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ANNEXES TO HARBOR DEFENSE PROJECT
HARBOR DEFENSES OF THE COLUMBIA

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

Under the provisions of A.R. 330-5 (paragraph 17 c), 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.

SECRET

AUTHORITIES

1. This Annex was prepared February 9, 1937 by a Board of Officers appointed under the provisions of paragraph 1 d, AR 100-20.

2. Approved by the Secretary of War in the 19th Indorsement, AG 660.2 (2-21-35)(Misc.) E, dated June 30, 1937.

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ANNEX A

SEACOAST GUNS

1. The tactical organization of the Harbor Defenses of The Columbia is shown on Exhibit 1-A. The commanding officer of Group 1, the commanding officer of Group 2, and the antiaircraft groupment commander, are designated as the Fort Commanders at Forts Stevens, Canby, and Columbia, respectively.

2. The fields of fire and the dead areas of the guns are shown on Exhibits 2-A to 7-A, inclusive. The fields of view of the observing stations and the lengths of baselines are shown in exhibits of Annex B.

3. The following batteries are required to carry out the mission of the harbor defense and are included in this project:

Group 1 (12" mortars)

Battery Guenther (Battery No. 1)
Battery Clark (Battery No. 5)
Railway Battery (Battery No. 7)

Group 2 (6" Guns)

Battery Allen (Battery No. 2)
Battery Murphy (Battery No. 3)
Mine Battery (Battery No. 4)
Battery Pratt (Battery No. 6)

All of the armament is installed except the Railway Battery (No. 7).

4. Battery Guenther (Ft. Stevens). - For location and field of fire, see Exhibit 2-A. This battery is designated in these annexes as Battery No. 1, and consists of four 12" mortars.

5. Battery Clark (Ft. Stevens). - For location and field of fire see Exhibit 5-A. This battery is designated in these annexes as Battery No. 5, and consists of four 12" mortars.

6. Railway Battery. - For location and field of fire, see Exhibit 7-A. This battery is designated in these annexes as Battery No. 7, and consists of four 12" mortars mounted on railway carriages. When employed in this harbor defense the firing position of this battery will be in rear of the hills on the right flank of Battery Russell. This site was approved by the Secretary of War in 9th Indorsement, dated January 22, 1934 (AG 660.2 (6-26-33)(Misc.) E). This will require the construction of a railroad from a point on the Jetty Railroad just north of old Fort Stevens to the position selected, a distance of about 2400 yards. A railroad formerly connected this point with Battery Russell and utilization of the old road bed will reduce the cost of construction.

7. Battery Allen (Ft. Canby). - For location and field of fire, see Exhibit 3-A. This battery is designated in these annexes as Battery No. 2, and consists of two 6" guns, mounted on disappearing carriages.

8. Battery Murphy (Ft. Columbia). - For location and field of fire, see Exhibit 4-A. This battery is designated in these annexes as Battery No. 3, and consists of two 6" guns, mounted on disappearing carriages.

9. Battery Pratt (Ft. Stevens). - For location and field of fire, see Exhibit 6-A. This battery is designated in these annexes as Battery No. 6, and consists of two 6" guns, mounted on disappearing carriages.

10. Ammunition. - The war reserve and battle allowances of seacoast ammunition are shown in Exhibit 8-A.

11. Cost estimate. - An estimate of cost and priority guide is appended as Exhibit 9-A. Those items which should be procured and installed in peace time are marked with an A. Those items which should be procured in peace time 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.

TACTICAL ORGANIZATION - HARBOR DEFENSES OF THE COLUMBIA

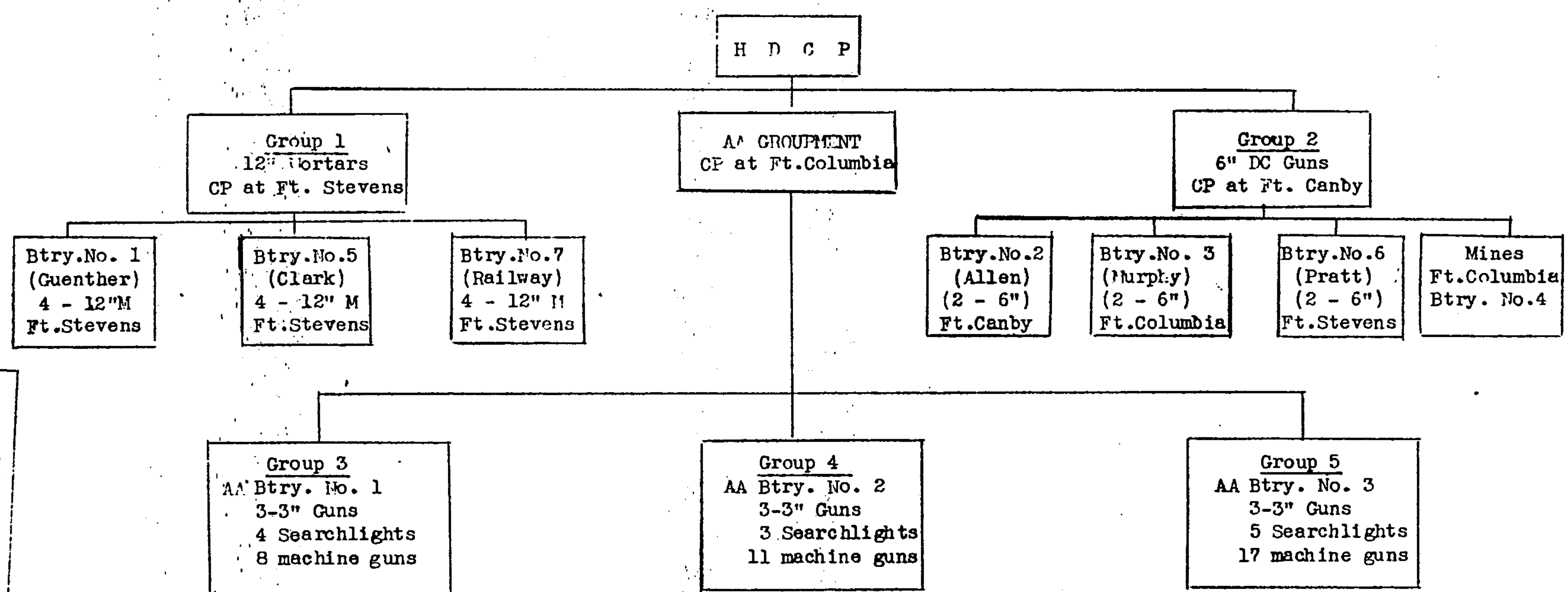

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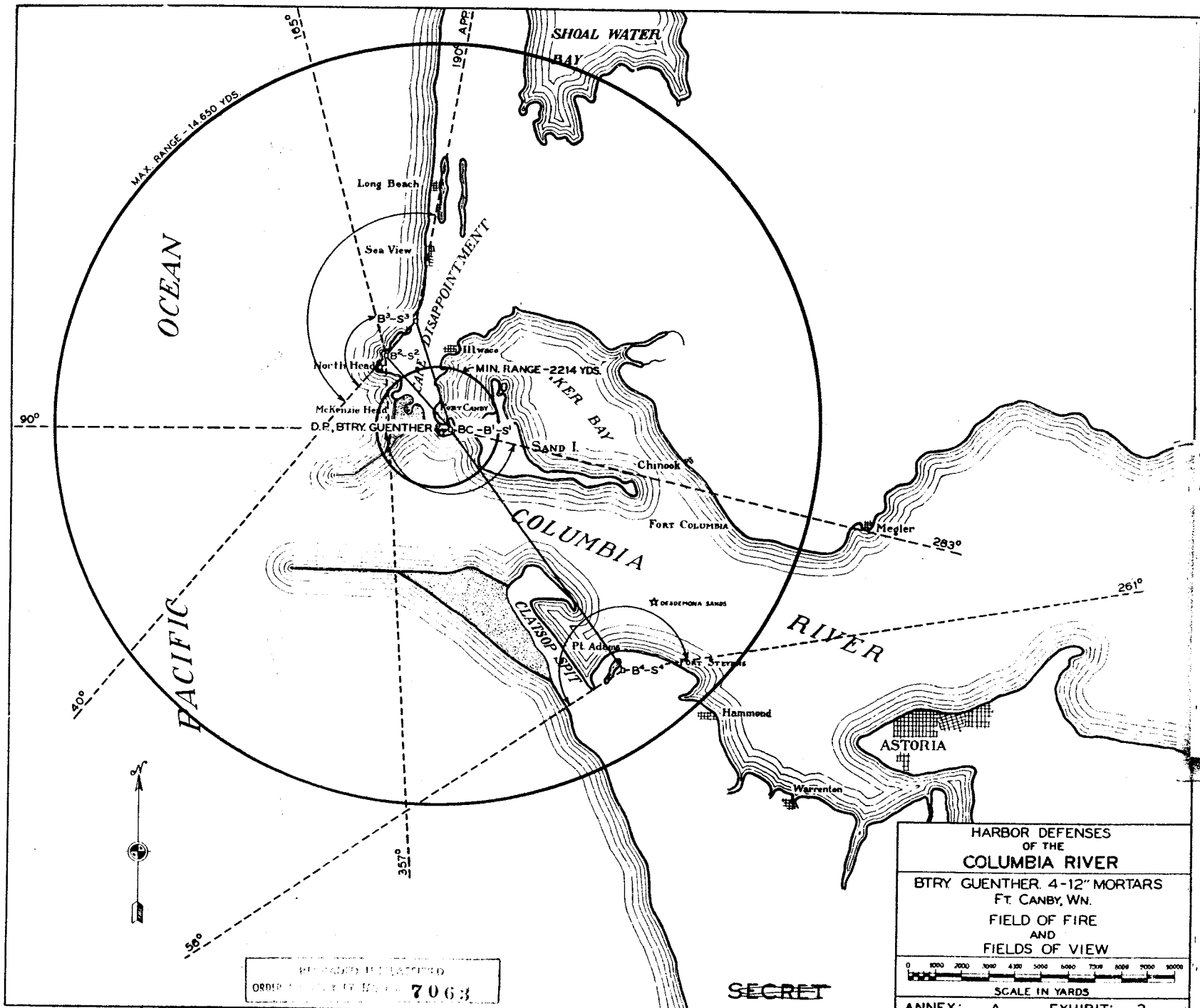
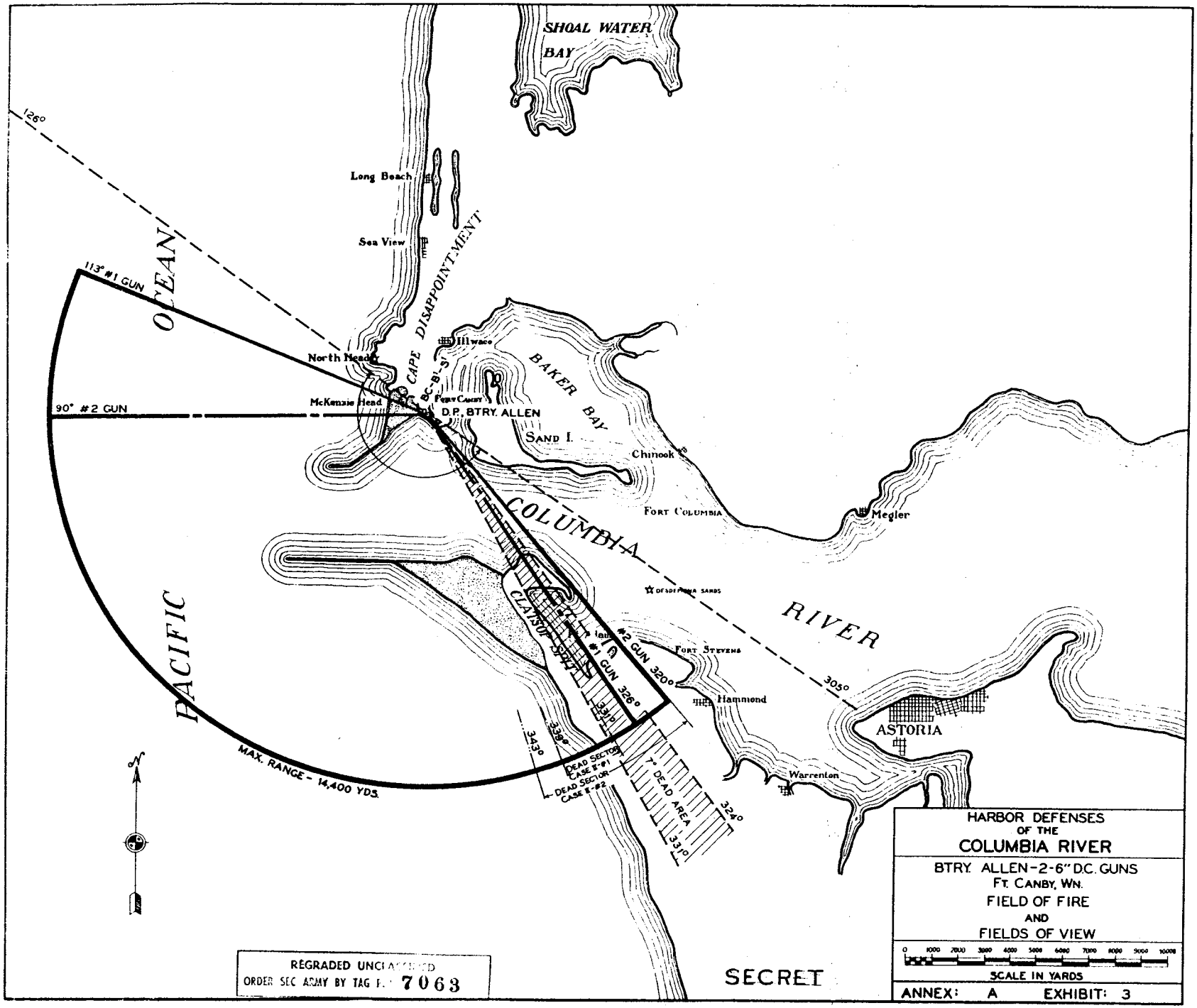
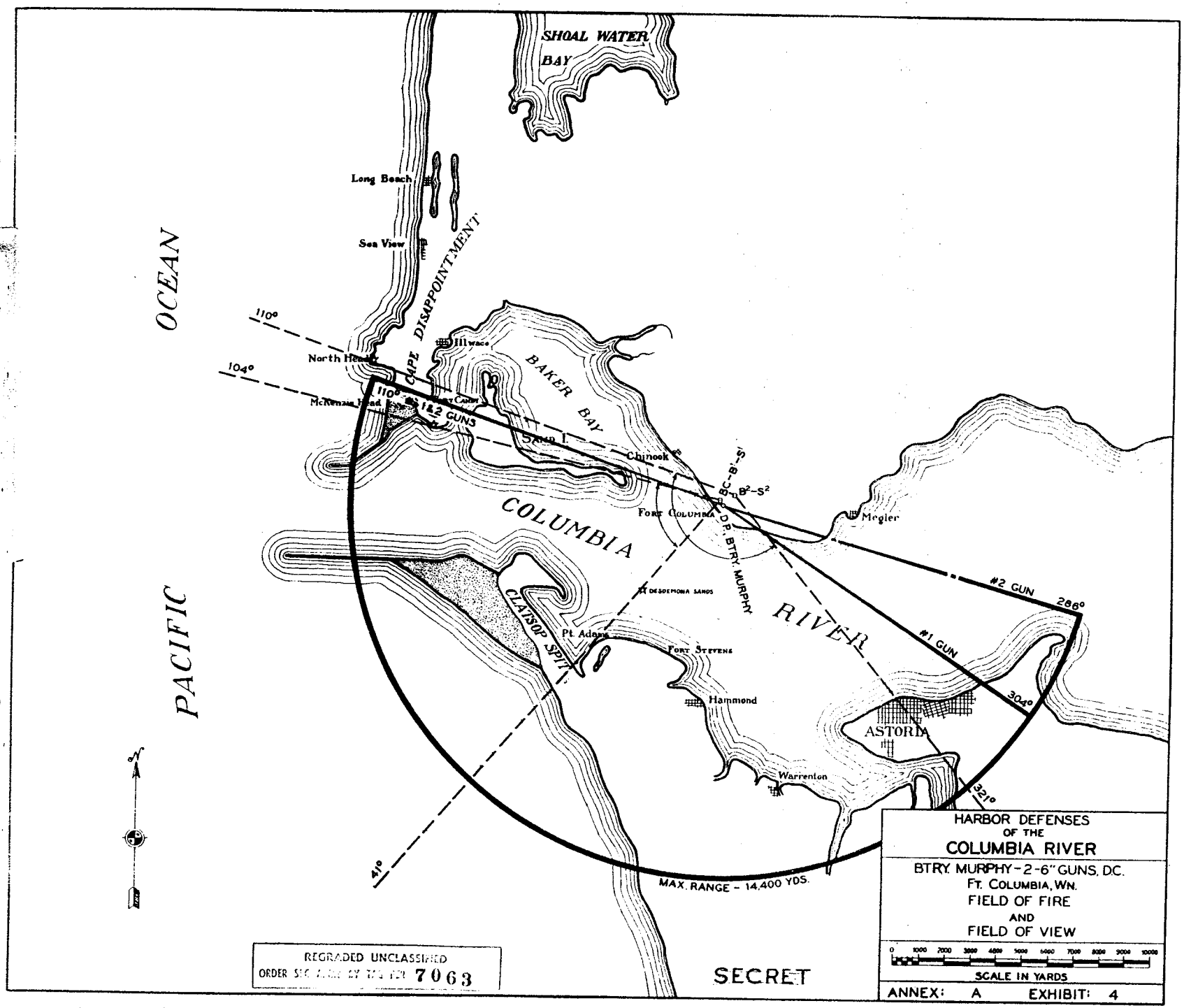
EXHIBIT 1-A







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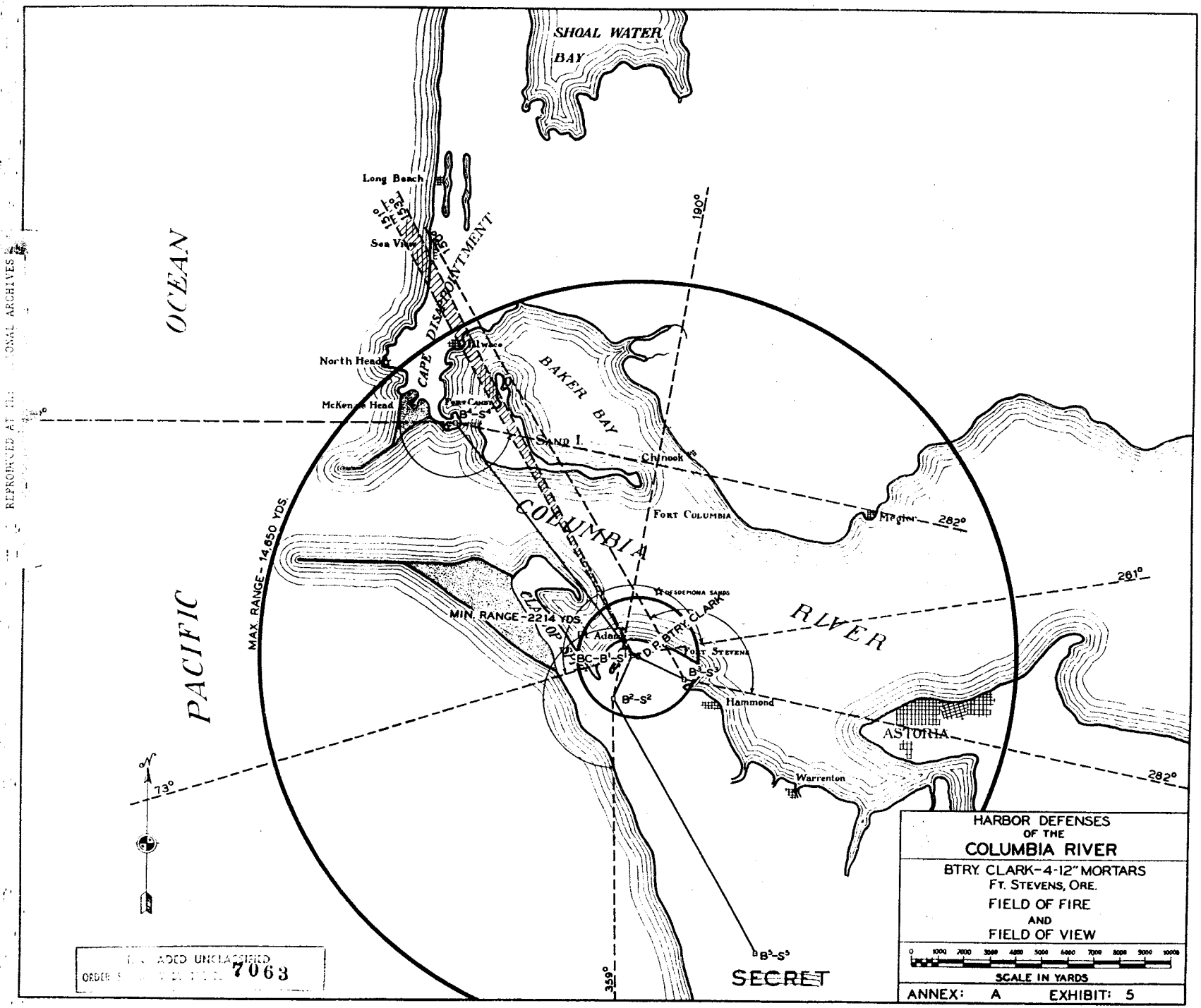
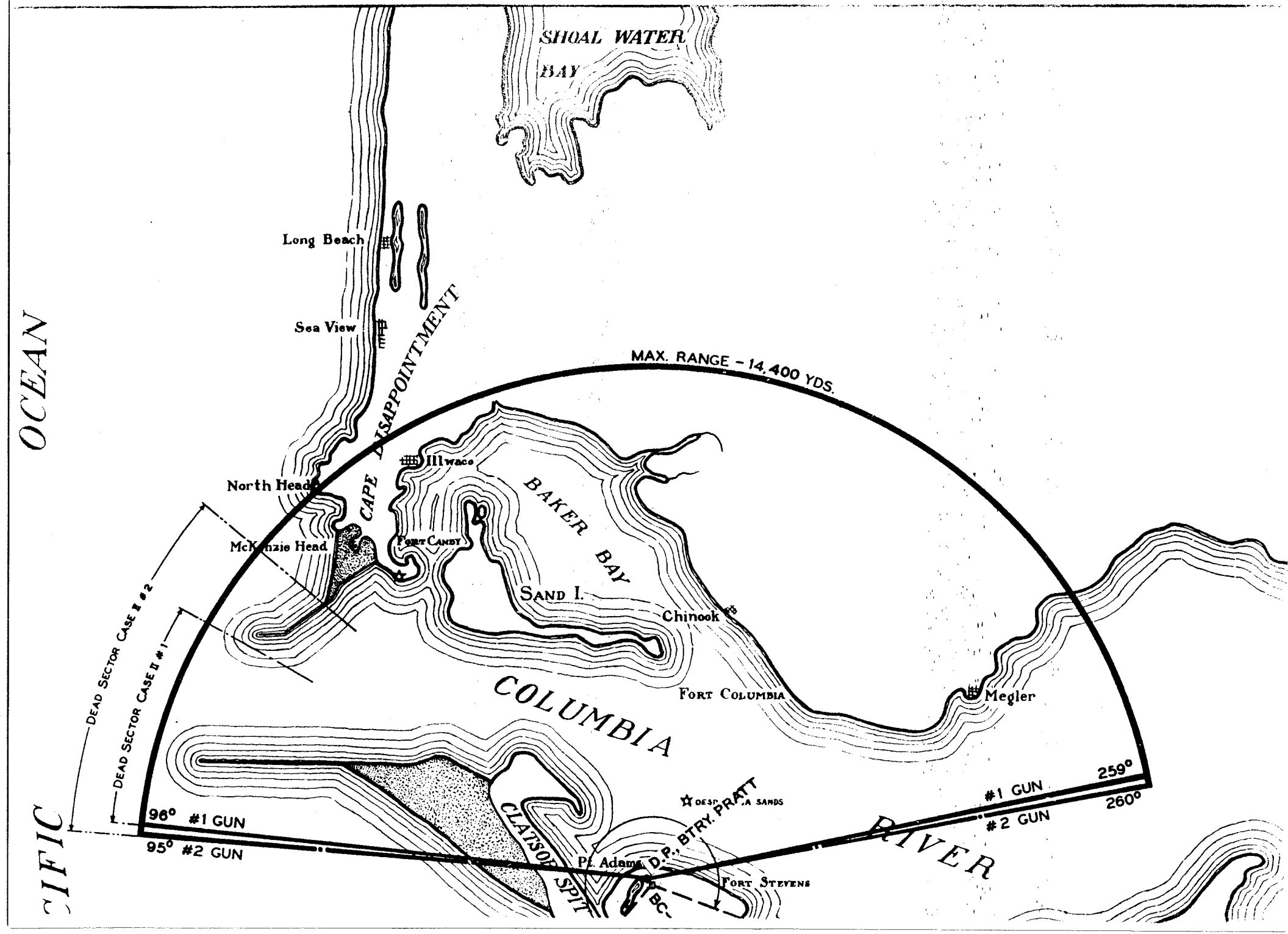
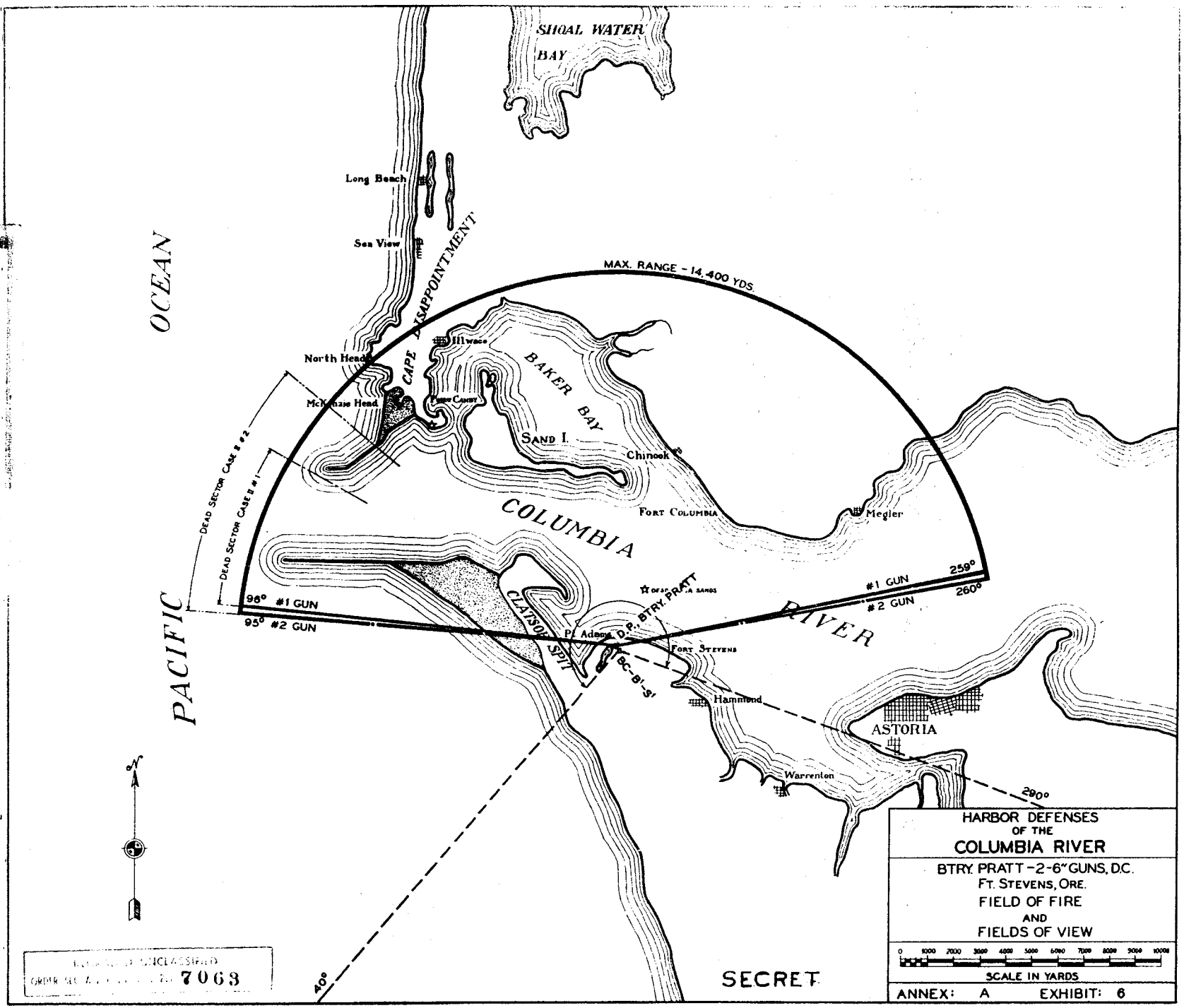
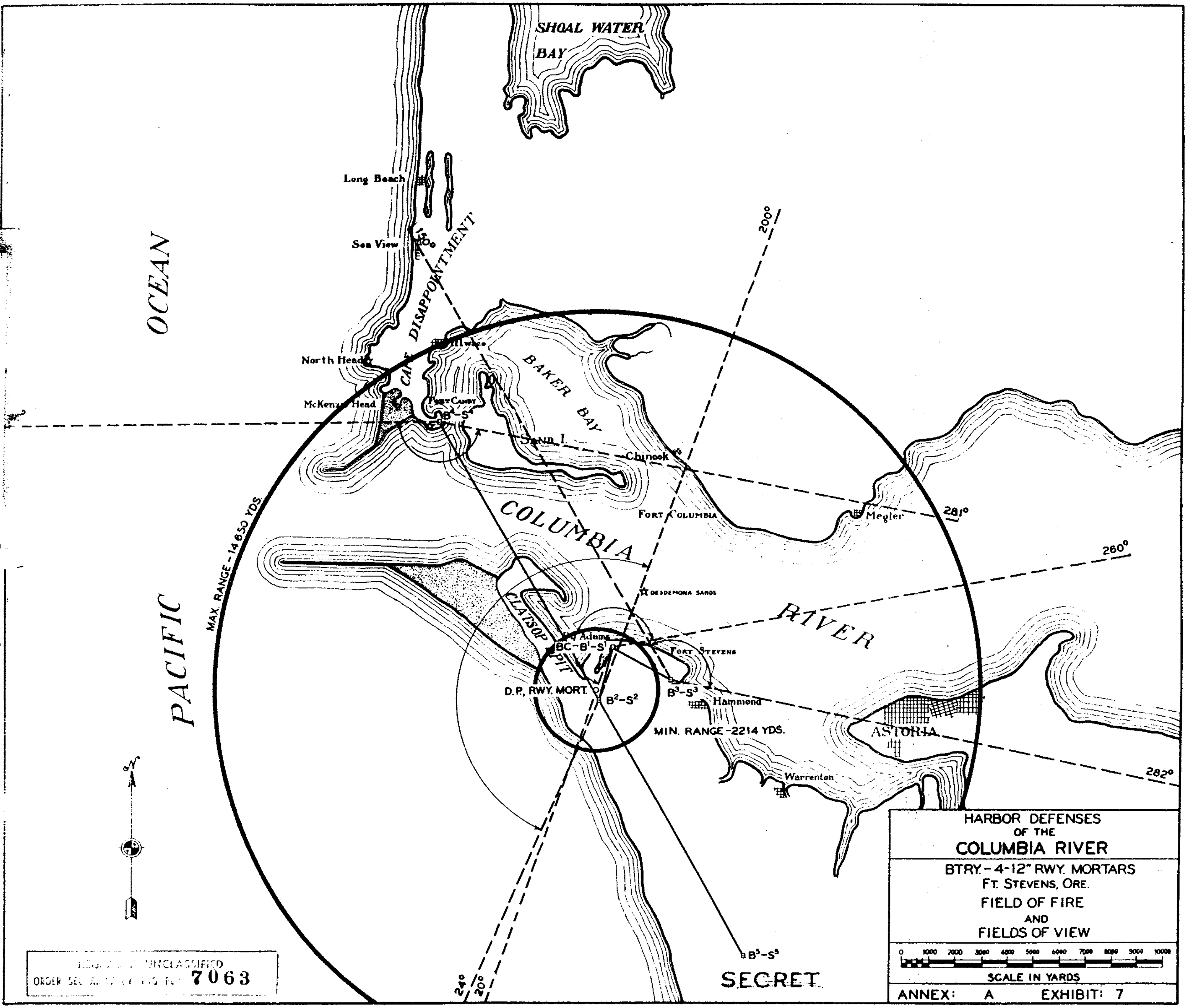



SHOAL WATER BAY
Long Beach
Sea View
OCEAN
CAPE DISAPPOINTMENT
MAX. RANGE - 14,400 YDS.
Illwaco
North Head
McKenzie Head
FORT CANBY
BAKER BAY
SAND I.
Chinook
FORT COLUMBIA
Megler
COLUMBIA
DEAD SECTOR CASE II #2
DEAD SECTOR CASE II #1
96° #1 GUN
95° #2 GUN
CLATSOP SPIT
Pt. Adams D.P.
BTRY. PRATT
FORT STEVENS
#1 GUN 259°
#2 GUN 260°
RIVER





WAR RESERVE AND BATTLE ALLOWANCES OF AMMUNITION
HARBOR DEFENSES OF THE COLUMBIA

Approved by the Secretary of War in 15th Indorsement, W.D., A.G.O., May 22, 1934 (AG 381.4 (3-13-33)(Misc.) E.

Battery	No. of Guns	Cal.	Class	Fort	Wt. of Proj.	Battle Allowance	War Reserve	Place of Storage
No.1, Guenther	4	12"M	B	Canby	700	640	640	Battery
					1046	320	320	"
" 2, Allen	2	6"DC M1905	B	"	AP	1200	1200	"
					HE	200	400	"
" 3, Murphy	2	6"DC M1897 M1	B	Columbia	AP	1200	1200	"
					HE	200	400	"
" 5, Clark	4	12"M	B	Stevens	700	720	720	"
					1046	240	240	"
" 6, Pratt	2	6"DC M1897 M1	B	"	AP	1200	1200	"
					HE	200	400	"
" 7, Ry.	4	12"M Ry.	-	-	700	720	720	25% in mag. Btry. Russell Remainder in Central Reserve.
					1046	240	240	

EXHIBIT 8-A

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ANNEX A EXHIBIT 9-A COST ESTIMATE AND PRIORITY GUIDE H.D. OF THE COLUMBIA

Priorities subject to change based on availability of funds

Priority	Item	Class	Description of Project	Engineer Material	Engineer Labor	Total
7	1	C	Construction of firing spurs for railway mortar battery and of railroad track from Jetty Railroad to firing position selected. About 2600 yards of track using 80 lb. rails	$ 12,450	$ 8,950	$ 21,400
			TOTAL	$ 12,450	$ 8,950	$ 21,400

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

SECRET

EXHIBIT 9-A

ANNEX B

FIRE CONTROL INSTALLATIONS

1. The tactical organization of the batteries of the harbor defense is shown on Exhibit 1-A. 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 (Exhibit 1-B). The location on the ground of the elements of the fire control system provided for in this project is shown on Exhibit 2-B.

2. Fire control stations.

FT. CANBY AREA

a. Location No. 1 (Exhibits 2-B, 1-E, 2-E). - 1,000 yards south of the village of Long Beach. At this site will be located antiaircraft searchlight No. 1 and antiaircraft OP No. 1. No construction is required.

b. Location No. 2 (Exhibit 2-B). - On the edge of a bluff about 1900 yards north of North Head Lighthouse. A 6-inch pipe set in a concrete base designates the base end and spotting stations ($B_1^3S_1^3$) for Battery No. 1 (Battery Guenther), 4-12" mortars. A small concrete dug-in 6' x 6' is required. Natural height of site, 100 ft. For limits of vision, see Exhibit 2-A. The two azimuth instruments required are on hand.

c. Location No. 3 (North Head) (Exhibit 2-B). - A concrete dug-in 6' x 6' now installed in front of the Lighthouse at North Head, houses the base end and spotting stations ($B_1^2S_1^2$) for Battery No. 1 (Battery Guenther), 4 - 12" mortars. Antiaircraft searchlight No. 2 and an antiaircraft OP No. 2 will be located at this station. Natural height of site, 148 feet. Height of instrument axis, 149.33 ft. This station is equipped with a DPF. One azimuth instrument is required and is on hand. For limits of vision see Exhibit 2-A.

d. Location 4 (McKenzie Head) (Exhibit 2-B). - The Group Commander's station (AA), Group 3, will be located at the position of Antiaircraft Battery No. 1 at McKenzie Head. No construction is required.

e. Location No. 5 (Ft. Canby)(Exhibit 2-B). - Under this heading are grouped all stations on the Ft. Canby Reservation, namely:

G-2
G-3
BC B^1S^1, Battery No. 1 (Battery Guenther, 4-12" M).
BC B^1S^1, Battery No. 2 (Battery Allen, 2-6" DC).
B^4S^4, Battery No. 5 (Battery Clark, 4-12" M).
B^4S^4, Battery No. 7 (Railway Battery, 4-12" M).
AA Searchlight No. 3.
AA OP No. 3.

(1) G-2 Station. - This is a two-level wood frame, plaster-covered structure, located on Cape Disappointment, about 320 yards northeast of Canby Light. It is protected in front by a hill. An officers' dormitory and an enlisted men's dormitory are located on the lower level. The observing room, 12' x 12', is on the top level. The controller for searchlight No. 4 is located in the observing room. One Swasey DPF is installed. One azimuth instrument, not on hand, is required. Natural height of site, 294 ft. Height of instrument axis, 296 ft. For limits of vision, see Exhibit 3-B.

(2) G-3 Station. - The command post of Group 3 (AA) will be located with AA Battery No. 1.

(3) The battery commander's station, base end and spotting stations (BC $B_1^1S_1^1$) for Battery No. 1 (Battery Guenther, 4-12" M) are located in a 10' x 14' dug-in at Cape Disappointment, about 240 yards northeast of Canby Light. Natural height of site, 264 ft. Height of instrument axis, 265 ft. This station is equipped with a DPF and a pedestal for an azimuth instrument. The required BC telescope and azimuth instrument are on hand. For limits of vision, see Exhibit 2-A.

(4) The battery commander's station, base end and spotting stations (BC $B_2^1S_2^1$) for Battery No. 2 (Battery Allen, 2-6" DC guns) are located in a 10' x 10' wood frame, plaster-covered structure, about 100 yards northwest of Battery Allen. It is protected by an earth fill to the height of the observing slot. Natural height of site, 222 ft. Height of instrument axis, 223 ft. This station is equipped with a Lewis DPF. The required azimuth instrument is not on hand. For limits of vision, see Exhibit 3-A.

(5) The base end and spotting stations ($B_5^4S_5^4$) for Battery No. 5 (Battery Clark, 4-12" M) are located in a 6'6" x 6'6" concrete dug-in on Cape Disappointment, about 280 yards northeast of Canby Light. Natural height of site, 286 ft. Height of instrument axis, 287.96 ft. This station is equipped with a DPF. One azimuth instrument is required and is on hand. For limits of vision, see Exhibit 5-A.

(6) The base end and spotting stations ($B_7^4S_7^4$) for Battery No. 7 (4-12" Ry. M) are located in a 6'6" x 6'6" concrete dug-in on Cape Disappointment, about 250 yards northeast of Canby Light. Natural height of site, 275 ft. Height of instrument axis, 275.92 ft. This station is equipped with a DPF. One azimuth instrument required is not on hand. For limits of vision, see Exhibit 7-A.

(7) AA Searchlight No. 3 and AA observation post No. 3 are located at the southern end of Cape Disappointment.

FT. COLUMBIA AREA

f. Location No. 6 (Chinook River)(Exhibit 2-B). - Antiaircraft observation post No. 4 and antiaircraft searchlight No. 4 will be located near the mouth of the Chinook River about 500 yards from the right bank.

g. Location No. 7 (Hill 660)(Exhibits 2-B and 1-D). -

(1) A small concrete dug-in should be constructed for an M^2 station on Hill 660, about 2200 yards east of the village of Chinook, Oregon. The area selected is densely wooded; several acres will have to be topped to provide observation. Forty acres of land should be acquired by the War Department for this installation. Right of way from the road to the site must also be secured. About 12,000 feet of cable will be required to connect this station with the Ft. Columbia installations. A 10-pr. cable should be installed (Exhibit 4-B). A DPF and an azimuth instrument are required and are not on hand.

(2) AA Searchlight No. 5 will be located on Hill 660.

h. Location No. 8 (Scarborough Hill)(Exhibit 2-B). - This location comprises the installations on Scarborough Hill, Ft. Columbia.

(1) A 12' x 12' wood frame, plaster-covered structure located on Scarborough Hill houses the base end and spotting stations ($B\frac{2}{3}S\frac{2}{3}$) for Battery No. 3 (Battery Murphy, 2-6" DC guns)(Exhibit 4-A). It is protected by an earth fill to the observing slot. The controller for Searchlight No. 5 is in this station. Natural height of site, 321 ft. Height of instrument axis, 323.58 ft. This station is equipped with a Swasey DPF. An azimuth instrument is required and is not on hand. For limits of vision, see Exhibit 4-A.

(2) A combined observing room and plotting room station on Scarborough Hill, about 400 yards northeast of Battery Murphy houses the Mine Command Station (Exhibit 1-D). It is of concrete, 18' x 18', and is protected by an earth fill. Controller for Searchlight No. 6 is in this station. Natural height of site, 325 ft. Height of instrument axis, 328.96 ft. The observing station is equipped with a Lewis DPF and an observing telescope. An azimuth instrument is required and is not on hand. For limits of vision, see Exhibit 1-D.

(3) The command post of Group 4, Antiaircraft, will be located with AA Battery No. 2 on Scarborough Hill. No construction is required.

i. Location No. 9 (Ft.Columbia)(Exhibit 2-B). - Under this heading are grouped all stations on the Ft. Columbia Reservation.

(1) The battery commander's station, base end and spotting stations (BC $B\frac{1}{3}S\frac{1}{3}$) for Battery No. 3 (Battery Murphy, 2-6" DC guns) is a 15' x 15' concrete structure located in Battery Jules Ord. There are two levels and the observing room is on the top level. Natural height of site, 107.5 ft. Height of instrument axis, 109.08 ft. This station is equipped with a Swasey DPF and an observing telescope. An azimuth instrument is required and is not on hand. For limits of vision, see Exhibit 4-A.

(2) The command post of the Antiaircraft Groupment is located in the rooms of the emplacement of Battery Jules Ord, Ft.Columbia (Exhibit 2-E).

(3) The mine casemate is located in a reinforced bomb-proof structure, 22' x 50', behind a rock knoll at Chinook Point, Ft. Columbia. It is about 14 ft. above MLW, and is well concealed and protected (Exhibit 1-D).

j. Location No. 10 (Megler)(Exhibit 2-B). - Antiaircraft observation post No. 5 and antiaircraft searchlight No. 6 are located on Hill 520, about 600 yards north of the village of Megler.

k. Location No. 11 (Exhibit 2-B). - Antiaircraft observation post No. 6 and antiaircraft searchlight No. 7 are located on Hill 900, about 7,000 yards northeast of Scarborough Hill.

FT. STEVENS AREA

l. Location No. 12 (Warrenton)(Exhibit 2-B). - Antiaircraft observation post No. 7 and antiaircraft searchlight No. 8 are located in the vicinity of Warrenton.

m. Location No. 13 (Exhibit 2-B). - Antiaircraft observation post No. 9 is located in the vicinity of Hammond.

n. Location No. 14 (Ft. Stevens)(Exhibit 2-B). - A twin station is located on a small reservation 280 yards east of Hammond Depot, Hammond, Oregon. It is a wooden frame structure, sheathed with corrugated iron. There are three levels, but only the top level is used for observing. The two lower levels may be used as dormitories. Natural height of site, 13 ft. Height of instrument axis, 40 ft.

(1) The base end and spotting stations ($B\frac{3}{5}S\frac{3}{5}$) for Battery No. 5 (Battery Clark, 4-12" M) occupy half of this station. A 10' x 10' level is equipped with a DPF. An azimuth instrument is required and is on hand. For limits of vision, see Exhibit 5-A.

(2) The base end and spotting stations ($B\frac{3}{7}S\frac{3}{7}$) for Battery No. 7 (4-12" Ry. M) occupy the other half of this structure. A 10' x 10' level is equipped with a DPF. An azimuth instrument is required and is not on hand. For limits of vision, see Exhibit 7-A.

(3) Antiaircraft observation post No. 8 is located here.

o. Location No. 15 (Exhibit 2-B). -

(1) Group 1 station is located in a two-level steel tower with a central concrete pier, about 270 yards southeast of Battery Clark, Ft. Stevens. The top level is 8' x 8'; the lower level, 15' x 15', has two piers for azimuth instruments, but the water area is completely obscured by tree tops. This station is equipped on the top level with a DPF; one azimuth instrument is required and is not on hand. Natural height of site, 23 ft. Height of instrument axis, 73 ft. For limits of vision, see Exhibit 3-B.

(2) The battery commander's station, base end and spotting stations (BC $B\frac{1}{5}S\frac{1}{5}$) for Battery No. 5 (Battery Clark, 4-12" M) are located in a wooden frame structure, sheathed with corrugated iron, located about 200 yards northeast of Battery Clark, Ft. Stevens. A concrete pier extends from the ground to the top level. There are six levels, the two lower levels being equipped for use as dormitories. The top level, about 14' x 16' houses the base end and spotting stations. Natural height of site, 20 feet. Height of instrument axis, 72 feet. This station is equipped with a DPF. The required azimuth instrument is on hand. For limits of vision, see Exhibit 5-A.

(3) The battery commander's station, base end and spotting stations (BC $B\frac{1}{6}S\frac{1}{6}$) for Battery No. 6 (Battery Pratt, 2-6" DC guns) are located in a steel tower with central concrete pier, about 100 yards southeast of Battery Pratt, Ft. Stevens. There are two levels. The controller for searchlight No. 8 is located in this station. Natural height of site, 25 ft. Height of instrument axis, 73 ft. The top level is 8' x 8' and is equipped with a Lewis DPF. The required azimuth instrument is on hand. For limits of vision, see Exhibit 6-A.

(4) The battery commander's station, base end and spotting stations ($B\frac{1}{7}S\frac{1}{7}$) for Battery No. 7 (4-12" Ry. M), are located in a one-level 14' x 14' structure on the parados of Battery Mishler. This station is equipped with a DPF. One azimuth instrument is required and is not on hand. Natural height of site, 55 ft. Height of instrument axis, 60 ft. For limits of vision, see Exhibit 7-A.

(5) The base end and spotting stations ($B_1^4 S_1^4$) for Battery No. 1 (Battery Guenther, 4-12" M) are located on the top level of a two-level steel tower about 180 yards southeast of Battery Clark. Natural height of site, 20 ft. Height of instrument axis, 72 ft. The tower is equipped with a central concrete pier; the top level 8' x 8' is equipped with a DPF. An azimuth instrument is required and is not on hand. For limits of vision, see Exhibit 5-A. The lower level has two piers for azimuth instruments but the view is entirely obscured by tree tops. Removal of these tree tops would provide the same field of vision as is had by the top level.

(6) The group commander of Group 4 (AA) will be located at position of AA Battery No. 3, Ft. Stevens.

p. Location No. 16 (Fire Control Hill) (Exhibit 2-B).

(1) The harbor defense command post (Exhibit 3-B) is located in a two-level concrete structure on Fire Control Hill, Ft. Stevens. It is dug in to the observation slot. The lower level is equipped with telephone booths for communication to group stations. The harbor defense message center and intelligence center will be located here. The controller of searchlight No. 9 is located in the observing room which is located in the top level. Natural height of site, 103 ft. Height of instrument axis, 105.75 ft. This station is equipped with a Swasey DPF mounted on a concrete base. One BC telescope is required and is on hand. For limits of vision, see Exhibit 3-B.

(2) The base end and spotting stations ($B_5^2 S_5^2$) for Battery No. 5 (Battery Clark, 4 - 12" M) are located in a one-level concrete structure, 12' x 12' buried to the slot on Fire Control Hill, Ft. Stevens. Natural height of site, 95 ft. Height of instrument axis, 98 ft. This station is equipped with a DPF. One azimuth instrument is required and is on hand. For limits of vision, see Exhibit 5-A.

(3) The base end and spotting stations ($B_7^2 S_7^2$) for Battery No. 7 (4-12" Ry. M) are located in a one-level concrete structure, 12' x 12', buried to the slot on Fire Control Hill, Ft. Stevens. Natural height of site, 95 ft. Height of instrument axis, 98 ft. This station is equipped with a DPF. One azimuth instrument is required and is not on hand. For limits of vision, see Exhibit 7-A.

(4) Antiaircraft observation post No. 10 is located on Fire Control Hill.

q. Location No. 17 (Clatsop Spit).(Exhibit 2-B). - Antiaircraft observation post No. 9 and antiaircraft searchlight No. 10 are located on the northern end of Clatsop Spit.

r. Location No. 18 (Exhibits 2-B, 1-E). - Antiaircraft searchlight No. 11 is located about 4,000 yards west of Hammond.

s. Location No. 19 (Exhibits 2-B, 1-E, 2-E). - Antiaircraft observation post No. 11 and antiaircraft searchlight No. 12 are located on the ocean shore southwest of Warrenton.

t. Location No. 20 (Exhibits 2-B and 1-C). - Fixed searchlights Nos. 11 and 12 are located on the ocean shore southwest of Warrenton.

u. Location No. 21 (Camp Clatsop) (Exhibit 2-B). - The base end and spotting stations (B^5S^5) for Battery No. 5 (Battery Clark, 4-12" M) are located in a steel tower, wooden frame structure, 8' x 14', on a hill east of Camp Clatsop. Natural height of site, 257 ft. Height of instrument axis, 275 ft. No instruments are installed. One DPF and one azimuth instrument are required and are on hand. The view from this station is entirely obscured by trees, many of which are 100 ft. high. Present form of station is unsatisfactory. To provide visibility all the trees in front of the site for a distance of 150 yards must be topped. The station reservation consists of one acre only, so that topping must be done on private property.

3. Fire control requirements for harbor defense command, groupment and group commands and for each battery.

a. Harbor Defense Command Post (Location 16, Ft. Stevens). (Exhibits 2-B and 3-B). - This station is located in a two-level concrete structure on Fire Control Hill, Ft. Stevens. The harbor defense message center and intelligence center will be located here. Height of instrument axis, 105.75 ft.

b. Antiaircraft Groupment Command Post (Location 9, Ft. Columbia). (Exhibits 2-B and 2-E). This station is located in the rooms of the emplacement of Battery Jules Ord.

c. Command post, Group 1 (Location 15, Ft. Stevens) (Exhibits 2-B and 3-B). - This command post is located in a two-level steel tower about 270 yards southeast of Battery Clark. Height of instrument axis, 73 ft.

d. Command post, Group 2 (Location 5, Ft. Canby). - This command post is located in a two-level, wood frame, plaster-covered structure at Cape Disappointment, about 320 yards northeast of Canby Light. Height of instrument axis, 296 ft.

e. Battery No. 1 (Battery Guenther, 4-12" M), Ft. Canby. (Exhibit 2-A). -

(1) BC station. - With B^1S^1, Location No. 5, Cape Disappointment. Height of instrument axis, 265 ft.

(2) Base end and spotting stations:

B^1S^1. In concrete dug-in with BC, Location No. 5, Cape Disappointment. Height of instrument axis, 265 ft.

B^2S^2. In concrete dug-in, Location No. 3, North Head. Height of instrument axis, 149.33 ft.

B^3S^3. A 6-inch pipe, Location No. 2, set in a concrete base, marks the location of these stations on the edge of a bluff 1900 yards northerly from North Head Lighthouse. Natural height of site, 100 ft.

B^4S^4. Top deck of steel tower at Location No. 15, Ft. Stevens. Height of instrument axis, 72 ft.

(3) Lengths of baselines.

$B^1 - B^2$	4185.29 yds.
$B^1 - B^3$	4594.92 "
$B^1 - B^4$	11319.21 "
$B^2 - B^3$	2412.13 "

(4) Plotting room. - Installed just in rear of emplacement and is adequate.

f. Battery No. 2 (Battery Allen, 2-6" DC guns), Ft. Canby (Exhibit 3-A). -

(1) BC station. - With B^1S^1, Location No. 5, in a wooden frame, plaster-covered structure, 100 yards northwest of Battery Allen. Height of instrument axis, 223 ft.

(2) Base end and spotting stations.

Located with BC station, Location No. 5. Height of instrument axis, 223 ft.

(3) Length of baseline.

No horizontal baseline is provided for this battery.

(4) Plotting room. - Located in the emplacement between guns of the battery and is adequate.

g. Battery No. 3 (Battery Murphy, 2-6" DC guns), Ft.Columbia. (Exhibit 4-A).

(1) BC station. - Located with B^1S^1, Location No. 9, Ft. Columbia, on top level of a reinforced concrete structure, part of Battery Jules Ord. Height of instrument axis, 109.08 ft.

(2) Base end and spotting stations.

B^1S^1. - Located with the BC station, Location No. 9. Height of instrument axis, 109.08 ft.

B^2S^2. - Located in a wooden frame, plaster-covered structure at Location No. 8, Scarborough Hill, Ft. Columbia. Height of instrument axis, 323.58 ft.

(3) Length of baseline.

No horizontal baseline is provided for this battery.

(4) Plotting room. -

Located in lower level of BC station in the emplacement of Battery Jules Ord. It is adequate.

h. Mine Command (Battery No. 4), Ft.Columbia. (Exhibit 1-D).

(1) Mine command station. - Located in a combined observing room and plotting room on Scarborough Hill, Ft. Columbia, Location No. 8. Height of instrument axis, 328.96 ft.

(2) Base end stations and baselines.

M^1 - With Mine Command Station, Location No. 8.

M^2 - To be constructed in a concrete dug-in on Hill 660, about 2200 yards east of village of Chinook, Oregon, Location 7. Height of instrument axis, approximately 660 ft.

(3) Length of baseline.

M^1 - M^2 Approximately 2300 yards.

(4) Plotting room. - Located in the lower level of the structure occupied by M^1. It is well concealed and protected and is adequate in size. A plotting board should be furnished that will permit tracking of a target at a range of 12,000 yards with a scale not smaller than 200 yards to the inch.

(5) Casemate, Location No. 9. - A reinforced concrete bombproof now in existence behind a rock knoll at Chinook Point, Ft. Columbia. It is well-concealed and protected. Three operating panels are now installed. The four panels now in the mine casemate at Ft. Stevens should be transferred to this casemate.

Batteries: No. 3 (Battery Murphy, 2-6" guns)
No. 6 (Battery Pratt, 2-6" guns)

i. Battery No. 5 (Battery Clark, 4-12" M), Ft. Stevens. (Exhibit 5-A). -

(1) BC station. - With B^1S^1, Location No. 15, Ft.Stevens. On top level of a wooden frame structure, sheathed with corrugated iron, 200 yards northeast of Battery Clark. Height of instrument axis, 72 ft.

(2) Base end and spotting stations.

B^1S^1. With BC station, Location 15, Ft. Stevens, on top level of wooden frame structure. Height of instrument axis, 72 ft.

B^2S^2. In a one level concrete dug-in structure on Fire Control Hill, Ft. Stevens, Location No. 16. Height of instrument axis, 98 ft.

B^3S^3. In a twin station, on the top level. Location No. 14, on a small reservation 280 yards east of Hammond Depot, Hammond, Oregon. Height of instrument axis, 40 ft.

B^4S^4. In a concrete dug-in, Location No. 5, Cape Disappointment, about 280 yards northeast of Canby Light. Height of instrument axis, 287.96 ft.

B^5S^5. In a steel tower, Location No. 21, on a hill east of Camp Clatsop, Oregon. Height of instrument axis, 275 ft.

(3) Length of baselines.

$B^1 - B^2$	2007.03 yds.
$B^1 - B^3$	1984.43 "
$B^1 - B^4$	11241.38 "
$B^2 - B^5$	10155.78 "

(4) Plotting room. - The existing plotting room should be replaced with a bombproof structure 20' x 20' dug in to the embankment in front of present location.

j. Battery No. 6 (Battery Pratt, 2-6" DC guns), Ft.Stevens. (Exhibit 6-A).

(1) BC station. With B^1S^1 on top level of a steel tower, Location No. 15, Ft.Stevens, 100 yards southeast of Battery Pratt. Height of instrument axis, 73 ft.

(2) Base end and spotting stations.

B^1S^1. With BC station on top level of a steel tower, Location No. 15, Ft. Stevens. Height of instrument axis, 73 ft.

(3) Length of baselines.

No horizontal baselines are provided for this battery.

(4) Plotting room. - Located in the emplacement between the guns, and is adequate.

k. Battery No. 7 (4-12" Ry. M) (Exhibit 7-A). - Firing position in rear of hill on right flank of Battery Russell, Ft. Stevens.

(1) BC station. - With B^1S^1 in a one level concrete structure, Location No. 15, on the parados of Battery Mishler, Ft.Stevens. Height of instrument axis, 60 ft.

(2) Base end and spotting stations.

B^1S^1. With BC station, Location 15, on parados of Battery Mishler, Ft. Stevens.

B^2S^2. In a concrete structure, Location No. 16, on Fire Control Hill, Ft. Stevens. Height of instrument axis, 98 ft.

B^3S^3. Top level of a twin station on a small reservation, Location No. 14, 280 yards east of Hammond Depot, Hammond, Oregon. Height of instrument axis, 40 ft.

B^4S^4. In a concrete dug-in, Location No. 5, on Cape Disappointment, about 250 yards northeast of Canby Light. Height of instrument axis, 275.92 ft.

B^5S^5. In a steel tower, Location No. 21, on a hill east of Camp Clatsop. Height of instrument axis, 275 ft.

(3) Length of baselines.

$B^1 - B^2$	2007.87 yds.
$B^1 - B^3$	2488.29 "
$B^1 - B^4$	10805.04 "
$B^2 - B^5$	10171.53 "

(4) Plotting room. - The plotting room of Battery Russell (surplus) will be used.

4. Radio intercommunication between the forts of the harbor defense does not now exist. One SCR 132 radio set is on hand and three SCR 177 sets are included in the cost estimate (Exhibit 7-B). It is proposed to use one of the SCR 177 sets at Fort Stevens for communication with our supporting aircraft and use the other two sets at Forts Canby and Columbia. The proposed harbor defense radio net is shown in Exhibit 6-B.

5. Three fire control switchboards, BD-74, one at each of the three forts are now constructed.

a. Ft. Canby. - A bombproof reinforced concrete structure located behind a hill. It is about 430 yards northeast of Canby Light and about 14 feet above MLW. Dimensions of rooms:

Operating room	18' x 15'
Storage battery room	4' x 15'
Dormitory	4'6" x 15'

b. Ft. Columbia. - All equipment is to be removed from present location in Battery Ord and installed in the old mining casemate constructed in 1901. This is an underground bombproof concrete structure located about 30 yards west of No. 1 emplacement of Battery Murphy and about 65 feet above MLW. Only the manhole is visible above ground. There are two rooms: one 10' x 17' and one 12' x 23'.

c. Ft. Stevens. - A bombproof reinforced concrete structure located about 230 yards east of Battery Clark and about 16' above MLW. Dimensions of rooms:

Operating room	18' x 15'
Storage battery room	4' x 15'
Dormitory	4'6" x 15'

6. Additional cable will be required to provide for lines made necessary by this project and to replace or supplement aged submarine cables. A detailed list is included in Exhibit 7-B. Proposed fire control cables are shown in Exhibit 4-B.

7. No commercial telephone circuits are available for use in an emergency. However, it is expected that antiaircraft intelligence will be received over the telephone trunk lines connecting the Astoria and Ft. Stevens switchboards.

8. Cost estimate. - An estimate of cost and priority guide is appended as Exhibit 7-B. Those items which should be procured and installed in peace time are marked with an A. Those items which should be procured in peace time 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.