NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

274

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration For* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for 'not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instruction. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name: Camp Evans Historic District

other names/site number: Camp Evans Signal Laboratory Marconi Belmar Station Signal Corps Radar Laboratory

2. Location

street and number: 2201 Marconi Road N/A not for publication

city or town: Wall Township N/A vicinity

state: New Jersey county: Monmouth County 025 zip code: 07719

3. State/Federal/Tribal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this [X] nomination [ ] request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property [ ] meets [ ] does not meet the National Register criteria. I recommend that this property be considered significant [X] nationally [ ] statewide [ ] locally. ([ ] See continuation sheet for additional comments.)

Signature of certifying official/Title — Date 3/20/02

Assistant Commissioner for Natural and Historic Resources/ DSHPO

State or Federal agency and bureau — American Indian Tribe

In my opinion, the property [X] meets [ ] does not meet the National Register criteria. ([ ] See continuation sheet for additional comments.)

Signature of certifying official/Title — Date 11 Feb 02

State or Federal agency and bureau — American Indian Tribe

4. National Park Service Certification

I hereby certify that the property is:

[✓] entered in the National Register.
[ ] See continuation sheet.
[ ] determined eligible for the National Register.
[ ] See continuation sheet.
[ ] determined not eligible for the National Register.
[ ] removed from the National Register.
[ ] other. (explain:) _____

Signature of the Keeper — Date of Action

Patrick Andrus — 3/26/2002

5. Classification

Ownership of Property
(Check as many boxes as apply)

- [ ] private
- [ ] public-local
- [ ] public-State
- [X] public-Federal

Category of Property
(Check only one box)

- [ ] building(s)
- [X] district
- [ ] site
- [ ] structure
- [ ] object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
32		buildings
1		sites
18		structures
		objects
51	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions)

Defense
Domestic
Education
Industry/Processing/Extraction
Social

Current Functions
(Enter categories from instructions)

Vacant/Not In Use

Historic Subfunctions
(Enter subcategories from instructions)

College
Communications Facility
Meeting Hall
Military Facility
Multiple Dwelling

Current Subfunctions
(Enter subcategories from instructions)

7. Description

Architectural Classification
(Enter categories from instructions)

N/A

Materials
(Enter categories from instructions)

Foundation	Concrete
Walls	Terra Cotta
Roof	Terra Cotta

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [X] **B** Property is associated with the lives of persons significant in our past.
- [X] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is

- [ ] **A** owned by religious institution or used for religious purposes..
- [ ] **B** removed from its original location.
- [ ] **C** a birthplace or grave.
- [ ] **D** a cemetery.
- [ ] **E** a reconstructed building, object, or structure.
- [ ] **F** a commemorative property.
- [ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

Architecture
Communications
Engineering
Invention
Military
Other
Social History

Period of Significance

1912-1975

Significant Dates

1914
1946

Significant Person

(Complete if criterion B is marked above)

Marconi, Guglielmo

Cultural Affiliation

Architect/Builder

JG White Engineering Corporation
John T. Rowland (1871-1945)
Richard Buckminster Fuller
William A. Goef

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS:)

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested.
- [ ] previously listed in the National Register
- [ ] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey
- [ ] recorded by Historic American Engineering Record
- [ ] See continuation sheet for additional HABS/HAER documentation.

Primary location of additional data:

- [ ] State Historic Preservation Office
- [X] Federal Agency (Repository Name: Command Historican Collection, Fort Monmouth)
- [ ]
- [ ]

10. Geographical Data

Acreage of Property: 55.00

UTM References

(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	18	580180	4448880
2	18	580500	4448480
3	18	580420	4448400
4	18	580100	4448520

- [x] See continuation sheet

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

Camp Evans Historic District
Monmouth County, New Jersey

UTM References (Continued)

#	Zone	Easting	Northing
5	18	579980	4448180
6	18	579740	4448400
7	18	580980	4448920

11. Form Prepared By

name/title: Fred Carl, Director; Robert Judge, Assistant Director, Mark Swanson, Historian

organization: Information Age Learning Center date: 8/1/1999

street & number: 2201 Marconi Road telephone: (732) 681-6018

city or town: Wall Township state: New Jersey zip code: 07719-

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property

Additional items

(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name: U. S. Army, Fort Monmouth

street & number: Attn: AMSEL-DCS telephone: (732) 532-3906

city or town: Fort Monmouth state: New Jersey zip code: 07703-5000

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United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 1 Page 1

Historic Name

Camp Evans Historic District

Content

Other Names:
Camp Evans Signal Laboratory, Signal Corps Engineering Laboratory, Evans Area, RCA Belmar Station, The King's College, and Imperial Hotel

Narrative Description

Camp Evans is a remarkably intact former U.S. Army secret research facility that was built around an earlier complex of buildings, known as the Belmar Station, operated by the Marconi Wireless Telegraph Company of America. Camp Evans, also known as the Signal Corps Radar Laboratory, the Camp Evans Signal Laboratory, Signal Corps Engineering Laboratory, and Evans Area, was established in 1941. A search of available documentation has established that the history of Camp Evans is strongly tied to the foundations of modern communications. The buildings and grounds that are at the heart of the Camp Evans three periods of significance are outlined as planning areas B and C in Map 2. The Camp Evans Historic district would include planning areas B and C. Historic photo 1 shows an aerial view of most of the buildings and grounds in planning area C, as photographed in the 1970s. The three periods significant to the development of communications and national defense: A) the Marconi era (1912-1925) with 6 contributing buildings; B) the achievements of the Signal Corps Radar Laboratory during World War II, adding 19 buildings and 1 structure; C) Army research projects from the close of World War II through 1975, adding 9 buildings and 2 structures. The establishment of this National Historic District would maintain the 1914 Marconi wireless station and later radar research facility character and integrity for the benefit, education and enjoyment of future generations.

Marconi Period of Significance Historic Buildings

The original facility was constructed by the Marconi Wireless Telegraph Company of America as the New York to London link in the 'World Encircling Wireless Girdle' (Sammis, Oct. 1912 Pg. 255, map 4). Built on a high bluff on the south bank of the Shark River basin, the complex of buildings with grass lawns and 85-year-old sycamore trees creates a park-like setting. The complex was a self-sufficient early twentieth century industrial village. The U.S. Army numbered the buildings in 1945. In the 1970s the numbering scheme was modified and is used here for easy cross reference to U.S. Army maps and surveys (Map 5). Five buildings, 9001, 9002, 9003, 9004 and 9006, are positively identified with the Marconi period. These buildings are considered significant for their architecture, their historical association with the Marconi company, their significant role in WWI communication by the U.S. Navy, and the significant persons associated with the station during this period. As constructed, the station complex included a wireless operation building (9004), steam electric power plant (9006), 300 – 400-ft. tall wireless masts (now gone), a hotel (9001) and two cottages for managers (buildings 9002 & 9003). The 1914 Henderson photo presents an excellent April 12, 1914 overview of the site (historic photo 2). Nearest to the Shark River and just a few feet above sea level is the operation building (9004) at the north end of the district. The other buildings are all south of the operation building up a steep hill to approximate 70-Ft. elevation. The two residences (9002 and 9003) are near the edge of the hilltop. Both are between River Road, later renamed Marconi Road, and the steep hill to the river. Directly across sycamore tree lined Marconi Road (photo 1) from residence 9002 is the Marconi Hotel (9001). The power plant (9006) is west of the hotel near the junction of Marconi Road and Monmouth Boulevard. Behind the hotel were vegetable gardens, now replaced by later Army construction. Between the hotel and the power plant was the first of six 300-ft. masts. The line of masts ran south for 2200 ft and can be seen in the historic Henderson photo. The masts were made of steel sections bolted together. Large concrete anchors and steel wires supported each mast. The last mast was removed in 1924. The upper portion of one of the Marconi balancing towers remains as part of a historic marker .

The Marconi buildings are good examples of early twentieth century industrial architecture that features unembellished substantial brick masonry construction. They are not cast in any formal style but incorporate Craftsman and Spanish Colonial elements, such as dormers, eave brackets, and Spanish Imperial roof tile, which are appropriate to their date of construction. Concrete is used as the sole architectural accent on windowsills, piers, and porch supports. The J. G. White Engineering Corporation of New York constructed this station for the American Marconi Company.

As a group, each Marconi building is fireproof with dark red brick exterior, with simple concrete accents and a lighter red tile roof. The tiles bear the imprint "LUDOWICI-CELADON CO. CHICAGO IMPERIAL TILE". The inside of each building is also fireproof. The wood floors are nailed to wood strips laid on poured wire reinforced concrete floors with clay NATCO tile spacers to reduce weight. Ceilings are concrete with clay tile spacers and the interior walls are made of plaster covered NATCO tiles. Wood was only used in the flooring, doors, window frames, molding, and to nail the imperial roof tiles. Bolted angle iron trusses support each tile roof. Except for Building 9004, the Marconi buildings have been well maintained by the Army during the past 60 years and are in excellent condition. For example, nearly all the original copper leaders and gutters are intact and many of the original 85-year-old sycamore trees planted in 1914 still grace the site.

Buildings 9001, is a U-shaped, 2 ½ story brick building constructed as a 45-bedroom hotel for unmarried employees. This substantial building is utilitarian in style. A 1913 photo shows the hotel under construction (historic photo 6). The August 1914 issue of the American Marconi publication *Wireless Age* featured a photo story of the station (historic photos 16 – 26) and in October 1914, the Marconi Corporate publication *Wireless World* featured the station (historic photos 11 – 15). Building 9001's three gable roofs are finished with Imperial tile; a one story piazza, supported by brick piers and covered with tile, wraps around the building's front and side elevations (photo 17). An undated color postcard shows the front and east side of the hotel (photo 8). Photo 2 shows the front of the hotel behind the overgrown ornamental bushes and photo 3 the rear. Comparing the present exterior to historic photos and original drawings (plans 1 – 3), the exterior has few changes. The east set of Dining Room front double doors have been replaced by a window, a fire escape has been added to the center rear and the rear of the kitchen area connects with a enclosed ramp to a 1942 constructed building.

The first floor interior features a center foyer hall with a large fireplace and stairs to the second floor (historic photo 18b). To the each side of the foyer a large door leads to hallways (Plan 4). The right hall led to bedrooms, now offices. The left hall led to the hotel office, two bedrooms, the lounge hall doors, dining room, and kitchen passage. Also, in the foyer were double doors leading to the lounge. The lounge features a large fireplace and was used as a billiards room (photo 18a). The dining room sat up to fifty persons, tables near windows had a view of the ocean (photo 19a). Behind the kitchen were double doors, which led to a pantry which, led to the kitchen (photo 19b). In the kitchen was a walk-in freezer. Behind the kitchen there was a laundry room and stairs, up to the servants bedrooms and down to the basement. The foyer, dining room, kitchen and billiards rooms were sub-divided into offices to meet wartime space needs. Upstairs (plan 5) at the top of the center foyer stairs is a hallway and across the hall, the former library. To either sides are halls which, led to bedrooms which are now offices. Also in the upstairs center hall are stairs to the attic. Originally, the upstairs servants' area hallway was separate from the main upstairs hallway and rooms. The Army connected them. Due to the poured concrete floors all bathrooms floors were elevated eight inches to allow the pipes to be concealed. The individual guest room plumbing and closets were removed by the Army, as well as the kitchen equipment and walk-in freezers. Plans 8 – 9 show the floor plan alterations made by the Army in 1941. Plan 10 shows the current floor plan. Radar development workspaces are still intact in the attic. In the east end of the attic are four 10-ft. by 10-ft. radio work booths with two layers of metal screens. In the full basement, the WWII blackout electric panel remains, as well as the cold war era Fall-Out shelters.

Two brick bungalows are located across Marconi Road from the hotel (photo 4). **Buildings 9002** (photo 5) **and 9003** (photo 6), were constructed for the station's Manager and Chief engineer and were later used for Army officers' housing. The bungalows are rectangular, masonry buildings with hipped roofs finished with imperial tile and dormers facing front and back. Each residence has a kitchen, dining room (historic photo 23a), living room (photo 23b), pantry, four bedrooms, a single bathroom, a porch, and a full basement. A stairway leads to the two upstairs bedrooms. The porch of 9002 has been sub-divided by a masonry wall into a front screen porch and a side glass block enclosed sunroom. The pantry wall of 9003 has been removed creating a larger kitchen. Associated with each bungalow is a wood-frame garage. Comparison with historic photos 22a and 22b show the exteriors show little alteration.

Building 9004 was the Operation Building for the Belmar Station near the edge of the Shark River (photo 7). This rectangular 83 by 30 ft., brick utilitarian building with a hip roof has a nearly full front porch supported by brick piers facing the north. Historic photos indicate that the current composition shingle roof replaced the imperial tile. This building is in need of repair, but the substantial masonry structure is intact. The front porch brick railings have been removed, and the eves are damaged. Most of the interior walls were removed (plan 11), leaving a large room where once there were offices and operator rooms (historic photo 24a). The October 1914 *Wireless World* article describes the building, how a ring of buried zinc plates electrically grounded it, and how the basement was waterproof. Time has defeated the engineers, the partial basement below water level has been flooded for many years. On the west side of the original structure, a one room concrete block addition was added to house a heat unit. This addition has collapsed and the boiler is exposed to the elements (photo 7). Just east of 9004 is 9005 (plan11). A 1949 photo shows the rear of 9004 and front of 9005 (photo 32). This single story wooden frame structure built on a concrete slab is very deteriorated with holes in the roof. **Building 9005** was on the property in 1941 acquisition maps, but it does not appear in the 1914 Henderson photo. The building may have been built later by Marconi, the Navy, or RCA.

Building 9006 is across Marconi Road, west of the hotel, near the intersection of Monmouth Boulevard and Marconi Road. It is a rectangular, brick building with a new asphalt shingle gable roof (photo 8). This was the Marconi steam-electric power and electric lighting plant. An undated color postcard shows the building with the first 300ft Marconi masts in front of it (historic photo 9). The interior was filled with boilers and equipment to supply electricity for the entire operation and steam heat to the hotel and cottages. The original boilers and generators were removed prior to 1938. The original 1913 plans show three sets of double doors have been replaced with modern doors (plan 12) and one opening has been made into a double window. It has a one car garage brick addition on the north side and an addition on the west side to house a heating unit (photo 9). The King's College Class of 1938 used the building as a biology laboratory. The Army, last used it as a electronics laboratory. The interior has been modified by the Army as a computer laboratory and is in excellent condition (plan 13). Behind 9006 is a small well pump house (9081), it replaced an original Marconi well house seen in a Marconi published photo (historic photo 21a).

Structure built by The Kings College

Building 9007 was constructed as a gymnasium for the students of The King's College in 1938. Some of the students assisted in finishing it in October 1938 as part of a work-study program. It was brick, with a bowed roof and parapet, large windows and was one and one-half stories high (historic photo 29). The gym was in very poor condition, it was razed in October 1999 (historic photo 30). The razing was necessary to remove contaminated soil under the building. The Army used it as a metal plating shop, allowing solvents to leak into the ground.

World War II Period of Significance Historic Structures

The second group of structures significant to communications history at Camp Evans were built by the U.S. Army to serve its mission during World War II as a radar production center, and its later transition to a research and development facility. Most of the buildings were built in 1942. The key permanent buildings associated with this period are Buildings 9010, 9011, 9036, and 9037. Nearly all the other structures built in 1942, were temporary wood frame construction designed to last five years. An aerial photograph from the 1970s shows most of the World War II constructed buildings behind the Marconi Hotel (historic photo 1). As a group the buildings are in good condition, but in need of paint. They have kept their WWII period look, with only minor exterior modifications. Most building interiors have been greatly modified to meet later mission requirements.

Buildings 9010 and 9011 are industrial, long, rectangular structures with 6 inch concrete slab floors, brick load bearing walls and wood truss every 20 ft. supporting an asphalt shingle gable roof. Approximately 450 ft. by 60 ft., each is one story in height and has four sections separated by firewalls and fire doors. Architect John T. Rowland, a noted New Jersey Architect, designed them in 1941 (plans 14 – 15). Building 9011 has a covered loading dock on the southwest side. A 1997 color photo taken from a tower provides an elevated view of 9010 and 9011(historic photo 33). Photo 10 shows a ground level view of 9010 looking east and photo 11, looking west. Buildings 9010 and 9011 are connected at their centers by an enclosed brick walkway with a gable roof, forming one large, "H"-shaped building, thus the name. **Buildings 9036, and 9037** (photos 12 – 13) were added in late 1942 based on the Roland design, William A. Goef was the architect (plan 16). Buildings 9036 and 9037 are similarly joined, to create the 'H' shape. The enclosed hallway from 9011 connects to the west ends of both 9036 and 9037, as seen in historic photo 1. Each "H-building" is paired with a brick boiler house (Buildings 9012 and 9038) that is situated within the building's court space. Both "H" buildings are in good condition and are fairly well preserved. The only exterior modifications since WWII construction are window security grates on some windows, some upgraded windows, and occasional air-conditioning units on concrete pads. The two 'H' buildings have the same interior design, a center hallway running the length of each building. Except for the firewalls all interior walls are non-load bearing partition walls. On either side of the hallways are offices and laboratories. Building 9010 has had some modifications from the original 1942 interior. The characteristic WWII Army radar laboratory interior is basically intact and in good condition. The interior of 9011 is nearly identical to the original floor plan. It housed a tool area, sign shop, wood shop, metal shop, and vacuum tube fabrication shop. 9011 is also in good condition, except for the east section. The old vacuum tube shop received little maintenance and removal of equipment damaged partition walls. Buildings 9036 and 9037 have undergone considerable interior modifications to meet the needs of the Electronics Warfare Laboratory, which replaced the 1950s electron tube and transistor laboratory. The original wall treatments, windows, and doors have been replaces with 1980s materials. Some areas have raised computer room floors.

Once found all over Camp Evans are the distinctive structures designed by American engineer Richard Buckminster Fuller, the **Dymaxion Deployment Unit** (DDU). The units were produced by the Butler Manufacturing Company, a firm that manufactured grainbins. They are pre-fabricated corrugated circular metal buildings (plan 20), made of a minimum of materials, and able to be assembled by two persons in a few hours. Thirteen still exist today at Camp Evans today, while many empty circular concrete pads testify to the numbers once in use. Three DDUs, adjacent to 9011, have been selected for restoration (photo 14). Three other DDUs have survived in the proposed district and will be preserved. In the district are nine empty concrete pads where DDUs once stood. There are seven DDUs and ten empty pads remaining outside the district.

Within the proposed district stand a number of single story wood frame contributing structures not specifically identified with historic events or persons. They are 9029, 9031, 9032, 9034, and 9059. All can be seen in historic photo 1, except for 9059, which is blocked by trees. As a group they were constructed in 1942-3 as support buildings for the radar laboratory mission. All have tan painted clapboard with brown painted doors and trim. All have black asphalt roofs. They have remained nearly as built, a limited number of new doors have been added, and window security grates added on some. West of 'H' building 9036 / 9037 is **Building 9029,** a square building, which served as the sheet metal shop. Next to it stands **Building 9031**, the post fire station. The fire station has a garage for two trucks and sleeping quarters behind the garage. **Building 9032** was a research library and administration building annex building. It is L-shaped and connected to the Marconi Hotel (9001) by an enclosed brick walkway (plan 17). It runs from the front east side of the hotel and behind it nearly its entire length. It has a center hallway with offices to either side. Except for the west rear section, it has not been updated since original construction. **Building 9034** (photos 15 – 16), a former electric shop, is rectangular in shape, approximately 60-ft. by 110-ft. Its design appears to be a wood version of a 'H' building section (plan 18). **Building 9059,** the telephone exchange, is between 9032 and the Marconi power plant (9006), possibly where the base of the first 300-ft. mast was. It is a simple rectangle (plan 19). Its interior once contained telephone operator switchboards, currently it only contains telephone switching equipment.

Not within the proposed district, an architecturally distinctive building type known as a "Special Antennae Cover," designed by John T. Rowland and exemplified in Buildings 9015, 9017 (photo 17), 9019, 9021, 9023, 9025, 9045, 9047, 9049, 9051, 9053, and 9055, are found at Camp Evans. Two stories in height and barn like in form, these frame buildings, originally supported by flying buttresses instead of interior supports, had two pairs of oversize double doors. After WWII the antenna shelters were extensively altered to accommodate their reuse as laboratories, office, or storage. Building 9023 still retains its flying buttresses, but like 9017, its original double doors have been replaced with a single metal roll-up door. The building type, its design and original elevations are shown in plan 21. Also found at Camp Evans is a WWII restricted airspace warning spotlight tower near Gate 3. This tower could be relocated to within the historic district for preservation.

Structures constructed at Diana Site and main historic district area during Research Period of Significance

The Project Diana site, already on the New Jersey State Register, is east of the Marconi hotel. The original 100-ft. SCR-271D radar antenna (historic photo 34 - 35), the wood frame electronics support structure housing the radar equipment used by Project Diana and the later constructed 50-ft. diameter Diana Dish are no longer extant (historic photo 36). The support facility (**building 9116**) for the Diana Dish and the footings from the Diana disk remain. A 1957 built 60-ft. diameter radar disk, the '**Space Sentry**', and conduit connected support facility (**building 9162**) still exist in the fenced two acre isolated site (photo 18). The existing structures and the Space Sentry are associated with early satellite tracking and ionosphere research giving them significance. Building 9116 (photo 19) is a one-story masonry structure, which appears to be an original center building and two additions. The interior has the look of a 1950s satellite control room. Building 9162 is also a one-story masonry structure that is connected via conduit to the 1957 'Space Sentry' satellite-tracking dish. The light green painted interior also has the appearance of a control room and support office. The 'Space Sentry' satellite-tracking dish is in good structural condition and the mechanical equipment appears to have been 'moth-balled' for possible future reactivation. The original electronics have been removed. In the main historic district one very simple one-story concrete structure, **building 9400**, was built sometime in the early 1950s. The building, east of building 9010 (historic photo 1), was where Senator Joe McCarthy's staff was denied entrance. Three 20-ft. by 80-ft. steel utility buildings, on concrete foundations, were added in the courtyards of the 'H' buildings. Along Monmouth Boulevard is a 20-ft. square steel building (9092). As a group they are all made of corrugated metal with asphalt roofs. Finally, one-story **Building 9093,** a secure entrance and guardhouse, is just west of the Marconi Hotel. It is frame construction with tan siding and brown doors and accents. It has an 18-ft. by 35-ft entrance hallway with a guard office to control entrance at Gate 1 of Camp Evans.

Table 1

Building Inventory, Camp Evans Historic District, Monmouth County, New Jersey

Bldg. No.	Type*	Original Use*	Last Use*	Date Built	Contributing Period*
9001	P	Marconi Hotel, Sta. No.6	Administration - Firefinder	1914	C-1,2,3
9002	P	Marconi manager cottage	Military residence	1914	C-1,2,3
9003	P	Marconi engineer cottage	Military residence	1914	C-1,2,3
9004	P	Marconi wireless operations	vacant	1914	C-1,2,3
9005	P	Wireless support	vacant	1918 ?	C-1,2,3
9006	P	Marconi power plant	Computer facility	1914	C-1,2,3
9007	P	King's College Gymnasium	Metal plating shop	1938	Demolished 9/29/1999
9010	P	Radar Laboratory	Administration gen. purpose	1942	C-2,3
9011	P	Radar Laboratory	Metal, wood, sign, tube shops	1942	C-2,3
9012	P	Heating oil plant	Heating oil plant	1942	C-2,3
9017	S	Radar shelter	Laboratory - Firefinder	1942	(I) -2,3
9029	S	Signal administration	Sheet metal shop	1942	C-2,3
9030	P	Heating oil plant	Heating oil plant	1942	C-2,3
9031	S	Fire station	Fire station	1942	C-2,3
9032	S	Signal administration annex	Administration gen. purpose	1942	C-2,3
9033	P	Heating oil plant	Heating oil plant	1942	C-2,3
9034	S	Electric shop	Laboratory - Firefinder	1942	C-2,3
9035	P	Heating oil plant	Heating oil plant	1942	C-2,3
9036	P	Radar Laboratory	Administration - EWL	1942	C-2,3
9037	P	Radar Laboratory	Administration - EWL	1942	C-2,3
9038	P	Heating oil plant	Heating oil plant	1942	C-2,3
9059	T	Telephone exchange	Telephone exchange	1944	C-2,3
9065	P	Distr. Xfmr vault	Distr. XFMR bldg.	1944	Not counted
9067	P	Distr. Xfmr vault	Distr. XFMR bldg.	1944	Not counted
9068	P	Distr. Xfmr vault	Distr. XFMR bldg.	1944	Not counted
9069	P	Distr. Xfmr vault	Distr. XFMR bldg.	1944	Not counted
9070	P	Distr. Xfmr vault	Distr. XFMR bldg.	1944	Not counted
9071	P	Distr. Xfmr vault	Distr. XFMR bldg.	1944	Not counted
9081	P	Wellhouse		1943	C-2,3
9084	T	General purpose warehouse	Secure metal shop	1946	C-3
9085	T	General purpose warehouse	General purpose warehouse	1946	C-3
9086	S	Laboratory general purpose	Administration gen. purpose	1942	C-2,3
9092	T	Laboratory general purpose	Laboratory general purpose	1958	C-3
9093	S	Guard headquarters	Sentry station	1951	C-3
9097	T	Laboratory general purpose	Foundry	1949	C-3
9098	T	Laboratory general purpose	General storehouse	1950	C-3
9116	P	Diana dish support facility	General storehouse	1950 ?	C-3
9162	P	Space Sentry support facility	General storehouse	1957	C-3
9195	P	Space Sentry (Diana Site)	Silent Sentry Dist (Diana Site)	1957	C-3
9196	T	Platform (Diana Site)	Platform (Diana Site)	1943	C-2,3
9178		Platform/tower	Platform/tower	?	C-3
9400	P	Laboratory general purpose	Administration gen. purpose	1952	C-3
No #	T	Dymaxion deployment units-6	Storage/laboratories	1942	C & I -2,3 (6 DDU)
No #	T	Empty Dymaxion unit pads-9	Former storage/laboratories	1942	C & I -2,3 (9 pads)

* P - Permanent ; S - Semi-permanent ; T - Temporary ; Distr. XFMR - Distributor Transformer; (C) - Contributing building (I) - Individually eligible

Significant Persons

Marconi Era
Armstrong, Edwin (December 18, 1890 – February 1, 1954)
Sarnoff, David (February 27, 1891 – December 12, 1971)
Alexanderson, Ernst F. W. (January 25, 1878 – May 14, 1975)
Weagant, Roy A. (March 29, 1881 – August 23, 1942)
Clark, George C. (1880 – 1950)
Taylor, A. Hoyt (1890 -)

1936 - 1941
Crawford, Reverend Percy (October 20, 1902 - October 31, 1960)

WWII Radar Laboratory
Colton, Col. Rodger B.
Corput , Lt. Col. Rex Jr.
Marchetti, John
Slattery, John
Watson, Paul
Zahl, Harold (August 24,1904 – March 11, 1973)

Project Diana
DeWitt, Lt. Col. John (1906 – January 27, 1999)
Kaufman, Herbert
Mofsenson, Jacob (? – August 19, 1969)
Stodola, E. King (? - April 6, 1992)
Webb, Dr. Harold D.
McAfee, Dr. Walter (September 19, 1914 – February 18, 1995

Research
Kronenberg, Dr. Stanley

Statement of Significance

At the dawn of the Information Age of wireless communication, the Belmar Marconi station was a key link in the first worldwide commercial wireless network. This station would play a part in fundamental innovations, host significant persons, and help prepare our nation for electronic defense. During 85 years, as communications technology went from spark, to alternator, to vacuum tubes, printed circuits, transistors, satellites, fiber optics, integrated circuits, and the internet this historic location saw it all. In national defense, the station would play a part in the beginnings of electronic warfare in WWI and participate in all major innovations leading to the modern integrated electronic battlefield fielded today. Camp Evans has exceptional importance in the development of communications, electronics, radar, and television, including their application.

The historic events that occurred at Camp Evans fall within three periods significant to the development of communications and national defense: A) the Marconi era; B) the achievements of the Signal Corps Radar Laboratory during World War II; C) later Army research projects from the close of World War II through 1975. In terms of level of significance, Camp Evans, the former Marconi Belmar Station has exceptional state and national significance under NRHP criteria A, B, and C for its role in the development of twentieth century communications and in establishing the United States Army's superior electronic capabilities in national defense. The site has a distinct period of social significance, March of 1925 to June of 1932, when a corporation named the Monmouth Pleasure Club owned the site which functioned as the unofficial state headquarters of the Ku Klux Klan.

The increasing data which has been gathered on the Marconi era in Wall Township and the pre-military beginnings of Camp Evans as a Marconi High Power Wireless Station, has shown Camp Evans to have been an early communications commercial enterprise and research center. Associated with the station were significant leaders during the formative period of modern communications, communications technology and WWI wartime communications. The site served as the Naval WWI wireless communication center. The history of modern communications is strongly tied to the history and growth of the State of New Jersey in the twentieth century. One building of the complex, the Marconi hotel, is listed on the New Jersey Register of Historic Places. In terms of level of significance, the Belmar Station period has achieved state and national significance for its role in the development of twentieth-century communications as the use of Marconi's invention expanded beyond its original maritime uses to become a world wide wireless commercial industry. The station was part of the "wireless girdle round the earth ", conceived and constructed by Marconi to expand his wireless commercial maritime system into a world wide commercial communication network to compete with cable based telegraph companies.

After the Marconi period, the site was used as a Nursing Home, a social club with close associations to the Ku Klux Klan and finally, was the first campus of The King's College, a Christian College.

The integration of ongoing research, fact collecting and recording of oral historical information documents the second period of significance. It was during this period that Camp Evans emerged as one of the nation's premier wartime radar production and research and development facilities during World War II. Camp Evans radar officers and technicians worked with British radar experts sharing information to improve Allied radar equipment quality and performance. In many instances Camp Evans radar teams set specifications, directed, contracted and coordinated wartime radar research and production with other US wartime radar laboratories. Camp Evans and its contributions to WWII national defense and radar technology research are of unquestionable exceptional significance at the national and state level under NRHP criteria A, B, and C. The radar developed and produced at Camp Evans had an enormous impact on our country's ability to wage war successfully. The lab also developed component parts that would become integral to modern communication systems. Equipment developed, prototyped, tested, battle hardened, documented, and upgraded at Camp Evans saw use in all WWII theaters of war and protected American military assets world-wide. In some cases equipment went directly into battle from Camp Evans to meet critical needs.

The Project Diana site, already on the New Jersey Register of Historic Places, is where the most famous event to occur at Camp Evans took place and foreshadowed the third period of significance. This site, in the northeast corner of Camp Evans, honors the electronic dawn of the space age by engineers who proved that radio waves could pierce the earth's ionosphere. Project Diana, named for the Roman goddess of the moon, was headed by Lt. Col. John J. DeWitt in 1945-1946. The significance of Project Diana is exceptional at the national and international level under NRHP criteria A and B. The demonstration and proof that the ionosphere could be pierced, and that communication was possible between earth and the universe beyond, opened the possibility of space exploration and had

worldwide social and scientific impact. Later at the Diana Site, upgraded radar equipment would be used to track the first satellite, Sputnik and subsequent U.S. and Soviet spacecraft and satellite launches.

The third and final period of significance under NRHP criteria A and B is the post WWII Cold War era, when the US military realized that future wars would require a commitment to fundamental scientific research and the incorporation into defense systems. During WWII, the value of cutting edge communications equipment and radar was recognized, as giving the US military the decisive edge needed for victory in the battlefield. Camp Evans personnel conducted research on site and were involved in projects world wide to support military communications and Electronic Warfare preparedness. Equipment, components, basic research and engineering projects provided components to communications technology, satellite technology, weather analysis and nucleonics. Equipment designed, prototyped, and tested at Camp Evans played a role in every US conflict, including the Cold War. At the beginning of this period, the Signal Corps researched areas and invested in emerging technology for military needs in which industry had no requirements or need to invest. Some of these developments proved fundamental to modern communications. At the close of the period, however, industry found lucrative applications for these Signal Corps inspired investments and the military could now select and modify commercially produced components. Principle among many advances was the Signal Corps support of electronics miniaturization. When Bell Laboratories disclosed its new breakthrough, the transistor, engineers of Camp Evans were positioned to play an important roll in the emerging technology. A politically inspired threat and cloud during this activity was the campaign, accusations and the attempts to show that some Camp Evans personnel had communist connections. The pivotal event was a face-off with security personnel at Camp Evans when Senator Joe McCarthy visited with a group and demanded entry into top-secret areas without proper security clearance.

Camp Evans developed, tested, improved, and integrated numerous electronic components that were deployed in many defense systems. A number of Army engineering projects were managed, developed and prototyped at Camp Evans. Those we currently have information about are Firefinder, REMBASS and J-Stars.

Historical background and significance:

The Marconi Era, 1912 to 1925

On July 12, 1912, the Marconi Company purchased land within Wall Township to serve as the headquarters for its American wireless subsidiary, named the Marconi Wireless Telegraph Company of America (Klein et al. 1984:2.20; Zahl 1970b, deed, W. J. Robinson to Marconi, Bk. 933 Pg. 289). Marconi's vision was to create a "wireless girdle round the earth... using Nature's ether as a conductor". This would aid maritime safety and compete with the undersea cable telegraph companies selling less costly wireless telegram service (Sammis 1912 Pg. 255). The Titanic disaster proved the value of Marconi's wireless system. Investors and new customers provided capital enabling the construction of these high-power stations on a grand scale, with quality of construction and amenities not enjoyed in the wireless industry at the time. Another result of the Titanic sinking was the passage by Congress of the Radio Act of 1912 that would impact the Marconi stations in the future. The original concept started with nine links for a message to circle the globe (map 4). Belmar station was a part of the New York to London link and the New York to Panama link. The J. G. White Engineering Corporation of New York constructed these stations for the Marconi Company at eight locations in the United States, two of which were in New Jersey. Even though the land was located in Wall Township, the station was called the Belmar Station, as Belmar was the nearest town with a rail station, just across the Shark River Basin, and the Belmar Post Office served the location and does so to this day. Similarly, the New Brunswick station was located in Franklin Township and named for the more widely known town. Each set of stations acted as a pair requiring a separation of at least 20 miles due to technology limitations of the day. Belmar was the receiving station, New Brunswick the transmitting station. Each operations building was located near an inlet or river connected to the ocean for effective electrical grounding. At Belmar, up to 30 wireless operators were on duty to receive messages from Carnavon, Wales, transcribe the messages by hand and forward the messages over landlines to the Marconi office on Broad Street, New

York City, or Philadelphia. Belmar operators also keyed messages for automatic transmission by equipment at New Brunswick to Towyn, Wales. (Bucher 1920 Pg. 293; Wireless World 1914 Pg. 414). As wireless technology improved, transmission distances would increase and more operator tasks were automated. The New Brunswick station operations buildings and masts are no longer standing and the last residential buildings are to be razed for a commercial business.

Camp Evans, the former Belmar station, is located about 20 miles south of Twin Lights, Highlands, NJ, the site of Marconi's 1899 first wireless demonstration in America at the America's Cup Sailboat races. Wireless was a new maritime industry and this was the start of worldwide commercial wireless expansion with Belmar a part of the transatlantic link. Marconi had sent the very first transatlantic message in 1901, and Marconi's first transatlantic radio tower had been set up at Twin Lights in 1907 (Zahl 1970a). In the late 1930's at Twin Lights, Army engineers who later relocated to Belmar station (Camp Evans) would also test their new radio advancement, radar. At Wall, Marconi improved on the Twin Lights arrangement by setting up some 30 radio towers. Six of these towers were over 300 feet tall, constructed in a straight line (Zahl 1970b: Wireless World 1914 Pg. 414). These towers can be seen in the historic Henderson photos (historic photos 2, 10). Of all the towers, only the top portion of a 150ft. balancing tower remains today, having fallen in 1974. It was relocated on Marconi Road between Brighton Ave and Laural Gully Brook as a historic landmark, by Wall Township. Near the intersection of Monmouth Boulevard. and Watson Road a large concrete anchor from the second 300ft tower remains. The only known, remaining 300ft tower base with two of the original four anchors is located approximately 100ft west of the intersection of Monmouth Bl. and Harrison St., about 10ft from the Harrison street edge. The ring of bolts to secure the iron mast sections still protrudes from the concrete base. The anchors are opposite one another in resident's yards each approximately 75ft. from the base.

Still extant are the Marconi Hotel (Building 9001), the bungalows across the street from the main building (Buildings 9002 and 9003), the Operations Building (Building 9004), and Power Plant (Building 9006) and Well House (9081). The J. G. White Engineering Corporation designed, as Station No. 6, all the Marconi buildings in June of 1913. Mark Swanson of New South Associates located a number of the original 1913 architectural plans (plans 1 –7, 12) during his valuable research and deed survey. His work adds a great deal to the knowledge of Camp Evans prior to Army take over and documents the title chain of properties purchased by the Marconi Company and later the US Army (Reed and Swanson 1999).

Completed in 1914, the hotel was used as the administrative center and housing for the nearly 50 personnel needed to maintain the 24 hr. wireless operations. The operators were mostly unmarried men and the accommodations at the hotel and station were luxurious for the day, especially when compared to shipboard wireless duty. The operations building (9004) has been long empty. It was here during its construction, in January of 1914, that Marconi employee David Sarnoff, inventor Edward Armstrong, Columbia Professor Morecroft, and Mr. Roy Weagant gave Armstrong's "regenerative circuit" the first full-scale test (Lessing 1969, Pg. 180). This device which, Armstrong kept concealed in a black box, greatly increased the distance of radio reception (Zahl 1970b: Lewis 1991 Pg. 247, 326). On February 2, 1914 Sarnoff reported the event, the report still exists (Sarnoff 1968 Pg. 7). This was a revolutionary development event which Sarnoff would later recall as "that memorable night at the Belmar station when, by means of your 'magic box,' I was able to copy signals from Honolulu" (Lewis 1991 Pg. 113). As a radio industry pioneer, Armstrong would go on to develop FM radio and superregeneration. Armstrong was later awarded the 1941 Franklin Medal and the 1942 Edison Medal from the IEEE both awarded for this fundamental radio advancement (Nahin 1996 Pg. 179). This was Armstong's first visit to the site, returning during WWII to apply his expertise to radar, again with revolutionary results. By the 100th anniversary of Armstrong's birth, historians of science would call him America's foremost inventor, exceeding Edison in imaginative scope and technical finesse (Fantel 1990 Pg. 26). Sarnoff would become President of the Radio Corporation of American (RCA) (Buchanan and Johnson 1984:79; Graham 1986; Wintemberg ca. 1980). At this point Armstrong and Sarnoff were friends. Years later they would become bitter enemies battling in court over FM patent royalties.

The life at Belmar station consisted of long shifts in the operations building. The social diversions consisted of billiards, boxing, reading, and card games. Outside there were tennis courts, croquet, baseball, football, and walking paths. During the winters the company hosted dances in the hotel with guests coming from the Marconi office on Broad Street in New York City. "The dining room, decorated for the occasion, was transformed into a ballroom" (Wireless Age undated).

An issue of Wireless Age describes living at high power stations as the "last word in comfort and convenience". The article describes the conditions;

> "The hotels attached to these huge plants are objects of wonder to all visitors. Operators are given well furnished bedrooms with adjoining baths; there are lounging and music rooms holding player pianos and Victrolas with splendid selections of records, besides a well-stocked library which circulates through all stations. Smoking rooms are fitted with restful lounging chairs and on many winter nights these are drawn up to form a cozy half circle about the large open fireplaces. The dining rooms are run solely for the convenience of operators and service may be had by those coming off duty at any hour of the day or night. Billiard tables are found very popular, and bowling alleys in the hotel basement are promised" (Wireless Age, November 1915 Pg. 127-129).

When the United States entered World War I in April of 1917, the federal government took over control of all wireless stations using the authority of Section Three of the 1912 Radio Act. The Marconi operation in Wall Township and New Brunswick, as well as all Marconi High-Power Stations in the U.S. were operated by the U.S. Navy. The Belmar Station played a significant role in wartime communications and played a roll in the beginnings of electronic warfare. Some of the most important messages of the war were dispatched and received at the Belmar station. The Germans had cut the trans-Atlantic submarine telegraph cables (Douglas 1987, Pg. 276-279) making wireless radio the key wartime communication technology. The Navy set up a control center at Belmar, with private leased wires to Washington and connections to northeast coast high-power stations capable of trans-Atlantic communication. A. Hoyt Taylor, the future father of Navy radar (McKinney 1961 Pg. 12), was commanding officer of the Belmar Station and also the TCO - 'Trans-Atlantic Communications Officer' (Taylor 1948 Pg. 50-60). Belmar had control of the German high-power transmitters in Tuckerton, N.J. and Sayville, L.I., and the Marconi New Brunswick transmitter station. The Belmar receiving station was connected via leased line to the Marconi station on Cape Cod and the Navy Bar Harbor station. When reception was poor at Belmar the other stations could assist. Outgoing messages for Europe were dispatched to Belmar from Washington and forwarded by radio to Europe. Received messages were dispatched by wire to Washington. Belmar was in regular communications with France, first via the Eiffel Tower and later a new station in Lyons, France. When service to Rome, Italy was initialed, A. Hoyt Taylor transmitted the first exchange between President Wilson and the Italian Minister of Communications in Rome. The station staff was now in excess of one hundred personnel plus Marine guards.

Messages sent between the U.S. to England, France, and Italy were coded to prevent German use of the information. The station also ran continuos interception of the messages from the German high-power station at Nauen. Most of the time uncoded English messages were sent to influence the German population in the U.S., but at times coded messages were sent and transmission frequencies were changed. These messages were believed for the German submarines operating off the American coast. The code was recorded and sent to code-breakers at Navy Headquarters. To detect suspected spies' transmissions from on shore to the submarines, Belmar station personnel built a radio direction finder on an old truck to patrol the coast. No spies were found, but they detected the source of some of the signals, faults in the New Brunswick station electric generator. Ernst Alexanderson, Roy Weagant, and George C. Clark performed revolutionary loop aerial construction, reception tests, and static reduction work at Belmar. Once when A Hoyt Taylor, and Alexanderson were testing a GE receiver in the Belmar hotel basement (9001) a lightning bolt struck the first 400-ft. mast giving Alexanderson a shock through his headphones. In spite of the danger, they kept on working (Brittain 1992 Pg. 128). In 1919 Mr. Clark began a radio history collection at Belmar station in the Marconi Hotel which is now housed at the Smithsonian Institution.

Possibly the most important messages exchanged by President Wilson were uncoded messages of his armistice terms transmitted directly to Nauen, Germany. This wireless negotiation is believed to have shortened the war (Wireless Age 1919 Pg. 8). At the end of the War, on February 1, 1919 the station was returned to Marconi Company control. Mr. Sarnoff, Mr. Alexanderson, and Mr. Winterbottom, a Marconi Vice President, were there to take the station back.

After the war, the Navy's Stanford C. Hooper, wanted to have military control of radio patents, licenses, and technology. Congress would not permit the Navy to control a commercial enterprise so Hooper urged a consortium of American companies to buy the American Marconi Company. Thus elements of General Electric, Westinghouse, and AT&T incorporated in October of 1919 to form The Radio Corporation of America (RCA), with David Sarnoff later becoming president (Buchanan and Johnson 1984:79; Zahl 1970b, Douglas 1985 Pg. 170). In October 1919 the Marconi Belmar station became the RCA Belmar station. RCA owned the Wall Township facility until 1925, when operations were moved to more modern accommodations since loop aerials made Belmar station obsolete (Wintemberg ca. 1980). This ended the Marconi period of significance of the Camp Evans Historic District. As an unnamed writer put in the late 1920s,

> "Belmar! It is a sweet and euphonious name. A pile of money went up the flue there, technical reputations were lost and gained, there were heartbreaks private and corporate, and now there is silence" (Wireless Age, undated).

The Monmouth Pleasure Club and the Ku Klux Klan: 1925 - 1932

In March of 1925, the Marconi Hotel (9001), the power plant (9006), other wooden buildings south of Marconi Road and approximately 90 acres became the property of a group called the 'Monmouth Pleasure Club Association'. The deed of sale reserved the right of the seller to remove a 400-ft. steel mast from the property for one year. The masts must have been extended from the original 300-ft. height (deed, Bk. 1287 Pg. 444). To raise money for the purchase of the property, the club was incorporated in New Jersey and 13,000 shares of stock were sold to the public. Additional lands were also purchased enlarging the tract. Most shares were sold to Ku Klux Klan (KKK) members at Klan meetings around the area. The group hosted meetings attended by the national officials of the KKK, whose "grand wizard" was Hiram K. Evans, of Illinois. As a result of this association, the Marconi site became known as the "Evans Encampment" (Zahl 1970b). A 1926 article in the New York Times identifies the property as the "State headquarters of the organization" (NY Times, June 20, 1926, section 2, pg. 19). The article states, "Only members of the Klan or affiliated organizations are admitted to the 396-acre reservation".

In 1926 plans were created to develop 200 acres into building lots. The subdivision was named Imperial Park. Plans on file in the Monmouth County Hall of Records label the Marconi Hotel (9001) as the Imperial Hotel. Once the potential value of the property became apparent, infighting and property ownership disputes fragmented the local KKK groups leading to lawsuits reported in the local press (Asbury Press, October 27, 1927 Pg. 1). The Monmouth Pleasure Club officers contended the purchase of the Marconi property was a business investment of individual stockholders. The Klan were tenants who paid a fee to hold meetings and rental for use of a bungalow for Grand Klan Dragon Arthur H. Bell and his wife. Dragon Bell insisted the Monmouth Pleasure Club was established by instruction of the Klan and Klan membership was the largest group of investors. At a hearing before the count of chancery in Long Branch, Bell's attorney argued the Klan should have controlling interest, based upon the shares owned by Klan members. Finally, in February of 1928 the New Jersey Klan suit was vacated when the largest single shareholder was shown to have no affiliation with the Klan and had invested for profit. In 1928 revised plans (map 6) were filed in Freehold for the Imperial Park development. The February 17, 1928 edition of the Asbury Park Press reported Judge Bodine of the United States district court in Trenton had granted the national Klan an injunction that prevented the Monmouth Pleasure club association from selling the property until an action before the federal court was decided. The national Klan contended the charters of the now dissolved local Klan units transferred all assets to the national Klan upon dissolution. This would give the national Klan a controlling interest in the Monmouth Pleasure Club Association. On September 30, 1929 the Federal Circuit Court of Appeals dismissed the action to confiscate the Marconi property. Now the Monmouth Pleasure Club was free to sell the subdivided property. The complete plans were not realized, the onset of the depression most likely reduced the value of the lots.

Little information has been found from 1929 – 1936. Russ Henderson, whose father photographed the Marconi station, recalled the Klan sponsored a circus behind the Marconi Hotel every summer while he was in High School (1934-37). Also in the field behind the hotel the Klan had a 50-Ft. tall cross with 25Ft. wide arms, which would light at night. In those days of open farm fields the cross was visible to a large area (Russ Henderson, personal communication 1999). A published oral history of William J. Jones states the American Nazi party, the Bund, held meetings at the Marconi Hotel before WWII (Johnson 12/2/1993 Pg. 30).

The Kings College Years: 1936 - 1941

In 1936, the Young People's Association for the Propagation of the Gospel purchased the Marconi property for the purpose of opening an interdenominational Christian College. The King's College opened on September 19, 1938, during the devastating hurricane. The president was coast-to-coast radio preacher Reverend Percy B. Crawford (Bahr Pg. 50; Zahl 1970b). Percy Crawford had established "The Young People's Church of the Air" in 1931 in Philadelphia. Donations and gifts to Reverend Crawford's radio ministry enabled the purchase of the Marconi property for $25,000. In 1933 he started the Pinebrook Bible Conference in Pennsylvania. Rev. Crawford's vision for Belmar, was to create a Christian College like Illinois's Wheaton College, the "Wheaton of the east". The college opened with a faculty of eleven and about seventy students. A 1938 photo (historic photo 28) shows the students in front of the Marconi Hotel (9001). A number of the faculty traveled from Temple University, University of Pennsylvania, Princeton University and other institutions one-day a week to help the college offer an outstanding program. A songbook published by Reverend Crawford describes the college as follows:

> "The College is unique for its high scholarship, unusual faculty made up of born-again Christian men, fine scientific laboratory and library, beautiful ninety-one acre campus adjoining the salt water bay, new modern equipped gymnasium." (Crawford 1939 Pg. 1).

The Marconi Hotel served as the main college building. Men were housed on the first floor and the servants' rooms above the kitchen area. Women's bedrooms were on the second floor, main hall. The Hotel billiards room served as the college chapel and classroom. The Marconi power building was the biology laboratory. In 1939 a student developed anti-venom for black-widow spider bites. The drug firm 'Sharpe and Dome', produced the anti-venom as a product. The Marconi cottages (9002 & 9003) were homes for residing professors. The Marconi operation (9004) building was a chemistry and physics laboratory. With the increased enrollment by the second year, 9004 would be used as dormitory space, as well as a two-story farmhouse behind the hotel. The College constructed a gymnasium (9007) next to the Marconi power building (9006), in 1938. Completed in October (historic photo 29), students helped finish the building as part of a work-study program. This building was razed in October 1999 (historic photo 30), to allow environmental remediation of soil under the structure.

Rev. Percy Crawford was described in the March 1961 issue of *Decision* as one of the most dynamic Christian leaders of the time. Rev. Crawford is also the first person to preach coast-to-coast in the first nation-wide religious radio broadcast. Rev. Billy Graham, who considers Percy his spiritual father (Bahr Pg. 48), was the speaker at his memorial service attended by over 2,500 persons (Bahr Pg. 78). The college campus would not stay long in Wall Township. King's college students would not graduate from the Belmar campus. The college had not attained permanent accreditation from the NJ Department of Education. Rather than continue with provisional accreditation the college placed the property up for sale (Fenton Duvall, personal communication 1999). In 1941 the government would again take over the site (map 7). This time it was not the Navy, but the nearby Army Signal Corps Installation, Fort Monmouth, that would purchase the old Marconi property (Buchanan and Johnson 1984 Pg. 79). The college relocated to Delaware City, Delaware and the Marconi station once again was on the cutting edge of communications.

Signal Corps Engineering Laboratory during World War II, 1941 to 1945

As early as 1918, US Army Signal Corps visionaries foresaw the extreme danger of enemy aircraft attack, as aircraft technology would progress. They then began an under-funded program to develop an early warning system. Using technology and components available at the time, the pioneers tried sound, infrared heat and ultimately began work with radio waves in 1934 (Dunlap 1948 Pg. 133-134; Davis 1943 Pg. 31). Interestingly, Marconi had observed changes in radio wave reception and predicted in a 1922 speech, before the International Radio Engineers (IRE) in New York City, that a system could be developed to detect ships in fog and darkness (Marconi 1962 Pg. 236). Known as Radio Position Finding (RPF), work was begun at Ft. Monmouth under Col. William R. Blair, but for secrecy reasons it was moved to the scrub barrens of Sandy Hook. By May 1936, they had a working prototype, and a complete system by May 1937. In the spring of 1940, the Army contracted with Bell Labs and Western Electric to manufacture Army radar units (Fagen 1978 Pg. 82). Fearing German commando attacks on narrow Sandy Hook (Zahl 1968 Pg. 73) and needing more space for the expanding work, in 1941, plans were made to locate a safer coastal location. A team visited Army bases as far south as Mississippi to find a suitable location (Vic Friedrich, personal communication 1999). When the old Marconi station in Wall Township was placed up for sale by The King's College the Army purchased the land and the college relocated to Delaware. The

radar division pioneers, Col. Roger B. Colton, Lt. Col. Rex Corput Jr., John Marchetti, John Slattery, Paul Watson, Harold Zahl and others relocated to Wall Township (historic photo 31).

The new laboratory was initially called the "Signal Corps Radar Laboratory," until intelligence services in Washington pointed out that "radar" was a classified word. Signs in front of the Marconi Hotel (9001) needed to be repainted, all stationery reprinted, badges reissued, and the bus from Asbury Park had "Radar Laboratory" removed from the route sign. Mr. A. E. Anderson, who was on travel duty the day new badges were issued, may have the only surviving "RADAR LABORATORY" badge (A. E. Anderson, email 10/18/98). On March 31, 1942 the
laboratory was dedicated as "Camp Evans Signal Laboratory", in honor of World War I Signal Corps officer Lt. Col. Paul Wesley Evans (Thompson 1954 Pg. 62). In spite of his former association with the site, Camp Evans was not named after Hiram K. Evans of the KKK, yet the story persists to this day among local residents (Zahl 1970b).

Camp Evans functioned as the nerve center of the Army's secret wartime radar research and development, using and coordinating the work of academic laboratories and private contractors like Bell Telephone Laboratories, the Radiation Laboratory at MIT, Lincoln Laboratories in Massachusetts and Westinghouse in Maryland. The Signal Corps in the past could do its own research and development. Faced with a Second World War and exploding equipment needs, the Signal Corps was overloaded with the burden of getting equipment into all theatres, incorporating improvements and training. During the war, 3000 officers and civilians worked at Camp Evans (Guerlac 1987 Pg. 119).

The first task at Camp Evans was the continued development and continuous improvement of the Army long-wave early warning radar, the SCR-268, 270, and 271. Radar sets produced by Western Electric and Westinghouse, with many undergoing final assembly and testing at Camp Evans. These radar sets saw use in all theatres of War, protected the US mainland, Panama Canal and other strategic locations. Sets were sent to the British and other allies. Some SCR-268 radar sets were sent to the USSR as a part of lend-lease (Getting 1989 Pg. 93). Upgraded models even saw action in Korea. Initially, the U.S. radar was considered inferior to British radar until side by side field tests proved otherwise (Zahl 1968 Pg. 62). The Historical Electronic Museum in Maryland has complete SCR-268 and SCR-584 radar units. A dataplate on a radar component reads "BC-404A Manufactured by Western Electric Co. Designed at The Signal Corps Radar Laboratory, Belmar, New Jersey".

When the National Defense Research Committee's (NDRC) Radiation Laboratory (RAD Lab) of MIT offered to assist in radar research, the Signal Corps was more than happy to assign the "long-haired" scientists the unfruitful microwave band. In the 1930's, microwave radar was explored by the Signal Corps but was abandoned for lack of a powerful transmitter. The Signal Corps officers felt this would keep the professors occupied while the military fought the war (Zahl 1968 Pg. 66; Thompson 1966 Pg. 625). To be effective in combat conditions electronic creativity needed to be backed by sound military procedures, technical documentation, training, proper sparing levels, component failure analysis, and constant upgrades. As good as the civilian laboratory engineering was, there was no substitute for Signal Corps deployment experience and procedures. At times, the civilian laboratories and the military had strained relationships. The stressful development part of WWII was a battle of wits against the Axis. It was fought in stateside laboratories with long hours leading to the breaking of new scientific and engineering ground. Much of the contracting, military specification, and technical drawings for industrial production, was done at Camp Evans. In spite of this military skepticism, the RAD Lab engineered the microwave based SCR-584 gun-laying radar, using the British cavity magnetron as a transmitter. The RAD Lab updated the Signal Corps and worked within their basic specifications (Buderi 1996 Pg. 127). It was up to the Signal Corps Radar Laboratory at Camp Evans to do production design for many of the SCR-584 components. An August 1942 report listed the component production drawings completed and those still in development (Thompson 1957 Pg.267). Louis Smullin of MIT worked with his Camp Evans counterpart, Ken Geroff, sending components to Camp Evans for testing and approval (Louis Smullin personal communication December 1998). Eventually the organizations developed a respect for the accomplishments of the other and close personal friendship developed (Getting 1989 Pg. 130).

An undertaking of extreme secrecy, Radio Countermeasure technology (RCM) consisted of jamming and deception methods to render enemy radio and radar equipment useless. RCM was housed in the Marconi hotel (9001) as the "Radio Countermeasures Section," later known as the Electronic Warfare Laboratory (EWL; EWL ca. 1981; Thompson 1964, Pg. 309 & 325, Reed & Swanson 1996, Pg.17). The Camp Evans Laboratory coordinated and cooperated with the Navy, Harvard Radio Research Laboratory (RRL), MIT and Army Air Forces School of Applied Tactics to meet this wartime challenge. This was the expansion of WWI radio jamming to a new level (Signal Corps 1922, Pg. 370). This was a battle of scientific and engineering wits, ingenuity and electronic creativity, which

helped the Allies win WWII. RCM also required the neutralization of enemy efforts to jam Allied equipment. In February 1943 Camp Evans engineers developed a new Anti-jamming circuit for SCR-270 and 271 radar called "George". The unique device was sent to the RRL at Harvard for the theoretical physicists to determine why the circuit worked (Thompson 1964, Pg. 309). Another example of a RCM event at Camp Evans was the repair and analysis of a captured German radar unit, the anti-aircraft Wurzburg. The analysis found flaws that were exploited by new RCM to reduce US 8th Air Force causalities (Zahl 1968, Pg. 48).

Beside SCR-268, 270 and 271 continuous upgrades, other wartime tasks were worked on at Camp Evans. Edwin Armstrong worked on experimental FM based radar in the 'development area', the future equipment and site of Project Diana. Camp Evans personnel worked to upgrade gun laying radar to shoot down the German V-1 and V-2 rockets in special radar suppression chambers using V-2 scale models (ESL 1945 Pg. 1; Thompson 1964 Pg. 320-321). One V-2 scale model has survived in storage. Special high-speed field wire dispensers were developed to effect quicker command to field telephone network setup (Thompson 1964 Pg. 384). Special Technical sections were enlarged to expedite the identification and replacement of upgraded radar components in the field to reduce battlefield equipment failures. Evans personnel also specified, tested and approved radar developed by other laboratories, for example the RAD Lab microwave early warning (MEW) radar, Interrogate Friend or Foe (IFF) systems, Eureka ground homing beacon radar. IFF used Armstrong's superregeneration (Lewis 1991 Pg. 287). As the lead radar center it was up to Evans personnel to militarize equipment developed by other labs. This included technical specification, contracting production, sparing, battle hardening, technical manual writing, training, failure analysis, and component improvements (Guerlac 1987 Pg. 119).

Widely recognized as best in the class of ten types of early warning lightweight radar, the SCR-602 series weighted about 100 lbs. Experimental models were completed at Camp Evans in January 1944. Zenith Radio Corporation produced 650 sets. The sets were landed on D-Day, in the Philippines, Iwo Jima, and used to detect kamikaze attacks (Guerlac 1987 Pg. 120; Thompson Pg. 102, 237, 470). The SCR-602-T8 used Harold Zahl's VT-158 vacuum tube. The British even asked for 200 sets in June of 1943, acclaiming the radar as one of the most important Ground Radar techniques in recent years (Thompson 1957 Pg. 261-264). Lacking the quality of radar expertise found in the U.S., the Japanese copied an early version of the VT-158 tube from captured radar sets.

An example of a gun locating device developed at Camp Evans was the sound locator set GR-6. Ten sets reached the Pacific for use in Okinawa. Using the new equipment, teams silenced the enemy with the first shots by destroying, 3 enemy machine guns, 65 mortars, 13 antitank guns, 40 medium artillery pieces and 16 heavy guns. In 1944, special radar to locate enemy troops and vehicles was developed at Camp Evans. Pre-production models were just being completed as WWII ended (Thompson 1964, Pg. 506). In preparation for the seaborne invasion of mainland Japan, special modifications were made to SCR-270 radar sets to protect our ships from kamikaze attacks where coastline mountains protected low flying enemy aircraft from radar detection. Allied command feared the Japanese were hoarding kamikaze planes and knew they were training pilots in radar evasion techniques. New systems were built at Camp Evans and tested in the Catskill Mountains. These were ready for deployment when the war ended (Stodola 1985 Pg. 1).

WWII Events associated with specific buildings

In November 1941, when the Army foreclosed on the former Marconi property from The King's College, it inherited five of the original Marconi brick buildings and numerous wood structures. These included the Marconi Hotel (9001), the two bungalows (9002 & 9003), the operations building (9004), the wood frame 9005, the power and light plant (9006) and The King's College gym (9007). Plans on file show the Army employed the architectural firm of John T. Rowland, a prominent Jersey City architect, for alterations to the hotel building and new construction behind the hotel (plans 8 – 9). In the hotel, the Army removed the guestroom plumbing and closets. In the second floor east wing, select walls were removed to create an open space. This area was later made into offices with temporary walls (plan 10).

With the exception of the five Marconi buildings constructed in 1913-1914, most other construction dates to the early years of World War II, when Camp Evans was first established. Most of these buildings at Camp Evans were constructed as temporary structures in either 1942 or 1943, when radar production was at its height. As little new construction was done after 1945, maps from that period show Camp Evans has changed little in the years since WWII (historic photo 1). For the continuing radar research required to meet exploding wartime radar needs, plans were completed in January 1942 for new radar laboratory buildings. The initial concept for the buildings were long 800ft by 60ft assembly line style buildings, this was changed in favor of the 'H' shaped building (plans 14 – 15) existing today (Zahl 1970b). A second 'H' building (9036 /9037) was added in late 1942 based on the Rowland design, William A. Goef was the architect.

In research for their 1996 cultural resources report, Mary Beth Reed and Mark Swanson documented the following:

> "Samuel Stine, a veteran employee at Fort Monmouth, remembers that when he first came to Fort Monmouth in 1943 as a branch chief at Camp Charles Wood, at least one of the Evans "H's" (Buildings 9036 and 9037) was set up as an assembly line for radar set production. This work was done by enlisted personnel, who were specifically trained in the manufacture of radar. One of the buildings, believed to be 9036, was set up to produce smaller radar sets, probably the SCR 268, while 9037 is thought to have produced the larger units, SCR-270 and SCR-271. All of these sets had bedspring type antennas. The finished radar sets left Buildings 9036 and 9037 at the south end, where they were mounted on trailers and other vehicles for further testing, storage, and transportation. The materials used in this assembly line production were stored in the brick buildings now identified as 9040, 9041, and 9042, located some 600 feet to the west. Building 9039, immediately south of the storage buildings, served as the contracting office for the radar set materials (Sam Stine, personal communication 1995)." (Reed and Swanson 1996 Pg. 17).

Building 9039 was also used for technical writing of radar manuals (Bernard Martin, personal communication 1999).

A two-story frame home, visible in the Belmar Station color postcard (historic photo 9) and the Henderson photo (historic photo 2), was relocated to the corner of Monmouth Boulevard and Taft Street., a few hundred feet south of the original location. Mark Swanson located a 1942 Army site plan (map 8) showing the original location and the building which replaced it (Reed & Swanson 1999 Figure A-17 Appendix A). During visits to the Belmar station, Marconi stayed in this home when it was just behind the hotel. The fireplace once had a plaque commemorating Marconi's visits (Alice Solomon, personal communication 1997).

In addition to these main permanent buildings, there were a number of temporary auxiliary structures constructed south of the 'H' buildings. Most numerous of these were the barn-like buildings known as a "Special Antennae Cover," that housed the radar sets and antennas after they had been assembled. Because the mounted SCR-268 and SCR-270 radars were so tall they did not allow room for interior roof supports, these buildings were augmented by wooden flying buttresses (plan 18). These unusual buildings were placed around Evans to minimize the impact of potential enemy bombing or sabotage. Later it was realized they were aligned perfectly for WWII aircraft bombing runs (Zahl 1970b). Buildings 9015, 9017, 9019, 9021, 9023, 9025, 9045, 9047, 9049, 9051, 9053, and 9055, are of this architecturally distinctive construction. Only building 9023 has the buttresses remaining. Later in the War these building were used for other needs, e.g. building 9019 was used for production drafting. Evans employee George L. Brown created classified drawings of radar components, often behind security screens. Mr. Brown once reported to his superiors that his classified drawings were being moved during off hours and he later found communist propaganda in his desk (G. Brown, personal communication, July 27, 1999). In this same building (9019) John Marchetti, twenty men and a secretary worked 96 continuous hours assembling mortar location radar sets for use in Pacific island landings (Zahl 1968, Pg. 76). During an oral history interview at Camp Evans in December 1998, Mr. Marchetti, age 91, posed in front of building 9019 for a newspaper photographer as he recounted the event. In 1943, mortar protection was so desperately needed in the war zone that the first units built in the Camp Evans development laboratory were flown directly into battle. Evans would be the home of this special type of radar for over fifty years. Photo 17 shows shelter 9017 after renovations for the current mortar and artillery location and counter-fire system, the Firefinder project in the 1980s.

Located near all the WWII built buildings are circular concrete pads, which were built to support "Dymaxion Deployment Units" (DDU). Some DDUs remain in place (photo 14). The DDU was designed by American engineer Richard Buckminster Fuller and produced by the Butler Manufacturing Company, a firm that manufactured grainbins. These corrugated sheet metal buildings were often placed beside the radar antenna shelters (historic photo 1) where they were used in the experiments that had to be conducted on the radar sets or for experiments that were potentially flammable. Many were removed and others were later converted for storage (Reed and Swanson 1996). A copy of Army instructions to assemble a DDU is preserved in the Ft. Monmonth Command Historian's collection.

Mary Beth Reed and Mark Swanson researched the DDU and found:

> "Created in 1940-41 and filed for patent in March of 1941, DDUs were first designed for British military use. Used by the American military after Pearl Harbor, they were loosely based on the construction principles first publicized by Fuller's "Dymaxion house" in 1927. "Dymaxion" was a word coined by Fuller to express his principle of maximum function for minimum effort. The dymaxion house, based on this principle, was a pre-fabricated circular construction supported by a single central mast (Buckminster Fuller Institute 1995; Klotz 1988; Roth 1979). The DDUs had circular walls and a unique domed metal roof, with a ventilator at the central apex. This design had the specific purpose of creating a warm-air thermal outside the building, together with a corresponding cool air draft pulled groundward in the middle. The ventilator served to pull this downward draft of cooler air into the DDU. This natural air-conditioning was just one of the unique features of Fuller's DDUs (Buckminster Fuller Institute 1995)." (Reed and Swanson 1996 Pg. 17, 19).

Toward the end of the war, Camp Evans was converted from a radar-manufacturing site to a laboratory and research facility. Radar manufacturing was turned over to commercial enterprises after the government found that the newer radar models were too expensive to build at Evans. In place of the manufacturing functions, additional research laboratories were set up at that time. A meteorological lab was established in Building 9039; this was where Sam Stine had his office in the years that followed. Known as the meteorology section this group was working on radar application to weather prediction (Donald Swingle, personnal communication 1996). Radio direction finding was placed in Building 9044. Dr. Zahl conducted his vacuum tube research for magnetron type radar in Buildings 9036 and 9037, which were also the site for new materials research (Sam Stine, personal communication 1995).

Mark Swanson found work on new materials also was done in adjacent buildings: 9025, 9021, 9058, 9088, and 9175. Much of the initial research into semi-conductor materials like germanium later used in the first transistors, was performed in this small group of buildings (Reed & Swanson 1996 Pg. 20). After 1955, about the time silicon became more important, this work was transferred to the new electronics research laboratory in the Charles Woods Area of Ft. Monmouth: the "Hexagon" building.

As a prototype and test facility the shop area was very important. The shops were set up in Building 9011; west side of the center connecting passage was the carpentry shop, while the east side was the metal shop. In between 9010 and 9011 was the classified metal shop (9085). The metal shed (9097) was a foundry. The engineers were often assigned craftsmen to assist them with projects. These craftsmen were highly regarded by the engineers, who often credited the craftsman with improving the final product. Parts for many models of radar systems, satellites, radios and other improved equipment were first formed in these shops.

The Winning and Ending of World War II

A very effective and deadly weaponry innovation during the war was a secret device known as the proximity fuse. This miniature radar unit built into an artillery shell was designed to detonate the shell within 30-Ft. of a target. This was more effective than a direct hit and would turn a near miss into a hit. A 1949 article relates information made public by the Camp Evans Chief Engineer George Eltz, Jr., "It can now be told that the proximity fuse was developed there" (Asbury Park Evening Press, Dec. 12, 1949). Camp Evans vacuum tube group worked with fuse development with the primary developer in Maryland on quality control of the fuse. The proximity fuse is another radar advance credited as a major contributor to the Allied victory.

A very intriguing potential connection with the Manhattan Project stems from an oral history. Mr. William Wood told the information to his son prior to his death. Mr. Wood was given an assignment on radar components that had to meet very stringent specifications, under unusually extreme secrecy. Afterward he was told these were used in the Manhattan Project. Research uncovered the 1946 Los Alamos technical history, declassified in 1961, states the atomic bombs were triggered by pre-production prototype radar units supplied by the Signal Corps. The units were nicknamed 'archies' and were based upon the design of an aircraft tail approach warning radar, the AN/APS-13 (Los Alamos 1946 Pg. 132-135). Units were used in development and testing of the triggering mechanism of the bomb. Units were also used in practice bombing runs with dummy bombs, and the actual bomb detonators. During the 1944-testing phase the tail warning units were very scarce. Barrage balloons with model bombs were used in tests in Warren Grove, New Jersey. Further investigation is needed to determine if the AN/APS-13 was prototyped at Camp Evans for production by RCA and what roll the units supplied by Camp Evans may have played.

The Wednesday, August 15, 1945 headline of the Daily News reads, "IT'S OFFICIAL: JAPS GIVE UP". On page seven a story titled "U.S. Gives Radar Secrets, 'Major Reason' of Victory" discloses the "long-secret story of radar". The story cites radar as more valuable than the atomic bomb because "it was at work for the Allies when they might have lost the war without it". It continues to say, "Radar is the story of victory in a laboratory race against the enemy". A photo accompanying the story is captioned "Radar equipment at Camp Evans, Belmar, N.J." it is just above a photo with Dr. A. Hoyt Taylor. Taylor, the father of Navy radar, spend part of WWI at the Belmar, Marconi Station and began his quest for radar in 1922 just three months after Marconi predicted radar and four years after he left Belmar station. The Signal Corps Radar Laboratory at Camp Evans played an exceptionally significant roll in the radar victory. Today, it stands nearly intact as one of the last remaining WWII radar laboratories. The MIT Radiation Laboratory was demolished in early 1999 and the radar laboratory at Sandy Hook is long gone.

Additional information has been collected about WWII activities at Camp Evans. As nearly all the work was classified and the existing documentation is very technical, a complete picture will be difficult to reconstruct. Oral histories have provided many leads to verifiable events. A potential source of primary materials is the 'CESL technical memos' in storage in Maryland. Due to its top-secret nature much information will probably never be uncovered. Even after nearly 60 years some Camp Evans personnel are reluctant to disclose once classified information. A general in the 1970s, residing in a Marconi cottage discovered boxes of WWII documents marked "TOP-SECRET" in the Marconi hotel attic. Sadly, he ordered them burned.

Project Diana, opens the Space Age at Camp Evans. 1945 - 1946

The most widely know event to occur at Camp Evans was Project Diana. This has exceptional significance on the national and international level. The achievement was reported worldwide in every major newspaper, movie theater newsreels, radio broadcasts, magazines, technical journals, cartoons, and even a children's book. An exhibit was created and displayed at the Smithsonian.

> As reported in *Time* Magazine:
> "Until Jan. 10, 1946, scientists had been experimentally limited to the earth and to a thin shell of air around it. Last week, the U.S. Army Signal Corps announced a scientific milestone: on Jan. 10 (and several times since), its radar at Belmar, N.J. had sent a message to the moon and got an answering echo. Man had finally reached beyond his own planet." (Time 02/04/1946 Pg. 84).

An excellent summary by Mary Beth Reed and Mark Swanson:

> "The importance of Project Diana cannot be overestimated. The discovery that the ionosphere could be pierced, and that communication was possible between earth and the universe beyond, opened the possibility of space exploration that previously had been only a dream in adventure films and comic books. Just as Hiroshima opened the nuclear age in 1945, Project Diana opened the space age in January of 1946. It would take another decade before the first satellites were launched into space, soon followed by manned rockets, but Diana paved the way for all of those achievements. It even initiated the tradition of naming such projects after ancient Greek and Roman gods, like Mercury and Apollo. For Fort Monmouth, Project Diana was a pivotal event that built on World War II expertise, but pointed the way to the future." (Reed & Swanson 1996, Pg. 27).

It is very fitting that this achievement took place at the former Marconi station, Camp Evans. It was Marconi who first described his experimental observations of Hertzian wave (radio waves) reception beyond the distance expected due to the curvature of the earth blocking the waves. Scientific opinion at the time expected the waves to go straight into space, limiting reception distance to the horizon. Marconi's entire "wireless girdle" depended upon the behavior he observed, radio waves would travel beyond the horizon to reach his stations separated by thousands of miles. It was at this Marconi station in Wall Township that Edwin Armstrong, using his breakthrough regenerative circuit and the newly constructed 300 ft. high by 2200 ft. long antenna, first picked up transmissions from other Marconi stations as far away as Hawaii. The radio waves were reflected between a layer of the atmosphere and the earth. Years later the layer would be discovered and called the ionosphere. Scientific opinion would then shift, believing the layer formed a radio barrier around the earth. This would prevent radio signals from leaving the earth, making space communications impossible. During WWII at Camp Evans, engineers worked with the British and MIT to find a way to track the German V-2 rockets to defend against their attacks. Just as their WWI Signal Corps brethren understood that the next war would use airplanes, these WWII Signal Corps

Engineers understood the next war would use rockets. The V-2 rocket was capable of traveling in and above the ionosphere. With the current state-of-the-art radar of WWII, they could not be tracked until they were returning to earth, when it was too late. At that time they could cross the English Channel. It would not be long before they would cross the Atlantic. A way had to be found to track them for early warning and defense, otherwise the U.S. would be blind to long range rocket attack.

Thus began Project Diana, as the first post-war step in rocket defense. Due to the wartime advances in radio and radar electronics, components were available to effectively address the problem. The challenge was designing a system to generate radar waves powerful enough to pierce the ionosphere; a receiver sensitive enough to detect the faint return signal reflected back; and to find a target to work with, as V-2 rockets were in short supply (Buderi 1996 Pg. 274). Col. John J. DeWitt, who had tried to bounce a radio signal off the moon before the war, headed the unofficial project. The team used a highly modified SCR-271-D 100 ft. bedspring antenna radar unit, a FM transmitter, and a sensitive FM receiver both developed and constructed by Armstrong during the war (Lewis 1991 Pg. 297). Reworking circuitry to reduce the pulse rate to a time interval appropriate to the distance to the moon and back, water cooling vacuum tubes and other equipment to prevent heat caused burnout, and pushing all components beyond their specified power limits, the team was successful after months of effort.

At the time, this achievement was so incredible that Army headquarters brought in MIT scientists, such as Dr. George Valley and Dr. Donald Fink, to validate the claims (Zahl 1968 Pg. 91). Once the achievement was announced the principle engineers, Lt. Col. John DeWitt, Herbert Kaufman, Jacob Mofsenson, E. King Stodola, and Dr. Harold D. Webb became media celebrities. A recording of a WOR radio broadcast of an actual 'moonshot' has been preserved. An important contributor to the effort was Dr. Walter McAfee. Dr. McAfee earned the first US Army Research and Development Achievement Award in 1961 and later would become one of the few exceptional civilian scientists to have an Army building named in their honor (Zizos 1994).

Project Diana also opened new vistas in ionosphere and communications research using radio echoes off the moon (Butrica 1997 Pg. xix). Now that the entire scientific world knew the ionosphere could be pierced, astronomy took a new turn. Surplus radar units were used to search the skies to supplement light telescopes. As a prime example, using the Camp Evans Diana radar, Dr. Zahl and the famous Princeton University astronomer John Q. Stewart attempted to track the Giacobini-Zinner comet on October 9, 1946 (Zahl 1968 Pg. 92).

Army Research Projects 1945 to 1989. Pure and applied research in response to the Cold War.

Camp Evans entered the Cold War era with momentum from the significant achievements in radar and communications technology that had already taken place. Many military installations were closed at the end of the war. Camp Evans remained open as a secret research sub-post of Fort Monmouth and saw little disruption in the transition from World War II to Cold War. Camp Evans personnel conducted research on site and were involved in projects worldwide to support military communications and Electronic Warfare preparedness. This was largely because science was now recognized as essential to the development of a technological nation. This recognition pertained to both applied and pure science (Signal Corps Engineering Laboratories 1945). It was recognized that, in any contest with the Soviet Union, science and technology would always provide the greatest edge. The pure research, components, electronic warfare preparation and political issues, with which Camp Evan was involved, give the site exceptional significance in the context of the Cold War.

Not only was Camp Evans a vital electronics facility, but it was also in the forefront of the political contest between the Army and Communist hunter Joseph McCarthy, in 1953 - 1954.

Equipment, components, basic research and engineering projects provided components to communications technology, satellite technology, weather analysis and nucleonics. Equipment designed, prototyped, and tested at Camp Evans played a role in every U.S. conflict, including the Cold War. As a secret project installation there is little documentation of activities. Personal interviews and videotaped oral histories have added to the information beyond WWII.

Post World War II 1940s

Post-war Signal Corps research consisted of four laboratory sites in Monmouth County: the Squire Hall facilities at the Main Post, the Coles Signal Laboratory, the Watson lab at Charles Wood, and the Evans Signal Laboratory. Harold Zahl served as research director for these engineering labs (Signal Corps Engineering Laboratories 1947; Zahl 1949). All the laboratories were secure facilities with Camp Evans hosting many top-secret projects. As all the Laboratories were under a single command, there was cooperation in research and shared expertise on a 'need to know' basis. A Signal Corps employee pamphlet described the work as follows;

> "The Evans Signal Laboratory is charged with certain engineering responsibility with respect to all ground radar sets, which include several types for each of the following tactical purposes: Early warning (aircraft), fire control of anti-aircraft artillery, search light positioning, ground controlled interception, harbor surveillance and fire control of seacoast batteries. It is responsible for radar beacons, radar control for mines, radar trainer equipment, special apparatus, such as ground control approach systems for landing aircraft, and installation designs and the recommendations of installation materials for all equipment requiring them." (SCEL Pg. 11)

At Evans, research was conducted in a number of areas. The most important were related to radio: communications systems, radar, electron tube research (thermionics), and component improvements. There were other areas of research as well: meteorology (which then included the study of rockets), proximity fuses, and photography (Signal Corps Engineering Laboratories 1945; Signal Corps Research and Development Labs ca. 1947; Zahl 1949:5a). Theoretical and long-term research was also conducted, especially in the area of "wave propagation," which concentrated on ionospheric studies (Signal Corps Engineering Laboratories 1951; Zahl 1949).

Teams from Camp Evans continued the work on rocket tracking, begun with Project Diana, in order to improve self-tracking radar. Specialist teams went to Almagordo, New Mexico, working with Army Ordnance tracking the V-2 rockets launched by Warner Von Braun and his team of fellow German scientists. Dennis Foster was a member of this team. His family shared his photos from a 1947 trip. Another team member, William J. Jones, solved the problem of V-2 rockets mysteriously exploding at 10 to 20 miles altitude. While observing a V-2 launch and monitoring the radio channel specified to carry the missile emergency self-destruct signal, Mr. Jones heard a police station message from Salem, Oregon, as the V-2 exploded. The message from Salem, with the same frequency as the emergency self-destruct signal, had reflected off the ionosphere, traveled to New Mexico and was received by the missile as a self-destruct signal. Dr. Von Braun supplied Mr. Jones a wire recorder which he used in a plane to record music on the detonation channel for all to hear. Realizing that changing the channel or frequency was not the answer, as the Russians would find the frequency. Work was begun on a 'jam-proof' system (Johnson 12/02/1993 Pg. 25-29).

The need for harsh weather testing was one of the lessons of World War II, where major campaigns were conducted in both cold and tropical climates (Misa 1985 Pg. 262; SCEL 1950 Pg. 5). Three special chambers were constructed to test for weather conditioning and other experiments. The tropical rainforest room and the cold chamber were located on the Main Post. There, experiments were conducted to determine the best ways of halting fungus growth on electronic equipment. In addition to the weather rooms, there was a silent or anechoic chamber at Camp Evans, in a Quonset hut adjacent to Building 9037 (Dr. Richard Bingham, personal communication 1995; Signal Corps Research and Development Labs ca. 1947). Later a facility to test components for nuclear hardness would be added to Camp Evans. Another test room would vibrate satellite prototypes to insure the design would standup to blast off stresses.

Solders in the field, coordinated by effective command and backed by flexible materials supply, fought World War II. Signal Corps radio equipment, especially Armstrong's FM, enabled command to rapidly react to changing battle situations. Throughout the war, Signal Corps engineers worked to improve reliability, reduce radio size and weight and reduce power consumption. Reduction of radio weight allowed a GI to carry more food and bullets. This effort of miniaturization of components was and is a mission of the Signal Corps (Zahl 1968 Pg. 115). Camp Evans housed the Thermionics lab to research and improve vacuum tube applications for the Army. It was recognized that the reduction in vacuum tube size was reaching a limit, so the Signal Corps began work and invested in research to exploit crystals and other solid-state materials to replace the vacuum tube. Research was conducted in the production of finer quartz crystals and even the manufacture of synthetic quartz (Signal Corps Engineering Laboratories 1947, 1950). The lab invested in germanium research at Purdue University by Professor Lark-Horovitz that produced over thirty unclassified research papers. The breakthrough came in 1948 at Bell Telephone Laboratories by scientists John Bardeen, Walter Brattain, and William

Shockley. Their new device was named the transistor. Signal Corps research in new component materials contributed to the invention of the transistor.

The transistor was scheduled to be unveiled to the public on June 30, 1948. Dr. Zahl was one of six military representatives invited to a pre-announcement on June 23. Understand the military advantage the transistor could be some of the military felt the invention should be classified and its development should go 'underground' as another Manhattan Project. Dr. Zahl argued against this on the basis of its economic advantage to the U.S. (Riordan and Hoddeson Pg. 162; Zahl 1968 Pg. 115). The military did not classify the transistor, which Bell Laboratories credited as one of the reasons for the rapid application of the transistor (Fagen 1978 Pg. 702). Understanding the value to its 'Miniaturization, Ruggedization and Reliability' program, the Signal Corps went all-out to expedite its application. The Corps promoted the new invention within industry, encouraging suppliers to retool for the new device and sponsored symposia. They also invested heavily in the advance of the technology, for example contracting research in the application of transistors to digital computers. To build up production capacity for military needs the Signal Corps even underwrote construction of transistor production plants by Western Electric and others (Misa 1985 Pg. 275).

As an extension of the Thermionics lab the Evans Laboratory Transistor section was established. It included a small transistor manufacturing facility in 1949, which produced fifty point-contact transistors (Misa 1985 Pg. 165). In a 1952 article in a Sunday edition of The Saturday Evening Post, Camp Evans Transistor Laboratory physicists predicted the use of transistor in computers, radio, and TV with future reduction in transistor size (Shalett 1952 Pg. 62).

Camp Evans and the Signal Corps support of the new invention had an accelerating effect upon the growth of the industry. Thomas Misa summaries as follows:

> "The Army Signal Corps not only underwrote the fundamental development of this technology, but also, as soon as it was released to industry, expedited the translation of prototypes into manufacturing processes and devices by strongly supporting engineering development." (Misa 1985 Pg. 284).

In the 1949 pre-integrated circuit days, the equipment size reductions relied on the combination of transistors and a Signal Corps invention, the printed circuit. Invented and patented at Camp Coles, this reduced the amount of labor-intensive hand wiring resulting in increased reliability, easier problem isolation and reduced costs (Shalett 1952 Pg. 62; Misa 1985 Pg. 263). Then known as "auto-sembly," it was a "dip-soldered printed wiring technique," (ERADCOM 1960s). Though greatly improved since the late 1940s, this technique is still used today in the manufacture of computer circuit boards (Dr. Richard Bingham, personal communication 1995). Beyond the use in land-based equipment such as radio and radar, the Army was making this investment in technology to move Signal Corps support of command to a new vantagepoint: space.

Many published scientific papers from Camp Evans in pure research were foundational to future advances in technology. As an example: Dr. Kurt Lehovec, Carl Accardo and Edward Jamgoghian authored one that was pioneering in the field of fiber-optics. After their presentation at The American Physical Society meeting in New York, William Shockley, an inventor of the transistor, told the authors this was information Bell Laboratories could make use of in their current development (Carl Accardo, personal communication December 1997). These investigations were instrumental in the development of the light-emitting diode (LED) by Bell Laboratories. Another paper involved scintillation counting noise reduction, an advance that aided researchers using these devices in research by increasing device sensitivity. The paper was authored by Carl Accardo and Dr. Hartmut Kallmann, a German scientist brought to the US in Operation Paperclip. Both papers were published as unclassified to benefit scientific advance.

Another area, in which Camp Evans scientists and engineers were involved, was post-war atom-bomb testing and effects characterization. Numerous Camp Evans personnel were on-hand for assistance in Nevada and the Pacific. A photo taken by Dennis Foster shows SCR-268 radar sets positioned in the desert prior to a blast. Dr. Zahl was in charge of some materials tests with a task force of forty men (Zahl 1966 Pg. 103-106). Donald Swingle of the meterology group used radar equipment to collect blast data at Pacific blasts (Donald Swingle personal communication 1996). In the 1952 article in The Saturday Evening Post, a photograph shows Dr. Zahl operating a radio controlled robot vehicle in a test area at Camp Evans. This vehicle was used in the Nevada atom-bomb tests to take samples of radioactive earth for analysis (Shalett 1952 Pg. 64). Dr. Kronenberg also attended some of the Pacific blasts.

The Korean War, 1950-1953

Research and development in miniaturization was partially interrupted by the Korean War, as Fort Monmouth scientists again concentrated on improving war equipment. Automatic mortar-locating radar (AN/MPQ-4), developed at Camp Evans in 1946, was used in the Korean War (ERADCOM 1980), and additional improvements were made in radio. Modifications were made to the SCR-584 to incorporate an analog tracking computer, the RD-54. The computer was designed at Camp Evans, with Electronic Associates, Eatontown, NJ, contracted for production. This analog computer was used to track 280mm cannon shells to locate the point of impact and later in the AN/MPQ-10 mortar tracking radar (Brendan Trinkaus letter August 24, 1999).

Camp Evans continued work on radar, vacuum tubes, and meteorological devices (Dr. Richard Bingham, personal communication 1995; Shalett 1952:3; Signal Corps Engineering Laboratories 1952). Direction finding equipment was placed on planes to locate enemy radio transmissions. At first the pilot would alter the flight path to find the signal. Over the years the systems became more complex and automatic (John Woodworth, oral history 1998).

In 1951, a WWII building was replaced with a new laboratory (Signal Corps Engineering Laboratories 1951). This was the radiation lab, identified as part of the Nucleonics Branch by the end of the Korean War. This included the Atomic Effects Section, Electronics Laboratory, and Radiac Instruments Section (9049), as well as the Radiochemistry and Dosimetry Section (9045) (Telephone Directory 1953). Small wonder that with so much concentrated science in one place, Fort Monmouth was often referred to as the Army's "House of Magic" (Shalett 1952 Pg. 34).

The McCarthy Era, 1950-1954

Julius Rosenberg was believed to have stolen radar and proximity fuse information from Fort Monmouth during his work as a electrical engineer there between 1940 and 1945 (Ewald 1984 Pg. 20; U.S. Senate 1954:I:19-20). Found guilty of treason, the Rosenbergs were finally executed on June 19, 1953, after numerous appeals.

In October 1953, McCarthy issued the claim that Julius Rosenberg had set up a wartime spy ring at Fort Monmouth that might still be in operation (Ewald 1984:93). Fort Monmouth was then known as the "house of spies". As proof, McCarthy produced an East German defector who claimed to have seen microfilmed top-secret radar manuals in an East German electronics lab. The Army, assisted by the Department of Justice's Criminal Division, insisted that there was no ring then in operation and that all radar books in East Germany were due to war-time lend-lease agreements, when the United States shared its radar secrets with the Soviets (Raines 1996 Pg. 343).

The claims and counter-claims led to subcommittee hearings from October through December of 1953 on the subject of "Army Signal Corps Subversion and Espionage" at Fort Monmouth. First held at the Foley Square Federal Building in New York City (the site of the Rosenberg trial), the proceedings were finally moved to the Capitol Building in Washington (Ewald 1984:156; U.S. Senate 1954:I:13). Among the many witnesses called to testify, the most prominent were Aaron Coleman, Carl Greenblum, and Joseph Levitsky, all former researchers at the Evans radar laboratories. Back in 1946, Coleman, a radar officer, had been caught outside the lab with classified materials, while both Greenblum and Levitsky had once carpooled with Julius Rosenberg (Ewald 1984:94; U.S. Senate 1954:II:69-73, 77-81, 93, 110). During the War, a draftsman, George Brown, had reported information leading to the uncovering of a communist cell at Camp Evans (George L. Brown, personal communication 1999).

While the subcommittee hearings were going on in New York, the Army was doing all it could to placate McCarthy without giving him any of the Fort Monmouth personnel files compiled by the FBI. Secretary of the Army, Robert Stevens, with Eisenhower's approval, insisted on the confidentiality of those files, while McCarthy insisted just as strongly on their release. While this tug of war was going on at the highest levels, General Kirke Lawton, commander of Fort Monmouth, began cooperating with McCarthy, even to the extent of suspending certain civilian employees during the hearings; 10 were suspended in mid-October, and that number had risen to 33 by November, although some of these were soon reinstated (Ewald 1984:90, 99, 123, 130). Mr. Bernard Martin, Mr. H. Kaplan, and Mr. William J. Jones were among those suspended and they speak about their experience in interviews. Those persons under

suspicion, but not suspended, were detailed to a series of World War II barracks, unofficially referred to as 'the leper colony', located along Watson Avenue, west of the other Monmouth Boulevard. There they were forced to work in isolation, without access to classified materials (Sam Stine, personal communication 1995).

During this same period, Roy Cohn, special counsel for the subcommittee, was having his own feud with the Army, a feud that would eventually lead to the famous "Army vs. McCarthy" confrontation of 1954. The feud began on 20 October 1953, when McCarthy, Cohn, Secretary of the Army Stevens, and other congressmen and Army personnel visited Camp Evans and walked up Avenue A, accompanied by the press, for a tour of the Evans radar laboratories (Ewald 1984:273-274; Sam Stine, personal communication 1995). Outside one of the top security buildings (9400), the party was stopped by security; the Senator and their entourage did not have the proper badges. Secretary Stevens made a spur of the moment decision; all elected officials of the U.S. government could enter, and all others had to remain outside. This excluded a furious Cohn and he vowed before witnesses that he would get the Army for this affront (Ewald 1984:273-274). Donald Swingle, who was there, was later told that Keith Schultes would have normally been in charge of security that day, but his friend Craig Crenshaw was substituting in his absence. Mr. Crenshaw refused entrance of the persons without secret clearance. He did not want to be a part of a security violation that could ruin his career (Donald Swingle personal communication 1997). The project housed in Building 9400, a small concrete block structure, was under direct Pentagon control. The Signal Corps simply provided space and as needed electronic expertise. When interviewed, knowledgeable persons would only describe the project as having international significance, not knowing if the project has been declassified as of 1999. In spite of McCarthy's considerable digging for espionage in the Army Signal Corps and Camp Evans in 1953 and 1954, not one individual was ever-prosecuted (Reeves 1982 Pg. 526).

McCarthy's allegations may have been true. Two Fort Monmouth Scientists, Joel Barr and Al Sarant fled to the Soviet Union. They may have been the Communist connection McCarthy was looking for. Emerging evidence indicates McCarthy may have been closer to the truth of Communists in the military than was once believed (Raines 1998 Pg. 15).

Achievements of the 1950s

Mark Swanson researched the 1950s work and activities at Camp Evans in the 1996 Cultural Resources report as quoted below:

> "It was during the McCarthy era, in April of 1953, that Dr. Stanley Kronenberg first came to work at Evans in the new Nucleonics Branch. Kronenberg was brought to the United States as a part of Operation Paper Clip, a program to recruit German and Austrian scientists for U.S. Army research in the late 1940s and early 1950s. Kronenberg, a native of Poland, had just finished a doctorate at the University of Vienna when he was asked by Army officials to work for the U.S. government (at the time, Vienna was still an occupied city, like Berlin). He accepted the offer and entered the country as a "classified parcel" (Dr. Stanley Kronenberg, personal communication 1995).
>
> In addition to Kronenberg, Operation Paper Clip recruited some 25 German and Austrian scientists to work at Fort Monmouth, most of whom worked under the direction of Harold Zahl in the Signal Corps Electronics Laboratories (Shalett 1952:13). It was in the middle to late 1950s, after the McCarthy disruptions, that Kronenberg and other scientists made their greatest achievements at Fort Monmouth.
>
> It was during this same period, in 1953, that the Army, through lease agreement, acquired the Deal Test Site. In previous decades, both Western Electric and Bell Laboratories had conducted research at Deal, and this work was now assumed directly by the Signal Corps. For the next 20 years, until 1973, the Deal Test Site served as an integral part of the Fort Monmouth operations (Deal Test Site ca. 1982).
>
> Little new construction was done at Evans, during this period, with one major exception, Building 9401. Officially listed as built in 1942, Building 9401 was almost completely overhauled in the early 1950s to house the new nucleonics facilities clustered in the area between the "H" radar buildings and the southernmost Testing and Training Area. The overhaul began in 1952, and Stanley Kronenberg arrived in time to help design part of the structure. Upon completion, Building 9401 was transformed into a concrete structure with walls 1.5 feet thick.

The center for Fort Monmouth's radiation testing, Building 9401 was dubbed "The Shield", by those who worked there. Kronenberg put his office at the front of the building in the early 1950s, and has worked there for over 40 years, even when he had other offices and other responsibilities (Dr. Stanley Kronenberg, personal communication 1995). The rest of the building consisted of at least four testing labs that have held a wide array of instruments used to measure radiation effects on Signal Corps components and equipment.

Working in Building 9401, Kronenberg and other researchers discovered new ways to measure radiation dosages. Called "dosimetry," the science of measuring radiation was essential for the protection of military personnel and equipment in the event of a nuclear disaster. Signal Corps equipment was tested in the dosimetry labs for radiation effects of all kinds: alpha, beta, and gamma rays; blast shock; and even some nuclear fall-out. Methods were sought to make Signal Corps equipment and components more resistant to the effects of such radiation (Dr. Stanley Kronenberg, personal communication 1995).

In the 1950s, one lab in Building 9401 contained a Van de Graaff Accelerator, believed to be the second commercial machine produced by the High Voltage Engineering Corporation, headed by Robert J. Van de Graaff. Generating up to two million volts, the Van de Graaff Accelerator was used to accelerate atomic particles studied in nuclear research (Fred Gentner, personal communication 1995; Dr. Stanley Kronenberg, personal communication 1995). The underground lab, known as the basement vault, has also been dubbed "the sarcophagus." Here, Kronenberg covered one wall with the text from an ancient Egyptian papyrus (historic photo 37). The "Egyptian wall" was later photographed and popularized by Life photographer Tom Alexander in the mid-1960s (Dr. Stanley Kronenberg, personal communication 1995).

In the Shield Machine Shop, immediately west-southwest of Building 9401, Kronenberg built his equipment prototypes, many of which garnered lucrative patents for the Army (Fred Gentner, personal communication 1995; Dr. Stanley Kronenberg, personal communication 1995).

Even greater improvements were made in the area of components, where emphasis was placed on development of smaller, standardized parts. The auto-sembly system of circuit production, first done in 1949, was perfected in the 1950s. Using the photo-etching process to mass produce wiring circuitry, auto-sembly reduced the space needed for electrical wiring in radios and other electrical devices (Shalett 1952:9). Much of this work was done at Squier Hall and, later, the Hexagon; results were tested at the Evans dosimetry labs. This work led to the micromodule circuit assembly, perfected in 1958. Wafer-thin, the micromodule circuits were uniform microelements joined together by peripheral wires to form a circuit module (ERADCOM 1960s).

The miniaturization of circuits and the development of transistors were probably the greatest achievements of the Fort Monmouth labs during the 1950s. Even in the early 1950s, these developments led to vast improvements in the early "mechanical brains," or computers, that had previously required vast numbers of electron tubes and personnel to operate (Shalett 1952:7-9). With every year, computers became smaller and more powerful, until, in the late 1970s, small "personal computers" were finally introduced to the market and simply revolutionized the world. Fort Monmouth played an early and important role in this development, and there were few achievements out of a Signal Corps laboratory greater than this (Reed and Swanson 1996 Pg. 33 – 38; also see Misa 1985; Riordan and Hoddeson 1997).

Satellites, 1957-Early 1960s

The course of Camp Evans history changed on October 4, 1957. The former Soviet Union successfully launched Sputnik I. Besides the bruising of national prestige, it started the 'space race' a contest between the Soviets and the Americans that would not end until American astronauts landed on the moon in July of 1969. To the U.S. Army Signal Corps engineers and scientists at Camp Evans and Deal Test site, the launch of sputnik I was a very personal life-changing event. For weeks, they labored in top-secret for marathon hours tracking this 'invader' from the Soviet Union. Using the tracking equipment at Diana Site on Marconi Road and antennas at Deal, they characterized the Sputnik. Spurred by Sputnik, the Eisenhower administration and Congress made huge allocations to the American space program, still in its infancy. One of the first new developments was the creation of the Institute for Exploratory Research. Based at Camp Evans, the Institute was directed by Harold Zahl and was divided into at least three divisions. Kronenberg

served as head of Division C (Fred Gentner, personal communication 1995; Dr. Stanley Kronenberg, personal communication 1995; Zizos 1994). One part of Division C was the Astro Observation Center, and most of those facilities were located at the Deal Test Site (Figure 14) (Deal Test Site ca. 1982; Electronic News 1961). To find some humor in the long hours of dedication, and cutting edge electronic work the scientists formed 'ROOSCH' – "the Royal Order Of Sputnik Chasers". A commendation and diploma was given to all U.S. Army Signal Corps employees who donated more than 100 hours to tracking Sputnik (Zahl 1960 Pg. 320-321).

The Navy launched the first U.S. satellite, "Vanguard," on 17 March 1958, and much of the electronics work for the project was done at Main Post, with parts fabrication done in the Camp Evans shops. The Vanguard satellites were the first to employ the Bell Laboratories 'Solar Cells' to supply the electrical power for the 'Minitrack' tracking signal. Other satellites followed: "Score," December 1958; "Vanguard II," February 1959; "TIROS I," April 1960; and "Courier 1B," October 1960. "Vanguard II" and "TIROS I" were weather satellites, the first that had ever been launched. TIROS I used television cameras to send pictures of cloud cover back to earth. The first TIROS I photos were received using the satellite dishes at the Diana site. The TIROS series of weather satellites has been improved as better components and updated versions are still being developed and launched by NASA. One shed (9088) provided a level of quality control by vibrating a satellite to be sure the design would withstand blast-off forces.

In order to carry out these projects, part of Fort Monmouth was reorganized by the Institute for Exploratory Research. The Project Diana area was turned over to the Astro Observation Center. Even earlier, the Diana area had been revamped. A large 50-ft. dish antenna, known as the "Diana Dish," had been erected in the mid-1950s just yards from the site of the original 1946 antenna. The Diana Dish was employed to keep track of the early satellites and, in 1958, received signals from Europe that had been bounced off the moon. The Diana Dish was soon joined by a 60-foot dish, known as the "Space Sentry," built in 1957 and also employed to track satellites (Bingham ca. 1990; Headquarters, Fort Monmouth, New Jersey 1958). The "Space Sentry" still stands on the Diana site.

Another important component advance in space science at Evans was the development of the basic technology used in Radioisotope Thermoelectric Generators (RTGs) in building 9045. When there is insufficient light to use solar cells, and batteries can not supply electrical power for the entire space mission, RTGs are used. The Galileo mission was the 24th U.S. space mission since 1961 to be powered partially or totally by nuclear power sources. These missions, for both the U.S. military and NASA, have included Earth-orbiting weather, communications, and navigational satellites, as well as the Apollo, Pioneer, Viking, and Voyager space programs.

Another component developed and patented at Camp Evans by Dennis Foster was the 'flyback transformer'. This component developed much higher voltages with lower currents than the standard transformer. It was used by RCA on the Apollo 11 color camera used on the moon (Nahal 1979 Pg. 7). This little appreciated, yet ubiquitous device can be found in every radar screen, color TV and every PC monitor today.

Satellite operations at Fort Monmouth began to wind down in the early 1960s as the Air Force and the National Aeronautics and Space Administration (NASA) took over the Army's role in the space race. Many scientists left Fort Monmouth to work for NASA, and soon communications satellites were overshadowed by manned space flights. The Institute for Exploratory Research lasted until the mid-1970s, when it too was disbanded (Deal Test Site ca. 1982; Dr. Stanley Kronenberg, personal communication 1995).

Achievements of Early 1960s

In 1962, the Signal Research and Development Laboratory changed its name to the U.S. Army Electronics Research and Development Laboratory, headquartered in the Hexagon in the Charles Wood area of Fort Monmouth. By this time, the Hexagon contained over 600 lab rooms and half of the Laboratory's labor force. The Hexagon was envisioned to replace and close all the remote sub-posts, but Camp Evans, remained open housing secret projects and prototype fabrication shops. The Laboratory and development at Camp Evans continued work on equipment development for the Army. Among the achievements of this period were the military application of the silicon transistor, improved solar cells for use in outer space, communications satellite work, and hand-held radar for use in combat. Work was also conducted on "lasers," an acronym for "light amplification by stimulated emission of radiation" (ERADCOM 1960s).

Mark Swanson documents:

> "During the 1960s, the Institute for Exploratory Research, located at both Deal and Evans, became more devoted to pure research in such fields as plasma physics, chemistry, nuclear physics, propagation research, and computer theory (ERADCOM 1960s). Stanley Kronenberg, director of the Institute of Exploratory Research, worked in Building 9401 as an applied researcher, analyzing the effects of nuclear weapons on Army equipment and operations. In 1962, he won an Army award for advances in neutron spectrometry. Ten years later, when Kronenberg won an award for directional sensing of nuclear radiation, he would be affiliated with the Electronics Technology and Devices Laboratory (Key Signal Corps Systems and Projects 1962; ECOM Information Office 1973:inside end cover)." (Reed and Swanson 1996 Pg. 41).

Also located at Camp Evans was the new Electronics Warfare Laboratory - EWL (ERADCOM 1960s). Organized by 1965, the EWL assumed much of the old Signal Corps radar work done at Camp Evans. During the 1960s, much of this work was devoted to the electronic protection of aircraft, a task that was made even more important by the Vietnam War (EWL ca. 1981). The Marconi hotel housed the EWL administration with the actual lab being housed in 9010. Jack Kaplan headed the Communications Intelligence area. John Woodworth headed the Special Purpose Direction Finding Branch. Harold Jaffe headed the ground based DF responsible for jammers. The EWL designed and contracted most of the equipment used by the Army Security Agency in Vietnam. Examples of airborne intercept/DF systems are: Pathfinder, Sure Thing (Gofer Delta), Café Girl, Left Bank, Left Jab, and Laffing Eagle. Ground Based intercept/DF systems: Café Blew, TRD-15, TRD-23 and TRD-26 (Dennis Buley, email communication 05/30/1999; Dave Fahr, oral history 1998). Some of these direction finders, TRD-16 for example, were used in West Germany to locate Soviet radios. The location and frequency of Soviet radio sets would give information on command and troop locations and the number of radios would indicate troop numbers.

A joint Army-Air Force project using early computers was designed to speed the interpretation of Air Force U-2 high altitude photos. MAGIIC was an automatic image interpretation system, which quickly found target information from spy-plane and later satellite images. Once developed, ten systems were initially contracted (John Schoenig, oral history 1998).

Despite the achievements made, the Evans area in general began a slow but steady decline in the early 1960s. The satellite work was transferred to NASA and the Air Force, and relocated to Florida and Texas. Along with the shrinking of funds came a decrease in personnel. Though barely noticeable in the 1960s, this trend accelerated in the 1970s and 1980s, and was checked only briefly by the Vietnam War (Dr. Stanley Kronenberg, personal communication 1995).

Vietnam War, 1965

Camp Evans was important to the war effort. It was during Vietnam that electron tubes, the mainstay of electronics equipment for over 50 years, were completely replaced in most functions by transistors and integrated circuits. Work was also done on night vision devices, mortar locators, and air-traffic control systems (CECOM Historical Office 1994:17).

At Camp Evans, the Combat Surveillance/Target Acquisition Lab developed a remotely monitored battlefield sensor system. Project REMBASS was designed to safeguard large areas of the country from Communist infiltration. This was developed to support the "McNamara Line" in Vietnam. Begun as an emergency project in 1966 the team worked all Thanksgiving weekend in the Marconi Hotel (9001), the team was ready to contract in five days. The first sensors were simply hoses, buried under ground in the jungle. Over time, improved devices would detect movement using sound, radar, and infrared light. These devices communicated with radio relays that were designed at Camp Evans, tested in Arizona and fielded within a year in the Vietnam jungles and Mai Cong Delta. Some of these sensors were disguised: one type was encased in epoxy and passed for dog feces; others looked like twigs. (John Schoeing, oral history interview 1998). Still in use today the system has improved and has been renamed I-REMBASS for the computer integrated REMBASS system.

The Vietnamese would use the ionosphere to make radio direction finding very difficult. Radio transmissions were sent upward reflecting all over. At Evans, the 'ManPack' DF system was developed to find enemy radios and mortar groups by finding stray signals the equipment inadvertently gave off. As the system was field-tested in Vietnam but still classified, Camp Evans engineers, with their equipment had to pass information to ASA headquarters in Saigon, not the local base personnel. Often the base would be

shelled before the enemy location information worked its way through command back to the base (Dave Pfall, oral history 1998).

An improved version of the AN/MPQ-4 mortar locating radar developed at Evans for the Korean conflict was used in Vietnam. It was so effective that Viet Cong mortar groups would not attack when they could observe the turning of the radar antenna. Firebase personnel would often keep the antenna rotating even if the electronics were down (Neil Wilson, personal communication 1999).

Even before American involvement in the war was over, Fort Monmouth began a series of changes that would lead to a complete Army overhaul in the late 1970s. First was the creation of the Electronics Technology and Devices Laboratory (ET&DL), created in 1971 from parts of the Electronics Components Laboratory and the old Institute for Exploratory Research (ECOM Information Office 1973:inside end cover). In 1972, the EWL moved its headquarters from Camp Evans to Building 2705, behind the Hexagon in the Camp Charles Wood area (EWL ca. 1981). The lab remained at Evans. The Marconi Hotel (Building 9001) became headquarters for the Combat Surveillance and Target Acquisition Laboratory (Evans Area ca. 1980).

Research in the 1970s and 1980s

During this period of reorganization, electronics work continued at Camp Evans. Rarely was physical equipment moved around as a result of command changes; labs simply reported to different commands (Dr. Richard Bingham, personal communication 1995). Unfortunately, more is known about changes in command than about the research that went on during this same period. Not only are the research projects often very specialized, but, because they are more recent, knowledge of their function is often more restricted than the earlier work at Camp Evans.

A project housed in building 9039 was the Atmospheric Sciences Group. In 1983 a replacement for the weather radiosonde system GMD-1 was fielded. This successful system used an improved radiosonde integrated with early HP desktops to collect more accurate upper atmosphere data for Army artillery accuracy. The totally automated system featured field hardened HP PCs and maybe the first fielding of a PC system in the Army (John Schoenig, oral history 1998).

Much of the information about recent research has come out of the EWL, whose mission has been to provide the Army with electronic warfare devices. This includes everything from sensors, direction-finding devices, emitter locators, jamming devices, and various computer driven processing devices. Direction finding devices were developed which could find radio locations which bounced signals off the ionosphere (Dave Pfall, oral history 1998). Some of the most prominent devices have been "Teampack," a ground based radio locator that identified and located mobile communications emitters. Another is "Guardrail V," an airborne radio and direction-finding system. In addition to these and other warning systems designed to be used in combat, the EWL has also done research in missile detection, targeting by radio location, ultraviolet instruments, and various laser technologies (ECOM Information Office ca. 1980). The EWL and other labs at Fort Monmouth are even believed to have had some research input into the Strategic Defense Initiative (SDI), popularly known as the "Star Wars" defense, popularized during the Reagan years (Dr. Richard Bingham, personal communication 1995). Building 9049, a converted WWII antenna shelter was used for a SDI project 'Power Pulse'.

Massive electric currents and high voltage were used to test components of a SDI system. By the mid 1980s the EWL had relocated completely to the Charles Wood area, leaving Camp Evans.

Desert Storm

At least two Camp Evans based projects contributed to victory in Desert Storm. One is credited with alerting U.S. forces of an Iraqi attack on a Saudi Arabian border town. The other decimated the experienced Iraqi artillery crews. Also, passive night-vision equipment development was managed from Camp Evans. Remote controlled drones development was managed at Camp Evans and played a role in the ground conflict.

The first project, 'Joint STARS' is an Army and Air Force wide area surveillance system. The system provides battle management and targeting information. It supports situation development and targeting of mobile and fixed ground targets. The system is designed

to detect, locate, and track moving and stationary targets beyond the forward line of troops. It is designed to operate effectively in all weathers, at long range and real time. Equipment includes a jet aircraft, the E-8 (Air Force) to collect radar data and transmit to mobile ground based stations (Army). The ground-based control stations receive, processes, stores, displays and disseminates battlefield information. Computers in the control station analyze the information and may choose and fire appropriate weapons, normally missiles, to attack the targets. The very successful system was rushed for deployment in Desert Storm (Monmouth Message 10/12/1990 Pg. 13; John Clancy, personal communication 1998).

In August of 1997 the last Army project left Building 9001, the Marconi hotel. This was Project FIREFINDER, officially started in 1972. This system united computer analysis with radar to automatically locate multiple enemy incoming mortar and artillery and respond with coordinated counter-fire. As the birthplace of the original WWII mortar locating radar built by John Marchetti and his team, Camp Evans was the home of this specialty radar for over fifty years. Improving versions of the original mortar location radar saw action in WWII, Korea, and Vietnam. One example from the 1950s is the MPQ-4. All its prototype components were fabricated in the Camp Evans shops (Brendan Trinkles personal communication 1999). Finally in early 1972 the concept of an integrated system developed and the first FIREFINDER project team was formed. A photograph of the original 1972 team was taken in the Marconi hotel in a meeting room that in 1914 was the billiards room. A number of the WWII constructed radar shelters (9015, 9017,) were specially modified to house mobile equipment during Firefinder development. The complete system was tested in 1978 and given the designations AN//TPQ-36 and AN/TPQ-37. The systems were deployed during the Cold War in West Germany and Korea. The system success during Desert Storm is vividly expressed by a captured Iraqi POW, "We couldn't fire our artillery; if we did, the steel rain would come...all we could do was surrender" (Firefinder 1997 Pg 1-6).

SUMMARY

Much more research needs to be done to fully characterize the impact of innovations, personnel, projects, and scientific research of Camp Evans upon communications history and the complete role in national defense. Potential sources of information, yet to be fully utilized, are the American Marconi publication *Wireless Age,* the Smithsonian's Radioana collection, WWI Naval station records, Signal Corps Annual reports, and patents granted to personnel of Camp Evans. Additional oral histories will also contribute information.

The documented information, oral histories, and research to date establish Camp Evans as a historic location of exceptional significance, worthy of preservation. As an official project of the National Trust for Historic Preservation and the White House Millennium Council 'Save America's Treasures' program, listing Camp Evans on the National Register of Historic Places as a Historic District is appropriate.

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1913f Plan of Second Floor, Hotel, Station No. 6
1913g Construction, Second Floor, Hotel, Station No. 6
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1913i Roof Plan-Steelwork, Hotel, Station No. 6.
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Boundary Description (Please reference historic photo 1 and map 2 - 3)

Starting at Gate 2 on Monmoth Boulevard the district boundary would follow the Boulevard north-east to Marconi Road. Then north-west to Laural Gully brook and follow the brook north-east to the Shark River. The boundary would follow the edge of the Shark River north of 9004 to and including the Diana site. From the Diana site the boundary would follow Marconi Road westward to the east fence corner along Marconi Road east of the hotel. From this corner the boundary would follow the fence south to a line even with Fourth Street. The boundary would follow this line westward along Fourth Street back to Gate 2.

Boundary Justification

The boundaries for the Camp Evans Historic district encompass the heart of the significant historic activities and associations with persons of historic impact. The district includes all the Marconi Belmar Wireless station buildings, WWI Naval communications center, the most significant WWII Signal Corps Radar Laboratory buildings, the complete Diana site, and the most significant research era buildings. In interviews with persons involved at Camp Evans during the development of radar in WW2 the buildings outside the district were used for the storage of parts and were for the most part support buildings. Later, during the research period some buildings would be involved with an aspect of a significant project, but again the Marconi hotel (9001) and the two 'H' buildings held the key laboratories, offices, and shops. The one exception is the radiation research area, buildings 9401 and 9045. Significant research and breakthroughs relating to space exploration were carried on in these buildings. The BRAC environmental remediation procedures and testing process found traces of radiation in both buildings as well as mercury traces in the sewer lines. The removal of the trace contamination to meet current health and safety standards has left the buildings heavily damaged and structurally unsound. The will be razed in the future.

The establishment of the Camp Evans Historic District would enable the preservation of the last intact east coast 1912 Marconi high-power wireless station, WWII era radar laboratory, and early space research. The character, beauty, and integrity of this site would be intact for the benefit, education, and enjoyment of future generations. The district is 55 acres.

HISTORIC PHOTOGRAPHS – Labels

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1970s
Location of Negative – Ft. Monmouth CECOM Historian Collection
Aerial view of Camp Evans from Shark River looking south
Historic Photo 1 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1970s
Location of Negative – Ft. Monmouth CECOM Historian Collection
Labeled - Aerial view of Camp Evans from Shark River looking south
Historic Photo 1a of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – E. F. Henderson
Date of photograph – April 12, 1914
Location of Negative – Glass negatives property of Mr. Russ Henderson, Wall Township, NJ.
View of Marconi Wireless station at Belmar from Shark River Hills looking south
Historic Photo 2 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – E. F. Henderson
Date of photograph – April 12, 1914
Location of Negative – Glass negatives property of Mr. Russ Henderson, Wall Township, N.J.
Labeled - View of Marconi Wireless station at Belmar from Shark River Hills looking south. Source: Reed and Swanson 1999
Historic Photo 2a of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published November 1913, *Wireless World*
Location of Negative – unknown
View of construction of Marconi Wireless station at New Brunswick, NJ.
Historic Photo 3 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published November 1913, *Wireless World*
Location of Negative – unknown
Lafayette House used as office during construction of Marconi Wireless station at New Brunswick, N.J.
Historic Photo 4 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published November 1913, *Wireless World*
Location of Negative – unknown
Digging Foundations for the Receiving Station , Marconi Wireless station at Belmar
Historic Photo 5 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published 1913, *Wireless Age*
Location of Negative – unknown
Rear view of hotel at Belmar under construction, showing steel girders of roof, (building 9001)
Historic Photo 6 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published 1913, *Wireless Age*
Location of Negative – unknown
View of wireless mast No. 6 at Belmar, during erection
Historic Photo 7 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Postcard, pub. By Frank E. Moyer, Druggist, Belmar, NJ.
Date of photograph – 1914+
Location of Negative – unknown, postcard courtesy of Mr. Richard Napoliton
Hotel at Marconi Wireless Station, Belmar, NJ. – looking southwest, (building 9001)
Historic Photo 8 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Postcard, pub. By Frank E. Moyer, Druggist, Belmar, NJ.
Date of photograph – 1914+
Location of Negative – unknown, postcard courtesy of Mr. Richard Napoliton
Power plant at Marconi Wireless Station, Belmar, NJ. (building 9006)– looking south, note white farmhouse moved in 1942
Historic Photo 9 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – E. F. Henderson
Date of photograph – April 12, 1914
Location of Negative – Glass negatives property of Mr. Russ Henderson, Wall Township, N.J.
View of 5 or 6 wireless reception masts at Belmar station looking north
Historic Photo 10 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
View of Operating Building at Belmar from Shark River.
Historic Photo 11 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
Interior view of Power House Building at New Brunswick, NJ.
Historic Photo 12 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
Interior view of Hotel (9001) – Lounge, looking toward fireplace.
Historic Photo 13 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
Hotel (9001), Engineer's cottage (9003), hotel piazza
Historic Photo 14 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
Engineer's cottage (9003) – living room
Historic Photo 15 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
Marconi operating building (9004) – from Shark River, looking south
Historic Photo 16 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
Marconi hotel building (9001) – looking east, front view of front and west piazza
Historic Photo 17 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Interior view of hotel (9001) – Lounge. (b) Hotel Foyer
Historic Photo 18 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Interior view of hotel dining room (9001) (b) Hotel kitchen showing freezers
Historic Photo 19 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Interior view of typical hotel guest room (9001) – Lounge. (b) Sitting room.
Historic Photo 20 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Station Gardens with power plant (9006) and well house in distance. (b) Hotel showers (9001).
Historic Photo 21 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Station manager's cottage (9002) and landscaped grounds. (b) Engineer in charge cottage (9003).
Historic Photo 22 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Interior of manager's cottage dining room (9002). (b) Interior of manager's cottage living room (9002).
Historic Photo 23 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Station manager's office in operating building (9004). (b) Station power plant (9006).
Historic Photo 24 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Path from operating building (9004) up hill to cottages and hotel. (b) View of Shark River showing balancing towers, looking east.
Historic Photo 25 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
Hotel (9001) front piazza looking east
Historic Photo 26 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Photo-Tone postcard, pub. By Eagle Postcard View Co., Inc. New York
Date of photograph – 1938
Location of Negative – unknown, postcard courtesy of Mr. Richard Napoliton
The King's College, Belmar, NJ. - Former hotel at Marconi Wireless Station, Belmar, NJ. – looking west (building 9001).
Historic Photo 27 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1938
Location of Negative – unknown
The King's College 1938 freshman class picture in front of building 9001, looking east
Historic Photo 28 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Fred Carl
Date of photograph – August 1999
Location of Negative – Wall Township, NJ.
The King's College Gym (9007) prior to demolition, looking north
Historic Photo 29 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Army Contractor
Date of photograph – September 29, 1999
Location of Negative – Wall Township, NJ.
The King's College Gym (9007) demolition in progress, looking north
Historic Photo 30 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – U.S. Army
Date of photograph – 1943 ?
Location of Negative – unknown.
U.S. Army radar pioneers group photo on west steps in front of former Marconi hotel (9001).
Historic Photo 31 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Asbury Park Press
Date of photograph – 1949
Location of Negative – Asbury Park Press files, Neptune, NJ.
Rear view of Marconi operating building (9004) with building 9005 and Marconi balancing tower in distance.
Historic Photo 32 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – James Stigliano
Date of photograph – 1995
Location of Negative – Wall Township, N.J..
Elevated rear view of radar laboratory 'H' building (9010/9011) with building 9032 roof and Marconi hotel (9001) in distance.
Historic Photo 33 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1946
Location of Negative – unknown
Aerial rear view of SCR-271-D radar at Diana site with Shark River in distance.
Historic Photo 34 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown, source: Raines 1996 Pg. 331
Date of photograph – 1946
Location of Negative – unknown
View of SCR-271-D radar antenna at Diana site.
Historic Photo 35 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown, source: Raines 1996 Pg. 332
Date of photograph – 1946
Location of Negative – unknown
View of 1959 Diana site with Diana Dish and Space Sentry.
Historic Photo 36 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – James Stigliano
Date of photograph – 1995
Location of Negative – Wall Township, NJ.
Dr. Kronenberg's underground lab in building 9401, known as "the sarcophagus."
Historic Photo 37 of 37

PHOTGRAPHS

The following items are common to all photographs and are not repeated at the individual labels below:

Name of photographer – Robert Judge
Date of photograph – October 1, 1999
Location of Original Negatives – Robert Judge, Neptune, NJ.

Photograph Labels

Camp Evans Historic District, Monmouth County, NJ.
Sycamore lined Marconi Road looking east, Manager's cottage (9002) to left of road, hotel (9001) to right, behind Army security fence.
Photo 1 of 20

Camp Evans Historic District, Monmouth County, NJ.
Front of Marconi hotel (9001) behind overgrown shrubs and Army security fence.
Photo 2 of 20

Camp Evans Historic District, Monmouth County, NJ.
Rear of Marconi hotel (9001), connection to building 9032 to left.
Photo 3 of 20

Camp Evans Historic District, Monmouth County, NJ.
View of both cottages from across Marconi Road, building 9003 to left, building 9002 to right.
Photo 4 of 20

Camp Evans Historic District, Monmouth County, NJ.
View of building 9002 – Manager's cottage, military residence.
Photo 5 of 20

Camp Evans Historic District, Monmouth County, NJ.
View of building 9003 – Engineer in charge cottage, military residence.
Photo 6 of 20

Camp Evans Historic District, Monmouth County, NJ.
View of building 9004 – Marconi operating building with building 9005 to left.
Photo 7 of 20

Camp Evans Historic District, Monmouth County, NJ.
View of building 9006 – Marconi heat and light, power plant building with transformer vault from demolished building 9007 to left.
Photo 8 of 20

Camp Evans Historic District, Monmouth County, NJ.
North side view of building 9006 – Marconi heat and light, power plant building showing front addition on left and boiler room addition to right.
Photo 9 of 20

Camp Evans Historic District, Monmouth County, NJ.
West side end view of 'H' building 9010 / 9011 along Second Street.
Photo 10 of 20

Camp Evans Historic District, Monmouth County, NJ.
Front side view of 'H' building 9010 along Second Street, looking east.
Photo 11 of 20

Camp Evans Historic District, Monmouth County, NJ.
East side end view of 'H' building 9036 / 9037, Between Third and Fourth Street.
Photo 12 of 20

Camp Evans Historic District, Monmouth County, NJ.
East side end view of 'H' building 9036, along Third Street. Platform 9178 on right.
Photo 13 of 20

Camp Evans Historic District, Monmouth County, NJ.
Dymaxion deployment Units, along Third Street, on south side of 'H' building 9011.
Photo 14 of 20

Camp Evans Historic District, Monmouth County, NJ.
West side of building 9034 facing Third Street.
Photo 15 of 20

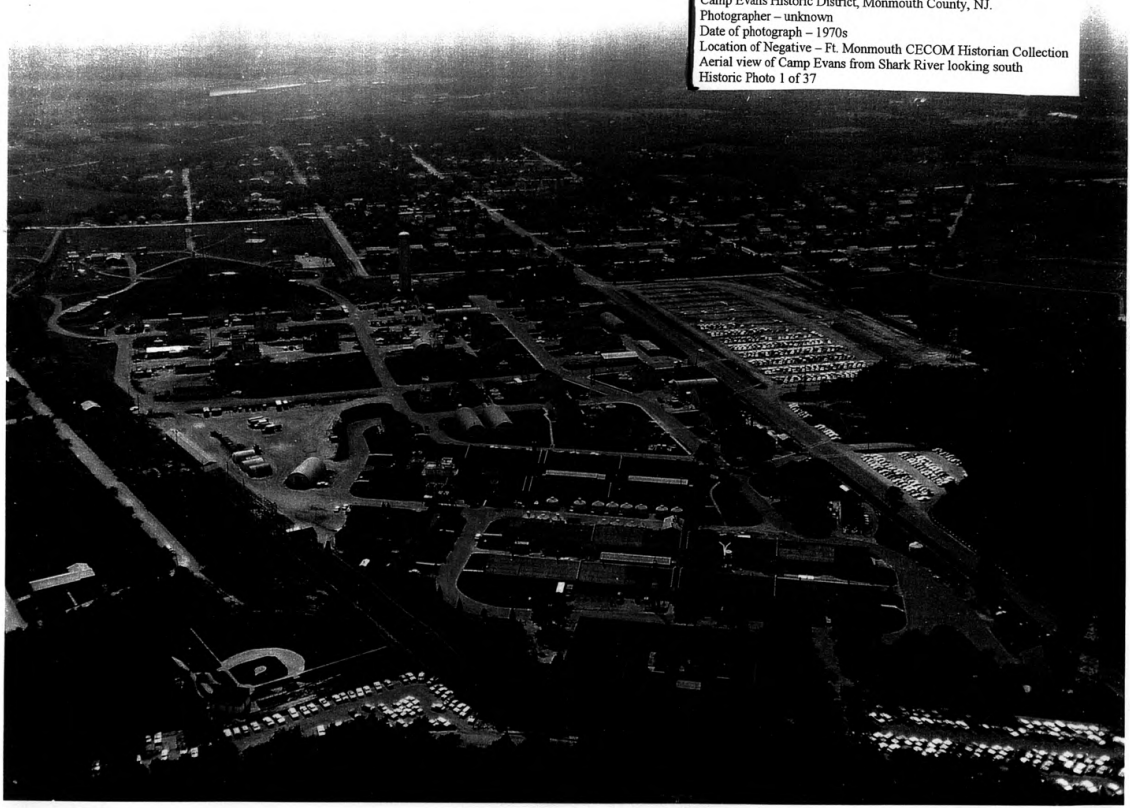
Camp Evans Historic District, Monmouth County, NJ.
East side of building 9034 facing Third Street. Chimney of oil heat plant visible on rignt.
Photo 16 of 20

Camp Evans Historic District, Monmouth County, NJ.
South side of radar shelter, building 9017 facing Fifth Street. Metal roll doors have replaced original double wooden doors.
Photo 17 of 20

Camp Evans Historic District, Monmouth County, NJ.
Overview of Diana site. Space sentry satellite tracking antenna with support facility (9162) to left, former Diana dish support facility (9116) to left.
Photo 18 of 20

Camp Evans Historic District, Monmouth County, NJ.
Support facility building (9116) for Diana dish (dismantled).
Photo 19 of 20

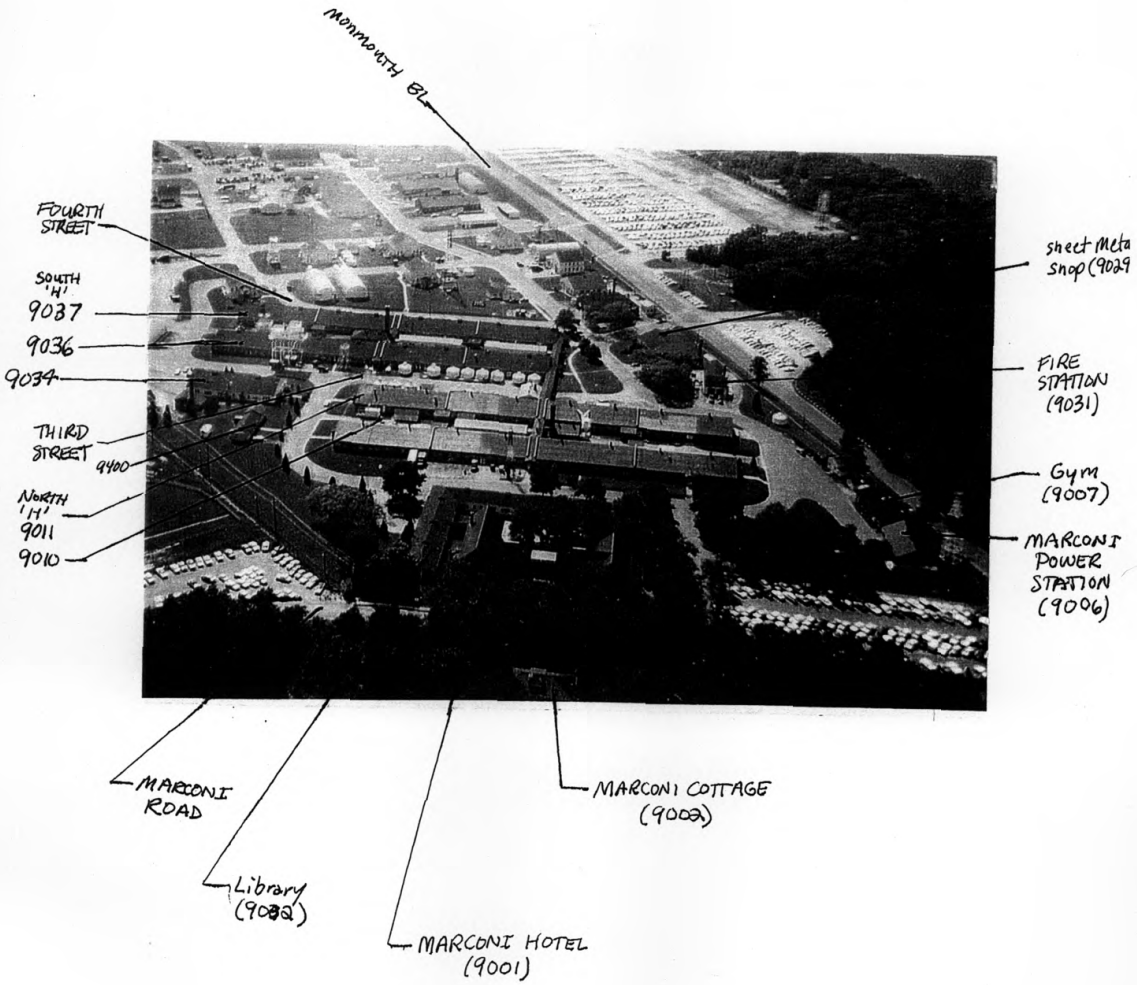
Camp Evans Historic District, Monmouth County, NJ.
Sixty-foot diameter, Space Sentry satellite tracking antenna with support facility building (9162) to left. WWII era wooden tower behind building.
Photo 20 of 20



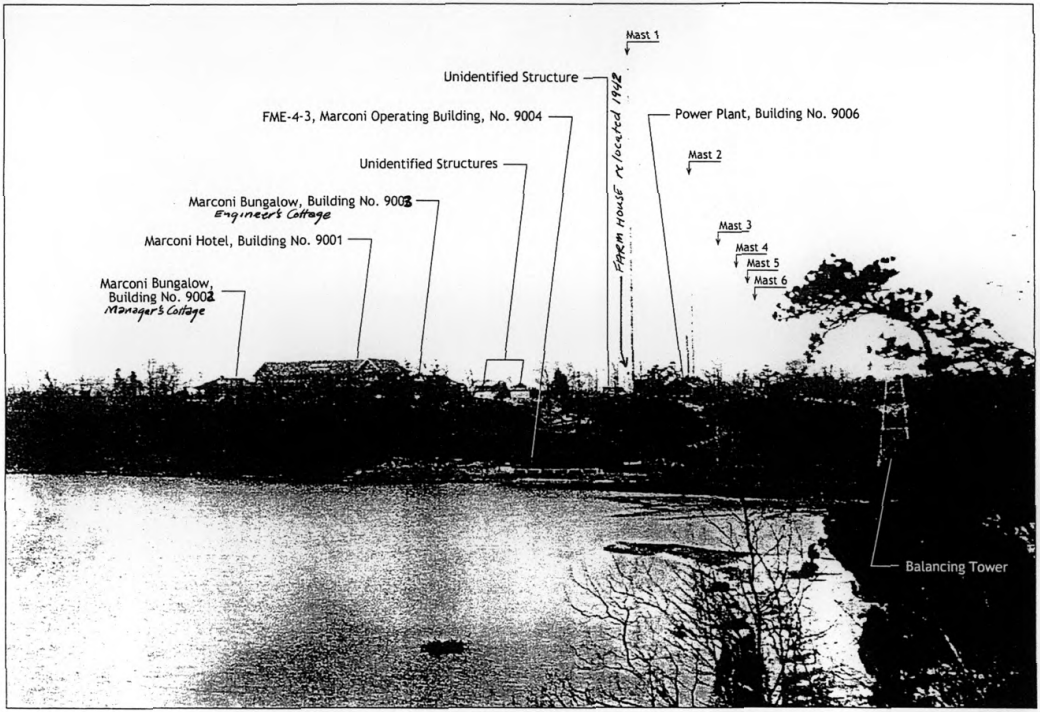
Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1970s
Location of Negative – Ft. Monmouth CECOM Historian Collection
Aerial view of Camp Evans from Shark River looking south
Historic Photo 1 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1970s
Location of Negative – Ft. Monmouth CECOM Historian Collection
Labeled - Aerial view of Camp Evans from Shark River looking south
Historic Photo 1a of 37

Source CECOM Command Historian Collection.



Camp Evans Historic District, Monmouth County, NJ.
Photographer – E. F. Henderson
Date of photograph – April 12, 1914
Location of Negative – Glass negatives property of Mr. Russ Henderson, Wall Township, NJ.
View of Marconi Wireless station at Belmar from Shark River Hills looking south
Historic Photo 2 of 37



Camp Evans Historic District, Monmouth County, NJ.
Photographer – E. F. Henderson
Date of photograph – April 12, 1914
Location of Negative – Glass negatives property of Mr. Russ Henderson, Wall Township, N.J. Source Reed and Swanson 1999
Labeled - View of Marconi Wireless station at Belmar from Shark River Hills looking south
Historic Photo 2a of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published November 1913, *Wireless World*

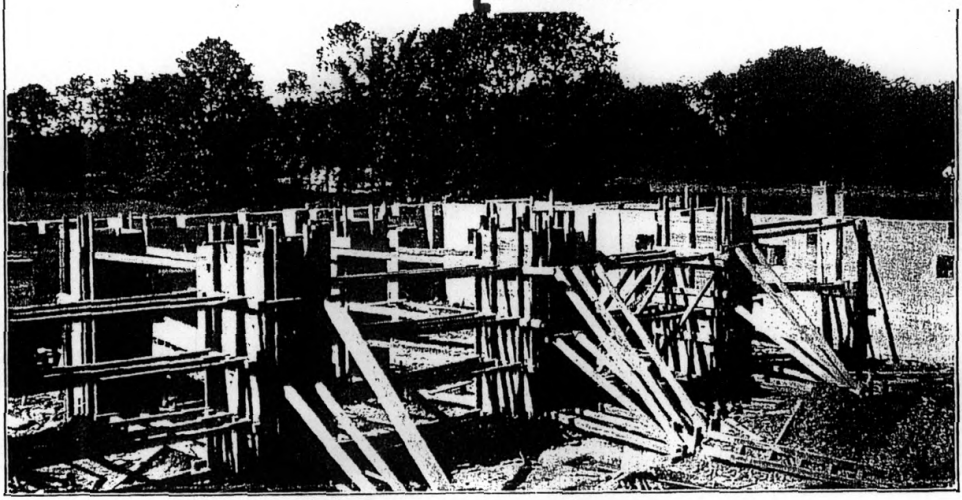
Transatlantic Wireless Telegraphy

THE NEW JERSEY STATION

GOOD progress is being made with the construction of the high-power stations which, when completed, will add enormously to the public facilities for the use of transatlantic wireless telegraphy. The Clifden-Glace Bay service, which, since 1908, has been in regular continuous communication, day and night, carrying commercial, public, and press messages, has hitherto been the only service in existence affording direct wireless communication between the Eastern and Western hemispheres. But it will not long enjoy its "splendid isolation," for other stations are now being erected which will bring the North American Continent nearer (in a telegraphic sense) to England and other European countries, thus relieving the pressure of traffic upon the Clifden-Glace Bay stations, and coping with the enormously increased use of transatlantic telegraphic communication which the cheapness and efficiency of the Marconi service has made possible.

From time to time we hope to be able to furnish our readers with details of the stations which are being erected on both sides of the Atlantic in fulfilment of this scheme. In the meantime, a few preliminary notes concerning the stations now being erected near New York may be of interest.

Location of Negative – unknown
View of construction of Marconi Wireless station at New Brunswick, NJ.
Historic Photo 3 of 37



Site of the Transmitting Section of the New Jersey Station, New Brunswick.

Two miles out from the historic city of New Brunswick, N.J., on a road that follows the banks of the Raritan river and the Raritan canal, lies the transmitting section of the wireless station which will bring the United States in direct communication with England. Approaching the site from the south one sees a beautiful meadow stretching from the road to the canal bank. In this meadow are located the power-house, the auxiliary transmitting office, and the first set of two masts. To the west of the road

the land rises sharply for about a thousand feet, and then runs nearly level for a mile or more. Looking up this rise the two cottages for the chief engineer and the assistant engineer are to be seen, and, further up the hill, the building which will accommodate the engineering staff, the operators required to work the auxiliary receiving apparatus and the riggers who keep the aerials and the mast system in shape.

The power-house is now beginning to take shape, for the concrete work is completed up to the first story and ready for the brick work. The foundations for the motor generators are well under way, and the steel girders and beams for the first floor are being erected. A feature which cannot fail to be noted is the permanent and fireproof nature of the work on all of the buildings.

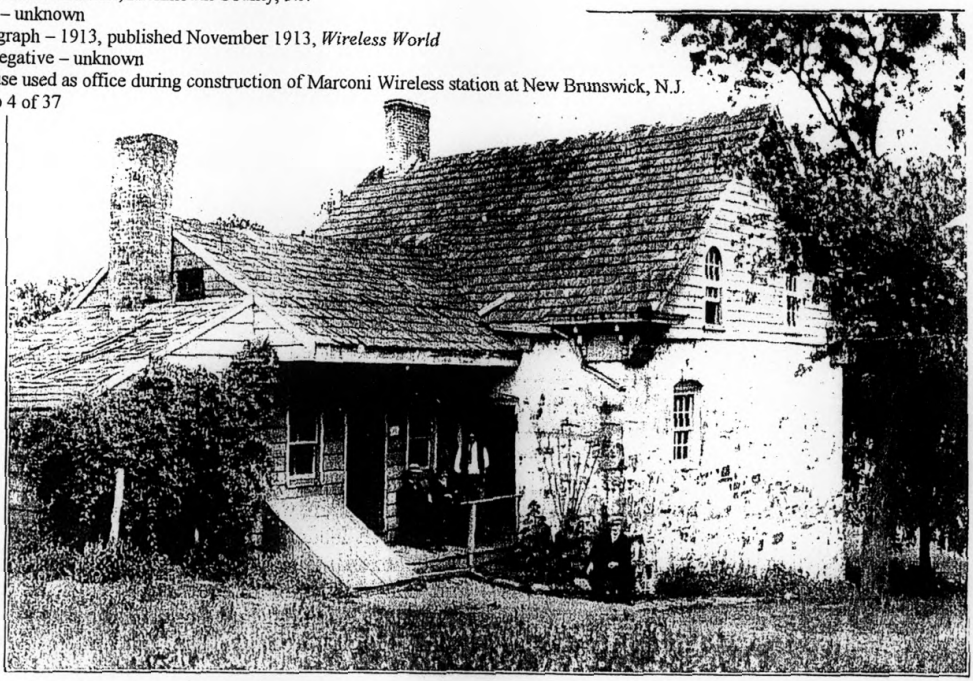
The auxiliary operating building is about 100 feet north of the power-house, has the brick work completed to the roof, and awaits the steel and roof tile to finish the structure of the building. All the buildings at this station are of rough tapestry brick, laid up with a wide joint in black mortar. With re tile roofs and an attractive design they mal a handsome appearance.

An old historic farmhouse, long since pa its prime, is being utilised as the constructio office. This house has stood for more tha one hundred and fifty years, and, judgin from the appearance of the huge hand hew timbers, will stand for another century or s In revolutionary days this dilapidated hous was a mansion of importance, having bee at one time the paymasters' office of th Revolutionary Army; and rumour has i that Lafayette had his headquarters her for a time during the American War c Independence.

The receiving section of the New Jerse station is at Belmar, the road to which lead along the Shark River, a famous salt wate inlet, which, during the summer months is the resort of launches and other pleasur craft. The countryside looks rather de serted as one travels to the Marconi Station At the station, however, all is life an bustle.

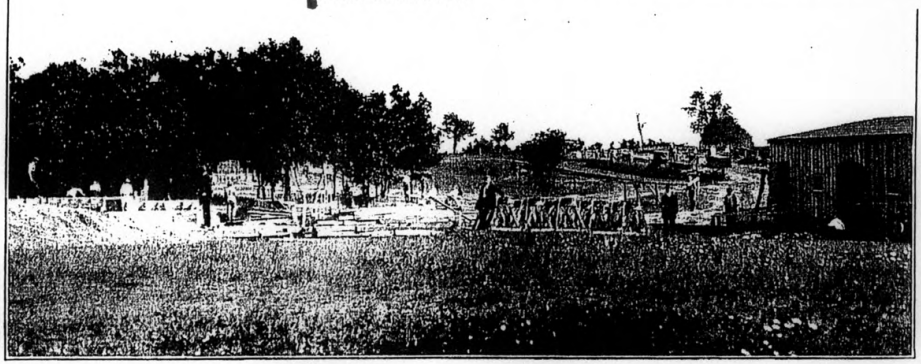
The operating house is at the foot of th

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published November 1913, *Wireless World*
Location of Negative – unknown
Lafayette House used as office during construction of Marconi Wireless station at New Brunswick, N.J.
Historic Photo 4 of 37



"Lafayette House." An historic dwelling converted to the use of the Staff erecting the New Brunswick Station.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published November 1913, *Wireless World*
Location of Negative – unknown
Digging Foundations for the Receiving Station , Marconi Wireless station at Belmar
Historic Photo 5 of 37



Digging Foundations for the Receiving Station at Belmar, N.J.

hill close to the river. From this building the receiving aerials will rise to the first mast located on top of the hill. Crossing the road at nearly right angles, and stretching westward for almost a mile, the aerials will be carried on the top of six masts, each 300 feet high. The back ends of these aerials will be carried down at an angle of thirty degrees, being insulated near the mast top and having steel running ropes attached. These ropes come down to the anchors, which consist of a pillar 15 feet high, with heavy iron weights free to slide up and down on them.

These weights balance the pull of the wires and are calculated to keep a definite tension in the aerial wires at all times, so that when the wind blows or sleet incrusts the aerials, the spans between the masts will sag down and the counterweights rise, keeping the tension constant. This straining pillar anchorage, as it is called, is an ingenious device which is a new departure in cable suspension.

At Belmar a large force is required to handle the operating work, and much will be done to make the residential quarters attractive to live in. Summer boating on Shark River is a pastime which is looked forward to with pleasure, while tennis and outdoor sport will be encouraged; in fact, a happy little community will soon be thriving in this neighbourhood.

AN ALASKAN CHAIN.

AS we announced last month, the American Marconi Company have in hand the erection of stations at Ketchikan and Juneau. Stations are already in existence at both of these points, but only ship business is handled. An entirely new station will be erected at Ketchikan, consisting of a 15-kw. synchronous rotating gap transmitter of the latest type and the usual receiving apparatus. Four skeleton steel towers will be erected, and the antenna so arranged as to work efficiently with Seattle, a distance of some six hundred miles to the south.

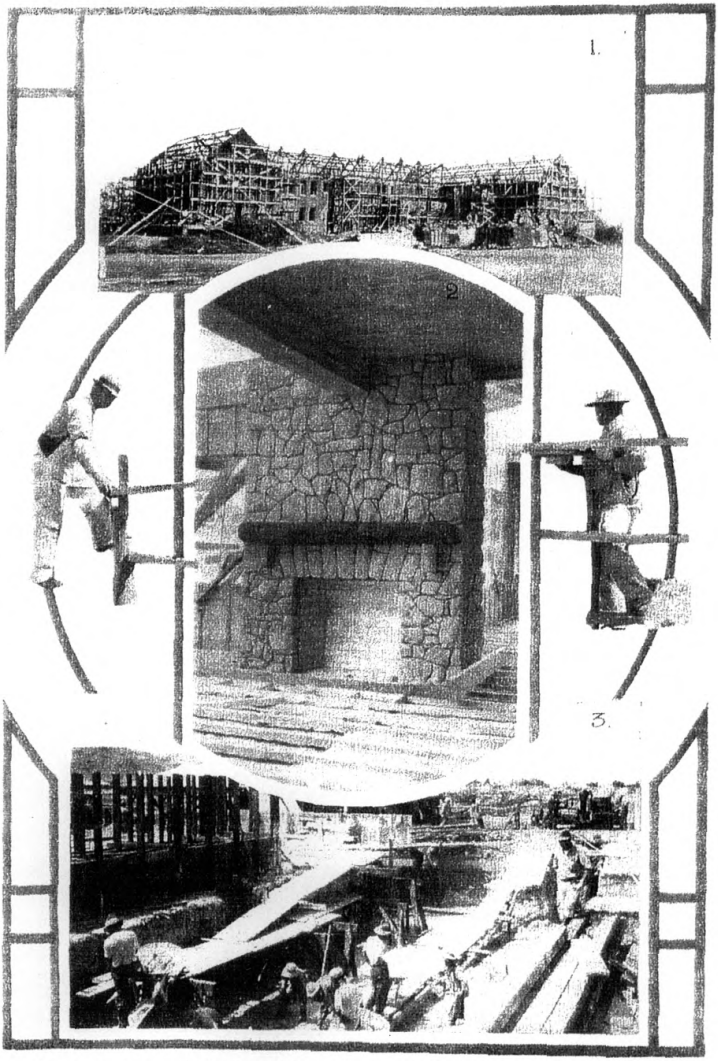
Ketchikan station will also work to the north to a distance of more than two hundred miles with the station at Juneau, Alaska. This latter station will be entirely rebuilt, and will be fitted with a 10-kw. transmitter and two skeleton steel towers.

These two stations are intended to be the first links of a chain to provide Alaska with a commercial wireless service connecting it with the United States. As business develops, the chain will be developed and provided with feeders further north.

The existing cable rate between Juneau and Ketchikan is 6 cents per word, and between Ketchikan and Seattle 19 cents per word. It is probable that the rates for communication between these points will be considerably reduced when the Marconi service is inaugurated.

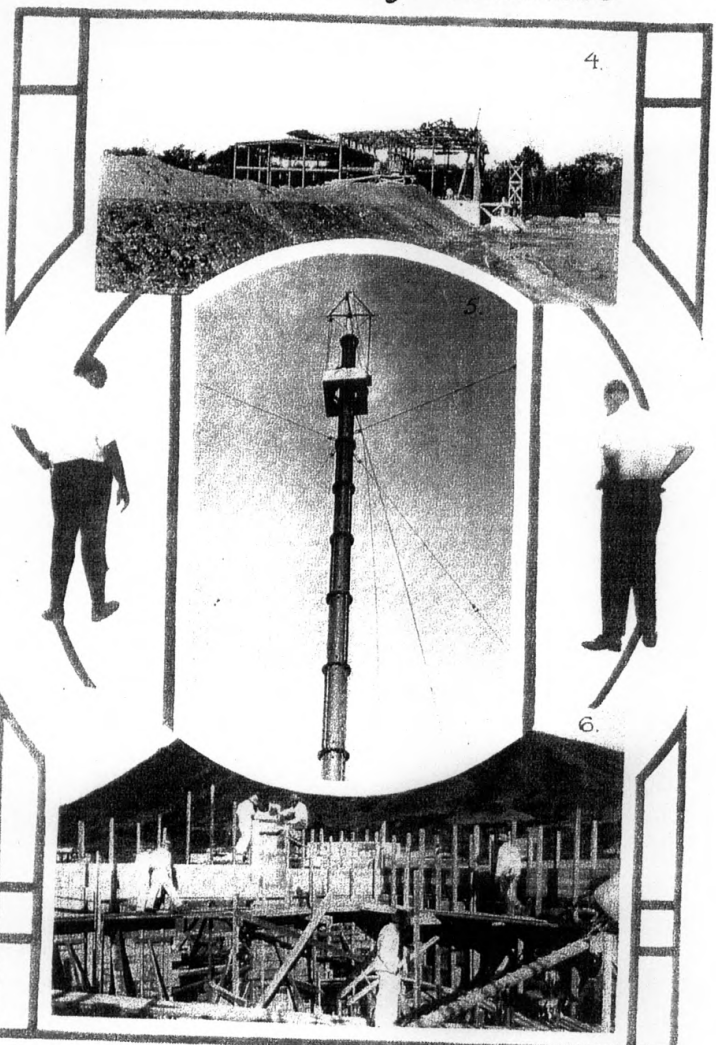
Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published 1913, *Wireless Age*
Location of Negative – unknown
Rear view of hotel at Belmar under construction, showing steel girders of roof, (building 9001)
Historic Photo 6 of 37

Preparing to Connect the



(1) Rear view of the hotel at Belmar, showing the steel girders of the roof in position; an idea of the great size of this structure may be had by closely examining the photograph, in which men may be seen working on the right wing of the building. (2) The fireplace in the hotel for operators at Marshalls, Cal. (3) Excavating the condenser pit for the powerhouse at the Kahuku transmitting site.

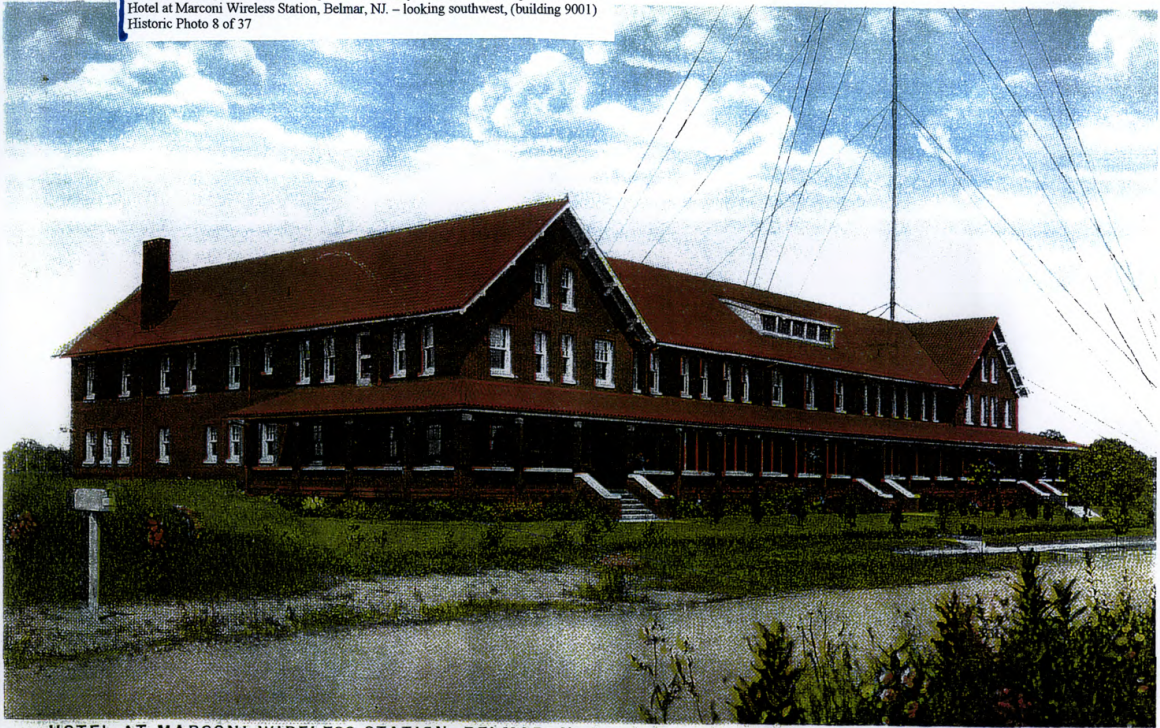
Continents by Wireless



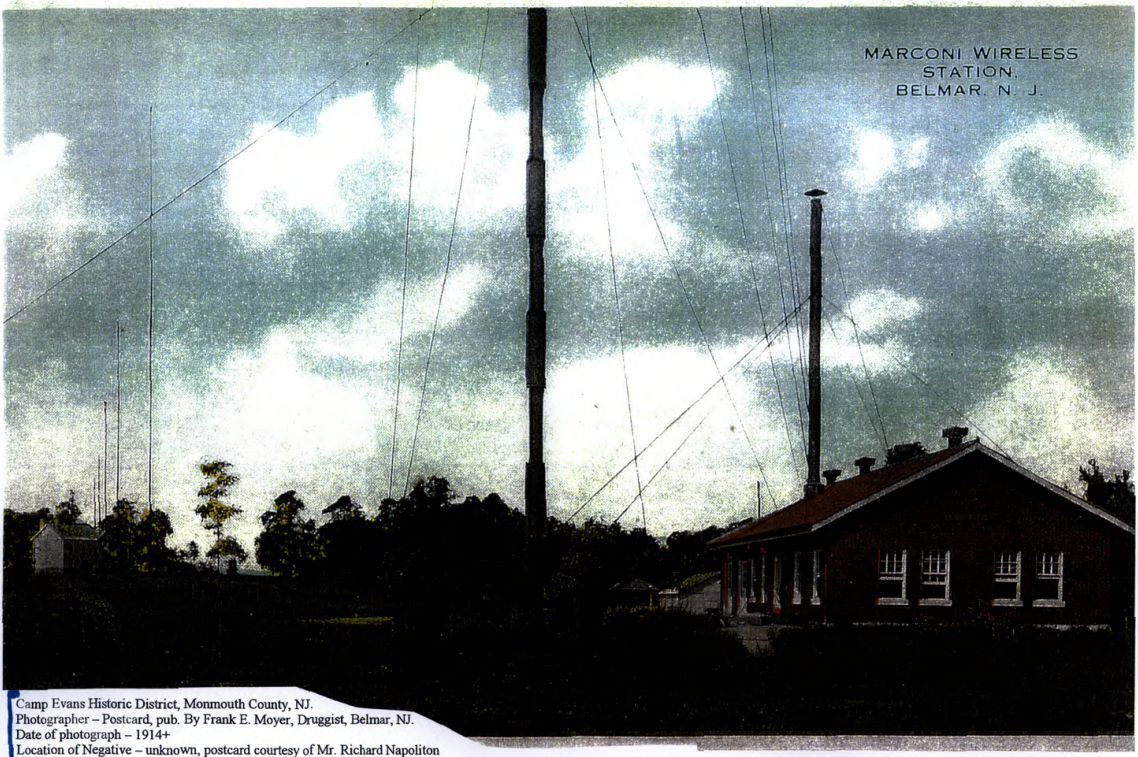
(4) *The powerhouse at New Brunswick station, from which messages are to be transmitted across the Atlantic.* (5) *A view of mast No. 6 at the Belmar trans-Atlantic receiving station, showing method of attaching stays and the erection cage in actual operation.* (6) *A glimpse of the concrete construction for the lighting plant at Koko Head, receiving site for the Honolulu station.*

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1913, published 1913, *Wireless Age*
Location of Negative – unknown
View of wireless mast No. 6 at Belmar, during erection
Historic Photo 7 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Postcard, pub. By Frank E. Moyer, Druggist, Belmar, NJ.
Date of photograph – 1914+
Location of Negative – unknown, postcard courtesy of Mr. Richard Napoliton
Hotel at Marconi Wireless Station, Belmar, NJ. – looking southwest, (building 9001)
Historic Photo 8 of 37



HOTEL AT MARCONI WIRELESS STATION, BELMAR, N. J.



Camp Evans Historic District, Monmouth County, NJ.
Photographer – Postcard, pub. By Frank E. Moyer, Druggist, Belmar, NJ.
Date of photograph – 1914+
Location of Negative – unknown, postcard courtesy of Mr. Richard Napoliton
Power plant at Marconi Wireless Station, Belmar, NJ. (building 9006)– looking south, note white farmhouse moved in 1942
Historic Photo 9 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – E. F. Henderson
Date of photograph – April 12, 1914
Location of Negative – Glass negatives property of Mr. Russ Henderson, Wall Township, N.J.
View of 5 or 6 wireless reception masts at Belmar station looking north
Historic Photo 10 of 37

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
View of Operating Building at Belmar from Shark River.
Historic Photo 11 of 37

Operating Building at Belmar.

IN the July number of the WIRELESS WORLD we published a full description of the British station—at Carnarvon, in North Wales—which had been erected to communicate direct with another station then nearing completion, in New Jersey, U.S.A., and which, between them, would provide greatly extended facilities for trans-atlantic wireless telegraph communication between the two continents.

The completion of the American station, or rather stations (for the system employed is duplex, and the transmitting and receiving stations are some distance apart), provides an opportunity for mentioning some of the prominent features. It is unnecessary to describe the plant and equipment of the New Jersey stations, for these are practically identical with the plant and equipment erected at the Welsh stations. In North Wales the transmitting station is a few miles east of Carnarvon, on the Cefn-du mountain, whilst the receiving station is at Towyn.

In New Jersey the transmitting station is at New Brunswick, about 50 miles S.W. of New York, and the receiving station at Belmar, some 70 miles S.S.W. of the capital. Private land lines connect these stations with New York, which will thus be in direct communication with London when the more propitious times ahead of us permit the opening of the service.

The station at Belmar introduces another note into the harmony of orchard and farmland of New Jersey.

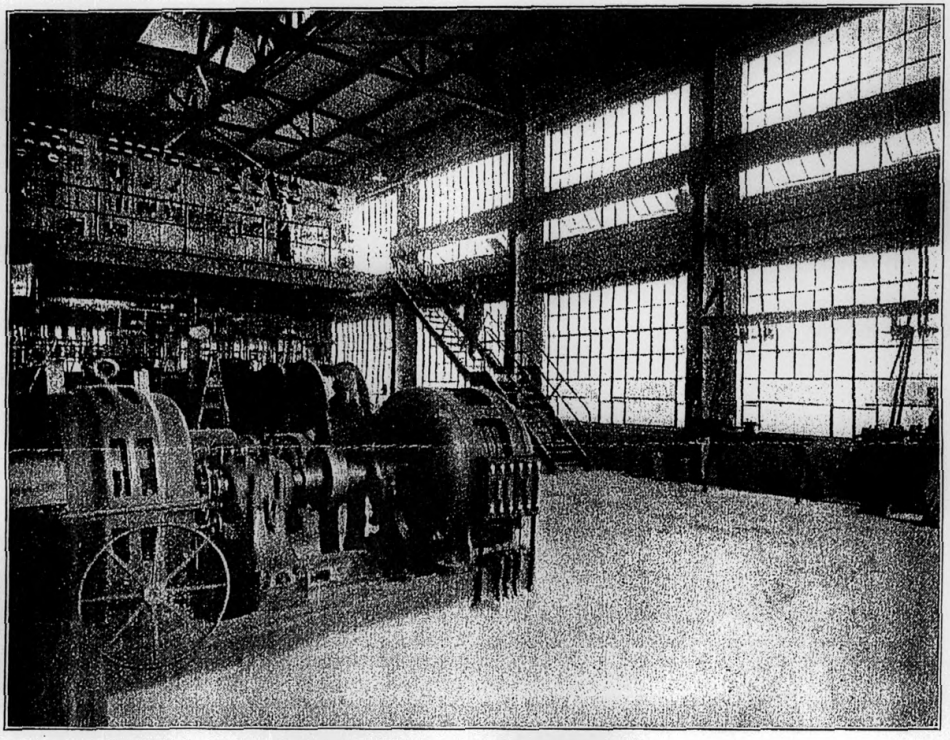
The beautiful spot stretches uphill overlooking Shark River, the famous salt water inlet, which in the summertime is crowded with sailing boats and launches, for here the well-to-do of New York come to spend the hot months and renew their strength for the rigours of the city winter.

The road leading to the Marconi station runs along the top of a bluff overlooking the river, while the operating house is at the foot of the hill and quite close to the river bank. Here the receiving aerial connects with the first great mast rising from the top of the hill, then pointing westwards they stretch for almost a mile, supported by six other masts each three hundred feet in height. The big end of these aerials is carried down at an angle of 30 degrees. These are supplied with steel-running ropes attached to anchors consisting of a pillar fifteen feet high with heavy iron weights free to slide up and down. The heads are provided with a view to keeping the balance of the wires and thereby ensuring a definite tension at all times, so that when the wind blows, or sleet encrusts the aerials, the spans between

the masts will sag down and the counter weights rise and thus make the tension constant. The chief difficulty experienced in building the operating house was in making the foundations water-tight, for the hills are intersected with hidden water streams. But skilled architecture has overcome this disadvantage, which, however, was a great asset to the engineer, for it has facilitated the grounding system for the wireless plant, some features of which may be mentioned here.

In selecting the sites for the erection of the new stations of the American Marconi Company, a number of elements had to be considered. The transmitting and receiving sites had to be more than twenty miles apart and correlated in such a manner that a line connecting them would be at right angles to the direction of desired transmission. The sites had to be chosen on low, marshy land on the coast, or near some waterway that would afford a direct electrical connection with the ocean. Where it was not possible to get the whole property in a marshy district it was necessary to have the land around the power-house at least damp and moist. Then, by burying a network of copper wires and zinc ground plates, a good electrical earth connection was possible.

With the middle of the oscillating circuit as a centre, wires radiate to a circle of zinc plates at a radius of 100 feet. This circle is continuous, all the plates being bolted together, and buried vertically in a trench, so that the radiating wires can be led down to the ground and soldered to the upper edge of the zinc ring. From the centre of the system cables, made up of stranded copper wire, are led from two sides of the building through insulators to the top of eight poles, set on a circle of eighty feet radius. From the insulators, on the top of these poles, the cables are separated and led down to the earth and soldered to points along the circle of zinc plates. The location of the eight poles and the separation of the cables is so arranged that the length of each cable from



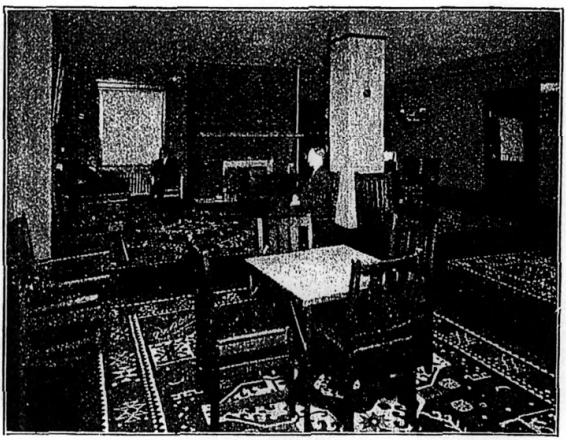
The Power House at New Brunswick.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless I*
Location of Negative – unknown
Interior view of Power House Building at New Brunswick, NJ.
Historic Photo 12 of 37

the centre of the system to the point it enters the ground is approximately the same.

Radiating from the ring of zinc plates there are cables soldered to the ring at equal distances. Each of these cables extends a few hundred feet beyond the zinc ring and terminates in a zinc plate buried vertically. From these outer plates, on the side of the circle under the aerial wires, extends a further grounding system parallel to the aerial and extending under its full length and a little beyond. Local conditions, however, usually make it necessary to slightly alter this general arrangement. Thus, the site of the power station at New Brunswick, N.J., is situated in a swampy meadow and bounded by the Delaware and Raritan canal on the north-east side. Running beside the canal is a stream connected to the Raritan River by culverts under the canal. In view of this condition, it was deemed advantageous at this station to straighten out one side of the circle of zinc plates and bury a large number of plates in the bed of the stream, by this means assuring a good electrical connection through the Raritan River with the ocean.

At the receiving station the circle of ground plates is made with a fifty-foot radius, with the receiving room of the operating house as the centre. The only wires extending beyond the circle of zinc plates are a number of cables radiating from the centre and extending in a marsh, or waterway, near



Lounge in the Hotel at Belmar.

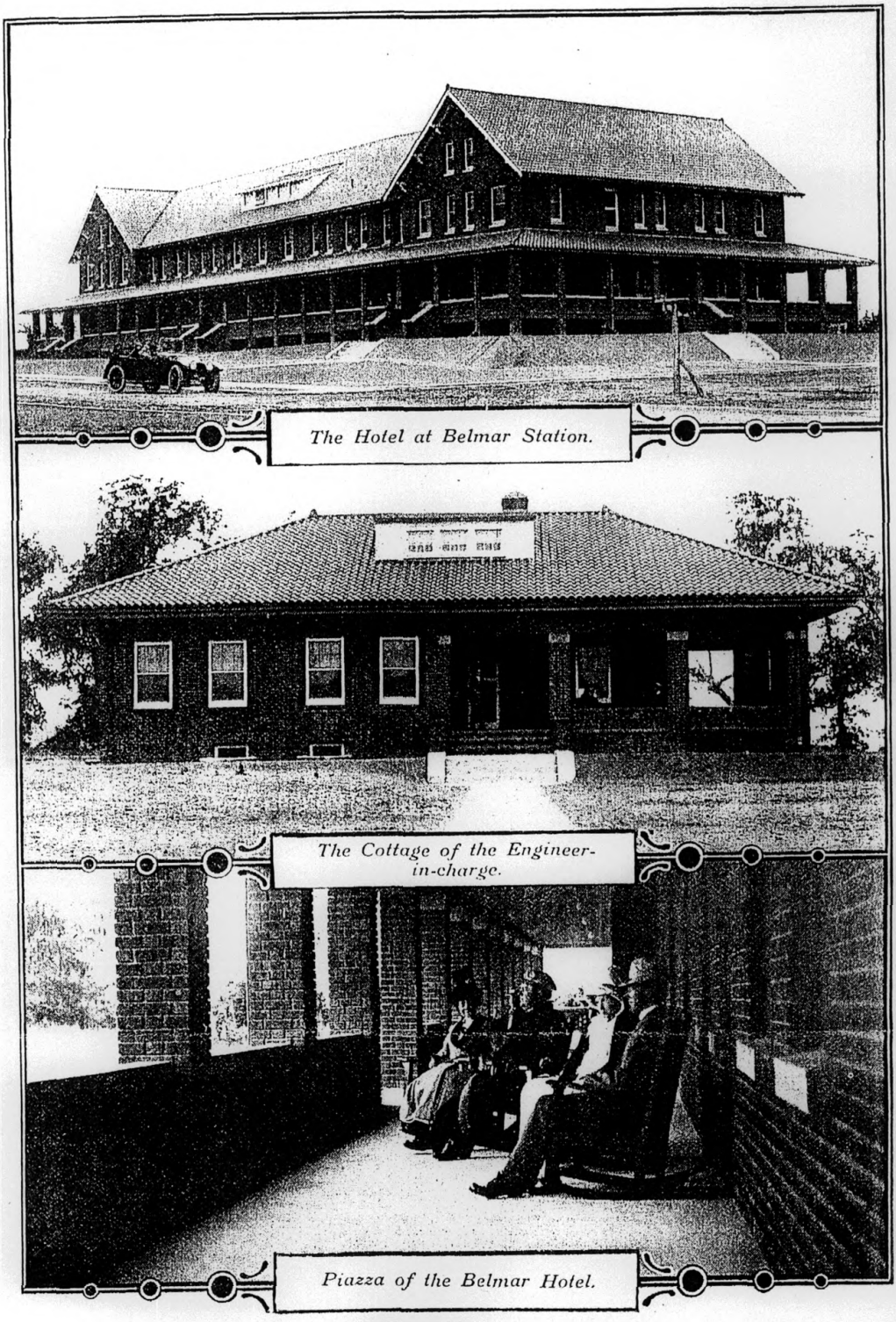
of these lines terminates in a zinc plate, as at the transmitting site.

A precaution, which is essential in the construction of the power-house and the running of power and lighting circuits, is to run all lines in iron conduit and thoroughly ground the conduit at frequent intervals; otherwise considerable difficulty might be caused by the current induced from the high-frequency oscillating circuits. Wherever possible, all circuits have been carried underground, and the supply run in conduit underground for about half a mile, approaching the power plant in a direction at right angles to the direction of the aerials.

The Marconi Company have not concentrated all their attention on the technical plans of this station. The utmost provision has been made for the comfort of the engineers and operators and all employed on the station. No detail has been too small for their consideration, and as a result the Belmar station is a model establishment, and those who are fortunate enough to be appointed to work at this station have every reason to "thank their lucky stars."

To give an instance of the forethought employed by those responsible for the welfare of their employees, it would surely have been sufficient to have provided the married men on the station with comfortable, well-furnished homes, and the unmarried men with an hotel equipped with every modern convenience; but they have done more than this. Recognising the natural beauties of the high bluff on which the station is located, they have determined to assist Dame Nature in her profession as beauty specialist. A landscape gardener has been employed, and the grounds occupied by the station have been laid out in beautiful manner, with rustic bridges and parterres of flowering plants, which set off the dull green of the trees and make delicious contrast against the background of dark undergrowth. From the river only the standing masts appear above the densely wooded slopes, so that Belmar station is among the most picturesque of the Marconi stations.

The operating building, which is designed



The Hotel at Belmar Station.

The Cottage of the Engineer-in-charge.

Piazza of the Belmar Hotel.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published October 1914, *Wireless World*
Location of Negative – unknown
Hotel (9001), Engineer's cottage (9003), hotel piazza
Historic Photo 14 of 37

over 82 feet long, and contains a generously-proportioned office for the manager, and a similar one for the engineer-in-charge ; also a large store-room and a cloak-room. The room containing the tuning apparatus runs the full length of the building, and is connected by a Lampson tube with the receiving room adjoining. Near by is the charging room for small accumulators, and the main operating room with five large tables, which, when fully manned will require thirty operators.

The hotel, built for the convenience of the large staff necessary for the maintenance of the 24-hour service at the station, is of dark red ornamental brick with a lighter red tile roof. The verandah runs the whole circuit of the building, which is slightly raised from the ground on a well laid-out parterre. The structure is fire-proof, and contains 45 bedrooms. There is an excellently appointed hotel lounge and smoking room. The dining-room is furnished with small tables, and from the deep windows the diner can look out beyond the wide sweeping shore line of the Shark River to the wide expanse of the Atlantic.

The kitchen is equipped with every modern convenience, and is in the charge of a French chef. To give an illustration of the completeness of arrangements it may be added that the cold storage and refrigerating plant has a capacity of six hundred pounds of ice *per diem*.

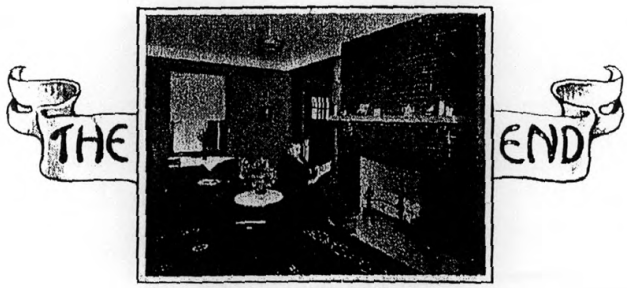
The bedrooms are charming—that is the only word that can describe them—while the private sitting-rooms will be a delight to all who can afford this added luxury. Attached to the hotel is a twelve-acre vegetable garden, which supplies all the necessaries in this branch of the catering.

The manager, and the engineer-in-charge have private residences built on the same plan as the hotel, but naturally smaller, though not less complete in every detail. The married operators' cottages, which consist of a living-room, kitchen and four bedrooms, have been equipped by the Marconi Company with every convenience.

Already Belmar has become a "sight" for touring motorists, who avail themselves of the opportunity to spend a quiet hour also at the hotel, or to wander through the beautiful country with its hills covered by thick woods of laurel, birch, oak, maple and pine trees ; or, again, to wander through the undergrowth in search of spoils from the wild grape vines, huckleberries, mulberries and blackberries.

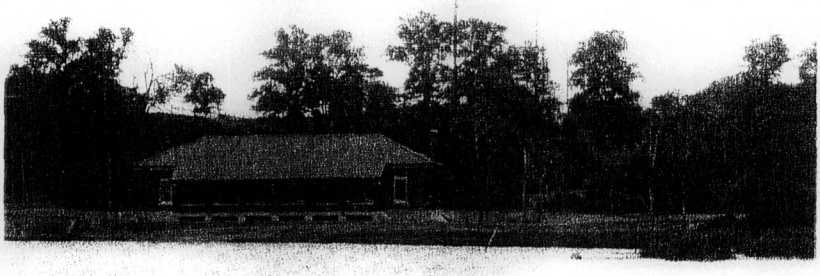
Spinney and coppice, wood and open meadow-land offer of their abundance, and the countryside teams with wild life. To any with a bent for natural history there is an unending source of amusement, while to those whom sport claims for devotees there is an equally wide range of interest. Fishing and shooting and, what is perhaps the most sportsmanlike of sport, long tramps over the miles of open country with a chance of bringing home a mixed bag at the end of the day.

The earth has many pleasant places, and Belmar is one of them.



Living Room in Chief Operator's Cottage, Belmar.

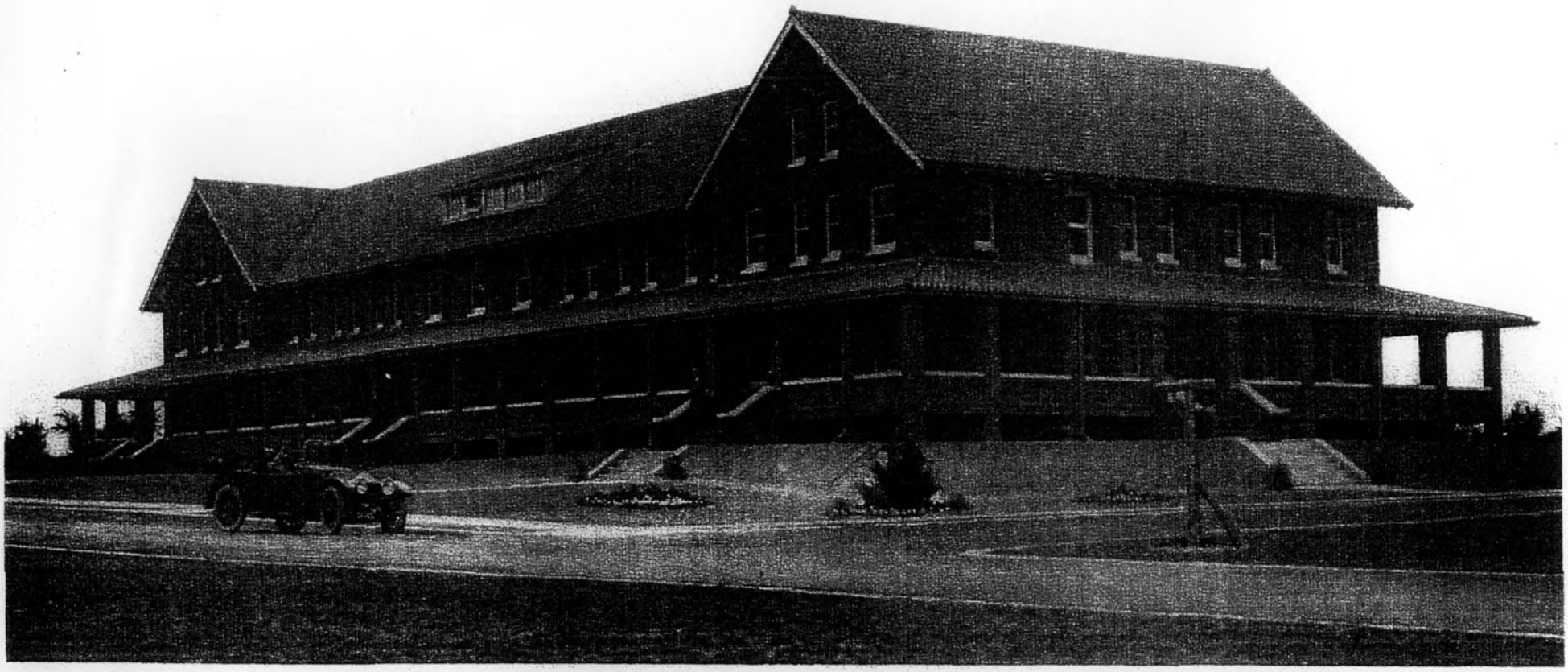
Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
Marconi operating building (9004) – from Shark River, looking sou
Historic Photo 16 of 37



The Belmar Station

The illustration at the top of this page shows the operating building located at the water's edge at Belmar, N. J. The masts of this transatlantic Marconi station, which appear in the background, are 300 feet high and the aerials carried by them stretch westward for almost a mile. It is here that the wireless messages, which are soon to wing their way across the Atlantic from Wales, will be received. The Belmar plant is one of the largest in the world and perhaps the most important link in the Marconi world-wide wireless chain. It has an equipment second to none, as the photographs on the pages following will testify. The operating building necessarily appears small in the illustration, but is over 100 feet long. It contains a generously proportioned office for the manager, a similar room for the engineer in charge, also a large store room and a coat room. The room containing the tuning apparatus runs the full depth of the building and is connected by a message chute with the receiving room adjoining. Nearby is the charging room for small accumulators and the main operating room with its large tables, which, when fully manned, will require thirty operators. All messages received and transmitted from this station will be handled automatically, most of them being received at the Broad Street and Madison Square offices of the Marconi Company. Similar arrangements have been made for filing Belmar station messages in London, thus placing the two greatest cities in the world in direct communication by trans-Atlantic wireless.

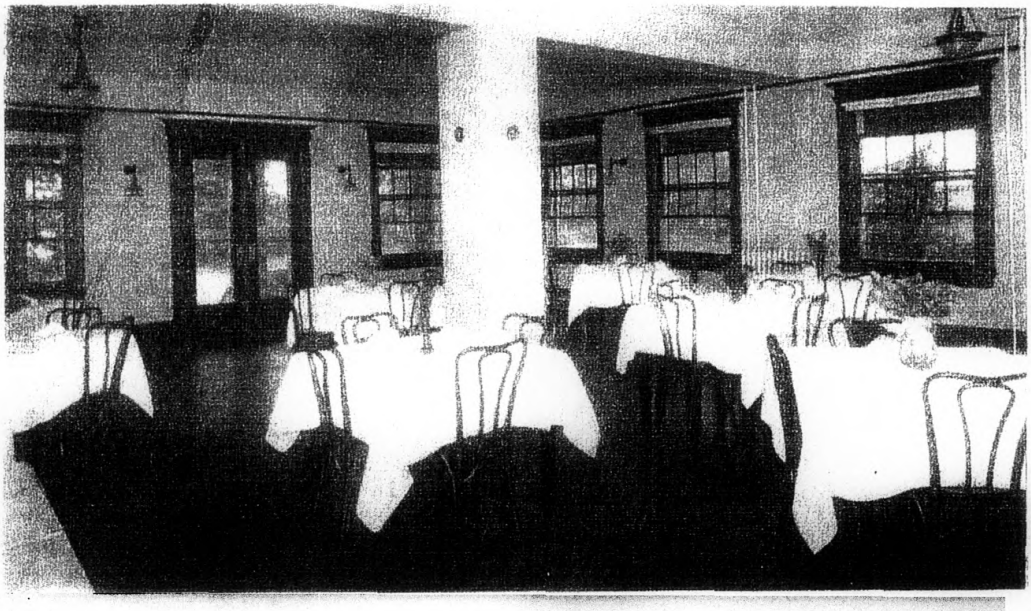
Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
Marconi hotel building (9001) – looking east, front view of front and west piazza
Historic Photo 17 of 37



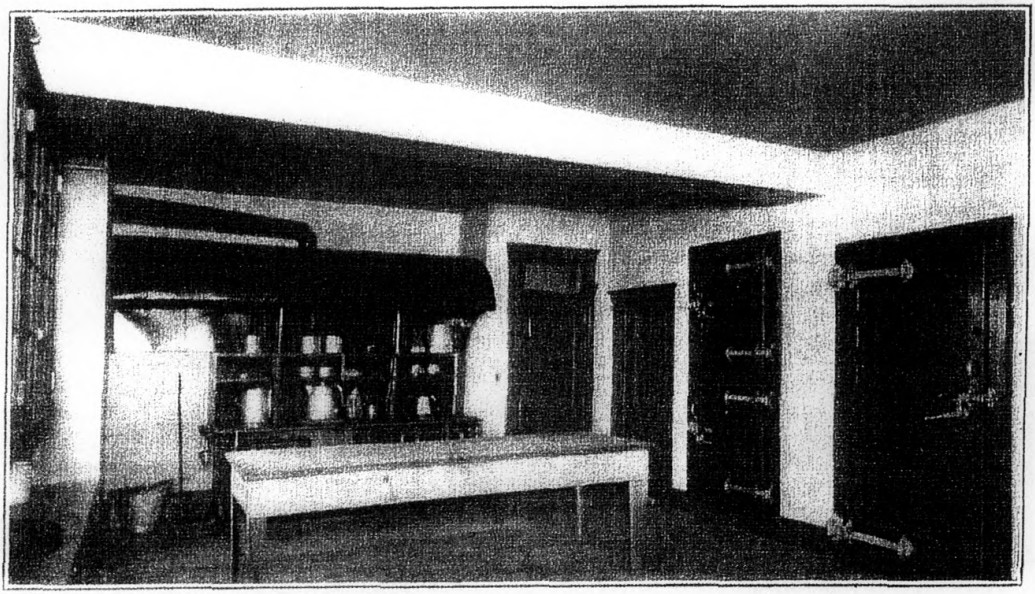
For the comfort and convenience of the large staff of operators and engineers necessary to maintain the twenty-four-hour service at Belmar the Marconi Company has erected the hotel shown in the above illustration. Built of dark red ornamental brick, with a lighter red tile roof, this fireproof structure is as handsome as any of the palatial summer resort hotels in the vicinity. It is a city block long and contains 75 bedrooms.

The photograph above gives a partial view of the hotel lounge, where the Belmar operators will congregate in the evening for relaxation and entertainment. Below, the foyer hall leading in from the porch.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Interior view of hotel (2001), Image (A-11) of 17



The dining-room in the hotel is a cheery apartment and is arranged so that each diner will have a pleasant outlook and plenty of room. From the windows may be seen the wide, sweeping shore lines of the Shark River and the breakers of the Atlantic. There are seating accommodations for 50 persons and many more can be taken care of whenever necessary. The kitchen, a portion of which is shown in the lower photograph, is equipped with every modern aid to the culinary art, in charge of a French chef. To the right of the illustration may be seen the heavy vault doors leading to the cold storage plant, eighteen feet square. The refrigerating plant, operated in conjunction, has a capacity of 600 pounds of ice per day.



Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown

A typical bedroom in the hotel and a private sitting room

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown

Some indication of the luxury afforded the operators fortunate enough to secure an assignment to the Marconi station at Belmar is given in the two illustrations on this page. The upper photograph shows a portion of the land set aside for the raising of fresh vegetables for the table. Twelve acres of the 600-acre tract are planted with garden truck for all seasons and experienced farm hands give this feature undivided attention. The photograph on the lower left hand shows part of the shower room in the hotel, an additional comfort to the sixteen bathrooms provided for the men. Outdoor sports play a large part in the life of the section and while the shower baths are not meant to be competitive with the sea and still water bathing, they will undoubtedly be greatly enjoyed by those coming off duty on a summer's day or returning from a hard set of tennis on the courts provided for the staff

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Station Gardens with power plant (9006) and well house in distance. (b) Hotel showers (9001).

The cottages for the manager and engineer in charge at Belmar are shown respectively in the upper and lower illustrations. These most attractive bungalows architecturally conform to the hotel building, being constructed of dark red tapestry brick, laid with raked joint and black mortar, and the roofs are of lighter red Spanish tile. The best of building materials have been used throughout and structural details comprise the most modern fireproofing methods. The inside partitions are of hollow tile, the plaster work of cement on terra cotta tile and the inside wood flooring is laid on concrete. Attractive terraces and sometimes verandas are an additional attraction of these buildings, which are 50 feet wide and 30 feet deep.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Station manager's cottage (9002) and landscaped grounds (b) Engineer's cottage (9003)

The progress in wireless telegraphy is well illustrated by these photographs taken in the quarters provided for the management, for they clearly indicate the change to ideal living conditions, as contrasted with the cramped quarters in bleak localities which until recently were the land station operator's portion. The smaller picture on this page shows the dining room of the manager's cottage at Belmar. The cottages, of which this is typical, have been furnished throughout by the Marconi Company. Hand some electric fixtures, high grade rugs in Oriental patterns, pictures, chairs, tables, buffets and the various items of furniture, were selected by a special committee with a view toward artistic harmony with the surroundings. The lower picture is of the living room, the feature of which is the tapestry brick fireplace. Easy chairs, upholstered in leather, rocking and straight chairs, settees and divan room chairs, too, are all upholstered in leather. Bookcases and library tables are further aids to comfort. The bedrooms, of which there are four to a cottage, are finished in mahogany, with fine rugs, straight and rocking chairs, enameled beds, chiffonier or dresser and appropriate pictures. The bathrooms are fitted with the very best of fixtures and the kitchen equipment includes a large range and hot water boiler. The cottages are steam heated from the power plant.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Interior of manager's cottage dining room (9002). (b) Interior of manager's cottage living room (9002).
Historic Photo 23 of 27

A glimpse of the manager's office and the power and electric lighting plant

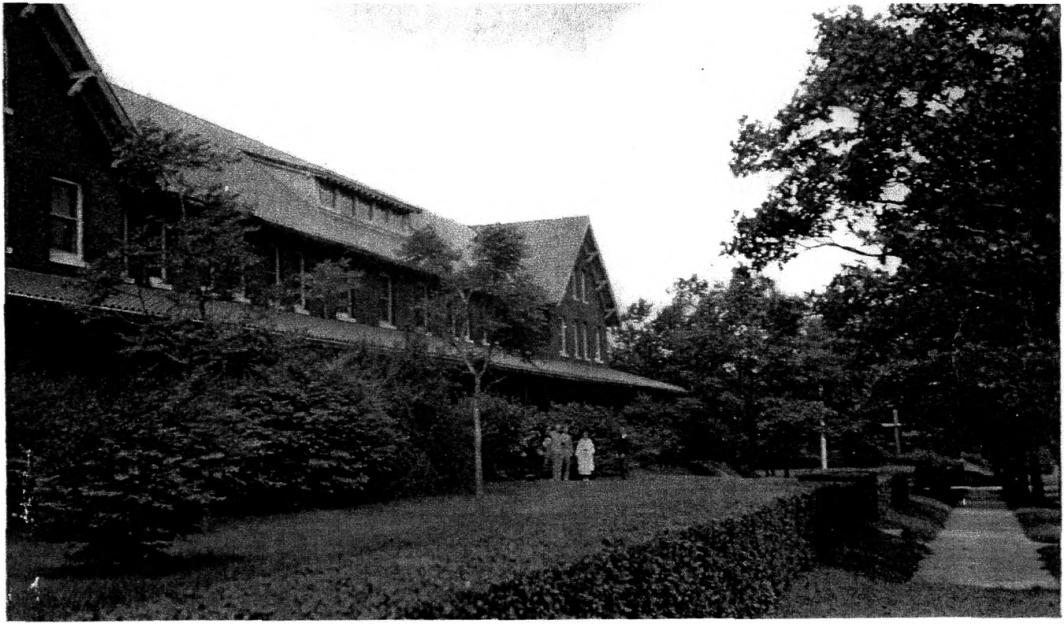
Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Station manager's office in operating building (9004). (b) Station power plant (9006).
Historic Photo 24 of 37

The natural beauties of the high bluff on which the Belmar station is located have been further enhanced by care in laying out the grounds under the direction of a landscape artist. The walk seen in the picture above is typical of the efforts in this direction. In the illustration below an impression of the heavily-wooded shores of the Shark River is given, here the balancing line towers are located. One may be seen in the foreground of the illustration, others may be traced by the fainter reproductions in the middle distance and background.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
(a) Path from operating building (9004) up hill to cottages and hotel. (b) View of Shark River showing balancing towers, looking east.
Historic Photo 25 of 37

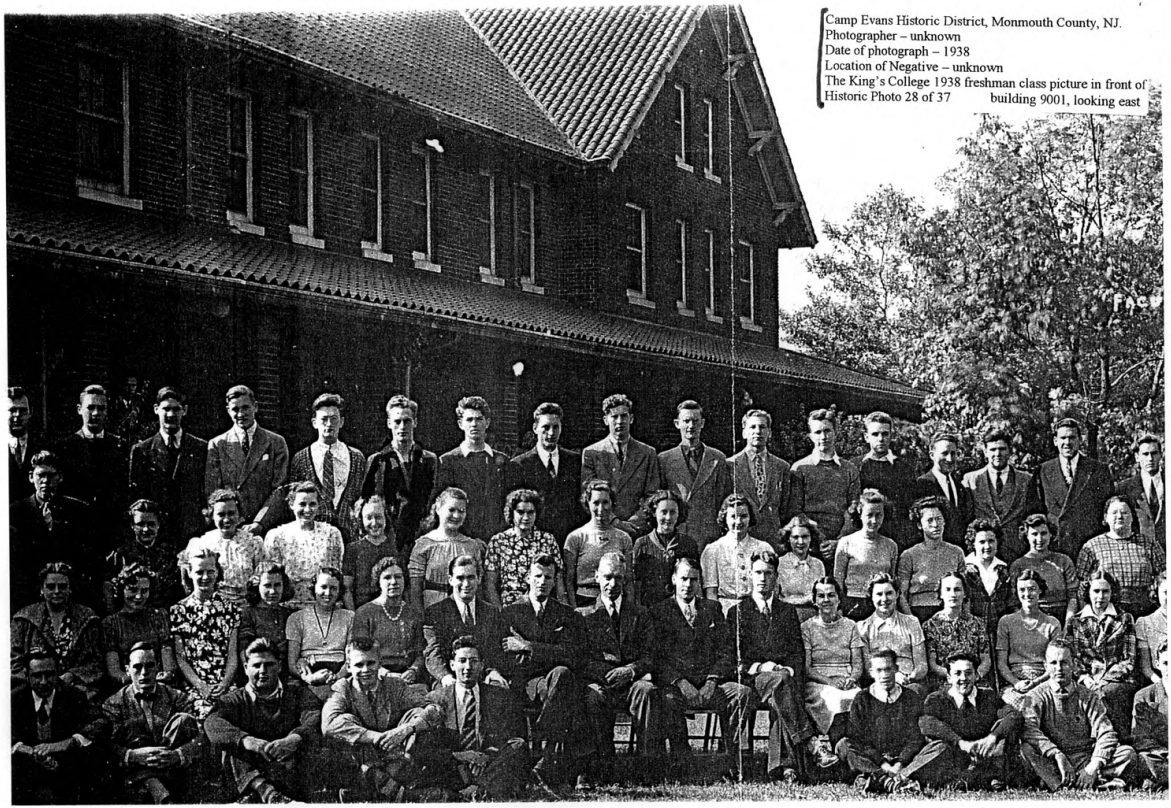
The piazza of the hotel is nearly a city block long and has already become a favored resting place for automobile tourists who visit the station. Situated on a high bluff at the westward end of the Shark River, a broad and navigable stream dotted here and there with sailboats, canoes and motor boats, the Belmar hotel commands a vista unsurpassed for miles around. An endless profusion of laurel, birch, oak, maple and pine trees cover the hills, and the spoils of wild grape vines and huckleberries, mulberries and blackberries are there for the wireless men and visitors. Off to the eastward may be seen the broad expanse of the Atlantic and the edge of the pine belt, and the resultant pungent blend of piney aroma and salty tang of the sea holds great attractions. A landing dock for motor boats is under construction and the wooded slopes of the Marconi property will soon become the headquarters of the numerous picnickers from the seashore cottages.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1914, published August 1914, *Wireless Age*
Location of Negative – unknown
Hotel (9001) front piazza looking east
Historic Photo 26 of 37

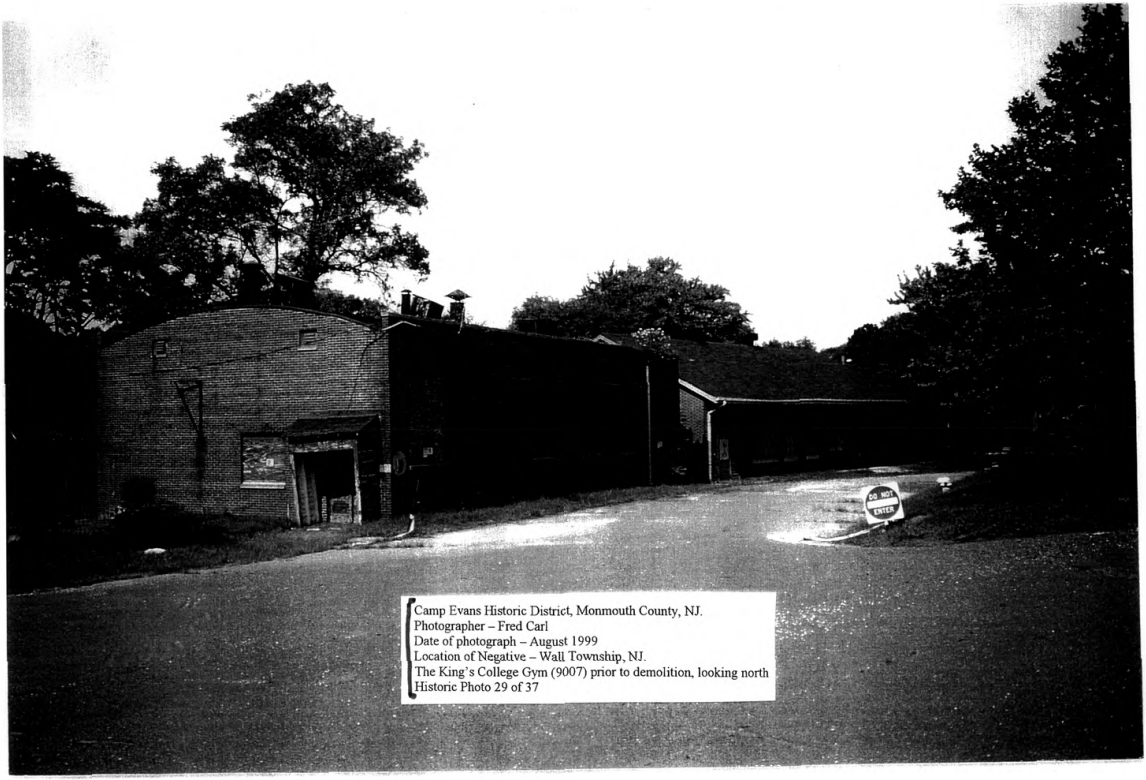


THE KING'S COLLEGE, BELMAR, N. J.

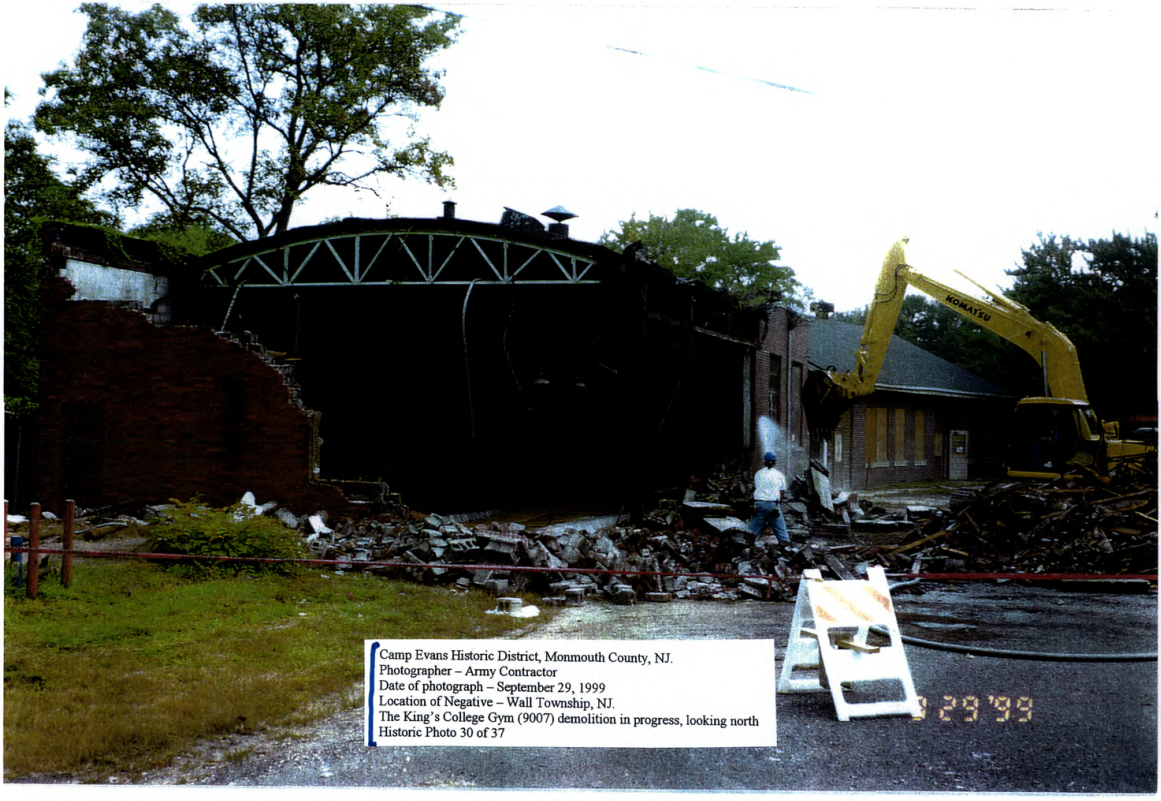
Camp Evans Historic District, Monmouth County, NJ.
Photographer – Photo-Tone postcard, pub. By Eagle Postcard View Co., Inc. New York
Date of photograph – 1938
Location of Negative – unknown, postcard courtesy of Mr. Richard Napoliton
The King's College, Belmar, NJ. - Former hotel at Marconi Wireless Station, Belmar, NJ. – looking west (building 9001).
Historic Photo 27 of 37



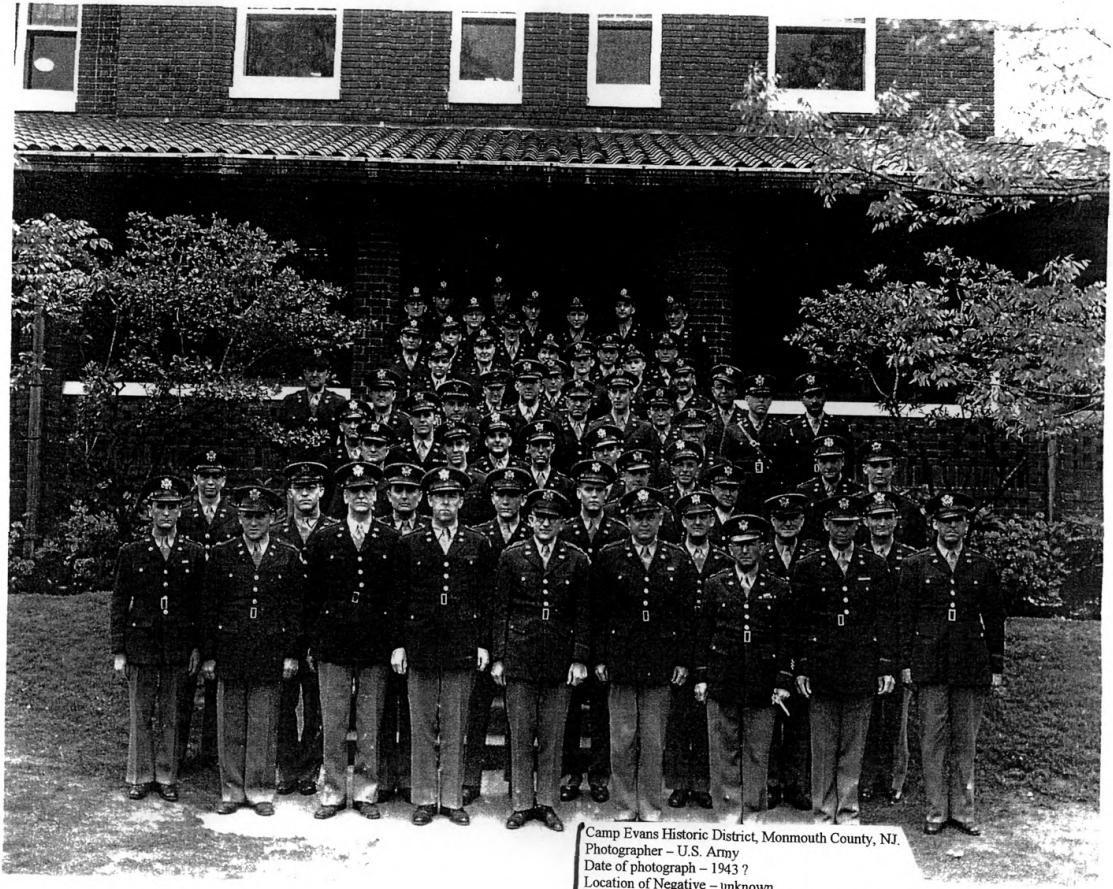
Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1938
Location of Negative – unknown
The King's College 1938 freshman class picture in front of building 9001, looking east
Historic Photo 28 of 37



Camp Evans Historic District, Monmouth County, NJ.
Photographer – Fred Carl
Date of photograph – August 1999
Location of Negative – Wall Township, NJ.
The King's College Gym (9007) prior to demolition, looking north
Historic Photo 29 of 37



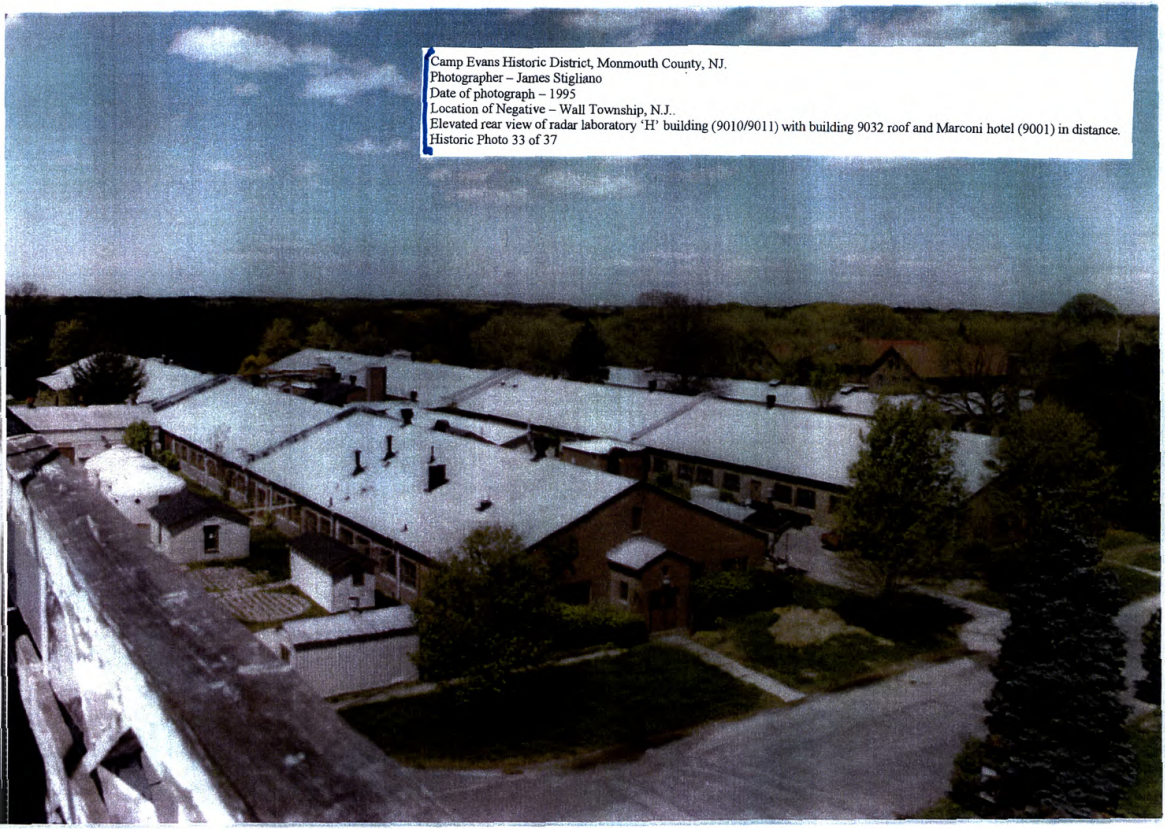
Camp Evans Historic District, Monmouth County, NJ.
Photographer – Army Contractor
Date of photograph – September 29, 1999
Location of Negative – Wall Township, NJ.
The King's College Gym (9007) demolition in progress, looking north
Historic Photo 30 of 37



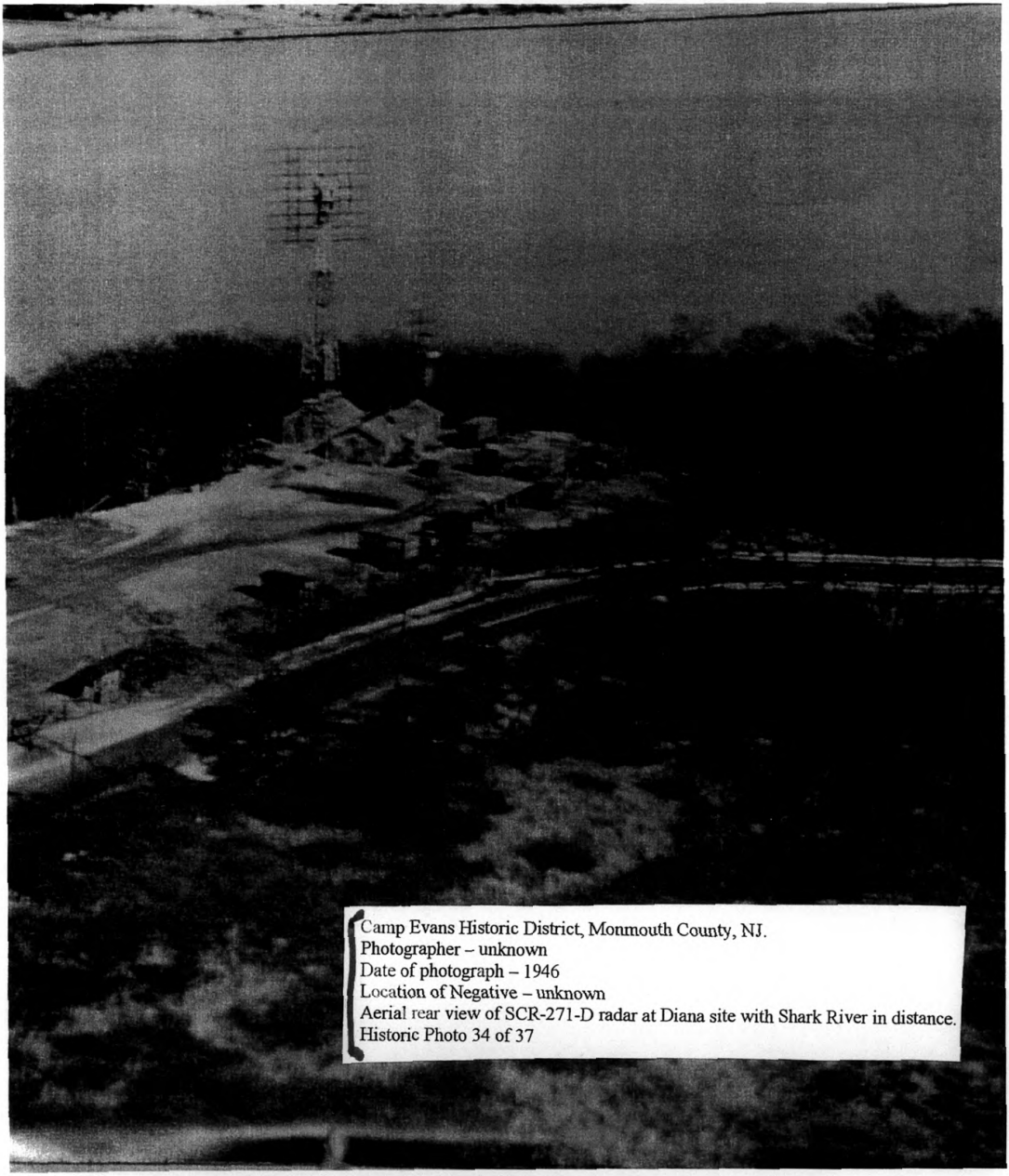
Camp Evans Historic District, Monmouth County, NJ.
Photographer – U.S. Army
Date of photograph – 1943 ?
Location of Negative – unknown.
U.S. Army radar pioneers group photo on west steps in front of former Marconi hotel (9001).
Historic Photo 31 of 37

TRANSMITTING AND RECEIVING STATION—Within the walls of these two buildings some the first commercial trans-Atlantic messages were sent and received by the Marconi c pany. In the background behind the white building to the right is one of the six tov constructed by the Marconi company in 1913. The tower is now United States governm property, and is used by Evans laboratories.

Camp Evans Historic District, Monmouth County, NJ.
Photographer – Asbury Park Press
Date of photograph – 1949
Location of Negative – Asbury Park Press files, Neptune, NJ.
Rear view of Marconi operating building (9004) with building 9005 and Marconi balancing tower in distance.
Historic Photo 32 of 37

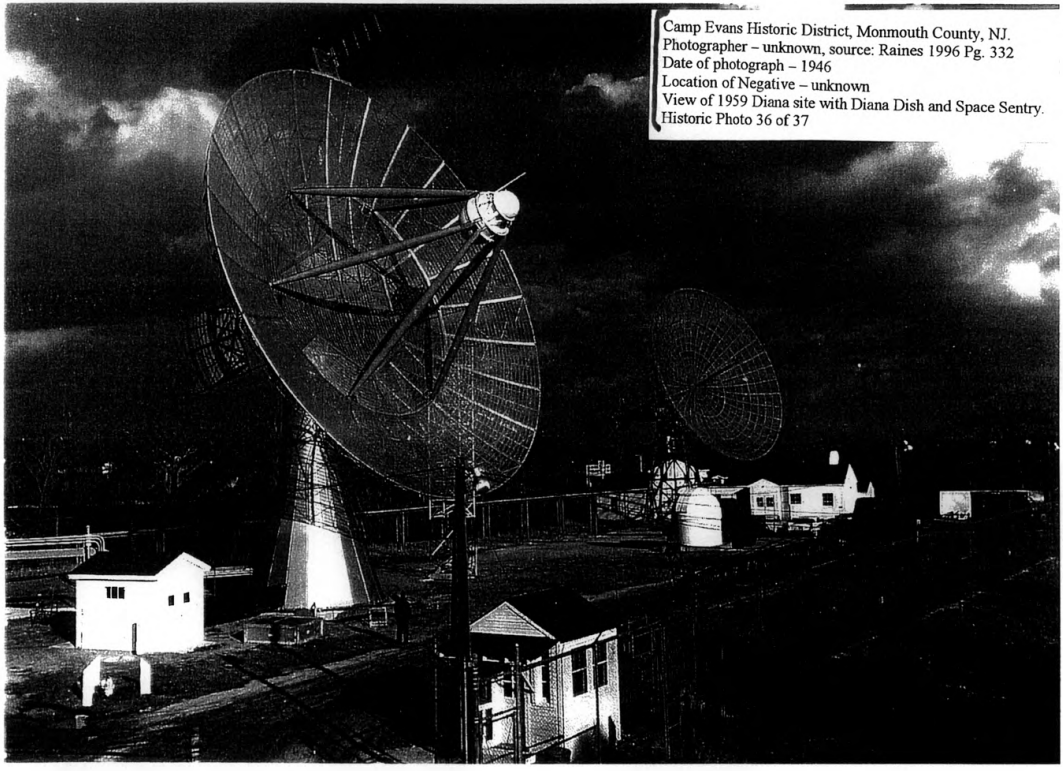


Camp Evans Historic District, Monmouth County, NJ.
Photographer – James Stigliano
Date of photograph – 1995
Location of Negative – Wall Township, N.J..
Elevated rear view of radar laboratory 'H' building (9010/9011) with building 9032 roof and Marconi hotel (9001) in distance.
Historic Photo 33 of 37

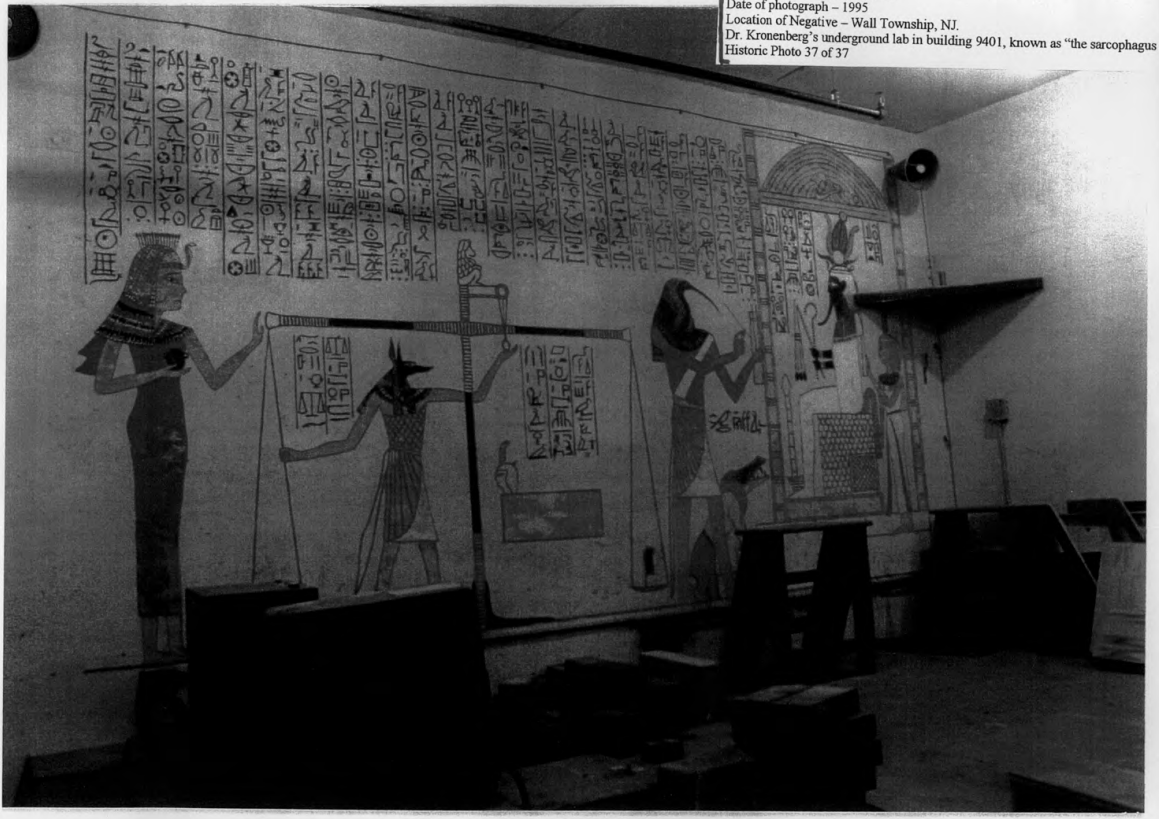


Camp Evans Historic District, Monmouth County, NJ.
Photographer – unknown
Date of photograph – 1946
Location of Negative – unknown
Aerial rear view of SCR-271-D radar at Diana site with Shark River in distance.
Historic Photo 34 of 37

GIANT SCR-271 ANTENNA BEAMED ON THE MOON AT CAMP EVANS, N.J.



The Signal Corps Engineering Laboratory's astrophysics observatory at Camp Evans, New Jersey, 1959. The parabolic antennas tracked the earliest U.S. and Soviet satellites.

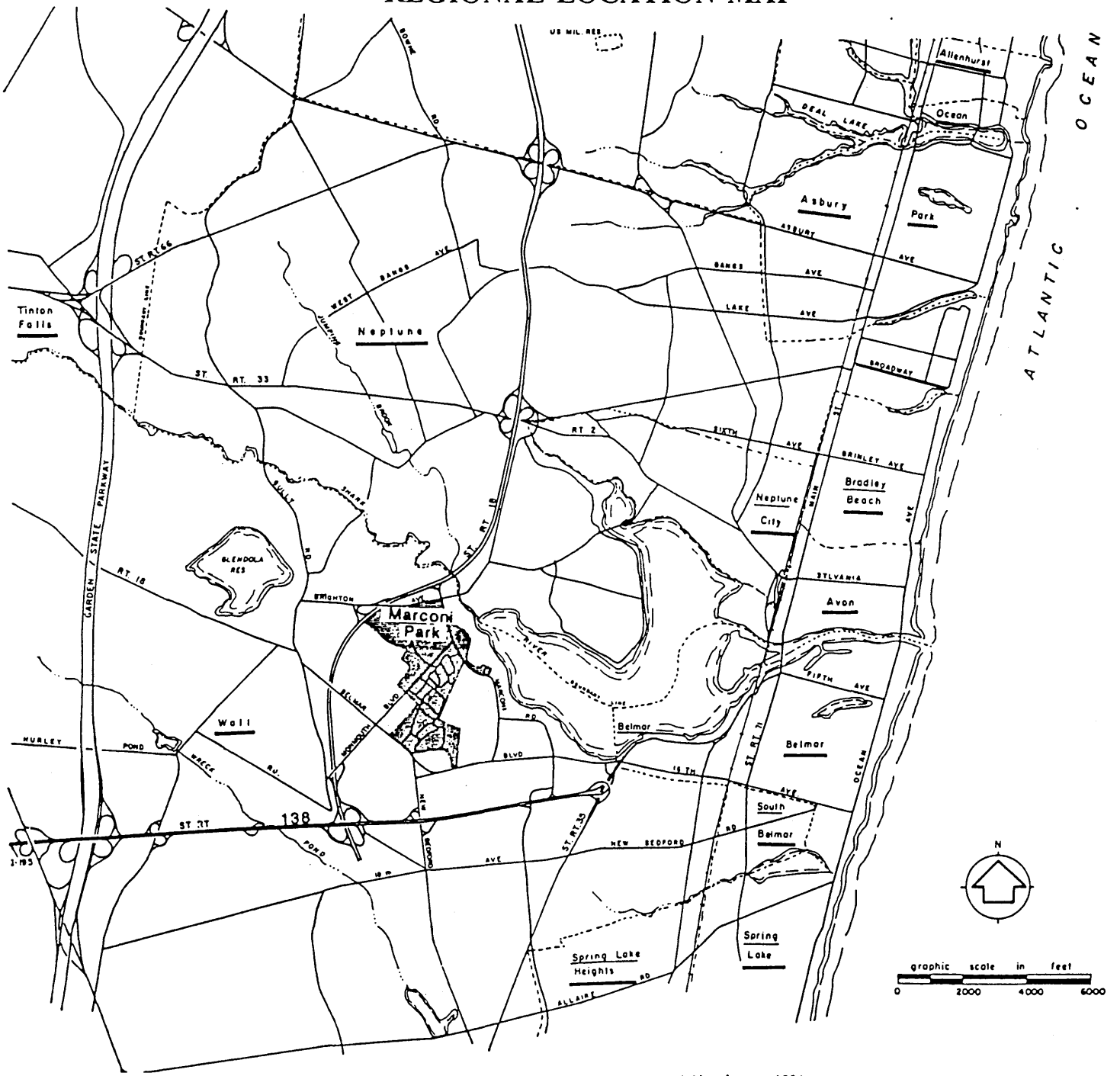


Photographer – James Stigliano
Date of photograph – 1995
Location of Negative – Wall Township, NJ.
Dr. Kronenberg's underground lab in building 9401, known as "the sarcophagus
Historic Photo 37 of 37

Regional Locator Map

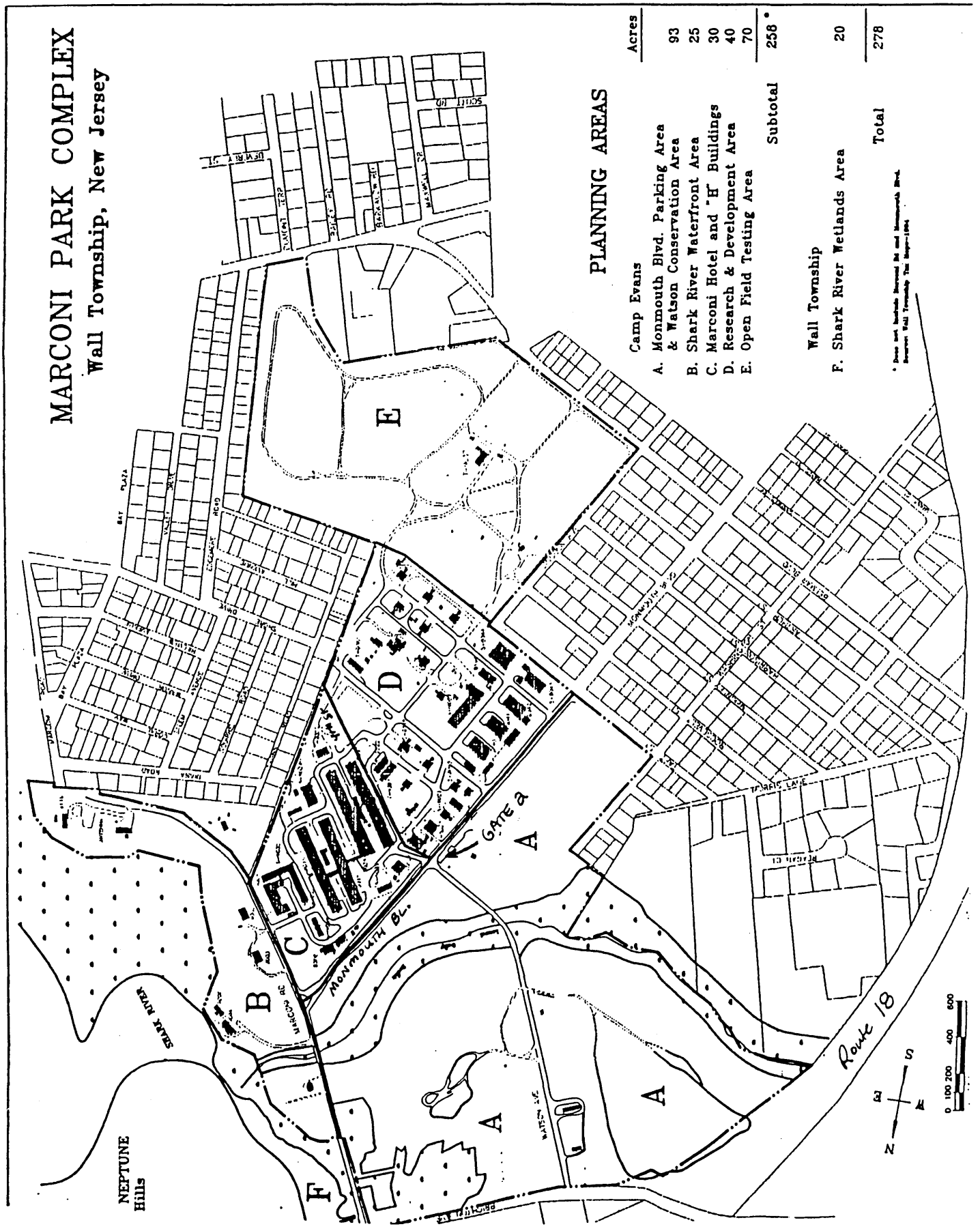
SOURCE: *Marconi Park Complex Reuse Plan*

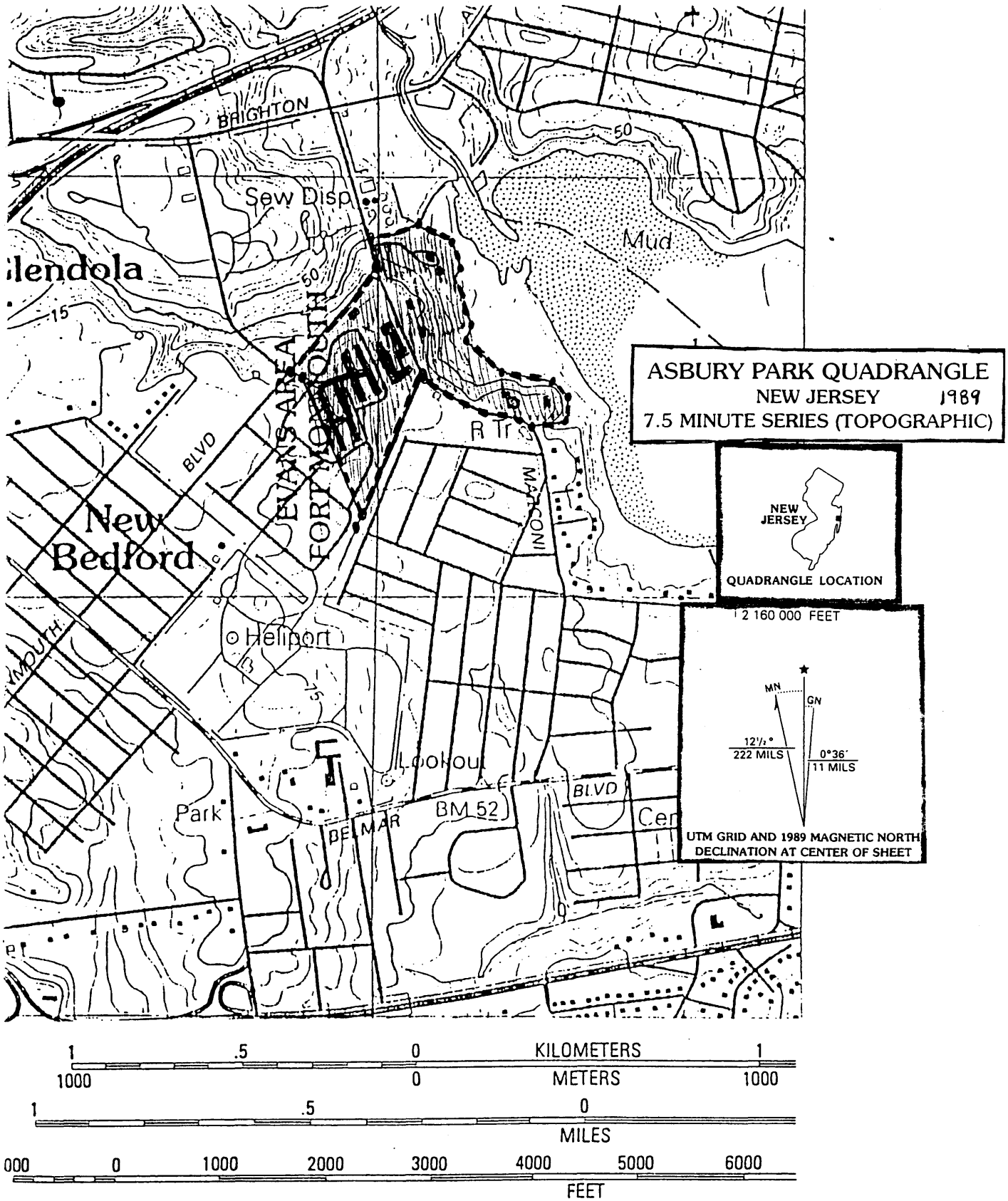
FIGURE 1-1
REGIONAL LOCATION MAP



SOURCE: Analysis of Existing Facilities And Environmental Assessment Report Fort Monmouth New Jersey - 1984
Harland Bartholomew and Associates, Inc.

Marconi Park Complex. Areas B and C comprise historic district





CONTOUR INTERVAL 5 FEET

A Wireless Girdle Round the Earth

By F. M. Sammis *

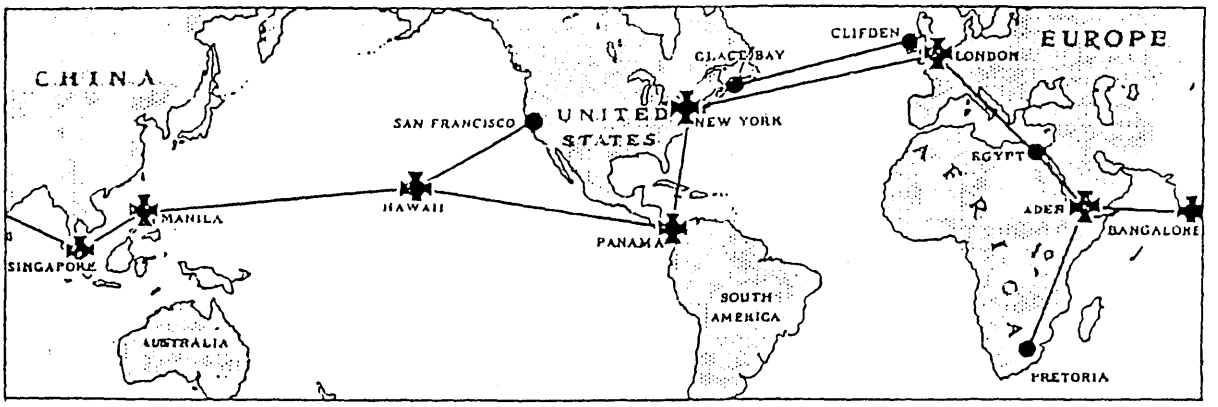
UNTIL the present time our country has not been entitled to boast of a real high-power (wireless) station, but now plans have been finished that will place the United States in the first rank with respect to both size and number of these modern high-power stations, and which, in conjunction with the stations being erected for the English Government, will provide a commercial service that will encompass the earth. This station will be near New York City, at Belmar, N.J., where 500 acres of land have been acquired upon which the masts and plants will be erected. Transmission will be effected to the Panama Canal Zone and thence to Hawaii.

The Hawaiian station will be one of the most powerful of the entire group, for, besides communicating with the station at Panama, it will be capable of working with San Francisco and the Philippine Islands, and with a station to be erected later in New Zealand. The Manila station is the last of the American group, and will connect to the east with the Singapore station of the English group. Unbroken communication will be maintained successively through the stations at Bangalore and Aden. At the latter station we may turn southward over the huge mountains of Abyssinia and the wilds of German East Africa to communicate with Pretoria in South Africa. It is probable that the station at Pretoria will be called upon to communicate with the proposed high-power station at Buenos Ayres soon to be started.

Retracing our steps to Aden on the Red Sea, we may talk with the station in Egypt to the north, and thence, by one tremendous leap, hurl a message with such force that it will cross the wide Mediterranean, ascend the boot of Italy, scale the ice-crowned Alps and drop quietly into London, all in less than one two-thousandth of one minute. Having arrived in England, we may take the present busy route from Clifden, Ireland, to Glace Bay, Nova Scotia, in order to talk with our Canadian neighbour, or we may utilise the new and more powerful station at London. By this means we arrive once more at our starting-point at Belmar. Thus with but nine stepping-stones we may trip around the earth. Still further stations are contemplated; in fact, the chain that girdles the globe will be but the main artery of a great system. Feeders and branch stations will be established in all countries, and a very comprehensive chain will be erected in South America in the near future.

With the establishment of this great network of stations will come an era of cheap communication, for wireless telegraphy may easily reduce the present cable rates. The cost of a submarine cable to cover a distance of 3,000 miles is anywhere from 7,000,000 dollars to 10,000,000 dollars, while the total cost of a pair of wireless stations to do the same work is but 600,000 dollars. The cable must handle a half-million dollars worth of business in order to earn enough to keep it in repair, while 2 per cent. of this amount will take care of the same item for the wireless. Two million words at 25 cents a word will earn only a sufficient sum to cover depreciation of the cable, while the same number of words at half-rate by wireless will produce enough to pay the depreciation charge and 35 per cent. on the investment besides.

The wireless system, in using Nature's ether as a conductor, has provided itself with a medium that requires no repairs. Surely we have here an accommodating servant by means of which we may from a single station talk with nations north, east, south, and west; we need no wires, no cables, no right of way and none of the expensive upkeep or repair that the older forms of communication require



Large Stations to be erected.

* Abstracted from an article by the Chief Engineer of the Marconi Wireless Telegraph Co. of America in *Popular Mechanics.*

KEY TO Photographs

TRANSITE WATER TO DIANA SITE

SUSPECTED LANDFILL

DIANA SITE INSERT

S63°59'24"E 144.98'
S8°57'24"E 108.00'
S39°33'04"E 178.57'
S01°41'04"E 183.55'
S76°48'46"W 239.66'
N25°25'14"E 86.17'
N78°02'14"W 497.67'

TOWER
#9182
TOWER
CHAIN LINK FENCE
Space Sentry RADAR DISH
BIT. ROAD
FRAMED SHED
MARCONI ROAD
9116
CHAIN-LINK FENCE ENCL. ELEC.

RESERVATION BOUNDARY

MARCONI ROAD

FIRST STREET

SECOND STREET

THIRD STREET

FOURTH STREET

MONMOUTH BOULEVARD

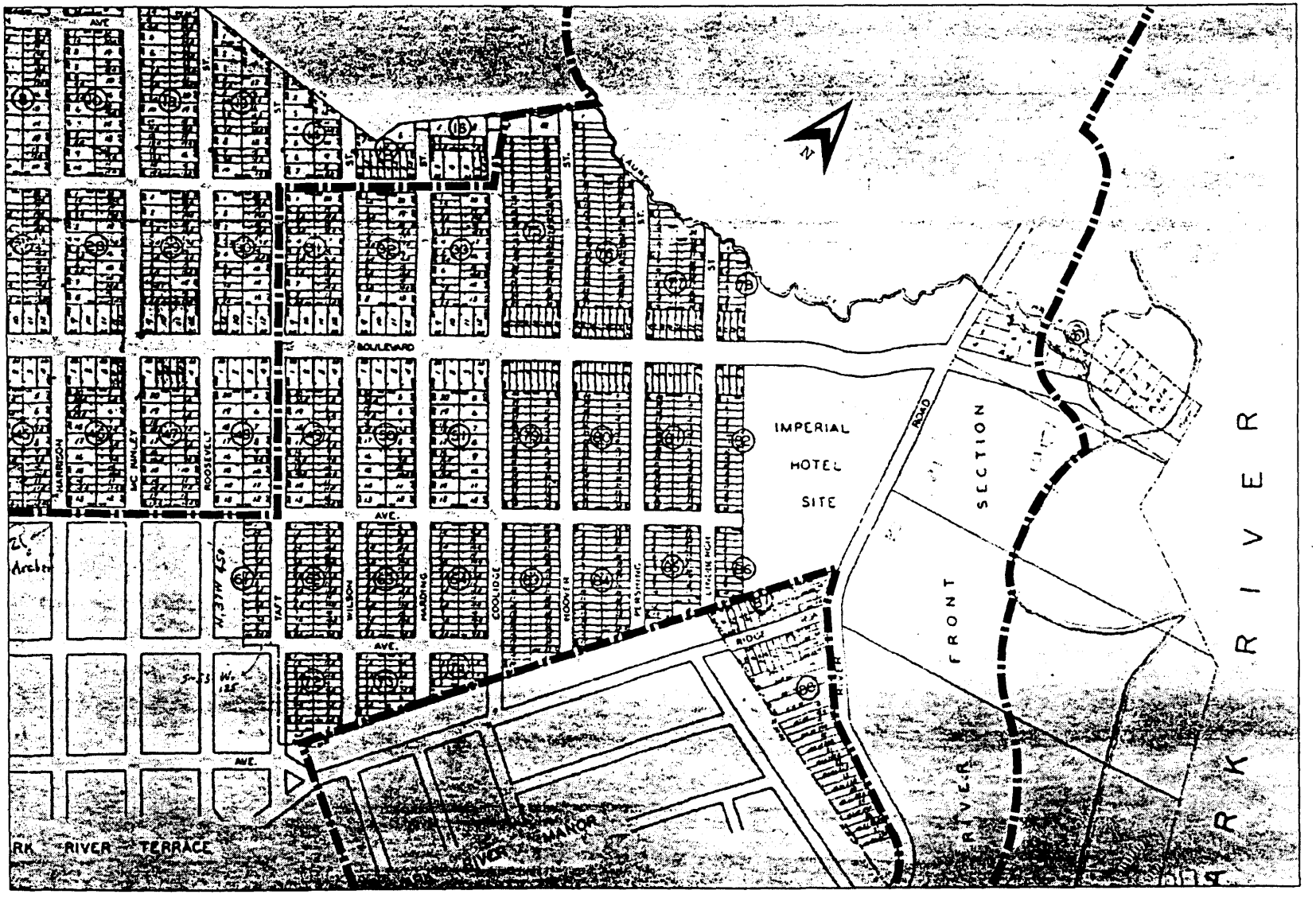
SEPTIC TANK

LEACHING BASIN

WELL HOUSE

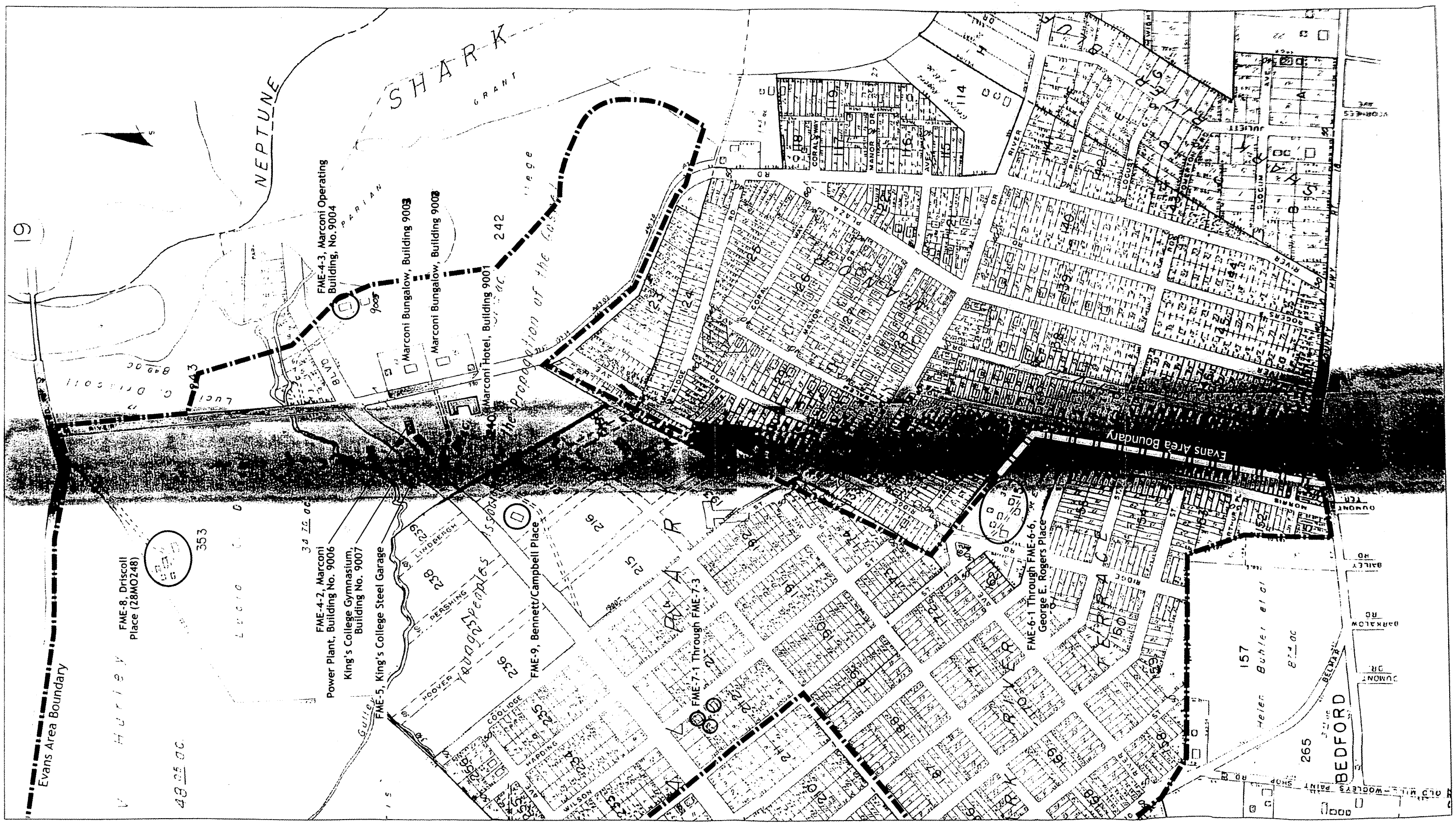
9100 9004 9005 9 9016 9096 9202 9003 9002 9201 9129 9152 9001 9008 9065 9093 9032 9033 379 9006 9059 9081 9007 9092 95 8 92 9010 9085 9069 9068 9312 9344 9098 9012 9067 9011 9120 9602 9625 9342 9097 9178 9352 9108 9036 9124 9038 9071 9086 9084 9070 9037 9031 9030 9029 9014 9180 9393 9392 9624 9614 9017 9400 9057 9035 9034 9114 9112 9106 9106

Camp Evans Historic District, Monmouth County, NJ / Map 5 of 9



Detail of Birdsall 1928 Amended Map of Imperial Park Showing Approximate Evans Area Boundary

SOURCE: Reed and Swanson 1999

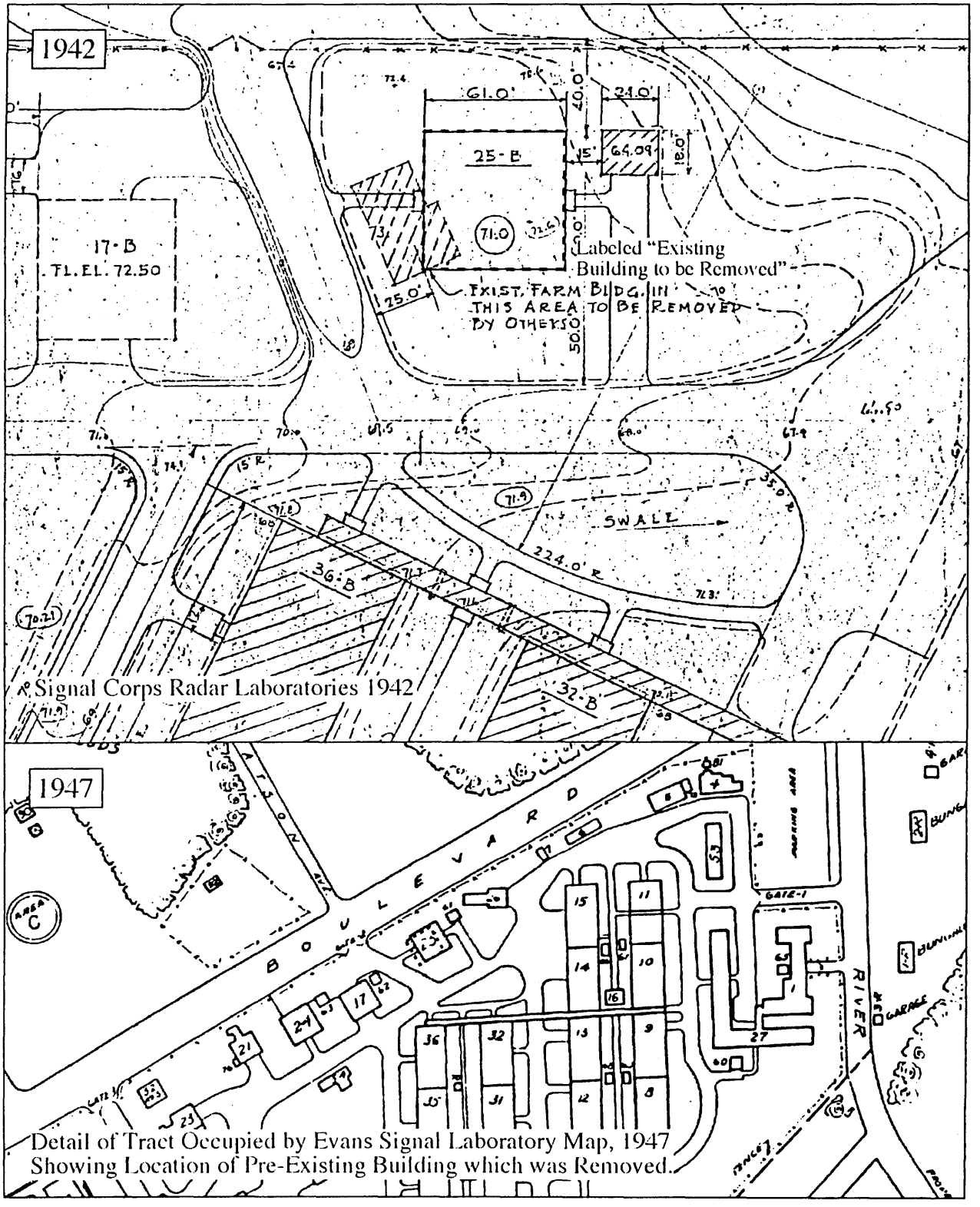


Source: Reed and Swanson 1999

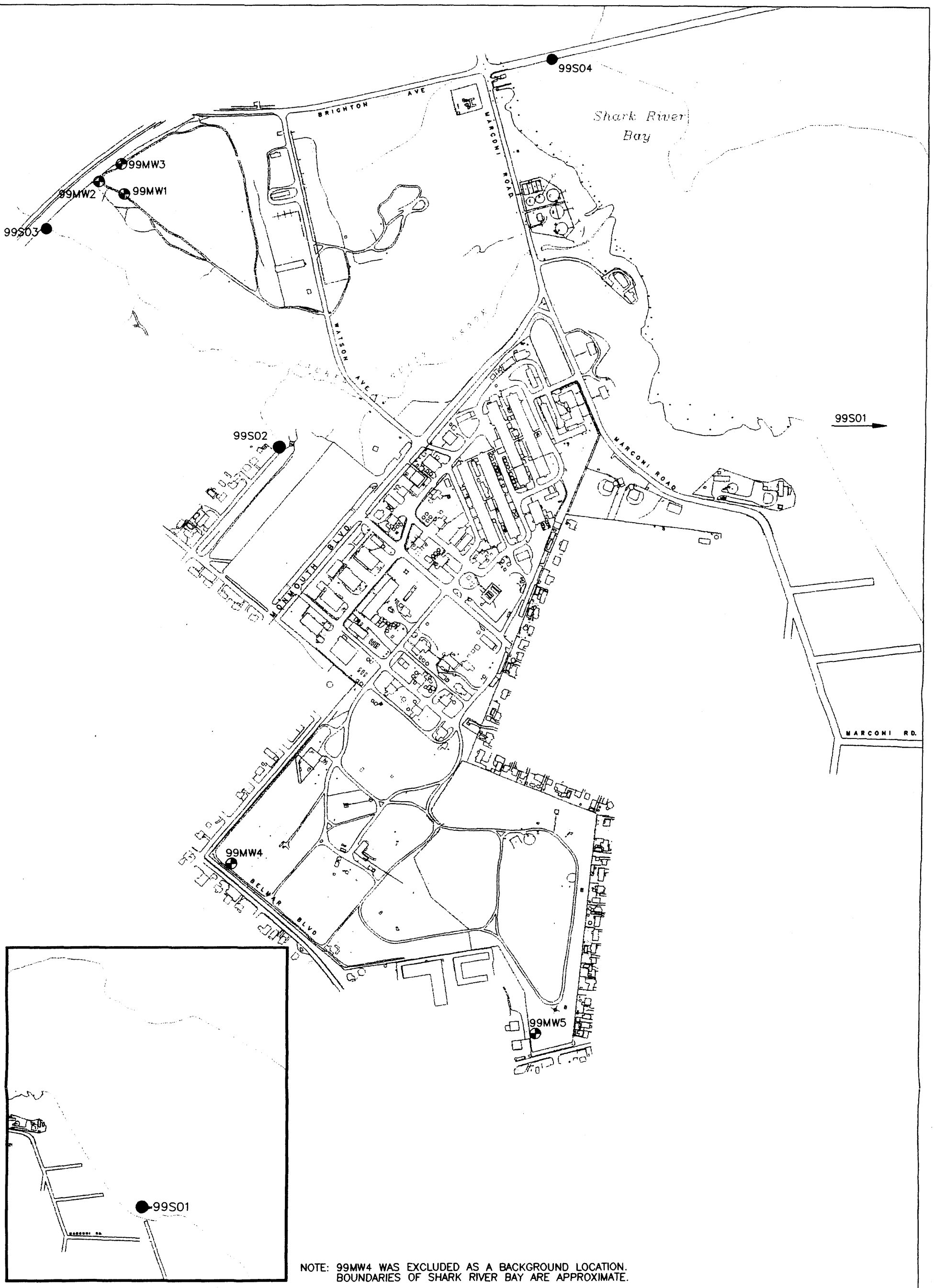
Camp Evans Historic District, Monmouth County, NJ / Map 7 of 9

Franklin Survey Company 1941

Maps Showing Proposed and Completed Removal of Existing Farm Building, Bennet/Campbell Residence, FME-9



SOURCE: Reed and Swanson 1999



LEGEND

- SEDIMENT SAMPLE
- MONITORING WELL

Source: CAMP EVANS FINAL SITE INSPECTION REPORT EARTH TECH APRIL 1996

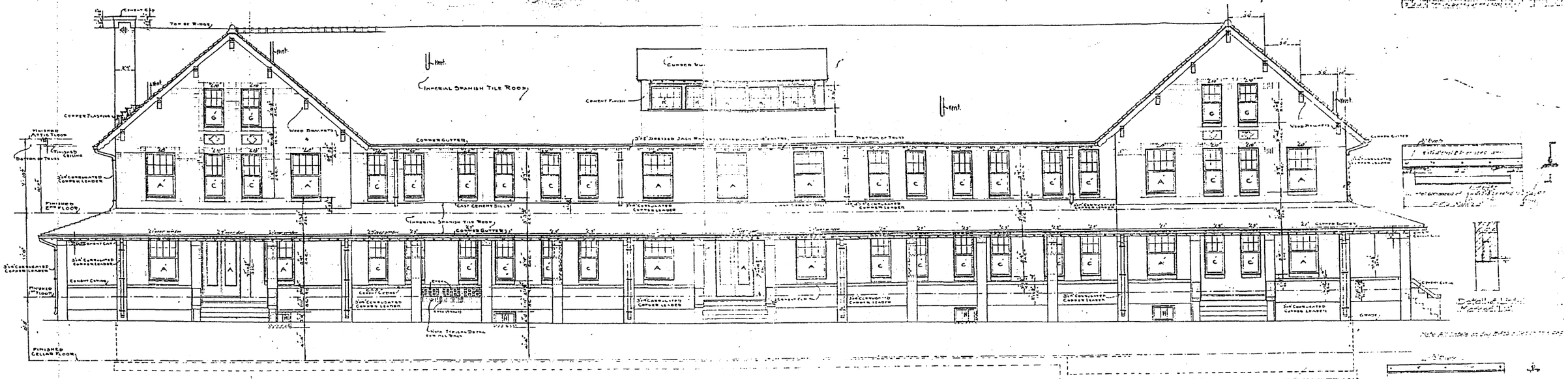
N

0 100 200
FEET

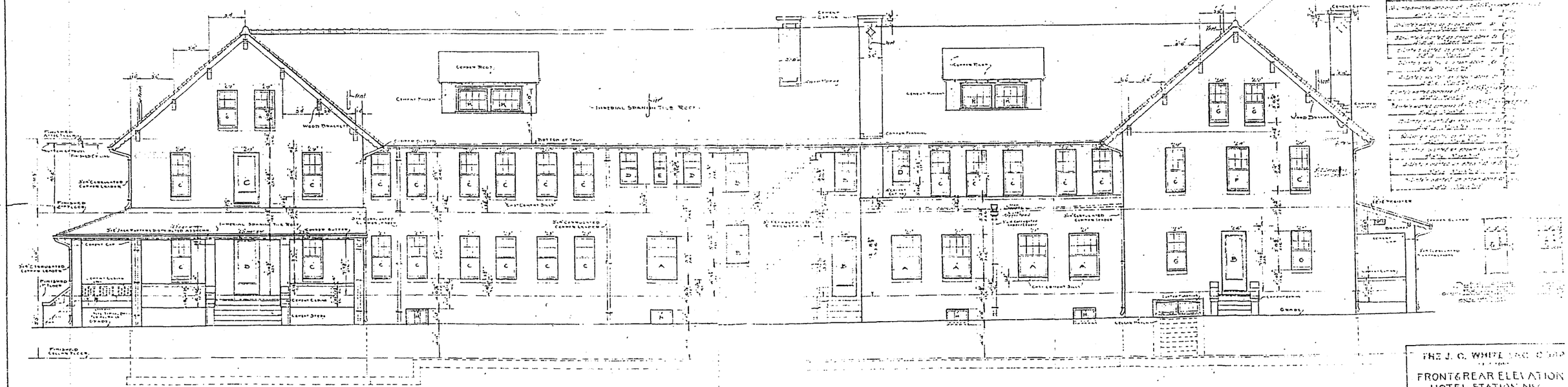
EARTH TECH

Figure 5.1-1

CAMP EVANS
ENTIRE SITE
1" = 200ft.



FRONT ELEVATION



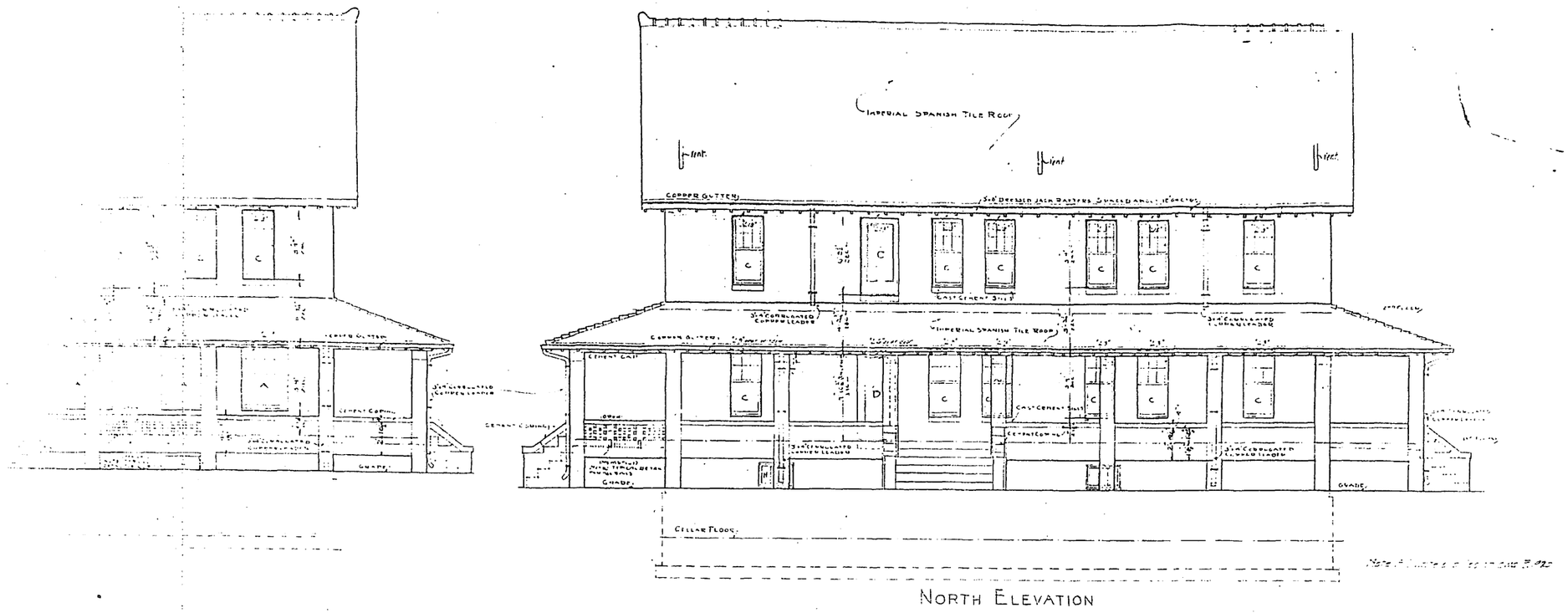
REAR ELEVATION

THE J. G. WHITE ENGINEERING CORP.

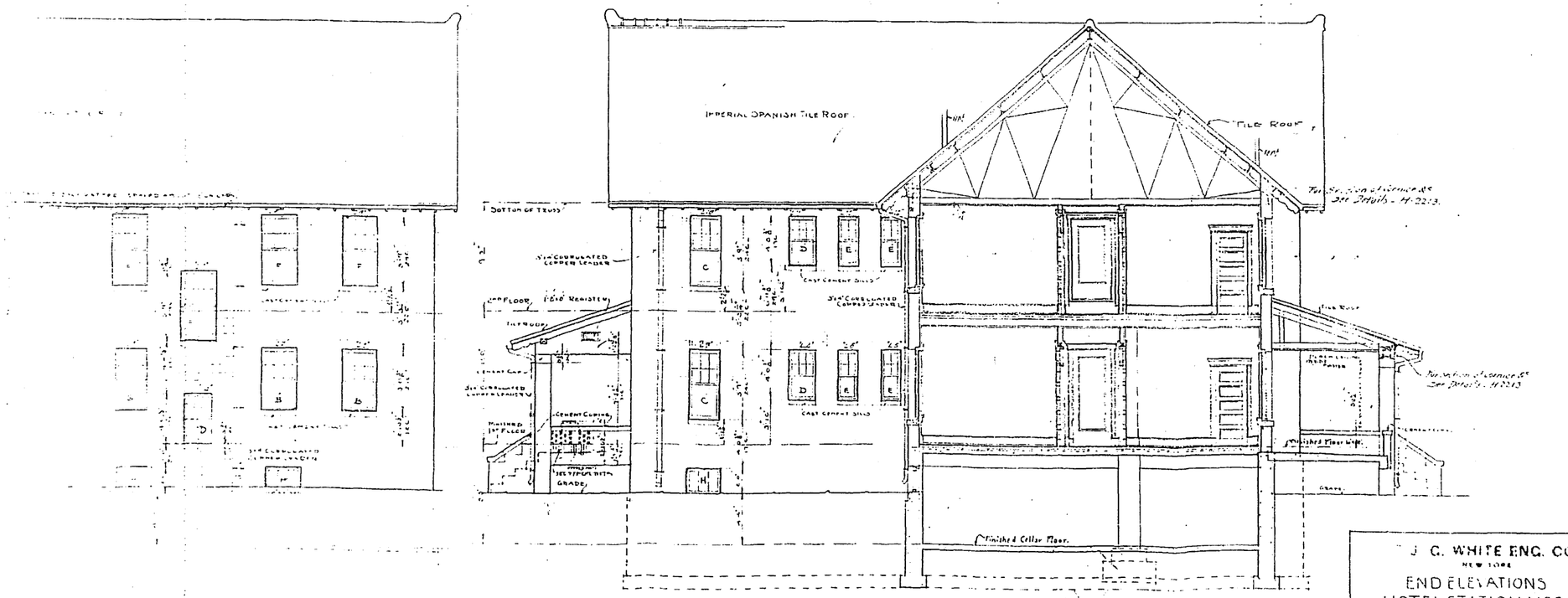
FRONT & REAR ELEVATION
HOTEL STATION NSG

E-720

Camp Evans Historic District, Monmouth County, NJ / Plan 1 of 21

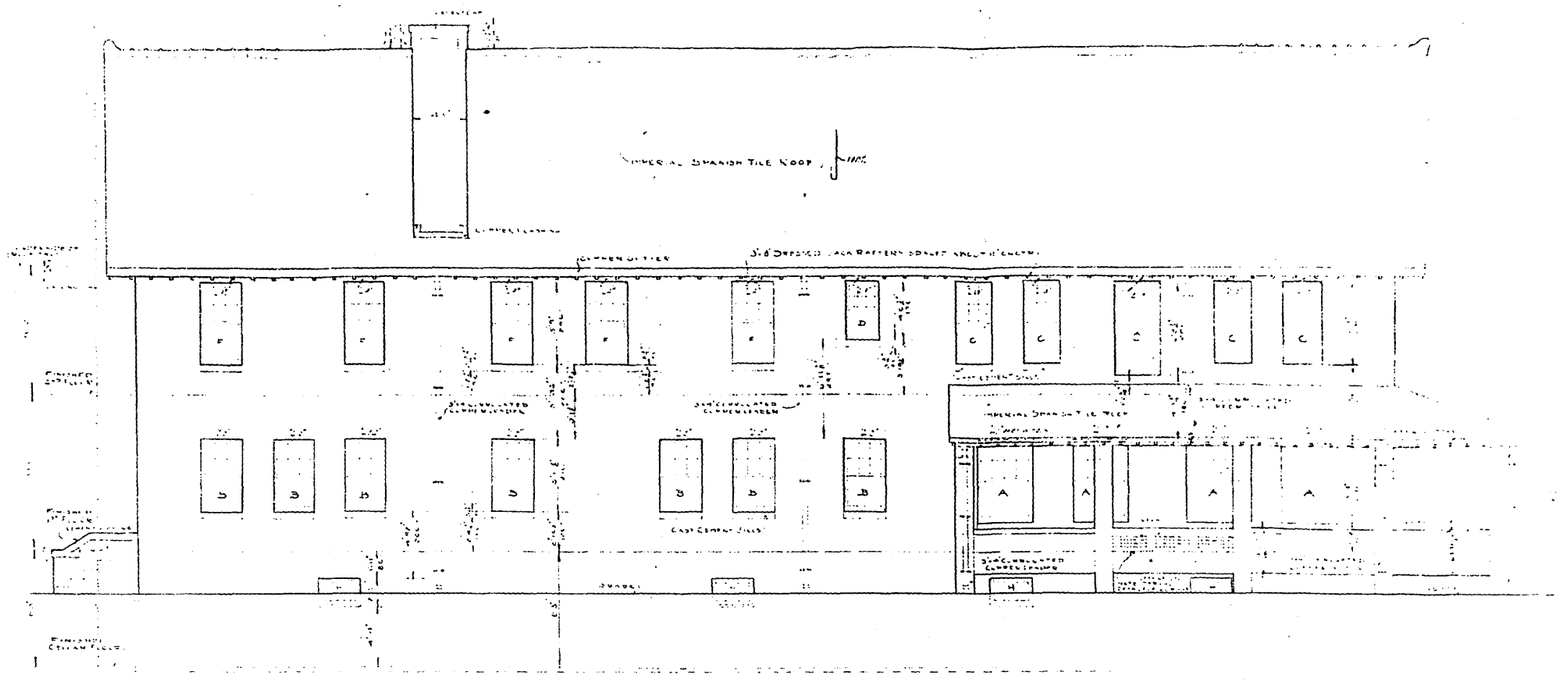


NORTH ELEVATION

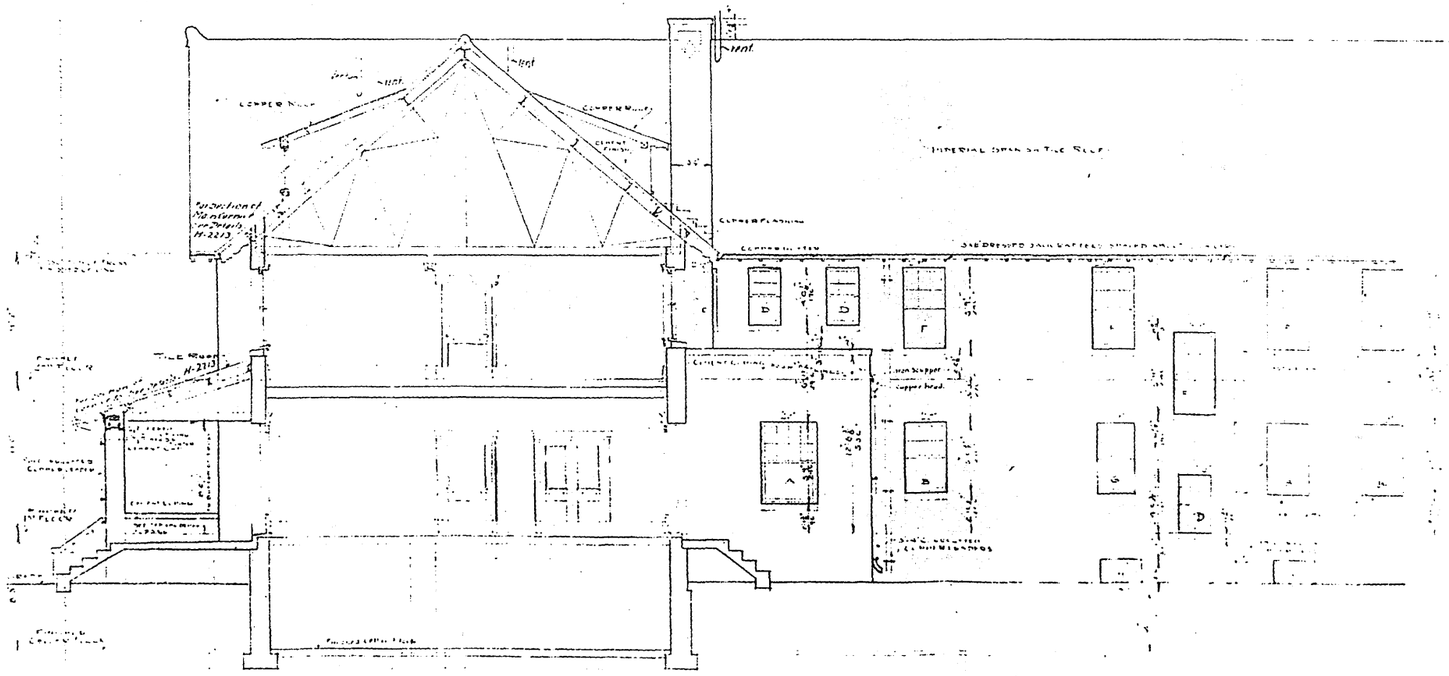


SECTION LOOKING NORTH

J. G. WHITE ENG. CO'S
NEW YORK
END ELEVATIONS
HOTEL-STATION N°6
WIRELESS TELEGRAPH CO.



SOUTH ELEVATION



SECTION LOOKING SOUTH

Camp Evans Historic District, Monmouth County, NJ / Plan 3 of 21

B-136-2

Detail of Porch Coping

CAST CEMENT SLIP WINDOW SILLS.

23 Wanted for 4'-0" opening.
24 " " 3'-0" "
82 " " 2'-8" "
9 " " 2'-4" "
6 " " 1'-8" "
All as per Sketch A. (Scale 3"=1'-0")

CAST CEMENT SLIP DOOR SILLS.

3 Wanted for 3'-4" wide opening.
As per Sketch B. (Scale 3"=1'-0")

ELEVATION OF 3 STEP FLIGHTS.

SECTION THRO 3 STEP FLIGHTS.

SECTION THROUGH 4 STEP FEIGHTS. WITH LANDING.

Note:- All steps to be nosed 1/8" on treads.

DETAILS OF OUTSIDE STEPS.
Scale 3/4"=1'-0"

Note - Material billed on M 610
Except Steam Heating which is billed on Dwg C-1127

DETAILS AT COLD STORAGE & REFRIGERATOR DOORS.
Scale 1/2"=1'-0"

PART PLAN. (Scale 1/2"=1'-0")

PLAN OF 1ST FLOOR

THE J. G. WHITE ENG. CORP.
NEW YORK
PLAN OF 1ST FLOOR
HOTEL STATION No. 6.
MARCONI WIRELESS TELEGRAPH CO.
SCALE 1/8" = 1'-0" DATE JUNE 15TH
NEW YORK OFFICE

Note - Material billed on M 615
Except Steam Heating which is billed on Dwg. C-1127

PLAN of 2ND FLOOR
Scale

THE J. G. WHITE ENG. CORP
NEW YORK
PLAN OF 2ND FLOOR
HOTEL STATION No
MARCONI WIRELESS TELEGRAPH C
SCALE
NEW YORK OFFICE

CONDUIT IN BASEMENT TO BE RUN EXPOSED ON CEILING.

PLAN - BASEMENT.

CNT. A-10 FOR LANDSCAPING

NEED FOR PANEL "C"

NEED FOR PANEL "D"

PANEL "A"

PANEL "B"

ALTERNATE CIRCUITS ON PORCH LAMPS

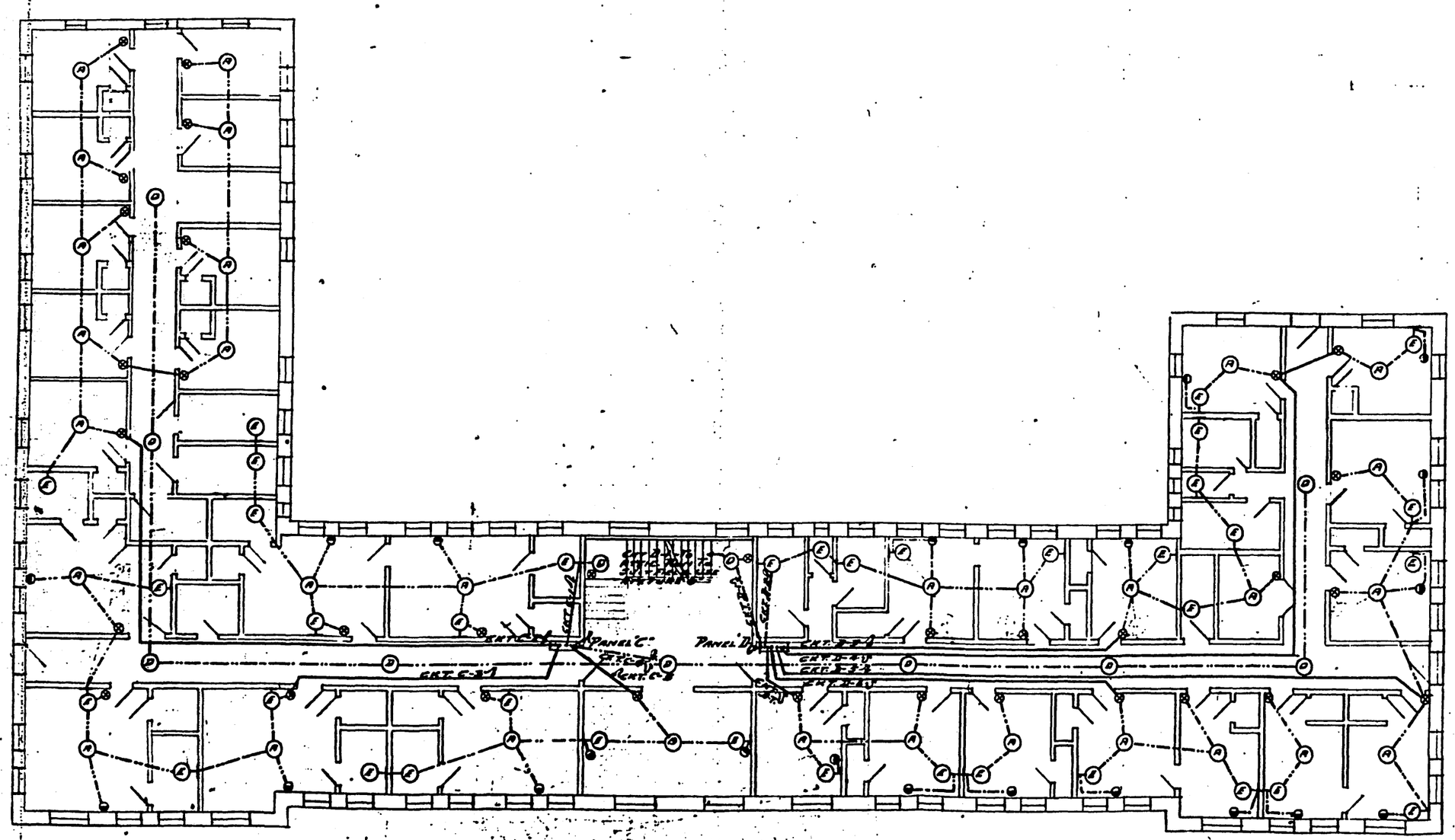
PLAN - 1ST FLOOR.

Drawing No. H-6197
Drawn by [illegible]
Traced by [illegible]
Checked by [illegible]
Rejected by
B/M Checked by [illegible]
Correct
Approved

Area - 9.96

FIXTURES

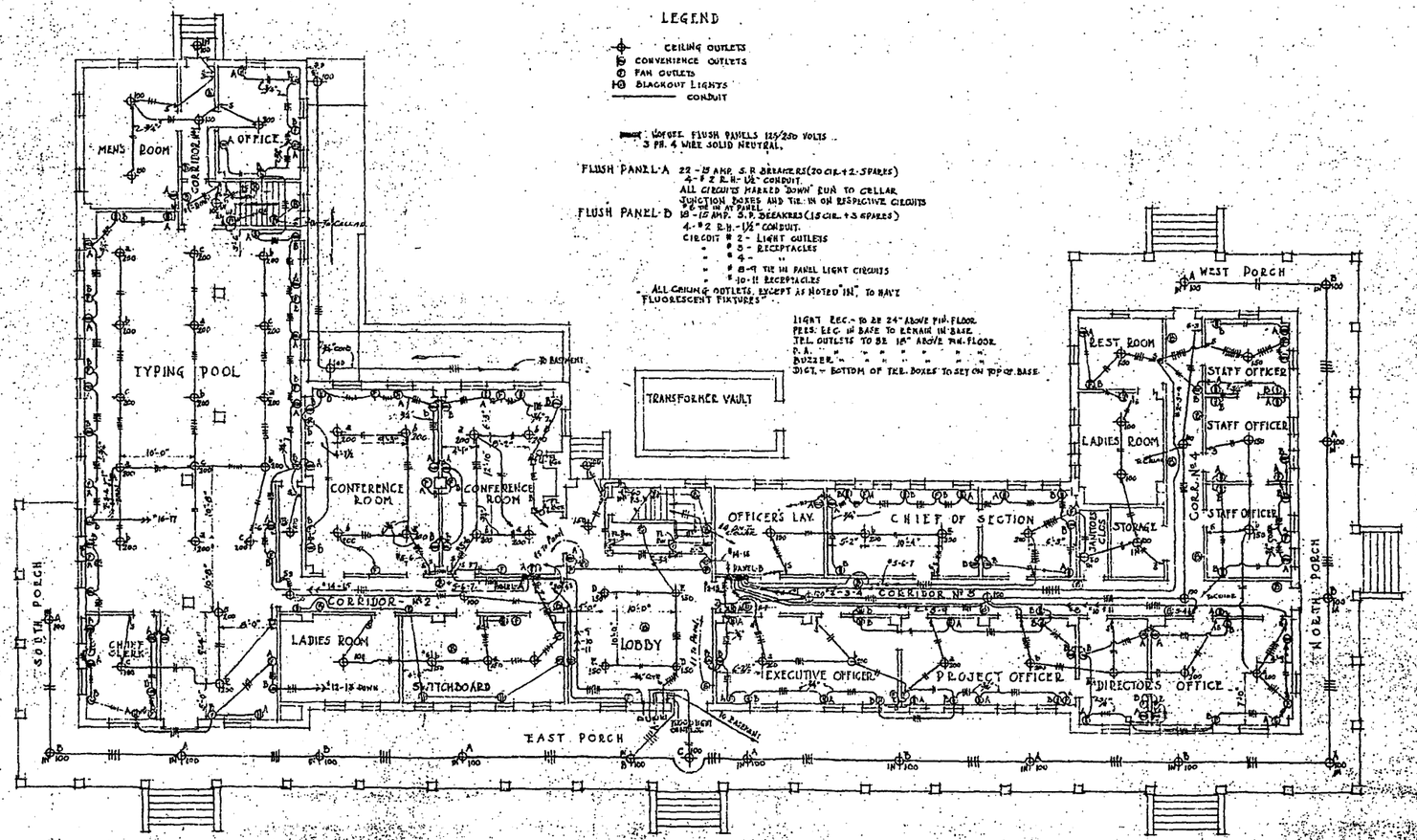
FIXTURE "A" 60 WATTS. SIMILAR TO FIXTURE "A" DWG. D-1092.
" "B" 100 " " " " SHAPIRO & ARONSON CAT. NO. 2211 E.
" "D" 40 " " " " " " " " " E 782.
" "C" 100 " " " FIXTURE "A" DWG. D-1092.
" "E" 40 " " " " "D" " " "
" "G" 40 " FEDERAL RECEPTACLE ON T88 COVER NO. 9F.



PLAN-2ND FLOOR.

NO.	DATE	REVISIONS				
1	7-3-13					
2	9-10-13	Added Item & Note on 8-M1				

THE J. C. WHITE ENG. CO
NEW YORK
LIGHTING PLANS AND DETA
HOTEL- STATION N
MARCONI-WIRELESS T
SCALE 1/8"=1FT. DATE 7
NEW YORK OFFICE



LEGEND

- CEILING OUTLETS
- CONVENIENCE OUTLETS
- FAN OUTLETS
- BLACKOUT LIGHTS
- CONDUIT

WOODEN FLUSH PANELS 125/250 VOLTS 3 PH. 4 WIRE SOLID NEUTRAL.

FLUSH PANEL-A 22 - 15 AMP. S.P. BREAKERS (20 CIR. + 2 SPARES)
4 - # 2 R.H. - 1½" CONDUIT.
ALL CIRCUITS MARKED "DOWN" RUN TO CELLAR JUNCTION BOXES AND TIE-IN ON RESPECTIVE CIRCUITS
6 TIE IN AT PANEL

FLUSH PANEL-B 18 - 15 AMP. S.P. BREAKERS (15 CIR. + 3 SPARES)
4 - # 2 R.H. - 1½" CONDUIT.
CIRCUIT # 2 - LIGHT OUTLETS
" # 3 - RECEPTACLES
" # 4 - "
" # 8-11 TIE IN PANEL LIGHT CIRCUITS
" # 10-11 RECEPTACLES

- ALL CEILING OUTLETS, EXCEPT AS NOTED "FX", TO HAVE FLUORESCENT FIXTURES".

LIGHT REC. - TO BE 24" ABOVE FIN. FLOOR.
PERS. REC. IN BASE TO REMAIN IN BASE.
TEL. OUTLETS TO BE 18" ABOVE FIN. FLOOR.
D.A. " " " " " "
BUZZER " " " " " "
DIGT. - BOTTOM OF TER. BOXES TO SET ON TOP OF BASE.

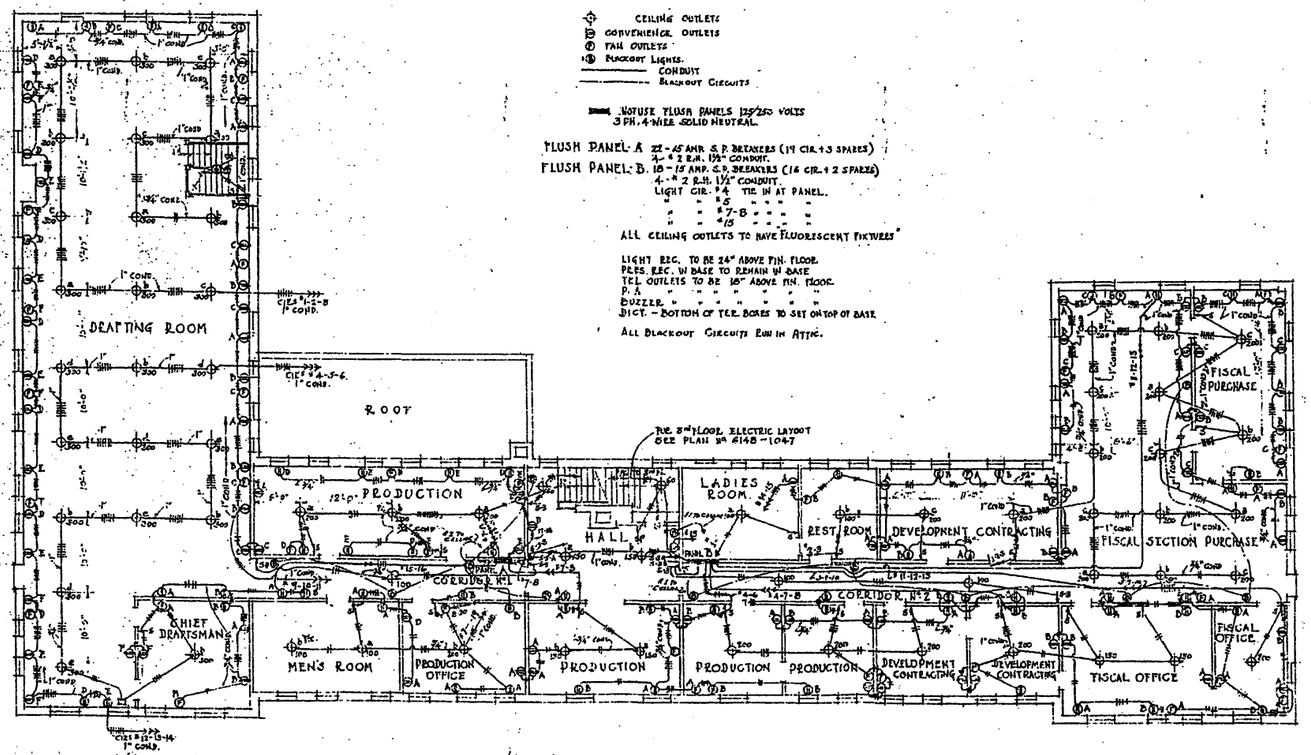
FOR CIRCUITING OF BLACK-OUT LIGHTS SEE CELLAR PLAN.

FIRST FLOOR PLAN
ELECTRICAL

APPROVED FOR
REC. H.D. COCHRAN
MAJOR - SIGNAL CORPS
DIRECTOR - SIGNAL CORPS LABORATORIES
9-15-41
1ST LIEUT - SIGNAL CORPS.

JOHN T. ROWLAND
ARCHITECT-ENGINEER

SCALE	CONSTRUCTION DIVISION OFFICE OF THE QUARTER MASTER GENERAL
1/8" = 1'-0"	KINGS COLLEGE AREA FORT MONMOUTH, N.J.
REVISIONS	ALTERATION TO EXISTING BUILDINGS MAIN BUILDING #1-B
DRAWN BY	SUBMITTED BY / APPROVED BY DIRECTION — DATE: OCT 24, 1941
TRACED BY	SEYMOUR A. POTTER JR. CAPTAIN, ONC: COM — PLAN NUMBER: 6148 / 1042



LEGEND

- CEILING OUTLETS
- CONVENIENCE OUTLETS
- FAN OUTLETS
- BLACKOUT LIGHTS.
- CONDUIT
- BLACKOUT CIRCUITS

NOTUSE FLUSH PANELS 125/250 VOLTS 3 PH. 4-WIRE SOLID NEUTRAL.

FLUSH PANEL A 22 - 45 AMP. S.P. BREAKERS (19 CIR. + 3 SPARES)
2 - 4" 2 R.M. 1½" CONDUIT.

FLUSH PANEL B. 18 - 15 AMP. S.P. BREAKERS (16 CIR. + 2 SPARES)
4 - 4" 2 R.M. 1½" CONDUIT.
LIGHT CIR. #4 TIE IN AT PANEL.
" " #5 " " " "
" " #7-8 " " " "
" " #10 " " " "

ALL CEILING OUTLETS TO HAVE FLUORESCENT FIXTURES"

LIGHT REC. TO BE 24" ABOVE FIN. FLOOR.
PRES. REC. W BASE TO REMAIN W BASE
TEL OUTLETS TO BE 18" ABOVE FIN. FLOOR.
P. A " " " " " "
BUZZER " " " " " "
DICT. - BOTTOM OF TEE BOXES TO SET ON TOP OF BASE

ALL BLACKOUT CIRCUITS RUN IN ATTIC.

SECOND FLOOR PLAN
ELECTRICAL

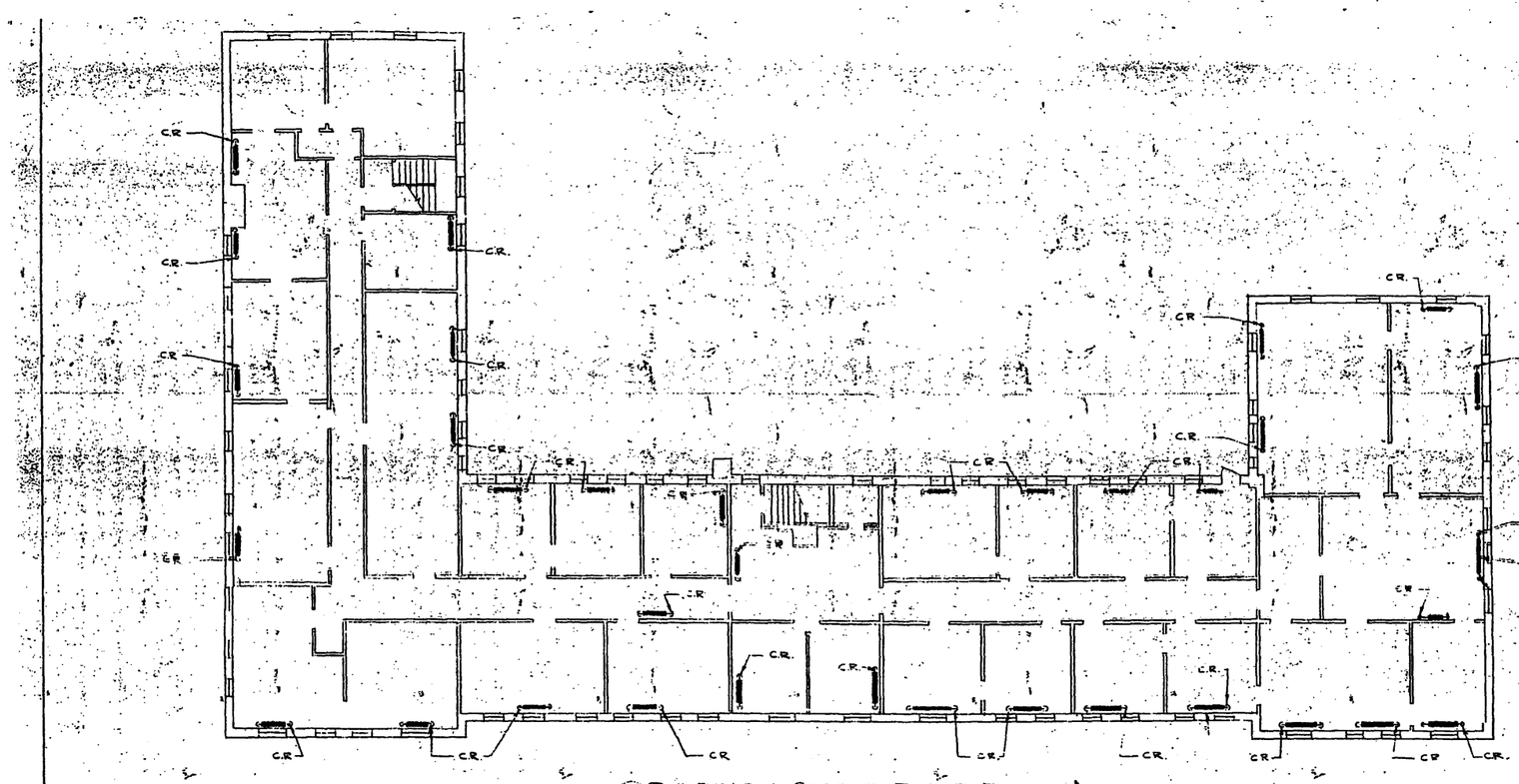
APPROVED FOR
R.E.X. P.O. CORPUT
MAJOR - SIGNAL CORPS
DIRECTOR - SIGNAL CORPS LABORATORIES.
E. B. Rexford
1ST LIEUT. SIG. CORPS

JOHN T. ROWLAND
ARCHITECT-ENGINEER.

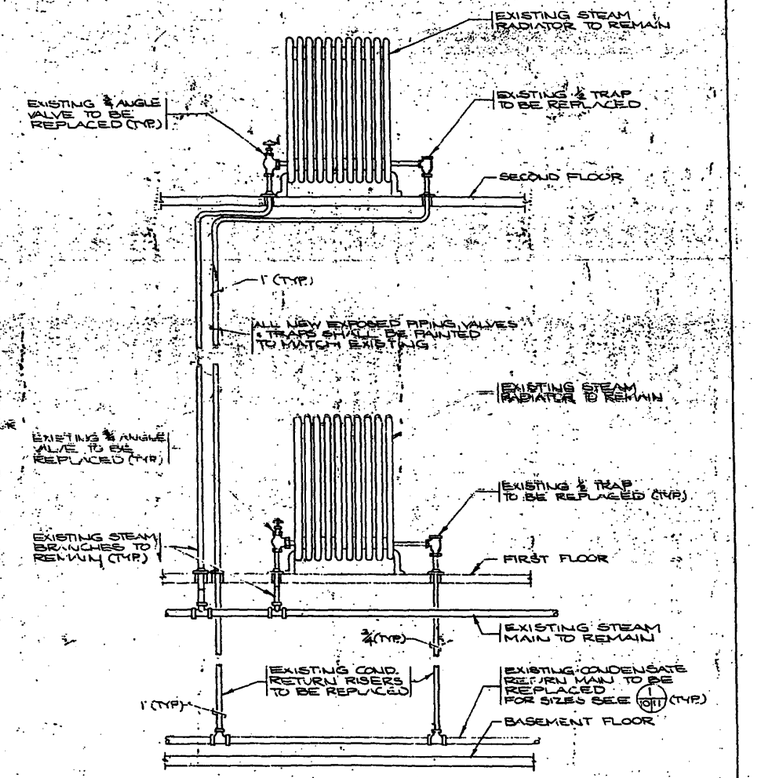
SCALE 1/8" = 1'-0"
REVISIONS.

CONSTRUCTION DIVISION
OFFICE OF THE QUARTER MASTER GENERAL
KING'S COLLEGE AREA
FORT MONMOUTH, N.J.
ALTERATION TO EXISTING BUILDING'S
MAIN BUILDING "1-B"

DRAWN BY	SUBMITTED BY	APPROVED BY DIRECTION	DATE
			OCT. 24, 1941
TRACED BY		SEYMOUR A. POTTER JR. CAPTAIN. Q.M.C. : C.Q.M.	PLAN NUMBER 6148 1043

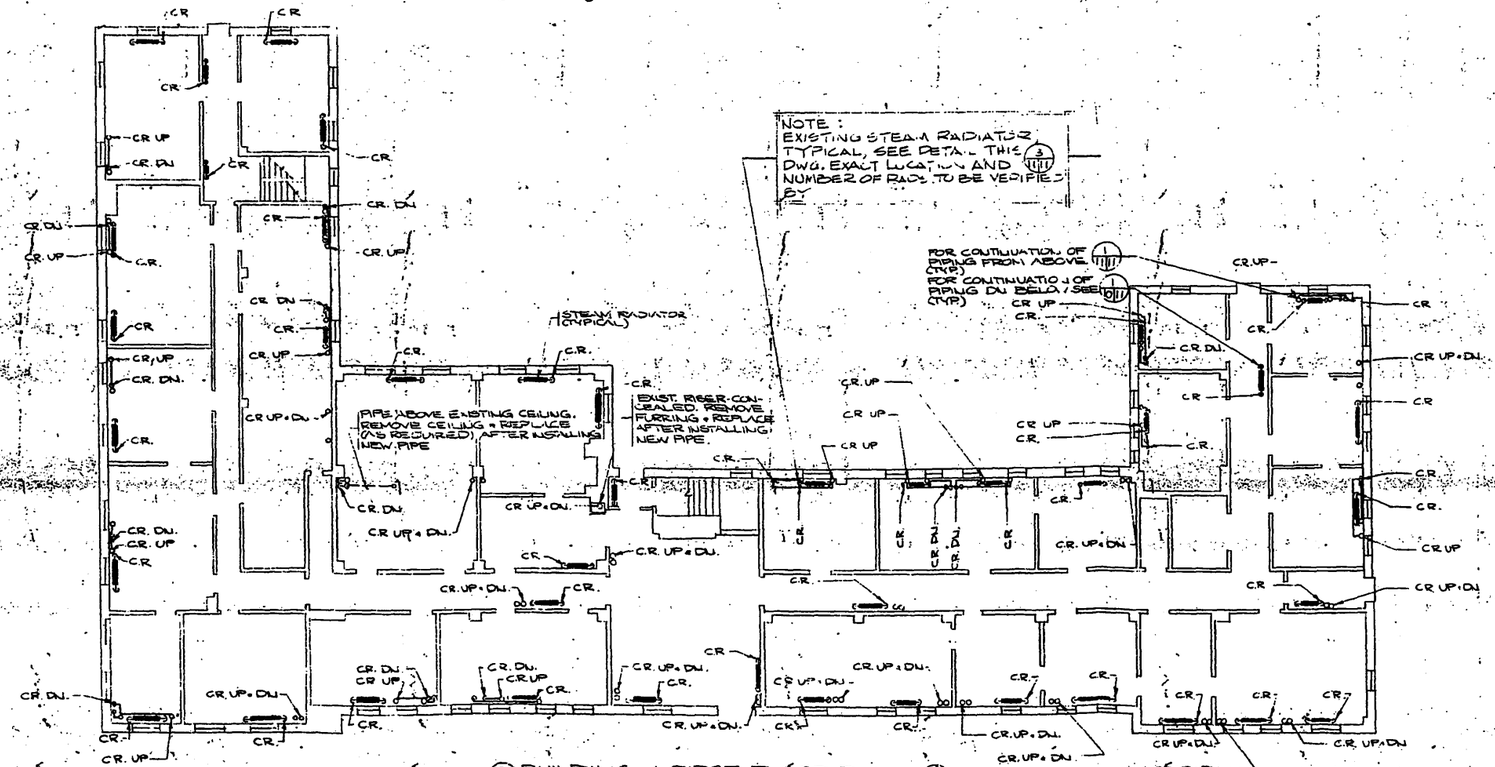


1 BUILDING 1 SECOND FLOOR PLAN
SCALE: 1/8" 1'-0"



3 10/11 EXISTING STEAM RADIATOR PIPING DETAIL
SCALE: NONE

NOTE: RISER DETAIL ARE SIMILAR FOR ALL 5TH. RADIATORS. NEW CONDENSATE RETURN (C.R.) RISER SIZES SHALL BE AS SHOWN ABOVE.



2 BUILDING 1 FIRST FLOOR PLAN
SCALE: 1/8" 1'-0"

CUH2A
Architecture, Engineering, Planning
45 State Road, Princeton, New Jersey 08540
Telephone (609) 921-8666 Telex 531729

SYMBOL	DESCRIPTION REVISIONS	DATE	APPROVED

OFFICE OF THE FACILITIES ENGINEER
Fort Monmouth, New Jersey

DRAWN	D.S.
DESIGNED	
CHECKED	D.V. ROONEY
FP&P BR	R.W. ABBOTT
S&S BR	
UTL. BR.	J. SELL
USING AGENCY	
RECOMMENDED:	
APPROVED:	JAMES ATT, Chief Engineering, Plans & Services

Boiler Replacement
Buildings 1,36,37,38,39,41,44,64

BUILDING 1
FIRST & SECOND
FLOOR PLANS

SCALE: AS NOTED
DATE: 8 JULY 1981
DRAWING NUMBER: 9781-A

SIDE ELEVATION: WEST

SECTION "A-A"

END ELEVATION: NORTH

END ELEVATION: SOUTH

PLOT PLAN
BUILDING 2-B
Scale 1/8" = 1'-0"

BUILDING 3-B
ELECTRICAL

BUILDING 2-D
ELECTRICAL

PLAN OF CELLAR - BUILDING 2-D
ELECTRICAL

FLOOR PLAN
BUILDING 2-D
Scale 1/8" = 1'-0"

PLAN OF CELLAR - BUILDING 2-D

Notes:
1. Remove all work shown in dotted lines.
2. Be careful not to damage any existing work.
3. Block up opening in wall in Buildings 2-B & 3-B.
4. Provide 5'-3" x 4'-0" Concrete platforms.
5. Connect to Building 3-B.
6. Shorten and lower 5-1¼" to Sec. of. from Office in Building 2-D.
7. Seal up the several openings as shown.
8. Bulkhead 2-B, 3-B.
9. Provide small shelter in door of 3-B.
10. Remove & replace the present wood bulkhead to cellar steps, Building 2-D.
11. Point-up all cast concrete steps, Verandah-sills & door sills.

Notes: Continued.
12. Remove 3'-0" x 2'-0" Concrete platforms.
13. New Gutters & Leaders to be installed.
14. Entrance to Room ... to be closed.
15. Partitions in Cellar Bldg. 2-D to be removed.
16. Patch the stucco exterior of 2-D.
17. Provide 2'-3" x 2'-6" door & door frame Building 2-B.

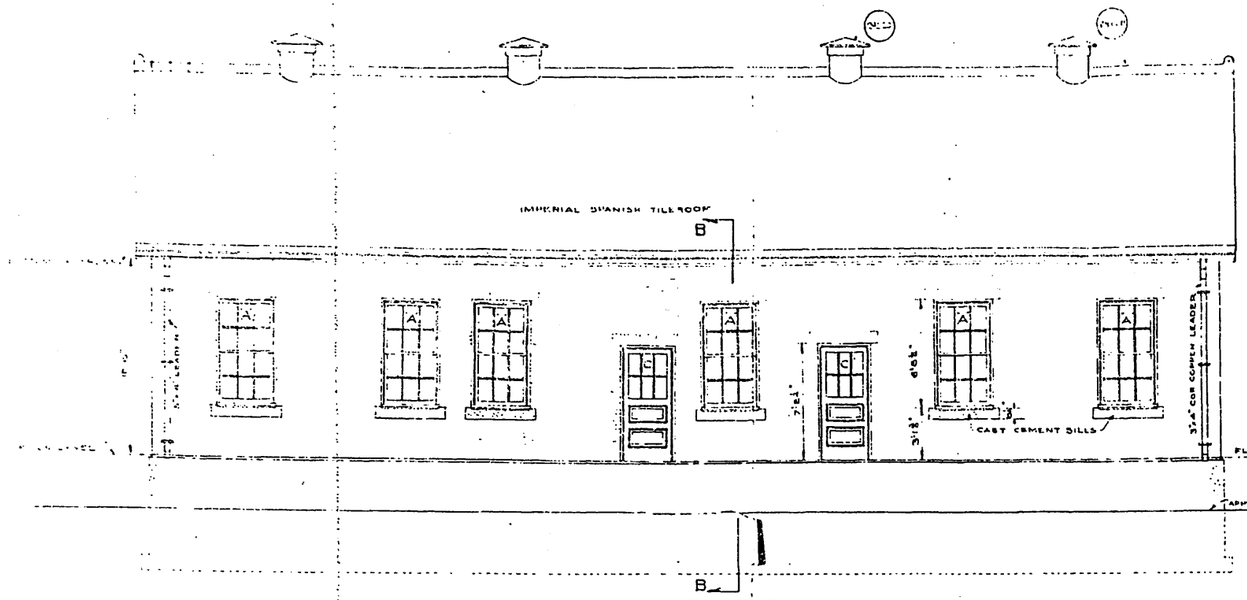
Electric Notes:
Light Receptacles 24" above f.
Press Receptacles 18" above f.
Telephone Outlets 18" above f.
F.A. 18" above f.
Buzzers 18" above f.
Distribution Point or Terminal Boxes 72" or 84" above f.
All panels & Distribution Boxes to be placed out of sight, as near the center as possible.
Fan outlets to be 10" above floor.

APPROVED FOR
REX. V.D. CORDUT
MAJOR SIGNAL CORPS
DIRECTOR SIGNAL CORPS LABORATORIES
W. B. Mountcastle
for LIEUT. SIGNAL CORPS

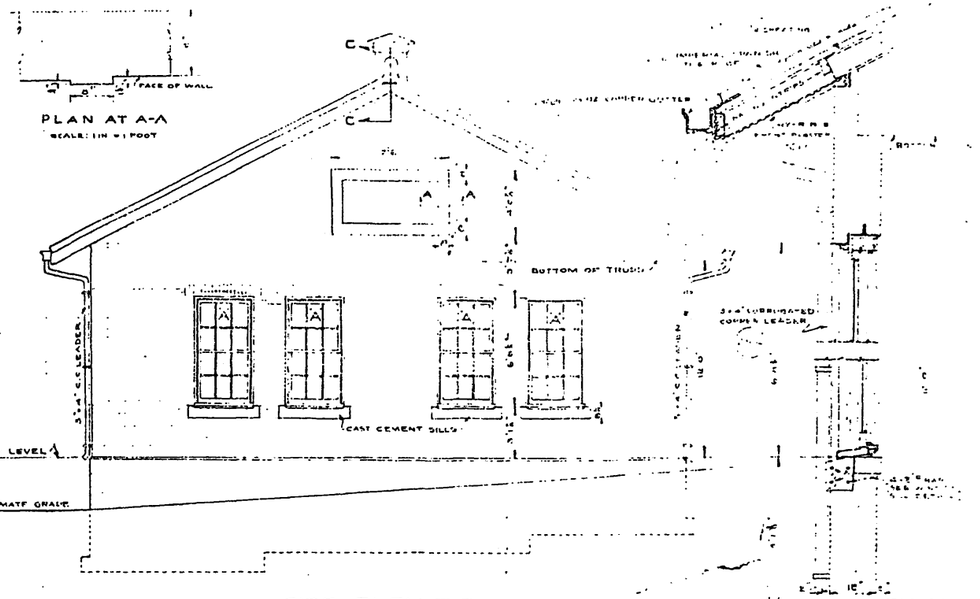
JOHN T. ROWLAND
ARCHITECT ENGINEER

CONSTRUCTION DIVISION
OFFICE OF THE QUARTERMASTER GENERAL
KINGS COLLEGE AREA
FORT MONMOUTH, N.J.
FLOOR PLANS & MISC. DETAILS
BUILDINGS 2D-2D

Scale: 1/8" = 1'-0"
Revisions:
Drawn by: Am.
Submitted by:
Approved by Direction: Seymour A. Pettet Jr. Captain Q.M.C. Con.
Date: Nov. 10-1941
Plan Number: 41.8 TC 8
19 Lines

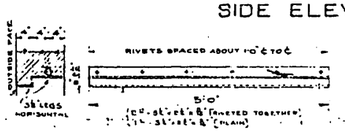


REAR ELEVATION

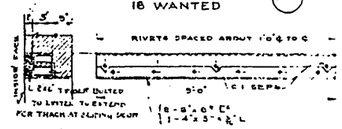


SIDE ELEVATION

PLAN AT A-A
SCALE: 1 IN = 1 FOOT



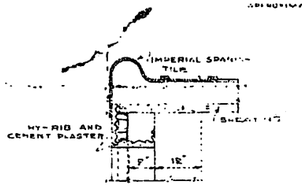
LINTELS FOR WINDOWS 'A' (2405)
18 WANTED



LINTELS FOR DOORS 'B' (2406)
3 WANTED

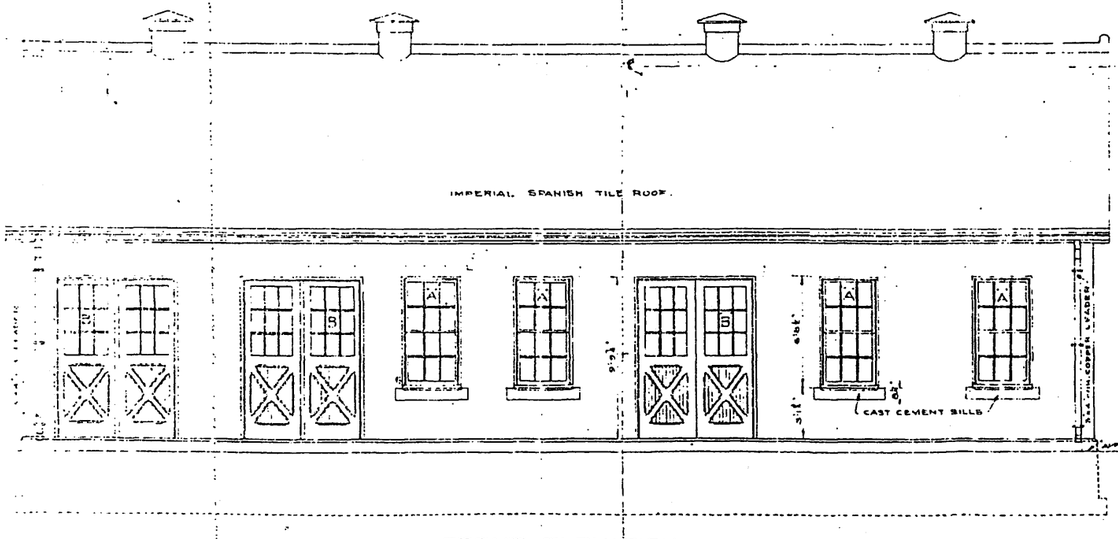
LINTELS FOR DOORS C & E (2407)
5 WANTED

LINTELS FOR DOORS 'D' (2408)
2 WANTED

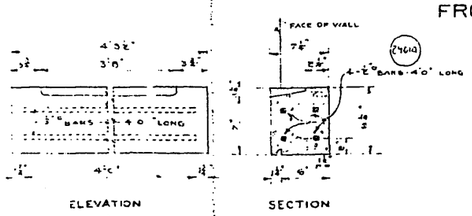


SECTION C-C
SCALE: ¾" = 1'-0"

SECTION B-B
SCALE: ¾" = 1'-0"



FRONT ELEVATION



DETAIL OF WINDOW SILL
18 WANTED
SCALE: 12" = 1'-0"

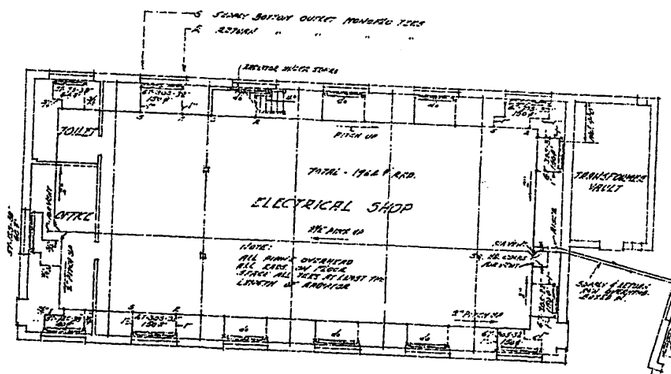
FOUNDATION & FLOOR PLAN	H-2-75
DOOR & WINDOW DETAILS	H-2-77
ROOF PLAN & DETAILS - STEEL	H-2-78

THE J. G. WHITE ENG. CORP.

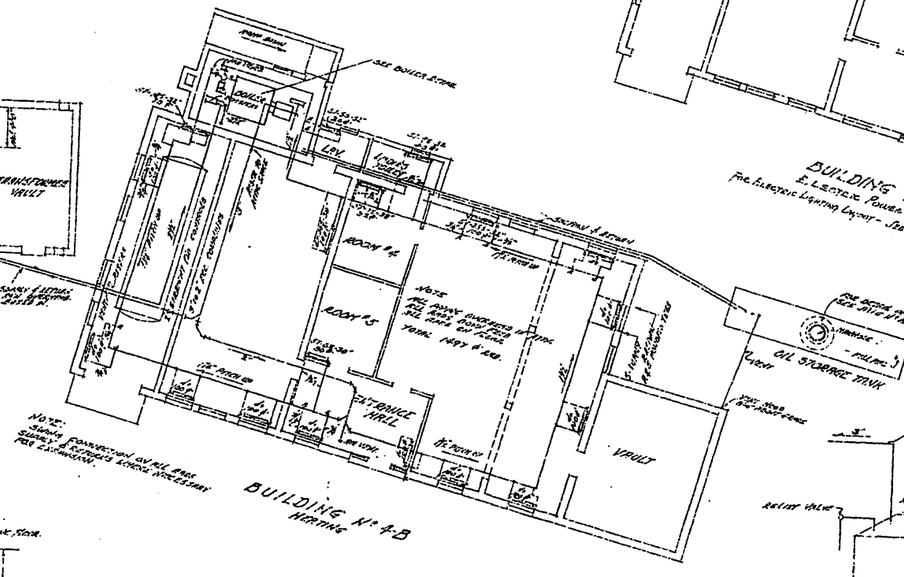
ELEVATIONS

LT. & HEAT. PLANT - STATION NO. 6

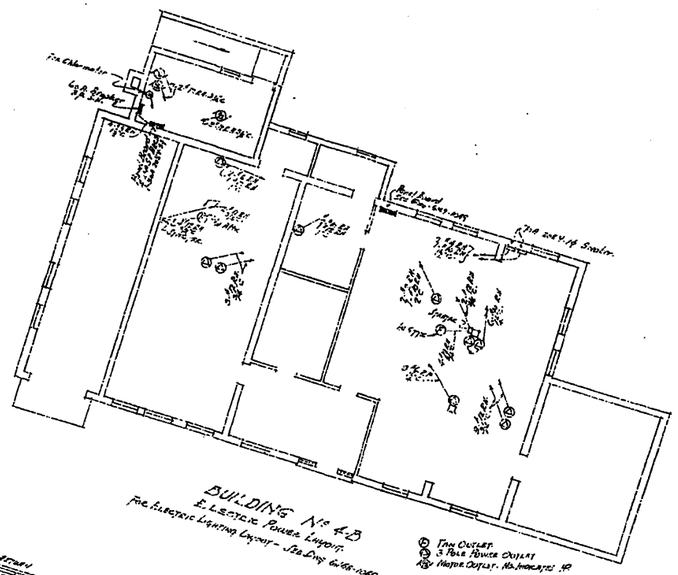
1/4"=1'-0"



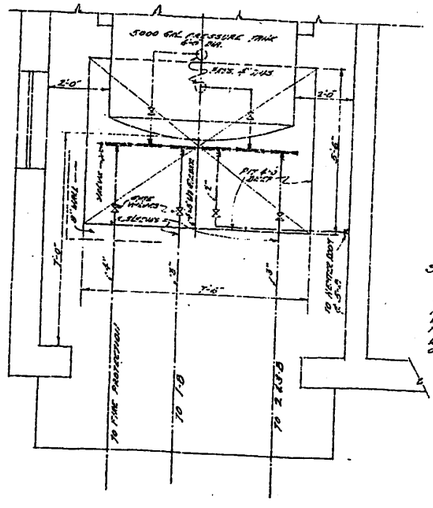
BUILDING No 5-B
HEATING

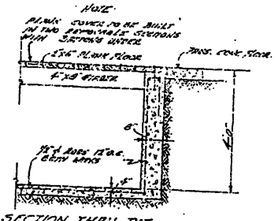


BUILDING No 4-B
HEATING

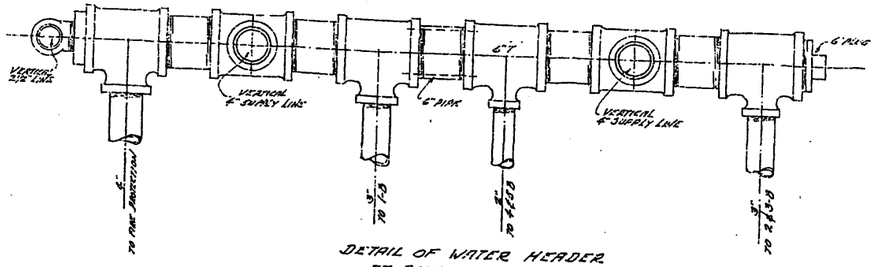


BUILDING No 4-B
FOR ELECTRIC LIGHTING LAYOUT - SEE DWG W.D. 1050

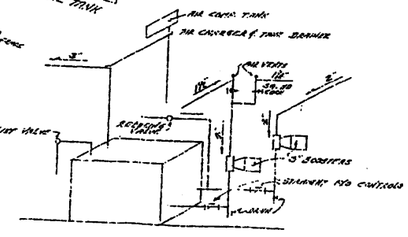




SECTION THRU PIT
Scale 1/2"=1'0"



DETAIL OF WATER HEADER
AT BUILDING 4-B
SCALE 1/2"=1'0"



BUILDING No 4-B
BOILER DETAIL
1/4" SCALE

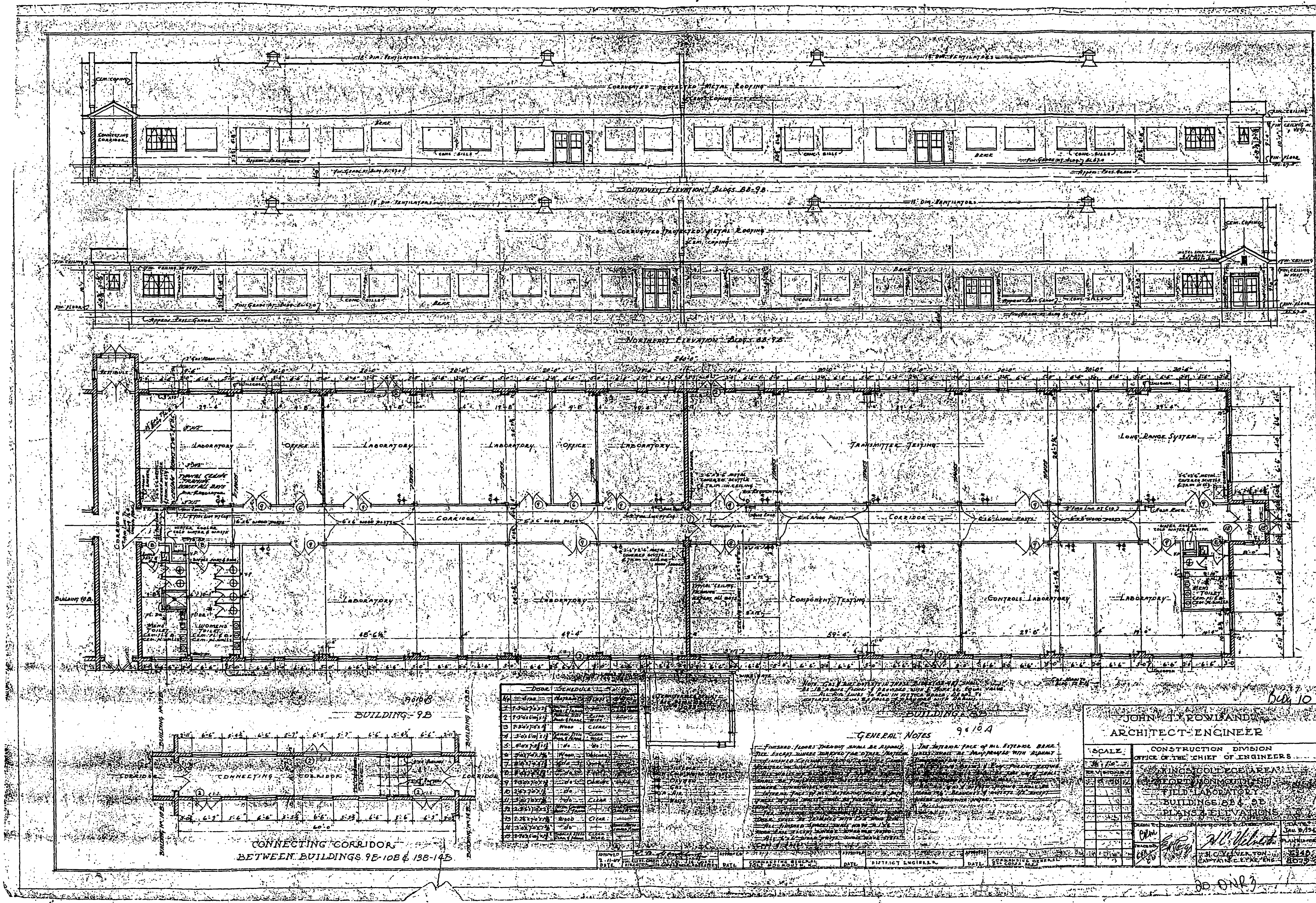
APPROVED FOR
ACT. V. D. CORPS
MAJOR - SIGNAL CORPS
DIRECTOR - SIGNAL CORPS LABORATORIES
SIGNED - W. D CONKLING
1ST LIEUT. SIGNAL CORPS

Kings 6/7

JOHN. T. ROWLAND
ARCHITECT-ENGINEER

SCALE	CONSTRUCTION DIVISION
1/8" = 1'-0"	OFFICE OF THE QUARTERMASTER GENERAL
REVISIONS	KINGS COLLEGE AREA
	FORT MONMOUTH, N.J.
	HEATING PLAN
	BUILDINGS No 4-B, 5-B

DRAWN BY	SUBMITTED BY	APPROVED BY DIRECTION	DATE
W.M.		Signed By	NOV. 10, 1941
TRACED BY	A.A.J	SEYMOUR A. POTTER, JR.	PLAN NUMBER
W.M.		SEYMOUR A. POTTER, JR. CAPTAIN, O.M.C. - C.Q.M.	6148 1050


18" DIA. VENTILATORS
CORRUGATED PROTECTED METAL ROOFING
CEM. COPING
CONNECTING CORRIDOR
BRICK
CONC. SILLS
FIN. CEILING
FIN. CEILING IN VEST.
FIN. FLOOR
SOUTHWEST ELEVATION BLDGS. 8B-9B
NORTHEAST ELEVATION BLDGS. 8B-9B
240'-0"
VESTIBULE
LABORATORY
OFFICE
TRANSMITTER TESTING
LONG RANGE SYSTEM
CORRIDOR
COMPONENT TESTING
CONTROLS LABORATORY
MENS TOILET
WOMENS TOILET
BUILDING 10B
BUILDING - 9B
CONNECTING CORRIDOR
CONNECTING CORRIDOR BETWEEN BUILDINGS 9B-10B & 13B-14B
DOOR SCHEDULE
BUILDING 8B
GENERAL NOTES
Bldg 10
9 & 10 A
JOHN T. ROWLAND
ARCHITECT-ENGINEER
SCALE
1/8" = 1'-0"
CONSTRUCTION DIVISION
OFFICE OF THE CHIEF OF ENGINEERS
KINGS COLLEGE AREA
FORT MONMOUTH, N.J.
FIELD LABORATORY
BUILDINGS 8B & 9B
PLANS & ELEVATIONS
JAN. 8, 1942
H. C. YELVERTON
CAPTAIN C.E. U.S.A. ENG.
DISTRICT ENGINEER
COMMANDING GENERAL

SOUTHWEST ELEVATION. BLDGS. 10B-11B.

NORTHEAST ELEVATION. BLDGS. 10B-11B.

240'-0"

Typing Pool

Office

Corridor

Conference Room

Specifications & Records

Laboratory

Test Room

Drawing Room

Specifications

Women's Toilet

Men's Toilet

Best Room

Conference Room

Conference Room

Laboratory

Engineering Office

Typing Pool

Office

Office

Office

Transformer Vault

Building 11B

Building 10B

Bldg 10

JOHN T. ROWLAND
ARCHITECT-ENGINEER

SCALE	CONSTRUCTION DIVISION OFFICE OF THE CHIEF OF ENGINEERS
1/4"-1'-0"	KINGS COLLEGE AREA FORT MONMOUTH, N.J.
REVISIONS	FIELD LABORATORY BUILDINGS 10B & 11B PLANS & ELEVATIONS
	DRAWN BY: CONN; SUBMITTED BY: [illegible]; APPROVED BY DIRECTION: [illegible]; DATE: JAN. 8, 1942
	TRACED BY: [illegible]; H.C. WEYLAND, CAPTAIN C.E.-A.U.S.; PLAN NUMBER: 6146 1080

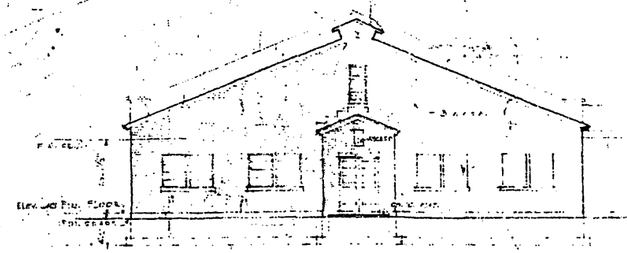
APPROVED 2-11-42 DATE — W. B. Spalding, Col. Q.M.C. FOR — Q.M.C. Constr. Officer, Fort Monmouth, N.J.

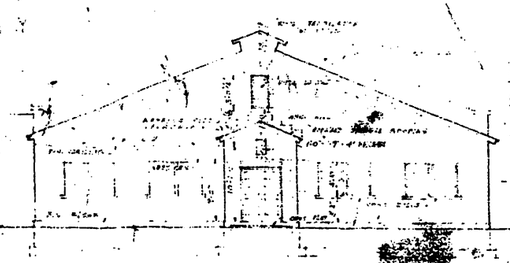
APPROVED DATE — Commanding General, Fort Monmouth, N.J.

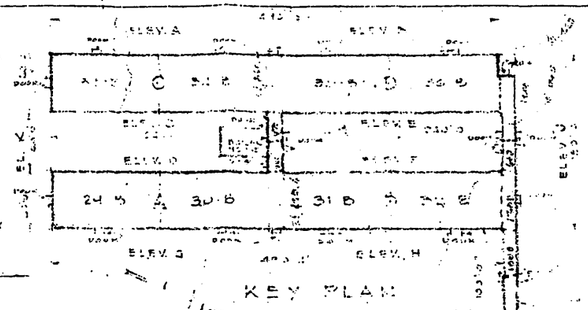
APPROVED DATE — District Engineer

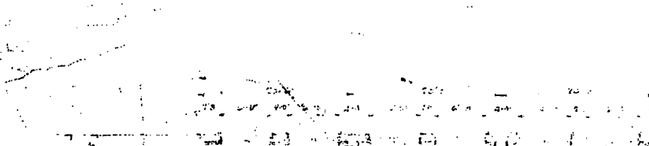
APPROVED DATE — Commanding General, 2nd Corps Area

20 Dwgs 3









QUADRANT A

FORT MONMOUTH
RED BANK, N. J.

SIGNAL CORPS RADAR LABORATORIES
CAMP EVANS
LABORATORY - BLDGS NO 29 & 30

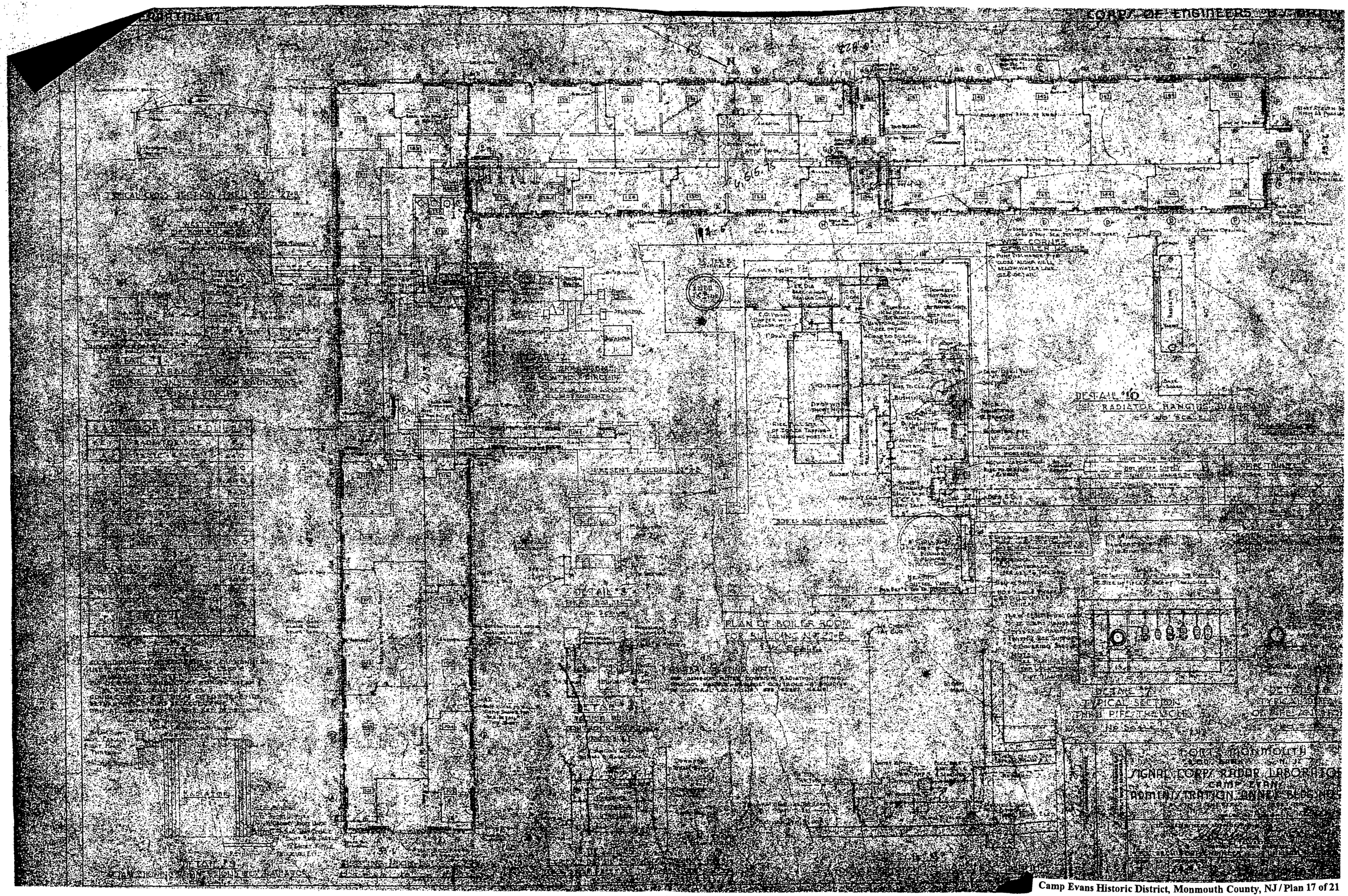
IN 4 SHEETS SHEET NO 2

SCALE AS SHOWN

U. S. ENGINEER OFFICE PHILA., PA., JUNE 5, 1942

CAPTAIN, CORPS OF ENGINEERS

ARCHITECT-ENGINEER WILLIAM A. BOLT


N
WEST CORNER
BOILER HOUSE
DETAIL "D"
RADIATOR HANGING BRACKETS
PRESENT BUILDING NO 2A
DETAIL "B"
PLAN OF BOILER ROOF
FOR BUILDING NO 2
DETAIL "A"
DETAIL "C"
TYPICAL SECTION
DETAIL "E"
FORT MONMOUTH
SIGNAL CORPS RADAR LABORATORY
CAMP EVANS
ADMINISTRATION ANNEX BLDG NO 2

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

PLAN - CONSTRUCTION & PLUMBING

ELEVATION 1

ELEVATION 2

ELEVATION 3

ELEVATION 4

ELEVATION: 1

ELEVATION: 2

ELEVATION: 3

ELEVATION: 4

FRONT ELEVATION

SIDE ELEVATION

ELECTRIC FIXTURE SCHEDULE

ROOM	TYPE	WATTS
EXTERIOR ENTRANCES	VP-1	150
VEST. & CORRIDORS	R-12F	175
TOILETS	R-12F	150
STORAGE & PAINT SHOP	R-12F	150
SHOPS	FL-3	3-40 W. FIXTURES
OFFICES	FL-3	3-40
ATTIC	I-3	150

ELECTRIC NOTES:

PLUMBING NOTES:

PLUMBING FIXTURES:

POWER PANEL SPECIFICATIONS

PANEL "P"

WATER DISTRIBUTION SYSTEM SPECIFICATIONS

FLOOR PLAN

SECTION SHOWING DRAINAGE FROM BOILER HOUSE TO BLDG. 286

FORT MONMOUTH
RED BANK, N.J.
SIGNAL CORPS-RADAR LABORATORIES
CAMP EVANS
BLDGS & GROUNDS NO. 286

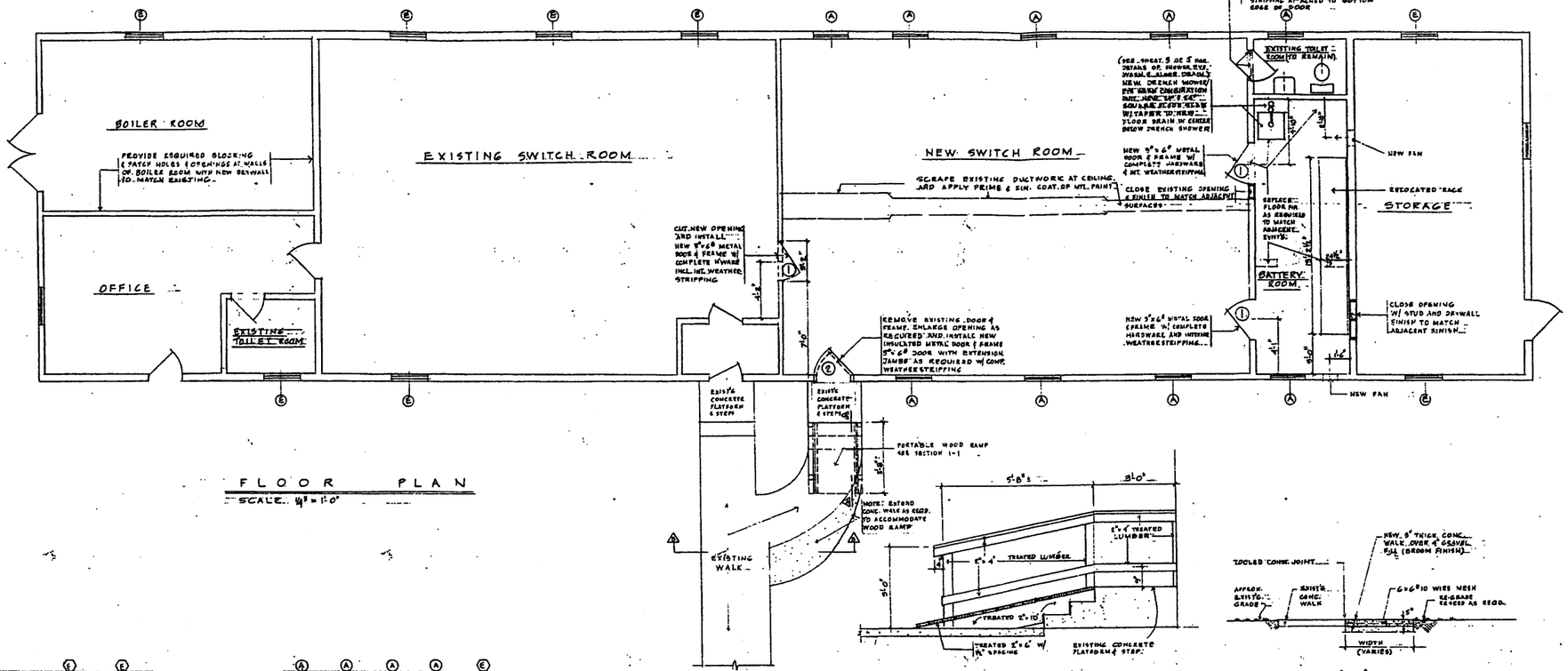
SHEETS SHEET NO. 1
SCALE AS SHOWN

DWG. 3435

DWG. 9054

BLDG. 1035

BOILER HOUSE



FLOOR PLAN

SCALE: 1/4" = 1'-0"

SECTION A-A AT RAMP

SCALE: 1/2" = 1'-0"

SECTION A-A AT CONC. WALK

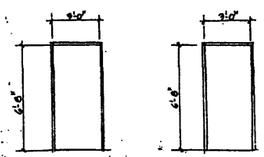
SCALE: 1/4" = 1'-0"

FRONT ELEVATION

NO SCALE

REAR ELEVATION

NO SCALE



① 3'-0" x 6'-8" x 1¾" FLUSH H.M. ② 3'-0" x 6'-8" x 1¾" FLUSH INSULATED H.M.

DOOR ELEVATIONS

SCALE: 1/4" = 1'-0"

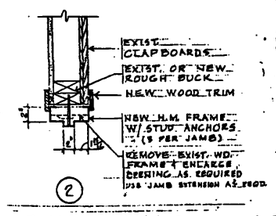
DOOR HARDWARE

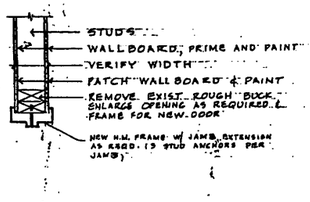
DOOR ①
1½ PAIR BUTTS 4½" x 4½" US 26D
DOOR LOCK SET US 26D
DOOR CLOSER SURFACE MTD HEAVY DUTY 604
WEATHERSTRIP AGAINST PASSAGE OF AIR

DOOR ②
1½ PAIR BUTTS 4½" x 4½" US 26D
MST. DOOR LOCK (BEST) RIM CYLINDER (1-PIN)
DOOR CLOSER SURFACE MOUNTED 604 EXIT RIM DEVICE HEAVY DUTY

INSTALLATION OF H'WARE

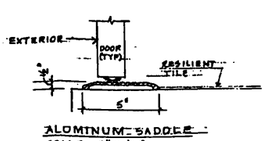
FINISH H'WARE SHALL BE INSTALLED IN ACCORDANCE W/ MANUFACTURER'S INSTRUCTIONS





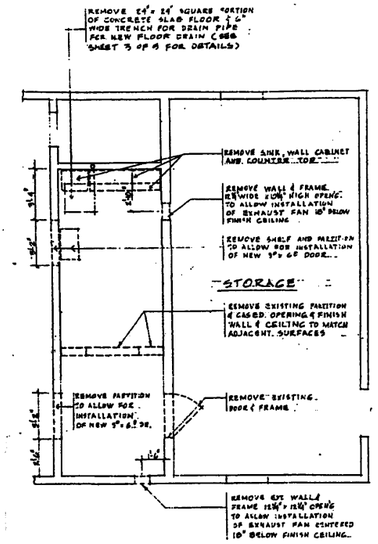
DOOR FRAME DETAILS

SCALE 1½" = 1'-0"



ALUMINUM SADDLE

SCALE: 3" = 1'-0"



PARTIAL DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. PATCH AROUND ELECTRICAL OPENINGS AND DUCTWORK AND FINISH TO MATCH ADJACENT OPENINGS. (INCLUDING BOILER ROOM)
2. SCRAPE EXISTING EXPOSED HEATING DUCTWORK AT CEILING, PRIME AND PAINT WITH METAL PAINT.
3. INSTALL BLOWN-IN WALL INSULATION AT EXT. WALLS OF NEW SWITCH ROOM & BATTERY ROOM
4. INSTALL 6" BATT INSULATION AT CEILING OF NEW SWITCH ROOM & TEL. RM.
5. PRIME & PAINT WALLS & CEILING OF NEW SWITCH ROOM & BATTERY ROOM.

SYMBOLS

(A) NEW D/H INSULATED WINDOW. (ANDERSEN 2442 WHITE)

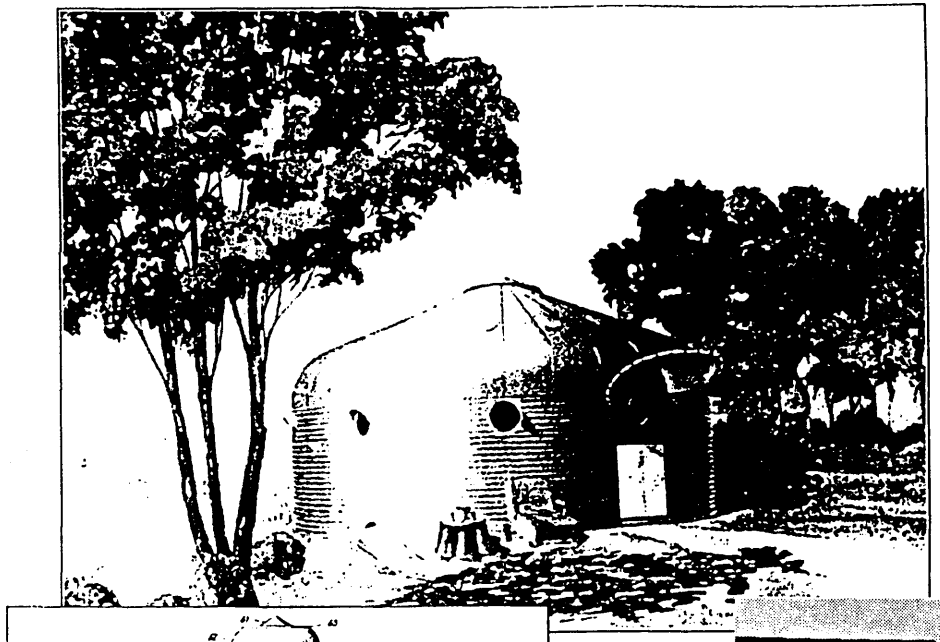
(E) EXISTING WINDOW TO REMAIN.

WINDOW NOTE: REMOVE EXISTING D/H WINDOWS & REPLACE W/ NEW ANDERSEN WINDOWS AS INDICATED. ENLARGE WINDOW OPENINGS OR REDUCE WINDOW OPENINGS AS REQ'D. REPLACE OR INSTALL EXT. WD TRIM AS REQD. AND INSTALL STANDARD WD. TRIM AT INTERIOR.

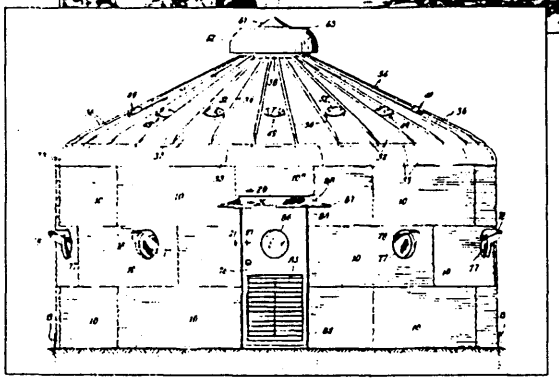
SYMBOL	DESCRIPTION	DATE	APPROVED
	REVISIONS		

DIVISION OF ENGINEERING & HOUSING
Fort Monmouth, New Jersey

DRAWN B.G.	SITE PREPARATION AND INSTALLATION FOR NEW TELEPHONE SYSTEM BUILDING S-59 EVANS AREA NEW JERSEY
DESIGNED B.G.	
CHIEF ESS K. DOONEY	
SAFETY [illegible]	
FP&P BR [illegible] A. GUZZI	
QA [illegible] W. ROBERTS	ARCHITECTURAL FLOOR PLAN DEMOLITION PLAN, DOOR DETAILS
USING AGENCY [illegible] MSG BONNIER	
RECOMMENDED: [illegible]	SCALE: AS NOTED — DRAWING NUMBER: 10190-2
JAMES O'T. Chief Engineering, Plans & Services	DATE: JAN 29, 1986
APPROVED W.N. MacKinnon	PR. NO: 85-DP-0907 — SHEET 2 OF 5
LT. COL. W.N. MACKINNON FACILITIES ENGINEER	

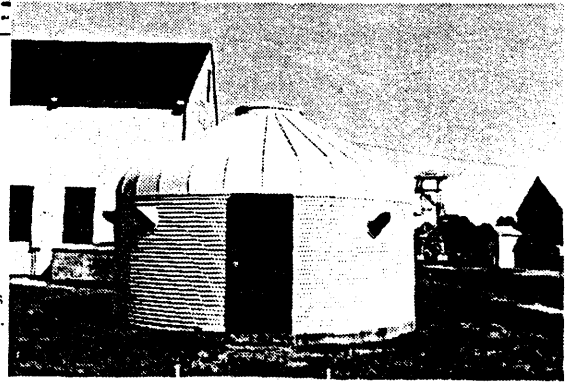


Converted grain bin redesigned by R. Buckminster Fuller for major housing use in the United States.



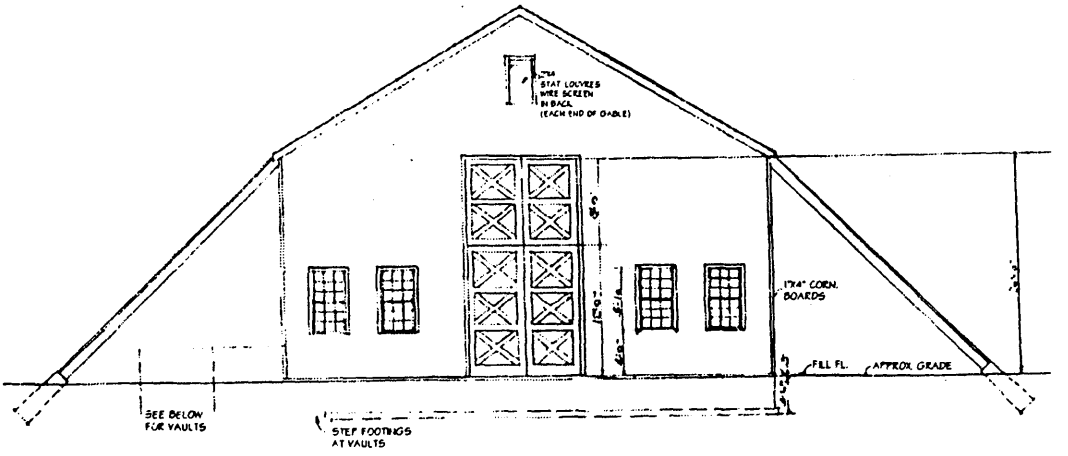
D.D.U. Diagram.

D D.U. at Evans Area.

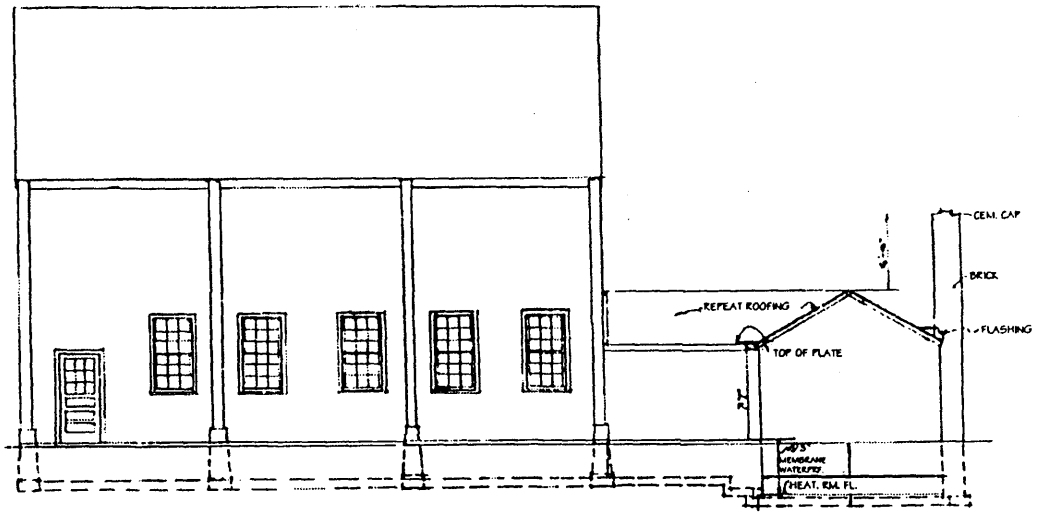


Dymaxion Deployment Units (Source: R. Buckminster Fuller Institute, Santa Barbara, California).

SOURCE: Reed and Swanson 1996



FRONT ELEVATION



RIGHT SIDE ELEVATION

Elevations of radar antenna shelters (Source: "Special Antenna Covers," Master Planning and Real Property Branch, Directorate of Public Works, Fort Monmouth). SOURCE: Reed and Swanson 1996