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Authority: Chief of Coast Artillery

6/16/29
DATE

AVS
INITIAL

Register No. 7

ANNEXES TO HARBOR DEFENSE PROJECT
HARBOR DEFENSES OF BOSTON

The short title of this document is CCA-AN-B

Under the provisions of A.R. 330-5 (paragraph 17c), each recipient of this document should make return therefor on June 30 and December 31 of each year to the Chief of Coast Artillery, Washington, D. C.

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ANNEX A

SEACOAST GUNS

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AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34)(Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-38)(Misc.) E, dated May 19, 1938.

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ANNEX A

SEACOAST GUNS.

1. Tactical Organization. The organization of the harbor defense into six groups is shown in Exhibit 1-A.

a. The underwater defense is divided into two groups, as the mine fields are widely separated and cannot be readily controlled from a single position.

b. The major calibre guns and mortars are organized into a long range group, a southern group, and a northern group. The field of fire of the first group is mainly in the outer bay; of the second group in the direction of Nantasket Roads (see Exhibit 2-A) with CP at Point Allerton; and of the third group, in Broad Sound (see Exhibit 3-A) with CP at Fort Heath. The 155 mm. battery to be provided at Nahant is included in the long range group for convenience, it being located on a flank of the harbor defense and near the long range 12-inch battery at Fort Ruckman.

c. In order to fix the responsibility for local defense against landing attacks and to provide for control of the armament in case of severance of communications, Fort Commanders are designated as follows:

Fort Ruckman,	Battery Commander, Battery Gardner.
Forts Banks and Heath,	Group Commander, Group 3.
Deer Island	Group Commander, Group 1.
Fort Standish	Senior Battery Commander.
Fort Warren	Harbor Defense Commander.
Fort Strong	Group Commander, Mine Group 2.
Fort Andrews	Regimental Commander.
Fort Revere and	
Point Allerton	Group Commander, Group 2.
Fort Duvall	Battery Commander, Battery Long.

d. The five antiaircraft batteries are organized into one group with command post at Fort Warren, adjacent to the harbor defense command post.

(1) Each of the five antiaircraft batteries is organized into a gun, a machine gun and a searchlight detachment.

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2. a. Under the provisions of the approved Harbor Defense Project, there are four 10-inch disappearing guns in the harbor defense which are to be retained on a reduced maintenance status, with no provision for personnel, as a reserve of materiel. These guns are Battery Morris at Fort Standish and Nos. 3 and 4 guns of Battery Bartlett at Fort Warren. One of these batteries has been assigned to each of the two groups into which the major calibre, medium range guns are organized.

b. Guns Nos. 3 and 4 of Battery Bartlett should hereafter be designated Battery Bartlett as the other guns are no longer required and are to be scrapped.

3. a. The field of fire of each of the batteries of the harbor defense is shown in an exhibit appended to Annex B, this exhibit showing also the fire control installations of the battery.

b. A map of each of the nine forts of the harbor defense is attached, marked Exhibits 10-A to 18-A, inclusive.

LONG-RANGE GROUP.

4. Battery Long, two 16-inch barbette guns at Fort Duvall. The field of fire is shown in Exhibit 2-B. The dead space resulting from the high traverse lies either on the land or close to shore and is unimportant. There is a small dead area formed by Point Allerton but this area extends no farther than 3,000 yards from the shore and is not a serious handicap. The dead spaces are shown in Exhibit 4-A.

5. Battery Gardner, two 12-inch LR guns at Fort Ruckman. The field of fire of this battery is shown in Exhibit 2-B. The dead space caused by the high bombproof traverse lies mostly on the land or within the harbor and is of no serious consequence.

6. 155-mm. Battery, four guns, at Nahant.

a. This battery is to be provided for the purpose of covering the water area north and northeast of Nahant. When an emergency arises the Harbor Defense Commander will select a site for the battery that will enable it to carry out the prescribed mission, which is to prevent destroyers from lying north of Nahant, where they could fire into the left rear of Battery Gardner and seriously interfere with the operation of these guns.

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b. The site selected should be such that the position can be occupied expeditiously and permit the battery to open fire without any unusual amount of preparation. The mission of this battery involves covering a field of fire of such limited extent that it can be accomplished without the use of concrete platforms.

c. (1) One position which may be considered by the Harbor Defense Commander is on a knoll on the shore at a point shown as "Spouting Horn" on the U. S. Coast and Geodetic Survey chart No. 240; the site is 1,050 yards northwest of East Point. Located on this knoll, with the axis of the field of fire 5° north of east, all four guns will be able to fire from a line tangent to East Point on the right to a line tangent to Marblehead Neck on the left; and one gun will be able to fire to the north and northwest in Nahant Bay. This site is shown in Exhibit 5-A.

(2) A second suitable location, also shown in the exhibit, is near the middle of Lynn Beach, north of Little Nahant and south of Lynn. This strip of open beach is the property of the Metropolitan Park Commission, a Commonwealth of Massachusetts public corporation, and probably will be maintained free of buildings. A field of fire can be obtained from a line tangent to Spouting Horn, on the right, to a line passing just south of Marblehead Neck on the left, as shown in Exhibit 8-A.

SOUTHERN GROUP.

7. This group is intended primarily to cover the water area to the southeast and east of the harbor. The group commander's station is favorably located on high ground at Point Allerton, overlooking the field of fire. There are four 12-inch guns and ten 12-inch mortars in this group, and two 10-inch guns in reserve. The field of fire of the group as a whole is shown in Exhibit 2-A; and in Annex B, the field of fire of each battery is shown in a separate exhibit with its fire-control installations.

8. Battery Stevenson, two 12-inch disappearing guns, at Fort Warren.

a. The field of fire of this battery is shown in Exhibit 4-B. Due to construction of the emplacements, the guns can be fired 10° farther to the left than they can be loaded. On the right the firing arc similarly can be increased for firing, though not for loading; but this additional arc would be on land. The directrix is correctly located, and there is no interference with one gun of the battery by the other in any part of the field of fire.

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9. Battery Ripley, two 12-inch barbette guns at Fort Revere.

a. The field of fire of Battery Ripley is shown in Exhibit 5-B. By removing the ladder leading to the loading platform from the left side of the carriage, the field of fire has been increased to the right by approximately 9°. A similar increase could be made on the left of the field of fire but this is unnecessary.

b. As the line of gun centers is 99°, No. 2 gun could not fire in the increased arc while No. 1 gun is manned. Nevertheless the modification has been made in the case of both guns since No. 1 gun may be disabled.

10. Battery Cushing-Whitman, ten 12-inch mortars at Fort Andrews.

a. There has been formed one battery of the two adjacent batteries, Cushing, four 12-inch mortars, and Whitman, six 12-inch mortars. Requirements for fire control stations and communications were reduced by the consolidation. While fire of the ten mortars will be confined to one target, this is not a material disadvantage because other major calibre, medium range batteries bear on the same water area.

b. While the mortars are capable of all around fire, the important part of the field of Battery Cushing-Whitman lies from azimuth 170° on the left to azimuth 282° on the right. See Exhibit 6-B.

c. The war reserve of ammunition heretofore approved for Battery Whitman is 648 rounds, all of which should be stored in the harbor defense. The war reserve of Battery Cushing is 432 rounds, all of which likewise should be stored in the harbor defense. As these mortars may be expected to fire chiefly in the outer zones because of restricted channels or shallow water within 8,000 yards range, most of the ammunition should be for the longer ranges; the distribution should be three 700-lb. projectiles to one 1046-lb. projectile.

	: Battle	: Central	: War
	: Allowance	: Reserve	: Reserve
<u>Battery Cushing-Whitman</u>	:	:	:
1046-lb.	: 270	: 0	: 270
700-lb.	: 810	: 0	: 810
Total	: 1080	: 0	: 1080

11. Nos. 3 and 4 Guns, Battery Bartlett, 10-inch D.C. at Fort Warren.

a. These two guns constitute a reserve of materiel. No manning party is provided for them. Should other guns be disabled, these guns may be used, personnel being shifted from

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the disabled armament. No fire control system is provided, data for this battery being furnished by the baseline of the disabled battery.

b. The field of fire is shown in Exhibit 7-B. The field of each gun can be increased five degrees on the right by removing the controller box from its present position and placing it elsewhere; the expense would be nominal; but as the increased field of fire would be on the land, the alteration is not considered necessary.

NORTHERN GROUP.

12. This group is planned to cover the water area to the northeast and east of the harbor. The group commander's station is well located on the high bluff at Fort Heath, overlooking Broad Sound and the approach to the main ship channel. The group comprises three 12-inch guns and twelve 12-inch mortars, with two 10-inch guns in reserve. The field of fire of the group as a whole is shown in Exhibit 3-A; and in Annex B each battery is shown in a separate exhibit with its fire control installations.

13. Battery Kellogg, six 12-inch mortars, and Battery Lincoln, six 12-inch mortars, at Fort Banks.

a. The fields of fire of these two mortar batteries are shown in Exhibit 8-B; as the two batteries are close together, their fields of fire are plotted as one. While they are capable of all around fire, the important part of the field lies from azimuth 220° clockwise to azimuth 345°.

b. The war reserve of ammunition for Battery Kellogg is 648 rounds and for Battery Lincoln it is the same. All should be stored in the harbor defense. These batteries may be expected to fire chiefly in the outer zones but there is also a considerable area of deep water within range of the heavier projectile. The distribution should be two 700-lb. projectiles to one 1046-lb. projectile.

14. Battery Winthrop, three 12-inch disappearing guns at Fort Heath.

a. The field of fire is shown in Exhibit 9-B. The battery is well located.

15. Battery Morris, two 10-inch disappearing guns at Fort Standish.

a. The battery constitutes a reserve of materiel. No manning party nor fire control system is provided but they are to be taken from the disabled armament which this battery replaces. The field of fire is shown in Exhibit 10-B.

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RAPID-FIRE BATTERIES

16. MINE GROUP 1.

a. Two 6-inch and three 3-inch batteries are assigned to this southern group. The mine field lies across Nantasket Roads between the Brewster Islands and Point Allerton and in rear of it is an antisubmarine net with no gate.

(1) Battery McCook, two 6-inch barbette guns at Fort Andrews. The field of fire is shown in Exhibit 11-B. The high ground at Hull prevents covering the south half of the mine field.

(2) Battery Whipple, two 6-inch barbette guns at Fort Standish. Both guns bear on the mine field, at ranges under 4,000 yards, as shown in Exhibit 12-B.

(3) Battery Bumpus, two 3-inch pedestal mounts at Fort Andrews. The field of fire is shown in Exhibit 13-B. The high ground at Hull prevents fire on the south half of the mine field. The battery is approximately 4,300 yards from the mine field.

(4) Battery Stevens, two 3-inch pedestal mounts at Fort Strong. This battery is masked from the mine field by Fort Warren and Gallups Island, as shown in Exhibit 14-B. Between these islands there is an angle of about 7° , from azimuth 272° to azimuth 279° approximately, in which the battery can fire on the mine field. The range is over 6,000 yards.

(5) Battery Williams, three 3-inch pedestal mounts at Fort Standish. This rapid fire battery which could be valuable, has the field of fire shown in Exhibit 15-B; it covers the mine field at a range of less than 4,000 yards. No. 1 gun, however, cannot fire on the northernmost group of the mine field and No. 2 gun cannot fire on the northern half of the field; only one of the three guns can fire on the whole mine field. This is due to the azimuth of the directrix which is 29° east of south instead of being more to the east. The traverses formerly prevented firing Nos. 1 and 2 guns farther to the left than azimuth 272° and 278° respectively. The traverses have been cut back to allow these guns to fire as far to the left as Boston Light and so to cover the mine field.

17. MINE GROUP 2.

a. Two 6-inch and two 3-inch batteries are assigned to this northern mine group. The mine field lies in Broad Sound, about 1,000 yards outside the entrance of North Channel (the main ship channel). On the south of the controlled mines is a barrage of Navy contact mines extending to Calf Island; and on the northwest is a similar barrage extending to Grovers Cliff. All of these mines should be defended by rapid fire guns.

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There is an antisubmarine net across the junction of the North and South channels with a gate in the North Channel. Of the four batteries, one three-gun 6-inch battery is fully effective. The others are of little value for the defense of the mine field.

(1) Battery Terrill, three 6-inch disappearing guns at Fort Standish. The field of fire is shown in Exhibit 16-B. All three guns bear on the mine field, at a range of approximately 6,000 yards.

(2) Battery Sanders, three 6-inch disappearing guns at Fort Revere. The field of fire is shown in Exhibit 17-B. This battery is approximately 8,300 yards from the mine field.

(3) Battery Basinger, two 3-inch, pedestal mounts, at Fort Strong. The field of fire is shown in Exhibit 18-B. The range to the mine field is approximately 6,500 yards.

(4) Battery Taylor, two 3-inch pedestal mounts at Fort Strong. The field of fire is shown in Exhibit 19-B. The battery faces northwest and but one gun at a time can be fired to the eastward of Deer Island. The range to the mine field is approximately 6,000 yards. This battery is of little value.

18. Ammunition Storage. The regulations for storage of explosives (Technical Regulations 1370-A to include Changes 5) are complied with. See chart of ammunition storage, Exhibits 6-A and 7-A.

19. Camouflage. A continuous program for the natural camouflage of the fixed elements of the harbor defense will be instituted by the local commander and upon war becoming imminent he will provide for the necessary artificial camouflage. Reference Section I, Chapter 9, C.A.F.M. Volume I, Sea-coast Artillery, Part One; Basic Field Manual, Volume VIII, and Part Two, Engineer Field Manual, Volume II.

20. A water supply system for Fort Duvall should be installed when an emergency arises. The system should consist of a six-inch cement-lined cast iron pressure main from the Town of Hull, and a 50,000-gallon storage tank of concrete located at Fort Duvall.

21. Ammunition. The war reserve and battle allowances of ammunition for the batteries of the harbor defense are shown in Exhibit 25-A.

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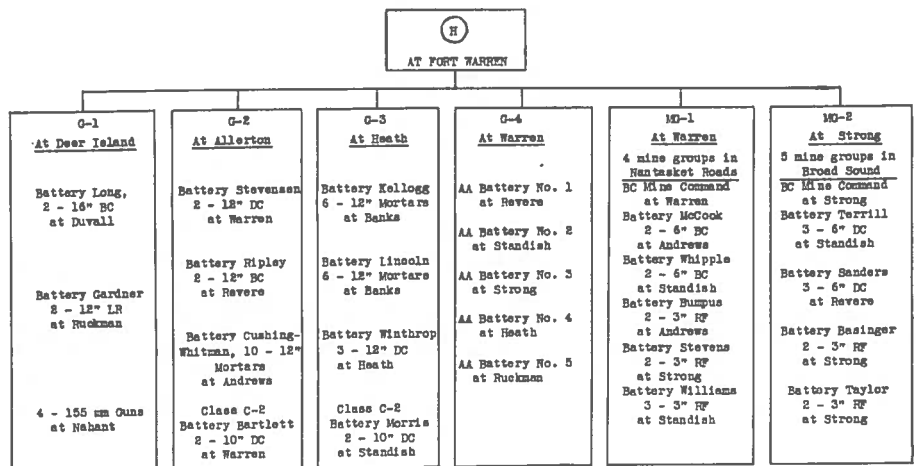
22. No acquisition of land by purchase or lease is required for installations prescribed in this Annex.

23. Cost Estimate. An estimate of cost and priority guide is appended as Exhibit 26-A. Those items which should be procured and installed in peace time are marked with an A. Those which should be procured in peace time but whose installations may be deferred until an emergency arises are marked B. Those items to be procured and installed when an emergency arises are marked C.

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ANNEX A

EXHIBIT NO. 1-A



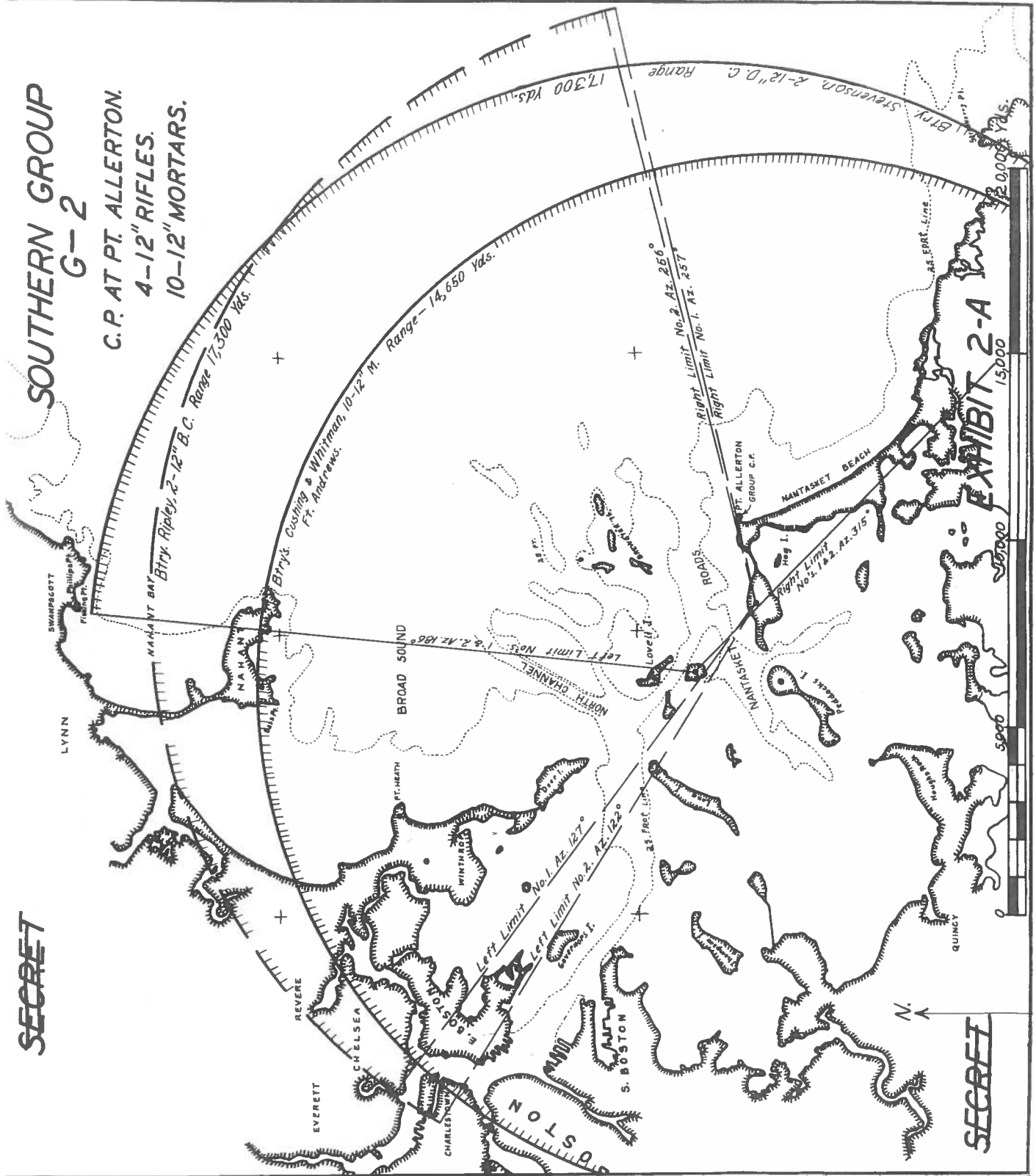
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EXHIBIT NO. 1-A

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SOUTHERN GROUP G-2

C.P. AT PT. ALLERTON.
4-12" RIFLES.
10-12" MORTARS.



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EXHIBIT 2-A

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NORTHERN GROUP G-3

C.P. AT FT. HEATH
3-12" RIFLES
12-12" MORTARS

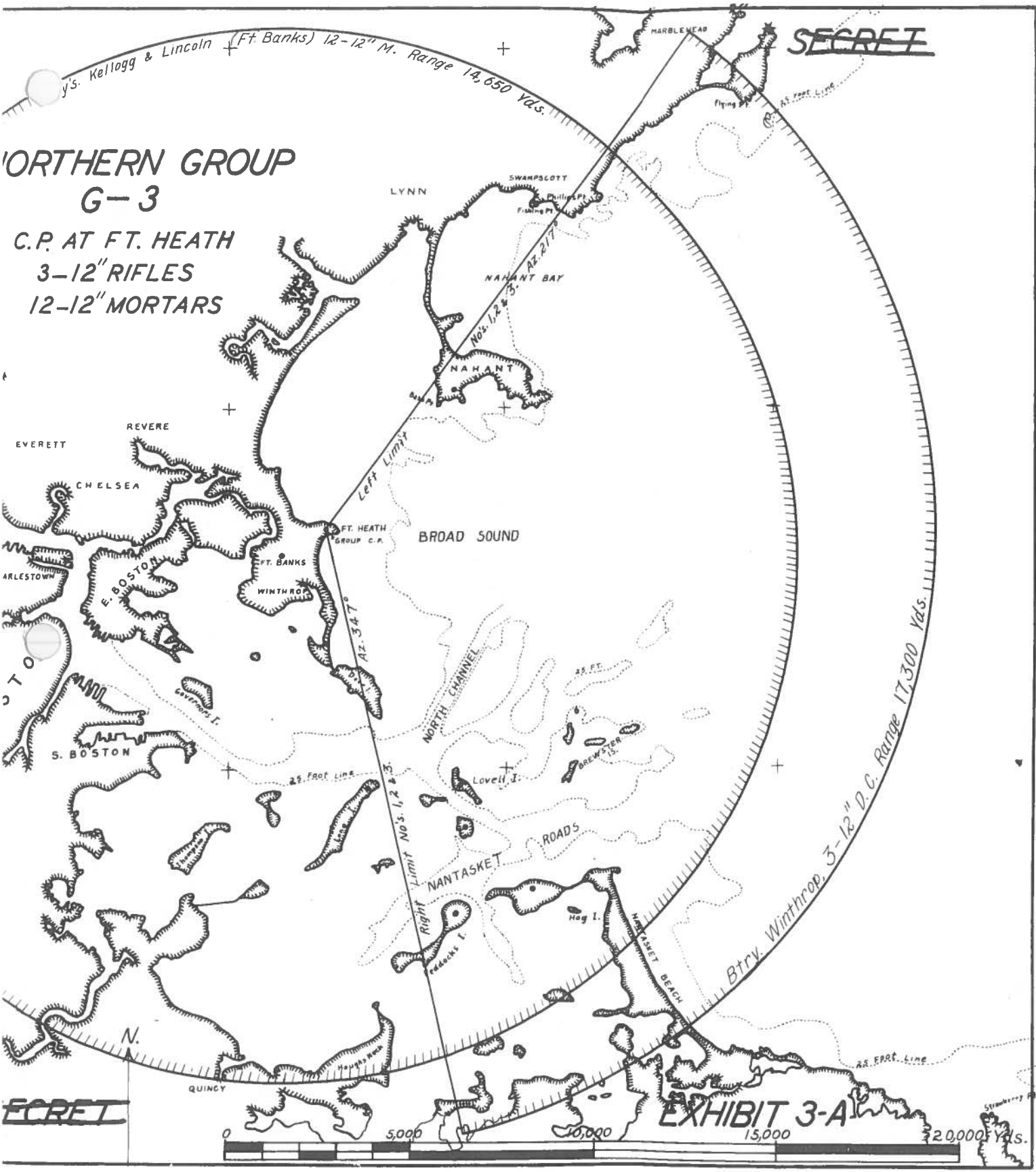
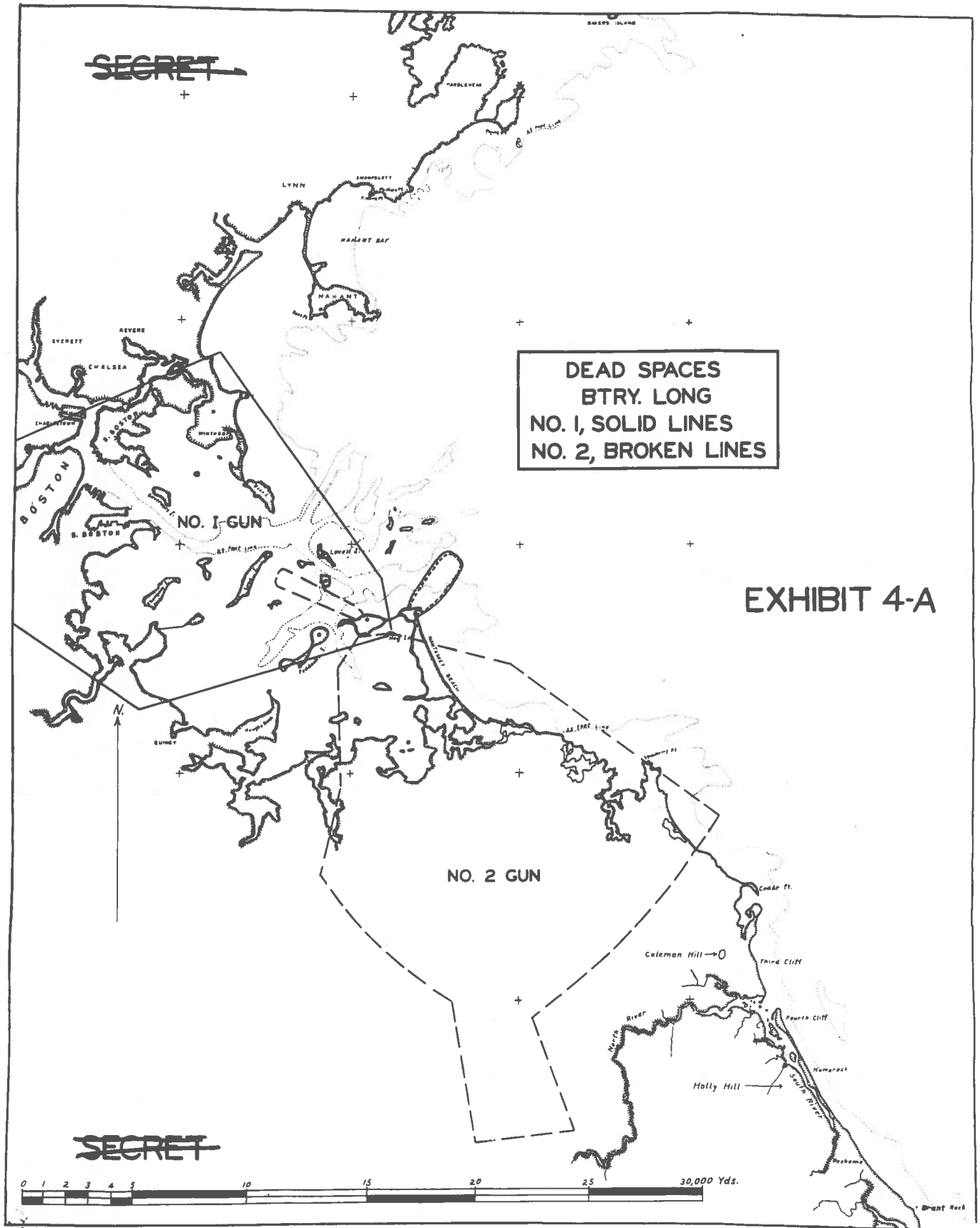


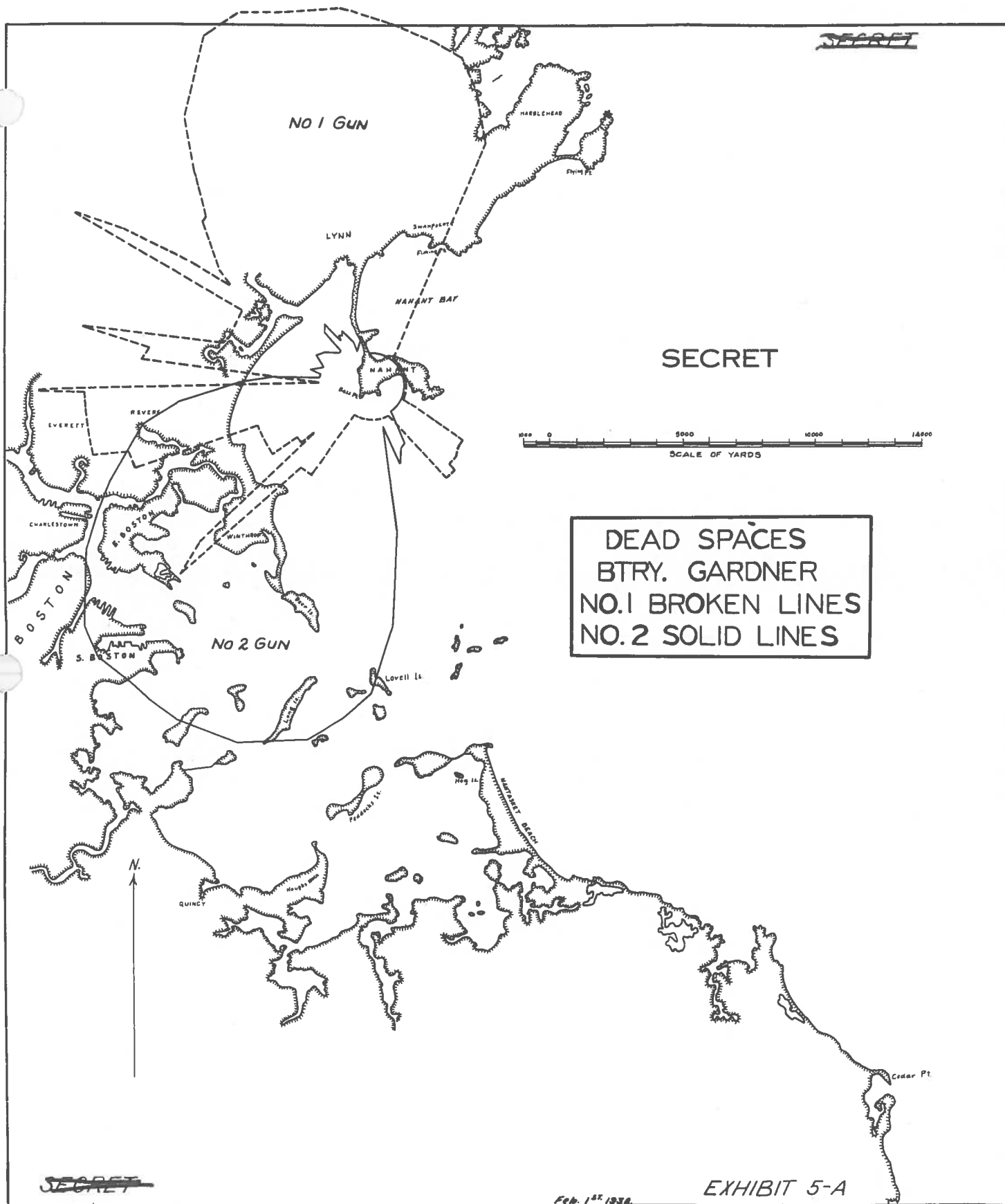
EXHIBIT 3-A

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CALF ISLAND
U.S. MILITARY RESERVATION

OUTER BREWSTER IS.
U.S. MILITARY RESERVATION

MIDDLE BREWSTER IS.

GREAT BREWSTER IS.
U.S. MILITARY RESERVATION

BOSTON LIGHT

BATTERY TERRILL 6" G

BATTERY MORRIS 10" G
AMMUNITION FOR BATTERY WHIPPLE 450 RDS.

BATTERY BURBECK 10" G
AMMUNITION FOR BATTERY TERRILL 450 RDS.

BATTERY WHIPPLE 6" G

BATTERY WILLIAMS 3" G

BATTERY STEVENSON 12" G

BATTERY BARTLETT 10" G

FORT REVERE

HULL

FORT DUVALL

POINT ALLERTON
U.S. MILITARY RES.

BATTERY LONG 16" G
To ROAD 1800 FT - To DWELLING 1760 FT

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HARBOR DEFENSES OF BOSTON

EXHIBIT 6-A

SHEET TWO OF
TWO SHEETS

ISH

THE NARROWS

REN
ERIES

IS 3" G
040 FT
OK 6" G
1400 FT.

★ DEER ISLAND
LIGHT

P R E S I D E N T R O A D S

BATTERY BASINGER 3" G

FORT STRONG

BATTERY TAYLOR 3" G
TO CITY HOSPITAL 1480 FT
TO ROAD 510 FT.

BATTERY STEVENS 3" G
TO CITY HOSPITAL 960 FT.
TO ROAD 500 FT.

LONG IS.
CITY HOSPITAL
BOSTON MASS

FORT STANDISH

GALLUPS IS.

FORT WARREN
AMMUNITION FOR AA BATTERIES

RAINSFORD IS

NANTAS

BATTERY BUMPUS 3" G
TO RESIDENCE 2040 FT.
BATTERY MCCOOK 6" G
TO RESIDENCE 2400 FT.

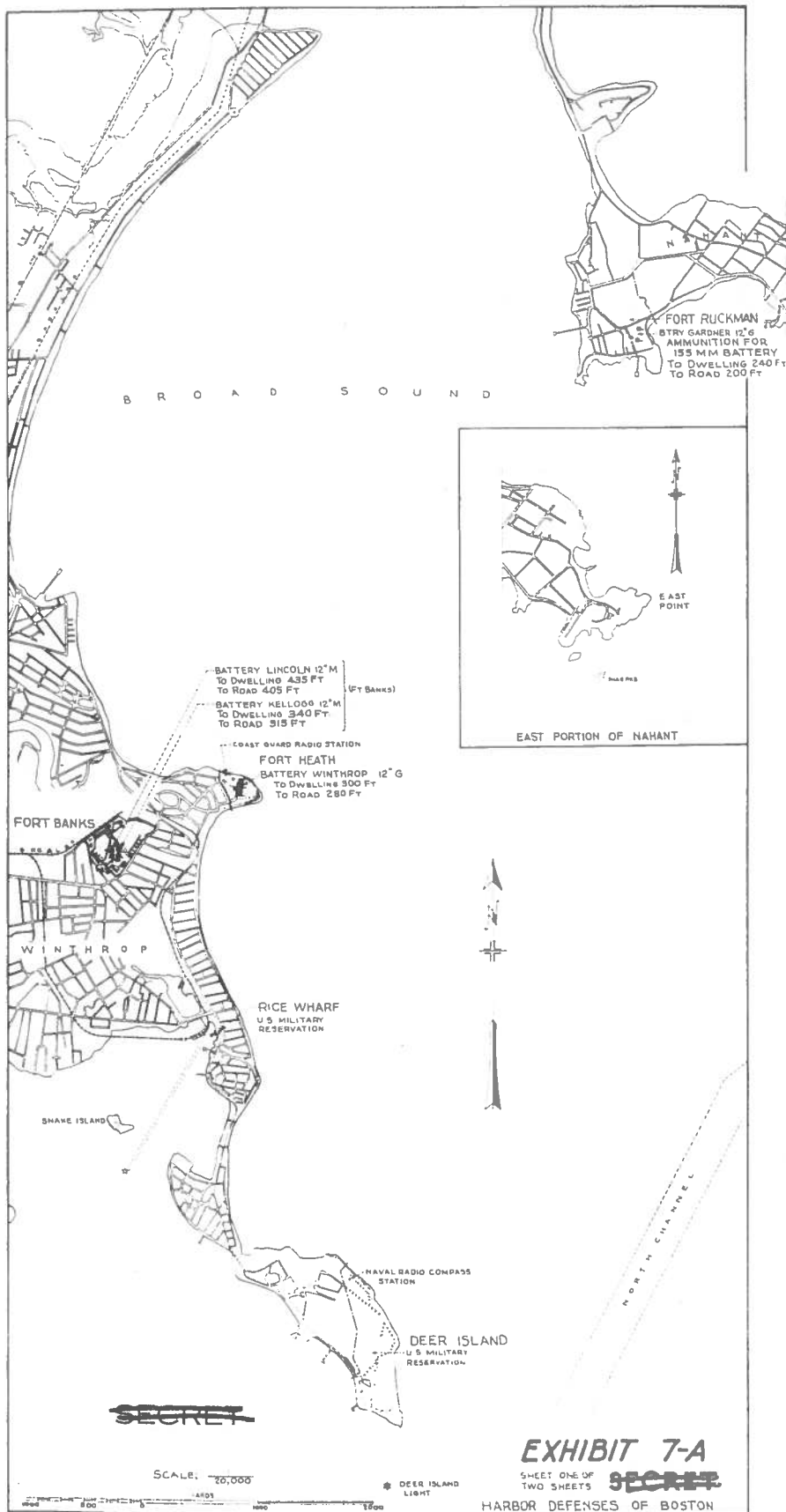
BATTERY CUSHING-WHITMAN 12" M
TO RESIDENCE (HOTEL) 2800 FT.

FORT ANDREWS

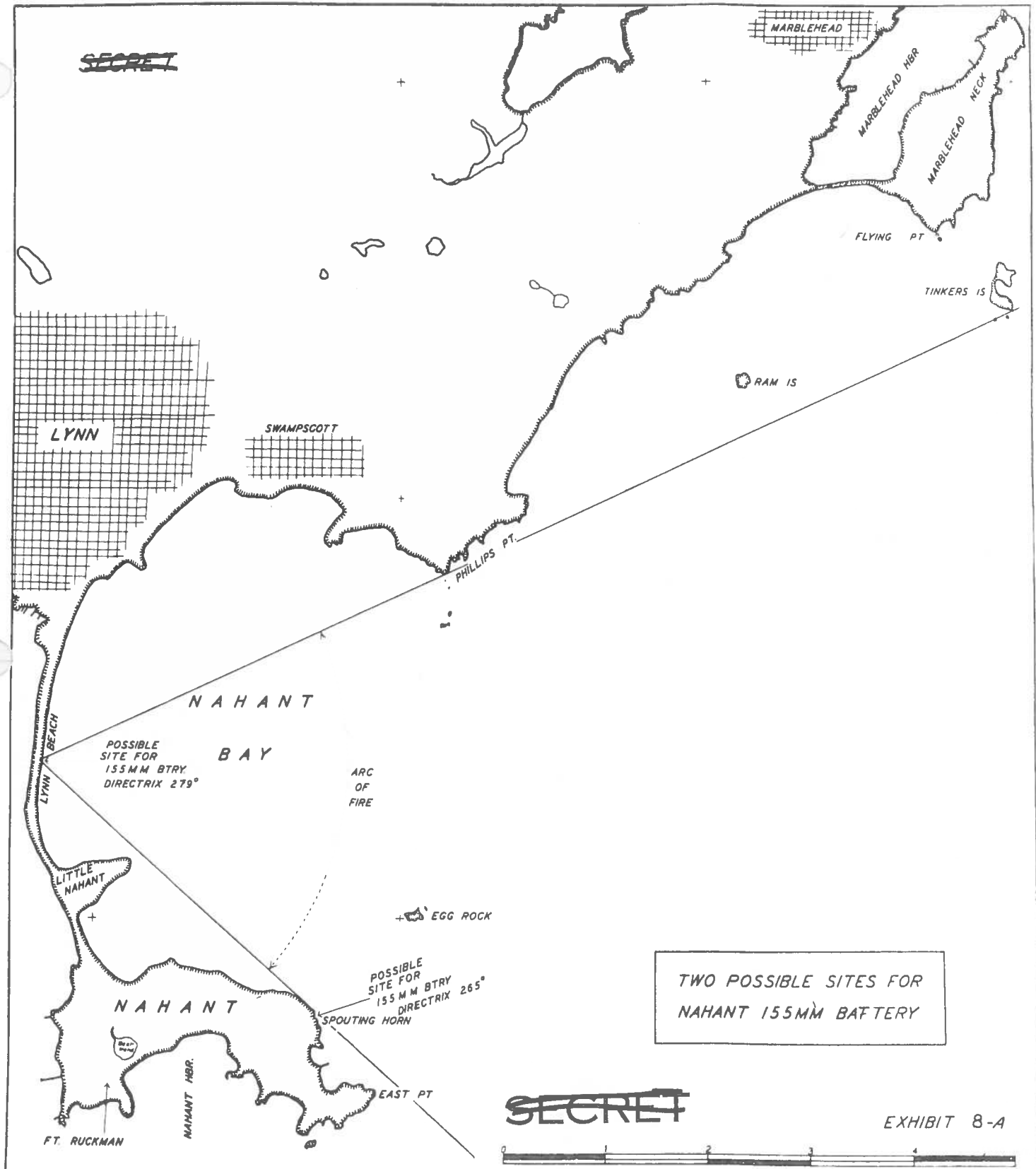
SECRET

SCALE: $\frac{1}{20,000}$

YARDS
1000 500 0 1000 2000



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TWO POSSIBLE SITES FOR
NAHANT 155MM BATTERY

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EXHIBIT 8-A

EDITION OF MARCH, 4, 1914.
 REVISIONS: FEB. 17, 1921; JAN. 29, 1925.
 MAY 6, 1929; JAN. 17, 1935; APR. 11, 1939

SERIAL NUMBER

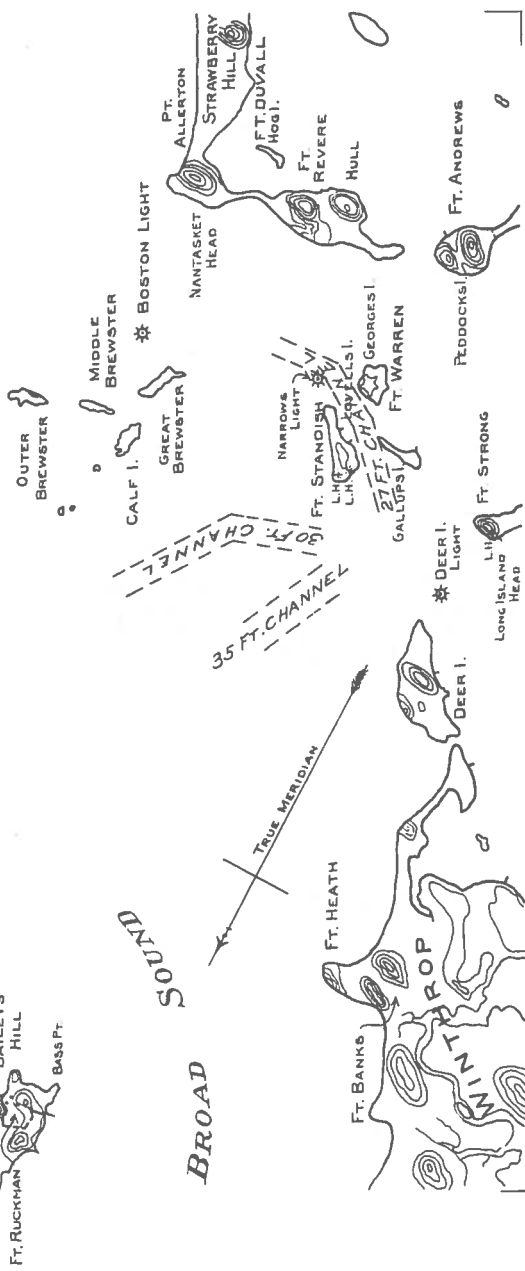
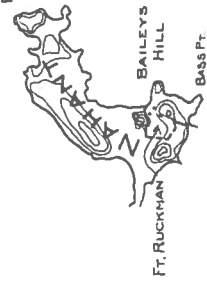
BOSTON HARBOR

MASSACHUSETTS.

Scale of Statute Miles



GRAVES LIGHT



SECRET

EXHIBIT 9-A

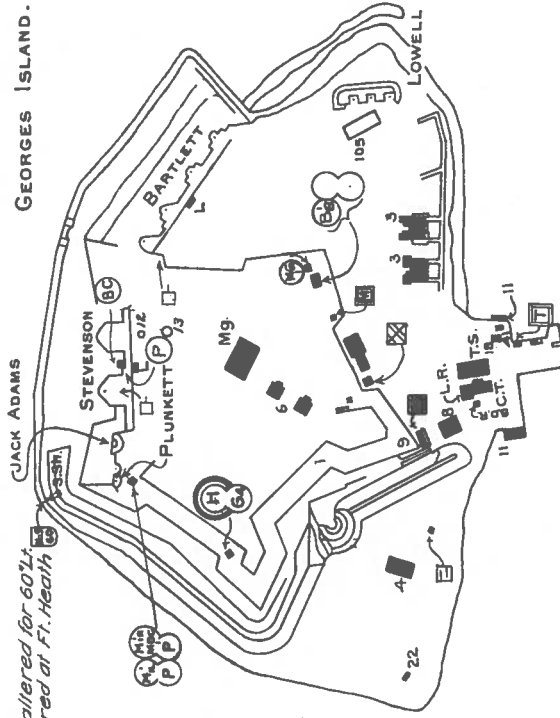
SERIAL NUMBER

EDITION OF MARCH, 4-1914.
 REVISIONS: DEC. 7, 1915;
 NOV. 6, 1916; APR. 8, 1920;
 FEB. 17, 1921; JAN. 29, 1925;
 MAY 6, 1928; JAN. 17, 1935;
 APR. 11, 1938

- LEGEND.
- 1 HEADQUARTERS.
 - 2 OFFICERS QRS.
 - 31 TEMP. OFFICERS QRS.
 - 4 HOSPITAL.
 - 6 N.C.O. QUARTERS.
 - 7 GUARD HOUSE.
 - 8 POST EXCHANGE.
 - 10 BOAT HOUSES.
 - 11 FRAME FOR W. TANK
 - 12 CISTERN
 - 13
 - 14
 - 15
 - 16
 - 17 WAITING ROOM.
 - 19
 - 101
 - 102
 - 103
 - 21
 - 22 WATER METER.
 - 31 ENGINEER ST. HO.
 - 105 TENNIS COURTS.
 - 71 BARRACKS.

BOSTON HARBOR MASS.
FORT WARREN.
 GEORGES ISLAND.

BATTERIES.
 STEVENSON 2-12" Ois.
 ** BARTLETT 4-10" *
 † ADAMS 1-10" *
 † PLUNKETT 2-4" P.
 * LOWELL 3-3" B.P.
 * Guns Dismounted.
 † ABANDONED.
 ** Guns Nos. 1 and 2
 not included in
 Project.



Shelter altered for 60" Lt.
 Light stored at Ft. Heath

SCALE OF FEET.
 100 0 500 1000

On Maintenance Status

DECLASSIFIED

DOD Dir. 5200.9-2, Sept. 27, 1958
 NMW by 21 date 3/3/78

SECRET

EXHIBIT 10-A

LEGEND.

- 1 ADMINISTRATION BLDG.
- 2 COMMANDING OFF. QRS.
- 3 OFFICERS QUARTERS.
- 4 HOSPITAL.
- 5 HOSPITAL STW'S QRS.
- 6 NCO QUARTERS.
- 7 BARRACKS.
- 8 GUARD HOUSE.
- 9 POST EXCHANGE & GYM.
- 10 DORMITORY.
- 11 COMBINED ST. HO.
- 12
- 13 FIRE APPARATUS.
- 14
- 15 STABLE.
- 16
- 18 BAKERY.
- 100 WIRELESS TEL. POLES.
- 101 WAITING ROOM.
- 102 OBS. PLATFORM.
- 103 COTTAGES.
- 104 OIL HOUSE.
- 106
- 108
- 109 TRANSFORMER BLDG.
- 21 Q.M. STORE HOUSE.
- 40 ENG. DEPT. ST. HO.
- 111
- 40 ENG. DEPT. ST. HO.

EDITION OF MARCH 4, 1914
 REVISIONS JAN. 14, 1915; DEC. 7, 1915;
 NOV. 8, 1916; APR. 8, 1920; FEB. 17, 1921.
 JAN. 23, 1923; MAY 6, 1929;
 JAN. 17, 1938;
 APR. 11, 1938

SERIAL NUMBER

BOSTON HARBOR, MASS.

FORT ANDREWS

PEDDOCKS ISLAND.

60' to be moved

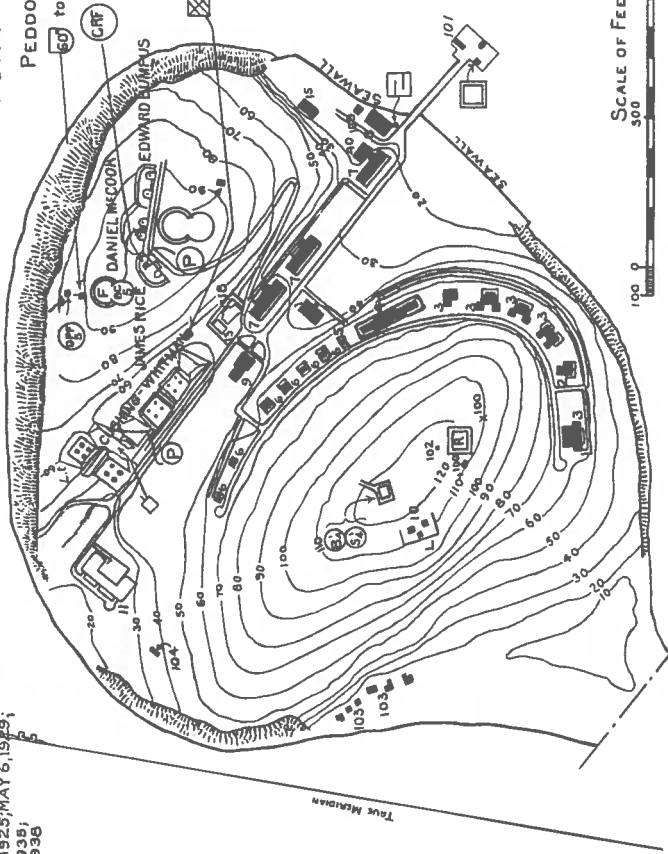
CRP BUMPUS

DANIEL MCCOON

JAMES NICE

EDWARD BUMPUS

BATTERIES.
 CUSHING - WHITMAN
 10-12" M.
 McCOOK 2-6" P.
 # RICE 2-5" P.
 BUMPUS 2-3" P.
 # GUNS REMOVED.

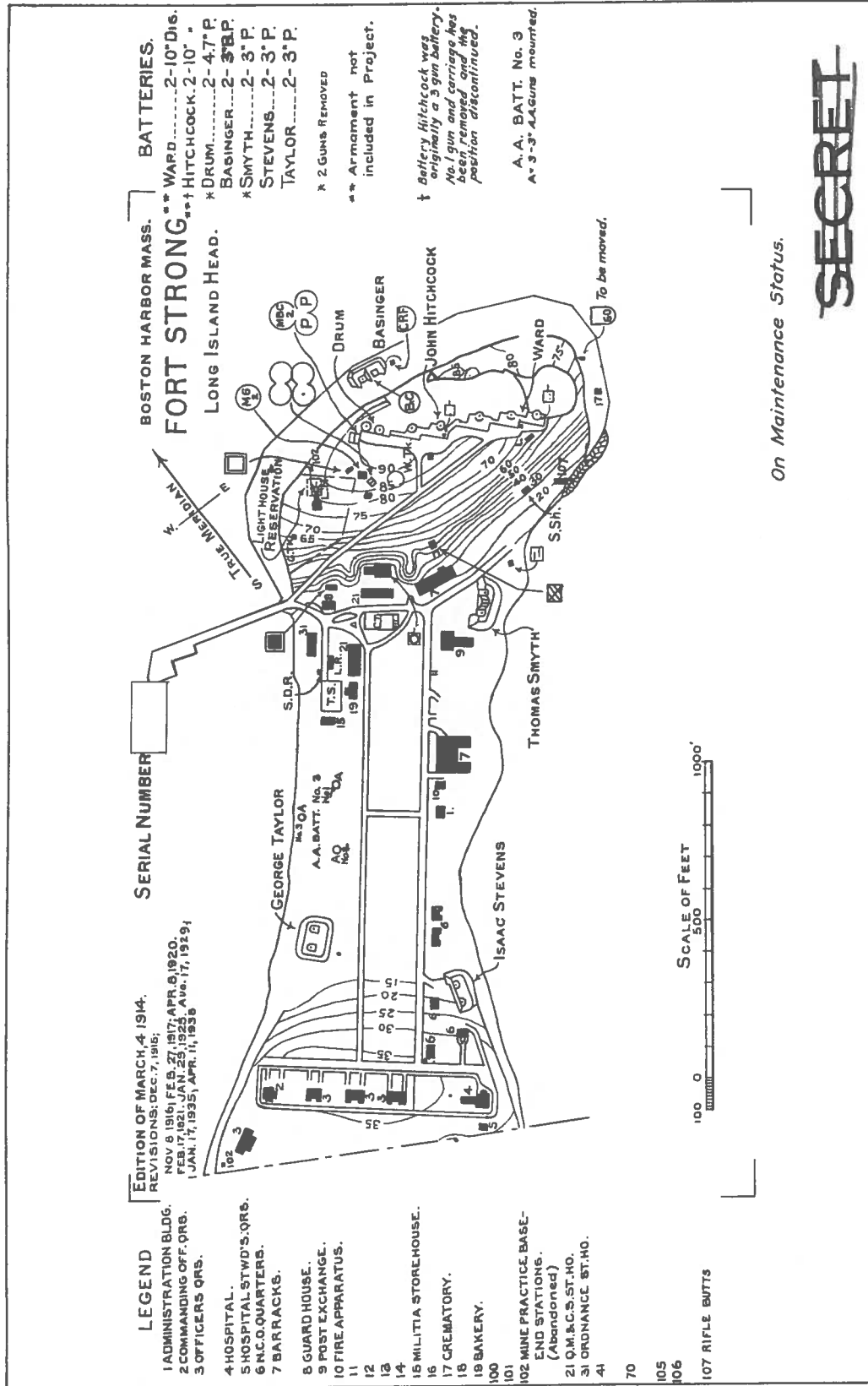


SCALE OF FEET.
 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500

On Maintenance Status

SECRET

Exhibit 11-A



On Maintenance Status.

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Exhibit 12-A

LEGEND

91 N.G.O. QUARTERS
92

10 HOIST HOUSE
11 WHARFINGERS HSE.

EDITION OF OCTOBER 20, 1919.
REVISIONS: APR. 8, 1920; FEB. 17, 1921.
JAN. 29, 1925; MAY 6, 1928; JAN. 17, 1935;
APR. 11, 1938

SERIAL NUMBER



BOSTON HARBOR, MASS.

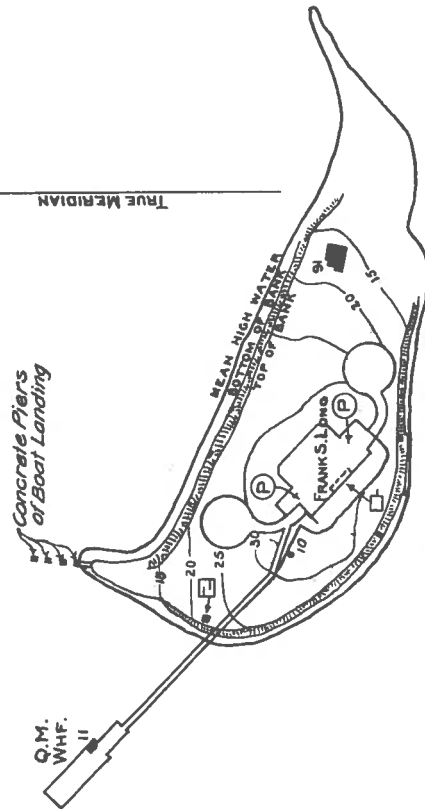
FORT DUVAL

LITTLE HOG ISLAND

Scale of Feet



BATTERIES
LONG.....2-16°ND



*This Reservation transferred and receipted for
by Q.M.C. May 10, 1927. C. of E. 662 B. (Bos-Duval) 8/12*

On Maintenance Status.

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Exhibit 13-A

BOSTON HARBOR MASS.
FORT BANKS.
 GROVERS CLIFF.

SERIAL NUMBER

EDITION OF MARCH 4 1914.
 REVISIONS: DEC. 7, 1915;
 NOV. 8, 1916; APR. 8, 1920; FEB. 17, 1921.
 JAN. 29, 1925; AUG. 17, 1929;
 JAN. 17, 1935; APR. 11, 1936

LEGEND

1 ADMINISTRATION BLDG.
 2 COMMANDING OFF. QRS.
 3 OFFICERS QUARTERS.

4 HOSPITAL.

5 HOSPITAL STWO'S QRS.

6 N.C.O. QUARTERS.

7 BARRACKS.

71. QUARTERMASTER SHOP

8 GUARD HOUSE.

9 GYMNASIUM

10 BAKERY.

11 COAL SHED.

12 ORD. MACH. SHOP

13 CREMATORY.

16 WAGON SHED & BLACKSMITH SHOP

17 SHOP.

18 GARAGE.

1001 LUMBER SHED.

21. ARTILLERY ENGR. & PLUMBING SHOP

22. Q. M. ST. HOUSE

41

50

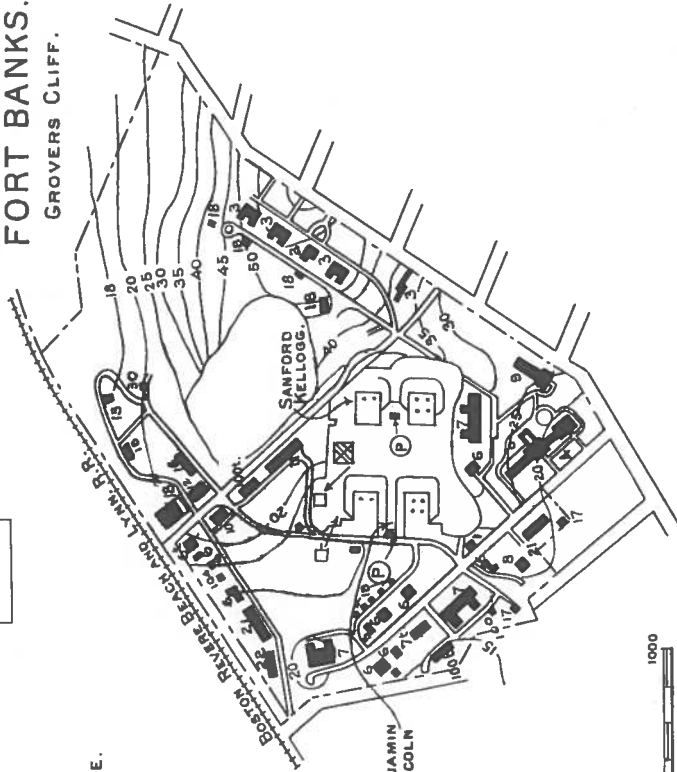
64 TEMP. N.C.O. QTRS.

101 GRAND STAND.

30 SHELTER FOR MOBIL. A.A. GUNS

100 FIRE STATION

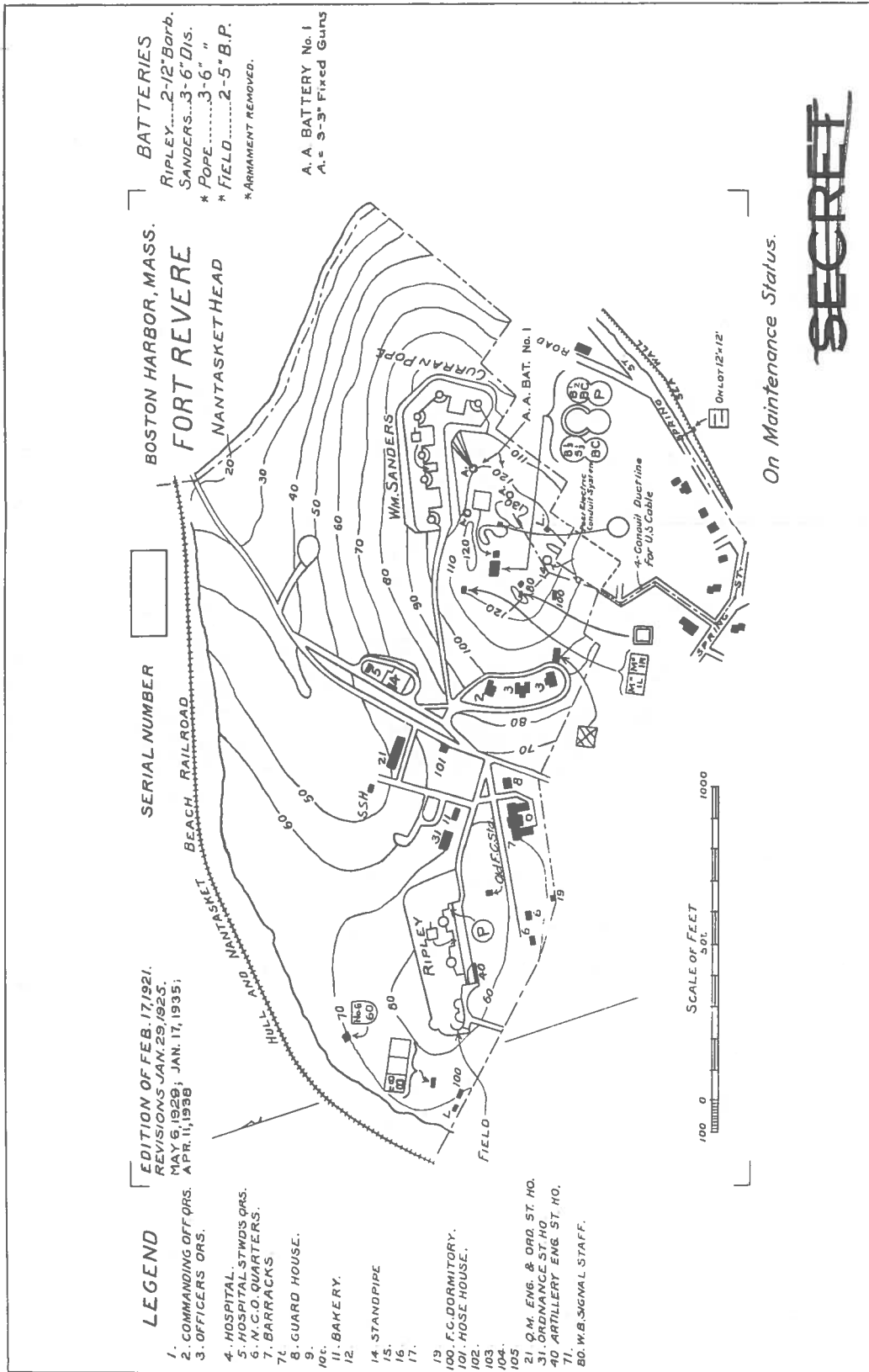
104 HOSE REEL SHED



On Maintenance Status

SECRET

Exhibit 14-A



BOSTON HARBOR, MASS.
FORT HEATH
 GROVERS CLIFF.

SERIAL NUMBER

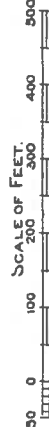
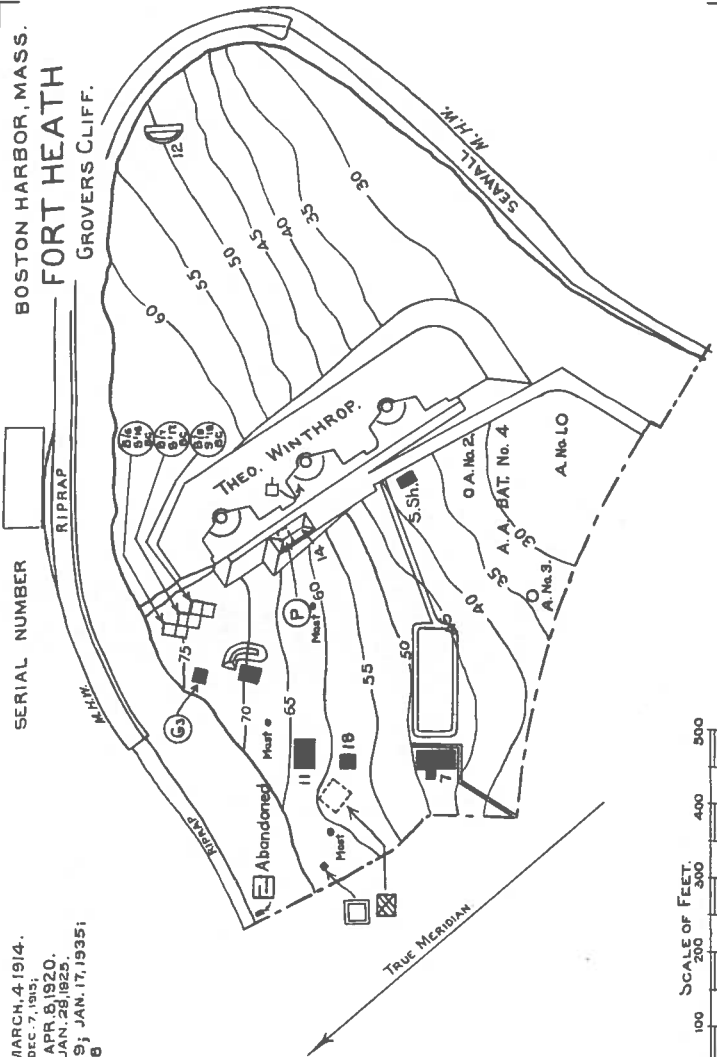
RIPRAP

EDITION OF MARCH, 4 1914.
 REVISIONS DEC. 7, 1913;
 NOV. 8, 1916; APR. 8, 1920.
 FEB. 17, 1921; JAN. 28, 1925.
 MAY 6, 1929; JAN. 17, 1935;
 APR. 11, 1938

LEGEND

- 7 N.C.O. QUARTERS
- 11 U.S.C.G. RADIO STA.
- 12 RIFLE BUTTS.
- 14 STOREHOUSE.
- 18 GARAGE
- 21.

A.A. BATTERY NO. 4
 A.No.1 - 3" A.A. Gun Fixed
 A.No.2 - 3" " " "
 A.No.3 - 3" " " "



On Maintenance Status.

SECRET

Exhibit 16-A

LEGEND

DEFENCE.

13L

20

6 N.CO. QUARTERS.

EDITION OF OCTOBER 20, 1919.
REVISIONS: APR. 6, 1920, FEB. 17, 1921,
JAN. 29, 1925; MAY 6, 1929; JAN. 17, 1935;
APR. 11, 1936

SERIAL NUMBER

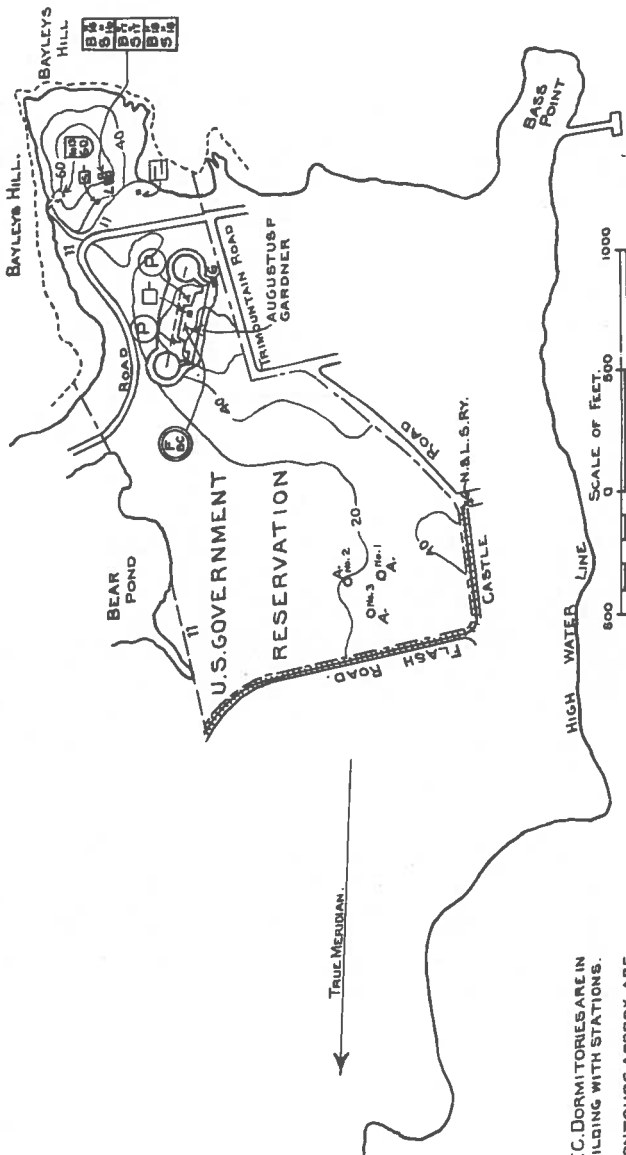
FORT RUCKMAN
BOSTON HARBOR, MASS.
NAHANT D-1.

BATTERIES.

GARDNER.....2-12" N.D

A. A. BATTERY No. 5
3-3" A. A. Guns, Mobile

A- Gun Blocks for
3" Fixed A.A. Guns



On Maintenance Status.

SECRET

Exhibit 17-A

LEGEND.

6 N.C.O. QUARTERS.

10 F.C. DORMITORY.

11 CISTERN.

12

13

14 RIFLE BUTTS.

15 SHEDS.

16

17 COAL SHED.

18

100 STABLE.

101

21 TEMP. Q. M. ST. HO.

31 ORDNANCE ST. HO.

80 L.H. RESERVATION.

81 OIL HOUSE (U.S.L.H.E.)

82 L.H. TRESTLE WALK.

SERIAL NUMBER

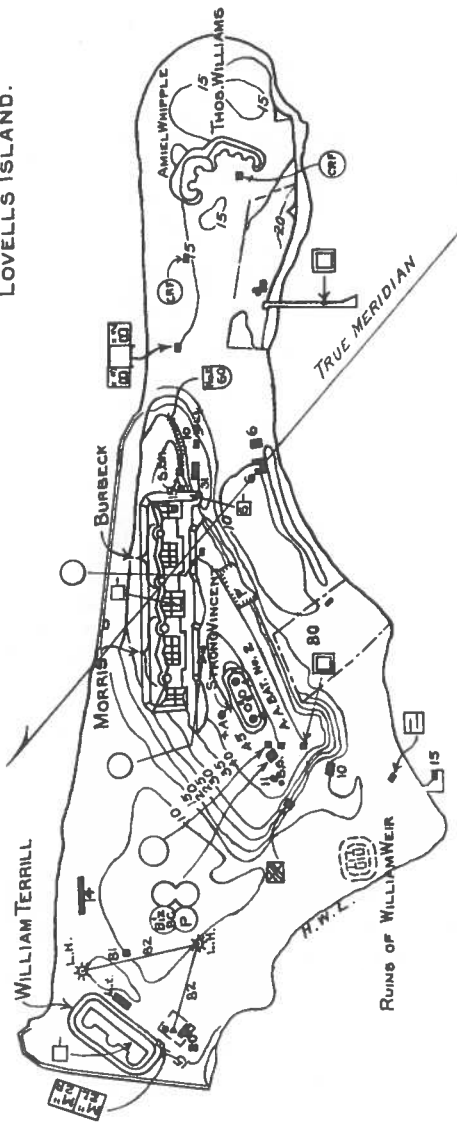
BOSTON HARBOR, MASS.
FORT STANDISH
LOVELLS ISLAND.

EDITION OF MARCH 4, 1914.
REVISIONS: DEC. 7, 1918,
NOV. 8, 1916, APR. 8, 1920; FEB. 17, 1921.
JAN. 29, 1925; MAY 6, 1929; JAN. 17, 1935;
APR. 11, 1938

BATTERIES.
** BURBECK... 2-10" DIS.
MORRIS... 2-10" -
WHIPPLE... 2-6" P.
* VINCENT... 4-3" .P.
WILLIAMS... 3-3" B.P.
WEIR... 2-3" P.
TERRILL... 3-6" DIS

* GUNS DISMOUNTED.
* Abandoned, guns removed.
** Armament not
included in Project

A.A. BAT. No. 2
A = 2-3" A.A. Guns mounted
at Fort Vincent, May
1925, at Empire, 17-4.
* A = 1-3" A.A. Gun Base under
construction.



On Maintenance Status.

~~SECRET~~

Exhibit 18-A

BATTERIES
GARDNER 2-12" N.D.

A.A. BATTERY No. 5
3-3" A.A. Guns, Mobile

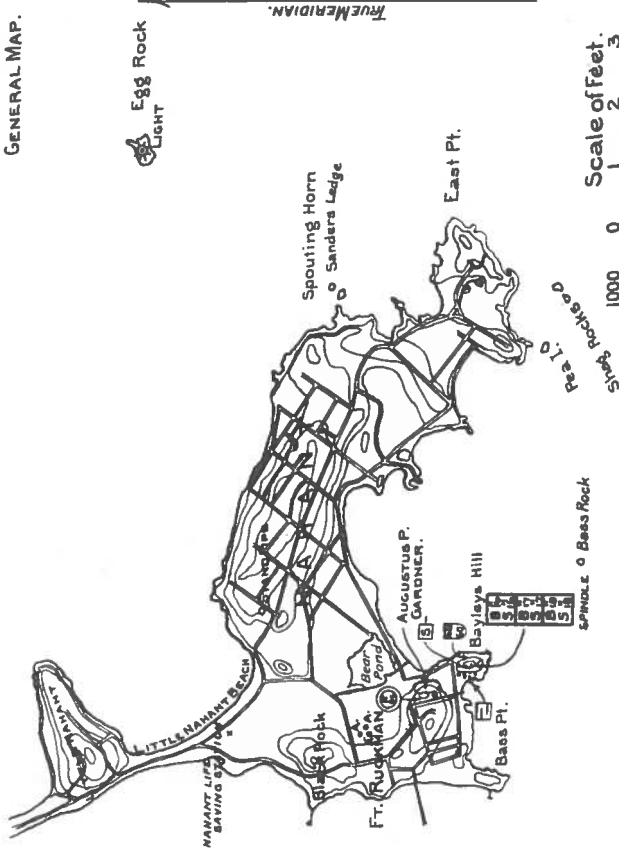
A. - Gun Blocks for
3" Fixed A.A. Guns

BOSTON HARBOR, MASS.

NAHANT GENERAL MAP.

SERIAL NUMBER

EDITION OF OCTOBER 20, 1919.
REVISIONS: APR. 8, 1920; FEB. 17, 1921.
JAN. 29, 1925; MAY 6, 1929; JAN. 17, 1935;
APR. 11, 1936



Scale of Feet.
0 1 2 3 4 5000

On Maintenance Status

SECRET

Exhibit 19-A

BOSTON HARBOR, MASS.
DEER ISLAND.



EDITION OF MARCH 4, 1914.
REVISIONS: NOV. 8, 1916; APR. 8, 1920; FEB. 17, 1921;
MAY 6, 1928; JAN. 17, 1935;
APR. 11, 1938

- LEGEND.
- 71 BARRACKS.
 - 11 CEMETERY.
 - 12 F.C. DORMITORY.
 - 13 CONCRETE WALL.
 - 16 CATTLE FENCE.
 - 17 WATCHMAN'S HOUSE.
 - 181 LAVATORY.
 - 41
 - 80 RADIO COMPASS STA.
 - 81 " OPERATORS QRS.
 - 82 " MAST NAVY

SERIAL NUMBER

LINE

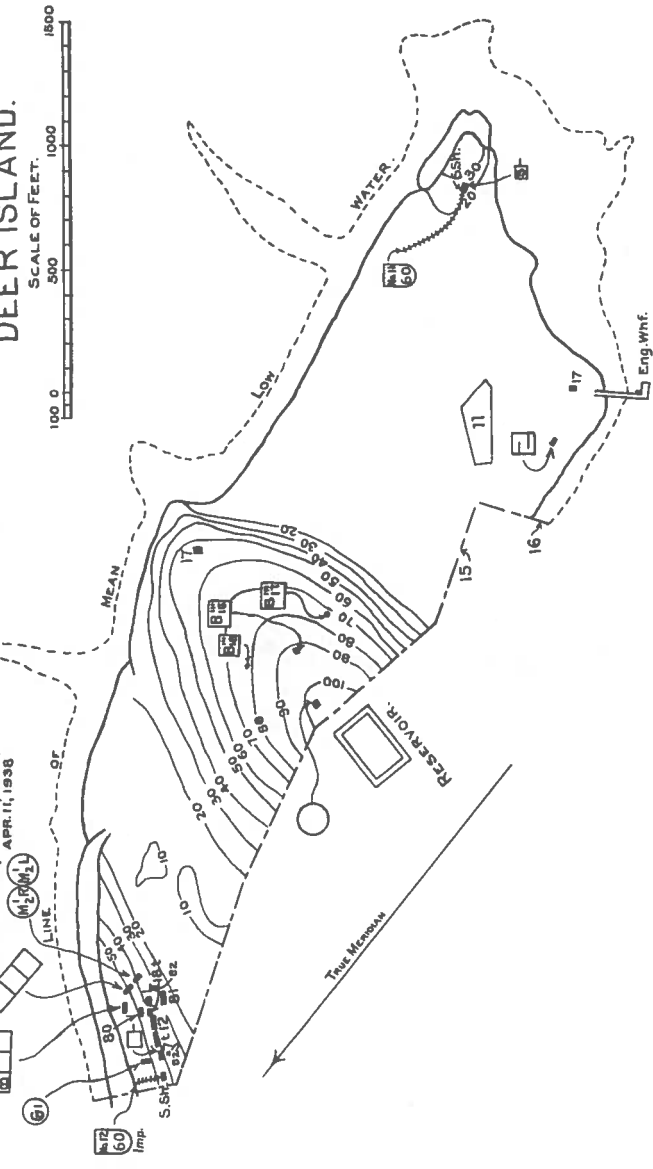
OF

MEAN

Low

WATER

Eng. Whf.



On Maintenance Status

~~SECRET~~

Exhibit 20-A

BOSTON HARBOR, MASS.
CALF ISLAND

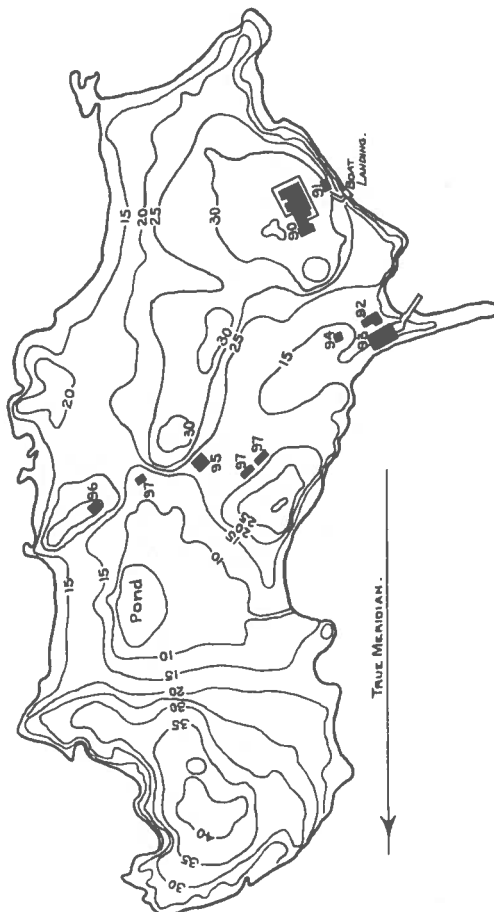
Scale of Feet
100 0 100 200 300 400 500 600
Has Civilian Caretaker.

SERIAL NUMBER

EDITION OF OCTOBER 20, 1919.
REVISIONS: JAN. 23, 1925.
MAY 2, 1929; JAN. 17, 1935;
APR. 11, 1936

LEGEND

- 90 HOUSE.
- 91 OBSERVATION HOUSE.
- 92 MESS HALL.
- 93 BOAT HOUSE.
- 94 ICE HOUSE.
- 95 BUNGALOW.
- 96 CEMETERY.
- 97 SHED.



On Maintenance Status.

SECRET

Exhibit 21-A

1116 ND

EDITION OF APR 23, 1915
REVISIONS, MAY 6, 1929,
JAN 17, 1935, APR 11, 1938

SERIAL NUMBER



BOSTON HARBOR MASS.

OUTER BREWSTER ISLAND



NOTE. THE PLANE OF REFERENCE
IS MEAN LOW WATER.
THE CONTOUR INTERVAL IS 10 FT.

SCALE OF FEET
100 0 100 200 300 400 500
No Cartographer

On Maintenance Status

SECRET

Exhibit 22-A

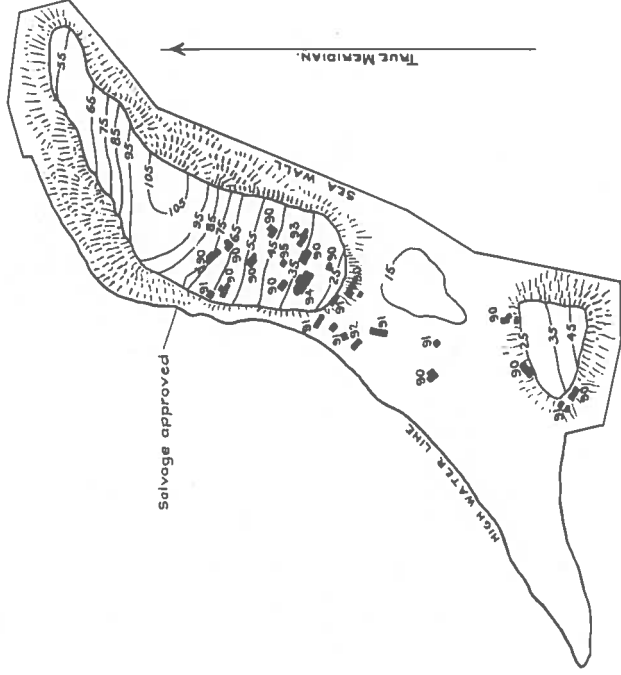
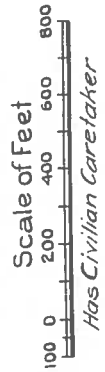
LEGEND

- 90 COTTAGE.
- 91 SHED.
- 92 BOAT HOUSE.
- 93 HENNERY.
- 94 HOUSE.
- 95 WELL.

EDITION OF OCTOBER 20, 1919.
 REVISIONS: JAN. 29, 1925;
 MAY 5, 1929; JAN. 17, 1935;
 APR. 11, 1938

SERIAL NUMBER

BOSTON HARBOR, MASS.
 GREAT BREWSTER



On Maintenance Status.

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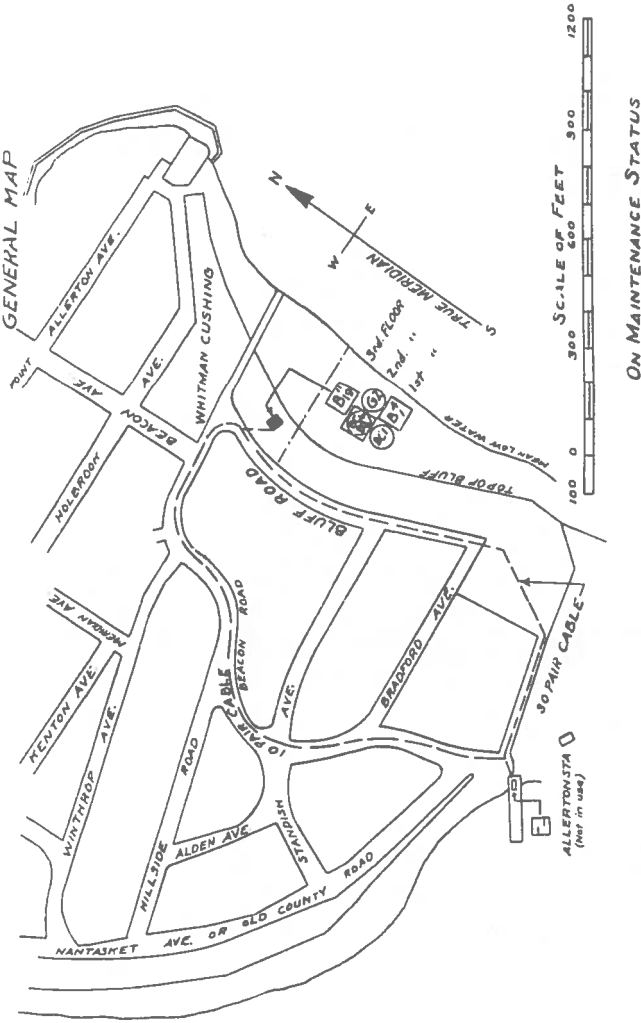
Exhibit 23-A

Edition of March 4, 1914
 Revisions: Feb 17, 1921,
 Jan 29, 1923, May 6, 1929,
 Jan 16, 1933, Apr 14, 1938

SERIAL NUMBER []

BOSTON HARBOUR MASS
POINT ALLERTON

CABLE LINE
GENERAL MAP



ON MAINTENANCE STATUS

SECRET

Exhibit 24-A

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ANNEX A EXHIBIT NO. 25-A

H. D. OF BOSTON

WAR RESERVE AND BATTLE ALLOWANCE OF AMMUNITION

Approved by the Secretary of War in the 6th Indorsement,
AGO, May 5, 1933, (AG 381.4; 3-31-33; Misc. E).

Batteries:	Guns:	Caliber	Type	Projec- tile	W.R.:	C.S.:	B.A.:	Rounds	Remarks
Long	2	16-inch			360:	180:	180:		
Cushing-	10	12-inch M.			1080:	-	1080:	1046 lb. projectiles, 270;	
Whitman								700 lb. projectiles, 810.	
Lincoln	6	12-inch M.			648:	-	648:	1046 lb. projectiles, 216;	
								700 lb. projectiles, 432.	
Kellogg	6	12-inch M.			648:	-	648:	1046 lb. projectiles, 216;	
								700 lb. projectiles, 432.	
Gardner	2	12-inch LR			540:	140:	400:	1070 lb. projectiles, 360;	
								975 lb. projectiles, 180.	
Winthrop	3	12-inch			540:	210:	330:	870 lb. projectiles,	
Ripley	2	12-inch			180:	-	180:	870 lb. projectiles.	
Stevenson	2	12-inch			360:	-	360:	870 lb. projectiles.	
Morris	2	10-inch			162:	30:	132:		
Bartlett	2	10-inch			162:	-	162:		
155 mm	4	155 mm			1440:	440:	1000:	Store at Btry. <i>Lincoln</i> <i>Gardner.</i>	
					(A.P.:	1080:	600:	480:	
McCook	2	6-inch			(H.E.:	360:	200:	160:	
					(A.P.:	1620:	765:	855:	
Sanders	3	6-inch			(H.E.:	540:	255:	285:	
					(A.P.:	1620:	1031:	589:	450 rounds to be stored
Terrill	3	6-inch			(H.E.:	540:	344:	196:	at Btry. <i>Burbeck</i> :
					(A.P.:	1080:	440:	640:	450 rounds to be stored
Whipple	2	6-inch			(H.E.:	360:	150:	210:	at Btry. <i>Morris</i> .
Bumpus	2	3-inch				720:	180:	540:	
Williams	3	3-inch				1080:	280:	800:	
Stevens	2	3-inch				360:	90:	270:	
Basinger	2	3-inch				720:	180:	540:	
Taylor	2	3-inch				360:	90:	270:	

The Battle Allowance can be stored at the battery in each case as noted.

The full Battle Allowance cannot be accommodated until certain surplus ammunition now on hand is removed from the Harbor Defense.

* *Change to 155 mm 450 rounds to be stored at Btry. Burbeck*

EXHIBIT NO. 25-A

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ANNEX A. EXHIBIT NO. 26-A.

COST ESTIMATE AND PRIORITY GUIDE

H. D. OF BOSTON

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Quartermaster		Total
					Material	Labor	
7	1	B	4 - 155 mm Gun Battery, Nahant	\$ 9,200			\$ 9,200
			Sighting equipment for 155 mm guns @ \$2,300				
8	2	C	Fort Duvall, Battery Long 2 - 16" guns		\$ 5,000	\$7,000	12,000
			Water Supply, Fort Duvall				
			Total	\$ 9,200	\$ 5,000	\$7,000	\$21,200

Class A - To be procured and installed in peacetime.

Class B - To be procured in peacetime and installed when an emergency arises.

Class C - To be procured and installed when an emergency arises.

Note: No expenditure of funds by the Signal Corps, Chemical Warfare Service, Coast Artillery Corps, or for land, is contemplated in this Annex.

Engineer Construction:

(Approved for insertion in revision
by Sec. of War, AG 654 (9-29-38)(Misc.)E,
(OCCA 654/3-B-1).

Manproof fence for Battery Gardner	\$1,060
Manproof fence for Battery Long	1,107
Total	<u>\$2,167</u>

Total Annex \$23,367

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ANNEX B

FIRE CONTROL INSTALLATIONS

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AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34)(Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-38)(Misc.) E, dated May 19, 1938.

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ANNEX B.

FIRE CONTROL INSTALLATIONS.

1. The tactical organization of the harbor defenses is shown in Exhibit 1-A of Annex A, Seacoast Guns. The system of communication between the elements of the command is shown in the Fire Control Diagram for the Eventual Status of the harbor defense, which accompanies this annex as Exhibit 1-B. The location on the ground of the major elements of the fire control system, as provided for in this plan, is shown in the several annexes attached.

2. In determining the fire control system needed by a battery, cognizance is taken of the following:

a. The angle of intersection at the target must be 15° or greater; and the area within 15° of the baseline (as measured from both base ends) is to be excluded because the construction of the plotting board arms does not permit utilizing this area.

b. The DPF may be depended upon to furnish reasonably accurate ranges to a distance of 800 yards for each 10 feet of its height above sea level, but is more dependent on clear weather than either the horizontal base or the CRF since accurate waterlining is essential. The M-1 DPF has a longer accuracy range. For the horizontal base or the CRF, sighting on the mast is sufficient and haze or low islands may not interfere with accurate range finding.

c. Atmospheric conditions in New England are such that visibility extends beyond 20,000 yards on exceptionally clear days only; it may be depended on up to 12,000 yards; and is ordinarily in the vicinity of 15,000 yards.

d. The extreme ranges of which the 16-inch and 12-inch LR batteries are capable require the use of a number of baselines in order that the full range and field may be utilized. Some of these baselines will be at such distance from the battery that unless a simplified and small scale plotting board is used, relocating will be necessary; this may be accomplished directly by use of the seacoast director, or by the use of an intermediate plotting board.

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e. On Exhibit 2-B there has been plotted a curve of 35,000 yards range from the Navy Yard on the north and from the Fore River Plant of the Bethlehem Shipbuilding Corporation on the south, which are representative of the harbor facilities to be defended. It is presumed that hostile fire at ranges greater than 35,000 yards will not be undertaken because of the expenditure of ammunition involved. The curve, in connection with the 20,000 yard limit of visibility and the effective areas of the proposed baselines shows that:

(1) During daylight, in clear weather, observation from the shore substantially covers the area within which vessels must lie to bombard the water terminals of Boston.

(2) At night or in hazy weather or beyond the 20,000 yard limit of visibility, position finding is dependent on airplanes, subaqueous sound ranging or such other means as may be developed.

3. Orientation Data.

a. The orientation data of any harbor defense are now based on rectangular coordinates whose origin is some convenient point on a meridian passing through the harbor defense. The data in use originated with the Coast and Geodetic Survey. The Survey is now engaged in redetermining its basic data, on the New 1927 North American Datum.

b. As the origin of some of the harbor defense orientation data is in doubt and may not have been carried out with the needed accuracy; as the triangulation of the Coast and Geodetic Survey is itself being revised; and as some new batteries and fire control stations must in any case be surveyed, it appears to be an advantageous time to redetermine the entire orientation net of the harbor defense.

4. Fire Control Diagram.

a. The Fire Control Diagram of the Eventual Status of the harbor defense is appended as Exhibit 1-B. This diagram shows the fire control system as it will be when all changes contemplated by the approved Project, and these annexes thereto, shall have been effected.

b. Whenever changes in the fire control system are made (such, for example as installing new switchboards or the laying of new cables), this diagram shall constitute a guide and shall be consulted in order that the trend of new work shall be to provide for the eventual needs of the command.

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c. Whenever alterations are made in the Project approved December 27, 1932, or its annexes, affecting the fire control diagram, the diagram should be modified to accord with the alterations. This fire control diagram of the eventual status and the fire control diagram of the existing status of the harbor defense will both be maintained and kept up to date at all times.

5. Post Telephone Lines. Within each post one post telephone is provided to the local switchboard from each battery, group or command post, and where the plotting room is at a distance from the BC station, a post telephone is provided from each switchboard to the switchboard at Fort Warren.

6. Steel Fire Control Tower.

a. The long range of the 16-inch and 12-inch LR batteries results in the necessity of providing very wide fields of view for the observing instruments of some base end stations. To avoid interference by one station with the view from an adjacent station, it is essential where the need for a wide view exists to provide that one observing room shall be above another. This is accomplished economically by using a steel tower. These wide angles can be obtained equally well with a concrete building; the advantage of a steel tower (in addition to lower cost) is in its quick erection if an emergency arises before funds have become available to purchase the site and build the station.

b. The required wide angle of view is usually best obtainable from some one location. If that site is not occupied it may become necessary to build several stations instead of one. It not infrequently happens that the desired site is on an estate which the owner will not sell at any reasonable cost but the war-time use of which would present no difficulties. A quickly erected steel tower best meets this case.

c. The design of a steel fire control tower is now the subject of correspondence with the War Department.

7. Harbor Defense Commander's Stations, Fort Warren. There is an excellent brick and concrete station at Fort Warren, originally the signal station but not now assigned. Good observation of the water area is available from the main observing room of the station and the top deck. Rooms for the harbor defense commander and his staff, the inshore patrol commander and for Group 4 are available in the galleries of Fort Warren immediately below the station, well protected and ample for any purpose. Partitions and other improvements will make an excellent command post located in the center of the harbor defense.

8. Brewster Islands.

a. This group of islands consisting of the Brewsters and adjacent islands, lies off the entrance of Boston Harbor and masks the view to some extent from all fire control stations in the harbor defense. The islands are of different elevations and it is possible to see the water over some of them, from some of the fire

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control stations. It is possible to see the superstructure or masts of vessels, over most of the Brewsters, from most fire control stations. A panoramic sketch, marked Exhibit 3-B, shows the view from a fire control station of average height; this view is representative of the masking effect of these islands on the harbor defense fire control system. It will be observed that:

(1) The horizontal baselines can track targets passing beyond the Brewsters by observing on the masts, except that small vessels cannot be observed and that no vessels can be seen across the high portion of Great Brewster.

(2) DFF's as such cannot operate.

(3) Searchlights are blocked by the islands.

9. Employment of Commercial Telephone Lines.

a. The somewhat dense population of the shores of Massachusetts Bay with its summer colonies results in there being available at most points on the shore ample commercial telephone installations which may be utilized to connect the more distant base end stations with the harbor defense fire control system. Near each of the proposed observing stations there are permanently installed commercial telephone cables. By leasing the requisite number of pairs at time of emergency with provision for cutting out switchboards and for energizing the lines, it will be possible to dispense with many miles of Government owned cables. It is proposed, however, to provide Government owned communications for the nearer base end stations.

(1) Where circuits extend through telephone exchanges, they should be cross connected straight through frames and not run into switchboards, to ensure continuous line with no possibility of interruption.

b. On War Department approval of this provision, a contract in the usual form should be made by the Corps Area Signal Officer with the New England Telephone Company, effective on the occurrence of an emergency.

10. The next succeeding paragraphs are concerned with description of places required for new fire control installations. Following these are paragraphs dealing with the requirements of each battery. The numbers used refer to the fire control stations shown in Exhibit 2-B.

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LONG RANGE FIRE CONTROL PROJECT.

11. a. No baselines had in 1938 been provided for the 16-inch and 12-inch LR batteries. On the south, there is an observing room for Battery Long (two 16-inch) and one for Battery Gardner (two 12-inch) in a newly constructed station at Point Allerton. On the north, at Marblehead Neck there is available a site on the lighthouse reservation. These two locations are points of departure in determining the baselines on the south and on the north shores of Massachusetts Bay.

b. The new positions selected as base end stations have been surveyed and their latitude and longitude determined. A concrete monument has been set in the ground to mark the exact location over which the instrument center should be placed. These monuments are marked with a brass disk bearing the inscription "Corps of Engineers, U. S. Army. Map Control Point."

12. Baseline 1 - 2. This baseline extends from Brant Rock to Fourth Cliff and is 9,700 yards long. It is shown in Exhibit 2-B as Baseline 1 - 2 and affords observation over and beyond the area included in the 25° intersection curve shown in the exhibit, up to the 20,000 yard limit of visibility which is an approximation.

a. Brant Rock. The site of the fire control station marked 1, is on a rise about 300 yards from the beach and about 27 feet above mean sea level, and overlooks most of the cottages which line the water front. The location is marked "Tower" on the Coast and Geodetic Survey chart; there is a high steel water tower at the site, belonging to the town of Marshfield in which the village of Brant Rock is located. An instrument height of 35 feet above the ground is required because of the possibility of construction of buildings in the foreground; and an additional 10 feet should be provided to increase the horizon. The total height of about 72 feet above sea level will afford a DPF range of 5,760 yards, which will cover the area along the shore on the south to within approximately 4,500 yards of the extreme range of the 16-inch guns. If the M-1 DPF is provided, the entire area along the shore to the maximum range will be covered. The property, being publicly owned, possibly cannot be purchased without court proceedings but plans may be made for its occupancy in an emergency. A steel fire control station with one observing room should be provided, the material being purchased and stored in the harbor defense. The required arc of view is from azimuth 157° to azimuth 333°. The station should be equipped with spotter's azimuth instrument, and an antiaircraft observer should be provided for.

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(1) The New England Telephone Company has overhead cables comprising 130 pairs, of which 42 pairs are not in use. The distance from the proposed station to the point of connection with the telephone cable at pole No. 159 is 1,288 feet. The connection from Brant Rock village is through the Marshfield exchange. Connection with the fire control system is proposed at Point Allerton. The charge for the required five circuits is \$82.90 each per month, or \$414.50 per month.

b. Fourth Cliff. This site is on a Navy Radio Direction Finding Station reservation. It is 9,700 yards from Brant Rock on the south and 12,100 yards from Strawberry Point on the north. The reservation comprises 2.56 acres and is now occupied by two small frame buildings. The elevation is approximately 35 feet and the arc of visibility extends from First Cliff on the north to Brant Rock on the south, or from azimuth 171° to azimuth 325°.

(1) Permission to erect a steel fire control tower was granted by the Secretary of the Navy in letter to the Secretary of War dated May 2, 1934 (Navy Department file A2-14;340406; WD file AG 665.41 H.D. of Boston; 5-2-34; Misc.D).

(2) A steel tower with one observing room should be erected. The instrument height should be approximately 75 feet above mean sea level or 40 feet above ground. A DPF and spotter's azimuth instrument should be provided. An anti-aircraft observer should be located here.

(3) If an emergency arises before this station has been constructed, it will be possible to use azimuth instruments on tripods as a temporary measure pending construction of the station.

(4) The village of Humarock is 3,000 yards distant. The New England Telephone Company has a cable of 51 pairs from Humarock, 21 pairs of which are spares. The cable route from Humarock is to the Marshfield telephone exchange. Connection with the fire control system at Point Allerton is proposed. The charge for the required five circuits is \$85 each per month or a total of \$425 per month. The telephone company has but one circuit from Humarock to Fourth Cliff. It will be necessary to provide 9,000 feet of 10-pair type 364 cable, costing \$1,350.

(5) If the site at Fourth Cliff should for any reason become unavailable, there is a suitable location at Third Cliff approximately 2,000 yards to the north of Fourth Cliff, and about 1½ miles southeast of Scituate village. This site is on a site about 70 feet above sea level. Cottages line this bluff. Commercial telephone service is available at the site. A suitable location for the observing station is on a lot owned by Professor Joseph C. Riley, Massachusetts Institute of Technology. This lot is 50 by 175 feet and last sold for \$2,000, since which time Professor Riley has built a small frame cottage

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estimated by a neighboring householder to be worth \$1,000. The view from Third Clieff (at an instrument height of 7 feet above ground level) is across Second Cliff and First Cliff to an azimuth of approximately 171° on the north and to Brant Rock on the south. If this site should be used, a one-room steel fire control station should be erected with the angle of view just stated. A concrete marker such as that described in paragraph 11 b has been set and surveyed.

13. Baseline 2 - 3. This proposed baseline extends from Fourth Cliff to Strawberry Point and is 12,100 yards in length. It is shown in Exhibit 2-B as Baseline 2 - 3 and affords observation over the sea area included in the 25° intersection curve shown in the exhibit, as limited by the 20,000 yard limit of visibility.

a. Strawberry Point. The site of the fire control station marked 3, is on a brush-covered knoll approximately 57 feet above mean sea level, on a point known as The Glades near Cohasset, the end of which is called Strawberry Point. Coast Chart No. 242 shows the locality in detail on a scale of 1:5000. The entire point is owned by The Glades Club of which Mr. Charles Francis Adams of 15 State Street, Boston, is now treasurer. The arc of view, 201° , is from Strawberry Hill at Nantasket clockwise to Cedar Point, or from azimuth 116° to azimuth 317° . Strawberry Point is a salient in the coastline which changes direction, making it important to locate a base end station here.

b. The knoll, on which it is proposed to erect a steel fire control tower, is 600 yards southeast of the clubhouse and 100 yards west of the road. Provision should be made for two observing rooms, for the 16-inch and the 12-inch LR batteries. Each observing room should be equipped with DPF and spotter's azimuth instrument, and an antiaircraft observer should be provided for. The upper DPF should have an instrument height of 80 feet above mean sea level or approximately 23 feet above ground level, and this upper observing room should be assigned to the 16-inch battery.

c. The station at Strawberry Point should be constructed as soon as funds are available. One-fourth acre of land with right of way thereto, is sufficient and will cost, it is estimated, approximately \$1,000.

d. Government owned communications should be provided in order that a part of the baselines required for the long range batteries may be ready at all times.

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(1) Should it be decided to substitute commercial leased lines, there is a telephone cable as far as The Glades village about 1,000 yards distant along the road. The cable is partly buried and partly aerial and has 30 pairs, 9 of which are now spare; it connects with the Cohasset telephone exchange.

14. Baseline 3 - 4. This baseline extends from Strawberry Point to Point Allerton where there is an existing station, and is 12,700 yards long. It is shown in Exhibit 2-B as Baseline 3 - 4; observation is afforded over the sea area included in the 25° intersection line shown in the exhibit, as limited by the 20,000 yard assumed limit of visibility.

15. Baseline 4 - 5. Extending across the entrance of Boston Harbor, this baseline from Point Allerton to East Point, Nahant, is 13,350 yards long. It is shown in Exhibit 2-B as Baseline 4 - 5; the area which it covers is shown in the exhibit.

a. Point Allerton. There is a three story fire control station at this point, completed in 1932. Observing rooms are hereby assigned as follows:

(1) The smaller room at the top of the building as B² Battery Gardner, equipped with DPF.

(2) The middle floor, right hand room as the group commander's station of Group 2, equipped with DPF and BC telescope.

(3) The middle floor, left hand room as BC and B², Battery Cushing-Whitman, equipped with DPF and BC telescope.

(4) The lower floor, right hand room as B⁴, Battery Long, equipped with DPF.

(5) The lower floor, left hand room as BC, Battery Long, equipped with BC telescope and spotter's azimuth instrument.

b. On the outbreak of an emergency, a small station should be constructed on the Point Allerton reservation, in front of the present station, to house a spotter for Battery Gardner and one for Battery Cushing-Whitman, for whom there is not room in the present station.

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c. East Point, Nahant. A three story fire control station is to be located southwest of an existing wooden observation tower about 450 yards southwest of East Point. The ground is approximately 50 feet above mean sea level. There are high trees in the background. An instrument height of about 12 feet above ground should be provided for the lowest station, giving a height of tower of approximately 30 feet above ground. Each station should be equipped with DPF and an azimuth instrument for spotting; and an antiaircraft observer should be provided for. The observing room for Battery Gardner should accommodate the battery commander.

(1) This station is provided as B3 Gardner, B5 Long and an Emergency station for either Winthrop, Lincoln or Kellogg as may be decided at the time by the group commander. These three medium range batteries have their secondary stations at Fort Ruckman; this "E" station will provide for observation (either by DPF, or by horizontal base in connection with the B1 of each battery at Fort Heath) over a water area north of an east and west line through East Point which is masked from the secondaries. The upper observing room should be assigned as the Emergency Winthrop, Lincoln, and Kellogg.

(2) It is believed that sufficient ground can be purchased at a reasonable price in the required location, which is the property of Harmon Elliott, 272 School Street, Watertown, Massachusetts. If the station has not been completed when an emergency arises, azimuth instruments on tripods can be used in the vicinity of East Point or on the wooden observation tower.

d. An arc of view from Marblehead Neck on the left to Fort Heath on the right should be obtained for each observing instrument.

e. A 20-pair trenched telephone cable will be required to Fort Ruckman, a distance by road of approximately 2,950 yards.

16. Baseline 5 - 6. This baseline extending from East Point to Marblehead Neck is 12,400 yards long; the areas covered by the baseline and by the DPF's at its ends are shown in Exhibit 2-B.

a. Marblehead Neck. The Marblehead Neck Lighthouse reservation, except a plot 100 feet square on which the lighthouse is located, has been transferred to the War Department. It is proposed to construct a steel fire control station of two rooms, one above the other, for use of the 16-inch and 12-inch LR batteries. The required arc of view is from azimuth 233° clockwise to azimuth 19°.

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b. Government owned communications should be provided in order that the baseline East Point - Marblehead Neck may be ready for use at any time. A 25-pair cable to Fort Ruckman should be laid, twenty pairs being required for the base ends and for two searchlights planned for this location.

c. The ground level at Marblehead Neck Light is approximately 30 feet above mean sea level. An instrument height of approximately 70 feet above ground, or 100 feet above sea level, should be provided for the upper of the two DPF instruments with which the stations should be equipped, in order to overlook the buildings on the Neck, to the south. This upper station should be assigned to Battery Gardner. The stations should also be equipped with azimuth instruments for spotters; and an antiaircraft observer should be provided for. This station, because of the retired position of the light-house reservation and high ground to the northwest, will not be conspicuous.

17. Baseline 6 - 7. This baseline extends from Marblehead Neck to Coolidge Point (1,000 yards west of Magnolia; on maps called Goldsmith Point), and is 13,000 yards long. It is shown in Exhibit 2-B as Baseline 6 - 7, on which the 25° intersection curve is plotted.

a. Coolidge Point. The proposed site is on a knoll covered with stunted trees from eighteen to twenty feet high. The knoll is approximately 125 yards in rear (north) of the summer home of Robert Treat Payne 2nd, 10 Postoffice Square, Boston; it is across the local road from Mr. Payne's residence and is owned by him. Close by on the east is a cottage belonging to Bishop Henry K. Sherrill. The principal real estate agent dealing in property here is John Coughlin of Manchester. The ground level is approximately 80 feet.

b. One-fourth acre should be purchased in order to hold the site. The price is estimated as \$1,500. A steel fire control tower two stories high should be erected when an emergency arises. An instrument height of 25 feet for the lower of the two required DPF's should be obtained in order to amply clear trees and houses. As the ground slopes away from the proposed site, this height will insure against future interruption of view.

(1) A buried cable, belonging to the New England Telephone Company, with ample capacity, extends along highway 127; it connects with the telephone exchange at Manchester. The distance from the proposed site to the highway is 850 yards. A 10-pair cable will be required. The charge for the required nine circuits with connection to the fire control station at Fort Ruckman is \$434.00 per month.

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(2) The height is sufficient to overlook the southern part of the village of Magnolia. The arc of view extends from Eastern Point, Gloucester, clockwise through the south and southwest to the direction of Marblehead Lighthouse. Kettle Island in the foreground does not obstruct the view, being about 30 feet above mean sea level at its highest point.

REQUIREMENTS OF EACH BATTERY.

18. Long Range Group.

a. There is available for the group commander a suitable station (heretofore the C-2 station and now surplus) on Deer Island. A spotter for the group should be located on Outer Brewster.

b. The M-1 DPF should be provided for each observing station of Battery Long and Battery Gardner.

c. It is proposed to provide Battery Long, two 16-inch guns at Fort Duvall, with the six baselines shown in Exhibit 2-B:

Brant Rock to Fourth Cliff (1 - 2),
Fourth Cliff to Strawberry Point (2 - 3),
Strawberry Point to Point Allerton (3 - 4),
Point Allerton to East Point (4 - 5),
East Point to Marblehead Neck (5 - 6),
Marblehead Neck to Coolidge Point (6 - 7).

(1) Spotters are proposed in each of the stations above, and also at Eastern Point Light, Gloucester. The Eastern Point spotting station should be connected by commercial telephone entering the fire control system at Fort Ruckman.

(2) This battery should be equipped with a sea-coast director.

(3) Plotting room equipment remains to be completed.

d. It is proposed to provide Battery Gardner, two 12-inch LR guns at Fort Ruckman, with the four baselines shown in Exhibit 2-B; viz,

Strawberry Point to Point Allerton (3 - 4),
Point Allerton to East Point (4 - 5),
East Point to Marblehead Neck (5 - 6),
Marblehead Neck to Coolidge Point (6 - 7).

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(1) Spotters are proposed in each of the five stations above except Point Allerton, and also at Eastern Point Light, Gloucester; this last to be connected by commercial telephone.

(2) Battery Gardner should be equipped with a seacoast director.

(3) Plotting room equipment is yet to be completed.

e. It is proposed to provide the Nahant 155 mm. battery with a 15 foot CRF to be located at the battery. The CRF should be stored in the harbor defense, and on the occurrence of an emergency, a frame station with concrete instrument base should be constructed.

(1) A spotter equipped with azimuth instrument should be located at the battery. Telephone communication should be provided with the group commander, by field wire to the Fort Ruckman switchboard.

19. Southern Group.

a. The group commander now has an excellent location in the fire control station at Point Allerton, overlooking his field of fire as shown in Exhibit 2-A. A spotter for the group should be located on Outer Brewster.

b. Battery Stevenson, two 12-inch D.C. at Fort Warren. The field of fire is shown in Exhibit 4-B. B¹ at Fort Warren has a DPF with range of 6,000 yards but it is masked over a considerable arc as shown. B² at Fort Revere is also equipped with a DPF which has a range of 6,650 yards, masked as shown. The baseline will operate up to the 15° intersection line, except for the masked areas; but the area covered by baseline and DPF's is only a small fraction of the area covered by the guns and an additional baseline is needed. It is proposed to provide Battery Stevenson with the left one of the two base end stations at Strawberry Hill on Nantasket peninsula where there is a small reservation now containing two tertiary stations of Batteries Whitman and Cushing, one of which becomes surplus by combining these two batteries.

(1) The present frame structure has deteriorated. When a new station is built, it should have two observing rooms, one above another, equipped with a DPF for Battery Stevenson and a DPF for Battery Cushing-Whitman. The DPF's will cover the area north of Strawberry Point, not covered by the proposed baseline Fort Warren - Strawberry Hill.

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c. Battery Ripley, two 12-inch B.C. at Fort Revere. The field of fire is shown in Exhibit 5-B. B¹ with DPF is at Fort Revere. B² also equipped with DPF is at Fort Standish. The two instruments are masked by the Brewsters and adjacent islands; but masts and occasionally some of the superstructure of vessels can be seen over these islands. Baseline intersections of 15° or greater are obtained up to the curve plotted on the exhibit. The fire control system of Battery Ripley is satisfactory.

d. Battery Cushing-Whitman, ten 12-inch mortars at Fort Andrews. It is proposed to form one battery by combining Battery Cushing, four 12-inch mortars, and Battery Whitman, six 12-inch mortars, as stated in paragraph 10 of Annex A; these two batteries are located adjacent to each other at Fort Andrews. Each battery has three baselines, the stations being located next each other; B¹ is at Fort Andrews, B² at Point Allerton, and B³ at Strawberry Hill. Combining the two batteries will permit of utilizing three of these stations elsewhere. The field covered by each of the three baselines, and by the DPF's with which each base end station is equipped, is shown in Exhibit 6-B. B¹ at Fort Andrews is almost completely masked but has a small field in the direction of Boston Light in connection with B² at Point Allerton. B² has a wide view and its DPF will reach approximately to the range limit of the mortars except on the north. B³ at Strawberry Hill, in connection with B² covers the field of fire to the east and southeast adequately. To avoid overcrowding the diagram, the masked areas from B³ are not shown; B³ is almost completely masked to the west of a line tangent on the east to Point Allerton, but is not masked to the east or southeast.

(1) At Strawberry Hill, the right hand station of the two located at that place is hereby assigned to Battery Cushing-Whitman, the left hand station being assigned to Battery Stevenson.

e. Battery Bartlett (Guns Nos. 3 and 4), 10-inch D.C. at Fort Warren. This is a battery in reserve. It is to have no fire control system, the equipment now on hand being available for use elsewhere. If brought into service, Battery Bartlett will utilize the fire control installations of the disabled battery which it replaces. Its field of fire is shown in Exhibit 7-3.

20. Northern Group.

a. The group commander is to be located in an existing station (heretofore designated F¹ - 6), well placed at Fort Heath, overlooking the field of fire of the group as shown in Exhibit 3-A of Annex A. The three batteries of this group are at present prevented from firing

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east or northeast of Nahant by the restricted view from the base end stations at Fort Ruckman. See paragraph 15 c. A spotter for the group should be located on Outer Brewster.

b. Battery Kellogg, six 12-inch mortars at Fort Banks. The battery is capable of all around fire and has three baselines as shown in Exhibit 8-B. B¹ at Fort Heath is equipped with a DPF having the effective radius shown in the exhibit. B² at Fort Ruckman also has a DPF; view from this instrument is restricted by East Point, as shown, and in consequence this baseline cannot be used north of an east and west line through Nahant. B³ at Deer Island is not yet provided with an observing instrument; a DPF should be furnished; it would have the effective radius indicated in the exhibit. The baseline B¹ - B³ provides for fire south of an east and west line through East Point. A rise near B³ on Deer Island masks a narrow sector to the northeast where this station is needed, and the ground here should be levelled; the cost is estimated as \$75.00. All three stations are masked by the Brewsters as shown, but masts and occasionally the superstructure of vessels can be seen over these islands.

c. Battery Lincoln, six 12-inch mortars at Fort Banks. This battery, adjacent to Battery Kellogg, has the same field of fire and its three base end stations are alongside those of Kellogg; see Exhibit 8-B. B¹ at Fort Heath has a DPF with the arc of view and effective range shown in the diagram. B² at Nahant, similarly equipped, is limited on the left of its field by East Point. The baseline B¹ - B² covers a large portion of the field of fire of the battery adequately but is masked to the north of an east and west line through Nahant. B³ at Deer Island is not yet provided with an observing instrument; a DPF should be furnished; it would have the effective radius indicated in the exhibit. The partial mask from all stations caused by the Brewsters and adjacent islands is shown; glimpses of targets can be obtained over these masks by the DPF's, as such cannot operate.

d. Battery Winthrop, three 12-inch D.C. at Fort Heath. The three stations are located adjacent to those of Batteries Kellogg and Lincoln. None of the stations at Battery Winthrop is equipped with DPF. The limitations of the three baselines and of the DPF's, when installed, are shown in Exhibit 9-B. The field of fire as a whole is adequately covered by the fire control system except that fire cannot be directed on targets in the area east or northeast of Nahant.

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e. An emergency station at East Point, described in paragraph 15 c will afford observation for either Battery Lincoln, Kellogg or Winthrop (as decided by the group commander) over the area east and northeast of Nahant, otherwise masked.

f. Battery Morris, two 10-inch D.C. at Fort Standish. This battery is in a status of a reserve of materiel, with no fire control system, it being intended to use the fire control equipment of the battery which it replaces whenever Battery Morris is placed in service. Its field of fire is shown in Exhibit 10-B. The fire control stations and equipment now on hand are available for assignment elsewhere. The present baseline Fort Standish - Deer Island has the advantage that it covers a part of the water area northeast of Nahant, masked from other baselines; for this reason, there is shown on the exhibit the area covered by the baseline, in order to record the information.

21. Secondary stations at Fort Ruckman.

a. The base end stations at Fort Ruckman (B² Kellogg, Lincoln and Winthrop) are located 220 yards in front of Battery Gardner, which has not been fired. One or both guns will fire over the stations if firing between azimuths 314° and 338°. This is a vital portion of the field of fire, across the harbor entrance. The stations are higher than the guns. Blast effect would probably render these important stations untenable. Therefore these stations are to be abandoned and new stations of the manhole type are to be constructed for Batteries Kellogg, Lincoln and Winthrop on the Fort Ruckman reservation, approximately 200 feet to the front of the present stations and close to the water. Blast will be sufficiently reduced by this increase of distance, and by the location beyond the crest of Bayley Hill. See map of Nahant, marked Exhibit 20-B. The instrument height will be approximately 55 feet, as compared with 74 feet at the old location.

b. In order to provide for fire to the northeast and north of East Point by one of the three batteries, Kellogg, Lincoln or Winthrop, one observing room is to be added to the East Point base end station to be constructed for Batteries Long and Gardner, described in paragraph 15 c ante. This observing room will be designated Emergency Kellogg - Lincoln - Winthrop and will serve whichever battery the group commander decides at the time. In conjunction with B¹ at Fort Heath, a baseline is formed which will cover an area to the east of Nahant, masked from the secondary stations at Fort Ruckman.

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(1) The upper observing room of the station is assigned as the "E" station in order to obtain the additional DPF range, which is especially important for Battery Winthrop. The observing arc should extend from Phillips Point on the north clockwise to Fort Heath on the southwest.

22. Rapid Fire Batteries. Because of their distance from the mine fields which they intended to protect, and the fact that some of the batteries are wrongly faced or are masked in part from the mine field, more guns are needed than would normally be necessary. There are nine rapid fire batteries; two 6-inch and three 3-inch batteries assigned to the southern mine field and two 6-inch and two 3-inch batteries assigned to the northern mine field.

23. Southern Mine Group.

a. Battery McCook, two 6-inch B.C. at Fort Andrews. See Exhibit 11-B. This battery has no fire control system. A manhole type station for DPF was built in 1925 for the battery, to replace a conspicuous brick tower, but no instrument has been installed. One is needed. The view from this station is limited on the right by the high ground at Hull, and masked on the left by the Brewsters. The mine field is covered.

(1) Should it become practicable at some time to provide a new station for Battery McCook, a CRF station should be built. The CRF station should be near the battery to avoid the necessity of relocating. As the present DPF station is new and is fairly satisfactory, the construction of the CRF station at this time is not proposed.

b. Battery Whipple, two 6-inch B.C. at Fort Standish. See Exhibit 12-B. The battery has a 15-foot CRF. Both guns and the CRF station bear on the southern mine field at a range of 3,500 yards and also on a portion of the northern mine field (one gun on the entire field) at a range of about 6,000 yards.

c. Battery Bumpus, two 3-inch P.M. at Fort Andrews. This battery has a 9-foot CRF, mounted in a station at abandoned Battery Rice; it has the field of view shown in Exhibit 13-B.

d. Battery Stevens, two 3-inch P.M. at Fort Strong. This battery, as shown in Exhibit 14-B, is approximately 6,000 yards in rear of the mine field and is masked from it except through an arc of 7°. It has no fire control station or instrument, and in view of the small value of the battery the expenditure to provide fire control equipment seems inexpedient.

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e. Battery Williams, three 3-inch P.M. at Fort Standish. See Exhibit 15-B. A 9-foot CRF is on hand, and a wooden platform 15 feet high has been constructed in rear of the battery, giving an instrument height of 20 feet and an all around view.

24. Northern Mine Group.

a. Battery Terrill, three 6-inch D.C. at Fort Standish. See Exhibit 16-B. The battery is provided with a horizontal base and plotting room. B¹ at Fort Standish has a DPF as has B² at Deer Island. The baseline has a good presentation and adequate length. The masked areas are shown in the exhibit, as are the areas covered by the baseline and by each of the DPF's. The mine field is adequately covered, though at a range of approximately 6,000 yards.

b. Battery Sanders, three 6-inch D.C. at Fort Revere. See Exhibit 17-B. The baseline provided, with B¹ (equipped with DPF) at Fort Revere and B² (similarly equipped) at Fort Standish, does not entirely cover the controlled mines and does not cover the west contact mines of the northern mine field at all. The low site of the DPF at B² limits its range to about 2,500 yards. The DPF at B¹ is effective to about 10,600 yards, and covers both the controlled and the contact mines. The average range to the mine field is 8,300 yards. Because of the range, the battery is of value principally in defending the southern portion of the mine field. A two gun 6-inch battery with CRF at Fort Heath would be more valuable.

c. Battery Basinger, two 3-inch P.M. at Fort Strong. The battery is approximately 6,500 yards from the mine field as shown in Exhibit 18-B. It is equipped with CRF having the field indicated.

d. Battery Taylor, two 3-inch P.M. at Fort Strong. No fire control stations or apparatus have been assigned to the battery. The field of fire is shown in Exhibit 19-B. As the battery faces northwest, but one gun at a time can be fired to the east of Deer Island. The range is approximately 7,000 yards. The battery has little value. It seems inadvisable to provide a fire control system.

25. Fire Control Cables.

a. Some of the fire control cables in the harbor defense are of considerable age. The elimination of batteries no longer required, and the addition of the extensive demands of the long range fire control project, and of the anti-aircraft artillery with its intelligence service, has made advisable a change in the routing of the main axis of communication. That axis should lie from Fort Ruckman on the north to Fort Heath, thence to Fort Banks, to Deer Island via the west side of Winthrop peninsula, to Fort Standish, to Fort Warren, and thence to the Hull terminal.

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(1) Lateral lines will extend from Fort Standish to Fort Strong; from Fort Standish to Outer Brewster; from Fort Warren to Fort Andrews; and from the Hull terminal to Fort Duvall.

b. The existing and projected cables are shown in Exhibit 22-B. In Exhibit 21-B are shown the detailed requirements of the fire control system, from which the required capacity of the cables were determined.

c. The following statement shows the cable requirements of the harbor defense:

(1) A 25-pair cable should be provided from Marblehead Neck to Fort Ruckman; 20 pairs are needed.

(2) A 50-pair cable should be provided from Fort Ruckman to East Point; 24 pairs are needed.

(3) A 75-pair cable should be provided from Fort Ruckman to Fort Heath in addition to the 30-pair cable existing; 48 pairs are needed.

(4) There is an existing 75-pair subterranean cable from Fort Heath to Fort Banks; 65 pairs are needed.

(5) A 75-pair cable should be provided from Fort Banks to Deer Island via the west side of the Winthrop peninsula; the necessary right of way from Fort Banks to the water is assured. The existing cables from Fort Heath to Deer Island then should be abandoned or recovered, as they lie over rocky shoals; 45 pairs are required.

(6) A 50-pair cable exists between Deer Island and Fort Standish; 42 pairs are needed.

(7) A new 52-pair cable was installed between Fort Standish and Fort Warren in 1936; 49 pairs are required.

(8) A new 21-pair cable was installed between Fort Standish and Fort Strong in 1936; 16 pairs are needed.

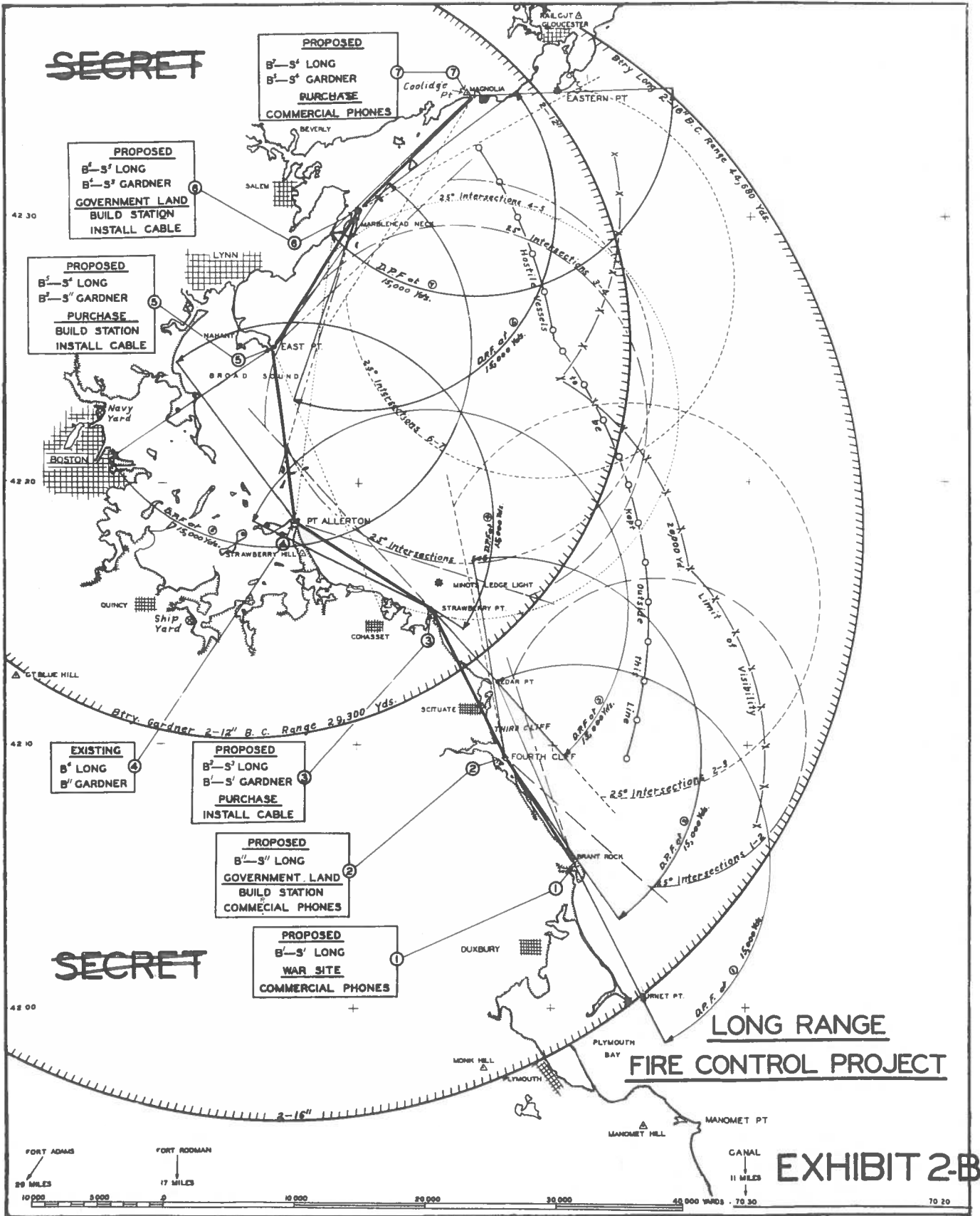
(9) A 30-pair cable exists between Fort Warren and Fort Andrews; 5 pairs are needed.

(10) A new 75-pair cable was installed in 1937 between Fort Warren and Fort Revere; 56 pairs are needed.

(11) Two 25-pair cables exist between Fort Andrews and Fort Revere; 13 pairs are needed.

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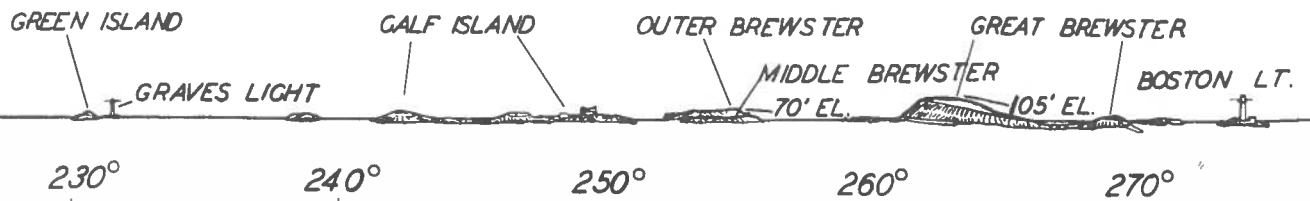
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**LONG RANGE
FIRE CONTROL PROJECT**

EXHIBIT 2-B

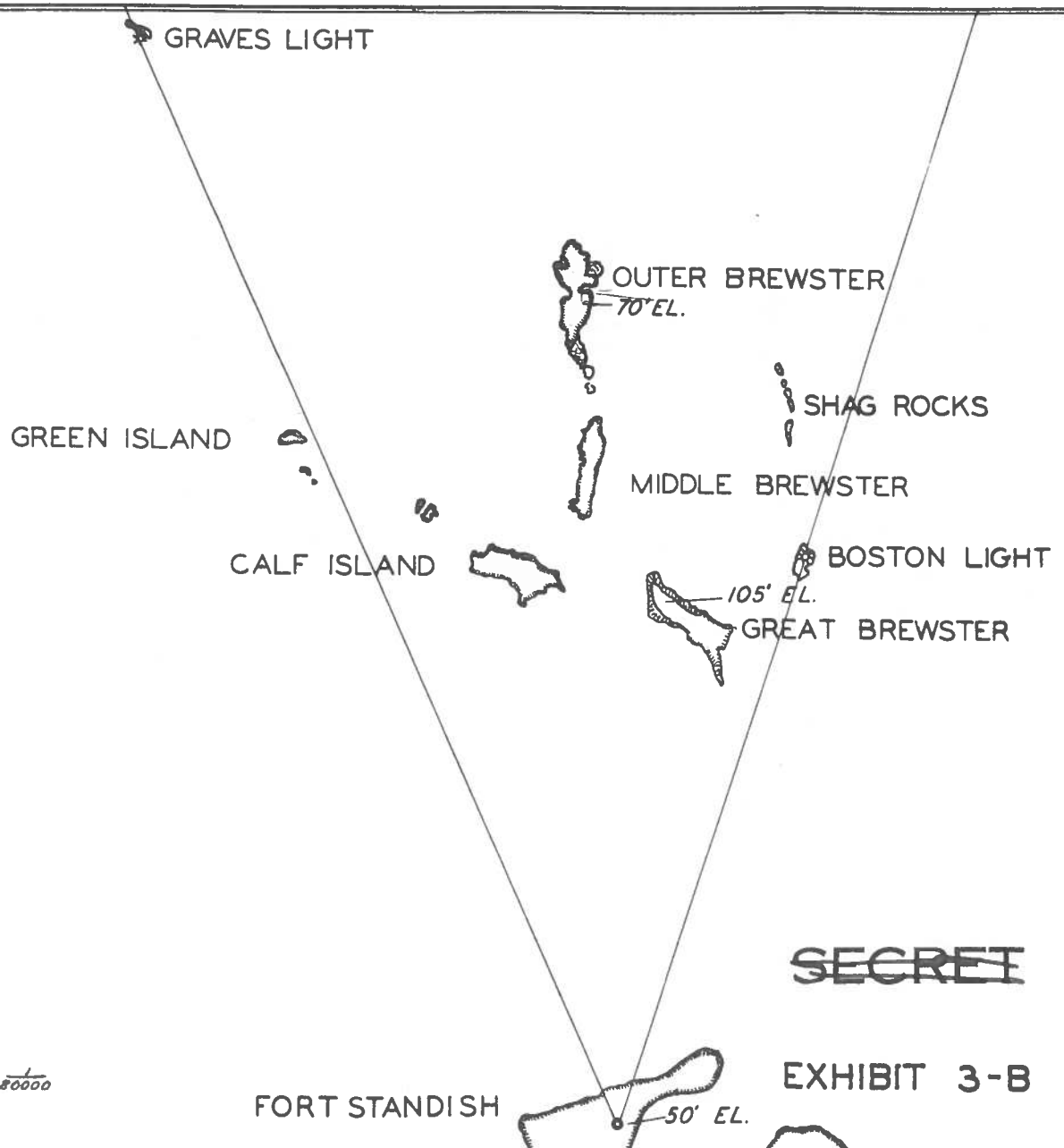
VIEW FROM AN AVERAGE FIRE CONTROL STATION,

FORT STANDISH

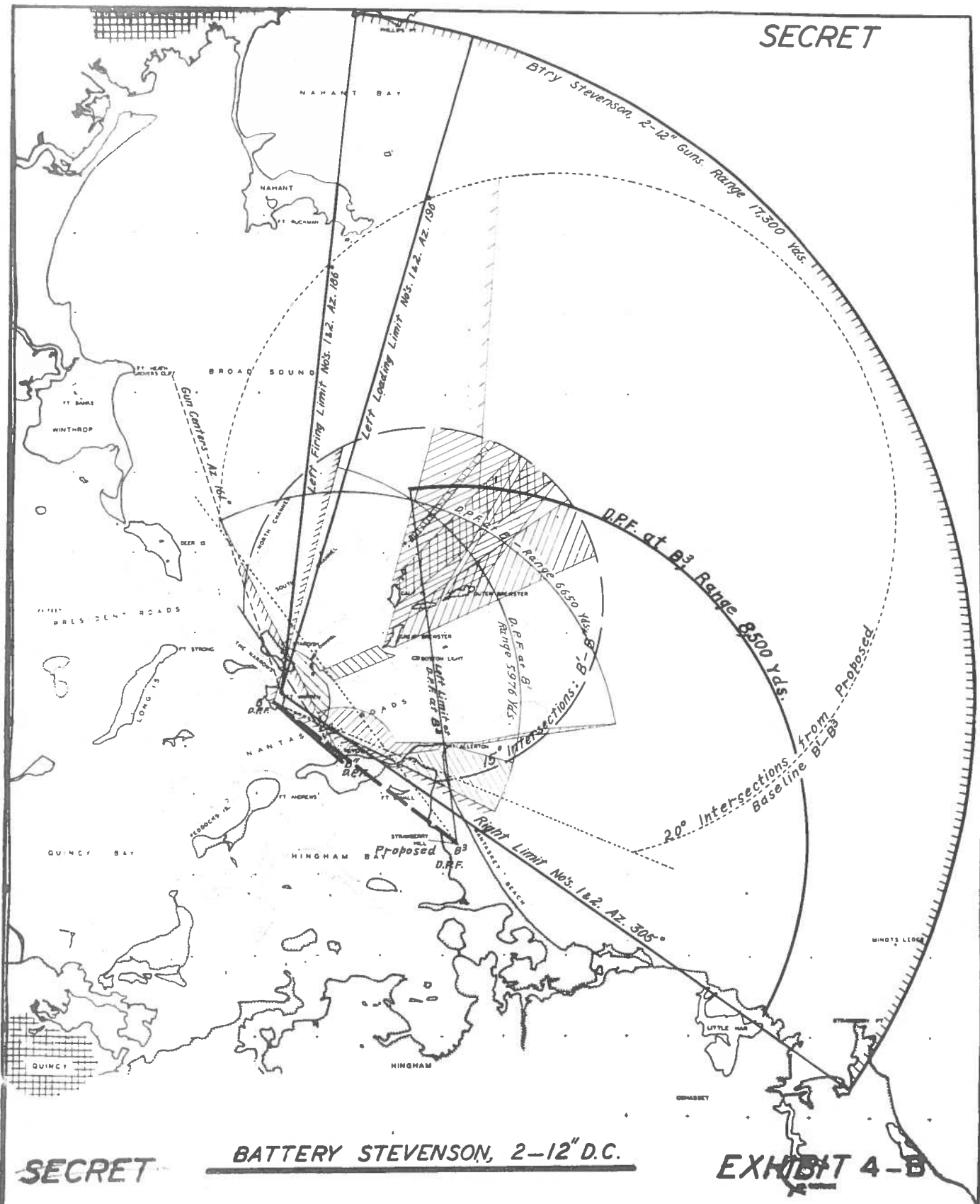


A CRF OR HOR. BASE CAN OBSERVE ON MASTS OVER ALL ISLANDS EXCEPT HIGH PORTION OF GREAT BREWSTER.

A D.P.F. CANNOT OPERATE OVER ANY ISLAND.



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BATTERY STEVENSON, 2-12" D.C.

EXHIBIT 4-B

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NEHANT BAY

Btry. Ripley, 2-12" Guns. Range 17300 Yds.

Masked from B'



Mushed from B''



NEHANT
WIND CLIFF

BROAD SOUND 10614 Yds.

15° intersect 10°

B'-B''

OUTER BREWSTER

GREAT BREWSTER

ERUSION LIGHT

CHANNL

NORTH CHANNL

DEER IS

ROADS

FT STANDISH

THE NARROWS

FT WARREN

BOAT HOUSE

FT DUNN

FT ANDREWS

PROCKS IS

STRIMBURY

LONG IS

Left Limit No. 2. Az. 127°
Left Limit No. 2. Az. 127°
Gun Centers N. Az. 99°

Right Limit No. 2. Az. 256°

Right Limit No. 1. Az. 257°

Right Limit No. 2. if Carriage is Altered - Az. 265°

Right Limit No. 1. if Carriage is Altered - Az. 266°

BATTERY RIPLEY, 2-12" B.C.

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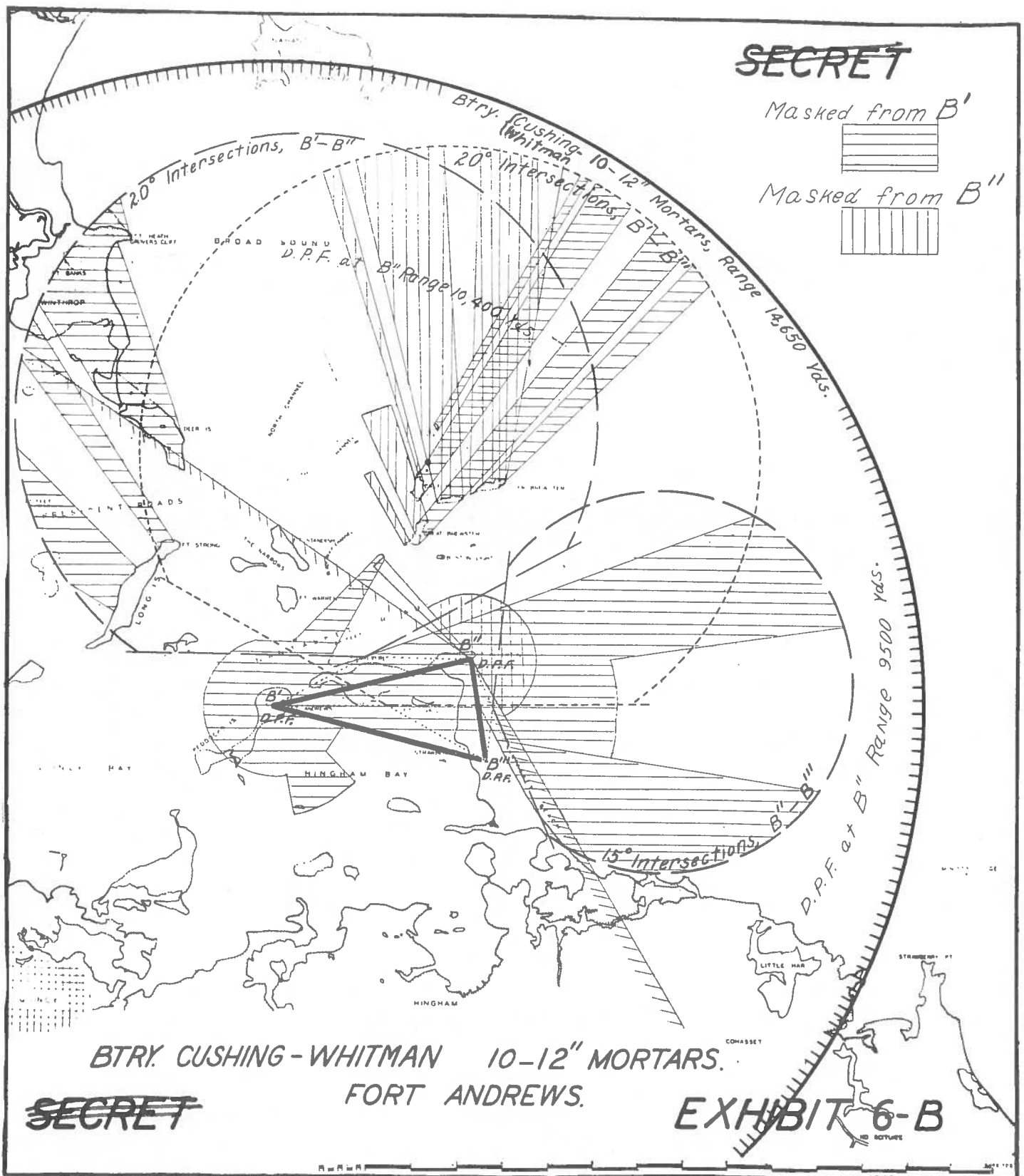
EXHIBIT 5-B

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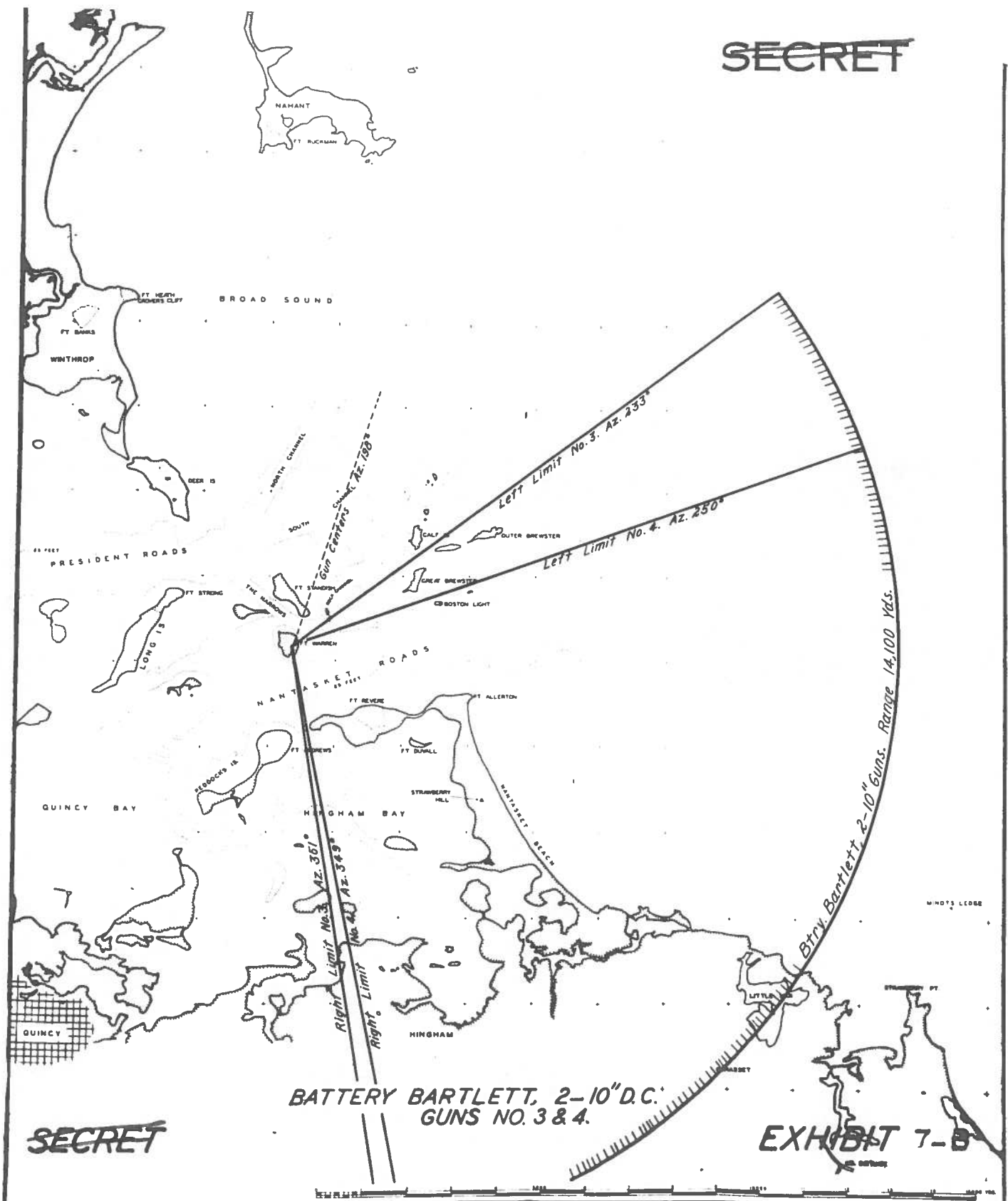
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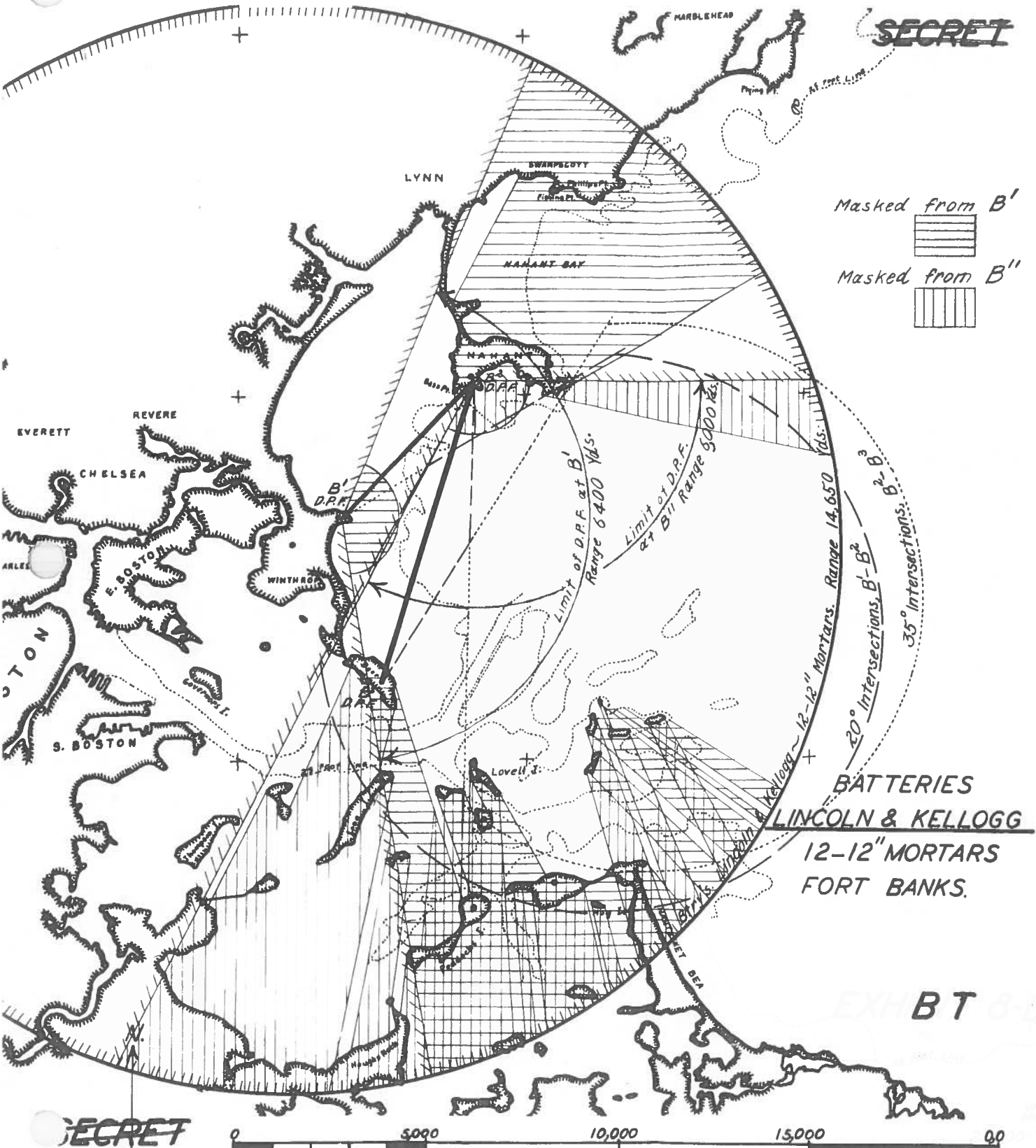
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EXHIBIT 7-B

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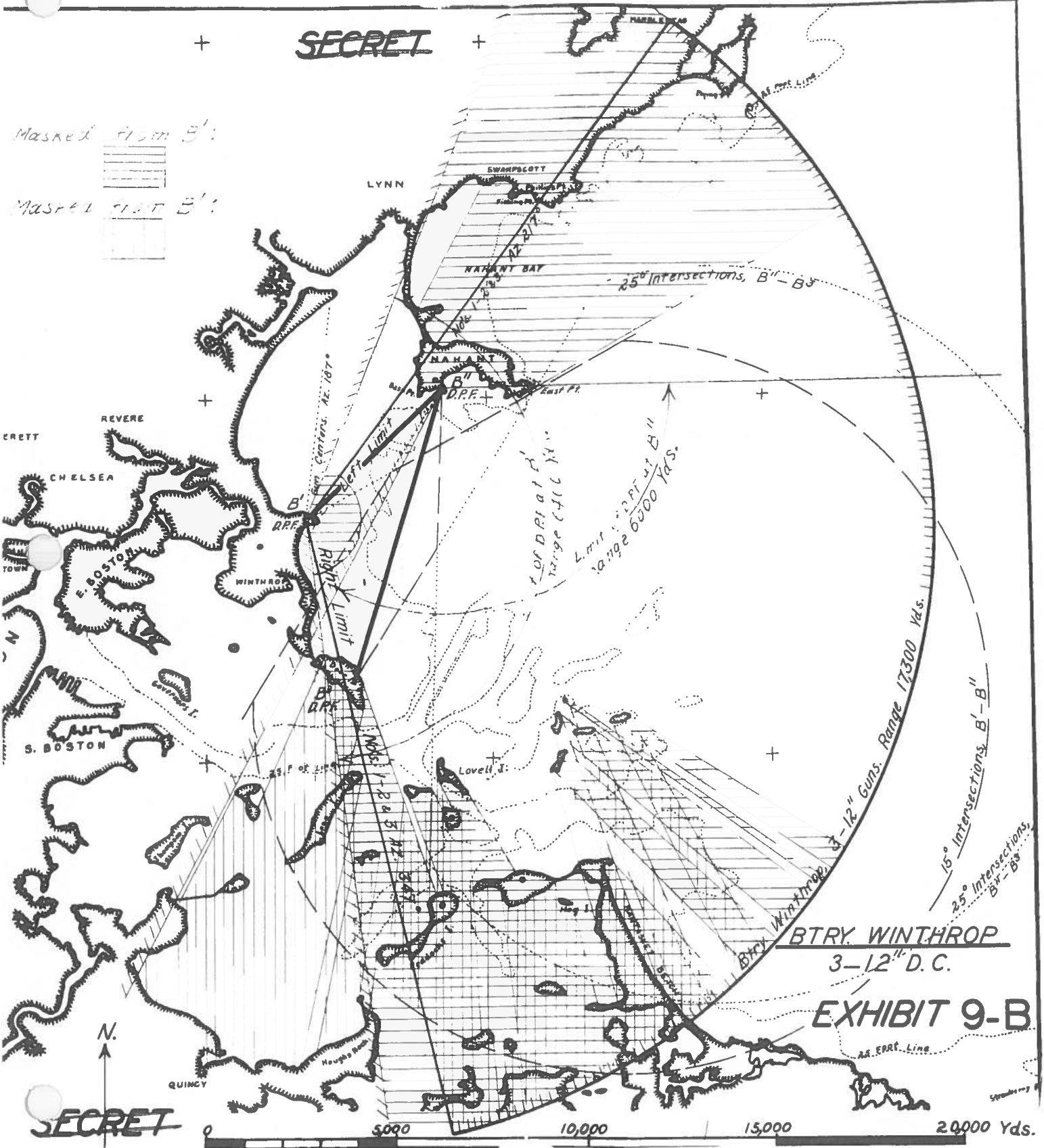
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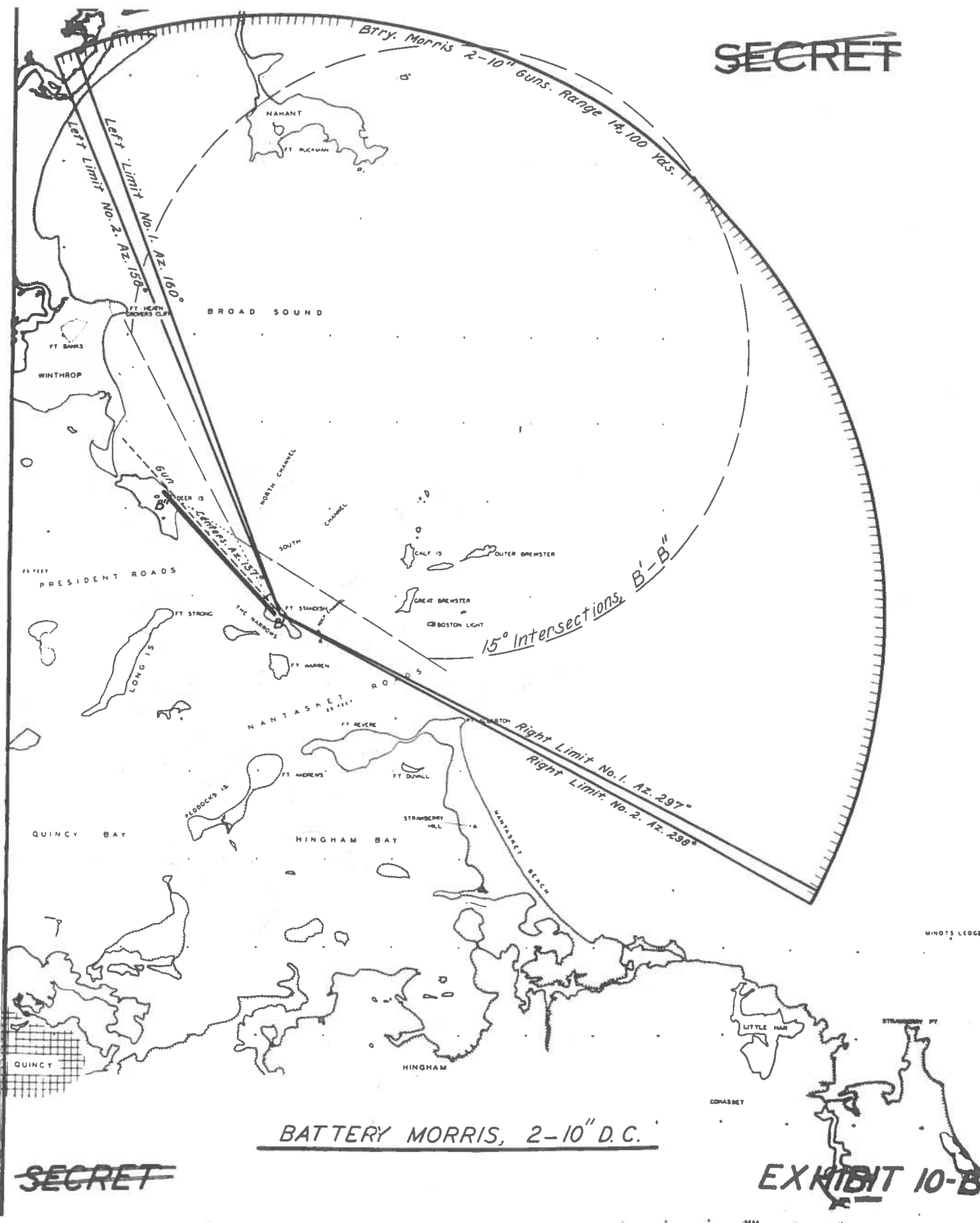


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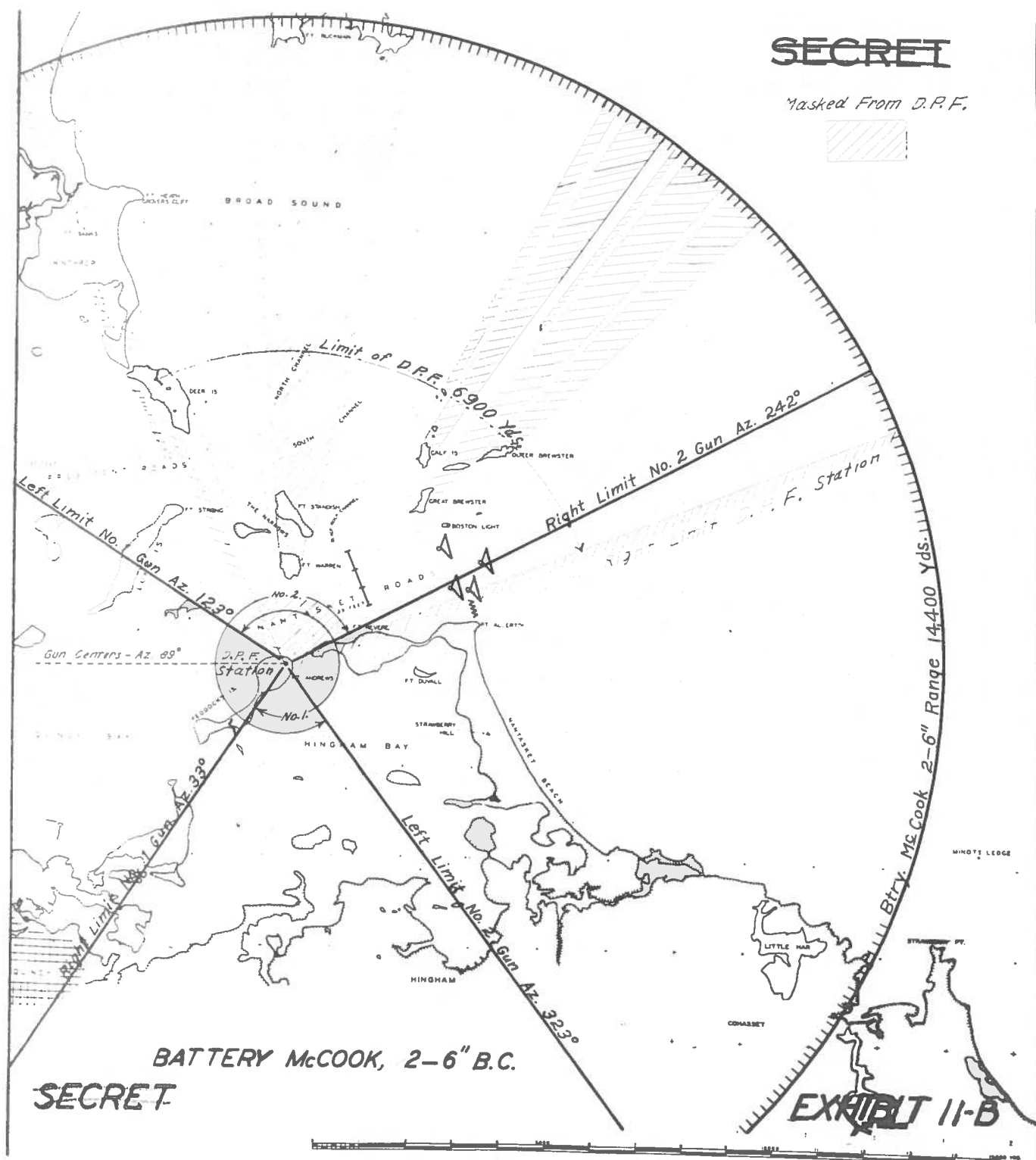


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EXHIBIT 10-B

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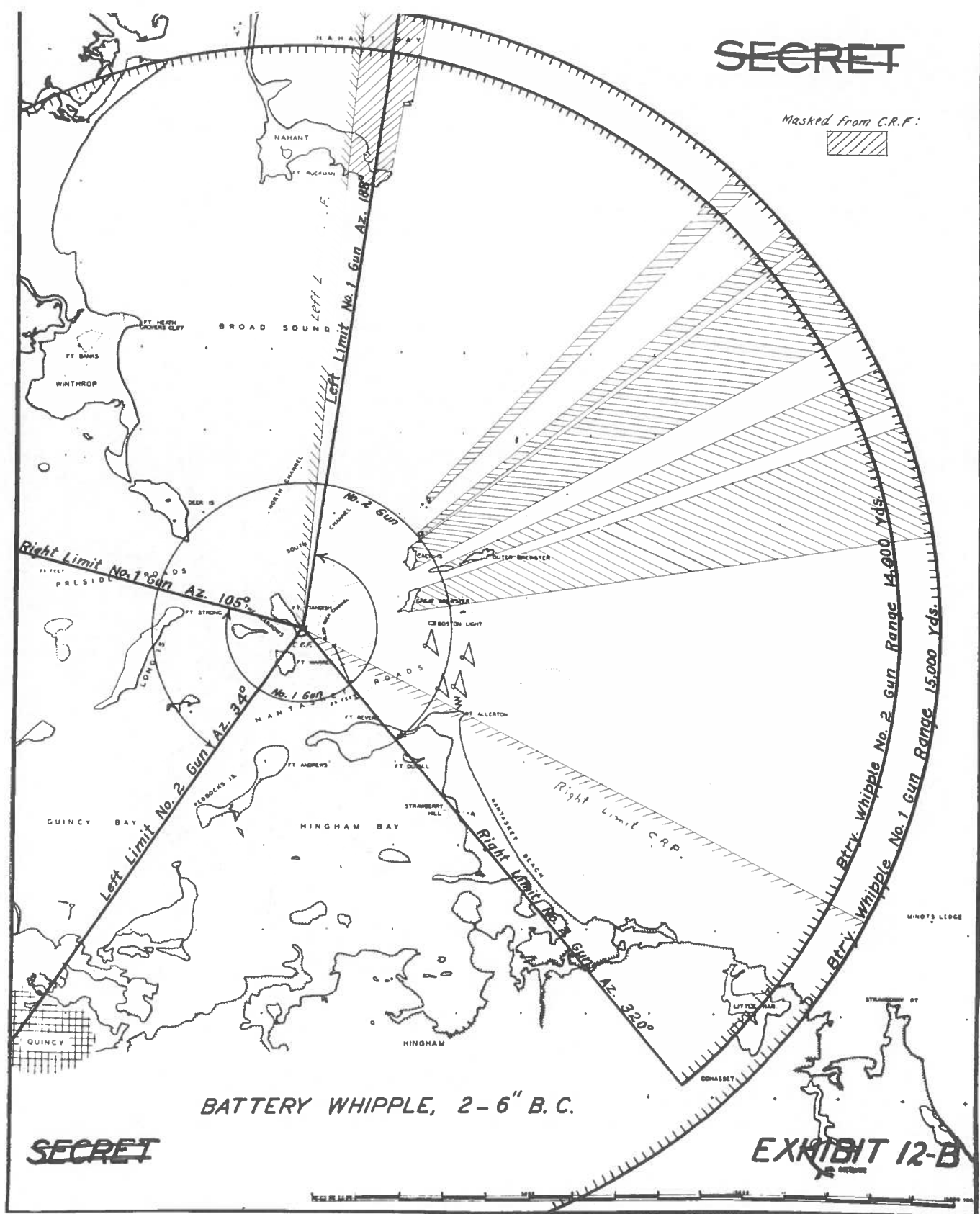
BATTERY McCOOK, 2-6" B.C.

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EXHIBIT 11-B

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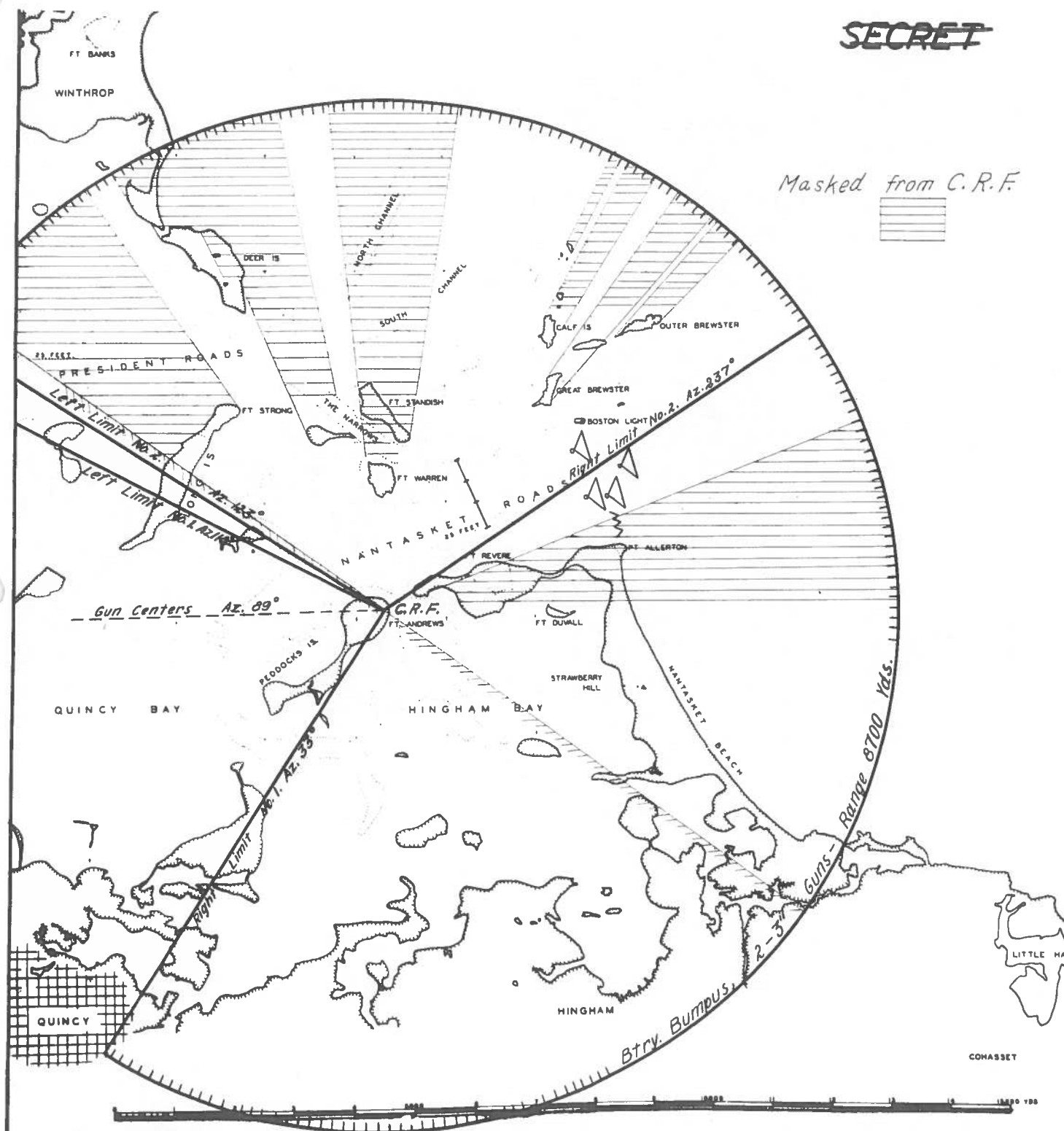


BATTERY WHIPPLE, 2-6" B.C.

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EXHIBIT 12-B

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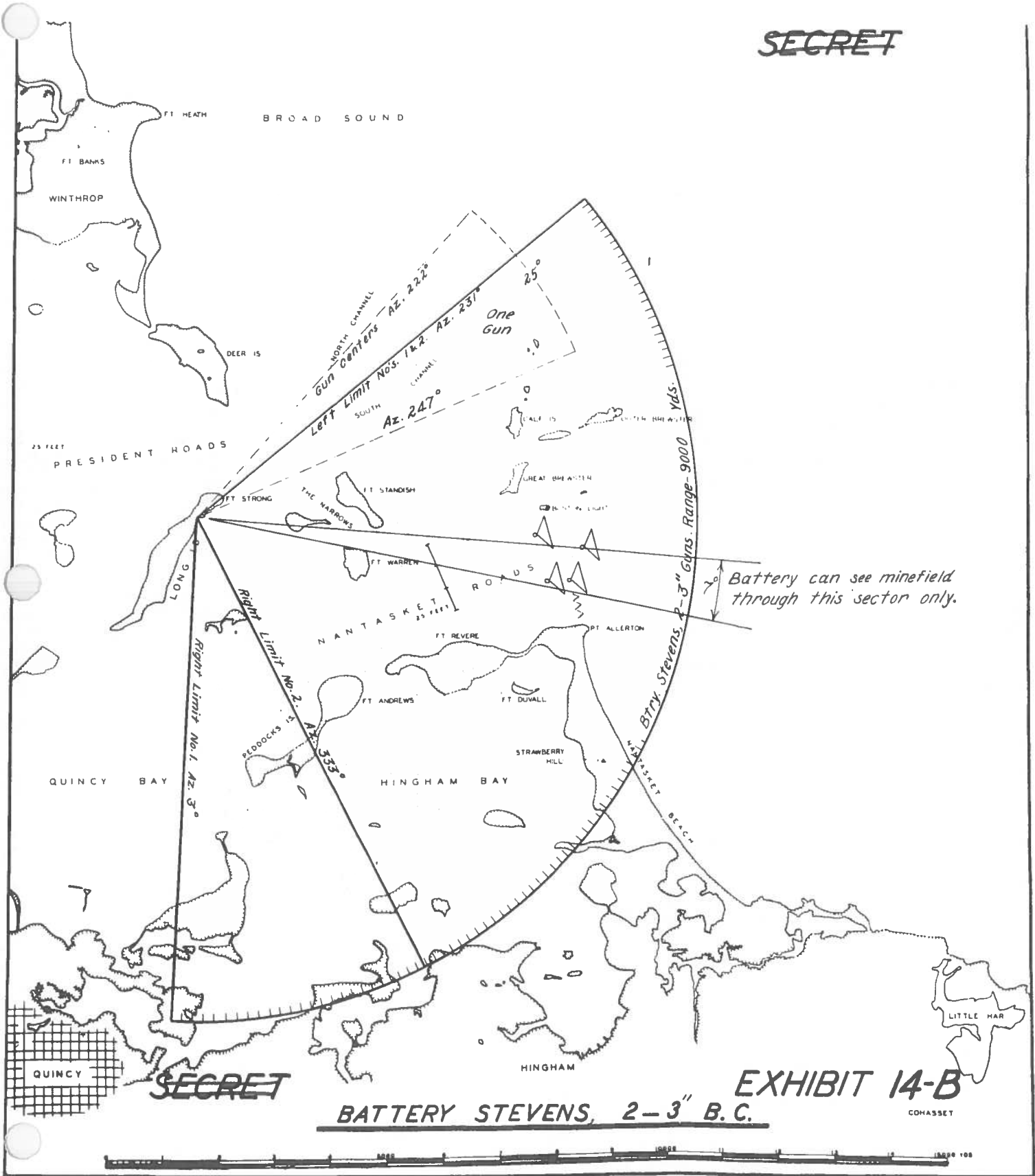


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BATTERY BUMPUS, 2-3" B.C.

EXHIBIT 13-B

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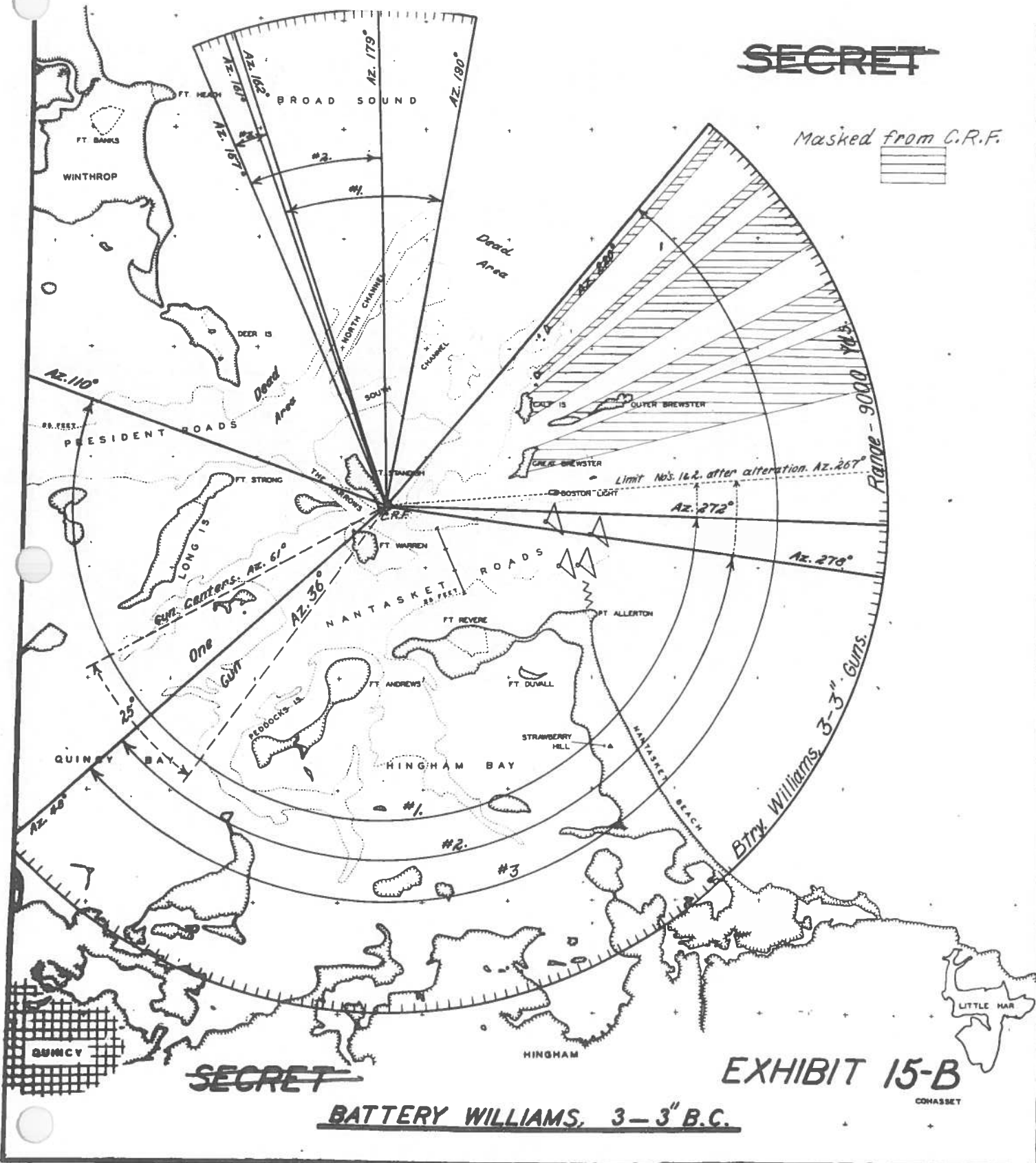
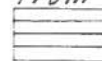
BATTERY STEVENS, 2-3" B.C.

EXHIBIT 14-B

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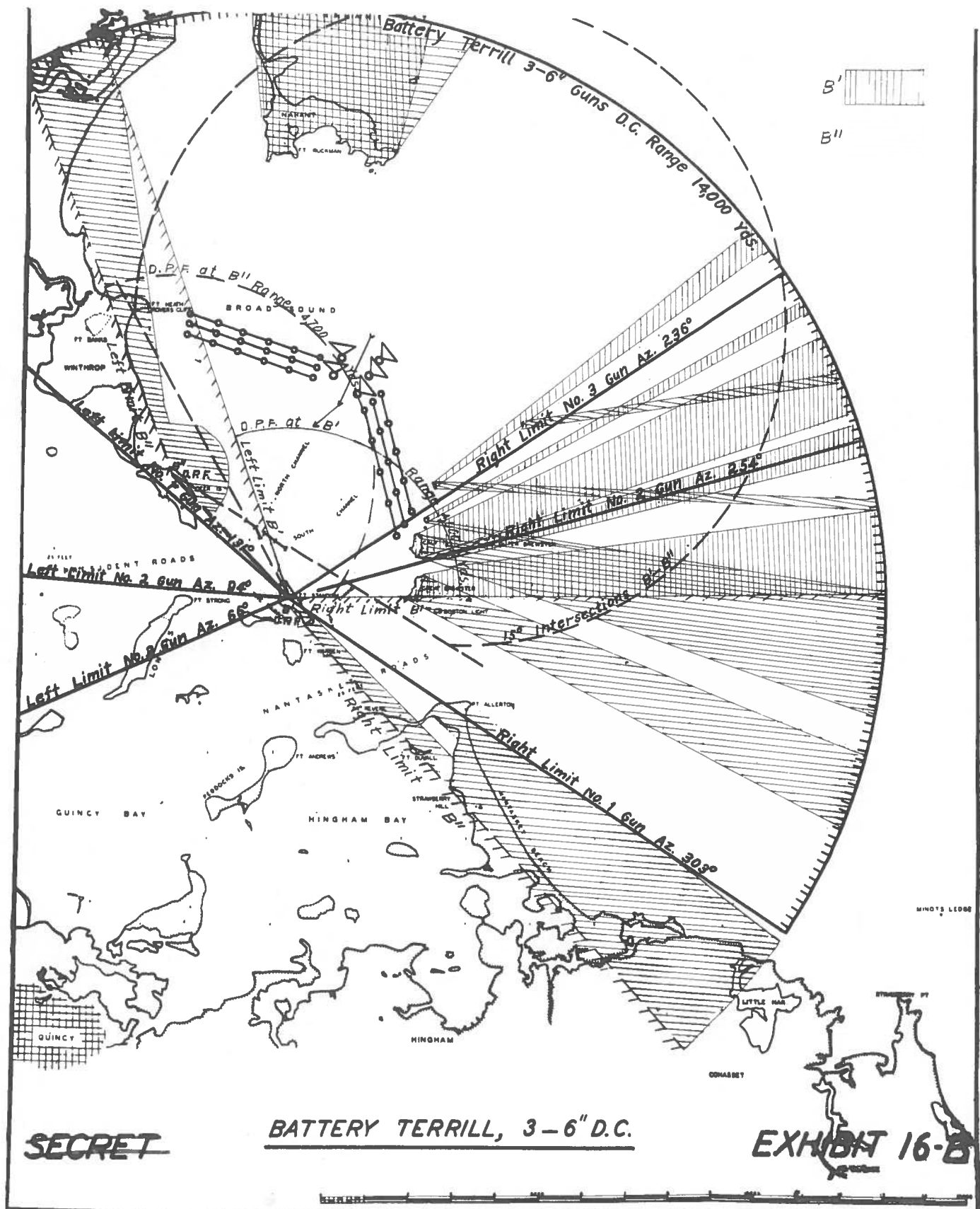


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EXHIBIT 15-B

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BATTERY WILLIAMS, 3-3" B.C.

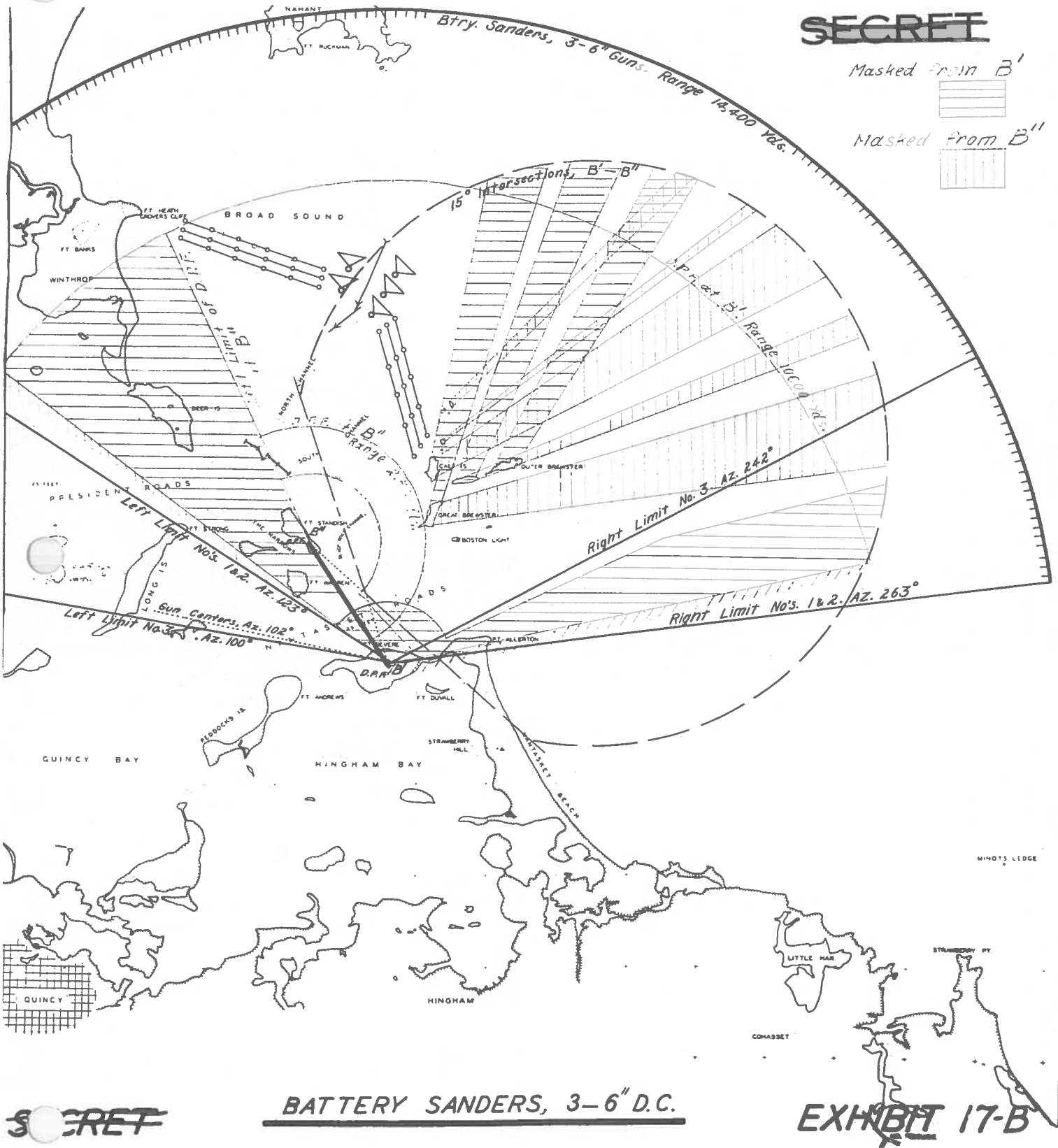


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Masked from B''



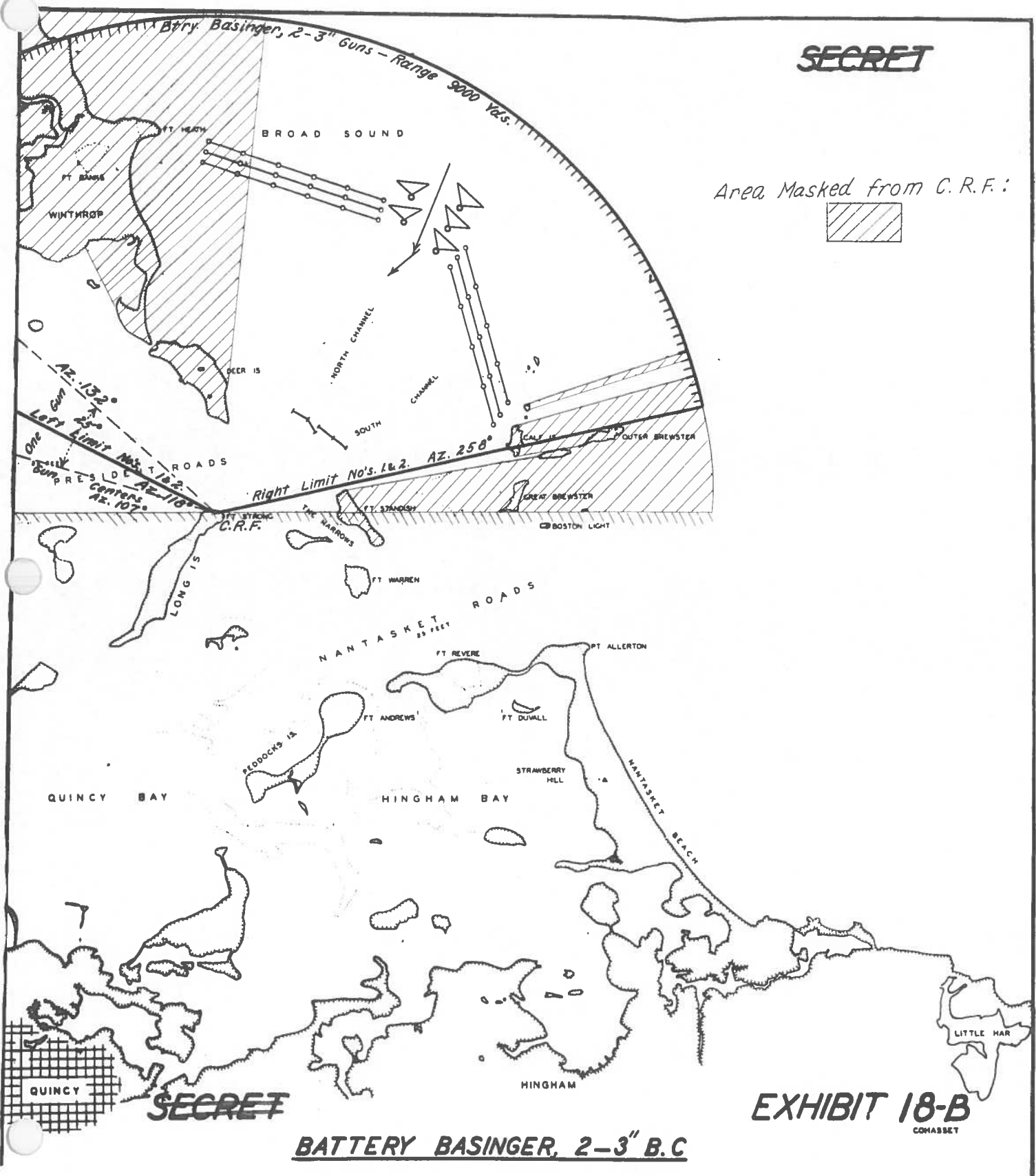
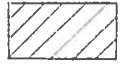
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BATTERY SANDERS, 3-6" D.C.

EXHIBIT 17-B

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Area Masked from C.R.F.:



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EXHIBIT 18-B

CONASSET

BATTERY BASINGER, 2-3\" B.C

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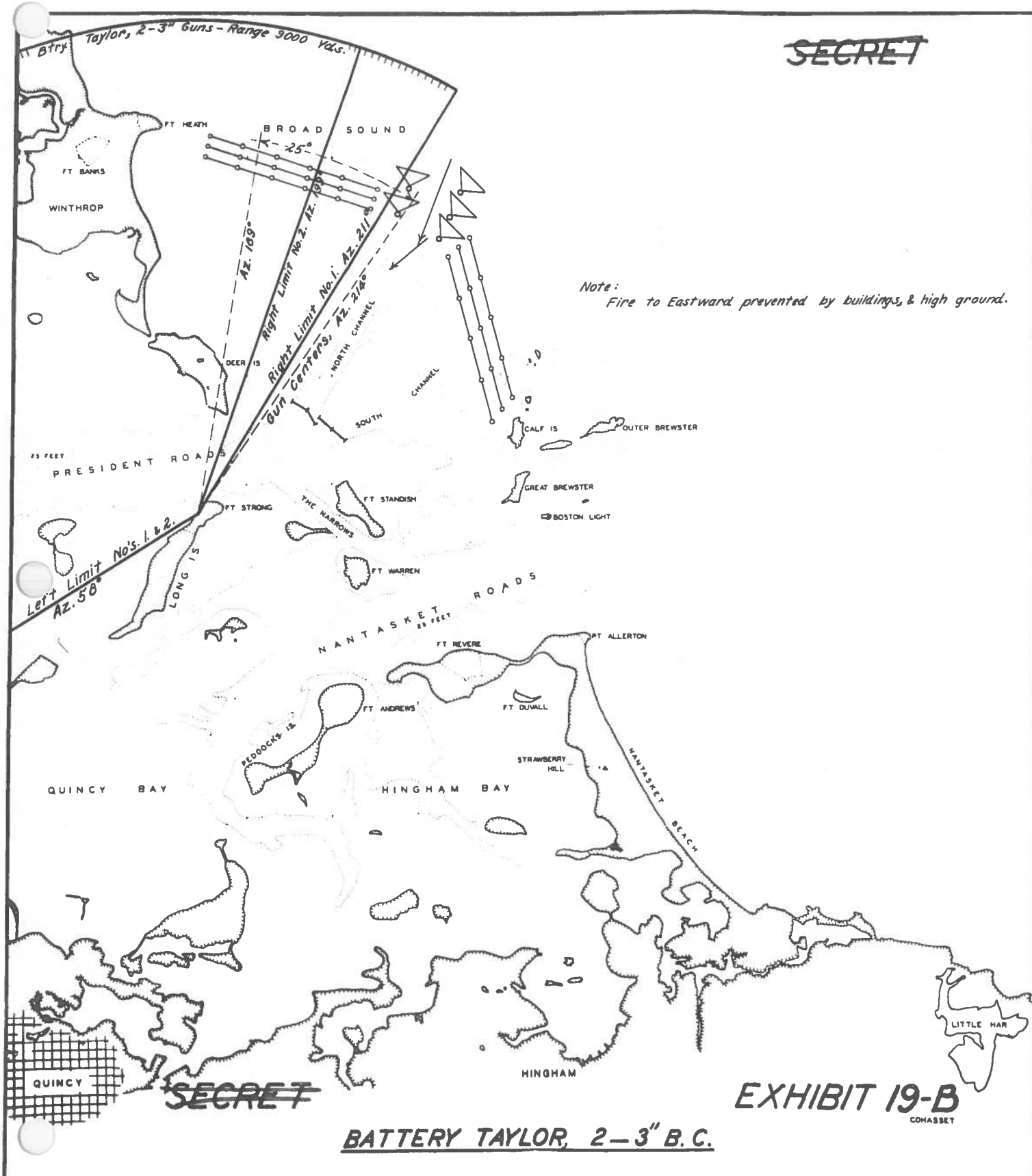


EXHIBIT 19-B

COMASSSET

BATTERY TAYLOR, 2-3" B.C.

EXHIBIT No. 20-B

PRESENT F. C. STATIONS AT
FORT RUCKMAN AND

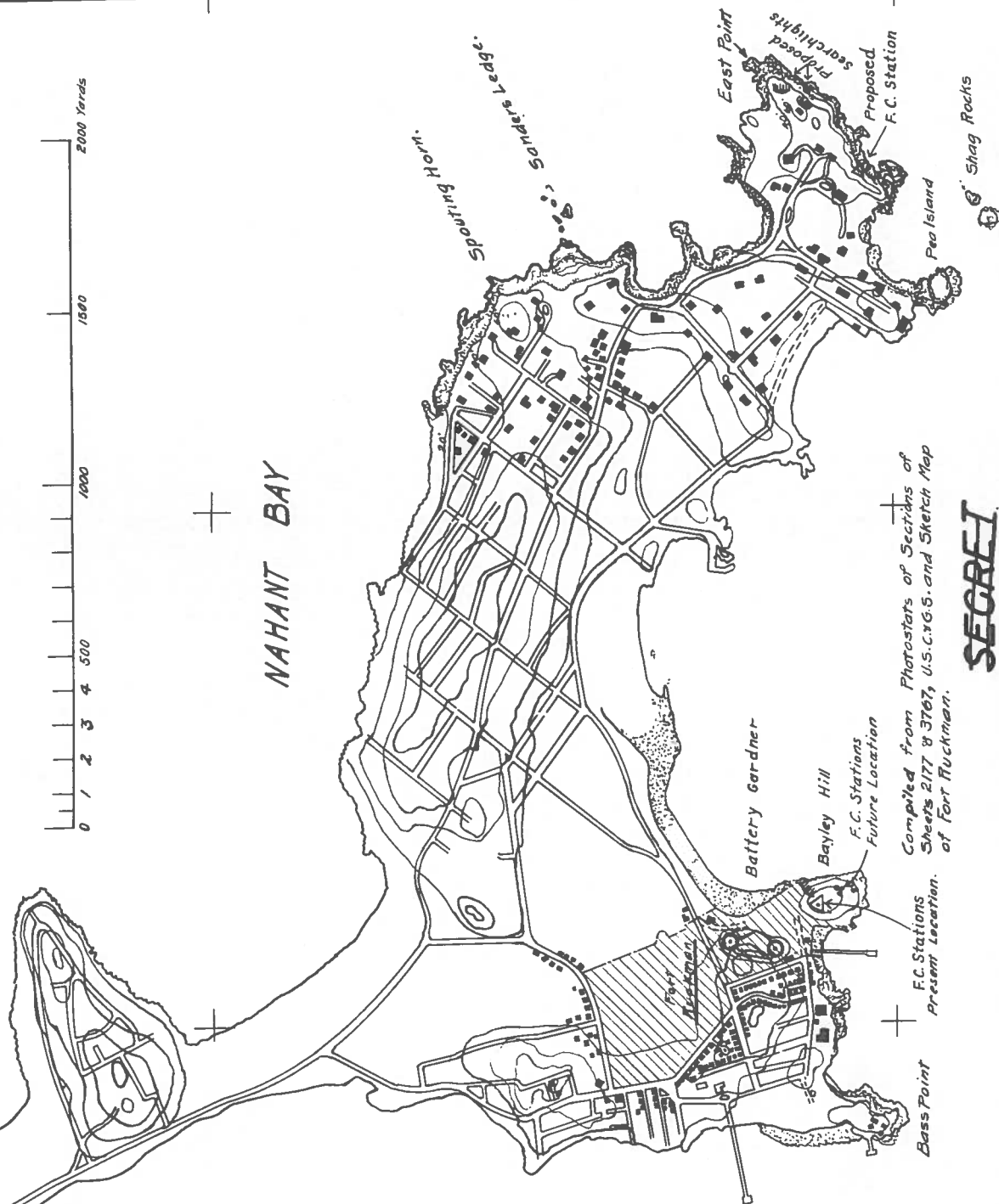
PROPOSED F. C. STATIONS AND

SEARCHLIGHTS AT EAST POINT.

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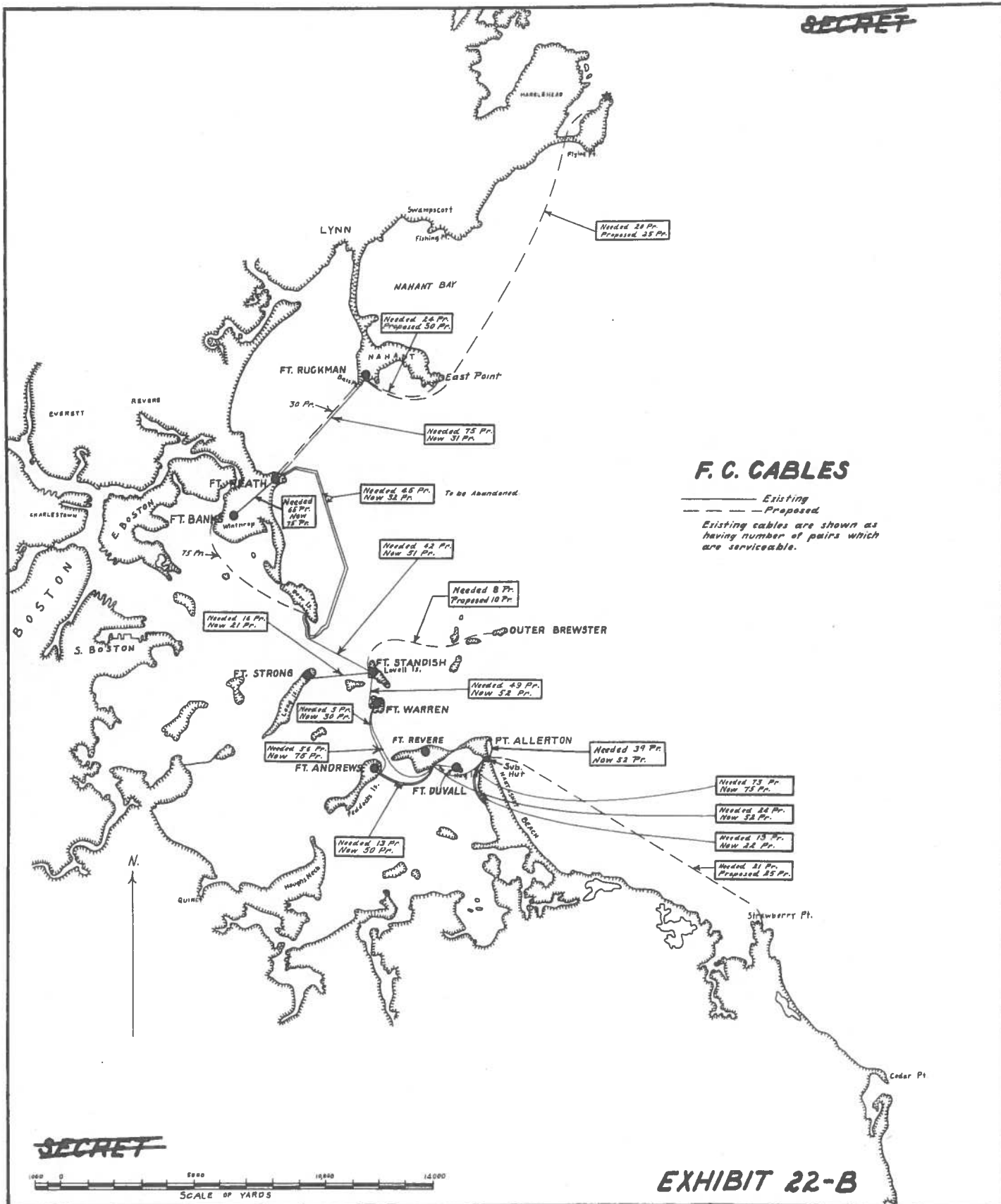
NAHANT BAY



Compiled from Photostats of Sections of
Sheets 2177 & 3767, U.S.C.V.G.S. and Sketch Map
of Fort Ruckman.

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A
EXHIBIT 23-B

Omitted.

EXHIBIT 23-B
Omitted

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INDEX

to
COST ESTIMATE AND PRIORITY GUIDE, ANNEX B
HARBOR DEFENSES OF BOSTON

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ANNEX B EXHIBIT NO. 24-B

LOCATIONS

H. D. OF BOSTON

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		
					Material	Labor	Land	Material	Labor	Total

1	1	A	RECOMPUTATION OF ORIENTATION DATA	\$	\$ 500	\$ 3,000	\$	\$	\$	\$ 3,500
---	---	---	-----------------------------------	----	--------	----------	----	----	----	----------

EASTERN POINT LIGHT,
GLoucester

1	12	B	8 ⁶ Btry. Long, (2-16" BC, Ft. Duwall)	1,800						1,800
1	20	B	8 ⁶ Btry. Gardner, (2-12" LR, Ft. Ruckman)	1,800						1,800
			(The above spotters to be connected by commercial telephone lines in an emergency.)							
			Total	3,600						3,600

COOLIDGE POINT

			<u>2-Deck Fire Control Station</u>							
1	11	A)	8 ⁷ Btry. Long, (2-16" BC, Ft. Duwall)	6,300	4,000	2,000	1,500	786	1,090	13,616
		B)								
1	20	C)	8 ⁵ Btry. Gardner, (2-12" LR, Ft. Ruckman)	6,300				274		6,574
		B								
			(Above includes purchase and installations of 2,550', 10 pr. Subterranean cable to be laid from station to commercial contact. Hence by commercial lines to Marblehead Neck)							
			Total	12,600	4,000	2,000	1,500	1,000	1,090	22,190

MARBLEHEAD NECK

			(Lighthouse Reservation)							
			<u>2-Deck Fire Control Station</u>							
1	10	A	8 ⁶ Btry. Long (2-16" BC, Ft. Duwall)	6,300	5,600	2,700		304	952	15,856
1	19	A	8 ⁴ Btry. Gardner (2-12" LR, Ft. Ruckman)	6,300				274		6,574
			<u>CABLE</u>							
1	122	A	Marblehead Neck - Ft. Ruckman 49,700', 25 pr. Submarine, FC-325					28,020		28,020
			Total	12,600	5,600	2,700		28,598	952	50,450

EAST POINT, NAHANT

			<u>3-Deck Fire Control Station</u>							
1	9	A	8 ⁵ Btry. Long (2-16" BC, Ft. Duwall)	6,300	4,200	2,100	1,250	289	1,070	15,209
1	17	A	8 ⁵ Btry. Gardner (2-12" LR, Ft. Ruckman)	6,300				274		6,574
1	18	A	BC Station	500				194	50	744
1	23	B)	155 mm Gun Btry. (4 guns) Nahant	3,725	100	100		231		4,156
		C)								
			<u>CABLE</u>							
1	123	A	East Point - Ft. Ruckman 13,000', 50 pr. Submarine, WC-327					8,682		8,682
			<u>"E" EMERGENCY STATION</u>							
1	56	A	For either: Btry. Lincoln (5-12" M) Ft. Banks Btry. Kellogg (5-12" M) Ft. Banks Btry. Winthrop (3-12" DC) Ft. Heath	6,300				274		6,574
			Total	23,125	4,300	2,200	1,250	9,944	1,120	41,939

FORT RUCKMAN

1	21	A	Btry. Gardner (2-12" LR) Completion of Plotting Room Equipment and Installations. (Includes 350,000 for Director and Data Transm. System)	35,065				3,950	150	39,165
1	22	A	<u>GUN REPLACEMENT (FIRING SIGNALS) BTRY.</u>					60	40	100
			<u>GARDNER</u>							
1	44	A	8 ² Btry. Kellogg (5-12" M) Ft. Banks	1,800						1,800
1	49	A	8 ² Btry. Lincoln (5-12" M) Ft. Banks	1,800						1,800
1	54	A	8 ² Btry. Winthrop (3-12" DC) Ft. Heath	1,800						1,800
			<u>CABLE</u>							
			Ft. Ruckman - Ft. Heath 17,000', 75 pr. Submarine WC-328					12,857		12,857
1	116	A	Fire Control Switchboard Room					4,010	1,000	5,010
			Total	40,465				20,877	1,190	62,532

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EXHIBIT NO. 24-B

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
<u>PORT HEATH</u>				\$	\$	\$	\$	\$	\$	
1	48	A	G-3, Group Command Post	2,300				116	50	2,466
1	45	A	BC - B-44, Btry. Kellogg (6-12" M, Ft. Banks)	1,800						1,800
1	48	A	BC - B-44, Btry. Lincoln (6-12" M, Ft. Banks)	1,800						1,800
			Btry. Winthrop, (3-12" DC, Ft. Heath)							
1	53	A	BC-B-44, Btry. Winthrop	1,800						1,800
1	57	A	Plotting Room, Btry. Winthrop	2,945						2,945
58			Gun Emplacement, Btry. Winthrop							
118			Fire Control Switchboard Room							
			Total	10,645				116	50	10,811

<u>PORT BANKS</u>										
1	46	A	Btry. Kellogg (6-12" M)	2,945						2,945
	47	A	Plotting Room (to complete)							
			Gun Emplacement							
1	51	A	Btry. Lincoln (6-12" M)	2,945						2,945
	52	A	Plotting Room (to complete)							
			Gun Emplacement							
1	106	A	Radio					3,750		3,750
			Fort Radio Set, SCR-177							
1	125	A	Cable					22,330		22,330
			Ft. Banks - Deer Island							
			88,700', 75 pr. Submarine, WC-328							
1	117	A	Fire Control Switchboard Room					2,510	500	3,010
			Total	5,890				28,590	500	34,980

<u>DEER ISLAND</u>										
1	46	A	G-1, Group Command Post	500				3,701	100	4,301
1	50	A	Btry. Kellogg (6-12" M, Ft. Banks)	4,500			75			4,575
1	55	A	Btry. Lincoln (6-12" M, Ft. Banks)	4,500						4,500
1	55	A	Btry. Winthrop (3-12" DC, Ft. Heath)	4,500						4,500
	88		M ₂ - M ₂ (Double Station) Deer Island							
	90		Btry. Terrill (3-6" DC)							
			Total	14,000			75	3,701	100	17,876

<u>PORT STRONG</u> <u>Long Island</u>										
1	77	A	Btry. Stevens (2-3" M, Ft. Strong)	1,800				2,224	100	4,124
	81	A	Mine Group Command Post							
			Mine Battery, 5 Groups, Broad Sound.							
	82		BC Station, Ft. Strong							
	84		M ₂ - M ₂ (Double Station), Ft. Strong							
1	85	A	Plotting Room, Ft. Strong	83						83
	86		Mine Casemate, Ft. Strong							
	87		Loading Room, Ft. Strong							
1	98	A	Btry. Baesinger (2-3" M, Ft. Strong)	1,800						1,800
	99		BC Station, Ft. Strong							
	100		CWF Station							
	101		Gun Emplacement, Btry. Baesinger							
			Btry. Taylor, (2-3" guns, Ft. Strong)							
1	106	A	Radio					3,750		3,750
			Fort Radio Set, SCR-177							
			Total	3,683				5,974	100	9,757

<u>PORT STANDISH</u> <u>Lovell Island</u>										
33			Btry. Ripley (2-12" BC, Ft. Revere)							
59			Btry. Morris (2-10" DC, Ft. Standish)							
			(Reserve Btry.)							
			Btry. Whipple (2-6" BC, Ft. Standish)							
71			BC Station, Ft. Standish							
72			CWF Station, Ft. Standish							
73			Gun Emplacement, Ft. Standish							
1	78	A	Btry. Williams (3-5" M, Ft. Standish)	1,800						1,800
	79		BC Station, Ft. Standish							
	80		CWF Station, Ft. Standish							
			Gun Emplacement, Ft. Standish							
1	88	A	Btry. Terrill, (3-6" DC, Ft. Standish)	1,800						1,800
	89		BC Station, Ft. Standish							
1	91	A	Plotting Room, Ft. Standish	418						418
	92		Gun Emplacement, Ft. Standish							
	95		Btry. Sanders (3-6" DC, Ft. Revere),							
			Ft. Standish							
1	107	A	Radio					3,750		3,750
			Fort Radio Set, SCR-177							
119			Ft. Standish, Fire Control Switchboard Room							
			Total	4,418				3,750		7,768

APPENDIX B EXHIBIT NO. 24-B

LOCATIONS

H. D. OF PROJECT

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		
					Material	Labor	Land	Material	Labor	Total
OUTER BREEMER ISLAND				\$	\$	\$	\$	\$	\$	
1	102	B	Spotters and Observers for C-1, C-2, C-3 and MC-1	7,200	200	300		358	50	8,108
1	126	A	Cable 21,000', 10 pr. Submarine MC-321					10,552		10,552
			Total	7,200	200	300		10,910	50	18,660

FORT WARREN

1	2	A	H.D.C.P. "H" Station, Ft. Warren	500	2,000	3,000		3,763	150	9,413
	25		Btry. Stevenson (2-12" DC, Ft. Warren)							
	26		BC Station, Ft. Warren							
1	29	A	Plotting Room, Ft. Warren	2,945				25		2,945
1	30	A	Gun Emplacement							25
1	61	A	MC-1, Mine Group Command Post	1,600				2,224	100	4,124
	62		Mine Battery, 4-Groups, Kantsasket Roads							
	63		BC Station, Ft. Warren							
	63		M ₁ - M ₂ (Double Station), Ft. Warren							
1	65	A	Plotting Room, Ft. Warren	83						83
	66		Mine Casemate, Ft. Warren							
	67		Loading Room, Ft. Warren							
	41		Btry. Bartlett (2-10" DC, Reserve Btry.)							
	113		Meteorological Station, Ft. Warren							
	114		Signal Station, Ft. Warren							
	115		Radio Station, Ft. Warren							
	116		Fire Control Switchboard Room, Ft. Warren							
			Total	5,328	2,000	3,000		6,012	250	16,550

FORT ANDREWS, Peddocks Island

1	68	A	Btry. McCook (2-6" BC, Ft. Andrews)	250						250
1	69	A	BC Station, Ft. Andrews	4,500						4,500
	70		DPF Station, Ft. Andrews							
	74	A	Gun Emplacement, Ft. Andrews							
1	74	A	Btry. Bumpus (2-3" RF, Ft. Andrews)	1,800						1,800
	75		BC Station, Ft. Andrews							
	76		CRT Station, Ft. Andrews							
	76		Gun Emplacement, Ft. Andrews							
1	103	A	Harbor Defense Radio Station					8,000	1,000	9,000
			Btry. Cushing-Whitman (10-18" H, Ft. Andrews)							
1	36	A	BISL Station, Ft. Andrews	1,800						1,800
1	39	A	Plotting Room, Ft. Andrews	2,945						2,945
	40		Gun Emplacement							
			Total	11,295				8,000	1,000	20,295

FORT REVERE

	27		Btry. Stevenson (2-12" DC, Ft. Warren)							
	31		Btry. Ripley (2-12" BC, Ft. Revere)							
1	32	A	BC Station, Ft. Revere	1,800						1,800
1	34	A	BISL Station, Ft. Revere	2,945						2,945
	35		Plotting Room, Ft. Revere							
	35		Gun Emplacement, Ft. Revere							
	64		M ₁ - M ₂ (Double Station), Ft. Warren, Ft. Revere							
1	93	A	Btry. Sanders (3-6" DC, Ft. Revere)	1,800						1,800
	94		BC Station, Ft. Revere							
	96		BISL Station, Ft. Revere	418						418
	97		Plotting Room, Ft. Revere							
	97		Gun Emplacement							
1	112	A	Radio					3,750		3,750
	121		Fort Radio Set SCR-177							
			Fire Control Switchboard Room							
			Total	6,963				3,750		10,713

FORT DUVALL, Hog Island

1	13	A	Plotting Room, Btry. Long (2-16" BC, Ft. Duvall)	35,200				3,950	150	39,300
1	14	A	Gun Emplacement, Btry. Long					60	40	100
			Total	35,200				4,010	190	39,400

JOINT ALLIANCE,
FIRE CONTROL STATIONS

1	4	A	BC - 34, Btry. Long (2-16" BC, Ft. Duvall)	2,300				186	50	2,536
1	8	A	Btry. Long (2-16" BC, Ft. Duvall)	4,500						4,500
1	16	A	Btry. Gardner (2-12" RF, Ft. Buckman)	6,300						6,300
1	84	A	C-2 Group Command Post	2,300				116	50	2,466
	37		BC - 32, Cushing-Whitman (10-18" H)							
			Total	15,400				302	100	15,802

ATTACHMENT B EXHIBIT NO. 24-B

LOCATIONS

H. D. OF BOSTON

Priority	Item	Class	Description of Project	Ordnaances	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
<u>STRAWBERRY HILL, Nantasket</u>				\$	\$	\$	\$	\$	\$	
1	28	A	B3S1 Btry. Stevenson (2-12" DC)	1,800	2,500	2,500		274	800	7,274
1	38	A	B2S2 Btry. Cushing-Whitman (10-12" M, Ft. Andrews)	1,800				274		2,074
			Total	3,600	2,500	2,500		548	800	9,348
<u>STRAWBERRY POINT</u>										
1	7	A	B3S3 Btry. Long (2-16" LR, Ft. Duvall)	6,300	4,000	2,000	1,000	354	1,200	14,854
1	15	A	B1S1 Btry. Gardner (2-12" LR, Ft. Ruckman)	6,300				374		6,574
1	127	A	Cable Pt. Allerton - Strawberry Pt. 43,900', 25 pr. Submarine WC-325					25,715		25,715
			Total	12,600	4,000	2,000	1,000	26,343	1,200	47,143
<u>FOURTH CLIFF (Naval Reservation)</u>										
1	6	B) C)	B2S2 Btry. Long (2-16" BC, Ft. Duvall) (Connection with Fire Control System via Commercial lines to Pt. Allerton)	6,300	3,600	1,800		1,839	2,584	16,123
			Total	6,300	3,600	1,800		1,839	2,584	16,123
<u>BRANT ROCK</u>										
1	5	B) C)	B1S1 Btry. Long (2-16" BC, Ft. Duvall) (Connection with Fire Control System via Commercial lines to Pt. Allerton)	6,300	2,800	1,400		534	504	11,538
			Total	6,300	2,800	1,400		534	504	11,538
TOTALS				\$240,812	\$29,500	\$20,975	\$3,750	\$164,798	\$11,180	\$471,015

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EXHIBIT NO. 24-B

Priorities subject to change based on availability of funds.

Priority	Item Class	Description of Project	Ordnance	Engineer			Signal		Total
				Material	Labor	Land	Material	Labor	
1	1	A	<u>Recomputation of orientation data, incl. necessary surveys</u>	\$	\$ 500	\$ 3,000	\$	\$	\$ 3,500
			<u>H.D.C.P., FORT WARREN</u>	500	2,000	3,000		3,763 150	9,413
1	2	A	<u>Ordnance:</u> 1 azimuth instrument, M1910 On Hand 1 BC telescope \$500 3500 <u>Engineer:</u> Modification of existing station: Mat. 2,000 Lab. 3,000 5,000 <u>Signal:</u> Equipment installed except: 3 switchboxes BE 60 36 1 telephone with head-set and chest set 77 1 radio set SCR-177 3,450 Contingency 200 3,763 Labor 150 150 <u>C-1, GROUP C.P., DEER ISLAND</u>	500			3,701	100	4,301
			Controlling: Btry. (Long) 2-16" BC, Ft. Duvall Btry. (Gardner) 2-16" LR, Ft. Ruckman Btry. 4-155 mm guns Nahant						
1	3	A	<u>Ordnance:</u> 1 DFF (not M1) On Hand 1 BC telescope 500 500 <u>Engineer:</u> Existing structure (old C-2 Sta.) <u>Signal:</u> Equipment installed except: 2 switchboxes BE 60 24 1 telephone with head and chest set 77 1 radio set SCR-177 3,450 Contingency 150 3,701 Labor 100 100						
			<u>BTRY. LONG, 2-16" BC, Ft. DUVAL</u>	(81,600)	(24,200)	(12,000)	(3,750)	(8,242)	(7,640) (137,432)
1	4	A	<u>PC-54, PT. ALLERTON (FC Station)</u> <u>Ordnance:</u> 1 Telescope, BC 500 1 azimuth instrument, M1910 1,800 2,300 <u>Engineer:</u> Existing FC building <u>Signal:</u> 1 set firing signal 60 2 switchboxes RF 60 24 1 telephone with head and chest set 77 Contingency 25 186 Labor 50 50	2,300			186	50	2,536
1	5	B	<u>B-3 BRANT ROCK (BTRY. LONG, 2-16" BC, FC Station)</u> <u>Ordnance:</u> 1 DFF M1 4,500 1 azimuth instrument, M1910 1,800 6,300 <u>Engineer:</u> Steel Tower, 1-deck Mat. 2,800 Lab. 1,400 Land (Public owned property) 4,200 <u>Signal:</u> <u>Material:</u> 3 telephones with head and chest set 231 1 bull. T.I., small 8 1, 258', 10 pr. Subterr. cable WC 364 195 Contingency 100 534 <u>Labor:</u> Installation of cable 334 Interior Sta. wiring 150 504	6,300	2,800	1,400	7,026	534	504 11,538

X Noted in original
de 2nd CAC 4/18/40

Priorities subject to change based on availability of funds.

Priority	Item Class	Description of Project	Ordinance	Engineer			Signal		Total
				Material	Labor	Land	Material	Labor	
1	6	<u>B² FOURTH CLIFF (RTV. LONG, 2-16" BC, FC Station)</u>	\$ 6,300	\$ 3,600	\$ 1,800	\$	\$ 1,839	\$ 2,584	\$ 16,123
		<u>Ordinance:</u>							
		1 DFF M 4,500							
		1 azimuth instrument, M1910 1,800 6,300							
1	7	<u>Engineer: Steel Tower, 1-deck</u>							
		Mat. 3,600							
		Lab. 1,800							
		Land: Naval Radio Direction Finding Reservation. 5,400							
1	8	<u>Signal:</u>							
		<u>Material:</u>							
		3 telephones with head and chest set 231							
		1 bell, T.I., small 8							
1	9	<u>9,000', 10 pr. Subterr. cable</u>							
		TC 364 1,360							
		Contingency 250 1,639							
		<u>Labor:</u>							
1	10	<u>Installation of cable</u>							
		Interior Sta. wiring 2,384							
		800 2,584							
		<u>B³ WEST PT. NAHANT (RTV. LONG, 2-16" BC, FC Station)</u>	6,300	4,000	2,000	1,000	354	1,200	14,854
1	11	<u>Ordinance:</u>							
		1 DFF M 4,500							
		1 azimuth instrument, M1910 1,800 6,300							
		<u>Engineer: Steel Tower, 2-deck (upper deck)</u>							
1	12	Mat. 4,000							
		Lab. 2,000							
		Land: 1/4 acre 1,000 7,000							
		<u>Signal:</u>							
1	13	<u>Material:</u>							
		3 telephones with head and chest set 231							
		1 bell, T.I., small 8							
		420', 10 pr. Subterr. cable 65							
1	14	<u>TC 364</u>							
		Contingency 50 354							
		<u>Labor:</u>							
		Construction of cable terminal 500							
1	15	<u>Interior Sta. wiring</u>							
		435							
		Installation of cable 265 1,200							
		Note: The lower deck contains B ¹ Btry. Gardner; for equipment etc. see Btry. Gardner.							
1	16	<u>B⁴ PT. ALLIPTON (RTV. LONG, 2-16" BC, FC Station)</u>	4,500						4,500
		<u>Ordinance:</u>							
		1 DFF M 4,500 4,500							
		<u>Engineer: Existing FC building</u>							
1	17	<u>Signal: Equipment installed</u>							
		<u>B⁵ EAST PT. NAHANT (RTV. LONG, 2-16" BC, FC Station)</u>	6,300	4,200	2,100	1,250	289	1,070	16,209
		<u>Ordinance:</u>							
		1 DFF M 4,500							
1	18	<u>1 azimuth instrument, M1910</u>							
		1,800 6,300							
		<u>Engineer: Steel Tower, 3-deck</u>							
		Mat. 4,200							
1	19	<u>Lab. 2,100</u>							
		Land: 1/4 acre 1,250 7,550							
		<u>Signal:</u>							
		<u>Material:</u>							
1	20	<u>3 telephones with head and chest set</u>							
		231							
		<u>1 bell, T.I., small</u>							
		8							
1	21	<u>Contingency</u>							
		50 289							
		<u>Labor:</u>							
		Construction of cable terminal 500							
1	22	<u>Interior Sta. wiring</u>							
		370 1,070							

Priorities subject to change based on availability of funds.

Priority	Item Class	Description of Project	Ordnance	Engineer			Signal		Total
				Material	Labor	Land	Material	Labor	
1	9	A B ² S EAST PT. NAHANT (BTRY. LONG, 2-16" RC, Continued) Note: This tower also contains B ² S ² Gardner and Emer- gency Sta. for either Win- throp, Lincoln or Kellogg, (for equipment see Btry. Winthrop, & Btry. Gardner). B ⁶ S MARSHFIELD NECK (BTRY. LONG, 2-16" RC, FC Station)	\$	\$	\$	\$	\$	\$	\$
			6,300	5,600	2,700		304	952	15,856
1	10	A Ordnance: 1 DFF M1 \$4,500\$ 1 azimuth instrument, 1910 1,800 6,300 A Engineer: Steel Tower, 2-deck Mat. 5,600 Lab. 2,700 8,300 Land: Part of L. H. Reservation has been transferred to War Department. A Signal: Material: 3 telephones with head and chest set 231 1 bell, T.I., small 8 100', 10 pr. Subterr. cable WC 364 15 Contingency 50 304 Labor: Construction of cable terminal 500 Interior Sta. wiring 402 Installation of 10 pr. cable 50 952 Note: This station also contains B ⁴ S ⁴ Btry. Gardner for equip- ment etc., (see Btry. Gardner). B ⁷ S COOLIDGE PT. (BTRY. LONG, 2-16" RC, FC Station)	6,300	4,000	2,000	1,500	726	1,090	15,616
1	11	B Ordnance: 1 DFF M1 4,500 1 azimuth instrument, 1910 1,800 6,300 Engineer: Steel Tower, 2-deck Mat. 4,000 Lab. 2,000 C Land: 1/4 acre 1,500 7,500 Signal: Material: 3 telephones with head and chest set 231 1 bell, T.I., small 8 2,350', 10 pr. Subterr. cable WC 364 392 Contingency 105 726 C Labor: Installation of cable 690 Interior Sta. wiring 400 1,090 Note: This station also in- cludes B ⁵ S ⁵ Btry. Gard- ner, for equipment etc. (see Btry. Gardner). B ⁸ EASTERN PT. LIGHT, GLAZIER (BTRY. LONG, 2-16" RC)	1,800						1,800
1	12	B Ordnance: 1 azimuth instrument, 1910 1,800 1,800 Engineer: No construction con- templated. Signal: Commercial telephone line							

SECRET

EXHIBIT 24-B

check and correct - 7/1/50 - 601/3-7 - no in the Annexation
28-2-50

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	13	A	<p> <u>PLOTTING ROOM, FT. DUVAL,</u> <u>BTRY. LONG, 2-16" BC</u> </p> <p> <u>Ordinance:</u> 1 atm scale M1906 \$300 1 board, plotting, 110" type 2,300 1 board, correction, range On Hand 1 board, spotting, M2 2,500 1 board, deflection, M1 On Hand 1 board, fire adjustment M1 On Hand 1 corrector, percentage, M1 125 1 rule, set forward On Hand 1 indicator, wind component 135 4 recorders, T.I. 110 1 scale, prediction On Hand 5,200 1 seacoast director 20,000 1 data transmission system 10,000 30,000 </p> <p> <u>Engineer:</u> None <u>Signal:</u> <u>Material:</u> Equipment installed except: 1 radio set, SCR-17 3,450 Switchboxes or Panels for selecting base and stations 500 3,950 <u>Labor:</u> Installation of additional equipment 150 150 </p>	\$35,200	\$	\$	\$	\$ 3,950	\$ 150	\$ 39,300
			<p> <u>GUN REPLACEMENT (BTRY. LONG,</u> <u>2-16" BC) FT. DUVAL</u> </p> <p> <u>Guns replaced & equipped except:</u> <u>Signal:</u> 2 sets, firing signals 60 60 <u>Labor</u> 40 40 </p>					60	40	100
			<p> <u>BATTERY GARDNER, 2-12" LR</u> <u>FT. ROCKMAN</u> </p>	(68,865)				(3,300)	(240)	(74,405)
			<p> <u>Big STRAWBERRY PT. (BTRY.</u> <u>GARDNER 2-12" LR, FC Station)</u> </p>	6,300				274		6,574
			<p> <u>Ordinance:</u> 1 DPF M1 4,500 1 azimuth instrument, M1910 1,800 6,300 <u>Engineer:</u> Construction of stations incl. under B2S3 BTRY. LONG (7,000) <u>Signal:</u> 3 telephones with head and chest sets 231 1 bell, T.I., small 8 Contingency 35 274 </p>							
1	15	A	<p> <u>B2S2 PT. ALLERTON (BTRY.</u> <u>GARDNER, 2-12" LR, FC</u> <u>Station)</u> </p>	6,300						6,300
			<p> <u>Ordinance:</u> 1 DPF (old type) On Hand 1 DPF M1 4,500 1 azimuth instrument, M1910 1,800 6,300 <u>Engineer:</u> Existing FC building <u>Signal:</u> Equipment installed </p>							
			<p> <u>B2S3 EAST PT. MAHANT</u> <u>(BTRY. GARDNER, 2-12" LR,</u> <u>FC Station)</u> </p>	6,300				274		6,574
1	16	A	<p> <u>B2S3</u> <u>Ordinance:</u> 1 DPF M1 4,500 1 azimuth instrument, M1910 1,800 6,300 <u>Engineer:</u> Construction of stations incl. under B2S3 BTRY. LONG (7,550) </p>							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	18	A	<u>B635 (Continued)</u>							
			<u>Signal:</u>							
			3 telephones with head and chest set							
			1 bell, T.I., small							
1	18	A	Contingency							
			500	500						
			<u>BC - STATION</u>							
			1 BC telescope							
1	18	A	<u>Signal:</u>							
			Equipment installed except:							
			1 set firing signal							
			2 switchboxes BE 60							
1	18	A	1 telephone with head and chest set							
			1 bell, T.I., small							
			Contingency							
			500	500						
1	19	A	<u>B634 MARBLEHEAD NECK, (BTRY. GARDNER, 2-16" LR, FC Station)</u>							
			<u>Ordnance:</u>							
			1 DPF M1							
			1 azimuth instrument, M1910							
1	19	A	<u>Engineer:</u>							
			Construction of stations incl. under B636 BTRY. LONG							
			(8,500)							
			<u>Signal:</u>							
1	19	A	3 telephones with head and chest set							
			1 bell, T.I., small							
			Contingency							
			231							
1	20	B	<u>B635 COOLIDGE PT., (BTRY. GARDNER, 2-12" LR, FC Station)</u>							
			<u>Ordnance:</u>							
			1 DPF M1							
			1 azimuth instrument, M1910							
1	20	B	<u>Engineer:</u>							
			Construction of stations incl. under B637 BTRY. LONG							
			(5,500)							
			<u>Signal:</u>							
1	20	B	3 telephones with head and chest set							
			1 bell, T.I., small							
			Contingency							
			231							
1	21	A	<u>B6 WESTERN PT. LIGHT, GLOUCESTER, (BTRY. GARDNER, 2-12" LR)</u>							
			<u>Ordnance:</u>							
			1 azimuth instrument, M1910							
			No construction contemplated							
1	21	A	<u>Signal:</u>							
			Commercial telephone line							
			<u>PLOTTING ROOM, BTRY. GARDNER, 2-12" LR, FT. ROCKMAN</u>							
			<u>Ordnance:</u>							
1	21	A	1 arm scale M1906							
			1 board, plotting, 110° type							
			1 board, correction, range							
			1 board, spotting, M2							
1	21	A	1 board, deflection, M1							
			1 board, fire adjustment M1							
			1 corrector, percentage, M1							
			1 rule set forward							
1	21	A	1 indicator, wind component							
			4 recorders, T.I.							
			1 scale, prediction							
			1 sea coast director							
1	21	A	1 data transmission system							
			10,000	30,000						
			<u>Engineer:</u>							
			None							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
			PLOTTING ROOM, BTRY. GARDNER, (E-12" LG, FT. MCKEAN CONTINUED)	\$	\$	\$	\$	\$	\$	\$
			<u>Signal:</u> Material: Equipment installed except: 1 radio set, SCR-177 \$3,450\$ Switchboxes or Panels for selecting base and Sta. 500 3,950 <u>Labor:</u> Installation of additional equipment 150 150							
1	22	A	GUN REPLACEMENT, BTRY. GARDNER, FT. MCKEAN					60	40	100
			Guns replaced and equipped except: <u>Signal:</u> 2 firing signal sets 60 60 <u>Labor:</u> 40 40							
			155 mm BATTERY (4 Guns), MAHANT	3,725	100	100		231		4,156
1	23	B	BC STATION <u>Ordnance:</u> 2 azimuth instruments, M910 3,600 1 CRF On Hand 1 corrector, percentage, M1 125 1 board, spotting On Hand 4 sights, on guns (See Annex A) 3,725							
		C	<u>Engineer:</u> Concrete base for CRF: Mat. 100 Lat. 100 200							
		B	<u>Signal:</u> Telephones On Hand 2 switchboxes, EX 60 24 1 telephone with head and chest set 77 2 miles of field wire 100 Contingency 30 231 <u>Labor:</u> Troop							
1	24	A	G-2, GROUP COMMAND POST FT. ALLESTON, FC BUILDING <u>Controlling:</u> Btry. Stevenson 2-12" DC, Ft. Warren Btry. Ripley 2-12" BC, Ft. Revere Btry. Cushing- 10-12" Mort. Whitman Ft. Andrews Btry. Bartlett 2-10" DC Ft. Warren Class C-2 <u>Ordnance:</u> 1 DFF (old type) On Hand 1 BC telescope, M915 500 1 azimuth instrument, M910 1,800 2,300 <u>Engineer:</u> Existing FC building <u>Signal:</u> Equipment installed except: 2 switchboxes, EX 60 24 1 telephone with head and chest set 77 Contingency 15 116 <u>Labor:</u> 50 50	2,300				116	50	2,466
			BATTERY STEVENSON, 2-12" DC, FT. WARREN	(4,745)	(2,500)	(2,500)		(299)	(200)	(10,244)
	25		BC - STATION, at BATTERY: <u>Ordnance:</u> 1 azimuth instrument, M910 On Hand 1 BC telescope On Hand <u>Engineer:</u> Existing structure <u>Signal:</u> Equipment installed							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
	26		B1 - STATION (BTRY. STEVENSON, 2-12" DC) FT. WARREN	\$	\$	\$	\$	\$	\$	\$
			Ordnance: 1 DFF (old type) On Hand							
			Engineer: Existing Structure							
			Signal: Equipped							
	27		B2 - STATION (BTRY. STEVENSON, 2-12" DC) FT. REVERE							
			Ordnance: 1 DFF (old type) On Hand							
			Engineer: Existing Structure							
			Signal: Equipment installed							
			B3-1 - STATION (BTRY. STEVENSON, 2-12" DC) STRANFORD HILL, NANTASKET	1,800	2,500	2,500		274	200	7,274
1	28	A	Ordnance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910S1, 800; 1,800							
			Engineer: Present structure deteriorated. New double deck station to be built.							
			Mat. 2,500 Lab. 2,500 5,000							
			Signal: (new station) 3 telephones with head and chest set 231 1 bell, T.I., small 8 Contingency 35 274							
			Labor: Interior Station Wiring at new station 200 200							
			FLOTING BOG, BTRY. STEVENSON, (2-12" DC), FT. WARREN	2,945						2,945
1	29	A	Ordnance: 1 board, correction, range On Hand 1 board, spotting, M2 2,500 1 board, deflection, M1 On Hand 1 board, fire adjustment 250 1 corrector, percentage 125 1 rule set forward 15 1 indicator, wind component On Hand 2 recorders, T.I. 55 1 scale, prediction On Hand 1 board, plotting, 110° type On Hand 2,945							
			Engineer: Existing Structure							
			Signal: Equipment installed							
1	30	A	GUN EMPLACEMENT, BTRY. STEVENSON, (2-12" DC), FT. WARREN					25		25
			Guns emplaced and equipment installed except:							
			Signal: 2 bells, T.I., large with covers 25 25							
			BATTERY RIFLEY, (2-12" BC), FT. REVERE	(4,745)						(4,745)
	31		BC - STATION, at BATTERY, FT. REVERE							
			Ordnance: 1 azimuth instrument, M1910 On Hand 1 BC telescope On Hand							
			Engineer: Existing Structure							
			Signal: Equipment installed							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	32	A	B131 (BTRY. RIPLEY 2-12" BC) FT. REVERE	\$ 1,800	\$	\$	\$	\$	\$	\$ 1,800
			Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910 \$1,800 \$1,800 Engineer: Existing Structure Signal: Equipment installed							
	33	A	B2 (BTRY. RIPLEY 2-12" BC) FT. STANDISH							
			Ordinance: 1 DFF (old type) On Hand Engineer: Existing Structure Signal: Equipment installed							
1	34	A	FLOOTING ROOM (BTRY. RIPLEY 2-12" BC) FT. REVERE	2,945						2,945
			Ordinance: 1 board, correction, range On Hand 1 board, spotting, M2 2,500 1 board, deflection, M1 On Hand 1 board, fire adjustment, M1 250 1 corrector, percentage 125 1 rule set forward 15 1 indicator, wind component On Hand 2 recorders, T.I. 55 1 scale, prediction On Hand 1 board, plotting, 110° type On Hand 2,945 Engineer: Existing Structure Signal: Equipment installed							
	35	A	GUN REPLACEMENT, (BTRY. RIPLEY 2-12" BC), FT. REVERE							
			Gun replaced and equipment installed.							
1	36	A	BATTERY CUSHING - WHITMAN, (10-12" M) FT. ANDREWS	(6,545)				(274)		(6,819)
			B131 STATION (CUSHING - WHITMAN, 10-12" M) FT. ANDREWS	1,800						1,800
	37	A	Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument 1,800 1,800 Engineer: Existing Structure Signal: Equipment installed							
			BC - B2 (CUSHING - WHITMAN, 10-12" M) FT. ALLESTON							
1	38	A	Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910 1,800 1,800 Engineer: Present Structure deteriorated. New double station to be built. Cost included under B331 (Btry. Stevens) (5,000) Signal: (for new Station) 3 telephones with head and chest set 231 1 bell, T.I., small 8 Contingency 25 274							
			B332 (BTRY. CUSHING - WHITMAN) STRATFORD HILL	1,800				274		2,074
	39	A	Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910 1,800 1,800 Engineer: Present Structure deteriorated. New double station to be built. Cost included under B331 (Btry. Stevens) (5,000) Signal: (for new Station) 3 telephones with head and chest set 231 1 bell, T.I., small 8 Contingency 25 274							
			B332 (BTRY. CUSHING - WHITMAN) STRATFORD HILL	1,800				274		2,074

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	39	A	<u>PLOTTING ROOM. (BTRY. CUSHING -</u> <u>WHITMAN, 10-12" M)</u> <u>FT. ANDREWS</u> Ordinance: 1 board, correction, range On Hand 1 board, spotting, M2 \$2,500 \$ 1 board, deflection, M1 On Hand 1 board, fire adjustment, M1 250 1 corrector, percentage 125 1 rule set forward 15 1 indicator, wind component On Hand 2 recorders, T.I. 55 1 scale, prediction On Hand 1 plotting board, W & H On Hand 2,945 Engineer: Existing Structure Signal: Equipment installed	\$ 2,945	\$	\$	\$	\$	\$	\$ 2,945
	40		<u>GUN REPLACEMENT. (BTRY. CUSH-</u> <u>ING - WHITMAN, 10-12" M)</u> <u>FT. ANDREWS</u> Guns emplaced and equipment installed							
	41		<u>BATTERY BARTLETT. (2-10" DC)</u> <u>FT. WARREN</u> <u>(GUNS No. 3 & 4)</u> Reserve Battery. No FC to be provided. Will utilize the FC system of disabled battery, which it replaces.							
1	42	A	<u>G-3, GROUP COMMAND POST</u> <u>FORT HEATH</u> Controlling: Btry. Kellogg 6-12" M, Ft. Banks Btry. Lincoln 6-12" M, Ft. Banks Btry. Winthrop 3-12" DC, Ft. Heath Btry. Morris 2-10" DC, Ft. Standish (Class C-2) Ordinance: 1 DFF (old type) On Hand 1 BC telescope 500 1 azimuth instrument, M1910 1,800 2,300 Engineer: Existing Structure Signal: Equipment installed except: 2 switchboards BE 60 24 1 telephone with head and chest set 77 Contingency 15 116 Labor: 50 50 <u>BATTERY KELLOGG, (6-12" M)</u> <u>FORT BANKS</u> 1,800 (11,045) (75) (11,120)	2,300				116	50	2,466
1	43	A	<u>BC - B121 (BTRY. KELLOGG</u> <u>6-12" M/Ft. HEATH</u> Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument 1,800 1 BC telescope On Hand 1,800 Engineer: Existing Structure Signal: Equipment installed	1,800						1,800
1	44	A	<u>BEG2 (BTRY. KELLOGG, 6-12" M)</u> <u>FT. ROUGHMAN</u> Ordinance: 1 DFF On Hand 1 azimuth instrument, M1910 1,800 1,800 Engineer: Existing Structure Signal: Equipment installed	1,800						1,800

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	45	A	B ⁵ (BTRY. KELLOGG, 6-12" M) <u>DEER ISLAND</u> Ordinance: 1 DFF M1 \$4,500 4,500 Engineer: Existing Structure Levelling of ground 75 75 Signal: Equipment installed "E" EMERGENCY STATION, EAST PT. (See BTRY. WINTHROP)	\$ 4,500	\$	\$ 75	\$	\$	\$ 4,575	
1	46	A	PLOTTING ROOM, (BTRY. KELLOGG, 6-12" M) FORT BANKS Ordinance: 1 board, range, correction On Hand 1 board, spotting, M2 2,500 1 board, deflection On Hand 1 board, fire adjustment M1 250 1 corrector, percentage, M1 125 1 rule set forward 15 1 indicator wind component On Hand 2 recorders, T.I. 55 1 scale prediction On Hand 1 board, plotting, 110° type On Hand 2,945 Engineer: Existing Structure Signal: Equipment installed	2,945					2,945	
	47		GUN EMPLACEMENT, (BTRY. KELLOGG, 6-12" M) FORT BANKS Guns emplaced and equipment installed BATTERY LINCOLN (6-12" M), <u>FORT BANKS</u> BC - B ⁵ (BTRY. LINCOLN, 6-12" M) <u>FORT HEATH</u>	(11,045) 1,800					(11,045) 1,800	
1	48	A	Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument 1,800 1 BC telescope On Hand 1,800 Engineer: Existing Structure Signal: Equipment installed B ² S ² (BTRY. LINCOLN, 6-12" M) <u>FORT ROCKMAN</u>	1,800					1,800	
1	49	A	Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910 1,800 1,800 Engineer: Existing Structure Signal: Equipment installed B ³ (BTRY. LINCOLN, 6-12" M) <u>DEER ISLAND</u>	4,500					4,500	
1	50	A	Ordinance: 1 DFF M1 4,500 4,500 Engineer: Existing Station Signal: Equipment installed "E" EMERGENCY STATION, EAST POINT (See BTRY. WINTHROP)							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	51	A	<u>FLOTTING ROOM, (BTRY. LINCOLN, 6-12" M), FORT BANKS</u>	2,945						\$ 2,945
			Ordinance:							
			1 board, correction, range On Hand							
			1 board, spotting, ME 2,500							
1	52	A	1 board, deflection On Hand							
			1 board, fire adjustment M 250							
			1 corrector, percentage, M1 125							
			1 rule set forward 15							
1	53	A	1 indicator wind component On Hand							
			2 recorders, T.I. 55							
			1 scale prediction On Hand							
			1 board, plotting, 110 type On Hand 2,945							
1	54	A	Engineer:							
			Existing Structure							
			Signal:							
			Equipment installed							
1	55	A	<u>GUN REPLACEMENT, (BTRY. LINCOLN, 6-12" M), FORT BANKS</u>							
			Guns replaced and equipment installed							
			<u>BATTERY WINTHROP, (3-12" DC), FORT LEATH</u>	(17,345)				(274)		(17,619)
			<u>BC - B151 (BTRY. WINTHROP, 3-12" DC) FORT LEATH</u>	1,800						1,800
1	56	A	Ordinance:							
			1 DFF (old type) On Hand							
			1 azimuth instrument, M1910 1,800							
			1 telescope BC On Hand 1,800							
1	57	A	Engineer:							
			Existing Structure							
			Signal:							
			Equipment installed							
1	58	A	<u>B25 (BTRY. WINTHROP, 3-12" DC) FORT RUCKMAN</u>	1,800						1,800
			Ordinance:							
			1 DFF (old type) On Hand							
			1 azimuth instrument, M1910 1,800 1,800							
1	59	A	Engineer:							
			Existing Structure							
			Signal:							
			Equipment installed							
1	60	A	<u>B3 (BTRY. WINTHROP, 3-12" DC) FORT ISLAND</u>	4,500						4,500
			Ordinance:							
			1 DFF M1 4,500 4,500							
			Engineer:							
1	61	A	Existing Structure							
			Signal:							
			Equipment installed							
			<u>W. EMERGENCY STATION, EAST POINT</u>	6,300				274		6,574
1	62	A	Ordinance:							
			1 DFF M1 4,500							
			1 azimuth instrument 1,800 6,300							
			Engineer:							
1	63	A	Construction included under B25 Btry. Long (7,550)							
			Signal:							
			3 telephones with head and chest set 331							
			1 bell, T.I., small 9							
1	64	A	Contingency 35 274							
			This Emergency Station to be used by either Btry. Winthrop, Btry. Lincoln or Btry. Kellers, as directed by G-3.							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	57	A	<u>PLOTTING ROOM, (STRY. WINTHROP, 3-12" DC), FORT HEATH</u> Ordinance: 1 board, correction, range On Hand 1 board, spotting, 12 2,500 1 board, deflection On Hand 1 board, fire adjustment 250 1 corrector, percentage 125 1 rule set forward 15 1 indicator wind component On Hand 2 recorders, T.I. 55 1 scale prediction On Hand 1 board, plotting, 110 type On Hand 2,945 Engineer: Existing Structure Signal: Equipment installed	\$ 2,945	\$	\$	\$	\$		\$ 2,945
	58		<u>GUN EMPLACEMENT, (STRY. WINTHROP, 3-12" DC), FORT HEATH</u> Guns emplaced and equipment installed.							
	59		<u>BATTERY WORKS, (3-10" DC), FORT STANDISH</u> Reserve Battery. No FC to be provided. Will utilize the FC System of disabled Battery it replaces.							
	60		<u>G-4, GROUP COMMAND POST FORT WARREN</u> ANTI-AIRCRAFT (See Cost Estimate & Priority Guide, Annex E)							
1	61	A	<u>W-1, MINE GROUP COMMAND POST FORT WARREN</u> <u>4 - Mine Groups, Mantasket Roads</u> Controlling: BC Mine Battery, Ft. Warren Stry. McCook, 2-6" DC, Ft. Andrews Stry. Whipple, 2-6" DC, Ft. Standish Stry. Bumpus, 2-3" RF, Ft. Andrews Stry. Stevens, 2-3" RF, Ft. Strong Stry. Williams, 3-3" RF, Ft. Standish Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910 1,800 1,800 Engineer: Existing Structure Signal: Equipment installed except: 5 telephone desk, VC 300 2 switchboxes BE 60 24 3 radio sets (Mine) 1,800 Contingency 100 2,224 Labor: 100 100 <u>MINE BATTERY, FORT WARREN</u> <u>4 - Mine Groups, Mantasket Roads</u> BC STATION, FORT WARREN Ordinance: 1 azimuth instrument, On Hand M1910 Engineer: Existing Structure Signal: Equipment installed	1,800				2,224	100	4,124
	62		<u>W-1, DOUBLE STATION, FORT WARREN</u> Ordinance: 2 DFF (old type) On Hand Engineer: Existing Structure Signal: Equipment installed							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
	64		M ² -M ² , DOUBLE STATION, FORT SEVEFF	\$	\$	\$	\$	\$	\$	\$
			Ordnance: 2 DFF (old type) On Hand							
			Engineer: Existing Structure							
			Signal: Equipment installed							
1	65	A	PLOTTING ROOM, (DOUBLE) FORT WARREN	83						83
			Ordnance: 2 scale prediction On Hand 2 boards, plotting On Hand 3 recorders, T.I. 83 83							
			Engineer: Existing Structure							
			Signal: Equipment installed							
	66		MINE CASEMATE, FORT WARREN							
			Signal: Communication equipment installed in existing structure.							
	67		LOADING ROOM, FORT WARREN							
			Signal: Communication equipment installed.							
			BATTERY NO COOK, (2-6" BC), FORT ANDREWS	(4,750)						(4,750)
1	68	A	BC STATION, FORT ANDREWS	250						250
			Ordnance: 1 azimuth instrument On Hand M1910 1 BC telescope On Hand 1 board, fire adjust- ment 250 250							
			Engineer: Existing Structure							
			Signal: Equipment installed							
1	69	A	DFF STATION, FORT ANDREWS	4,500						4,500
			Ordnance: 1 DFF 4,500 4,500							
			Engineer: Existing Structure							
			Signal: Equipment installed							
	70		GUN EMPLACEMENT, FORT ANDREWS							
			Guns emplaced and equipment installed.							
			BATTERY WHIPPLE, (2-6" BC), FORT STAUDISH							
	71		BC STATION, FORT STAUDISH							
			Ordnance: 1 azimuth instrument, M1910 On Hand 1 BC telescope On Hand							
			Engineer: Existing Structure							
			Signal: Equipment installed							
	72		CRF, STATION, FORT STAUDISH							
			Ordnance: 1 CRF 15 ft. On Hand							
			Engineer: Installed							
			Signal: Equipment installed							
	73		GUN EMPLACEMENT, FORT STAUDISH							
			Guns emplaced and equipment installed.							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	4	A	BATTERY HIMPUS (2-3" RF) FORT ANDREWS	\$ (1,800)	\$	\$	\$	\$	\$	\$ (1,800)
			RC STATION, FORT ANDREWS	1,800						1,800
			Ordinance: 1 azimuth instrument, M1910 1,800 1 RC telescope On Hand 1,800							
			Engineer: Existing Structure							
			Signal: Equipment installed							
			75 CRF STATION, FT. ANDREWS							
			Ordinance: 1 CRF 9 ft. On Hand							
			Engineer: Installed in existing structure							
			Signal: Equipment installed							
			76 GUN EMPLACEMENT, FORT ANDREWS							
1	81	A	Guns emplaced and equipment installed.							
			BATTERY STEVENS (2-3" RF), FORT STROUD							
			Battery has no Fire Control. In view of the small value of this battery, no Fire Control will be provided.							
			BATTERY WILLIAMS (3-3" RF), FORT STANDISH							
			RC STATION, FORT STANDISH	1,800						1,800
			Ordinance: 1 azimuth instrument M1910 1,800 1 RC telescope On Hand 1,800							
			Engineer: Existing Structure							
			Signal: Equipment installed							
			79 CRF STATION, FORT STANDISH							
			Ordinance: 1 CRF 9 ft. On Hand							
1	81	A	Engineer: Wooden platform constructed in rear of Battery.							
			Signal: Equipment installed							
			80 GUN EMPLACEMENT, FORT STANDISH							
			Guns emplaced and equipment installed							
			MC - 2 MINE GROUP COMMAND POST FORT STROUD	1,800				2,224	100	4,124
			5 - Mine Groups, Broad Sound							
			Controlling: RC, Mine Battery, Ft. Strong Btry. Terrill, 3-6" DC, Ft. Standish Btry. Sanders, 3-6" DC, Ft. Revere Btry. Baskinger, 2-3" RF, Ft. Strong Btry. Taylor, 2-3" RF, Ft. Strong							
			Ordinance: 1 DFF (old type) On Hand 1 azimuth instrument, M1910 1,800 1,800							
			Engineer: Existing Structure							
			Signal: Equipment installed except: 5 telephone desk FC 300 2 switchboxes BF 60 24 3 radio set, (Mine) 1,800 Contingency 100 2,224 Labor: 100 100							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	82	A	MINE BATTERY, FORT STRONG 5 - Mine Groups, Broad Sound	2 (83)	\$	\$	1	\$	\$	2 (83)
			BC STATION, FORT STRONG							
			Ordinance: 1 azimuth instrument, M1910	On Hand						
			Engineer: Existing Structure							
	83		Signal: Equipment installed							
			M ₂ - M ₂ , DOUBLE STATION, DEER ISLAND							
			Ordinance: 2 DPF (old type)	On Hand						
			Engineer: Existing Structure							
	84		Signal: Equipment installed							
			M ₂ - M ₂ , DOUBLE STATION, FORT STRONG							
			Ordinance: 2 DPF (old type)	On Hand						
			Engineer: Existing Structure							
1	85	A	Signal: Equipment installed							
			PLOTTING ROOM, (DOUBLE), FORT STRONG	83						83
			Ordinance: 2 scale predictions	On Hand						
			2 boards, plotting (Mine)	On Hand						
	86		3 recorders, T.I.	83						
			Engineer: Existing Structure							
			Signal: Equipment installed							
			MINE CASEMATE, FORT STRONG							
	87		Signal: Communication equipment installed in existing structure.							
			LOADING ROOM, FORT STRONG							
			Signal: Communication equipment installed.							
			BATTERY TERRILL, (3-6" DC), FORT STANDISH	(2,218)						(2,218)
1	88	A	BC STATION (BTRY. TERRILL, 3-6" DC), FORT STANDISH	1,800						1,800
			Ordinance: 1 azimuth instrument, M1910	1,800						
			1 BC telescope	On Hand						
			Engineer: Existing Structure							
	89		Signal: Equipment installed							
			B ¹ STATION (BTRY. TERRILL, 3-6" DC), FORT STANDISH							
			Ordinance: 1 DPF (old type)	On Hand						
			Engineer: Existing Structure							
	90		Signal: Equipment installed							
			B ² STATION (BTRY. TERRILL, 3-6" DC), DEER ISLAND							
			Ordinance: 1 DPF (old type)	On Hand						
			Engineer: Existing Structure							
			Signal: Equipment installed							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	91	A	<u>PLOTTING ROOM, (BTRY. TERRILL, 3-6" DC), FORT STANDISH</u> Ordnance: 1 board, correction, range On Hand 1 board, deflection On Hand 1 board, fire adjustment 250 1 corrector, percentage 185 1 rule set forward 15 1 indicator, wind component On Hand 1 recorder, T.I. 28 1 scale prediction On Hand 1 board, plotting, W & H On Hand 418 Engineer: Existing Structure _____ Signal: Equipment installed _____	\$ 418	\$	\$	\$	\$	\$	\$ 418
	92		<u>GUN EMPLACEMENT, (BTRY. TERRILL, 3-6" DC), FORT STANDISH</u> Guns emplaced and equipment installed. <u>BATTERY SANDERS (3-6" DC), FORT REVERE</u>	(2,218)						(2,218)
1	93	A	<u>BC STATION, FORT REVERE</u> Ordnance: 1 azimuth instrument, M1910 1,800 1 BC telescope On Hand 1,800 Engineer: Existing Structure _____ Signal: Equipment installed _____	1,800						1,800
	94		<u>B¹ STATION (BTRY. SANDERS 3-6" DC), FORT REVERE</u> Ordnance: 1 DPF (old type) On Hand Engineer: Existing Structure _____ Signal: Equipment installed _____							
	95		<u>B² STATION, (BTRY. SANDERS 3-6" DC), FORT STANDISH</u> Ordnance: 1 DPF (old type) On Hand Engineer: Existing Structure _____ Signal: Equipment installed _____							
1	96	A	<u>PLOTTING ROOM, (BTRY. SANDERS, 3-6" DC), FORT REVERE</u> Ordnance: 1 board, correction, range On Hand 1 board, deflection On Hand 1 board, fire adjustment 250 1 corrector, percentage 125 1 rule set forward 15 1 indicator, wind component On Hand 1 recorder, T.I. 28 1 scale prediction On Hand 1 board, plotting, W & H On Hand 418 Engineer: Existing Structure _____ Signal: Equipment installed _____	418						418
	97		<u>GUN EMPLACEMENT, (BTRY. SANDERS, 3-6" DC), FORT REVERE</u> Guns emplaced, equipment installed. <u>BATTERY BASTING, (2-3" RF) FORT STRONG</u>	(1,800)						(1,800)
1	98	A	<u>BC STATION, FORT STRONG</u> Ordnance: 1 azimuth instrument, M1910 1,800 1 BC telescope On Hand 1,800 Engineer: Existing Structure _____ Signal: Equipment installed _____	1,800						1,800

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
	99		<u>CHE STATION, FORT STRONG</u> Ordnance: 1 CRF, 9 ft. On Hand Engineer: CRF installed Signal: Equipment installed	\$	\$	\$	\$	\$	\$	\$
	100		<u>GUN REPLACEMENT, (BTRY. RASINOV, 2-3" RF), FORT STRONG</u> Guns replaced and equipment installed.							
	101		<u>BATTERY TAYLOR, (2-3" guns) FORT STRONG</u> This battery is of little value. Inadvisable to provide Fire Control.							
1	102	B	<u>OUTER BREWSTER SPOTTERS & OBSERVERS G-1, G-2, G-3 & MG-1</u> Ordnance: 4 azimuth instrument, M910 \$7,200 \$7,200 Signal: 4 telephones with head and chest set 308 Contingency 50 358 Labor 50 50 Engineer: Improved Structure Mat. 200 Lab. 300 500	7,200	200	300		358	50	8,108
1	103	A	<u>HARBOR DEFENSE RADIO STATION, FORT ANDREWS</u> Signal: 1 set, radio (commercial) receiving & transmitting 8,000 8,000 Labor: For installation 1,000 1,000 Engineer: Radio station building available					8,000	1,000	9,000
	104		<u>FORT MUCKIAN</u> 1-SCR-177 provided for under Plotting Room, Btry. Gardner							
	105		<u>FORT HEATH</u> 1-SCR-177 provided for under G-3							
1	106	A	<u>FORT BANKS</u> 1-SCR-177 3,450 Contingency 300 3,750					3,750		3,750
1	107	A	<u>FORT STAUDISH</u> 1-SCR-177 3,450 Contingency 300 3,750					3,750		3,750
1	108	A	<u>FORT STRONG</u> 1-SCR-177 3,450 Contingency 300 3,750					3,750		3,750
	109		<u>FORT WARREN</u> 1-SCR-177 provided for under H.D.C.P.							
	110		<u>FORT ANDREWS</u> Harbor Defense radio station (see above)							
	111		<u>FORT M'VALL</u> 1-SCR-177 provided for under P.R. Btry. Long							

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer			Signal		
					Material	Labor	Land	Material	Labor	Total
1	112	A	<u>FORT REVERE</u> 1-SCR-177 3,450 Contingency 300 3,750 (SCR-177 to be installed in existing suitable Fire Con- trol buildings by troop labor.)	\$	3	\$	\$	\$ 3,750	\$	\$ 3,750
	113		<u>METEOROLOGICAL STATION,</u> <u>FORT WARREN</u> Exists & equipped							
	114		<u>SIGNAL STATION,</u> <u>FORT WARREN</u> Exists & equipped							
	115		<u>TIDE STATION,</u> <u>FORT WARREN</u> Exists & equipped							
1	116	A	<u>FIRE CONTROL SWITCHBOARD</u> <u>ROCKS</u> <u>FORT HUCKMAN, FIRE CONTROL</u> <u>SWITCHBOARD ROOM</u> Signal: 1 T.L. apparatus with panel 200 1 FC switchboard RD 74 1,600 1 RD 75, panel 150 1 battery, storage 30 volt 250 2 M generator charging sets 400 1 rectifier 60 2 power panels 150 Miscellaneous 200 Contingency 1,000 4,010 Labor: For installation 1,000 1,000 Engineer: Room provided for in em- placement of Btry. Gardner					4,010	1,000	5,010
1	117	A	<u>FORT BANKS, FIRE CONTROL</u> <u>SWITCHBOARD ROOM</u> Signal: 1 T.L. apparatus with panel 200 1 FC switchboard RD 74 1,600 1 panel, RD 75 150 1 rectifier 60 Miscellaneous 200 Contingency 300 2,510 Labor 500 500 Engineer: Switchboard Room building exists.					2,510	500	3,010
	118		<u>FORT REACH, FIRE CONTROL</u> <u>SWITCHBOARD ROOM</u> Exists & equipped							
	119		<u>FORT ST. MICH, FIRE CONTROL</u> <u>SWITCHBOARD ROOM</u> Exists & equipped							
	120		<u>FORT WARREN, FIRE CONTROL</u> <u>SWITCHBOARD ROOM</u> Exists & equipped							
	121		<u>FORT REVERE, FIRE CONTROL</u> <u>SWITCHBOARD ROOM</u> Exists & equipped							
1	122	A	<u>FIRE CONTROL CABLES</u> (Exhibit 22-B) <u>MARBLEHEAD PECK - FORT HUCKMAN</u> 49,700', 25 pr. Submarine, TC 325 @ \$.50 per ft. 24,850 Contingency 15% 2,610 Miscellaneous material 560 28,020 Labor (Cable to be laid by cables ship)					28,020		28,020

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project.	Ordnance	Engineer			Signal		Total
					Material	Labor	Land	Material	Labor	
1	123	A	<u>FORT POINT - FORT RUCKMAN</u> 13,000', 50 pr. Submarine, WC-327, c \$\$.57 per ft. 7,410 Contingency 15% 1,112 Miscellaneous material 160 8,682 Labor (Cable to be laid by cables) 160 8,682	\$	\$	\$	\$	\$ 8,682	\$	\$ 8,682
1	124	A	<u>FORT RUCKMAN - FORT HEATH</u> 17,000', 75 pr. Submarine, WC-328, c \$.65 per ft. 11,050 Contingency 15% 1,657 Miscellaneous material 150 12,857 Labor (Cable to be laid by cables) 150 12,857					12,857		12,857
1	125	A	<u>FORT BANKS - DEER ISLAND</u> 28,700', 75 pr. Submarine, WC-328, c \$.65 per ft. 18,655 Contingency 15% 2,800 Miscellaneous material 375 Cable Terminal, Deer Island 500 22,330 Labor (Cable to be laid by cables) 500 22,330					22,330		22,330
1	126	A	<u>OUTER BREWSTER - FORT STANDISH</u> 21,100', 10 pr. Submarine, WC-321, c \$.37 per ft. 7,807 Contingency 15% 1,171 Miscellaneous material 174 Cable Terminal, Outer Brewster 500 Land Wiring Outer Brewster 900 10,552 Labor (Cable to be laid by cables) 900 10,552					10,552		10,552
1	127	A	<u>POINT ALLERTON TO STRAWBERRY POINT</u> 43,800', 25 pr. Submarine, WC-325, c \$.50 per ft. 21,900 Contingency 15% 3,285 Miscellaneous material 530 25,715 Labor (Cable to be laid by cables) 530 25,715					25,715		25,715
	128		<u>SEACOAST SEARCHLIGHT SIGNAL EQUIPMENT</u> See ANNEX "C"							
			TOTALS	\$240,812	\$29,500	\$20,975	\$3,750	\$164,798	\$11,180	\$471,015

Class A - To be procured and installed in peacetime.

Class B - To be procured in peacetime and installed when an emergency arises.

Class C - To be procured and installed when an emergency arises.

Note: No expenditures of funds by the Chemical Warfare Service, or Coast Artillery Corps is contemplated in this Annex.

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ANNEX C
SEARCHLIGHTS

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AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34) (Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-38) (Misc.) E, dated May 19, 1938.

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ANNEX C

SEARCHLIGHTS

1. The maximum dependable range of the 60-inch searchlight in clear weather on the northern New England coast is assumed to be 8,500 yards or less. In Exhibits 1-C to 4-C are shown the areas illuminated by the proposed lights.

2. a. The Brewsters and adjacent islands, squarely in front of the harbor entrance, seriously restrict lights located at Forts Revere, Warren and Standish (the three more advanced forts) as shown in panoramic drawing marked Exhibit 3-B; and thus more lights are needed in this harbor defense than would be required if these masks were not present. Lights on the Brewsters cannot alone be relied on because of their exposed position.

b. It is considered advisable that each gun and mine group should be provided with sufficient lights under control of the group commander to ensure a minimum effective illumination of at least the inner vital part of the field of that group. Lights not essential to the groups should be provided to cover a reasonable portion of the outer fields of fire; the wide front of searchlight illumination makes it impracticable of control from a single station. The favorable locations of the G-2 and G-3 stations, each having an excellent view of half of the water area, makes it advisable to assign searchlights to the commanders of these groups, the harbor defense commander exercising only general direction of illumination.

3. The present numbering of lights dates from the time of the Davis Board in 1908 and many changes have taken place; some of the positions recommended by that board were subsequently disapproved; the 36-inch light has become obsolete; the locations of the main ship channel and of the mine fields have been changed; and the long range batteries have been constructed. The numbers so long in use should be discontinued to avoid confusion which already tends to exist. Both numbers are used in this annex in order to facilitate the transition.

4. There are eight searchlights now installed in the harbor defense. It is proposed to provide nine additional lights for the locations stated below. One light should be provided as a reserve on the south shore and one on the north shore; if needed, they may be taken from positions 1 and 17 and replaced from depot.

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5. a. The following searchlights are proposed:

Two at Strawberry Point	(Nos. 1 and 2; new),
Two SE of Strawberry Hill	(Nos. 3 and 4; old positions of Nos. 1 and 2; installed for the period of the World War),
One at Point Allerton	(No. 5; old position No. 3),
One at Fort Revere	(No. 6, old No. 4),
Two on Outer Brewster	(Nos. 7 and 8; old positions No. 8 and 9),
One at Fort Warren near Bastion B	(No. 9; old position No. 7),
One at Fort Standish	(No. 10; old No. 10),
Two on Deer Island	(Nos. 11 and 12; old Nos. 13 and 14),
One at Fort Ruckman	(No. 13; old No. 16),
Two at East Point	(Nos. 14 and 15; old No. 17, installed for the period of the World War),
Two at Marblehead Neck	(Nos. 16 and 17; new).

b. This project calls for a total of 17 searchlights.

	: Fixed :	Semimobile:	Total
Called for	: 8 :	9	: 17
On hand	: 8 :		: 8
In designated position	: (6) :		: (6)
Not in designated position:	(2)* :		: (2)*
To be furnished	: 0 :	9	: 9

* 1 at Fort Andrews; 1 at Fort Strong; to be moved to Outer Brewster.

6. a. It is proposed to discontinue the lights not included in paragraph 5, as follows:

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Old No. 5 at Fort Andrews, now installed.
Old No. 6 at Fort Warren (near sea wall)
never installed; dropped from project
before 1915.
Old No. 11 at Fort Strong, now installed.
Old No. 12 at Fort Strong, 36-inch, re-
moved some time prior to 1922.
Old No. 15 at Fort Heath; never installed;
dropped from project before 1915.

b. Searchlight No. 5 at Fort Andrews is a 60-inch fixed light located on the north end of the island on an elevator mount with 25-KW set located in Battery Cushing-Whitman. Its field of illumination is from a line tangent to the high ground at Hull (azimuth 256°) on the right, through the north and west to a line toward Quincy (azimuth 55°) on the left. It can cover a portion only of the southern mine field, at a distance of 4,500 yards. It does not assist effectively in the gun defense. The mine field is better illuminated by other lights located more to the front as stated below.

(1) This light and power plant are hereby designated for position No. 7 on Outer Brewster.

c. Searchlight No. 11 at Fort Strong is a 60-inch fixed light located on the northeast tip of the island on a railroad car, with 25-KW set located in abandoned Battery Ward. Its field is from Quincy Bay (azimuth 230°) on the right counterclockwise to a line toward Mahant (azimuth 194°) on the left. It is masked by nearby islands through more than 90° from the south to the east. It is 6,000 yards in rear of the northern mine field, and is cut off from the southern mine field by Gallups Island and Fort Standish except through a sector of less than two degrees. It does not assist the gun defense, being situated too far inside the harbor.

(1) This light and power plant are hereby designated for position No. 8 on Outer Brewster.

7. Telephones. A telephone line should be provided to the searchlight controller from the station of the group or higher commander who controls that searchlight. From the controller to the light and, separately, from the light to the power plant, a sound-powered or local battery telephone system should be provided.

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PROPOSED SEARCHLIGHTS IN DETAIL.

8. Two lights at Strawberry Point, Nos. 1 and 2.

a. These lights should be located about 100 yards apart on the rocky point 515 yards north of Strawberry Point fire control station. See Coast Chart No. 242, scale 1:5000. The property belongs to The Glades Club. It need not be purchased but authority to occupy it in an emergency may reasonably be presumed.

b. The site is approximately 25 feet above mean sea level. The lights should be mounted on the standard 32-foot steel towers designed for fixed installation. The semimobile (modified standard seacoast type) searchlights with portable AA type power plants should be employed.

c. The lights should be approximately 100 yards apart and should not be closer to the fire control station than the point indicated. They should both have an illuminating arc from the direction of Cedar Point on the south to the direction of Point Allerton on the north.

d. These lights should operate under Group 2.

9. Two lights southeast of Strawberry Hill; Nos. 3 and 4.

a. These lights should be about 800 yards southeast of the reservation on Strawberry Hill, being sited to the right (south) in order to avoid interference with the fire control station there. They should be near the beach. The water front is built up with an inexpensive type of summer house and beach resort buildings; a site need not be purchased but an available open space occupied by lease or permission at time of an emergency.

b. The site is low. The lights should be mounted on the standard 32-foot steel towers designed for fixed installations. The semimobile (modified standard seacoast type) searchlights with portable AA type power plants should be employed.

c. Lights 3 and 4 should operate under the southern gun group, G-2.

10. One light at Point Allerton; No. 5.

a. The light should be near the extreme eastern end of the point, for use to the northeast, east and south-east over the approaches to Nantasket Roads. There is a level, Government owned strip of land running around Point Allerton, extending back from the seawall. The

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searchlight should be mounted on a push car with track running back from the operating position to a location approximately 200 yards to the west, where it may be sheltered in daylight behind the high knoll in which Point Allerton terminates; the power plant should be placed in this sheltered location.

b. Interference with the fire control station at Point Allerton, which is on a hill 300 yards southwest of the tip of the point, is adequately provided against by locating the searchlight near the water, below the hill, at a distance of more than 200 yards from the station; the difference in level will be approximately 90 feet.

c. The semimobile (modified standard seacoast type) searchlight with portable AA type power plant should be employed.

d. This light should be assigned to the southern gun group, G-2.

11. One fixed light at Fort Revere; No. 6 (old No. 4).

a. This light is in place. Its operating arc is from a line tangent to Point Allerton (azimuth 258°) counterclockwise to a line tangent to the north end of Peddocks Island (azimuth 80°). It is masked on the north by the Brewsters and adjacent islands; by Forts Warren and Standish; and by Long Island; but it bears directly on the southern mine field.

b. It is proposed to assign the light to the southern mine group, MG-1. It covers the mine field at a distance of approximately 2,500 yards, and the approaches thereto except from the south.

12. Two fixed lights on Outer Brewster; Nos. 7 and 8, (old Nos. 8 and 9).

a. This island, comprising $17\frac{1}{2}$ acres, is the property of the War Department. It is the most important searchlight and spotting position in the harbor defense. See Exhibit 5-C. These two lights should be located on knolls 73 and 52 which are 150 yards apart. Located on these knolls, both lights will have an operating arc from the direction of Nantasket Beach on the south counterclockwise to the direction of Great Head, Winthrop, on the northwest; and in addition the light on knoll 73 will cover the southern mine field. The lights should be so installed as to ensure these operating arcs.

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b. One splinter proof power plant should be constructed, utilizing the existing excavation of a basement of a burned house (near which there is a well affording a small but adequate water supply). Approximately 200 yards of conduit will be required from power plant to the two lights. In this location, both power plant and conduits will be masked from view.

c. Each light should have a splinter proof shelter located west of the knoll with approximately 20 yards of railroad track to the operating position. No mechanical power beyond a hand windlass will be needed.

d. Lights and 25-KW sets can be landed by barge; the construction of a landing is not necessary. Telephone connection should be provided by 10-pair cable to Fort Standish with two circuits for the searchlights, four for spotters for the three gun groups and the southern mine group, and one for an antiaircraft searchlight.

e. The installation should be completed as soon as funds are available; the lights and engines should be installed and the submarine cable should be stored in the harbor defense. A frame barrack for the detachment may be built when the emergency arises. The lights should operate under Group 2.

13. One fixed light at Fort Warren; No. 9 (old No. 7).

a. A 36-inch light was removed from this position some time prior to 1922. The direction of the railroad track from the shelter to the operating position is 219° which is the approximate axis of the arc over which the light can be traversed; this arc is from azimuth 129° on the left to azimuth 309° on the right. The actual useful limits are from the direction of the south end of Fort Standish (or just north of there, as the end of the island is low), to the direction of Point Allerton.

b. A 60-inch fixed light was installed in 1934. It will illuminate the southern mine field at a range of approximately 3,500 yards, and the approaches thereto. The light should be assigned to line Group 1.

14. One fixed light at Fort Standish, No. 10 (old number same).

a. This light, now installed, has an operating arc from azimuth 163° on the left to azimuth 42° on the right, a width of 239 degrees. Like other lights in this vicinity, it is masked by the Brewsters and adjacent islands, in this case through an arc of approximately 43 degrees.

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b. It is too distant from the northern mine field (approximately 5,500 yards) to be of great value, and should be assigned to the northern gun group, G-3.

15. Two fixed lights on Deer Island, Nos. 11 and 12; (old Nos. 13 and 14).

a. These two lights are now installed. No. 11 has an operating arc from a line toward Fort Ruckman (azimuth 185°) on the left to a line toward Fort Andrews (azimuth 340°) on the right, and also has an arc west of Fort Strong, inside the harbor. It is masked by Forts Standish and Warren and by Gallups Island, as well as by the Brewster group. No. 12 has an operating arc from a line tangent to Fort Heath on the left (azimuth 171°) to a line toward Fort Warren, (azimuth 329°) on the right. It is masked by the same islands as No. 11.

b. Both of these lights should be assigned to the northern mine group, MG-2. They cover the mine field at a distance of approximately 5,000 yards. This group has a double primary station on Deer Island.

16. One fixed light at Fort Ruckman, No. 13, (old No. 16).

a. This light is installed. It has an operating arc from a line tangent to East Point on the left to a line toward Fort Standish on the right or from azimuth 278° to azimuth 358° . It is limited on the right by the location of the operating position in the face of Bayley Hill; the field cannot be increased to the right without excessive cost. The light fails to bear on the deep water area off Winthrop. It is of slight value.

b. Light No. 13 should be assigned to the northern gun group, G-3.

17. Two lights at East Point, Nos. 14 and 15; (old No. 17).

a. There was a light installed on private property here during the war. A distance of 300 yards or more should be ensured between the location of the nearer of the two proposed lights and the fire control station proposed for East Point; this distance is obtainable. The lights should be approximately 100 yards apart. Both should have an operating arc of about 195° from the direction of the east end of Deer Island to the direction of Phillips Point.

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b. These searchlights can be sited on the high rocky ground of the northeast tip of East Point, without interfering with the East Point fire control station, approximately 400 yards distant.

c. The property, owned by the family of Henry Cabot Lodge, need not be purchased, but plans may be made to occupy it in war. It was so occupied in the Spanish American and World Wars.

d. The semimobile (modified standard seacoast type) searchlights with portable AA type power plants should be employed. The lights should be mounted on push cars for movement from shelter to operating position, using a light rail track and flange wheels.

e. Searchlights Nos. 14 and 15 should be assigned to the northern gun group, Group 3.

18. Two lights at Marblehead Neck, Nos. 16 and 17.

a. In view of the deep water closer to Boston on the north than on the south side of the Bay, these two lights are requisite if bombardment is to be prevented, at something less than extreme range. Marblehead harbor with 25 feet of water is too close to Boston to be left open for use by large landing parties.

b. The lights should be located 100 yards or more apart, on the southeast part of Marblehead Neck. They will be sufficiently distant from the base and station near the lighthouse to avoid interference. Both lights should have an illuminating arc from the direction of Nahant to a line toward Bakers Island.

c. There are two sites, free from buildings at this time, which are suitable. One is on a 60-foot knoll, 1,450 yards south of the lighthouse, 830 yards northeast of Flying Point and 150 yards west of the shore. The other location is close to the shore on a rocky point 770 yards northeast of Flying Point. U. S. Coast and Geodetic Survey chart No. 240, scale 1:20,000 shows the locality in detail. The site need not be purchased but may be obtained by lease at time of an emergency.

d. The semimobile (modified standard seacoast type) searchlights with portable AA type power plants should be employed. The lights should be mounted on the standard 32-foot steel tower designed for fixed installation.

e. These lights should operate under Group 3.

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19. Priority.

a. Searchlight materiel should be provided in the following order of priority:

(1) Nos. 7 and 8 on Outer Brewster: position to be prepared; the two lights and engines rendered surplus at Forts Andrews and Strong should be designated for use on Outer Brewster, and should be moved there as soon as the positions can be prepared.

(2) Nos. 14 and 15 at East Point: to be furnished and stored.

(3) No. 5 at Point Allerton: to be furnished and stored.

(4) Nos. 3 and 4, southeast of Strawberry Hill: to be furnished and stored.

(5) Nos. 16 and 17, at Marblehead Neck: to be furnished and stored.

(6) Nos. 1 and 2, at Strawberry Point: to be furnished and stored.

20. Storage. Space can be made available for storing and operating these nine lights at the Army Base, Boston, under jurisdiction of the harbor defense commander.

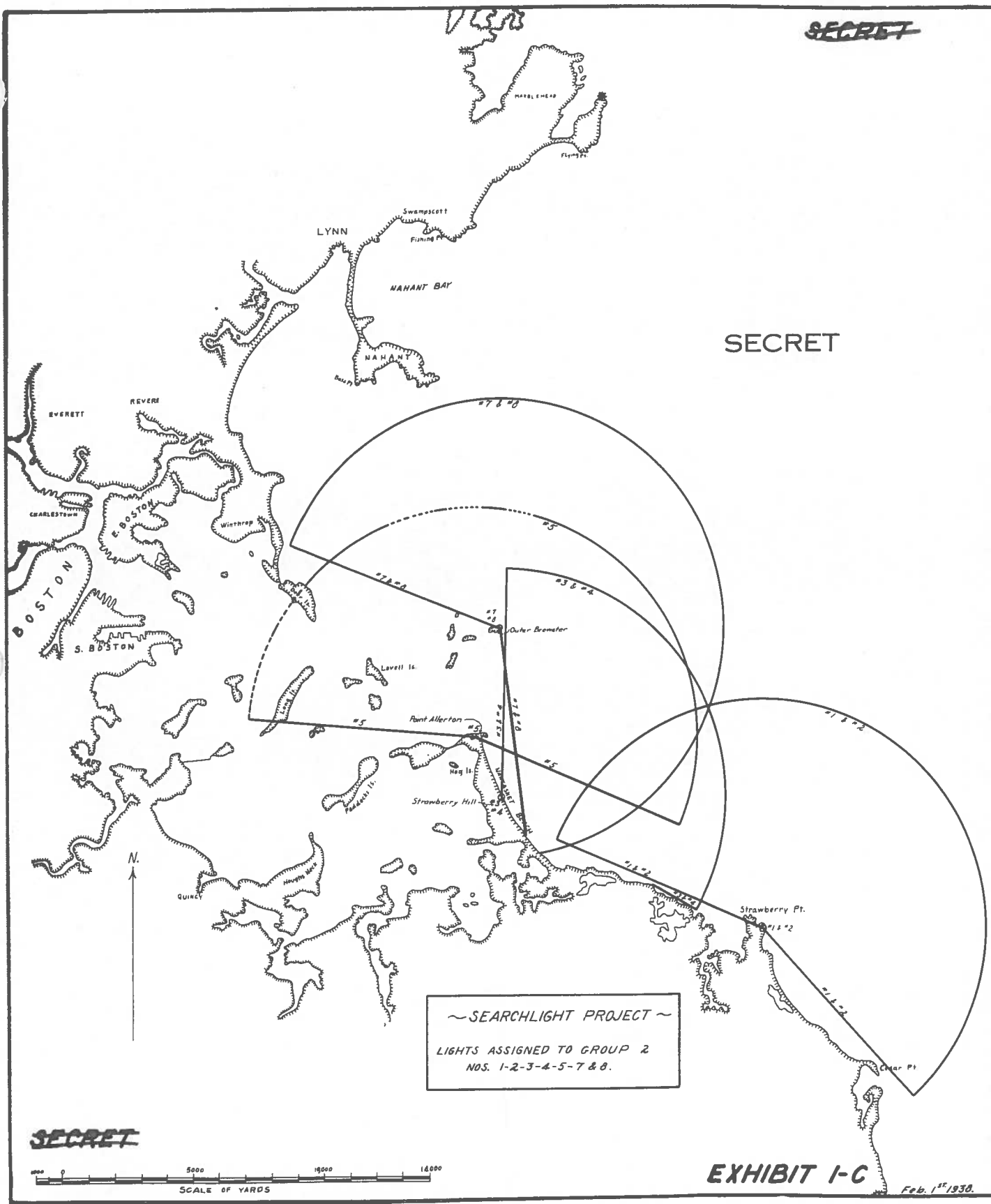
21. No acquisition of land by purchase or lease is required for installations prescribed in this Annex.

22. Cost Estimate. An estimate of cost and priority guide is appended as Exhibit 6-C. Those items which should be procured and installed in peace time are marked with an A. Those which should be procured in peace but whose installation may be deferred until an emergency arises are marked B. Those items to be procured and installed when an emergency arises are marked C.

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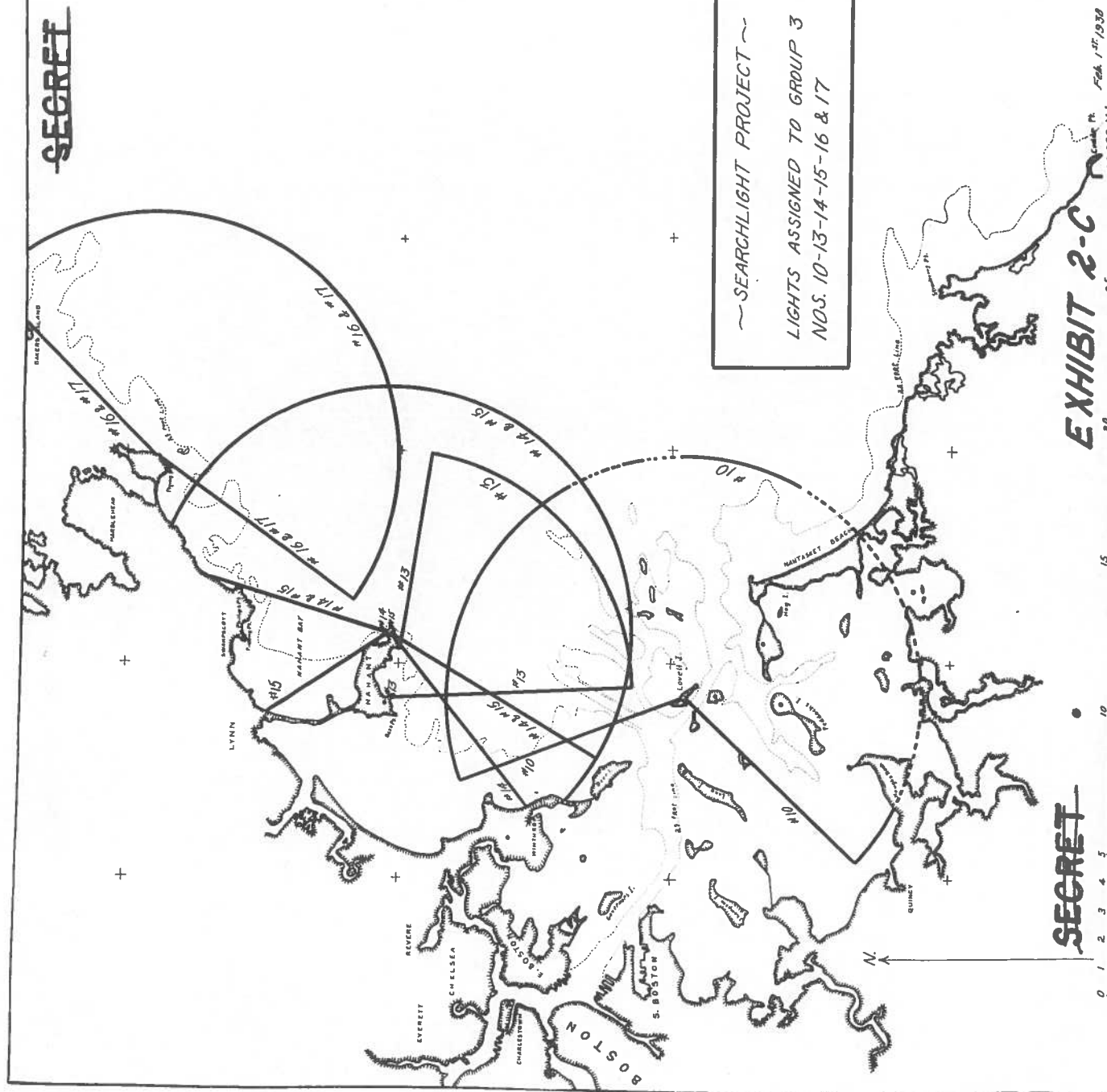


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EXHIBIT I-C

Feb. 1st 1930.

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EXHIBIT 2-C

Feb. 14, 1938

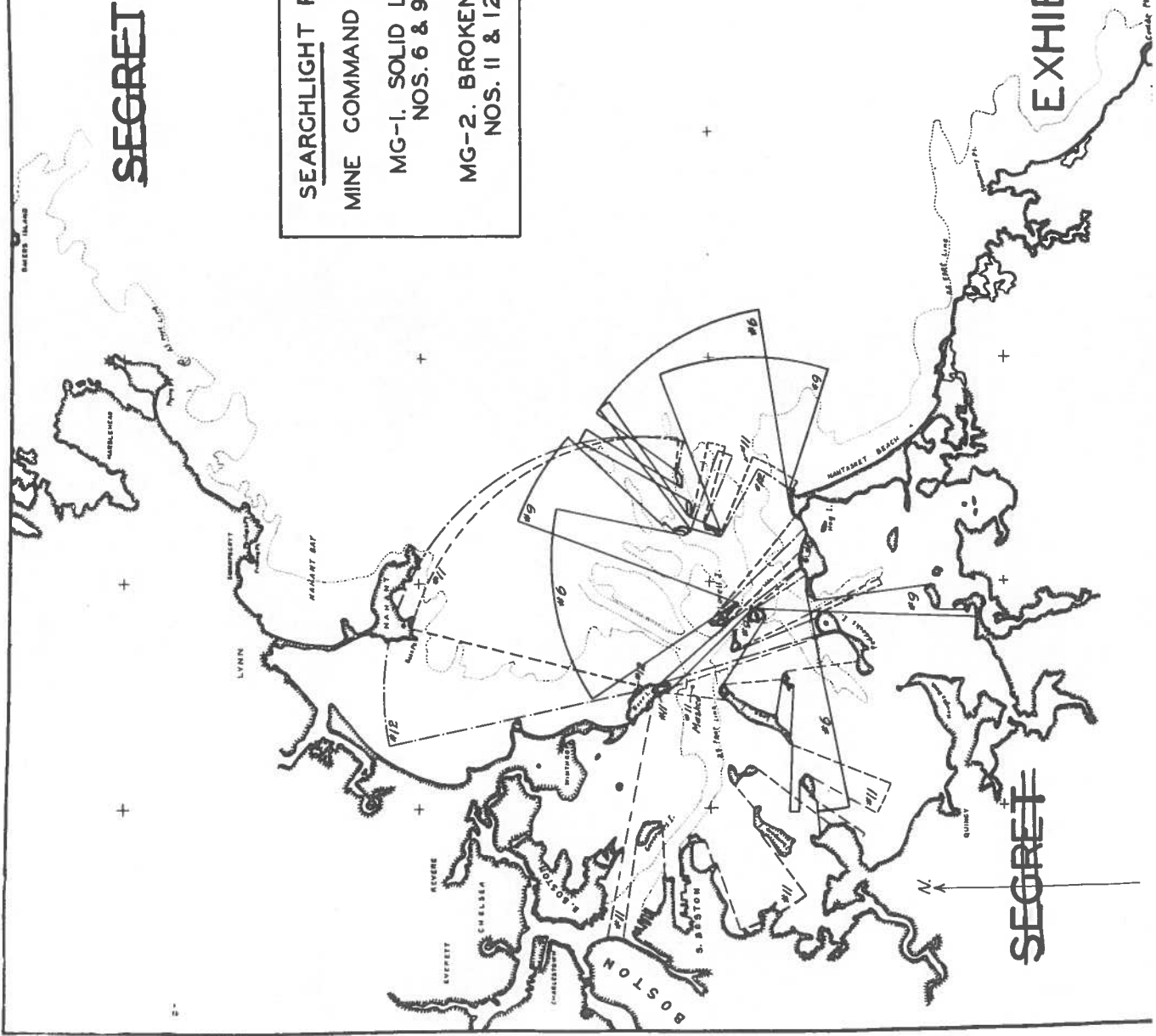
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SEARCHLIGHT PROJECT

MINE COMMAND LIGHTS

MG-1. SOLID LINES
NOS. 6 & 9

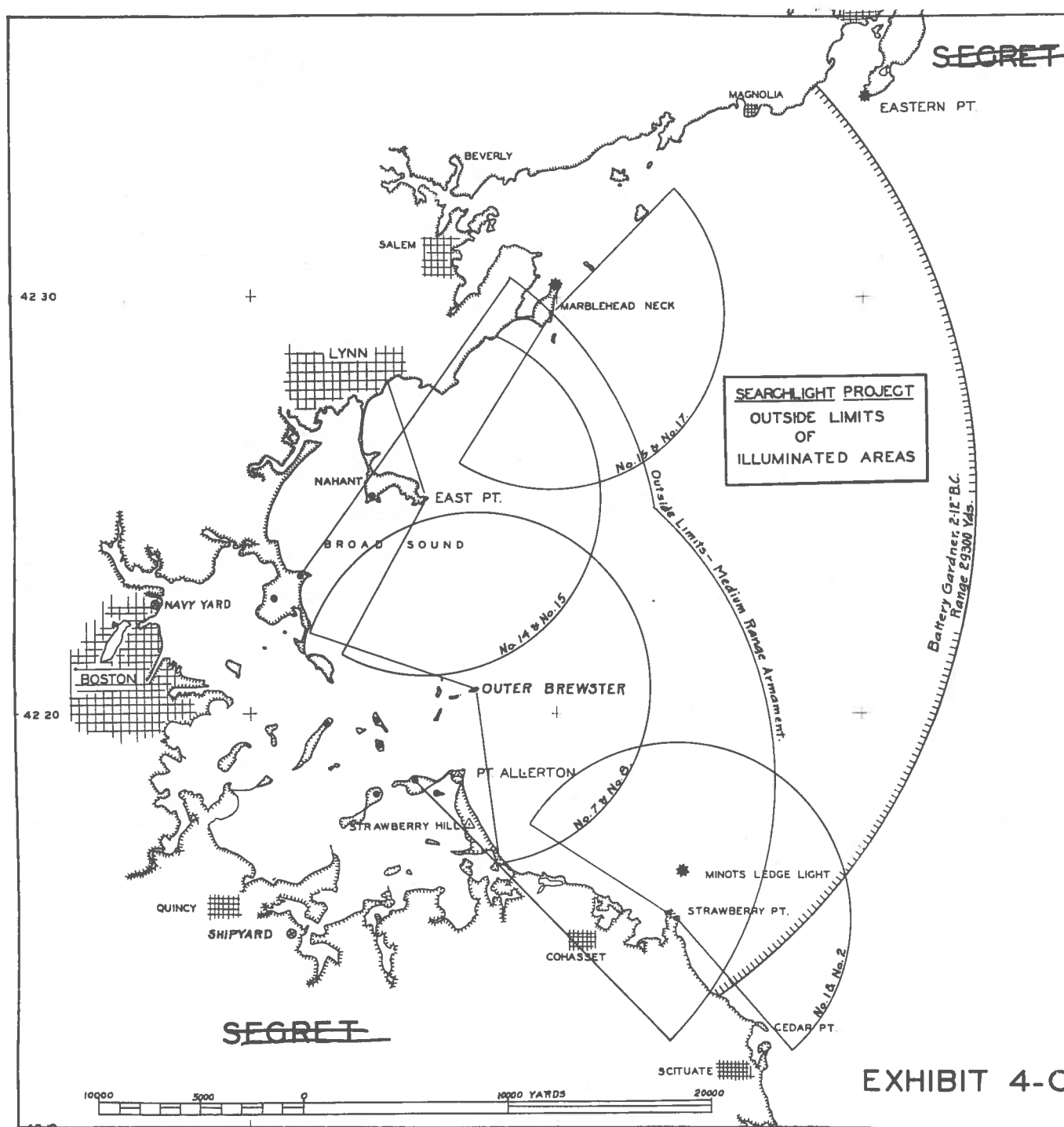
MG-2. BROKEN LINES
NOS. 11 & 12



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EXHIBIT 3-C

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INDEX

**SURVEY 1914 BY ERNEST A. PORTER
OFFICE DISTRICT ENGINEER
BOSTON**

ORIGINAL SCALE 1"=50 FEET
V.I., 5 FEET. REF. M.L.W. +

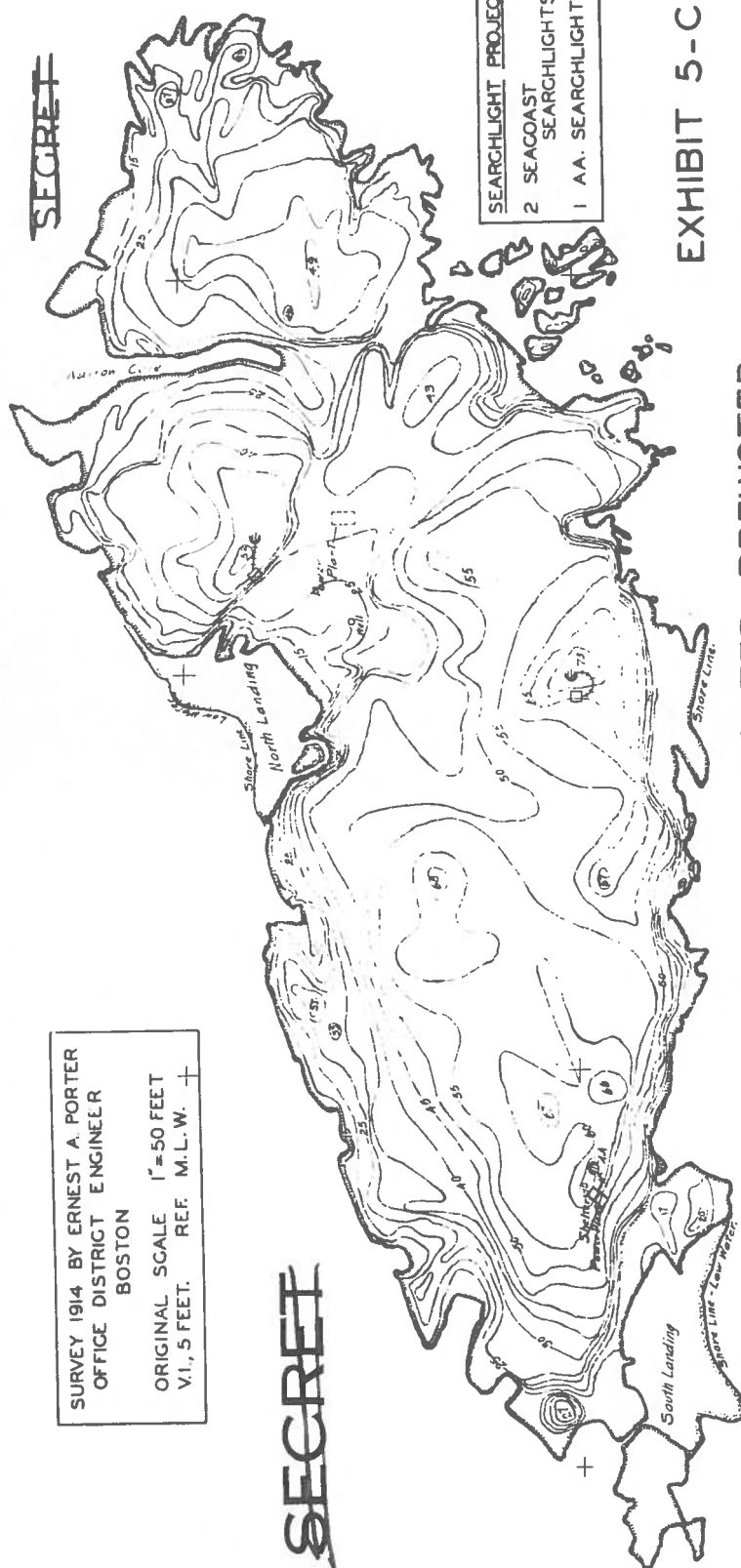
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SEARCHLIGHT PROJECT

2 SEACOAST
SEARCHLIGHTS
1 AA. SEARCHLIGHT

EXHIBIT 5-C

OUTER BREWSTER



Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Engineer		Signal		Total
				Material	Labor	Material	Labor	
1	1	B	SEARCHLIGHT NO. 1 & 2, STRAWBERRY HILL	3 14,140	3 4,800	3 612	3 75	3 19,627
			Control: G-2, Pt. Allerton, by telephone to controller station, Strawberry Pt.					
			Engineer:					
			2 - SL, 60" seacoast, available from Depot Storage					
			Overhaul & shipment, 2 SL	\$1,300				
			2 controllers available from Depot Storage					
			2 power plants; portable(AA Type)	8,000				
			1,200' power cable	600	600			
			400' controller cable	240	200			
			2 towers, steel, 32' standard	4,000	4,000			
				14,140	4,800			
			Signal:					
			6 telephones (outside) with headsets		462			
			Miscellaneous		75			
			Contingency		75			
			Labor				75	
					612		75	
1	2	B	SEARCHLIGHT NO. 3 & 4, STRAWBERRY HILL	14,140	4,800	612	75	19,627
			Control: G-2, Pt. Allerton, by telephone to controller station, Strawberry Hill.					
			Engineer:					
			2 - SL, 60" seacoast, available from Depot Storage					
			Overhaul & shipment of 2 - SL	1,300				
			2 controllers available from Depot Storage					
			2 power plants; portable(AA Type)	8,000				
			1,200' power cable	600	600			
			400' controller cable	240	200			
			2 towers, steel, 32' standard	4,000	4,000			
				14,140	4,800			
			Signal:					
			6 telephones, (outside) with headsets		462			
			Miscellaneous		75			
			Contingency		75			
			Labor				75	
					612		75	
3	3	B	SEARCHLIGHT NO. 5, POINT ALLERTON	6,770	1,800	331	75	8,976
			Control: G-2, Pt. Allerton, con- troller station, Pt. Allerton.					
			Engineer:					
			1 - SL, 60" seacoast, available from Depot Storage					
			Overhaul & shipment of 1 - SL	650				
			1 controller, available from Depot Storage					
			1 power plant; portable(AA Type)	4,000				
			600' power cable	300	300			
			200' controller cable	120	100			
			1 push-car with 600' track	1,100	800			
			1 shelter for SL & power plant	600	600			
				6,770	1,800			
			Signal:					
			3 telephones (outside) with headsets		231			
			Miscellaneous		50			
			Contingency		50			
			Labor				75	
					331		75	
4			SEARCHLIGHT NO. 6, FORT REVERE, (installed)					
			Control: MG - 1, Fort Warren, by telephone to controller sta- tion, Ft. Revere.					

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EXHIBIT 6-C

ANNEX C

EXHIBIT 6-C

COST ESTIMATE AND PRIORITY GUIDE

H. D. OF BOSTON

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Engineer		Signal		Total
				Material	Labor	Material	Labor	
3	5	A	<u>SEARCHLIGHT NO. 7 & 8,</u> <u>OUTER BREWSTER</u> Control: G-2, Ft. Allerton & G-3, Ft. Heath by telephone to controller stations, Outer Brewster. Engineer: Transfer 2 - SL & power plants from Fort Strong & Fort Andrews and install at Outer Brewster Construct 2 - SL shelters and 1 shelter for 2 power plants. Signal: Reinstallation of telephone equipment.	\$ 8,200	\$ 5,000	\$ 75	\$ 100	\$ 13,375
			Mat. Lab. \$8,200 \$5,000 8,200 5,000 75 100 75 100					
	6		<u>SEARCHLIGHT NO. 9, FORT WARREN</u> <u>(installed)</u> Control: MG - 1, Fort Warren, controller in M ₁ - M ₁ at Ft. Warren					
	7		<u>SEARCHLIGHT NO. 10, FORT STANDISH</u> <u>(installed)</u> Control: G-3, Ft. Heath, by telephone to controller station, Ft. Standish.					
	8		<u>SEARCHLIGHT NO. 11 & 12, DEER ISLAND</u> <u>(installed)</u> Control: MG - 2, Fort Strong, by telephone to controller stations, Deer Island.					
	9		<u>SEARCHLIGHT NO. 13, FORT DUCKMAN</u> <u>(installed)</u> Control: G-3, Ft. Heath by telephone to controller station, Ft. Duckman.					
3	10	B	<u>SEARCHLIGHT NO. 14 & 15, EAST POINT</u> Control: G-3, Ft. Heath by telephone to controller stations near lights. Engineer: 2 - SL, 60" seacoast available from Depot Storage Overhaul & shipment of 2 SL 2 controllers, available from Depot Storage 2 power plants, portable (AA Type) 1,200' power cable 400' controller cable 2 push-cars for SL, with 900' track 2 shelters for SL's Signal: 6 telephones (outside) with headsets Miscellaneous Contingency Labor	12,190	2,600	612	75	15,477
			1,300 8,000 600 240 850 1,200 12,190 2,600 462 75 75 612 75					
3	11	B	<u>SEARCHLIGHT NO. 16 & 17, MARBLEHEAD NECK</u> Control: G-3, Ft. Heath, by telephone to controller station, Marblehead Neck. Engineer: 2 - SL, 60" seacoast, available from Depot Storage. Overhaul & shipment of 2 SL 2 controllers, available from Depot Storage 2 power plants, portable (AA Type) 1,200' power cable 400' controller cable 2 towers, steel, 32' standard	14,140	4,800	612	75	19,627
			1,300 8,000 600 240 4,000 14,140 4,800					

EXHIBIT 6-C

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EXHIBIT 6-C

COST ESTIMATE AND PRIORITY GUIDE

H. D. OF BOSTON

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Engineer		Signal		Total
				Material	Labor	Material	Labor	
3	11	B	SEARCHLIGHT NO. 18 & 19 (Contd.)					
			Signal:					
			6 telephone (outside) with headsets	\$462				
			Miscellaneous	75				
			Contingency	75				
			Labor					
				612	75			
			TOTALS	\$69,560	\$23,800	\$2,354	\$475	\$96,709

Class A - To be procured and installed in peacetime.
Class B - To be procured in peacetime and installed when an emergency arises.
Class C - To be procured and installed when an emergency arises.

Note: No expenditure of funds by the Ordnance Department, Chemical Warfare Service, or Coast Artillery Corps, or for land is contemplated in this annex.

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EXHIBIT 6-C

ANNEX D
UNDERWATER DEFENSE

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AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34) (Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-38) (Misc.) E, dated May 19, 1938.

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(12) A 10-pair cable should be provided from Fort Standish to Outer Brewster; 8 pairs are required.

(13) A new 75-pair cable was installed in 1937 between Fort Revere and Point Allerton, Sub Hut; 73 pairs are required.

(14) There is an existing 52-pair cable from Point Allerton Sub Hut to Point Allerton; 39 pairs are needed.

(15) A 52-pair cable exists between Fort Revere and Fort Duvall; 24 pairs are required.

(16) Two 11-pair cables exist between Point Allerton and Strawberry Hill; 13 pairs are needed.

(17) A 25-pair cable should be provided from Point Allerton to Strawberry Point; 21 pairs are needed.

(18) 15,000 feet of 10-pair subterranean cable is required for fire control installations.

d The commercial lines from the south (see paragraph 9, ante) should enter the fire control system at Point Allerton.

26. Switchboards.

a. Switchboards are required as follows:

Fort Ruckman	-	to be provided,
Fort Heath	-	existing,
Fort Banks	-	to be provided,
Fort Standish	-	existing,
Fort Warren	-	existing,
Fort Revere	-	existing.

b. Batteries Long and Gardner should be equipped with a switching panel under control of the battery commander, enabling him promptly to change from one baseline to another.

27. Cost Estimate. An estimate of cost and priority guide is appended as Exhibit 24-B. Those items which should be procured and installed in peace time are marked with an A. Those which should be procured in peace but whose installation may be deferred until an emergency arises are marked B. Those items to be procured and installed when an emergency arises are marked C.

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ANNEX D

UNDERWATER DEFENSE.

1. The present underwater defense project, approved by the Secretary of War on January 16, 1929, provides for four groups of mines in the southern (Nantasket Roads) entrance to the harbor controlled from Fort Warren, and five groups in the northern entrance (the main ship channel), controlled from Fort Strong.

2. a. The mine cases, anchors, cable, tools and other materiel required, as well as the panels, generators and other electrical equipment (all of which materiel of both classes is enumerated in Tables of Allowances - Submarine Mine Equipment) should be stored at Fort Warren for the southern mine field and at Fort Strong for the northern mine field.

b. This materiel should be kept on hand, complete and in serviceable condition.

3. In addition to the material comprised in the Tables of Allowances, the mine project requires adequate shore installations including position finding systems, and boats and wharfs.

SHORE INSTALLATIONS.

4. Fort Warren.

a. The present shore facilities at Fort Warren are sufficient to house and operate the mine materiel assigned to that station.

(1) Faulty design, the heavy structure resting on the tank floor; or

(2) Washing away of the soil beneath the tank.

It is proposed to rebuild the floor, supporting it with numerous heavy concrete pillars sunk deep into the ground.

b. The wharf has had only small annual repairs for many years and before long will require extensive rehabilitation.

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5. Fort Strong.

a. The present shore installations are sufficient to store and operate the mine materiel assigned to the northern mine field.

b. The wharf is serviceable at present but will soon require extensive rehabilitation.

6. Position Finding Service.

a. Southern Mine Group, MG-1. The mine group commander is assigned the station at Fort Warren now designated F¹ - 3; it overlooks the mine field.

(1) Baselines. The base end stations are double stations; in each pair, the stations are referred to as right or left. Duplicating the baselines enables tracking more than one target. M¹ is at Fort Warren and both right and left stations are equipped with DPF's. M², similarly equipped, is at Fort Revere. Exhibit 1-D shows the area covered by the baseline and by each DPF. The mine field is satisfactorily covered. Where the approaches from the north or south are masked from one base end, they are visible from the DPF at the other end of the baseline. A spotter for the batteries of this mine group should be located on Outer Brewster.

b. Northern Mine Group, MG-2. The mine group commander is hereby assigned the station at Fort Strong now designated F¹ - 5. It overlooks the mine field.

(1) Baselines. The base end stations are double stations. This group has three pairs of base end stations. The M¹ stations at Fort Strong are not needed and should be abandoned, leaving the baseline Deer Island - Fort Standish. M³ at Deer Island is hereby designated M¹, and M² at Fort Standish should continue to be so designated. Exhibit 2-D shows the area covered by the baseline Deer Island - Fort Standish. At Deer Island there is a DPF in the left station but none installed in the right station; a DPF should be provided. At Fort Standish there is a DPF in the right station but none in the left; one should be installed. There are two Lewis DPF's in the double station proposed for abandonment at Fort Strong.

BOATS.

7. It is considered that two mine planters, four DB boats and twelve motor mine yavls are required to plant and maintain the submarine mines included in the project. In addition, for use during the period of planting, there should be provided a third mine planter as substitute.

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**MINE GROUP I
AREA COVERED BY
DOUBLE BASELINE**

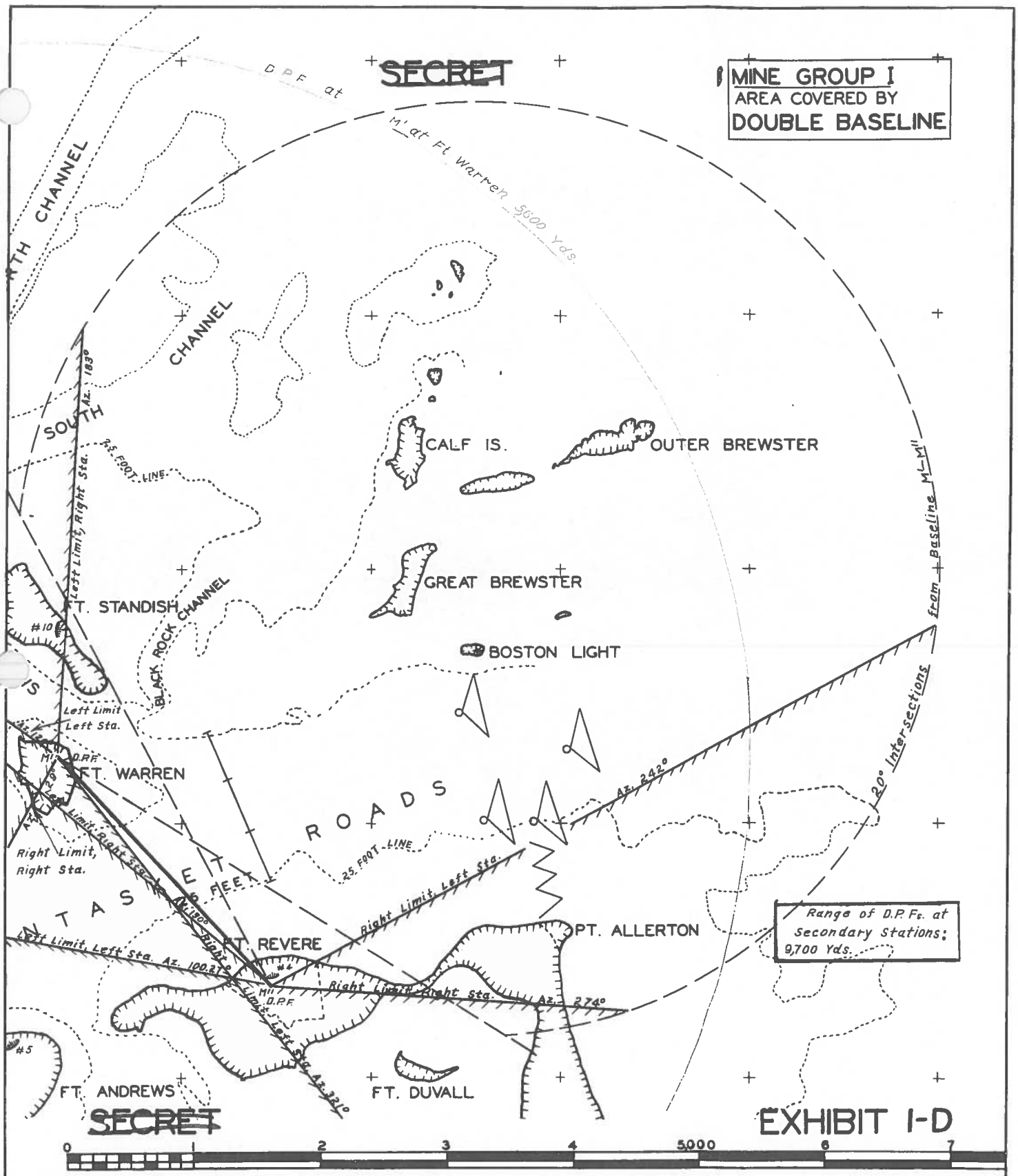


EXHIBIT I-D

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a. Mine Planters.

(1) Lighthouse tenders should be designated by name for service as emergency mine planters. These two vessels should be provided in peace with the necessary deck fittings as specified in the Tables of Allowances, and the specified planting equipment should be kept on hand in the harbor defense.

(2) A tug with barge equipped with power boom may be employed as the third (substitute) mine planter.

b. DB BOATS.

(1) There are two L boats in the harbor defense.

(2) In Massachusetts Bay there is a common type of power boat from 45 to 60 feet in length, with hoisting boom; these boats are used by fishermen. Two of these power boats can be employed as DB Boats.

c. In addition to the four yawls now on hand in the harbor defense, the necessary additional launches can be obtained locally.

8. No acquisition of land by purchase or lease is required for installations prescribed in this Annex.

9. Cost Estimate. An estimate of cost and priority guide is appended as Exhibit 3-D. Those items which should be procured and installed in peace time are marked with an A. Those which should be procured in peace but whose installation may be deferred until an emergency arises are marked B. Those items to be procured and installed when an emergency arises are marked C.

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**MINE GROUP 2
AREA COVERED BY
DOUBLE BASELINE**

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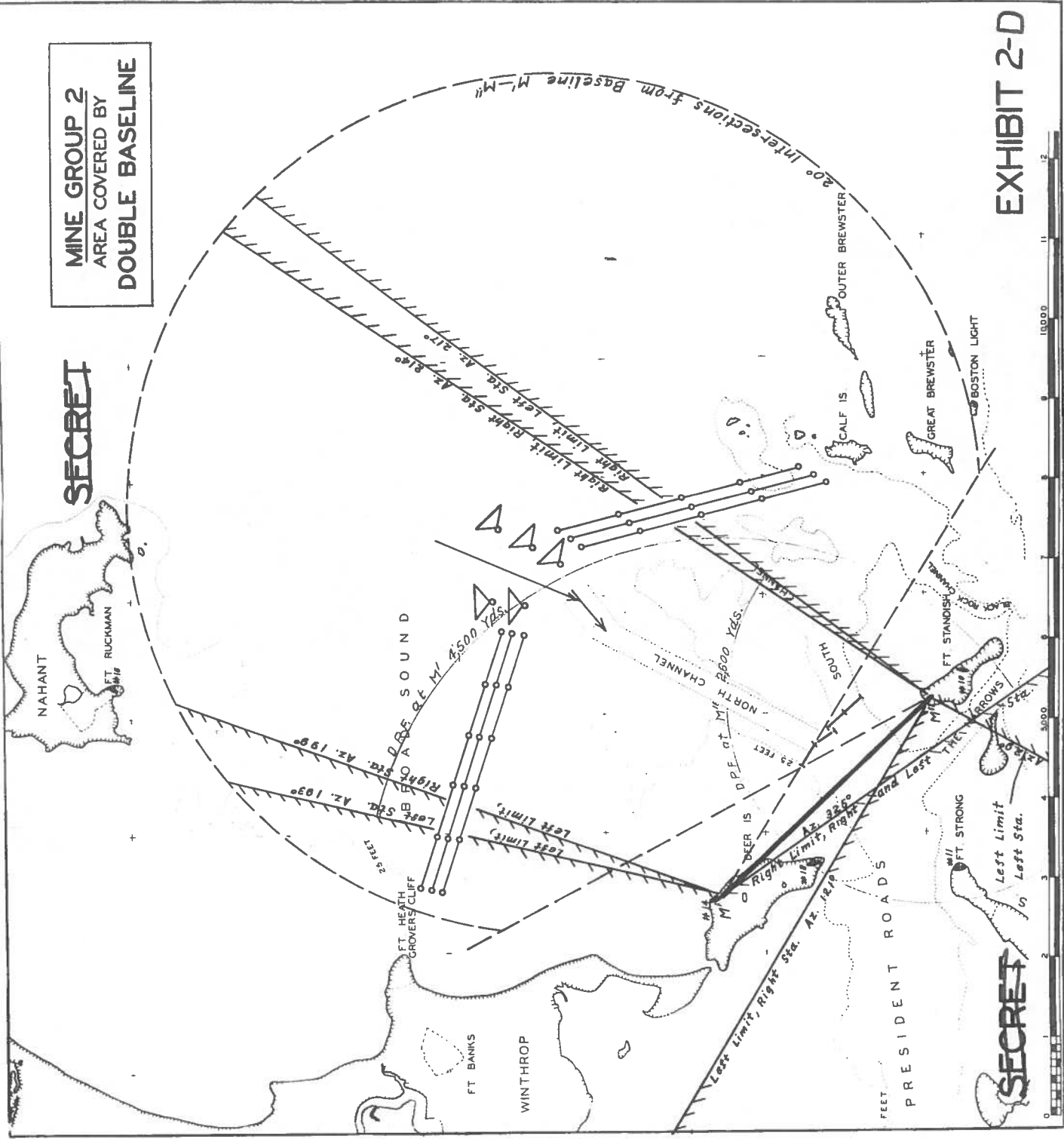


EXHIBIT 2-D

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ANNEX D

EXHIBIT NO. 3-D

COST ESTIMATE AND PRIORITY GUIDE.

U. S. OF BOSTON

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of project	C.A.C.		Engineers		Total
				Material		Material	Labor	
2	1	A	Submarine mine material to complete mine project Change to single conductor system \$14,938 Miscellaneous equipment 2,274 Single conductor cable (App.70-M) <u>80,003</u> Total \$97,215	\$97,215		-	-	\$97,215
			Totals	\$97,215				\$97,215

Class A - To be procured and installed in peacetime.
 Class B - To be procured in peacetime and installed when an emergency arises.
 Class C - To be procured and installed when an emergency arises.

Note: No expenditure of funds by the Chemical Warfare Service or for land is contemplated in this Annex.

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EXHIBIT NO. 3-D

ANNEX E
ANTIAIRCRAFT GUN DEFENSE

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AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d. AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34) (Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-36) (Misc.) E, dated May 19, 1938.

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ANNEX E

ANTIAIRCRAFT GUN DEFENSE.

1. Guns.

a. The antiaircraft gun defense of the Harbor Defenses of Boston is shown in Exhibit 1-E. In that diagram the assumptions are made that the target is traveling at 200 miles per hour, at an altitude of 15,000 feet and that the effective horizontal range of the guns at that altitude is 6,000 yards.

b. Machine Guns. The number of machine guns which reasonably may be required, and provided, is conditioned on the expectation of simultaneous attack by more than one flight; and as a general guide, the proportion of machine guns to gun batteries in the antiaircraft regiment may be taken. For the five gun batteries in this harbor defense this proportion would provide twenty machine gun platoons. This project calls for eighteen machine gun platoons.

(1) The exact location of the machine guns is to be determined by the harbor defense commander, considering the availability, at the time when an emergency arises, of sites which will give all around fire, as nearly down to the horizon as is practicable.

c. Searchlights. The disposition of the antiaircraft searchlights is shown in Exhibit 1-E. To the extent permitted by the coast line, the lights have been pushed out from the batteries to such distance that targets may be illuminated before they come within range of the guns. While the searchlights are regarded as an accessory of the particular gun battery which they are provided to serve, their locations have been modified to secure the best illumination of the area covered by the five batteries as a whole. Unless so located, the 15 lights would be insufficient. It may become desirable in this location to control all fifteen searchlights from the group commander's station. Sufficient pairs have been provided in the cables to permit this arrangement.

(1) All searchlights in this project are to be of the portable type.

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d. Organization. The antiaircraft batteries are each composed of a gun detachment, a machine gun detachment and a searchlight detachment. The five batteries form the antiaircraft group (Group 4) with command post at Fort Warren. This is also the center of the antiaircraft intelligence service which is a part of the group. Information is to be telephoned to the intelligence center by all antiaircraft batteries and by outlying observers.

2. Antiaircraft Intelligence Service.

a. Antiaircraft observers have been provided for at six of the outlying fire control stations and at five other points, each observer being provided with telephone direct to the antiaircraft intelligence center. These places are: Manomet Hill,

Monk Hill,
Brant Rock FC Station,
Fourth Cliff FC Station,
Strawberry Point FC Station,
Great Blue Hill,
East Point FC Station,
Marblehead Neck FC Station,
Coolidge Point FC Station,
Eastern Point (Gloucester),
Railcut Hill.

The antiaircraft intelligence net is shown in Exhibit 2-E.

(1) In addition to the antiaircraft observers above who are specially designated as such, antiaircraft intelligence will originate with each antiaircraft gun battery, machine gun platoon and searchlight. An observer should be placed aboard a vessel of the Inshore Patrol. Information may be received from the Harbor Defenses of Narragansett Bay (64 miles), New Bedford (51 miles), and Portsmouth (52 miles), and as from the Aircraft Warning Service, New England Sector.

(2) Provision for intelligence from other sources such as the Offshore Patrol, the Coast Guard and lighthouses is the function of the sub-sector commander and does not form a part of this Project.

3. AA Battery No. 1 at Fort Revere.

a. Gun Detachment. The three guns of this battery are located on the high ground near the water tower. The carriages have not been altered for data transmission and data transmission mechanisms are not installed.

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(1) The director may be placed 107 yards from the center of the battery. The director and height finder will be stored in a wooden searchlight shelter on top of the water tower which is directly under its position.

Distance of director to directing point	- 107 yards.
Length of cable, director to junction box	- 450 feet.
Length of cables, height finder to director	- 320 feet.
Length of cables, junction box to guns	- 100 feet each.

A sketch of the battery position is shown in Exhibit 3-E.

b. Machine Gun Detachment. Four platoons, or 16 machine guns, are proposed, two platoons to be located at Fort Duvall, one at Fort Andrews and one at Fort Revere.

c. Searchlight Detachment. Four lights with sound locators are to be provided, each with portable power plant. These lights should be located as follows:

AASL No. 1	- near base of Nantasket peninsula.
AASL No. 2	- near Crow Point (Hingham).
AASL No. 3	- Strawberry Hill.
AASL No. 4	- Fort Duvall.

d. A total of $1\frac{1}{2}$ miles of field wire for AASL and Machine Gun Detachment will be required. Nos. 1 and 2 should be connected by commercial telephone lines to Strawberry Hill.

4. AA Battery No. 2 at Fort Standish.

a. Gun Detachment. Two guns are in position. The third gun is to be supplied from Ordnance storage and mounted on the existing gun block. The carriages have not been altered for data transmission and data transmission mechanisms have not been installed. The director may be located 70 yards from the center of the battery on the left flank of Battery Morris. The director and height finder will be stored in a magazine on the left flank of Battery Morris.

Distance of director to directing point	- 70 yards.
Length of cable, director to junction box	- 275 yards.
Length of cable, height finder to director	- 35 feet.
Length of cables, junction box to guns	- 100 feet each.

A sketch of the battery position is shown in Exhibit 4-E.

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b. Machine Gun Detachment. Three platoons or 12 machine guns are proposed; one at Outer Brewster, one at Fort Standish and one at Fort Warren; this last to utilize commercial cable supplemented by field wire.

c. Searchlight Detachment. Two lights with sound locators and portable power plants are to be provided. They should be located as follows:

AASL No. 6 - Fort Standish.

AASL No. 7 - On Outer Brewster at point shown on Exhibit 5-C of Annex C.

d. A total of 1/3 mile of field wire for AASL and Machine Gun Detachment will be required. Connections with No. 7 AASL will be through the submarine cable from Outer Brewster to Fort Standish.

5. AA Battery No. 3 at Fort Strong.

a. Gun Detachment. The three guns of this battery are in position. Carriages have not been altered for data transmission and data transmission mechanisms have not been installed. The director may be located on Battery Taylor, 125 yards from the directing point. The director and height finder will be stored in the tool room of Battery Taylor.

Length of cable, director to junction box - 450 feet.

Length of cable, height finder to director - 35 feet.

Length of cables, junction box to guns - 120 feet each.

A sketch of the battery position is shown in Exhibit 5-E.

b. Machine Gun Detachment. Three platoons or 12 machine guns are proposed; one at Fort Strong, one at Fort Andrews and one on Gallups Island. Fire control cables to the first two, and commercial cable to the last, each supplemented by field wire, will be used.

c. Searchlight Detachment. Four searchlights with sound locators and portable power plants are to be provided. They should be located as follows:

AASL No. 5 - near south end of Peddocks Island.

AASL No. 8 - near south end of Long Island.

AASL No. 9 - Squantum.

AASL No. 11 - Governors Island.

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No. 5 will be connected by field wire to the submarine cable at Fort Andrews.

No. 8 will be connected by field wire to the battery.

No. 9 will utilize commercial telephone lines to Point Allerton, thence by fire control cable to the battery.

No. 11 will require a submarine cable to the Army Base, thence commercial telephone lines to Long Island, and field wire to the battery.

d. A total of $1\frac{1}{2}$ miles of field wire for AASL and Machine Gun Detachment will be required.

6. AA Battery No. 4 at Fort Heath.

a. Gun Detachment. The three guns of this battery are in position. Carriages have not been altered for data transmission and data transmission mechanisms have not been installed. The director should be located on the parapet of Battery Winthrop, 80 yards from the center of the AA battery. The director and height finder will be stored in an old searchlight shelter at rear of Battery Winthrop.

Distance of director to directing point - 80 yards.
Length of cable, director to junction box - 275 feet.
Length of cable, height finder to director - 35 feet.
Length of cables, junction box to guns - 135 feet each.

A sketch of the battery position is shown in Exhibit 6-E.

b. Machine Gun Detachment. Four platoons or 16 machine guns are proposed, one to be disposed so as to protect Battery Winthrop, two to be placed so as to protect Batteries Lincoln and Kellogg at Fort Banks, and one on Deer Island. Connections with the battery will be by field wire.

c. Searchlight Detachment. Three searchlights with sound locators and portable power plants are to be provided. They should be located as follows:

AASL No. 10 - Deer Island.

AASL No. 12 - at Winthrop Head, mounted on the stand-pipe there. The water tower has sufficient strength to carry the light and the present local authorities are willing to have it there.

AASL No. 13 - Revere Beach.

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d. These lights will be connected by field wire to the battery. A total of 2 miles of field wire will be required for the machine gun and searchlight detachments.

7. AA Battery No. 5 at Fort Ruckman.

a. Gun Detachment. A three gun mobile battery is to be provided. It may be located on the golf course north of Battery Gardner.

b. Machine Gun Detachment. Four platoons or 16 machine guns are proposed; two to be disposed so as to protect Battery Gardner and the other two to protect the fire control station and searchlights proposed for East Point.

c. Searchlight Detachment. Two searchlights with sound locators and portable power plants are to be provided.

AASL No. 14 - between Spouting Horn and East Point,
Nahant.

AASL No. 15 - Phillips Point.

No. 14 will be connected by field wire to the battery.

No. 15 will employ commercial telephone lines from Phillips Point to Fort Ruckman, thence field wire to the battery.

d. A total of 1 mile of field wire will be required for AASL and Machine Gun Detachments.

8. The locations prescribed in this Annex for individual antiaircraft guns and for antiaircraft gun batteries were approved by the War Department in 12th Indorsement, W.D. AGO, October 14, 1933 (AG 660.2; 7-13-33; (Misc.) E).

9. The war reserve and battle allowance of ammunition is shown in Exhibit 7-E. The battle allowance of machine gun ammunition, should be stored at Fort Warren.

10. No acquisition of land by purchase or lease is required for installations prescribed in this Annex.

11. Cost Estimate. An estimate of cost and priority guide is appended as Exhibit 8-E. Those items which should be procured and installed in peace time are marked with an A. Those which should be procured in peace but whose installation may be deferred until an emergency arises are marked B. Those items to be procured and installed when an emergency arises are marked C.

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HARBOR DEFENSES

OF BOSTON

ELEMENTS
OF THE
A.A. DEFENSE

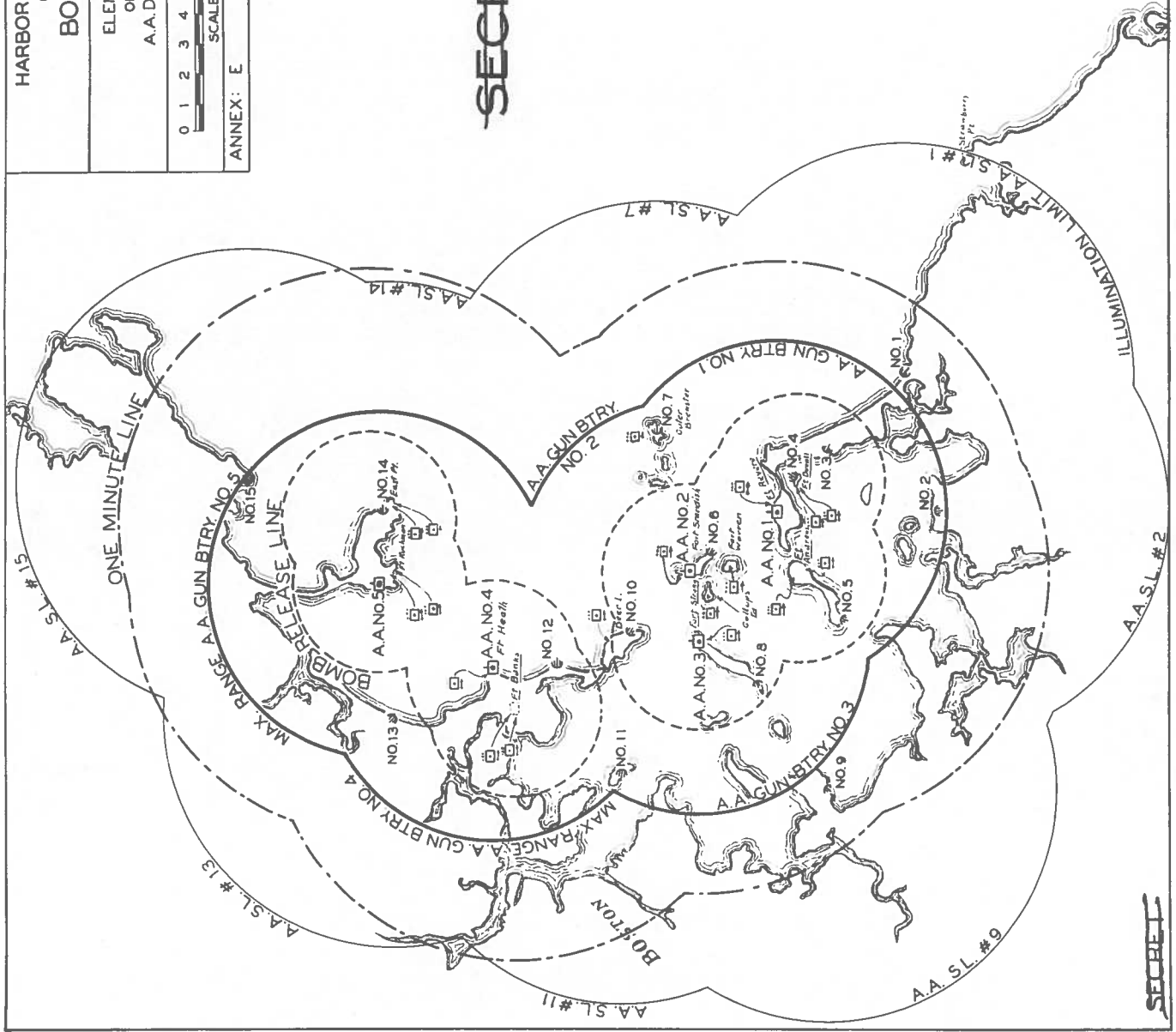
0 1 2 3 4 5 10000

SCALE IN YARDS

ANNEX: E EXHIBIT: 1

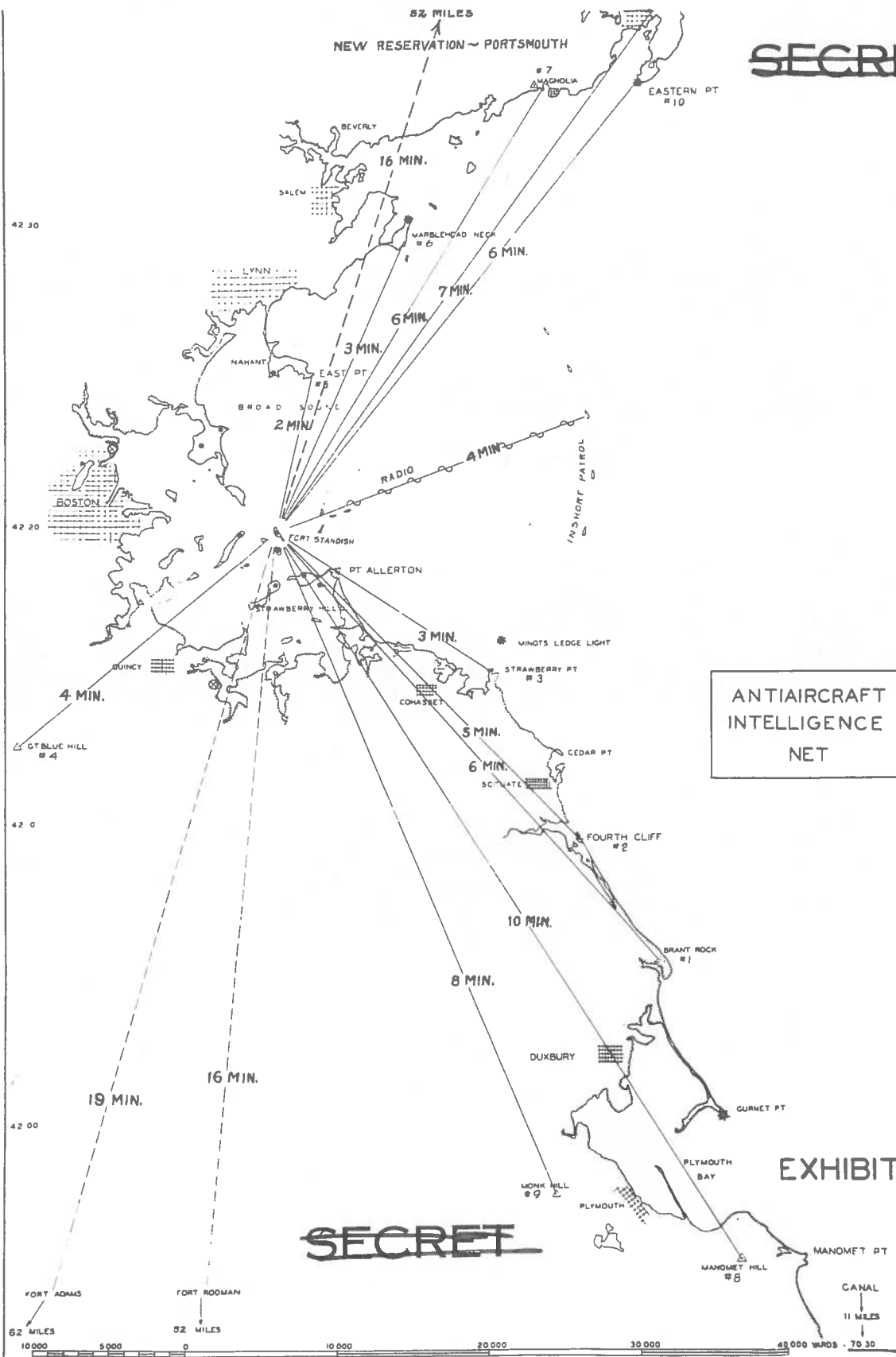
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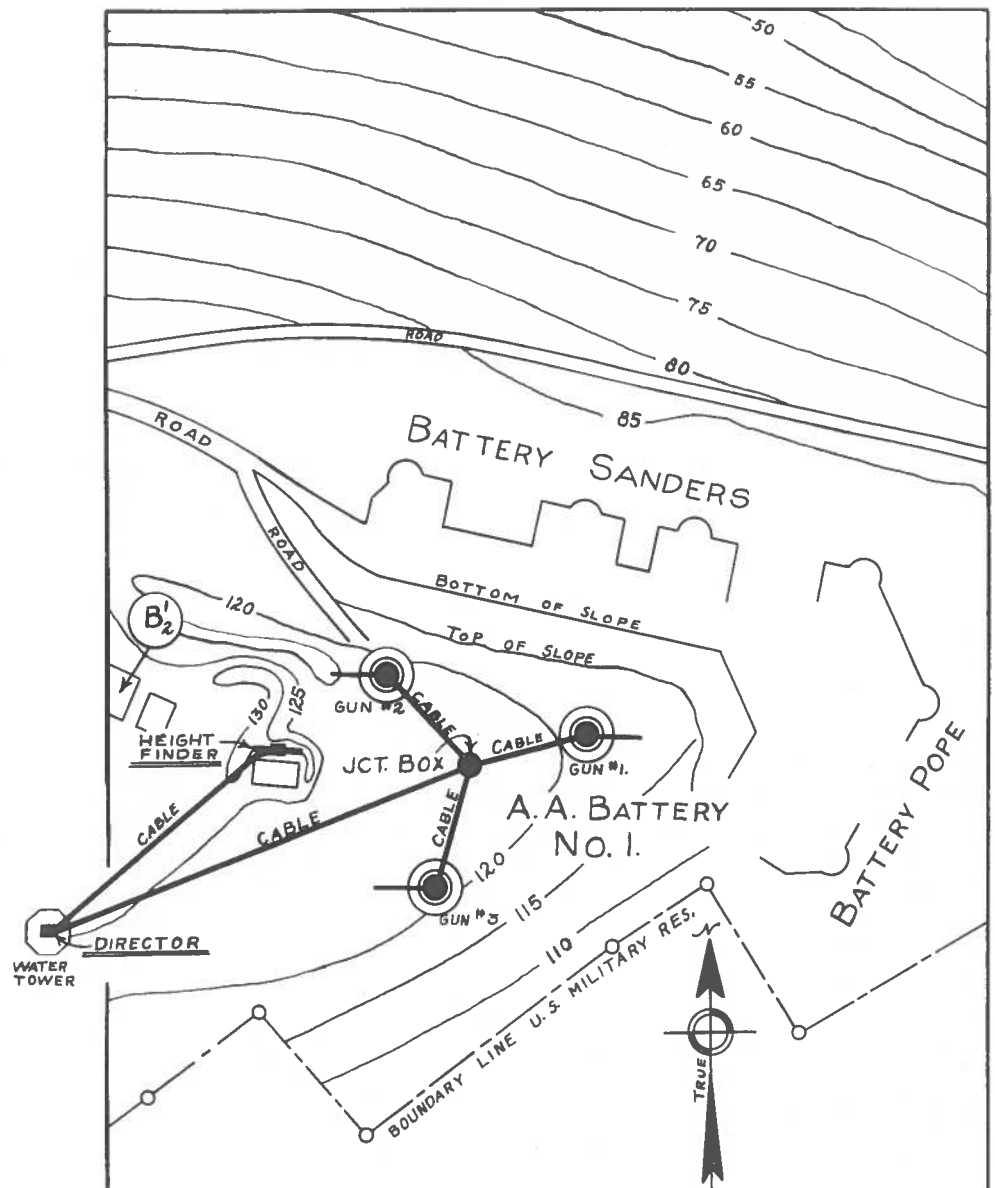
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EXHIBIT 2-E



NOTE

LENGTH OF CABLE, DIRECTOR TO JUNCTION BOX....450 FT.
 LENGTH OF CABLES, HEIGHT FINDER TO DIRECTOR.....320 FT.
 LENGTH OF CABLES, JUNCTION BOX TO GUNS (EACH)...100 FT.
 DISTANCE, DIRECTOR TO DIRECTING POINT.....107 YDS.
 SHELTER FOR DIRECTOR OLD S.L. SHELTER AT POSITION



ANTI-AIRCRAFT BATTERY No. 1.
FORT REVERE
HARBOR DEFENSES OF BOSTON

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EXHIBIT 3-E

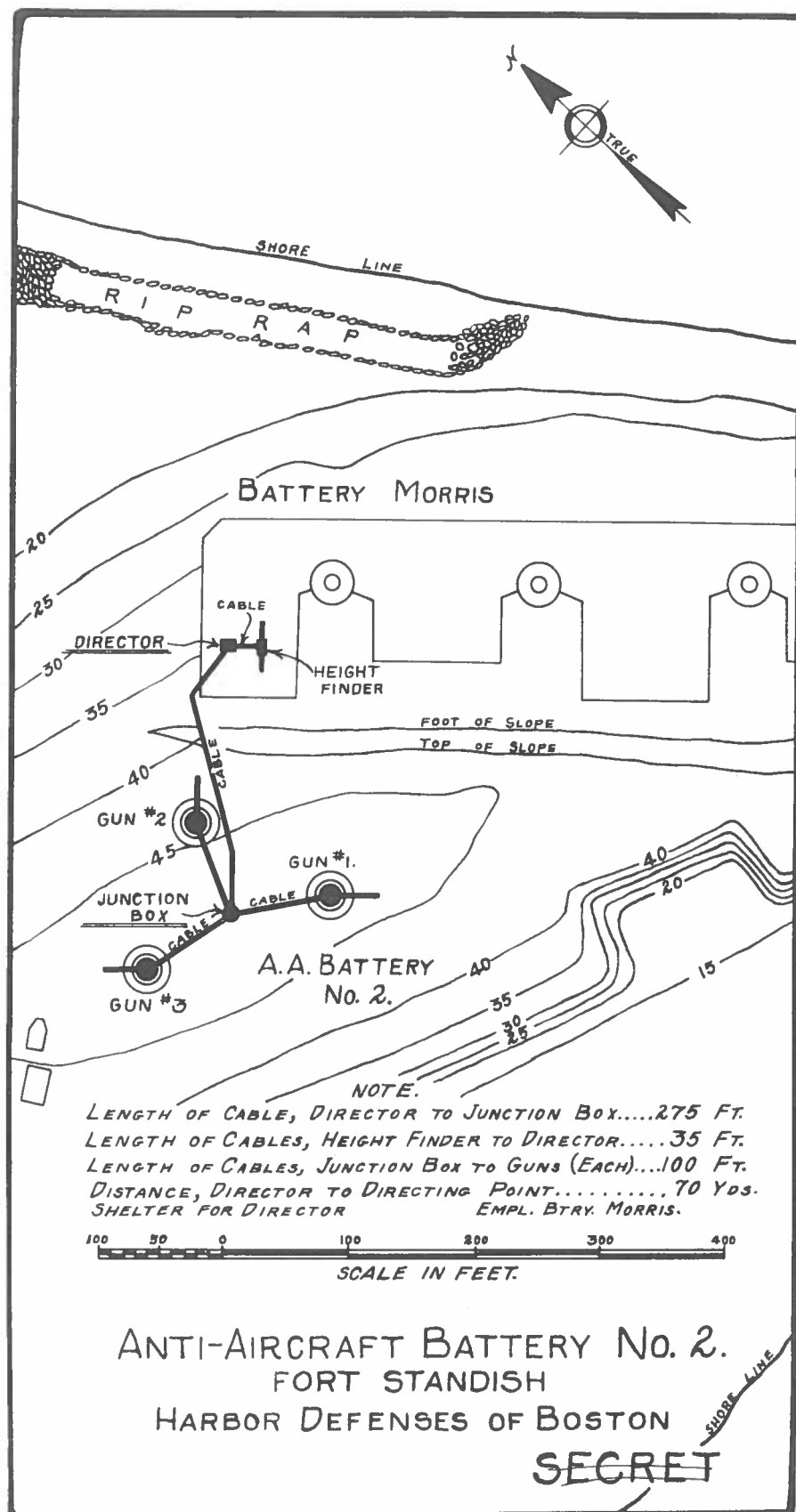


EXHIBIT 4-E

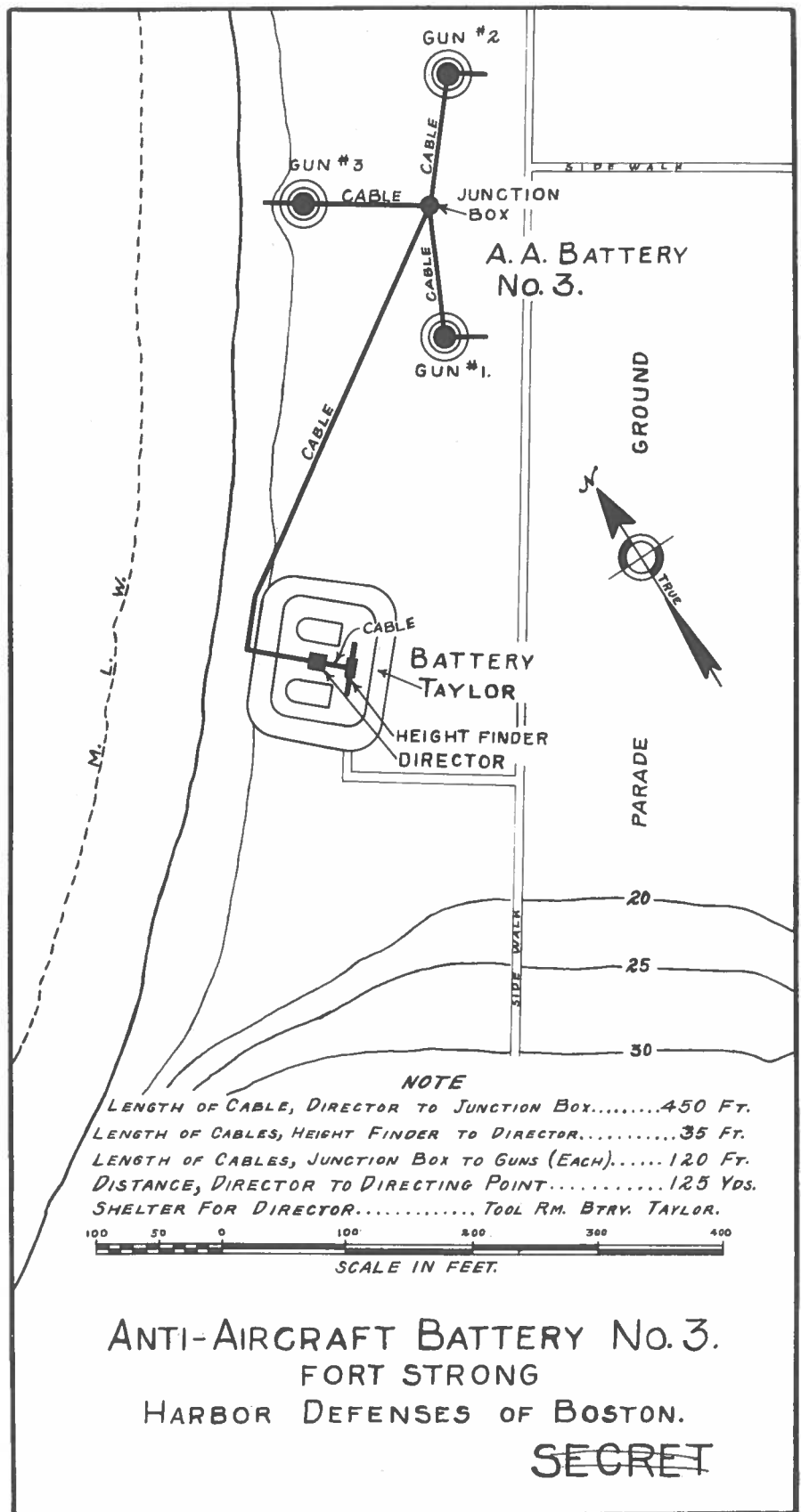


EXHIBIT 5-E

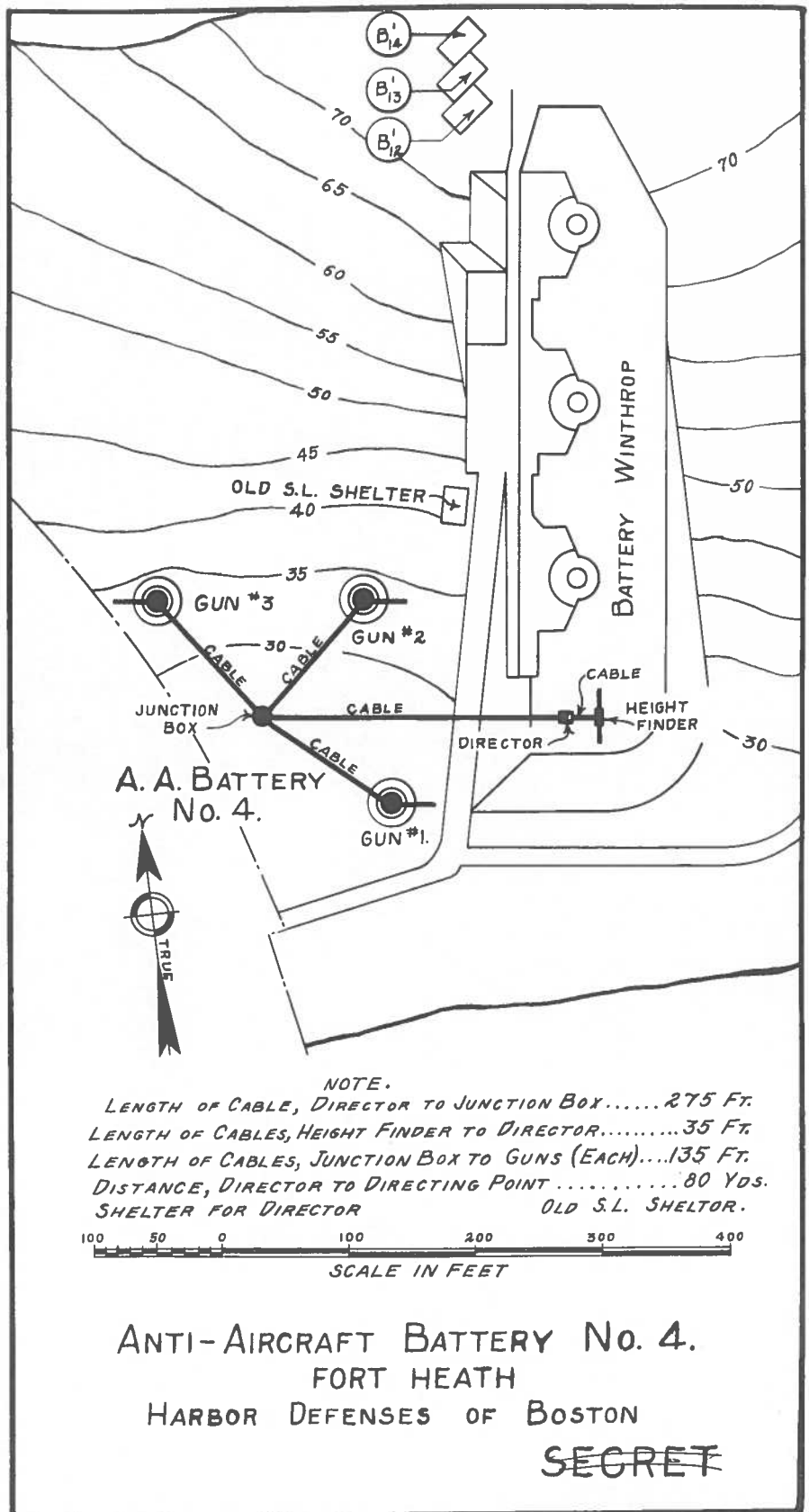


EXHIBIT 6-E

EXHIBIT NO. 7-E

Approved in 6th Indorsement, W. D., AGO,
May 5, 1933, (AG 381.4; 3-31-33; Misc. E).

AA (5 batteries) W.R. 16,200; B.A. 8,100.

The Battle Allowance of antiaircraft machine gun ammunition, when determined, should be stored in Fort Warren.
The provisions of Technical Regulations 137C-A are complied with.

EXHIBIT NO. 7-E

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Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance		Engineer		Signal		Total
				Material	Labor	Material	Labor	Material	Labor	
1	1	A	G - 4, AA GROUP COMMAND POST, FORT WARREN	\$ 110	\$	\$	\$	\$ 545	\$	\$ 655
			Ordnance: 2 field glasses	\$110	\$110					
			Engineer: Existing Structure							
			Signal: 1 monocoord switchbd. BD-71		125					
			2 monocoords switchbd. BD-72		350					
			Contingency		70					545
5	2	A	A.A. BATTERY NO. 1, (3-3" F), FORT REVERE	146,500	100,000			727		247,227
			Machine Gun Detachment, 4 Platoons, 16 - .50 Cal. Machine Guns							
			8 - MG, Ft. Duvall							
			4 - MG, Ft. Andrews							
			4 - MG, Ft. Revere							
			SEARCHLIGHT DETACHMENT							
			No. 1 AA S-L, near base of Nantasket Peninsula							
			" 2 AA S-L, near Grow Pt. (Hingham)							
			" 3 AA S-L, Strawberry Hill							
			" 4 AA S-L, Ft. Duvall							
			Ordnance: 1 director with data Transm. system		32,000					
			3 "On carriage" equipment & alterations		6,900					
			1 height finder, stereoscopic		20,000					
			1 stereoscopic tester		100					
			4 fuze setters		3,400					
			4 BC telescopes, AA		6,800					
			1 instrument, binocular training		500					
			16 AA MG, complete .50 cal.		52,800					
			4 sound locators		24,000					146,500
			Engineer: 4 searchlights, AA complete		100,000					100,000
			Signal: 1 monocoord switchbd. BD-71		125					
			1 telephone (outdoor), with head & chest set		77					
			10 head & chest sets (field)		400					
			1 1/2 miles field wire		75					
			Contingency		50					727
5	3	A	AA BATTERY NO. 2, (3-3" F), FORT STANDISH (2 BNS installed)	120,800	50,000			1,159		171,959
			Machine Gun Detachment, 3 Platoons, 12 - .50 Cal. Machine Guns							
			4 - MG, Outer Brewster							
			4 - MG, Ft. Standish							
			4 - MG, Ft. Warren							
			SEARCHLIGHT DETACHMENT							
			No. 6 AA S-L, Ft. Standish							
			" 7 AA S-L, Outer Brewster							
			Ordnance: 1 director with data Transm. system		32,000					
			3 "On carriage" equipment & alterations		6,900					
			1-3" gun (available)							
			1 height finder, stereoscopic		20,000					
			1 stereoscopic tester		100					
			4 fuze setters		3,400					
			4 BC telescopes, AA		6,800					
			12 AA MG complete .50 cal.		39,600					
			2 sound locators		12,000					120,800
			Engineer: 2 searchlight, AA complete		50,000					50,000
			Signal: 1 monocoord switchbd., BD-71		125					
			1 telephone (outdoor) with head & chest set		77					
			11 telephones (field)		440					
			1/3 mile field wire		17					
			10 tel. head & chest set (field)		400					
			Contingency		100					1,159

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordinance	Engineer		Signal		Total
					Material	Labor	Material	Labor	
5	4	A	<u>AA BATTERY NO. 3, (3-3" F,</u> <u>PORT STRONG</u> <u>(3 guns installed)</u> Machine Detachment, 3 Platoons, <u>18 - .50 Cal. Machine Guns</u> 4 - MG, Ft. Strong 4 - MG, Ft. Andrews 4 - MG, Gallop Island <u>SEARCHLIGHT DETACHMENT</u> No. 8 AA S-L, south end of Peddocks Island " 8 AA S-L, south end of Long Island " 9 AA S-L, Squantum " 11 AA S-L, Governors Island <u>Ordinance:</u> 1 director with data Transm. system 38,000 3 "On carriage" equipment & alterations 6,800 1 height finder 20,000 1 stereoscopic tester 100 4 fuse setters 3,400 4 BC telescopes, AA 6,800 12 AA MG, complete, .50 cal. 38,600 4 sound locators 18,000 120,800 <u>Engineer:</u> 4 searchlights, AA complete 100,000 100,000 <u>Signal:</u> 1 monocoord switchbd., BD-71 125 1 monocoord switchbd., BD-72 175 1 telephone (outdoor) with head & chest set 77 20 telephones (field) 800 10 head & chest set (field) 400 1 1/2 miles field wire 75 Contingency 75 1,727	\$120,800	\$100,000	\$	\$ 1,727	\$	\$ 222,527
5	5	A	<u>AA BATTERY NO. 4, (3-3" F,</u> <u>PORT HEATH</u> <u>(3 guns installed)</u> Machine Gun Detachment, 4 Platoons, <u>16 - .50 Cal. Machine Guns</u> 4 - MG, Btry. Winthrop 8 - MG, Btry. Lincoln, Btry. Kellogg, Ft. Banks 4 - MG, Deer Island <u>SEARCHLIGHT DETACHMENT</u> No. 10 AA S-L, Deer Island " 12 AA S-L, Winthrop Head " 12 AA S-L, Revere Beach <u>Ordinance:</u> 1 director with data Transm. system 38,000 3 "On carriage" equipment & alterations 6,800 1 height finder 20,000 1 stereoscopic tester 100 4 fuse setters 3,400 4 BC telescopes, AA 6,800 16 AA MG, complete, .50 cal. 38,600 3 sound locators 18,000 140,000 <u>Engineer:</u> 3 searchlight, AA complete 75,000 75,000 <u>Signal:</u> 1 monocoord switchbd., BD-71 125 1 monocoord switchbd., BD-72 175 1 telephone (outdoor) with head & chest set 77 20 telephones, field 800 10 head & chest set (field) 400 2 miles, field wire 100 Contingency 75 1,727	140,000	75,000		1,727		216,752

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EXHIBIT NO. 8-2

Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	Ordnance	Engineer		Signal		Total
					Material	Labor	Material	Labor	
5	6	A	<u>AA BATTERY NO. 5, (3-3" Mobile)</u> <u>FORT RUCKMAN</u> <u>Machine Gun Detachment, 4 Platoons,</u> <u>16 - .50 Cal. Machine Guns</u> 8 - MG, Btry. Gardner, Ft. Ruckman 8 - MG, East Point <u>SEARCHLIGHT DETACHMENT</u> No. 14 AA S-L, between Spouting Horn - East Point No. 15 AA S-L, Phillips Point <u>Ordnance:</u> 3 - 3" AA guns mobile, complete \$120,000 1 director with data Transm. system 32,000 1 recuperator, spare, incl. in cost of guns 1 height finder 20,000 1 stereoscopic tester 100 4 fuze setters 3,400 5 BC telescopes AA 8,500 16 AA MG complete, .50 cal. 52,800 2 sound locators 12,000 <u>\$248,800</u> <u>Engineer:</u> 2 searchlights, AA complete 50,000 50,000 <u>Signal:</u> 1 monosord switchboard, BD-71 125 1 monosord switchboard, BD-72 175 1 telephone (outdoor) with head & chest set 77 20 telephones, field 800 10 head & chest sets (field) 400 1 mile, field wire 50 Contingency 75 1,702	\$248,800	\$ 50,000	\$	\$ 1,702	\$	\$ 300,502
5	7	B	<u>AA OBSERVATION POSTS</u> <u>Ordnance:</u> 12 field glasses 760 760 <u>Signal:</u> 12 telephone hand sets 144 144	760			144		904
TOTALS				\$777,770	\$375,000		\$7,756		\$1,160,526

Class A - To be procured and installed in peacetime.
Class B - To be procured in peacetime and installed when an emergency arises.
Class C - To be procured and installed when an emergency arises.

Note: No expenditure of funds by the Chemical Warfare Service, Coast Artillery Corps, or for land is contemplated in this Annex.

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ANNEX F
SUPPORTING AIRCRAFT

SECRET

AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34) (Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-38) (Misc.) E, dated May 19, 1938

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ANNEX F

SUPPORTING AIRCRAFT.

1. Mission: To furnish observation and surveillance missions for gun defenses of Fort Andrews, Fort Banks, Fort Duvall, Fort Heath, Fort Revere, Fort Ruckman, Fort Standish Fort Strong and Fort Warren.

2. Equipment required: One (1) Observation Flight; three planes equipped with radio.

3. Landing Fields:

a. Operating:

(1) Boston Airport, Boston, Mass.

b. Emergency:

- (1) Naval Reserve Station, Squantum, Mass.
- (2) Dennison Airport, North Quincy, Mass.
- (3) Muller Field, Revere, Mass.
- (4) Brockton Airport, Brockton, Mass.
- (5) Boston Metropolitan Airport, Norwood, Mass.
- (6) Natick - Wellesley Airport, Natick, Mass.
- (7) Beverly Airport, Beverly, Mass.
- (8) Clark Airport, Hanover, Mass.

4. Gas and Oil: To be requisitioned for and maintained on hand at Air Corps Detachment, Boston Airport, Boston, Mass.

5. Communications:

a. Local telephone system. Air Corps Detachment, Boston Airport.

b. Radio between planes on missions and the Harbor Defense Command Post.

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ANNEX G

GAS DEFENSE

SECRET

AUTHORITIES

This Annex was prepared January 25, 1934, by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

Approved by the Secretary of War in the 14th Indorsement, AG 660.2 (1-25-34) (Misc.) E, dated August 13, 1934.

First Revision approved by the Secretary of War in 4th Indorsement, AG 660.2 (1-29-38) (Misc.) E, dated May 19, 1938.

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ANNEX G

GAS DEFENSE

1. a. This project contemplates the use of the collective protector unit M1 or later model, having a rated capacity of 200 cubic feet per minute. Three cubic feet per minute per person not physically active, and ten cubic feet for personnel of plotting rooms is required. Therefore one unit will supply a maximum of 20 persons actively engaged or 67 persons not active. There are the further conditions that each person should be allowed 150 cubic feet of space; and that one unit will supply the necessary slight positive air pressure to a room of no more than 10,000 cubic feet capacity.

b. The basis for providing reserve canisters is that the life of the canister is 40 hours; and the assumption that there may be two gas attacks of eight hours each, each week for three months. This is a very ample allowance.

c. Only permanent and bombproof structures should, in general, be gas-proofed. Power plants do not require protection, nor do isolated fire control stations. Short range batteries of the secondary armament are not protected. Provision for gas defense is to be made whenever new emplacements are constructed.

d. For personnel outside of gas-proofed rooms, reliance is placed on gas masks, protective clothing and the employment of trained squads of men using chloride of lime to neutralize mustard gas. All of this personal and organizational equipment is outside the scope of this project.

2. a. Attack by gas must ordinarily be carried out by airplane since otherwise the expenditure of naval ammunition would be excessive. The fire of antiaircraft guns and machine guns will be a deterrent to effective gas attack.

b. Attack with persistent gas is the chief concern.

3. Provision is made in this project for complete gas-proofing of the plotting rooms, and a rest room at each battery where a room is available without undertaking new construction. Aid stations may be established in the rest rooms. Evacuations should be first to military and then to civil hospitals.

4. No acquisition of land by purchase or lease is required for installations prescribed in this Annex.

5. Cost Estimate. An estimate of cost and priority guide is appended as Exhibit 1-G. Those items which should be procured and installed in peace time are marked with an A. Those which should be procured in peace but whose installation may be deferred until an emergency arises are marked B. Those items to be procured and installed when an emergency arises are marked C.

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Priorities subject to change based on availability of funds.

Priority	Item	Class	Description of Project	No. of Cubic Feet	No. of Persons	No. of Collective Prots.	No. of Reserve Canis- ters	Chemical Warfare Service	Engineer		Total
									Material	Labor	
9	1		<u>FT. DUVALL (Btry. Long)</u>								
		A	Plotting Room	2,745	16	1	4	\$ 1,860	\$ 300	\$ 75	\$ 2,235
		B	Rest Room	2,650	18	1	4	1,860	300	75	2,235
	2		<u>FT. HUCKMAN (Btry. Gardner)</u>								
		A	Plotting Room	2,448	16	1	4	1,860	300	75	2,235
		B	Rest Room	2,800	19	1	4	1,860	300	75	2,235
			<u>FT. WARREN</u>								
	3	A	Btry. Stevenson Plotting Room	7,200	16	1	4	1,860	300	75	2,235
		B	Btry. Stevenson Rest Room	13,600	90	2	8	3,720	600	150	4,470
		A	1st Mine Command Plotting Room	2,068	14	1	4	1,860	300	75	2,235
		B	1st Mine Command Casemate	2,688	4	1	4	1,860	300	75	2,235
		B	1st Mine Command Rest Room	1,584	10	1	4	1,860	300	75	2,235
	4		<u>FT. HEATH (Btry. Winthrop)</u>								
		A	Plotting Room	3,456	16	1	4	1,860	300	75	2,235
		B	Rest Room (Not Bombproof)	1,512	10	1	4	1,860	300	75	2,235
	5		<u>FT. REVERE (Btry. Sanders)</u>								
		A	Plotting Room	2,160	14	1	4	1,860	300	75	2,235
		B	Rest Room	1,000	7	1	4	1,860	300	75	2,235
	6		<u>FT. STANDISH</u>								
		A	Btry. Terrill Plotting Room	1,920	13	1	4	1,860	300	75	2,235
		B	Btry. Terrill Rest Room (Not Bombproof)	1,386	9	1	4	1,860	300	75	2,235
		B	Btry. Whipple Rest Room	2,100	14	1	4	1,860	300	75	2,235
	7		<u>FT. ANDREWS (Btry. McCook)</u>								
		A	Plotting Room	1,568	10	1	4	1,860	300	75	2,235
		B	Rest Room	2,430	16	1	4	1,860	300	75	2,235
	8		<u>FT. STRONG (2d Mine Command)</u>								
		A	Plotting Room	1,547	10	1	4	1,860	300	75	2,235
		B	Casemate	4,030	4	1	4	1,860	300	75	2,235
		B	Rest Room	2,016	13	1	4	1,860	300	75	2,235
	9		<u>FT. BANKS</u>								
		A	Btry. Kellogg Plotting Room	3,500	16	1	4	1,860	300	75	2,235
		B	Btry. Kellogg Rest Room	5,000	33	1	4	1,860	300	75	2,235
		A	Btry. Lincoln Plotting Room	3,500	16	1	4	1,860	300	75	2,235
		B	Btry. Lincoln Rest Room	5,000	33	1	4	1,860	300	75	2,235
			TOTALS					\$ 48,360	\$ 7,800	\$ 1,950	\$ 58,110

Class A - To be procured and installed in peacetime.

Class B - To be procured in peacetime and installed when an emergency arises.

Class C - To be procured and installed when an emergency arises.

Note: No expenditure of funds by the Ordnance Department, Signal Corps, Coast Artillery Corps, or for land, is contemplated in this Annex.

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EXHIBIT NO. 1-G

ANNEXES H-M

ESTIMATES-CHIEFS OF ARMS AND SERVICES

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ANNEX H

ESTIMATES, CHIEF OF COAST ARTILLERY

Annex	Priority	Item	Class A	Total
D	2	1	\$ 97,215	\$ 97,215

The following is a recapitulation of the total cost of all Annexes:

Annex	Procuring Service	Class A	Class B	Class C	Total
A	Engineers	\$	\$ 2,167	\$	\$ 2,167
	Ordnance		9,200		9,200
	Quartermaster			12,000	12,000
	TOTAL		\$ 11,367	\$ 12,000	\$ 23,367
B	Engineers	36,425	10,400	7,400	54,225
	Ordnance	201,087	39,725		240,812
	Signal Corps	167,788	4,012	4,178	175,978
	TOTAL	\$ 405,300	\$ 54,137	\$ 11,578	\$ 471,015
C	Engineers	13,200	80,180		93,380
	Signal Corps	175	3,154		3,329
	TOTAL	\$ 13,375	\$ 83,334		\$ 96,709
D	Coast Artillery	97,215			97,215
	TOTAL	\$ 97,215			\$ 97,215
E	Engineers	375,000			375,000
	Signal Corps	7,612	144		7,756
	Ordnance	777,010	760		777,770
	TOTAL	\$1,159,622	\$ 904		\$1,160,526
G	Engineers	4,125	5,625		9,750
	Chemical Warfare	20,460	27,900		48,360
	TOTAL	\$ 24,585	\$ 33,525		\$ 58,110
GRAND TOTAL		\$1,700,097	\$183,267	\$ 23,578	\$1,906,942

APPROVED BY CHIEF OF COAST ARTILLERY
March 17, 1939.

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ANNEX J

ESTIMATES, CHIEF OF ENGINEERS

Annex:	Priority:	Item:	Class A	Class B	Class C	Total
A	:	:	:	:	:	:
	:	:	:\$	2,167	:\$	2,167
B	1	1	3,500	:	:	3,500
	:	2	5,000	:	:	5,000
	:	5	:	2,800	1,400	4,200
	:	6	:	3,600	1,800	5,400
	:	7	7,000	:	:	7,000
	:	9	7,550	:	:	7,550
	:	10	8,300	:	:	8,300
	:	11	:	4,000	3,500	7,500
	:	23	:	:	200	200
	:	28	5,000	:	:	5,000
	:	45	75	:	:	75
	:	102	:	:	500	500
TOTAL			36,425	10,400	7,400	54,225
C	1	1	:	18,940	:	18,940
	:	2	:	18,940	:	18,940
	3	3	:	8,570	:	8,570
	3	5	13,200	:	:	13,200
	3	10	:	14,790	:	14,790
	3	11	:	18,940	:	18,940
TOTAL			13,200	80,180	:	93,380
E	5	2	100,000	:	:	100,000
	:	3	50,000	:	:	50,000
	:	4	100,000	:	:	100,000
	:	5	75,000	:	:	75,000
	:	6	50,000	:	:	50,000
TOTAL			375,000	:	:	375,000

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ANNEX J (CONT'D.)

Annex:	Priority:	Item:	Class A	:	Class B	:	Class C	:	Total	
G	:	9	:	1	:	\$ 375	:	\$ 375	:	\$ 750
	:		:	2	:	375	:	375	:	750
	:		:	3	:	750	:	1,500	:	2,250
	:		:	4	:	375	:	375	:	750
	:		:	5	:	375	:	375	:	750
	:		:	6	:	375	:	750	:	1,125
	:		:	7	:	375	:	375	:	750
	:		:	8	:	375	:	750	:	1,125
	:		:	9	:	750	:	750	:	1,500
TOTAL			:	:	:	:	:	:	:	:
			:	\$ 4,125	:	\$ 5,625	:		:	\$ 9,750
GRAND TOTALS			:	:	:	:	:	:	:	:
			:	\$ 428,750	:	\$ 98,372	:	\$ 7,400	:	\$ 534,522

Approved by Chief of Engineers:
February 14, 1939.

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ANNEX K

ESTIMATES, CHIEF OF ORDINANCE

Annex:	Priority :	Item :	Class A :	Class B :	Total
			:\$:\$:\$
A :	7 :	1 :		9,200 :	9,200
B :	1 :	2 :	500 :		500
		3 :	500 :		500
		4 :	2,300 :		2,300
		5 :		6,300 :	6,300
		6 :		6,300 :	6,300
		7 :	6,300 :		6,300
		8 :	4,500 :		4,500
		9 :	6,300 :		6,300
		10 :	6,300 :		6,300
		11 :		6,300 :	6,300
		12 :		1,800 :	1,800
		13 :	35,200 :		35,200
		15 :	6,300 :		6,300
		16 :	6,300 :		6,300
		17 :	6,300 :		6,300
		18 :	500 :		500
		19 :	6,300 :		6,300
		20 :		6,300 :	6,300
		20 :		1,800 :	1,800
		21 :	35,065 :		35,065
		23 :		3,725 :	3,725
		24 :	2,300 :		2,300
		28 :	1,800 :		1,800
		29 :	2,945 :		2,945
		32 :	1,800 :		1,800
		34 :	2,945 :		2,945
		36 :	1,800 :		1,800
		38 :	1,800 :		1,800
		39 :	2,945 :		2,945
		42 :	2,300 :		2,300
		43 :	1,800 :		1,800
		44 :	1,800 :		1,800
		45 :	4,500 :		4,500
		46 :	2,945 :		2,945
		48 :	1,800 :		1,800
		49 :	1,800 :		1,800
		50 :	4,500 :		4,500

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Annex:	Priority :	Item :	Class A :	Class B :	Total
			\$	\$	\$
B	1	51	2,945		2,945
		53	1,800		1,800
		54	1,800		1,800
		55	4,500		4,500
		56	6,300		6,300
		57	2,945		2,945
		61	1,800		1,800
		65	83		83
		68	250		250
		69	4,500		4,500
		74	1,800		1,800
		78	1,800		1,800
		81	1,800		1,800
		85	83		83
		88	1,800		1,800
		91	418		418
		93	1,800		1,800
		96	418		418
		98	1,800		1,800
		102		7,200	7,200
TOTAL			\$ 201,087	\$ 39,725	\$ 240,812
E	1	1	110		110
	5	2	146,500		146,500
		3	120,800		120,800
		4	120,800		120,800
		5	140,000		140,000
		6	248,800		248,800
		7		760	760
TOTAL			\$ 777,010	\$ 760	\$ 777,770
GRAND TOTALS			\$ 978,097	\$ 49,685	\$1,027,782

Approved by Chief of Ordnance:
February 24, 1939.

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ANNEX L

ESTIMATES, CHIEF OF CHEMICAL WARFARE SERVICE

Annex:	Priority:	Item:	Class A	:	Class B	:	Total
G	6	1	\$ 1,860	:	\$ 1,860	:	\$ 3,720
		2	1,860	:	1,860	:	3,720
		3	1,860	:	3,720	:	5,580
			1,860	:	1,860	:	3,720
				:	1,860	:	1,860
		4	1,860	:	1,860	:	3,720
		5	1,860	:	1,860	:	3,720
		6	1,860	:	1,860	:	3,720
				:	1,860	:	1,860
		7	1,860	:	1,860	:	3,720
		8	1,860	:	1,860	:	3,720
				:	1,860	:	1,860
		9	1,860	:	1,860	:	3,720
			1,860	:	1,860	:	3,720
GRAND TOTALS			\$ 20,460	:	\$ 27,900	:	\$ 48,360

Approved by Chief, Chemical Warfare Service.
February 14, 1939.

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ANNEX M

ESTIMATES, CHIEF SIGNAL OFFICER

Annex:	Priority:	Item:	Class A	Class B	Class C	Total
B	1	2:	\$ 3,913	\$	\$	3,913
		3:	3,801			3,801
		4:	236			236
		5:		534	504	1,038
		6:		1,839	2,584	4,423
		7:	1,554			1,554
		9:	1,359			1,359
		10:	1,256			1,256
		11:		726	1,090	1,816
		13:	4,100			4,100
		14:	100			100
		15:	274			274
		17:	274			274
		18:	244			244
		19:	274			274
		20:		274		274
		21:	4,100			4,100
		22:	100			100
		23:		231		231
		24:	166			166
		28:	474			474
		30:	25			25
		38:	274			274
		42:	166			166
		56:	274			274
		61:	2,324			2,324
		81:	2,324			2,324
		102:		408		408
		103:	9,000			9,000
		106:	3,750			3,750
		107:	3,750			3,750
		108:	3,750			3,750
		112:	3,750			3,750
		116:	5,010			5,010
		117:	3,010			3,010
		122:	28,020			28,020
		123:	8,682			8,682
		124:	12,857			12,857
		125:	22,330			22,330
		126:	10,552			10,552
		127:	25,715			25,715
TOTAL			\$ 167,788	\$ 4,012	\$ 4,178	\$ 175,978

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ANNEX M (CONT'D.)

Annex:	Priority:	Item:	Class A :	Class B :	Class C :	Total
C	1	1	\$	\$ 687	\$	687
		2		687		687
	3	3		406		406
		5	175			175
		10		687		687
		11		687		687
TOTAL			\$ 175	\$ 3,154	\$	3,329
E	1	1	\$ 545	\$	\$	545
		2	727			727
		3	1,159			1,159
		4	1,727			1,727
		5	1,752			1,752
		6	1,702			1,702
		7		144		144
TOTAL			\$ 7,612	\$ 144	\$	7,756
GRAND TOTALS			\$175,575	\$ 7,310	\$ 4,178	\$187,063

Approved by the Chief Signal Officer:
February 9, 1939.

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