and evaluates each one for eligibility to the National Register of Historic Places.

An historic district or landscape is comprised of sites, structures, buildings, and/or objects. These resources fall into three categories in terms of their contribution to the significance of the entire district or landscape. **Eligible resources** possess significance under National Register criteria and retain integrity. **Contributing but ineligible resources** are those that add to the significance of the district or landscape even though they may not possess significance or integrity as a separate entity. An example of a contributing but ineligible resource is a heavily modified building that maintains its original location and massing and whose absence would adversely affect the overall integrity of the landscape. **Non-contributing resources** include those constructed during the last fifty years or those so heavily modified as to eliminate any association with the district's period of significance or historic context.



Figure 29. Photograph of United States Army Standardized Housing Plan #147.
Source: Delaware State Archives.

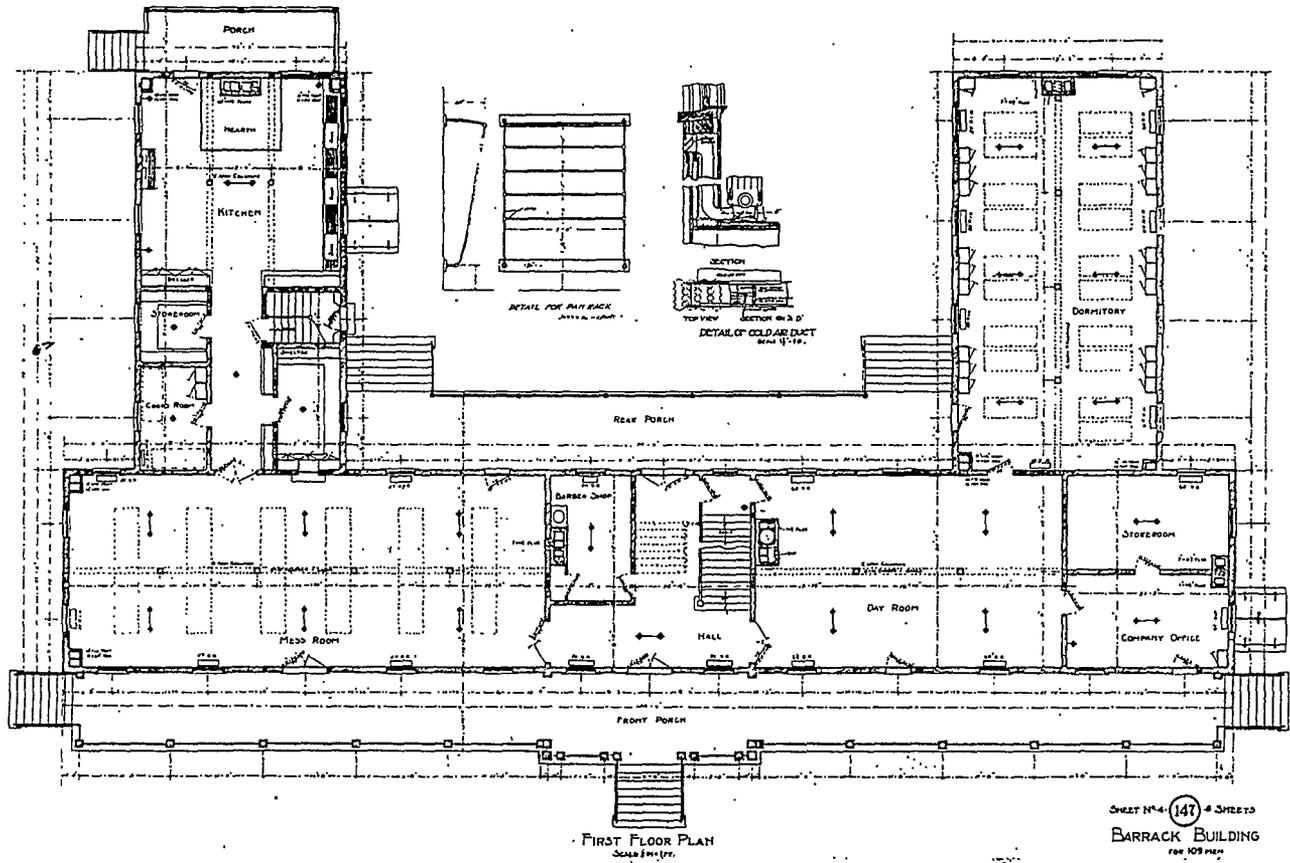


Figure 30. Floor plan of United States Army Standardized Housing Plan #147. Source: National Archives, Cartographic Division, Record Group 77.

Descriptions of each resource identified during the Fort DuPont survey, including determinations of their eligibility for the National Register of Historic Places and their status (contributing or non-contributing) for inclusion in the historic district, are listed below. The buildings appear in a roughly chronological order of construction. The names listed are those obtained from the Construction Log for Fort DuPont and represent the historic names assigned to the buildings at the time of construction. Some buildings have also been assigned a Fort DuPont inventory number that identifies the building in the archival records and on historic maps. If the building is a duplex, this number will be followed by the letters A or B to designate the left or right side of the house. The final number in the title sequence is the survey number assigned to the property by the Delaware State Historic Preservation Office. The number for the entire Fort DuPont site is "N (for New Castle County) 1499." Numbers following a decimal point indicate a specific building, object, or site within the fort. For example, Ten Gun Battery is given the number N-1499.002. Each of the descriptions is accompanied by one or more photographs depicting the resource.

The number N-1499.001 has been reserved for the archaeological site located at the end of Officers Row. Complete information on this site can be found in the site report produced by the University of Delaware Center for Archaeological Research.

Building Condition

Many of the historic structures at Fort DuPont have undergone changes to their original form. The specific modifications made by the military are listed in the Construction Log for Fort DuPont. The log itemizes various types of changes, ranging from the installation of new venetian blinds to the construction of an addition to the building. In addition, alterations occurred to many buildings after the state acquired the site. Transformations that took place during the period of significance at the fort must be considered part of the history of the building. Many of those alterations reflect modifications in building functions as the purpose of the fort itself changed. In that sense the changes contribute to our understanding of the changing functions of the fort and do not affect the integrity of the buildings. Changes that took place after 1950 may alter a building in a way that causes it to lose integrity as a contributing or eligible resource. Each building must be examined individually to determine whether the changes in it occurred during or after the period of

significance. This examination must be done in conjunction with the Construction Log for Fort DuPont. Any change that can be documented by the log should be considered historic and contributing to the significance of the resource and the district.

Each of the buildings, objects, and sites found in the survey is described and evaluated for eligibility in the following section. Except where noted, all resources are minimally considered to contribute to the military planned landscape and to the proposed historic district.

Architectural Descriptions and Evaluations

1. Ten Gun Battery (N-1499.002)

Description: The Ten Gun Battery was a pentagonal structure constructed in 1864 to serve as an ancillary battery to Fort Delaware. The apex of the battery pointed due east and the two adjacent sides consisted of earthen parapets, sloped glacis, and a defensive moat. A wooden stockade and a six-foot deep moat protected the three landward sides of the battery. A bridge on the western-most side of the fort provided access across the defensive works. Several structures occupied the interior of the battery. The most prominent was a centrally-located magazine. Constructed of double layers of timbers and heavily reinforced with mounded earth, this structure was erected partially below grade. Other structures within Ten Gun Battery included a kitchen, guard house, privy, and quarters for officers and enlisted men. No details are available as to the architectural characteristics of these buildings. Between 1898 and 1901, new construction of the Mortar Battery obliterated the Ten Gun Battery from the landscape. The battery exists today only as an archaeological site.

Evaluation: Ten Gun Battery belongs to the **fortifications** property type as defined in the Fort DuPont Historic Context. Archaeological investigation of the site is recommended. If preliminary testing reveals evidence of the battery, the site could be eligible for the National Register under Criterion D as an archaeological site providing information about national coastal defense.

2. Twenty Gun Battery (N-1499.003)

Description: Constructed in the 1870s, Twenty Gun Battery replaced the Civil War fortification as the primary artillery emplacement on the upper Delaware River.

Rectangular in shape with two flanking parapets, the battery appeared in the nineteenth century as a large earthen mound roughly parallel to the river (Figure 31). Initially planned for both large-bore cannon and coastal mortars, the battery never exceeded three guns. Only the southern-most flanking parapet survives (Figures 32 and 33). Emplacement construction utilized alternating layers of brick and large-aggregate concrete. The east (water) face of the battery was reinforced with fill. Heavy blocks held ordnance pintels, and wooden frameworks with iron rails provided support for the rear of the gun carriage and allowed traversing of the carriage. To the west and below the gun emplacements are two brick powder magazines. The entry and retaining walls are built of cut and dressed stone with an arched opening and heavy stone lintel (Figures 34 and 35). Hardware and pintels are of cast iron. A downward sloping, vaulted corridor connects the entry to the main portion of the magazine. This large, groin-vaulted chamber contains vents that penetrate its earthen covering to the battery's outer surface. Both magazines are of similar design although the northern magazine is missing most of its dressed stone details. In addition to the earthenworks and extant magazine, an additional magazine survives to the north. Originally a single magazine identical to those of the battery, this magazine was later enlarged to provide two separate chambers. The addition contains an off-set vaulted entrance, which directly accesses the barrel vaulted chamber. Neither magazine retains its entry. Erosion of the surrounding embankment has exposed the concrete cap placed above the magazines. This concrete is similar in composition to that present in the emplacements--large aggregate and clear evidence of successive pours. It is likely that the magazines within the battery's embankment are reinforced in a similar fashion.

Evaluation: Twenty Gun Battery belongs to the fortifications property type as defined in the Fort DuPont Historic Context. In its ruinous state it no longer possesses integrity as a complete battery, but the four individual powder magazines and the four surviving emplacements for fifteen-inch Rodman guns do possess integrity. These factors allow the site to be eligible for the National Register under Criterion A for national coastal defense, under Criterion C for military architecture, and under Criterion D for potential archaeology.



Figure 31: Twenty Gun Battery. Detail of parapet construction showing alternate layers of brick and large aggregate concrete.



Figure 32: Twenty Gun Battery. Pintle and attachment bolts for fifteen-inch Columbiad surviving on terrepleine of battery.



Figure 33: Twenty Gun Battery. Brick and cut stone entrance to powder magazine. Sloping vault of access tunnel visible through doorway.



Figure 34: Twenty Gun Battery. Exposed powder magazine.



Figure 35: Twenty Gun Battery. Hazards to the powder magazines include dense overgrowth, trees, and lack of security.

3. Batteries Reed and Gibson (N-1499.004)

Description: This large concrete structure erected between 1898 and 1901 once contained the twelve-inch and eight-inch rifles that comprised the fort's main weaponry. This rectangular structure runs north and south and extends over 350 feet in length. The river side of the battery is a sloping earthen parapet while the opposite face is vertical and unprotected by fill (Figure 36). The structural components of the battery consist of a steel substructure completely encapsulated by concrete. Vertical surfaces represent a type of slip formed of concrete. In this technique, three separate cavities are created between the forms. A coarse-aggregate concrete fills the central void, and finely-grained material fills the outer two voids. After stripping the forms, the finer material provided a smooth, weather-resistant finish.

Each of the four gun emplacements is characterized by a terrepleine and circular mounting hole (Figure 37). The mounts for the disappearing guns (these eight-inch weapons occupied the two inner emplacements) are stepped well below the terrepleine, while the twelve-inch barbette guns were installed in pits nearly flush with the surrounding surface. Each emplacement contains a sheltered area with storage room (used for munitions carts) and access to the elevator used in transporting rounds from the magazines within the structure. Exterior iron walks and stairs provided access between the individual emplacements and the ground below. The interior of the battery is divided into numerous chambers, most of which served as magazines. Each magazine contained an overhead trolley system that moved rounds from the storage chamber to the munitions elevator. Centrally located within the structure is a large, tiled room that photographs show as a boiler and dynamo room.

Evaluation: Batteries Reed and Gibson belongs to the **fortifications** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military engineering.

4. Mortar Battery (N-1499.005)

Description: Constructed between 1898 and 1901, the mortar battery is built of concrete and almost completely covered with earthen fill (Figure 38). The battery contains four pits, each of which held four mortars. The two western pits are



Figure 36: Batteries Reed and Gibson.



Figure 37: Batteries Reed and Gibson.



Figure 38: Mortar Battery.

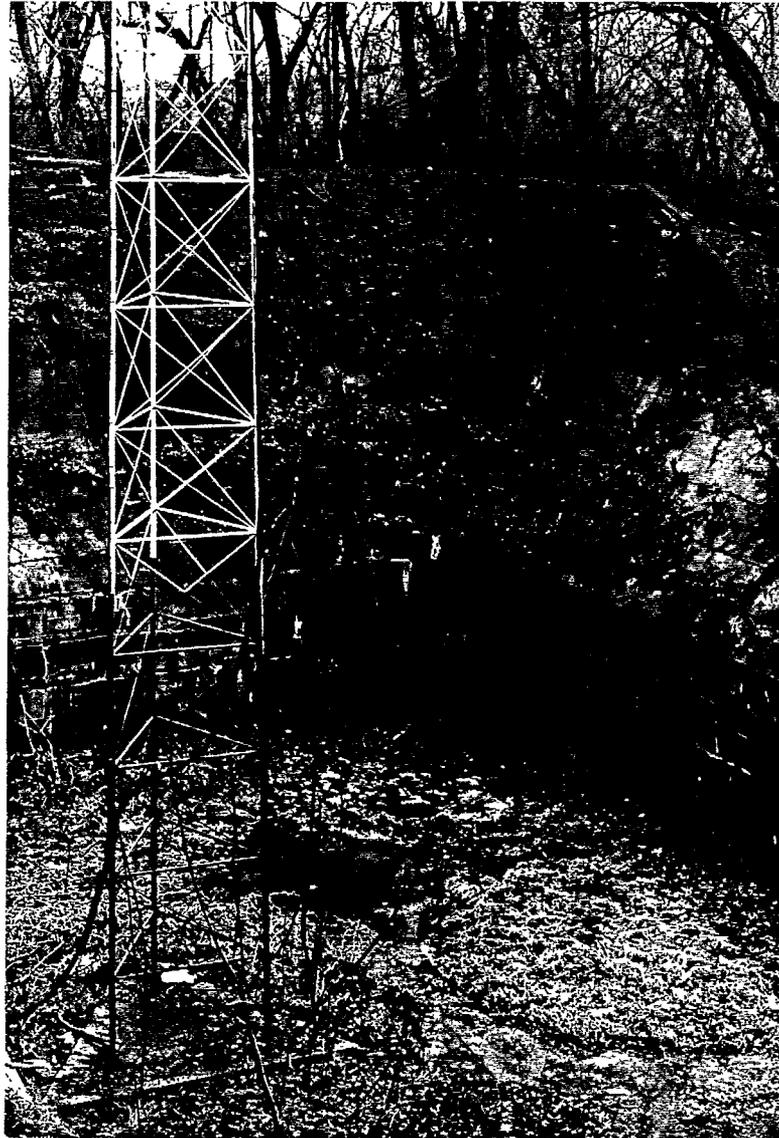


Figure 39: Mortar Battery.



Figure 40: Mortar Battery. Control/spotting room on top of structure.

are accessible from the outside, while those on the east can only be entered from within the protected portions of the battery. Each pit contains a heavily reinforced observation/firing tower on its northern edge. Iron blast doors separate the individual weapons areas from the corridors which connect it to the battery's underground galleries. Construction of the mortar emplacements presumably follows the same procedures as that of batteries Reed and Gibson.

The northwest pit of the battery is currently used by the Emergency Operations Management Center. The interior of the mortar battery was not accessible.

Evaluation: The mortar battery belongs to the property type **fortifications** as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military engineering.

5. Pump House (N-1499.006)

Description: This square, concrete structure was built circa 1899; no standard plan number is available. The structure is located below grade with a concrete, pyramidal roof with slightly overhanging visible above the surface (Figure 41). The metal grate door is accessed by a dirt slope. The interior of the structure has a tapered floor for drainage purposes and three-phase electrical equipment.

Evaluation: The pump house belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

6. Rapid Fire Gun Emplacement (N-1499.007)

Description: This square, concrete structure dates from circa 1900. It is open-topped and its floor is raised about four feet above grade (Figure 42). A circular mounting platform for a single gun occupies the center of the floor, which is protected by concrete walls about three feet in height. A recess in the east wall contains a sheet-metal box for the installation of a field telephone. Mounting flanges along the top edge of the wall suggest that some form of removable roof may have been present when this building was in use.



Figure 41: Pump House.



Figure 42: Rapid Fire Gun Emplacement.

Evaluation: The rapid fire gun emplacement belongs to the **fortifications** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military engineering.

7. Battery Elder (N-1499.008)

Description: Battery Elder is a trapezoidal building constructed of concrete and is located on the eastern edge of the fort (Figure 43). This installation contained two Brown, five-inch, rapid-fire guns. Like the mortar and rifle batteries, the river-facing edge is an earthen parapet, with depressed emplacements on either side of a concrete transverse. Powder magazines are located to the right and left of the central axis of the structure, and a communications/fire control room occupies the center of the works. Centrally located stairs provide access to a raised walkway, which in turn leads to the gun emplacements.

Evaluation: Battery Elder belongs to the **fortifications** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military engineering.

8. Officers' Quarters (Single), #23 (N-1499.009)

Description: This *circa* 1898 building is a one-and-one-half story, single-pile, center passage frame structure with a gable roof and five-bay facade (Figure 44). The facade faces the river and the rear elevation faces the street. The main block sits on a brick foundation; three historic additions extend from the rear elevation with parged brick and poured concrete foundations. The building is covered with aluminum siding and the roof has asphalt shingles. Two central brick chimneys and gable roof dormers pierce the roof line. A one-story hipped-roof screen porch with brick pier foundation is located on the facade. Window sash is a mixture of one-over-one and two-over-two double-hung sash and six light fixed sash. Wooden casement windows are visible in the dormers. The building is currently used as a dwelling and the interior was not accessible.

Evaluation: The Officers' Quarters belongs to the **residential buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion



Figure 43: Battery Elder.



Figure 44: Officers' Quarters (Single).

C for standard military architecture.

9. Officers' Quarters (Single), #22 (N-1499.010)

Description: Constructed in 1900, this frame building has a one-and-one-half story main block with a one-and-one-half story ell on the facade (Figure 45). The facade faces the river and the rear elevation faces the street. The two-story ell and three other additions form an asymmetrical dwelling set on a brick foundation and sheathed with aluminum siding. The facade fenestration and front door are concealed by a shed-roof, screen porch; an open porch is located on the northeast elevation and is adjacent to the screened porch. The gable roofs of the main block and all additions are covered with asphalt shingles. A brick stove flue chimney is located on the street elevation of the main block. The window sash is a mixture of two-over-two double hung sash and six-light hinged or fixed sash. The building is currently used as a dwelling and the interior was not accessible.

Evaluation: The Officers' Quarters belongs to the **residential buildings** property type which is defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

10. Ordnance Storehouse, # 25 (N-1499.011)

Description: This one-story, two-bay gable-front frame building was constructed in 1901 according to standard plan number 128-A. The structure has a brick pier foundation, walls of wood siding over diagonal frame bracing and a slate roof (Figure 46). The box cornice with internal gutter system has partial returns. A central interior brick chimney is located near the facade of the building and there is a second interior chimney is on the rear elevation. The facade originally contained a door and a window, but the door has been modified to create a second window. The sash in these and other windows is six-over-six double-hung sash; some windows are secured with iron grates. Two doors are located on the southeast elevation and one on the northwest elevation. Trim for windows and doors is plain boards with a drip hood. The building is vacant and the interior was not accessible.

Evaluation: The Ordnance Storehouse belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion



Figure 45: Officers' Quarters (Single).



Figure 46: Ordnance Storehouse.

C for standard military architecture.

11. Non-Commissioned Officers' Quarters (Double), #15 A and B (N-1499.012)
12. Non-Commissioned Officers' Quarters (Double), #16 A and B (N-1499.013)

Description: These two-story, four-bay, frame dwellings were built in 1901 according to standard plan number 82-C. The structures have a brick foundation with bulkhead entrance to the basement, side gable roof with front and rear projecting gables covered in composition shingles and a brick chimney in each of the front and rear projecting gables (Figures 47 and 48). The cornice of the building is formed by overhanging eaves. CRS # N-1499.012 is sheathed in aluminum siding, while CRS # N-1499.013 has ship lap vinyl siding. Both buildings have a screen front porch with brick piers and a shed roof, and two symmetrical additions projecting from the rear elevation; the additions can be seen in *circa* 1940 photographs. Trim for the eight-over-eight double-hung sash windows has been concealed by siding on the buildings. The buildings are currently used as dwellings and the interiors were not accessible.

Evaluation: The Non-Commissioned Officers' Quarters belong to the **residential buildings** property type as defined in the Fort DuPont Historic Context. They are eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

13. Guard House, # 19 (N-1499.014)

Description: This one-and-one-half story, five-bay frame building was built in 1901 according to plan number 30-E. The raised basement foundation is constructed of rubble stone on the facade beneath the open porch and cut stone on the remaining elevations (Figure 49). Original wood siding sheaths the building and slate covers the pyramidal roof. A single gable-roof dormer is central to the facade of the building. The windows are six-over-six double hung sash and have plain board trim with a drip hood. The door is five-part raised panel and has trim that matches the windows. A hipped roofed porch with tapering square posts and pilasters is located on the facade. The building is vacant and the interior was not accessible.

Evaluation: The Guard House belongs to the **administrative buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion



Figure 47: Non-Commissioned Officers' Quarters (Double).



Figure 48: Non-Commissioned Officers' Quarters (Double).



Figure 49: Guard House.

C for standard military architecture.

14. Administration Building, #10 (N-1499.015)

Description: This two-story, three-bay, double-pile frame Colonial Revival building was constructed according to standard plan number 122 in 1901. The structure has an irregularly-coursed ashlar raised basement foundation, aluminum siding, and composition shingle roofing (Figure 50). The overhanging cornice has slight returns. A corbelled brick interior chimney is located in each of the gable ends. Windows are six-over-six double hung sash with plain trim; vinyl shutters are present. The six part recessed panel door is centrally located on the facade and flanked by three-part sidelights. The architrave has a broken-top pediment with fluted pilasters at the outer edges and narrow fluted trim between the door and sidelights. A small addition with shed roof is centered on the rear elevation. The building is currently used as an office and the interior was not accessible.

Evaluation: The Administration Building belongs to the **administrative buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

15. Ordnance Repair Shop, #34 (N-1499.016)

Description: This one-story, gable-roof building with asymmetrical bays was constructed in 1902; no standard plan number is available (Figure 51). The foundation is not visible, the walls are covered in wood siding, and the slate roof has overhanging eaves. A corbelled brick chimney is located on the interior of the southeast elevation. The windows are double pane sliding sash with plain board trim. A two-part recessed panel double-door constructed of diagonal boards is located in the gable end, where a concrete pad forms a porch. The building is currently used as a stable. The interior of the building was not accessible.

Evaluation: The Ordnance Repair Shop belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

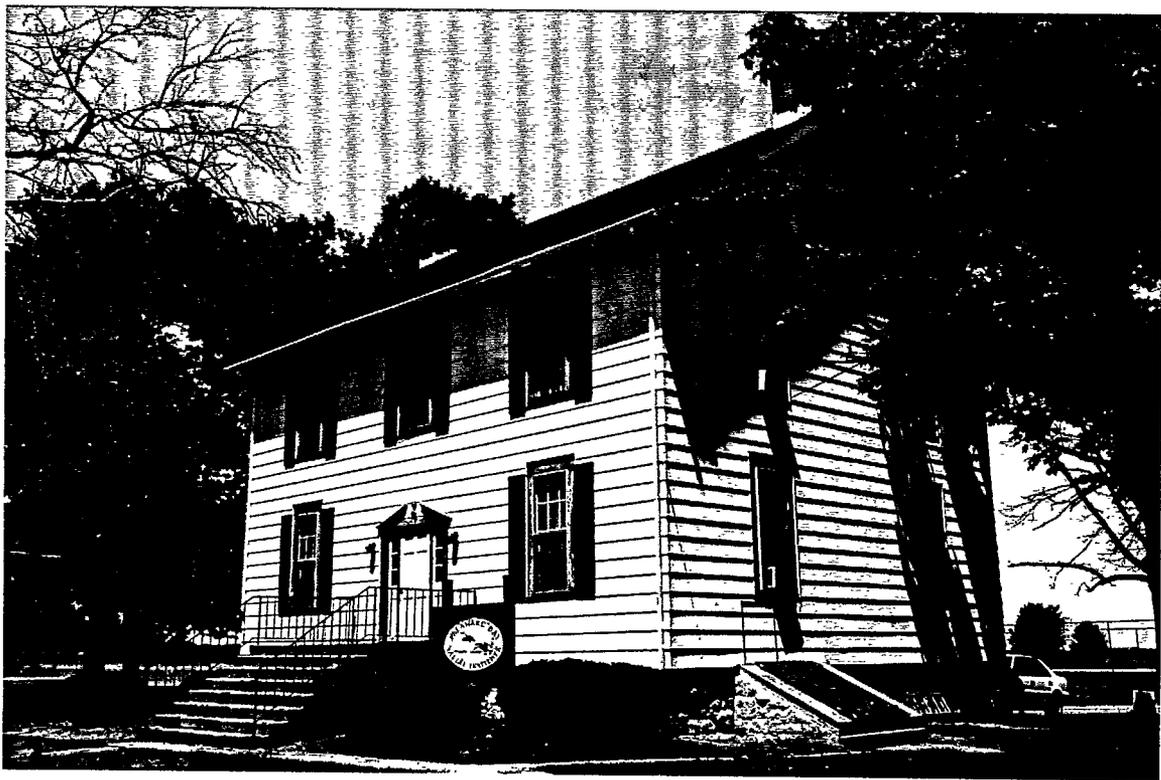


Figure 50: Administration Building.



Figure 51: Ordnance Repair Shop.

16. Flagstaff, # 56 (N-1499.017)

Description: This concrete pad foundation with iron pole was built in 1906 according to standard plan number 47-A. The original pole was approximately one hundred feet high and had a configuration that consisted of two poles, one bolted next to the other roughly half-way up the pole. The current pole was installed in 1937 (Figure 52).

Evaluation: The Flagstaff belongs to the **administrative buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register as an object under Criterion A for national coastal defense and under Criterion C for standard military architecture.

17. Fire Apparatus Building, #40 (N-1499.018)

Description: This one-story, single-bay frame building was constructed in 1906 according to standard plan number 98-C. The structure has a poured concrete foundation, composition siding, and a gable roof covered in slate (Figure 53). The gable end facade is dominated by a modern garage door with plain board trim. Two passage doors are present, one on the southeast elevation and another on the southwest elevation. A brick chimney is located near the rear elevation. Windows are six-over-six double hung sash; the trim has been concealed by siding. The building is well-maintained and appears to be in use, but the interior was not accessible.

Evaluation: The Fire Apparatus Building belongs to the **administrative buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

18. Quartermaster's Storehouse, #43 (N-1499.019)

Description: This one-and-one-half story brick building was constructed in 1906 according to standard plan number 91-D. The load-bearing masonry building is constructed on a raised basement that is illuminated by four cellar windows and accessed by a bulkhead entrance at each gable end (Figure 54). An overhanging frame cornice is located above the corbelled brick cornice; the roof is covered with composition shingles. An interior-end chimney is centered on each gable end; two other chimneys are located in the center of the building, one in each of the front

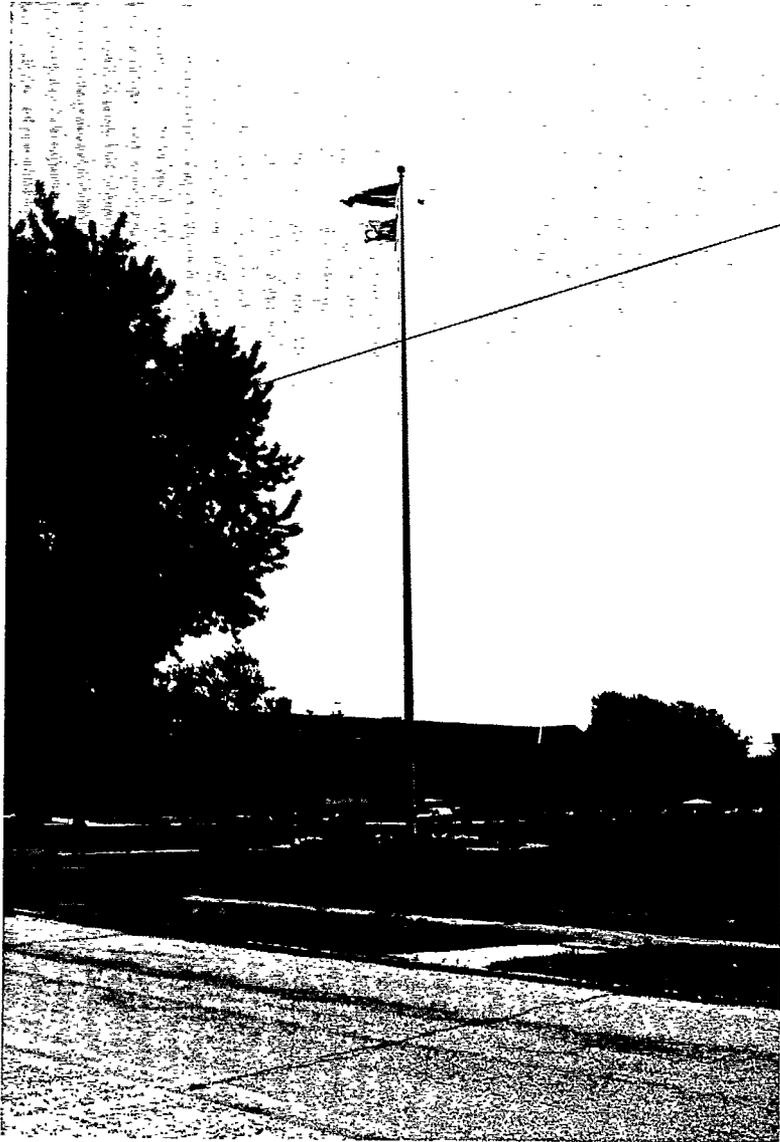


Figure 52: Flagstaff.

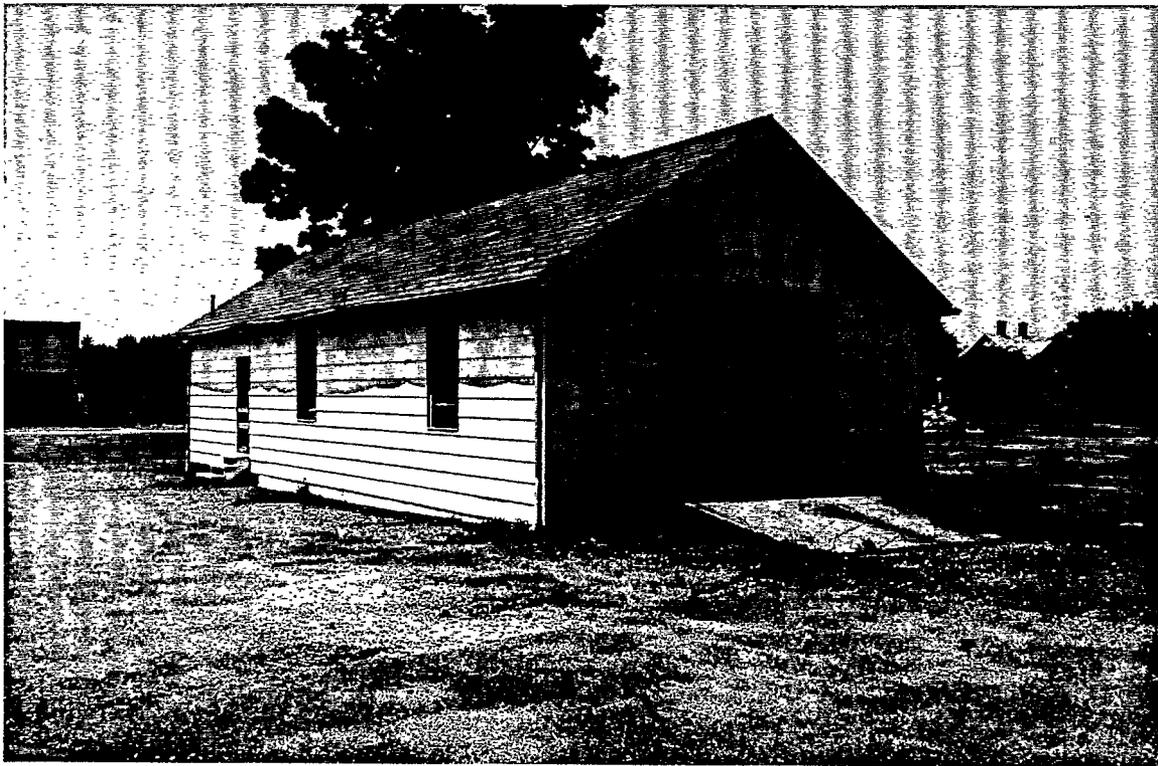


Figure 53: Fire Apparatus Building.



Figure 54: Quartermaster's Storehouse.

and rear projecting gable-roof dormers. Windows are six-over-six double-hung sash with segmented arches and plain board trim. One cargo door and three passage doors are located on the facade, where a concrete and brick loading dock extends the full length of the building. Two original cargo doors are located on the rear elevation; the loading docks for these doors are missing. The building continues to be used as storage; the interior was not accessible.

Evaluation: The Quartermaster's Storehouse belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

19. Post Exchange, #36 (N-1499.020)

Description: The Post Exchange was built in 1906 according to standard plan number 175. The five-bay, load-bearing masonry building is one-and-one-half stories over a raised basement (Figure 55). The hipped roof is covered in asphalt shingles; a box cornice decorates the eaves. Three-light frieze windows are centered over the windows of the double-pile main block. Window openings have an all-header arch and cast concrete sills. The type of window sash for the basement and first floor is concealed. The central door is three-part recessed panel with sidelights and evidence of a fanlight; the door is part of a gable-roof projecting architrave decorated with quoins and a keystone. The building has a sandstone water table and a brick belt course. A small frame addition is located on the northwest elevation; its construction date is not known.

The interior of the building possesses two notable original features: a gymnasium on the first floor and a two-lane bowling alley in the basement. In addition to these areas, several lounge and recreation rooms are located in the main block of the building. The gym is equipped with basketball goals, a scoreboard and gallery seating in the half-story of the southwest end. The bowling alley has two raised lanes constructed of narrow flooring. A wall rack for regular and duck pins is located adjacent to the lanes. The building is currently used for storage.

Evaluation: The Post Exchange belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 55: Post Exchange.

20. Non-Commissioned Officers' Quarters (Double), #46 (N-1499.021)

Description: This two-story, six-bay, brick duplex was constructed in 1909 according to standard plan number 82-K. The structure is built on a stone foundation with a basement that is accessed by a bulkhead entrance on the rear elevation (Figure 56). A shed roof porch supported by masonry piers is located on the facade and a shed roof frame addition is located on the rear elevation. Two corbelled brick chimneys are located along the dividing axis of the building. The windows are six-over-six double-hung sash, with cast concrete sills and a double row of headers forming an arch for the opening. The doors are four-light over three-part panel; the trim is not visible. Fan lights are located in the gable ends of the attic. The interior of the building was not accessible.

Evaluation: The Non-Commissioned Officers' Quarters belongs to the **residential buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

21. Firemen's Quarters (Double), #47 (N-1499.022)

Description: This one-story, eight-bay brick duplex was built in 1909 according to standard plan number 230 (Figure 57). The structure has a brick foundation with a basement; the brick laid in an irregular bond. The window and door openings are accentuated by two rows of headers that form an arch and a cast concrete sill. The windows are six-over-one double-hung-sash; doors are eight-light over a single panel. The hipped roof has wide, over-hanging eaves with exposed rafter ends that are decoratively carved; the roof is sheathed with asphalt shingles. Three brick chimneys pierce the roof of the building. A small frame porch supported by brick piers is located on the facade at each door. The porch roofs have wide overhanging eaves and decorative rafters that match the main block. The interior of the building was not accessible.

Evaluation: The Firemen's Quarters belongs to the **residential buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 56: Non-Commissioned Officers' Quarters (Double).



Figure 57: Firemen's Quarters (Double).

22. Band Barracks, #48 (N-1499.023)

Description: This seven-bay, two-story over raised basement brick building was built in 1909 according to the standard plan number 61-F (Figure 58). The concrete foundation supports walls with a brick bond that is six courses of all-stretcher bond and one course of alternating header/stretcher bond. A belt course is located at the top of the second floor windows. The main block of the building has a side-gable roof, while the original flanking wings are gable-end; a two-story porch is located on the facade between the flanking wings. A box cornice with full returns forms the cornice; a circular form delineated by brick headers decorates the gable end. The original slate roof has been replaced by asphalt shingles.

Windows are two-over-two double hung sash; the opening is formed by an arch of bricks and a stone sill. The central double door with a four-light transom have been heavily modified. The two-story porch on the facade has a cast concrete floor supported by brick piers on the first level and a wood floor at the second level, supported by wood columns and engaged pilasters. There are three covered entrances/porches are located on the rear elevation. A modern passage located on the northeast elevation connects the buildings to the adjacent barracks building. The building is currently used as an office and the interior was not accessible.

Evaluation: The Band Barracks belongs to the **residential buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

23. Field Officer's Quarters, # 50 (N-1499.024)

Description: This two-and-one-half story load-bearing masonry building was constructed in 1910 according to standard plan number 235. The building has a concrete foundation, brick walls with a bond of seven courses of all stretcher and one row of alternating header/stretcher and a stone water table (Figure 59). The hipped roof sheathed in asphalt shingles. The cornice is formed by wide, overhanging eaves and exposed rafter ends that are notched into the plate and decoratively carved. The four original dormers located on the roof have cornices identical to that of the main block. The facade contains paired windows; all windows have jack arches, stone sills and one-over-one double-hung sash. The modern door with ten-pane sidelights retains a jack arch and is centrally located on the facade.



Figure 58: Band Barracks.



Figure 59: Field Officer's Quarters.

The current porch of the building is centered on the facade and has a brick foundation with columns supporting the hipped roof. A ramp that extends to the northeast elevation makes the building handicap accessible. Historical photos and plans depict the building as having a two story porch decorated with Chinese railing that extended the length of the facade. The building is used as an office and the interior was not accessible.

Evaluation: The Field Officer's Quarters belongs to the **residential buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

24. Officers Quarters (Double), # 51 A and B (N-1499.025)

Description: This two-story, six-bay brick building was constructed in 1910 according to standard plan number 260. The building has a brick foundation with raised basement, irregular bond brick walls, and a gable roof with asphalt shingles (Figures 60 and 61). The box cornice has partial returns. The plan of the building is symmetrical, with a brick bay located at each of the gable ends and two adjoining gable-roof projections on the rear facade. Second floor windows and the facade wall-dormers have six-over-two double-hung sash. First floor windows are two-over-two double hung sash; all windows except wall dormers are set in an arched opening formed by two rows of headers. The facade porch has a hipped roof covered with standing seam metal and wood columns with cast iron bases. An open porch extends the length of the rear elevation, where two bulkheads provide access to the basement.

The interior of this building has been heavily modified, although basic room arrangement appears to be original. The basement is relatively undisturbed and is shared by both sides of the house. It contains a series of small rooms that were part of the original construction. The building is currently vacant.

Evaluation: The Officers' Quarters belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 60: Officers Quarters (Double).



Figure 61: Officers Quarters (Double).

25. Non-Commissioned Officers' Quarters (Double) # 52 (N-1499.026)

26. Non-Commissioned Officers' Quarters (Double) # 53 (N-1499.027)

Description: These two duplexes were constructed in 1910 according to standard plan number 82-N. The two-story, four bay frame buildings are constructed on a concrete foundation with a bulkhead entrance to the basement (Figures 62, 63, and 64). CRS # N-1499.052 is sheathed with vinyl siding, while CRS #N-1499.053 has aluminum siding. Both buildings have a gable roof covered in asphalt shingles. Each building has two brick chimneys projecting from the roof. The cornice is formed by wide, overhanging eaves. The buildings have symmetrical fenestration with six-over-six double-hung sash windows; a double window with three-over-three double-hung sash is centrally located on the second floor. The type of door located on the facade was not visible although the trim was plain board with drip hood. A hipped-roof screen a double porch supported by concrete piers is located on the facade; a hipped roof addition is also located on the rear elevation.

The buildings are currently used as dwellings and the interiors were not accessible.

Evaluation: These Non-Commissioned Officers' Quarters belong to the **residential buildings** property type defined in the Fort DuPont Historic Context. They are eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

27. Bakery, #54 (N-1499.028)

Description: This one story, five-bay, brick building was constructed in 1910 according to standard plan number 217. There are two frame additions to the building, one on the facade and another on the southwest corner of the main block (Figure 65). The irregular bond brick walls rest on a poured concrete foundation and support a hipped roof sheathed in slate. A pyramidal-roof cupola with louvered vents is centered on the peak of the roof. The cornice is formed by overhanging eaves with carved rafter ends. The six-over-six and two-over-two double-hung sash window openings are arched and have cast concrete sills; a belt course located at the base of the arch joins all the windows. The facade has two entrances: a central opening in the frame addition formed by double doors that are four-light over two part recessed panel; and an arched opening in the main block with three-light transom and five-part recessed panel door.



Figure 62: Non-Commissioned Officers' Quarters.



Figure 63: Non-Commissioned Officers' Quarters.



Figure 64: Non-Commissioned Officers' Quarters.

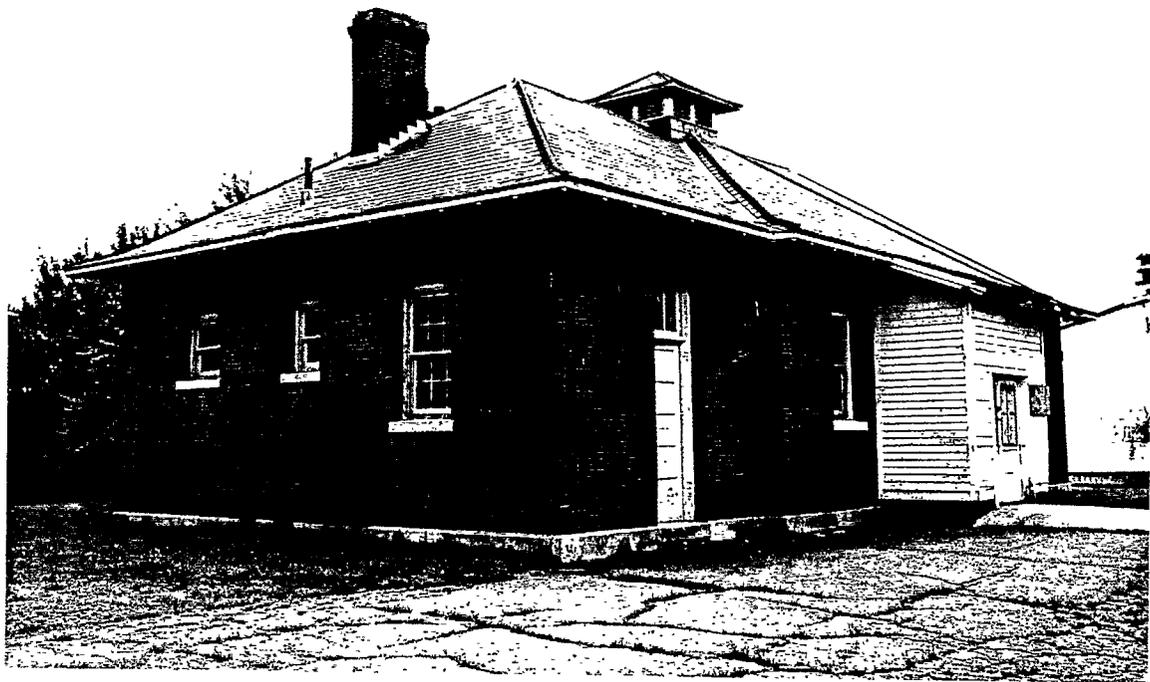


Figure 65: Bakery.

The interior of the bakery has been modified for use as freezer storage, however the form remains intact. A cooler room with glazed bricks and a system for circulating cold water through metal pipes does survive intact.

The building is currently used for storage.

Evaluation: The Bakery belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

28. Motor Repair Shop, # 55 (N-1499.029)

Description: This one-and-one-half story, seven-bay brick structure was constructed in 1911 according to standard plan number 59-11. The building currently consists of this brick structure and a frame building, CRS #N-1499.057, located on the rear elevation and joined to this building with a frame hyphen. Because there are two distinct structures with separate plans and construction dates, they are being treated as two different buildings.

The Motor Repair Shop has a concrete foundation, five-course common bond walls with a water table, and a gable roof sheathed in slate (Figure 66). A corbelled brick chimney is located at the northwest gable end of the main block. A small, one-story, shed roof brick boiler room with corbelled chimney is also located at the northwest gable end of the main block. The fenestration of the facade is asymmetrical. There are six-over-six double hung sash windows set in arched openings; no shutters are present, but there is evidence in the brick of pintels to secure them. Two arched cargo door openings are also located on the facade; a third door on the facade is a passage door. A passage door and window on the southeast elevation have been added in the original location of a cargo door.

The building is currently used for maintenance and the interior was not accessible.

Evaluation: The Motor Repair Shop belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 66: Motor Repair Shop.

29. Quartermaster's Stable, #17 (New) (NC-1499.030)

Description: This two-story brick building with nine bays on the side elevation was constructed in 1912 according to standard plan number 54-F. The structure has a brick foundation that supports walls constructed in five-course common bond (Figure 67). The gable roof is sheathed in slate and has decoratively-carved rafter ends that are birds-mouthed into the plate. Window openings have an arch formed by two rows of headers and cast concrete sills; the sash is a mixture of six-over-six double-hung and six-light fixed sash. Second floor windows are all six-light fixed sash. The building is accessed by a loading dock in the southwest gable end, where the first floor door has been heavily altered. A door located on the second floor has the same arch and cast sill as the window openings.

The building is currently used for storage and the interior was not accessible.

Evaluation: The Quartermaster's Stable belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

30. Service Club (N-1499.031)

Description: This one-story, eight-bay frame building was constructed circa 1913 (Figure 68). There are numerous additions to the side and rear elevations of the main block. The ship-lap siding walls are supported by a concrete block foundation; the gable roof is covered in composition shingles and has exposed rafter ends. The fenestration on the main block of the facade is symmetrical, with eight six-over-six double-hung-sash windows trimmed with plain board; a solid wood panel door is located in the facade portion of an addition that is located along the southeast elevation. It appears that the door opening has been modified from a double door to its current appearance as a single door. A frame porch constructed in 1993 is located on the facade; it is supported by masonry posts and has a gable roof.

The interior of the building is divided into one large central room and several smaller office-type rooms. The Fort Delaware Society uses the building as its headquarters.

Evaluation: The Service Club belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. The building has undergone many changes and represents several building periods. According to historic maps,

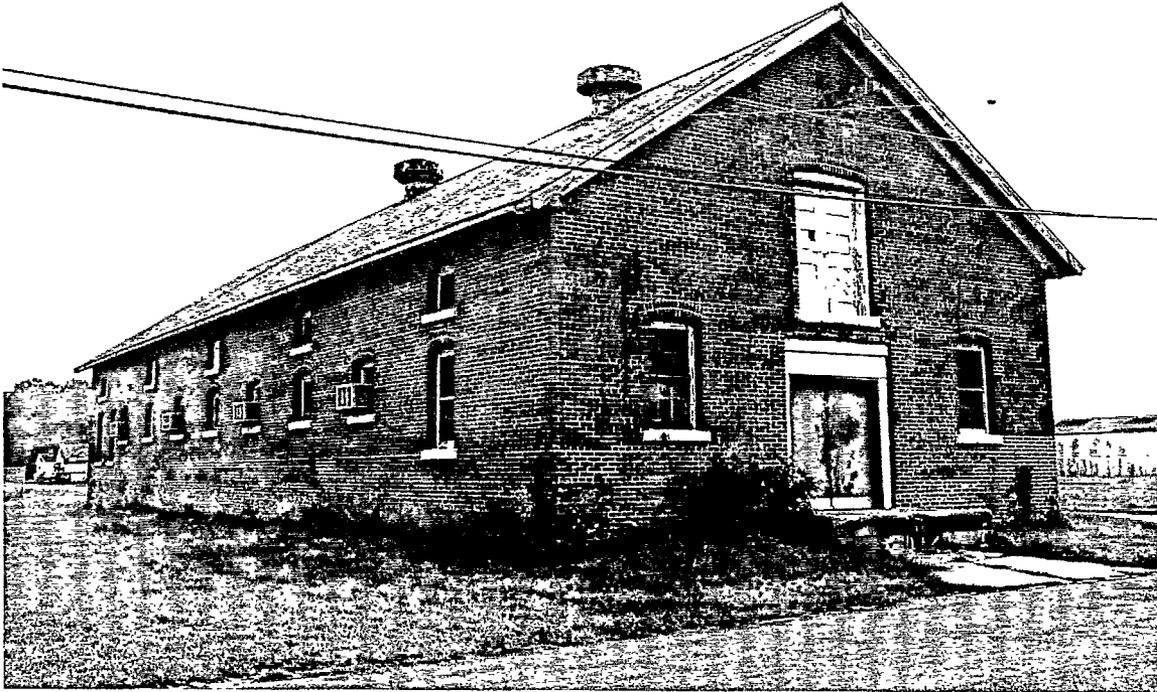


Figure 67: Quartermaster's Stable.

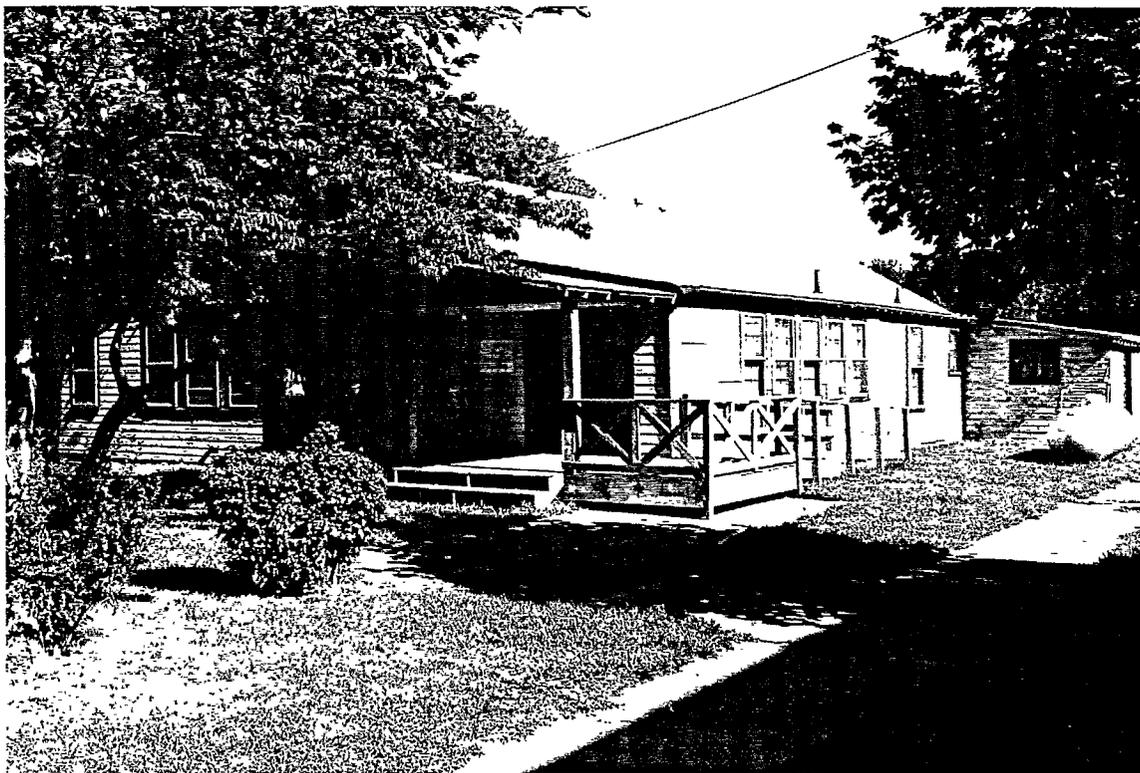


Figure 68: Service Club.

the massing of the building has been altered dramatically. Because of these issues, National Register eligibility is not recommended, but its location and historic construction make it a contributing structure to the Fort DuPont landscape.

31. Coastal Artillery Corps Warehouse (N-1499.032)

Description: This one-story, two-bay rectangular riveted steel building was constructed circa 1913. The concrete foundation supports the steel frame walls sheathed in corrugated metal; the gable roof with box cornice and partial returns is also covered with corrugated metal (Figure 69). The six-over-six double hung sash windows are protected by metal shutters. Two side-hinged, double cargo doors are located on the facade. Double doors located on the side elevations accommodate a rail line which runs through the building and into CRS # N-1499.033. The interior of the building is an open plan with the exception of a small frame room located along the facade between the two cargo doors. Exposed roof trusses are visible throughout the building. The building is bisected along the gable by thirteen riveted steel posts that help to support two cranes located on either side of the building.

The building is currently used for storage.

Evaluation: The Coastal Artillery Corps Warehouse belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

32. Coastal Artillery Corps Warehouse (N-1499.033)

Description: This one-story, two-bay, rectangular building was constructed circa 1913; there is no standard plan number available. The walls are corrugated metal over wood siding and rest on a concrete foundation (Figure 70). The gable roof covered in composition shingles has a box cornice with partial returns. A five-part recessed panel door and a six-over-six double hung sash window are located in the facade. The side and rear elevation are symmetrical arrangements of window and door openings. Windows are also six-over-six double hung sash and most are concealed by metal shutters. Double doors are located on the side elevations to accommodate the rail line that runs through this building and the adjacent building, CRS # N-1499.032. The interior is divided into two spaces, an office that is adjacent to the facade and a large open room that makes up the remainder of the structure. Roof



Figure 69: Coastal Artillery Corps Warehouse.



Figure 70: Coastal Artillery Corps Warehouse.

trusses are exposed and wood shelving lines portions of the walls in the large room.

The building is currently used as a base of operations by the Delaware Conservation Corps.

Evaluation: The Coastal Artillery Corps Warehouse belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

33. Water Storage Tank (N-1499.034)

Description: This round, one story, reinforced concrete structure was built circa 1913; no standard plan number is available (Figure 71). A ladder on the north side leads to the conical roof. The interior was not accessible and it is unknown if the structure is still in use.

Evaluation: The Water Storage Tank belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military engineering.

34. Tool House, # 61 (N-1499.035)

Description: This one-story, two-bay rectangular frame structure was constructed in 1916 according to standard plan number 53 (Figure 72). The building has a concrete foundation, exterior walls sheathed in aluminum siding, and a gable roof covered with asphalt shingles. The cornice is formed by overhanging eaves. A brick chimney is located on the former southwest exterior wall. A shed roof addition is located along the full length of this elevation. The fenestration is asymmetrical, with a window sash that is mostly six-over-six double hung; window trim is concealed by siding. The double doors each have six lights over a two-part recessed panel and plain board trim.

The building appears to be used as an office; the interior was not accessible.

Evaluation: The Tool House belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 71: Water Storage Tank.



Figure 72: Tool House.

35. Carpenters' Quarters, # 122 (N-1499.036)

Description: This one-story, four bay frame building was constructed in 1913 according to standard plan number 122 (Figure 73). Frame walls covered with aluminum siding sit on a concrete foundation; asphalt shingles cover the gable roof. The fenestration is window, door, door, window, indicating the likelihood of a double house. (This would be the smallest duplex on base.) The windows are six-over-six double hung sash with plain board trim. A frame porch is centered on the facade. There are three wings on the building: a shed roof addition extending the full length of the rear elevation, a half-story shed roof addition on the northwest gable end and a full story shed roof addition on the northwest end. All wings appear in a *circa* 1940 photograph.

The interior of the building was not accessible.

Evaluation: The Carpenter's Quarters belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

36. Water Pumping Plant, # 55 (N-1499.037)

Description: This one story, three bay masonry building was constructed in 1923 according to standard plan number 6172-111. The reinforced concrete structure rests on a concrete foundation and has a hipped roof sheathed with asphalt shingles (Figure 74). Exposed rafter ends are visible beneath the eaves. An interior brick chimney is located near the northeast elevation. The windows are six-over-six double hung sash with plain board trim. The centrally located double doors are four light over two-part panel. An addition is located on the rear elevation. The building appears to retain its original purpose of water pumping.

The interior of the building was not accessible but research indicates that the building included living quarters--a bedroom, bath and office.

Evaluation: The Water Pumping Plant belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 73: Carpenters' Quarters.



Figure 74: Water Pumping Plant.

37. Quartermaster's Warehouse, #135 (N-1499.038)

Description: This one story frame building was constructed in 1926 according to standard plan number 1. The frame structure sheathed in corrugated metal rests on round concrete piers and has a gable roof that is also covered in corrugated metal (Figure 75). The fenestration is asymmetrical, with six light fixed sash windows, a five part recessed panel door and a set of sliding sash double doors.

The building appears to be vacant and the interior was not accessible.

Evaluation: The Quartermaster's Warehouse belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

38. Field Officers Quarters, # 6 (New) (N-1499.039)

Description: This two story, four-bay frame building was built in 1905 at Fort Mott, New Jersey and moved to Fort DuPont in 1932; the standard plan number is not available. (The designation as a "new" building six indicates that it is not the original building six, which was likely destroyed by fire.) The structure is built on a poured concrete basement and has a raised basement (Figure 76 and 77). The walls are covered with aluminum siding and support a gable roof with two projecting gables that is covered in composition shingles. The cornice is formed by overhanging eaves. There are three interior brick chimneys. The windows are a mixture of two-over-two double hung sash, four-light fixed sash and two-light modern fixed sash; a three-part Palladian window is located in the forward projecting gable and two arched windows are located in the rear gable. A modern poured concrete porch with ramp leading to the southeast elevation is located on the facade.

The building is currently used as an office and the interior of the building was not accessible.

Evaluation: The Field Officer's Quarters belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. Although it has been moved, it is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 75: Quartermaster's Warehouse.



Figure 76: Field Officer's Quarters.



Figure 77: Field Officer's Quarters.

39. Swimming Pool (Officers) (N-1499.040)

Description: This concrete structure was built in 1932. It has a depth ranging from two to eight feet deep. There are built in concrete stairs in the shallow end and a metal ladder in the deep end (Figure 78). A diving board is also present. The structure is surrounded by a concrete pad; a small frame pump house with wood siding and an asphalt-covered gable roof is located northwest of the pool.

The pool is no longer used.

Evaluation: The Swimming Pool belongs to the **service buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

40. Non-Commissioned Officers' Quarters (Double) #90 A and B (N-1499.041)

41. Non-Commissioned Officers' Quarters (Double) #91 A and B (N-1499.042)

42. Non-Commissioned Officers' Quarters (Double) #92 A and B (N-1499.043)

43. Non-Commissioned Officers' Quarters (Double) #93 A and B (N-1499.044)

Description: These two-story, four-bay brick buildings were constructed in 1933 according to standard plan number 625-2510/16. The structures all maintain their original exterior form and differ only in the color of paint used in the trim (Figure 79). The five course common bond brick walls are set on a brick foundation; the basement is accessed by a double bulkhead entrance on the rear elevation. The gable roof is sheathed in slate and has overhanging eaves. An interior brick chimney is located in each gable end of the main block. A one-story, flat roof enclosed sun porch is located at each of the gable ends. The fenestration is symmetrical with a two-bay central entrance and tripartite windows consisting of a principal opening that is six-over-six double hung sash which is flanked by two-over-two double hung sash sidelights. The window openings have jack arches, cast concrete sills and plain board trim. A modified hipped, copper-roof entryway is centered on the facade. The principal passage door is located perpendicular to the house in the side elevation of the porch. The openings on the facade are doors equipped with screens and a metal railing on the exterior. A frame porch is centrally located on the rear elevation.

The buildings are currently used as dwellings and the interiors were not accessible.

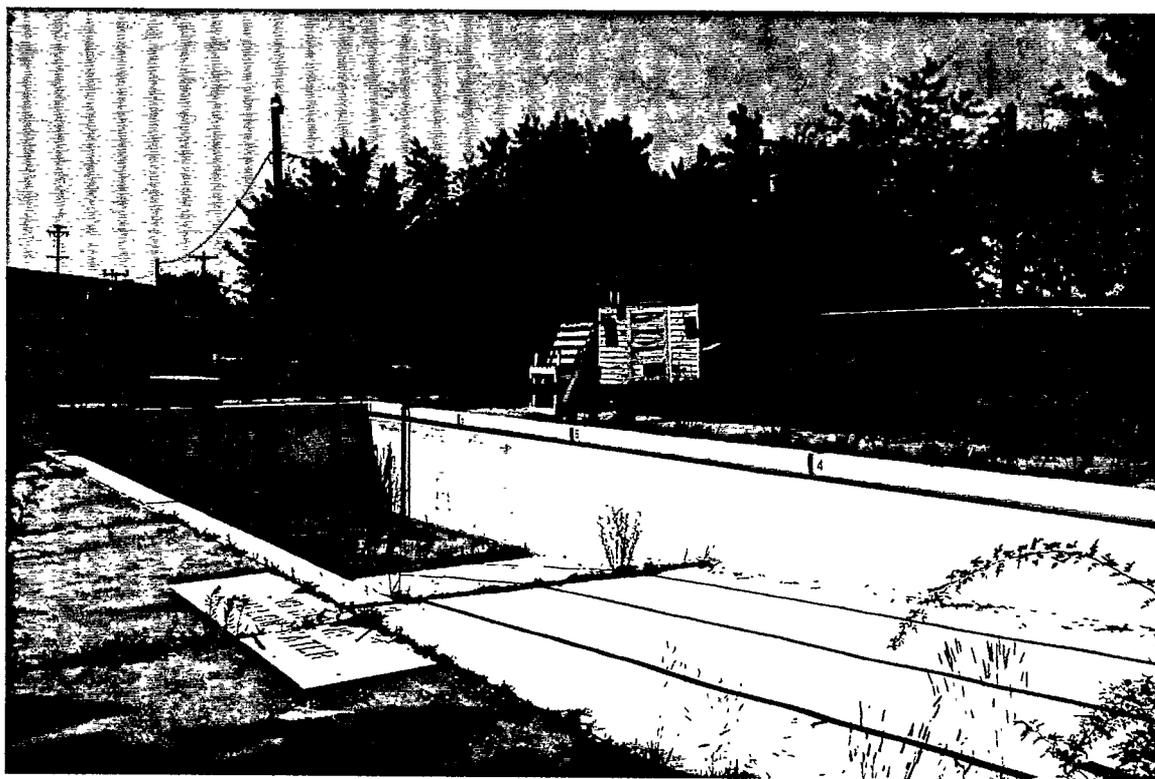


Figure 78: Swimming Pool.



Figure 79: Non-Commissioned Officer's Quarters

Evaluation: These Non-Commissioned Officer's Quarters belong to the **residential buildings** property type defined in the Fort DuPont Historic Context. The buildings are eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

44. Officer's Quarters (Double), # 81 A and B (N-1499.045)

Description: This two-and-one-half story, four bay, frame structure was constructed at Fort Mott, New Jersey and moved to Fort DuPont in 1933; the date of construction is unknown. The building has a rectangular-shaped main block with a projecting gable on the facade and wings projecting off the rear elevation to form a U-shaped plan (Figure 80). The foundation is primarily concrete, with some brick in the rear enclosed porches. Aluminum siding covers the building and the gable roof is sheathed in composition shingles. An overhanging box cornice with partial returns is located at the eaves; an eyebrow dormer/vent is located on the rear elevation of the main block. A brick chimney is centrally located in the main block and two other brick stacks are located in the gable ends of the rear wings. The two-over-two double hung sash windows with plain board trim are symmetrically spaced. A single light over three-part raised panel door is located in each half of the main block; door trim is identical to windows. A frame porch on brick piers spans the facade. Unfluted columns with cast iron bases and turned capitals support a fully developed cornice; the hipped roof is sheathed in standing seam metal. A hipped roof enclosed porch is located at the gable end of each wing.

The building is currently used for offices and meetings; the interior was not available for inspection.

Evaluation: The Officer's Quarters belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

45. War Department Theater, # 29 (N-1499.046)

Description: This two-story, three bay brick structure was constructed in 1933 according to standard plan number 608-220-251 from the Office of the Quartermaster General. The building has a poured concrete foundation, Flemish-bond facade with four brick engaged pilasters and gable roof sheathed in



Figure 80: Officer's Quarters (Double).

parapets at the end (Figure 81). The cornice is formed by heavy moldings and has a partial return. A chimney is located on the rear elevation of the main two-story block; a one-story shed roof wing extends from the rear elevation.

The fenestration of the facade consists of four symmetrically arranged doors centered around the ticket window. The outer pair of doors are nine-light over two-part recessed panel with trim consisting of a fanlight with faux keystone and engaged pilasters. The inner set of doors are ten light double doors set in a molded wood frame. There are symmetrically arranged six-over-six double hung sash windows with jack arches and cast concrete sills on the second floor facade and side elevations. Two emergency exit doors are located on each side elevation. The facade marquee is constructed of wood and has a pressed tin ceiling; a row of exposed lights illuminates the perimeter; the overhang is anchored to the building by two heavy metal chains.

The interior of the building is divided into a two-story service area located near the facade entrance and the auditorium, which forms the remainder of the building. The first floor of the service area includes a central hall flanked by equal-sized rooms, possibly an office and a snack bar. Stairs in the southeast room lead to the second floor, where there are four rooms. An unfinished storage area is located at the top of the stairs, beneath the eaves; an "office" and storage/equipment room are illuminated by the facade windows. The projection room is located northeast of the office and contains two Simplex projectors. This room is constructed to be fire-proof with a metal door and metal baseboard trim.

The first floor central hall leads to an intersecting hall with rest-room facilities and "arcade" with passage ways and curtained openings to the theater. The theater has a proscenium arch and the seating area slopes toward the stage and screen. There is a central aisle and two flanking aisles along the exterior walls; a bisecting aisle is located midway in the seating configuration. The stage area and one-story shed wing were not available for inspection.

The building is currently vacant.

Evaluation: The War Department Theater belongs to the **service buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.



Figure 81: War Department Theater.

46. Gasoline Filling Station, #79 (N-1499.047)

Description: This one-story open frame structure on a concrete foundation was built in 1934; the standard plan number is not known. The site consists of a shelter with exposed framing that supports a gable roof and an adjacent shed-roof frame building (Figure 82). The single bay building has a centrally located four-light-over-three-part-panel door. Each of the side elevations contains a window that has been boarded over and has a metal grate. There are two gas pumps with underground tanks.

The structure is no longer used.

Evaluation: The Gasoline Filling Station belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

47. Garage (N-1499.048)

Description: This one-story, two-bay frame structure with one-story wing was built in 1936 according to standard plan number T-137 (Figure 83). The building rests on concrete posts, is sheathed with ship-lap wood siding and has a shed roof covered in asphalt paper. There are no windows. Two sets of double doors on the facade are constructed of vertical beaded boards and are hinged at the side. The interior of the structure was not accessible.

Evaluation: The garage belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. The building is in an advanced state of deterioration. Nomination to the National Register is not recommended.

48. Truck Scale, # 62 (N-1499.049)

Description: This site was developed in 1937 as a truck weigh station in the coal storage area. The rectangular scale is built of concrete with metal trim and is elevated approximately three feet above grade (Figure 84).

Evaluation: The scale belongs to the **service buildings** property type defined in the Fort DuPont Historic Context. Since the scale house and mechanism for reading the scale are not present, the site is ineligible for the National Register. The scale is a contributing element to the historic landscape of the fort.



Figure 82: Gasoline Filling Station.



Figure 83: Garage.



Figure 84: Truck Scale.

49. Garage (N-1499.050)

Description: This one-story, two bay frame building was constructed in 1939 according to standard plan number T-77 (Figure 85). The ship-lap siding walls are supported by concrete piers and the floor is exposed dirt. The gable roof is sheathed with asphalt paper and has exposed rafter ends. A shed-roof frame addition has been built on the southwest elevation. The building is currently being used as a stable.

Evaluation: The garage belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. The extreme modification of the building renders it ineligible for the National Register as an individual building. However, it is a contributing building to the historic landscape.

50. Storm Water Pump House, #57 (N-1499.051)

Description: This one story, single bay square brick building was constructed in 1939 according to standard plan number 6172-130 (Figure 86). The building has a poured concrete foundation and walls of five-course common bond brick; there are some glazed headers located in the bond. The hipped roof is sheathed in slate and has a box cornice. There is a metal two-part panel door with a jack arch on the northeast elevation. Six-light fixed sash over six-light casement windows with jack arches are located on the southeast and southwest elevations. The interior of the building was not available for inspection.

The building appears to retain its use as a pump house.

Evaluation: The Storm Water Pump House belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

51. Barracks, #49 (N-1499.052)

Description: This two-story over raised basement, twenty-bay brick rectangular structure with projecting side-elevation wings was constructed in 1939; the standard plan number is not known (Figure 87). The building has a poured and molded concrete foundation, six-course common-bond brick walls with a water table, and a gable roof with asphalt shingles. A box cornice with partial returns and plain frieze are located at the eaves. Brick chimneys are located on the rear elevation in the main block and in the gable ends of the wings. The fenestration pattern has



Figure 85: Garage.

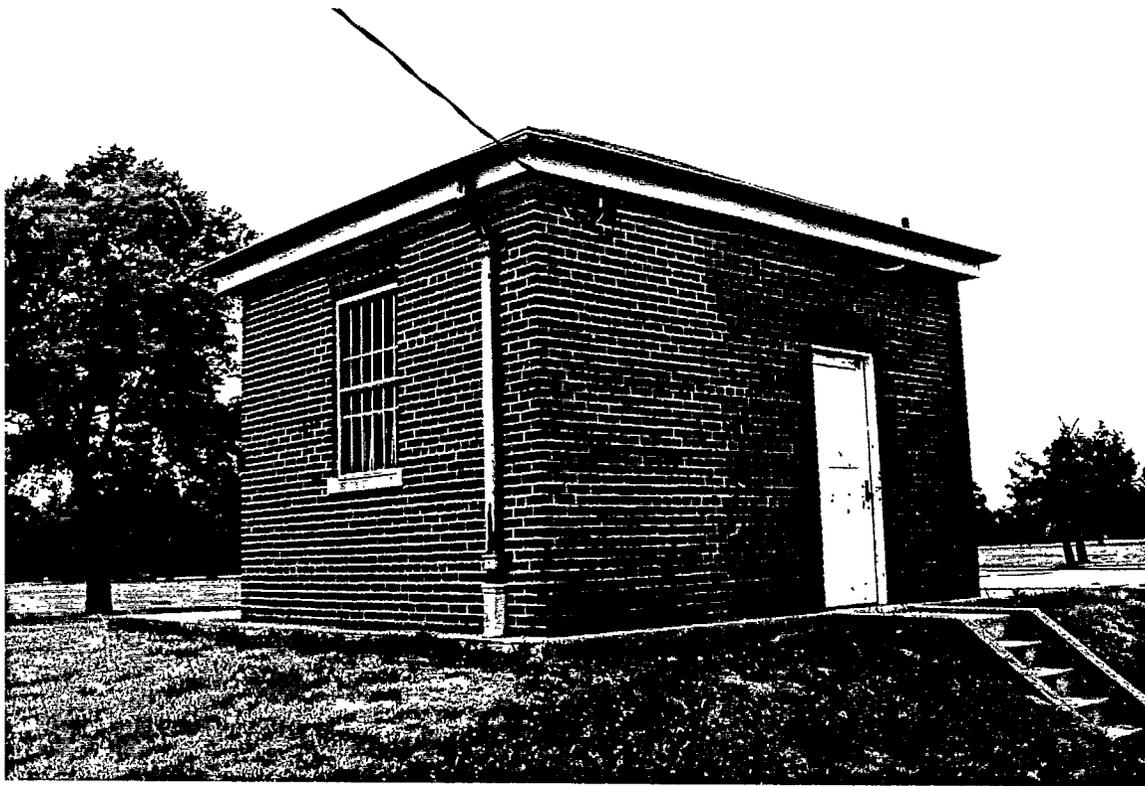


Figure 86: Storm Water Pump House.



Figure 87: Barracks.

been altered by in-filled windows and added doors, but is basically composed of a central double door with decorative patterned transom flanked by six-over-six double hung sash windows. Original windows have jack arches and cast concrete sills.

A two-story inset porch is located on the facade, formed by the forward projecting wings. Brick columns with cast concrete bases and capitols support the second floor. A decorative metal railing is located between the columns. Portions of the porch have been in-filled with modern materials to create interior rooms. An addition to the facade at the basement level forms the building's main entrance.

The rear elevation has eight gable roof dormers located symmetrically across the main block and wings. Four later additions can also be found. A two-story, small brick addition has been made to each of the gable ends of the wings. Each interior side of the wing has a shed roof addition.

The building is currently used as a medical facility and the interior was not available for inspection.

Evaluation: The Barracks Building belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

52. Barracks, #24 (New) (N-1499.053)

Description: This two-story, approximately fifteen-bay brick building was constructed in 1940; the standard plan number is not available. The rectangular structure with side elevation projecting wings is set on a concrete foundation with a raised basement (Figure 88). The walls are laid in six-course common bond and the gable roof has slate shingles; there are three gable roof dormers with fluted pilaster trim on the rear elevation of the main block. A box cornice with partial returns and a frieze adorns the eaves. Lunettes are located in the gable ends of the projecting wings and a copper gutter system is in place. The fenestration is a centrally located double door flanked by six-over-six double hung sash windows with jack arches and cast concrete sills; one window has been modified to create two small windows. The doors are six light over two-part panel with a decoratively patterned transom light and cast concrete architrave. Windows in the raised basement are eighteen-light metal casement.

An two-story inset porch is located on the facade, formed by the forward



Figure 88: Barracks.

projecting wings. The concrete slab second floor is supported by brick columns with cast concrete bases and capitols. There is one shed-roof frame addition to the rear elevation extending from the southwest projecting wing; the construction date of this addition is not known.

The interior appears to have maintained its original form of a series of small rooms in the main block with large bunk room in the wings. Some rooms have been modified for sanitary facilities and others were not available for inspection. The building is currently being used for storage.

Evaluation: The Barracks Building belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

53. Recreation Building, # E-308 (N-1499.054)

Description: This two story rectangular frame building was constructed in 1941 according to standard plan number 700-310. The structure rests on a concrete pier foundation, has ship-lap wood siding, and a gable roof sheathed in asphalt paper (Figure 89). The overhanging eaves shelter roof framing that projects from the building. The structure is heated by a system with a detached chimney, located on the northwest elevation of the building. Fenestration is symmetrical on all elevations; six-over-six double hung sash windows with plain board trim have shed roof projections on the southeast elevation. The doors are three-light over three part recessed panel with plain board trim. Although the interior of the building was not accessible, a stage was visible at the northeast end of the building.

The building is currently used for storage.

Evaluation: The Barracks Building belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

54. Chapel, # E-215 (N-1499.055)

Description: This one-story, three bay frame building was built in 1941 according to standard plan number 700-1800. The rectangular structure with one-story shed roof addition has a poured concrete foundation, ship-lap wood siding wall,

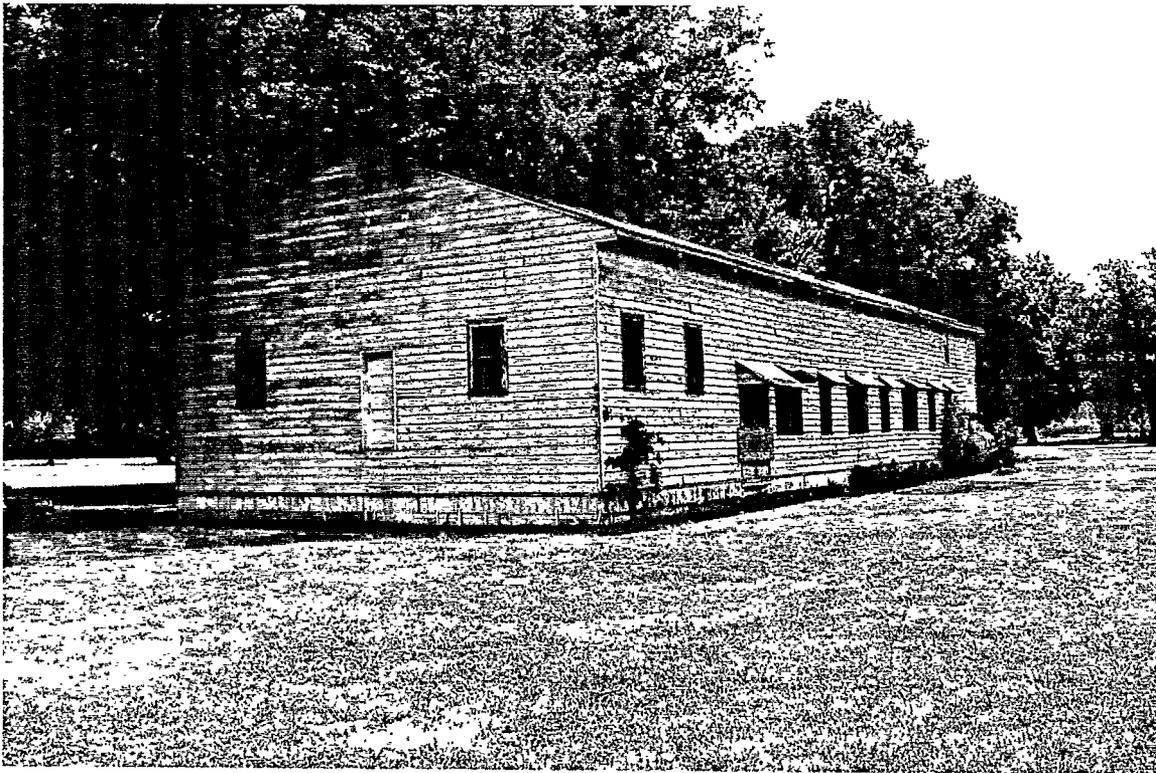


Figure 89: Recreation Building.

and a gable roof sheathed with asphalt shingles (Figure 90). The cornice is formed by overhanging eaves. A brick chimney is located on the rear elevation of the main block and a bell tower with steeple is centered on the gable at the facade.

Fenestration is symmetrical with sixteen-over-sixteen double hung sash windows with plain board trim. The central double doors are three-part panel.

The current use of the building is unknown and the interior was not available for inspection.

Evaluation: The Chapel belongs to the **service buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

55. Warehouse, # E-212 (N-1499.056)

Description: This one-story, three-bay, frame structure was built in 1941 according to the standard plan number 700-325, CQM 53, provided by the Office of the Quartermaster General. The building has a poured concrete foundation, walls constructed of standing-seam metal over ship-lap wood siding, and a gable roof sheathed in corrugated metal over asphalt (Figure 91). The cornice is formed by overhanging eaves. There are no windows or chimneys. Three sliding track garage doors are located on the facade and are accessed by loading docks constructed of poured concrete and concrete block. Each of the doors has a small pent roof above it.

The building is currently used for storage and maintenance; the interior was not accessible.

Evaluation: The Warehouse belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

56. Motor Repair Shop, # 129 (N-1499.057)

Description: This one story, twelve bay frame structure was built in 1941. The building is attached to the brick Motor Repair Shop, # 55, CRS # N-1499.029. The ship lap siding walls rest on a concrete foundation and support a gable roof covered in asphalt sheets (Figure 92). The cornice is formed by overhanging eaves. The fenestration is asymmetrical, with six-over-six double hung sash on the southeast

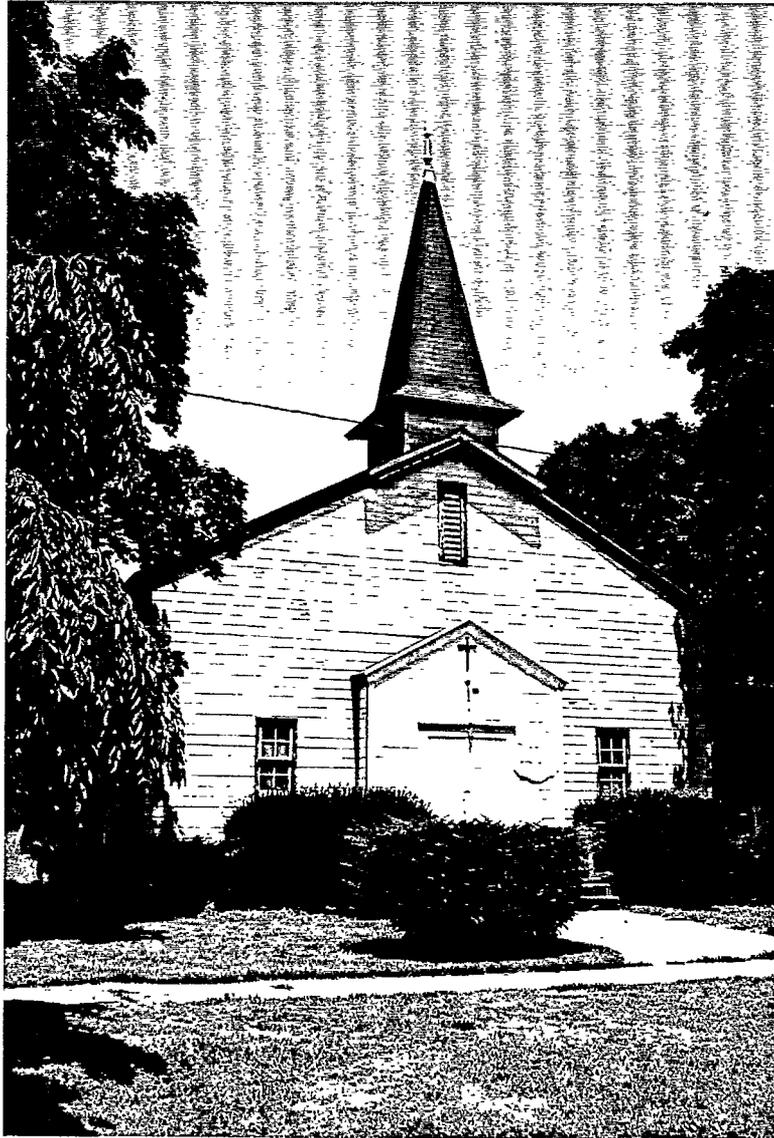


Figure 90: Chapel.



Figure 91: Warehouse.



Figure 92: Motor Repair Shop.

elevation and six-light fixed sash in the gable end, where there are also two cargo doors and two six-over-six double-hung sash windows. Window trim is plain board with drip hood. The doors are side hinge garage doors, some of which have windows in them. The passage door in the southeast elevation is modern with a single light over a wood panel.

The building is currently used for maintenance; the interior was not accessible.

Evaluation: The Motor Repair Shop belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

57. Carpenters' Stores (N-1499.058)

Description: This one-story frame building was constructed circa 1913; no standard plan number is available. The concrete pier foundation supports frame walls sheathed in corrugated metal (Figure 93). The gable roof with exposed rafter ends is covered with asphalt shingles. Fenestration is asymmetrical with six-light fixed or sliding sash windows trimmed with plain board. A central, sliding, metal cargo door is located on the facade. Mortises in the sill located on the facade suggest that a loading dock was located beneath the cargo door.

The current use of the building is unknown and the interior was not available for inspection.

Evaluation: The Carpenters' Stores belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

58. Hospital Mess Hall (N-1499.059)

Description: This one story, rectangular frame building was constructed in 1941 according to standard plan number 700-1251. The ship lap wood siding walls rest on a foundation that is concealed, but recorded to be concrete posts; the gable roof is sheathed in asphalt shingles and sheets and has exposed rafter ends at the cornice (Figure 94). The fenestration is symmetrical with six-over-six double hung sash windows with plain board trim. A loading dock constructed of wood and concrete is

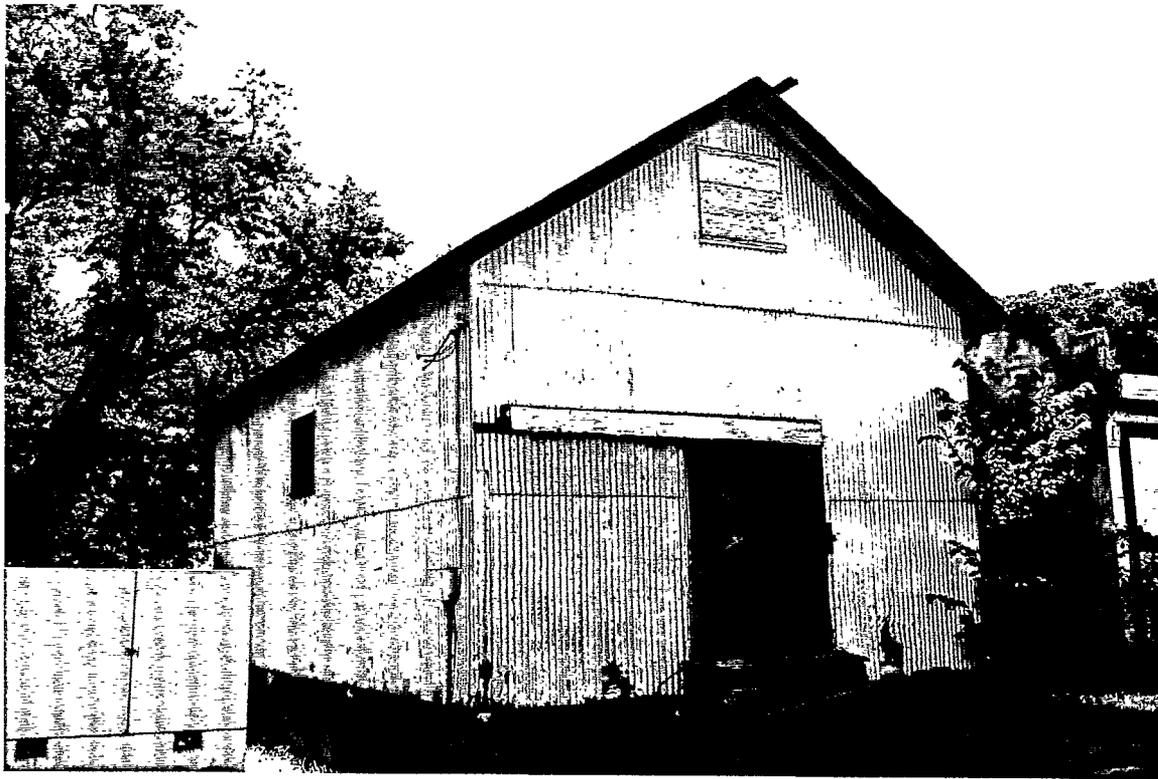


Figure 93: Carpenters' Stores.



Figure 94: Hospital Mess Hall.

located on the southeast elevation; it has a sliding door on a metal track. The building is connected with CRS # N-1499.078 via a gable-roofed walkway with a concrete foundation. The interior of the building is primarily an open plan, with some room dividers located in the east end of the building. There is extensive built-in shelving and bins for sorting mail.

The building is currently vacant.

Evaluation: The Hospital Mess Hall belongs to the **service buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

59. Tent Pads (3) (N-1499.60)

Description: These fourteen feet, six inch square concrete pads located ten feet apart were constructed prior to 1941. The pad was the base on which a canvas tent was pitched. These three pads are the only surviving examples from a site that once included approximately one-hundred-and-thirty pads (Figure 95).

Evaluation: The tent pads belong to the residential buildings property type defined in the **residential buildings** property type defined in the Fort DuPont Historic Context. The three tent pads are eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

60. Office (N-1499.061)

Description: This one-story, two-bay frame building was constructed prior to 1941; no standard plan number is available. The main block has two frame shed-roof additions on the rear elevation (Figure 96). The wood siding walls are set on concrete pilings that are located at the corners of the main block; dirt is in-filled between the pilings. The gable roof is sheathed in asphalt paper. The windows are four-over-four double-hung sash with plain board and drip hood trim; they are located on the facade and southeast elevation. The door is five part panel and has a pent-roof overhang.

The current use of the building is unknown and the interior was not accessible.

Evaluation: The Office belongs to the **support buildings** property type



Figure 95: Tent Pads.



Figure 96: Office.

defined in the Fort DuPont Historic Context. Further research on the building should examine the possibility that the original use was that of scale house for the nearby truck scale (N-1499.049) The building is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

61. Pole Shed, # E-341 (N-1499.062)

Description: This one-story, three-bay frame structure was constructed prior to 1941 according to standard plan number 800-900. The ship-lap wood siding walls rest on a concrete foundation and support a gable roof sheathed with asphalt paper (Figure 97). The cornice is formed by a plain, flush verge board. There are two beaded vertical board cargo doors on a sliding metal track on the northeast elevation. The passage door is a modern single panel wood door. The interior consists of four cargo bays and the side passage area which is divided into two rooms. A small room located near the southwest elevation may have been a bath room. Evidence of window framing exists on the interior of the southeast elevation.

The building is currently used for storage.

Evaluation: The Pole Shed belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture. Photographic and archival information on the building indicates that it has been moved from another location at the fort. However, a 1943 map shows the building in its current position and this change in location should not affect National Register eligibility.

62. Tennis Courts, # T-112 (N-1499.063)

Description: This site consists of two rectangular courts on a concrete foundation and was built prior to 1941. No standard plan number is available. The courts are surrounded by a chain link fence that is eight feet tall. Back-stops and center fence are also chain link fences and are twelve feet tall (Figure 98).

Evaluation: The Tennis Courts belong to the **service buildings** property type defined in the Fort DuPont Historic Context. They are eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

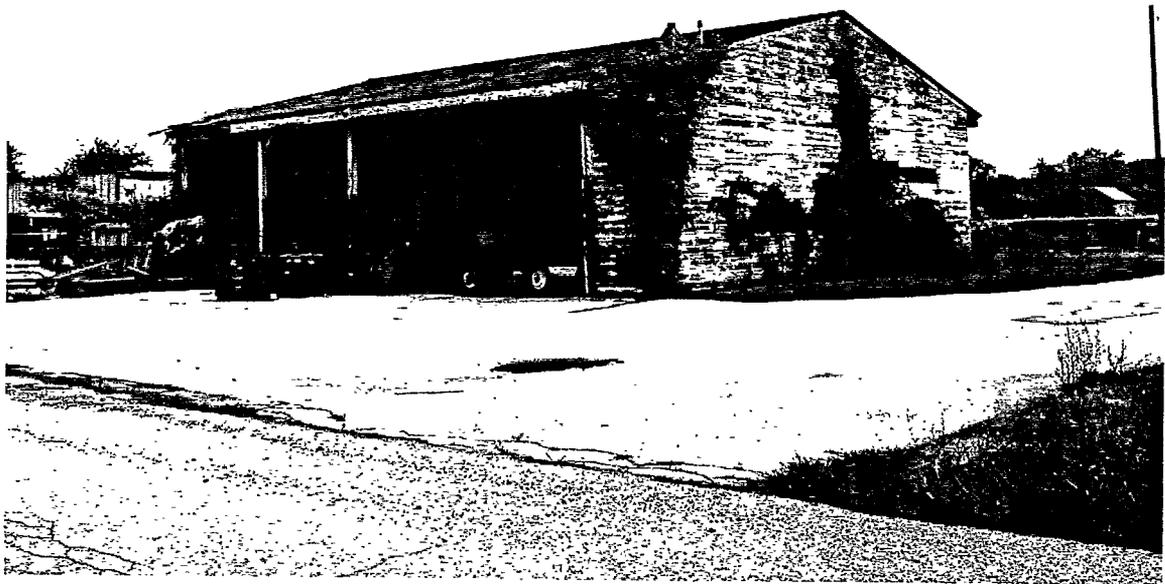


Figure 97: Pole Shed.



Figure 98: Tennis Courts.

63. Coastal Artillery Corps Radio Tower/ POW Guard Tower (N-1499.064)

Description: This square steel and concrete structure was built prior to 1941; no standard plan number is available. The structure consists of four steel beams bolted into four concrete pads. A fifth concrete pad with metal posts is centrally located between the steel beams and appears to be an elevator shaft. A stair and ladder combination with trap door accesses the room at the top of the tower (Figure 99). The steel frame room covered with concrete and has a pyramidal roof. Four metal casement windows are located on each of the side elevations. The interior of the structure was not accessible.

Evaluation: As a Coastal Artillery Corps Tower, this structure belongs to the **support buildings** property type as defined in the Fort DuPont Historic Context. As a POW Tower, the structure belongs to the **administrative buildings** property type. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

64. Coastal Artillery Corps Radio Shelter (N-1499.065)

Description: This one-story, one-bay masonry building was built prior to 1941; there is no standard plan number available. The building is constructed entirely of concrete, which is used for the foundation, walls, and shed roof. A door opening with wooden lintel is located on the northwest elevation and concealed by plywood (Figure 100). A pipe projects from the roof near the center of the building.

The current use of the building is unknown and the interior was not accessible.

Evaluation: The Coastal Artillery Corps Radio Shelter belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

65. Pontoon Repair Shed (N-1499.066)

Description: This one-story, one-bay, brick building was constructed prior to 1941; there is no standard plan number available. The seven course common bond walls are built on a concrete foundation and support a gable roof covered with corrugated metal (Figure 101). A side-hinged garage door is located on the facade; three in-filled windows with cast concrete sills are located on each of the side

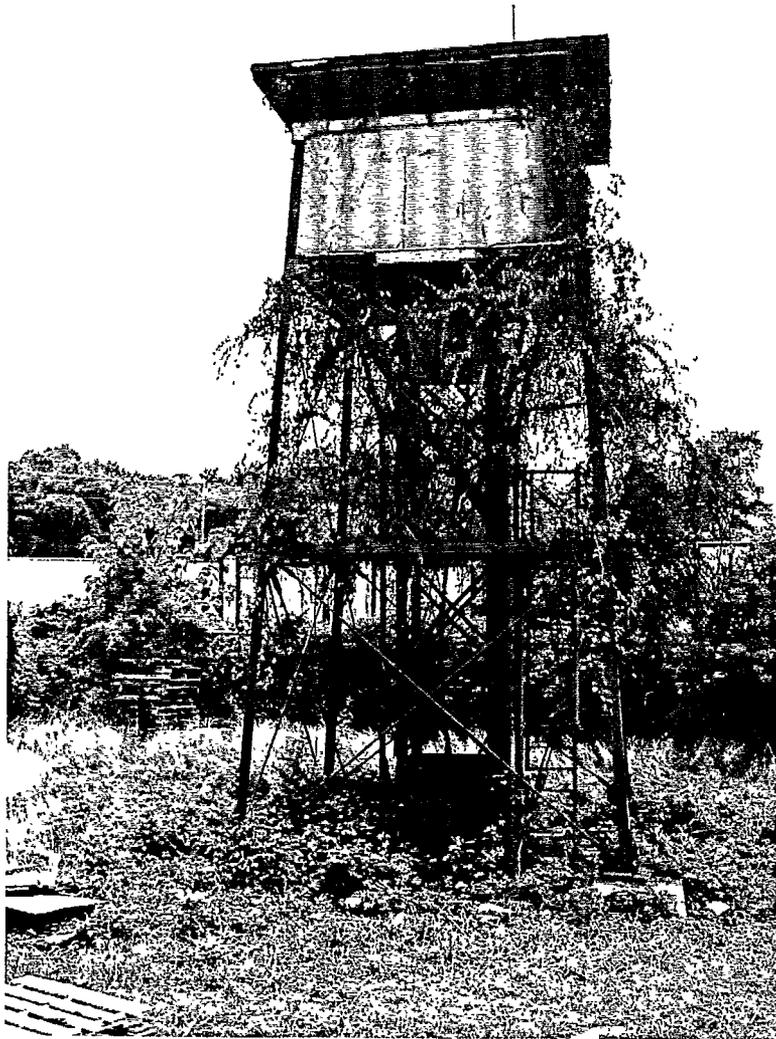


Figure 99: Coastal Artillery Corps Tower.

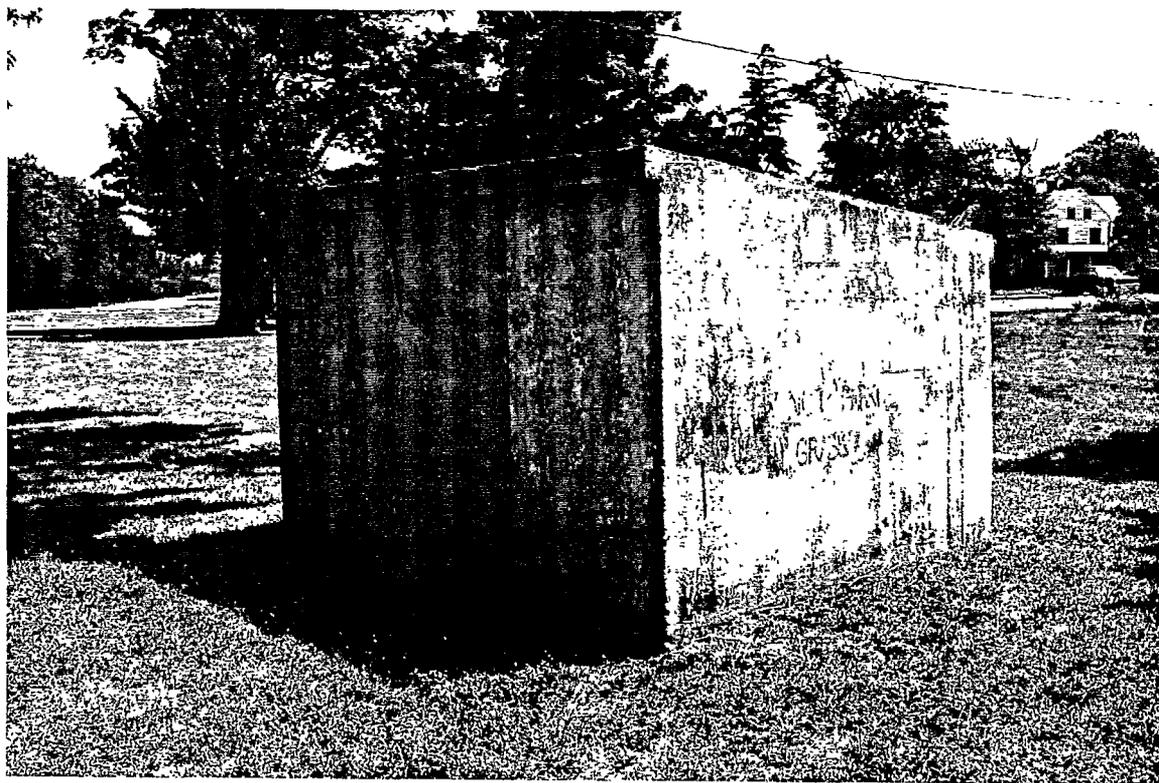


Figure 100: Coastal Artillery Corps Radio Shelter.

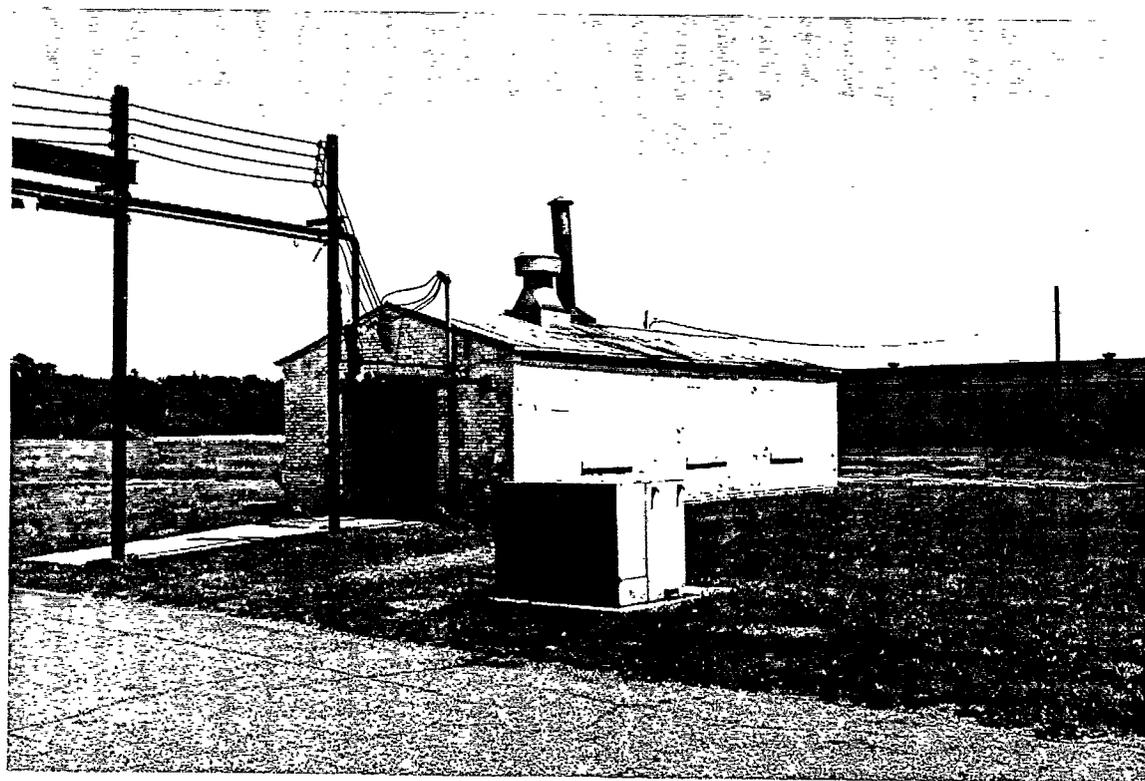


Figure 101: Pontoon Repair Shed.

elevations.

The interior of the building was not accessible. The structure is reportedly being used as a freezer.

Evaluation: The Pontoon Repair Shed belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

66. Pontoon Shed (N-1499.067)

Description: This one-story, two-bay frame building was constructed prior to 1941; there is no standard plan number available. The frame structure with walls sheathed in corrugated metal is built on a concrete foundation and supports a gable roof with flush verge-board that is covered in composition shingles (Figure 102). A cargo door is located in each of the gable ends and a passage door is also located in the southwest gable end. There are no windows.

The building is currently being used for storage and the interior was not accessible.

Evaluation: The Pontoon Shed belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

67. Warehouse (N-1499.068)

Description: This one-story, three-bay frame building was constructed prior to 1941; there is no standard plan number available. The poured concrete foundation has vertical board skirting. The walls are covered in board and batten wood siding and asphalt. The gable roof with exposed rafter ends is sheathed with corrugated metal (Figure 103). The windows on the rear elevation have been boarded over, but have plain board trim with a drip hood. There are three cargo doors and one passage door located on the facade. A concrete block and poured concrete loading dock is located at the southwest end of the facade.

The building is currently being used for storage; the interior was not accessible.

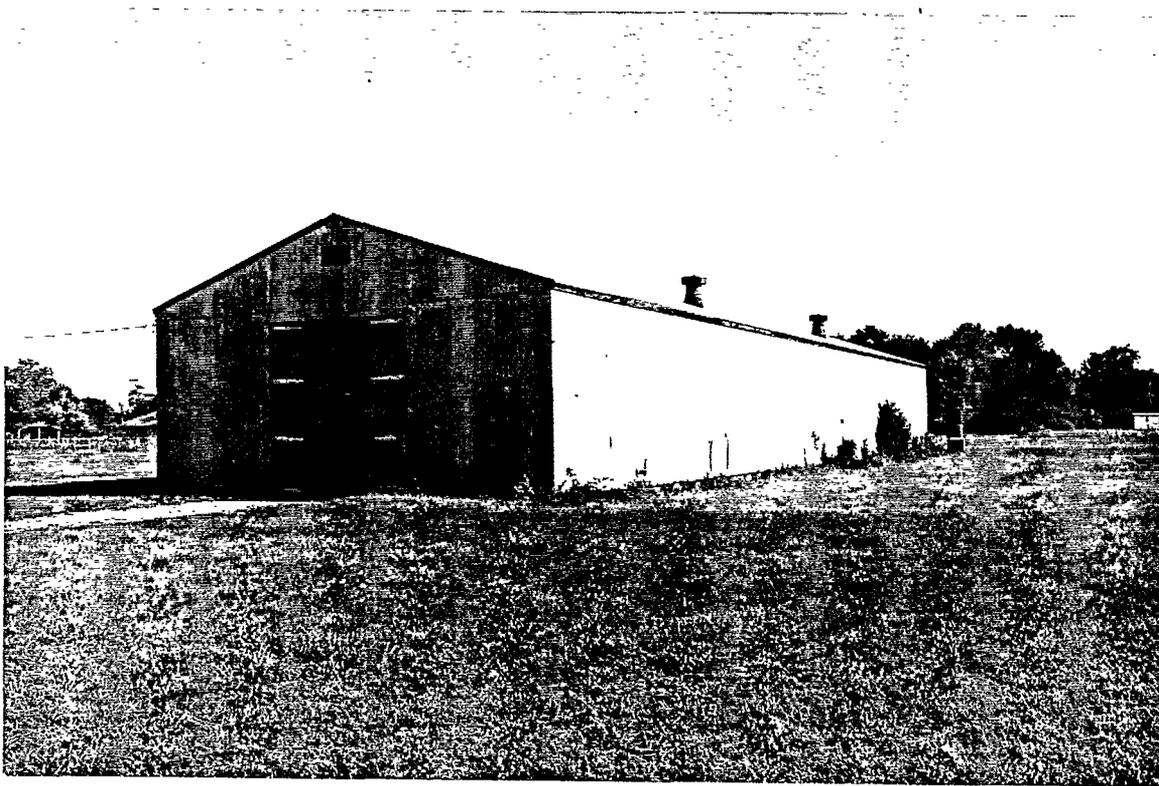


Figure 102: Pontoon Shed.



Figure 111: Garage.

irregular bond. The roof is sheathed in slate (Figure 112). The building appears to be in use; the interior was not accessible.

Evaluation: The Transformer House belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for standard military architecture.

78. Ruins of Hospital Barracks (N-1499.079)

Description: These two buildings were part of the Hospital Area defined on the 1941 map. They appear to be constructed in a manner similar to CRS # N-1499.059 and N-1499.082, which were also part of the Hospital Area. One building is entirely collapsed and the other is partially collapsed.

Evaluation: The Ruins of the Hospital Barracks belong to the **support buildings** property type defined in the Fort DuPont Historic Context. The site is eligible for the National Register under Criterion C for potential archaeology.

79. Storage Building (N-1499.080)

Description: This one-story, frame building was constructed after 1943. The ship-lap wood siding walls rest on a concrete foundation and support a shed roof with exposed rafter ends (Figures 113 and 114). Fenestration is asymmetrical, with two windows located on the southwest elevation and three passage doors located on the northeast elevation. A large door is located in the northwest end and evidence for a matching door that has been in-filled can be seen in the southeast end. A small shed-roof frame addition has been constructed on the northeast elevation.

The original purpose of the building is unknown and further research should attempt to determine this. The building is currently being used for storage; the interior was inaccessible.

Evaluation: The Storage Building belongs to the **support buildings** property type defined in the Fort DuPont Historic Context.. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

80. Fourteen Stall Garage (N-1499.081)

Description: This one-story, six-bay building was constructed in 1941; the

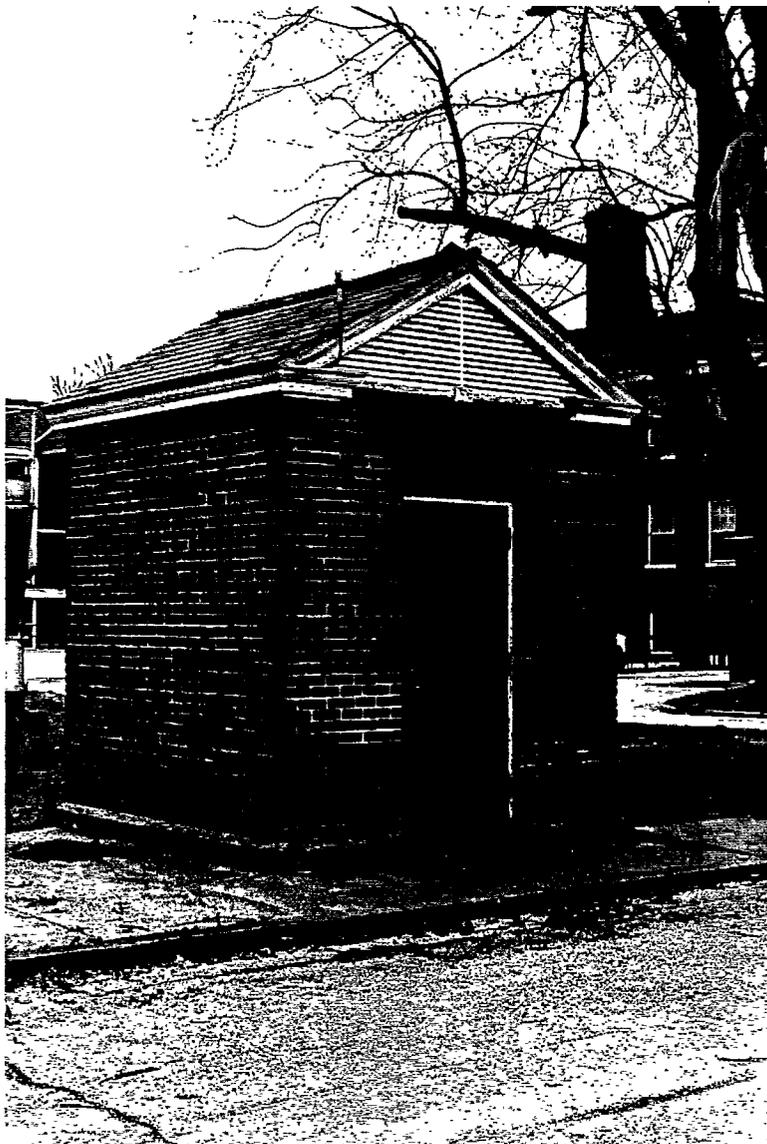


Figure 112: Transformer House.



Figure 113: Storage Building.



Figure 114: Storage Building.

standard plan number is not available. The structure has a concrete foundation, stepped gable masonry ends constructed of brick and concrete, and side walls of plain and ship-lap wood siding. The roof is sheathed in asphalt paper. There are five cargo doors, one passage door, and no windows (Figure 115).

The current use of the building is unknown; the interior was not available for inspection.

Evaluation: The Fourteen Stall Garage belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

81. Hospital Barracks (N-1499.082)

Description: This one-story, rectangular frame building was constructed in 1941; no standard plan number is available. The shiplap wood siding walls rest on a poured concrete foundation; the low gable roof is sheathed in asphalt shingles and sheets and has exposed rafter ends at the cornice (Figure 116). The fenestration is symmetrical with six-over-six double hung sash windows with plain board trim. A loading dock constructed of wood and concrete is located on the northwest elevation; it has a vertical board sliding door on a metal track. The building is connected with CRS # N-1499.059 via a gable-roofed walkway with a concrete foundation.

The building is currently vacant and the interior was not accessible.

Evaluation: The Barrack belongs to the **residential buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

Ineligible Resources

The following buildings are not eligible for the National Register because they do not meet the fifty-year age requirement.

82. Bath House

This one-story, two bay rectangular, concrete block structure was constructed circa 1950. It rests on a poured concrete foundation and has a gable roof sheathed in asphalt shingles; the cornice is formed by overhanging eaves. There are modern,



Figure 115: Fourteen Stall Garage.



Figure 116: Hospital Barracks.

wood panel passage doors with plain trim located in the gable ends. Instead of windows, there are nine symmetrically spaced openings located beneath the eaves that have plain trim and evidence of screens. The interior of the building was not accessible.

83. Sewage Treatment Plant

This one story, three bay, load bearing masonry building was constructed circa 1960. It is built on a concrete foundation and has walls of all-stretcher bond brick. The roof is flat and roofing material not visible. The building was not accessible for close inspection and the interior was not available.

84. Water Tank

This one story reinforced concrete structure was built circa 1960. It has exposed, unpainted concrete walls and a flat roof. It is unknown if the structure is being used.

85. Well House, #2

This one-story , one-bay shed roof frame building was built circa 1970 on the site of a previous well house that is visible on a 1943 map. The building has a poured concrete foundation, plywood walls, a flush verge board and a shed roof. There are no windows and the central door is modern wood construction. The interior of the building was not accessible.

86. National Guard Armory

This two-story, nine bay load bearing masonry building was constructed circa 1970. It has a poured concrete foundation, walls laid in all-stretcher bond brick and a flat roof; the roofing material is not known. fenestration is asymmetrical, with one-over-one casement windows and four metal doors with large sidelights. A one-story wing is located on the front elevation. The interior of the structure was not available for inspection.

87. Gate House

This one-story, one-bay, rectangular load bearing masonry building was constructed circa 1970. It rests on a concrete foundation and has brick walls laid in

all-stretcher bond. The flat roof has copper flashing at the stepped cornice; the roofing material is not visible. The fenestration is symmetrical with two louvered glass in metal frame doors on the facade and a plate glass window with louvered section on each of the side elevations. The interior of the building was not accessible.

88. Main Pod

This one story multi-bay rectangular load bearing masonry building was constructed circa 1970. The structure rests on a concrete foundation and has brick walls laid in all-stretcher bond brick. The roof is flat and the roofing material not visible. Fenestration is asymmetrical with single pane windows located at some of the corners; the windows are trimmed with a pilaster-like configuration of brick. The double doors are modern metal construction with a small rectangular light. The exterior was not available for close inspection and the interior was not accessible.

89. - 98. Residential Pods

These one-story, multi-bay load bearing masonry buildings were constructed circa 1970. The structures rest on a concrete foundation and have walls laid in all-stretcher bond brick. The flat roof has concrete pavers at the juncture of wall and roof; the roofing material is not known. The fenestration is asymmetrical; there are single light windows and modern metal doors trimmed with a pilaster-like configuration of brick. The exterior was not available for close inspection and the interior was not accessible.

99. Warehouse, Division of Purchasing

This one-story, five bay metal building was constructed circa 1980. The foundation is a raised concrete pad and the walls are sheathed in vertical metal siding. The flat roof is sheathed in an unknown material. There are four cargo doors and one passage door located on the southeast elevation. The cargo doors are modern garage-type and the double passage doors are modern metal construction.

100. Office Building, Division of Purchasing

This one-story, nine-bay frame building was built circa 1980 by Nanticoke Homes, Inc. The building has a rectangular main block with two projecting gable

roof wings. The concrete block foundation supports walls sheathed in vinyl siding; the gable roof is covered with asphalt shingles and has overhanging eaves. The fenestration of the facade is symmetrical with six-over-six aluminum sash windows with modern louvered shutters and a centrally located six part panel metal door with three part sidelights. A porch with round synthetic material columns is inset on the facade, formed by the projecting wings. There are symmetrically spaced windows on the side elevations; the rear elevation has symmetrically spaced window and door openings.

101. Emergency Management Facility

This one-story, gable-roof building was constructed circa 1980. The construction material for the walls and roof is unknown, but both are sheathed in a polyvinyl or composite material. A door is located in each of the gable ends and each elevation contains a sliding sash window.

Reference Bibliography

Secondary Sources

Arthur, Robert. "Coast Forts of Colonial New Jersey, Pennsylvania, and Delaware." The Coast Artillery Journal, volume 69, number 1 (July 1928), pp. 46-59.

Coggins, Jack. Arms and Equipment of the Civil War. Wilmington, North Carolina: Broadfoot Publishing Company, 1989.

Federal Register, 9/29/83.

Grashof, Bethanie C. A Study of United States Army Military Family Housing Standardized Plans, Volumes 1-6. Atlanta: Center for Architectural Conservation, College of Architecture, Georgia Institute of Technology for the Office of the Chief of Engineers, U.S. Army Corps of Engineers and the National Park Service, Department of the Interior, 1986.

Hunt, O.E., editor. The Photographic History of the Civil War, Volume 3. Secaucus, New Jersey: Blue and Grey Press, 1987 (reprint).

Kostof, Spiro. The City Shaped: Urban Patterns and Meaning Through History. Boston: Little, Brown and Company, 1991.

Kriv, Arlene R., editor. World War II and the U.S. Army Mobilization Program: A History of 700 and 800 Series Cantonment Construction. Legacy Resources Management Program, United States Department of Defense and Historic American Buildings Survey/Historic American Engineering Record, National Park Service, United States Department of the Interior, 1989.

Lewis, Emanuel Raymond. Seacoast Fortification of the United States: An Introductory History. Washington: Smithsonian Institution Press, 1970.

National Register Bulletin 18: How to Evaluate and Nominate Designed Historic Landscapes. Washington, D.C.: National Park Service, U.S. Department of the Interior.

Ramirez, Constance Werner and Katherine Grandine. "Housing the Military" in Housing: Symbol, Structure, Site. Edited by Lisa Taylor. New York: Cooper-Hewitt Museum, 1990.

Roberts, Robert B. Encyclopedia of Historic Forts: The Military, Pioneer and Trading Posts of the United States. New York: MacMillan and Company, 1988.

Robinson, Willard B. American Forts: Architectural Form and Function. Urbana, Illinois: University of Illinois Press for the Amon Carter Museum of Western Art, Fort Worth, 1977.

Sauer, Leslie et al. Earthworks Landscape Management Manual. Washington: U.S. Department of the Interior, National Park Service, Cultural Resources, Park Historic Architecture Division, 1989.

Snyder, Frank E., and Brian H. Guss. The District: A History of the Philadelphia District of the U.S. Army Corps of Engineers. Washington, D.C.: U.S. Government Printing Office, 1974.

Thomas, Dean S. Cannons: An Introduction to Civil War Artillery. Gettysburg, Pennsylvania: Thomas Publications, 1985.

Primary Sources

Delaware State Archives, Dover, Delaware

Record Group 0775: *Fort DuPont Building Construction and Maintenance Manual*.

Collection 1, Record Group 1325: Delaware in WWII Photograph Collection, 1938-1961.

Collection 5, Record Group 1325: Department of State/Public Archive Commission Photograph Collection.

Collection 10, Harold T. Purnell Photograph Collection ca. 1860-1963, Record Group 9027: Private Collection Photographs.

Post Card Collection, Record Group 1325: Department of State (Delaware City.)

National Archives Cartographic and Architectural Branch, College Park, Maryland.
Record Group 92: Records of the Construction Division of the War Department and Predecessors.

Record Group 77: Records of the Office of Chief of Engineers.

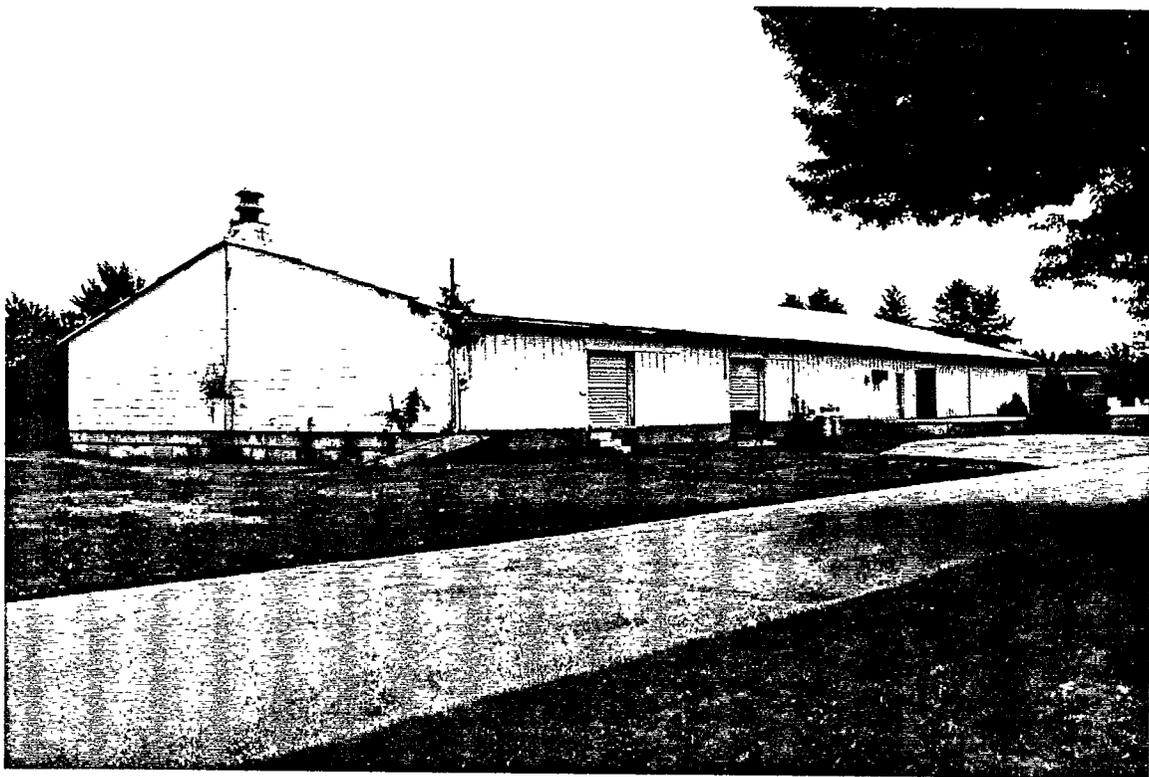


Figure 103: Warehouse.

Evaluation: The Warehouse belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

68. Incinerator (N-1499.069)

Description: This brick structure was built prior to 1941; there is no standard plan available. The site consists of a one-story rectangular building containing five ovens and an adjacent chimney stack (Figure 104). Much of the building is below grade. A sliding door with ten lights over a three-part recessed panel on the southeast elevation. The building has a flat concrete "roof" with hoist mechanism centered on top; it appears that another structure may have been located on top of this roof. The roof is accessed from the interior by a concrete stair in the east corner. The large chimney is located on the northeast elevation.

The structure is currently vacant.

Evaluation: The Incinerator belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

69. Cistern (N-1499.070)

Description: This round, brick and concrete structure was built prior to 1941; no standard plan number is available. The structure is below grade and has a flat concrete lid covering it. A rectangular brick base with wooden cap with is located adjacent to the circle on the west side (Figure 105).

Evaluation: The cistern belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

70. Coastal Artillery Corps Radio Tower Foundation (N-1499.071)

Description: The square configuration of concrete pads was built prior to 1941. None of the metal structure is still standing.

Evaluation: The Coastal Artillery Corps Radio Tower belongs to the **support**

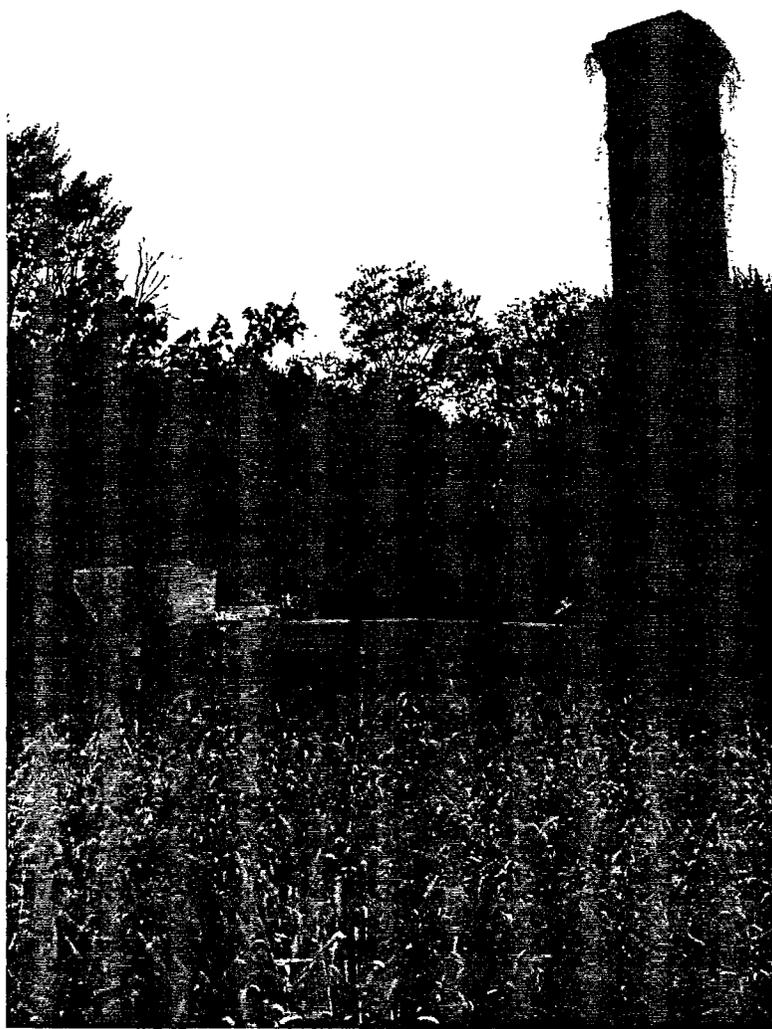


Figure 104: Incinerator.



Figure 105: Cistern.

buildings property type defined in the Fort DuPont Historic Context. The site of the Radio Tower Foundation is not eligible for the National Register. It is a contributing element to the historic landscape of Fort DuPont.

71. Quartermaster's Office (N-1499.072)

Description: This one-story, three-bay frame building was constructed prior to 1941. The foundation is a mixture of concrete piers and brick that has been heavily parged with concrete. The walls are sheathed with wood siding; some is ship-lap (Figure 106). The gable roof with exposed rafter ends is covered with composition shingles. A brick chimney is located at the former exterior end of the main block. Two frame additions have been constructed: one is located directly adjacent to the northeast gable end of the main block and the second is constructed on the southeast elevation. Window openings are symmetrical with six-over-six double-hung sash. Trim is plain board for all windows; those windows that are not protected by the eaves also have a drip hood. The central facade door is a single pane of glass over a two-part recessed panel. A five-part recessed panel door is located on the rear elevation.

The building is currently being used for educational purposes; the interior was not accessible.

Evaluation: The Quartermaster's Office belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

72. Pumping Station (N-1499.073)

Description: This one-story, two-bay frame structure was built in 1942; there is no standard plan number available. The building has a poured concrete foundation, wood siding, and a gable roof sheathed with asphalt shingles (Figure 107). Overhanging eaves form the cornice. The fenestration is symmetrical with three-over-one "awning" sash windows have plain board trim with a drip hood and a two-part panel door with plain board trim.

The building appears to serve its original use as a pumping station. The interior was not available for inspection.

Evaluation: The Pumping Station belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the



Figure 106: Quartermaster's Office.

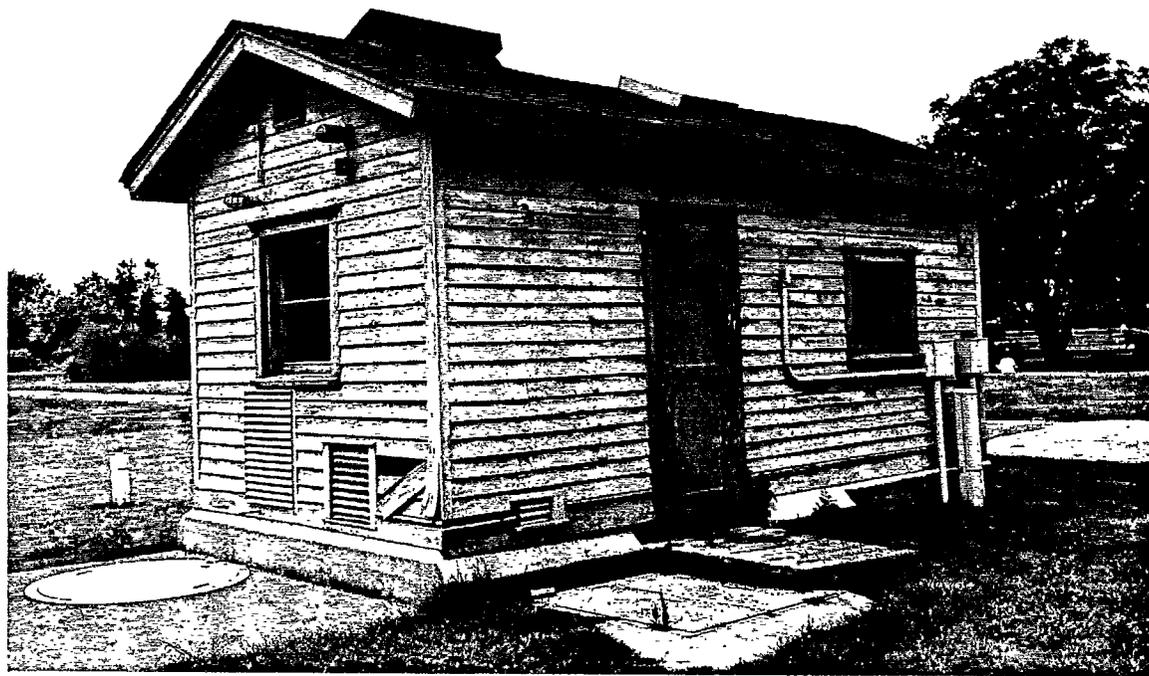


Figure 107: Pumping Station.

National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

73. Engineering Building (N-1499.074)

Description: This one story, one bay frame building was constructed in 1942; the standard plan for the building is not available. The structure has a poured concrete foundation, ship lap wood siding, and a gable roof sheathed in asphalt paper sheets (Figure 108). The cornice is formed by overhanging eaves. No chimney is present in the building, but a stove pipe projects from the roof. The six-over-six double hung sash windows have plain board trim; the door opening is located in the gable end and is concealed. The door opening has plain board trim with a drip hood; a gable roof overhang is located above the door.

The building appears to be used for storage; the interior was not available for inspection.

Evaluation: The Engineering Building belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

74. Post Engineering Supply (N-1499.075)

Description: This one-story, four-bay frame building was constructed circa 1942. The concrete foundation supports frame walls sheathed with corrugated metal. The shed roof is also covered with corrugated metal and has wide overhanging eaves. There are four cargo bays located on the facade with modern garage doors (Figure 109). Window openings are located directly above the cargo bays, but the sash is not visible. Window openings on the rear elevation have been covered by siding, but some six-over-six double-hung sash with plain board trim is visible from the interior. The interior is an open plan with exposed framing.

The building is currently being used for maintenance.

Evaluation: The Post Engineering Supply belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

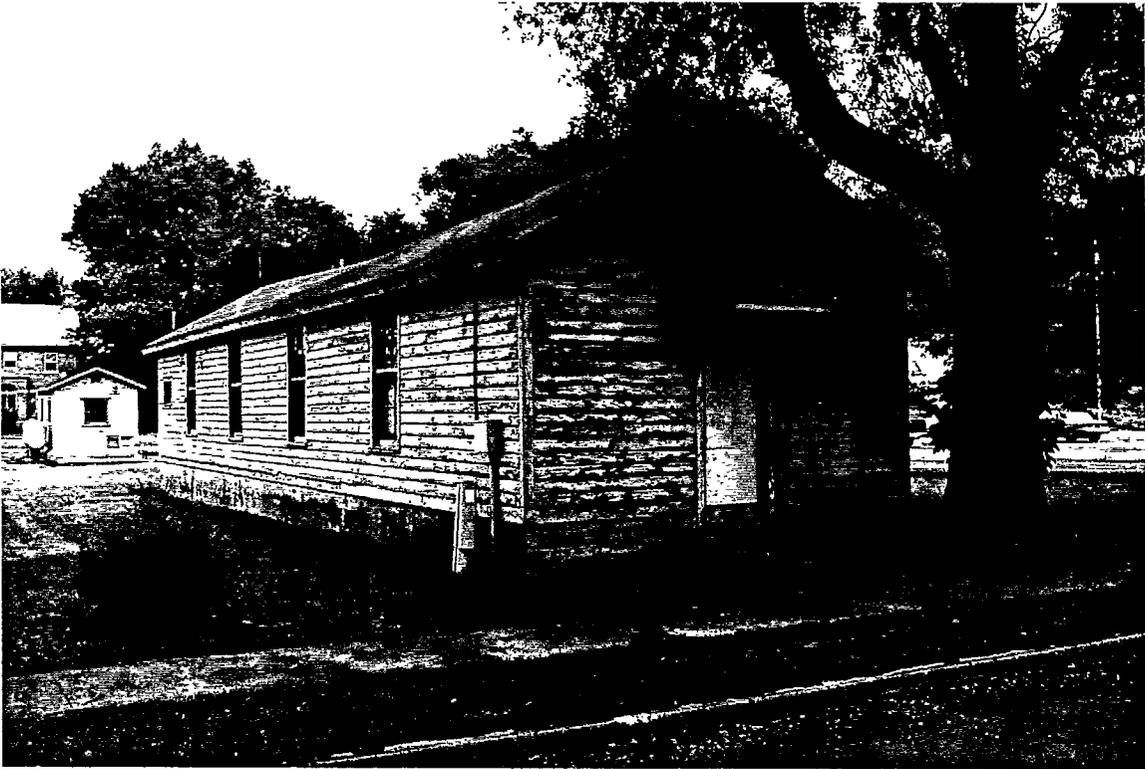


Figure 108: Engineering Building.

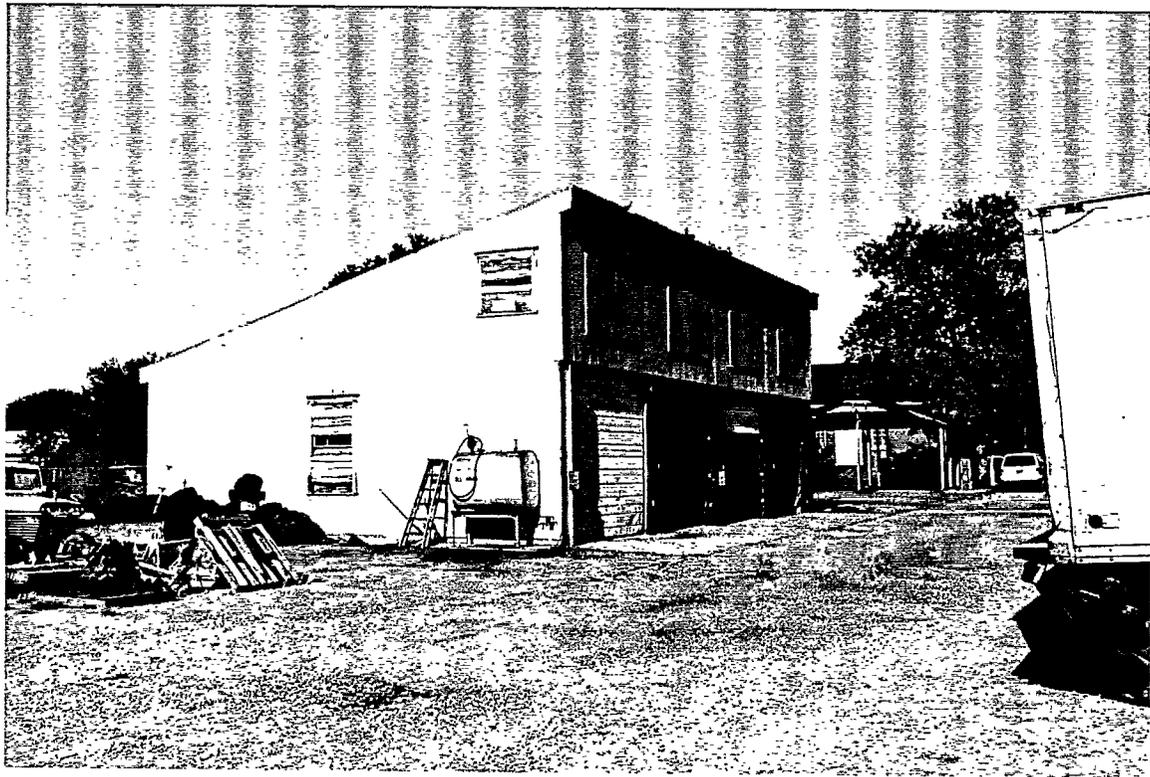


Figure 109: Post Engineering Supply.

75. Well House #1 (N-1499.076)

Description: This one-story, one-bay frame building with concrete foundation was built circa 1942; no standard plan number is available (Figure 110). The walls are sheathed in ship-lap wood siding and composition board. The shed roof is covered with asphalt sheets and has exposed rafter ends. There are no windows. A centrally located five-part recessed panel door on the southwest elevation has plain board trim.

The building appears to serve its original purpose as a well house; the interior was not accessible.

Evaluation: Well House #1 belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

76. Garage (N-1499.077)

Description: This one-story, five-bay frame building was built circa-1941. The frame walls are sheathed in corrugated metal and rest on a poured concrete foundation. The gable roof with exposed rafter ends is covered with corrugated metal (Figure 111). The fenestration on the facade was originally symmetrical on the facade, where there were five cargo doors. One of those doors has been modified to form a passage door and two windows. There are two raised windows and a door located on the northeast elevation that have been boarded up. A cargo door and in-filled window are located on the southeast (rear) elevation. A brick chimney is located near the southeast corner of the building.

The current use of the building is unknown; the interior was not available for inspection.

Evaluation: The Garage belongs to the **support buildings** property type defined in the Fort DuPont Historic Context. It is eligible for the National Register under Criterion A for national coastal defense and under Criterion C for military architecture.

77. Transformer House (N-1499.078)

Description: This one-story, one-bay brick building was built in 1939 according to plan number CQM-19. The foundation supports brick walls laid in an



Figure 110: Well House #1. This resource is the building shown in the foreground of the photograph.