File F-1-1

ECV-3
Ser 4130

22 DEC 1960

Chief of Staff

Engineer-in-Chief

info

info

Nantucket Island Loran C Site Survey Report

Ref : (a) Chief of Staff memo of 5 Dec 1960

1. Subject to the attached comments and cost estimates, the site survey report is recommended for approval. However, only $845,700 is currently available for Civil Engineering construction and outfitting, whereas $1,040,700 is required, making a present deficit of $195,000. In event that any relocation of VOR is required, an additional $120,000 is involved and the deficit will then be $315,000.

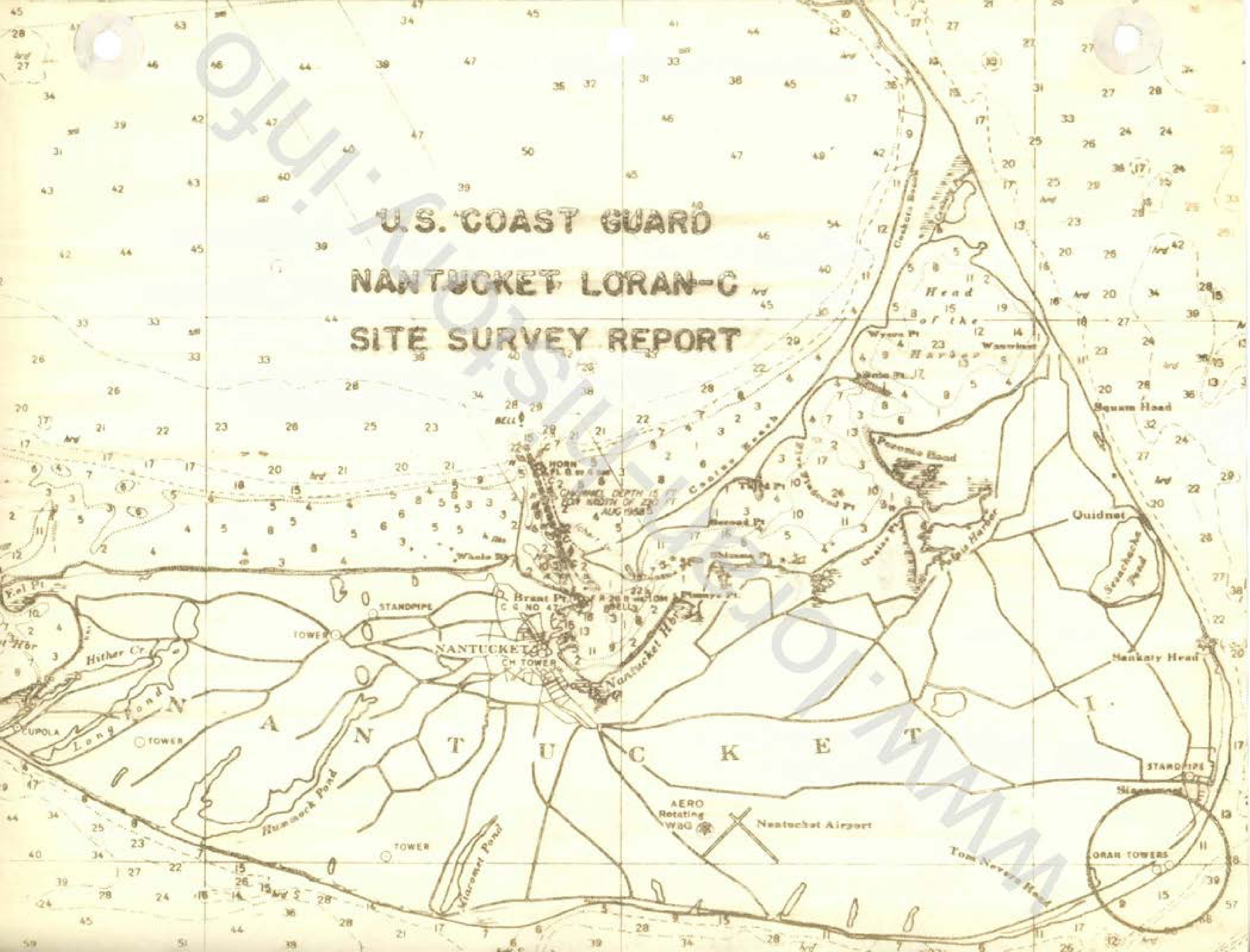
2. This site survey report is indicative that there will also be a deficit for the Cape Hatteras project because of similar expanded planning for relocating the existing "C" Station. Although the status of the Jupiter Station is uncertain, it is possible that additional funds will also be required. Currently available DOD Loran construction funds administered by the Engineer-in-Chief are fully programmed and there are no excess funds available for transfer to the East Coast Loran C Chain rebuilding projects.

3. It is requested that approval be given to proceed with the station design on the basis of the survey report as amended by the enclosures. Financing of this station can be resolved when the site survey reports of all stations have been approved and total fund requirements have been determined.

E. H. THIELE

Encl: (1) Engineering Comments
(2) Construction Cost Estimate

U.S. COAST GUARD
NANTUCKET LORAN-C
SITE SURVEY REPORT



UNITED STATES COAST GUARD

COMMANDER
First Coast Guard District
1400 Custom House
Boston, Massachusetts

o
U2/608
21 October 1960

From: Chief, Nantucket Island Loran Site Survey Team
To: Commandant (OCS)
Via: Commander, First Coast Guard District

Subj: Nantucket Island Loran C Site Survey Report; submission of

Ref: (a) COMDT ltr G08/2-1 dtd 16 Sept 1960

1. The site survey for the incorporation of the Loran C Station at Chilmark, Massachusetts with the Loran A Station at Siasconsett on Nantucket Island, Massachusetts has been completed as directed by reference (a). The survey report is enclosed herewith.

2. The recommendations as to the location of the site and changes to existing facilities are contained in the report. Logistic and administrative support requirements have been touched upon only briefly because of the non isolated nature of the selected site and because of presently existing Coast Guard facilities.

3. The report contains several black and white photographs. A series of color slides were made but have not been reproduced, therefore only the one set is being submitted under separate cover. However a listing of the views is enclosed herewith.

4. No particular problem is foreseen with regards to staging or transporting of equipment and materials nor with construction at the site. No details or arrangements in this regard have been undertaken by the site survey party. The site survey party was aware of negotiations underway for the acquisition of additional land but has not been covered in this report since Headquarters is cognizant of the details and correspondence between Headquarters and the District Office initiated the action.

5. Remaining details of the site survey have been included in the report which consists of the following:

a. General Operations Report
b. Civil Engineering Report
c. Electronics Engineering Report
d. Site Photographs

G. H. Lawrence

G. H. LAWRENCE
Commander, U. S. Coast Guard
Chief, Nantucket Island Loran Site Survey Team

Encl: (1) Nantucket Loran Site Survey Report

ENC: (1)

NANTUCKET LORAN
SITE SURVEY REPORT

LIST OF COLORED SLIDES (ONE COPY ONLY)

GROUP A - 16 SLIDES:

1. General view of Loran-A Station looking south from county road
2. Garage Building looking east.
3. Pumphouse looking northeast.
4. Generator building looking southeast.
5. Aircraft matting road between generator building and signal building.
6. Paved road looking north from generator building toward county road.
7. Generator building looking NE with comb antenna.
8. Loran-A Signal Building.
9. General view looking NE from near 300 ft. tower showing barracks, garage, generator building.
10. General view looking east from near 300 ft. tower.
11. General view looking SE showing NW corner of Signal Building.
12. General view looking east toward station from near proposed western boundry at county road.
13. General view looking NE toward proposed new property from near proposed western boundary at county road.
14. General view looking south toward ocean showing 300 ft. tower and proposed new property from near proposed western boundary at county road.
15. General view looking SE from near NW corner existing property showing barracks (rear) and generator building.
16. Front view of new duplex family quarters at Sankaty Head LS (nearing completion of construction).

GROUP B - 18 SLIDES:

1. Aerial View, Nantucket Harbor looking SE
2. Aerial View, Nantucket Harbor, looking E
3. Aerial View, Nantucket Airport, looking NE
4. Aerial View, Nantucket Airport, looking N
5. Aerial View, Loran Station looking NW
6. Aerial View, Loran Station & Nantucket Island, looking W
7. Aerial View Loran Station, looking SW
8. Aerial View, Loran Station & Siasconset, looking SW
10. Aerial View, Nantucket Harbor looking W showing Steamer pier at right
11. Aerial View, Nantucket Harbor looking SW showing Steamer pier at right
13. Aerial View, Loran Station, looking N
14. Aerial View, Loran Station, looking W
15. General view of new property looking N along east boundary
16. General view along paved county road looking W showing new land
17. General view along existing east boundary toward ocean.
18. General view of station from existing NE corner looking SW
19. General view toward Siasconset along paved county road
20. General view toward station from end of paved county road looking SE

21 NOV 1960

FIRST ENDORSEMENT on CHIEF, NANTUCKET ISLAND LORAN SITE SURVEY TEAM LTR of 21 Oct 1960

From: Commander, First Coast Guard District
To: Commandant (CCS)

Subj: Nantucket Island Loran C Site Survey Report; submission of

1. It is recommended that the subject report be approved subject to the following:

General Operations Report

a. One of the 12 Electronic Technicians listed in the proposed complement should be pay grade seven(7) or above.

b. While the location of this station is not considered isolated, the recreation facilities locally available do not compare with most locations on the mainland. It is considered that station recreational facilities should be emphasized including an amateur radio station(if the crew indicates an interest in this type of activity).

Civil Engineering Report

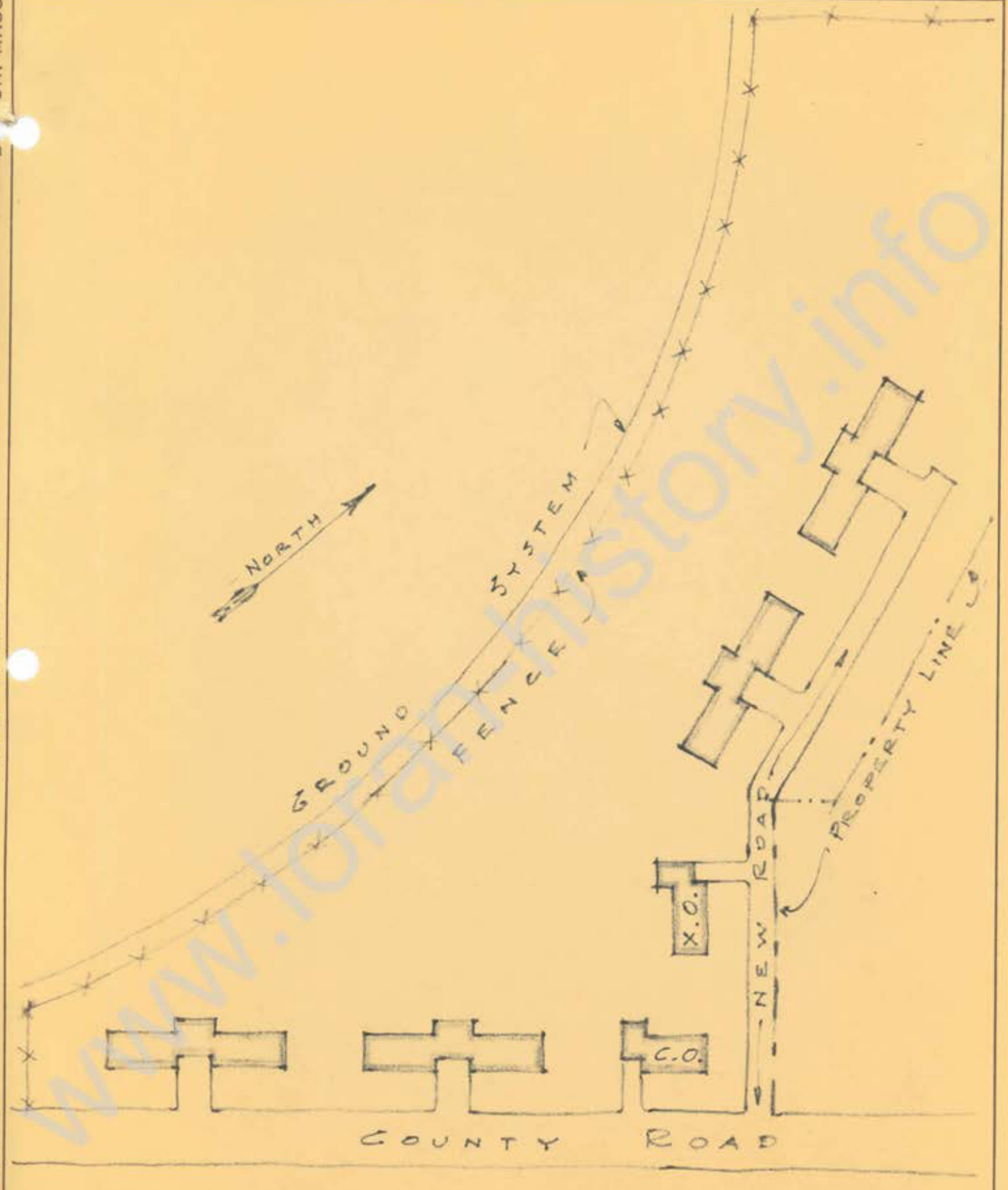
a. A sketch showing a recommended change in the arrangement of dwelling is enclosed. This arrangement is considered to include the following advantages: (1) economy in construction due to proximity of county road; (2) provides more back yard space for the quarters; (3) closer to fire protection and better access;(4) provides separate structure for the Commanding Officer and Executive Officer.

b. The overall plan for the reservation should include street lighting.

C. L. Harding

C. L. HARDING

Encl (1) CGDONE Sketch "A" of 11-17-60



DRAWN BY: GMB DATE 11-17-60

CHECKED BY:

APPROVED BY:

IC.G.D. SKETCH NO. "A"

NANTUCKET LORAN STATION - NANTUCKET ISLAND, MASS.

SITE SURVEY

GENERAL OPERATIONS REPORT

A. Local Area for Site.

1. Local Name.

The local area in which the site is located is the town of Siasconsett, Massachusetts.

2. Site Description.

The site is located on Nantucket Island, Mass. The island is located approximately 23 miles south of the eastern mainland of the state of Massachusetts. The site itself is located 8 road miles from the town of Nantucket on the island and about 3/4 of a mile from Siasconsett. The site is the same as the present Loran-A station except for more land area which is involved.

B. Land for site.

1. Ownership and Control.

The land required for the Loran-C site involves the present Coast Guard land on which the Loran-A station is located, four parcels of privately owned property which are presently being leased by the Coast Guard in connection with Loran-A operation and nine other parcels of privately owned land. The ownership of one parcel is questionable and is one of those currently under lease. Even though a lease exists the presumed owner has not accepted payment for several years because of his uncertainty of ownership. One parcel is situated so as to be needed only for the purpose of boundary convenience. Since the owner of this property wants what appears to be an excess price, its acquisition is not recommended. The owner of one parcel of land needed has shown no interest to sell. In this case negotiations are still in progress. Owners of the remaining parcels including three under lease have executed options for purchase which have been accepted by Headquarters and can be delivered. Further information regarding land areas, boundaries, ownership and acquisition is incorporated in the Civil Engineering Section of this Site Survey Report and are also shown on Drawing No. 5438.

2. Whose Jurisdiction and Availability.

a. Non-private.

Government land involved is as explained in B.1. above.

b. Privately owned.

(1) The situation of privately owned land is as explained in B.1. above and as shown on Drawing No. 5438 enclosed as part of the Site Survey Report. Addresses of owners have not been shown since all negotiations for the procurement of the needed land is currently being processed.

(2) Availability of Site.

The only problems concerned with the procurement of land parcels are as explained above as to the ownership in one case which has not been determined and the owner of the one parcel who has not indicated a desire to sell. Negotiations are currently in progress to provide for the acquisition of these two parcels of land. The availability of the sites required has been the subject of separate correspondence between Headquarters and the First Coast Guard District Office.

3. Description of Site.

a. Geographic Limits (general location)

This site is located at latitude 41°14'59."45N, longitude 69°58'21.""73W. The position given herein is the position of the present Loran-A transmitting tower.

b. Accessibility.

The site is accessible by asphalt paved road from the local airport, towns and harbor on Nantucket Island. The airport is 6 miles from the site. The airport is a regular scheduled stop for Northeast Airlines on flights to and from Boston, Mass., and New York, N.Y. via Hyannis, Mass. and Marthas Vineyard. Other non scheduled flights are made between Nantucket Island and Hyannis, Mass. by the Cape and Islands Flight Service Inc. Further information relative to schedules of airlines and steamer accessibility to the island is incorporated in the Civil Engineering Section of this report.

c. Other Details of Interest Concerning Description.

(1) The most impractical construction period of the year is from December to March when weather conditions are poorest as regards low temperatures, winds and rain. Deep snow is usually not a problem since the amount of fall is not too great and usually snow does not remain too long.

(2) The soil at the site is practically all sand and where vegetation does not grow, there are sand dunes which change their contours slightly with varying wind conditions.

(3) The site extends to the ocean shoreline to the southeast-ward of the station.

d. Developments Existing or Planned Nearby. Effect on Loran Station Operation.

The Loran-A station already on the site will not affect Loran-C operation. Other developments existing in the area have been listed in the Civil Engineering Section of the report. It is not expected that any of the facilities will adversely affect the operation of Loran-C.

C. Local Officials.

1. Local Government.

The town of Siasconsett has a Siasconsett Civic Association which is a local board that meets regularly and makes recommendations to the Nantucket Board of Selectmen since Siasconsett is actually a part of Nantucket. The 5 selectmen of Nantucket hold weekly meeting on Wednesday nights. They are empowered with the making of local regulations.

2. Involved with construction.

None as far as could be determined.

3. Persons that should be contacted in the area.

Possibly a courtesy approach to the Board of Selectmen in Nantucket and the Civic Association in Siasconsett should be made. Also a courtesy contact should be made with individuals who own land adjacent to the site.

4. Local population.

a. General Discussion of Local Inhabitants.

The total NUMBER of permanent residents on the island is about 3600. The permanent residents in Siasconsett number approximately 275. During the summer season there is an influx of many tourists, some of whom own residences there. The permanent residents in the town of Nantucket are estimated to be about 2500, and like Siasconsett many tourists spend their vacations there. Relationship between the local people and the Coast Guard is considered very good. There is no reason to believe that this situation would change with the building and operation of a Loran-C Station. The local residents appear to be somewhat individualistic and desire to see no great changes to present conditions on the island. They have no special desire to have the present Coast Guard installation expanded and would be just as satisfied if it were not. Other than the normal retail stores and some fishing there is not too much activity on the island except for the associated business that serves the many tourists in summer.

b. Possible conflicts, ameliorating conditions, local officials to contact.

No possible conflicts are foreseen since the increase of Coast Guard personnel will be so small that they can be absorbed in the activities of the towns without difficulty, especially since housing is proposed for the family men assigned to the station. The names of the members

of the Board of Selectmen were not determined. The local people have little knowledge of the present station operations nor do they attempt particularly to associate with personnel on the station site.

c. Special restrictions set up by local government.

As regulated by the Board of Selectmen of Nantucket.

d. Is there a need to use ground plane land for grazing, etc?

No.

D. Security.

1. Protection.

None required other than standard small arms allowance.

2. Fencing.

Fencing should be built around the bases of antennas to protect personnel. This pertains not only to Coast Guard personnel but also to the numerous visitors who wander around the area and who are interested in seeing the station. Whereas further fencing is not actually required it would be desirable to have at least a wood railing fence along the property boundary lines including both sides of the road which runs through the property.

3. If normal station complement is considered inadequate to handle security indicate additional measures required.

No additional personnel will be required to handle security.

4. Small arms allowance required and or recommended.

Standard allowance of .45 caliber pistols, .22 caliber pistols and 12 gauge shotguns to meet the needs of the overall approved complement ~~of~~ for training and recreation.

E. Personnel.

1. Transportation.

a. Mainland to General Locality.

Air and water transportation are equally as acceptable when time permits. For schedules see the Civil Engineering Section of the report. Fares for round trip of personnel is about $9.00 and for personnel with cars the fare is about $15.00.

b. General locality to site.

Taxis are available at the airport to travel the 6 miles to the station. Taxis are also available from Nantucket where the steamer terminal is located. Taxi fare from Nantucket to Siasconsett runs about $4.00. Both the Lifeboat Station at Brant Point, just outside of Nantucket, and the Loran Station have authorized vehicles which

can be used to some extent. However with station duties to perform, neither station should be requested to provide excess transportation. In the summer busses operate between Nantucket and Siasconsett. The amount of the fare was not determined.

c. Personal Vehicles, Licenses.

Requirements are the same as any other stateside station.

d. Other Considerations.

A favorite pastime of tourists is bicycle riding and in some parts of the island special bicycle roads have been built. With this in mind and the fact that men make frequent trips between scattered buildings on the station it is suggested that at least four bicycles be considered as station equipment both for use at the station and for recreation on the island.

2. Medical.

a. Hospital.

Nantucket Cottage Hospital is located on the edge of the town of Nantucket and is about 8 miles from the site. This hospital would be available for emergencies. The Brighton Marine Hospital in Boston handles most all routine cases.

b. Medical.

USPHS out-patient treatment is on a contract basis for active duty personnel only. Dr. G.A. Folger holds the present contract. His office is located in Nantucket.

c. Dental.

Emergency dental work for active duty personnel is done by contract through the USPHS contract doctor. The present dentist is a Dr. F.M. Vallett and arrangements for treatment are made through Dr. Folger. On occasions a mobile dental unit visits the island and some routine work is accomplished in this manner. Many of the present Coast Guard personnel pay for their own dental work on a private basis because of the problem of going to Boston. In many cases routine dental care for CG personnel is not being accomplished.

d. Emergency.

When necessary to evacuate cases of such a nature as to be beyond the scope and capability of island facilities, Coast Guard Aircraft at the Salem Air Station are available for such cases as cannot be evacuated by regular scheduled transportation means.

3. Pay and other records.

The pay records should be maintained by the District Office and pay checks mailed to the station. Health records should be retained by the station. Service records could be maintained by the unit provided the complement provided for a Yeoman second class or higher.

4. Dependents.

a. Housing

The Loran-C installation will result in increased personnel and dependents. Civil housing on Nantucket Island is generally scarce expecially in summer and any that is available is considerable distance away but more important, rentals or home purchasing is considered especially high on the island. The planning for combining the two loran station should provide for government housing. The present loran station contains 10 rooms as bachelor quarters. This includes one room for the Officer-in-Charge. It is to be presumed that the authorized complement after the stations are combined will be approximately 27. Included in this figure will probably be a Lieutenant and a Radio Electrician. In view of the complement, and poor housing conditions, it is recommended that government quarters provide for five duplex houses. Each duplex to consist of one 3 bedroom home and one 4 bedroom home. For this type of station and considering the community, it is not felt that either officer need to be provided with a single dwelling. The 5 duplex dwellings would provide for 10 of the personnel which would be a reasonable estimate of the number of married personnel who might be assigned to the unit. This would result in bachelor quarters requirement for 15 men. To provide for these men it is proposed that the present building be expanded to add 6 new rooms and eliminate the present CO bedroom and enlarge the office by using this space. This would make a total of 15 seperate bedrooms. The rooms would accomodate two non-rated men if a need arose for extra space because of visiting personnel on official business. The recommended location for the duplex dwellings is shown on Drawing No. NANT-005 which is a part of this report. Prior planning provided for an extra set of family quarters at Sankaty Head Light Station to accomodate the Officer-in-Charge of the Loran Station. However no particular problem or bearing on the proposals contained in the report will result because the quarters can be effectively used as family quarters for a member of the Brant Point Lifeboat Station.

b. Subsistence.

Food prices are somewhat higher on the island than on the mainland. There is no Commissary available. Food purchases are made at regular prices and are bought over the counter at regular stores and markets.

c. Clothing.

Clothing and supplies are purchased at regular retail stores on the island where prices run higher than on the mainland.

d. Schooling.

There is an elementary school through the first four grades in Siasconsett. Elementary through all grades and a high school are located in Nantucket. A school bus runs to and from Siasconsett and Nantucket.

5. Mail.

a. Service.

Both regular and air mail service is available on the island. The mail for the loran station is recieved at the Siasconsett Post Office. 3/4 of a mile from the station.

b. Official Address.

U.S.C.G. Loran Transmitting Station (Nantucket)
Siasconsett, Mass.

6. Vehicular or water transportation required.

a. General.

Water transportation does not exist nor is it required at the site. The present Loran-A station has an allowance of one (1) one-half ton panel truck and presently has a half ton Ford panel truck. Supplies other than that recieved by parcel post is usually sent to the Brant Point LBS and put in a transient locker until the Loran Station picks it up or the Lifeboat Station can deliver it.

(1) Type and number.

One additional vehicle should be allowed the station. With the rotation of personnel, the need for transporting numerous official visitors to the station, the increase of supplies and food for the station, the one truck would not seem adequate. There is also the need to stop drawing so heavily on the vehicles at the Brant Point LBS as well as the current situation of the assigned men using their personnel vehicles for official use.

(2) Spares required.

The requirement for spare parts is the same as for other units in the district.

7. Enviroment.

a. Settlements nearby.

The town of Siasconsett is about 3/4 of a mile from the site. The town of Nantucket is about 8 miles from the site. These are the two principle settlements on the island. Sparse population covers the remainder of the island.

b. Population types.

The island's population consists of average American people.

c. Language.

English.

8. Local restrictions.

None of significance.

a. Contacts with local population.

Present Coast Guard personnel report that contacts with the local population are very good.

b. Customs.

Nothing of interest.

c. Commercial practices.

Nothing of interest.

d. Taxes.

Massachusetts Old Age Tax of 5% on certain items.

9. Recreation.

a. On station.

The present Loran-A station has a recreation room suited as a reading room but one section of this room also serves as the station mess hall. The facility has a basket-ball hoop with the road to the garage as the playing surface. A ping pong table has been set up in the garage. It is recommended that the following improvements to the present recreational facilities be provided.

(1) A suitable outdoor basket-ball playing area.

(2) An addition to the present barracks building to provide for a larger recreation room separated from the mess deck.

(3) A pool table in the recreation room.

(4) A shuffle board in the recreation room.

(5) Renewal of most of the furniture in the barracks building.

b. Off station.

There is very lettle in the way of recreation off the station except movies in Nantucket and bicycle riding/ Swimming at the station beach should be viewed with concern because the beach drops off sharply and there is a treacherous undertow which runs parallel to the beach. Some fishing can be done.

c. Uniforms.

Standard.

10. Health conditions.

a. Endemic diseases.

No problem.

b. Precautions.

None other than usual good health practices.

11. Local fauna and flora.

a. General.

The present Loran-A Station is located on a very sandy area which has little growing on it but sand grass. The areas to be acquired are well covered with scrub oak and entangling shrub bushes which grow in abundance on the island. In the summer there are numerous ticks which infest animals, especially dogs and will get on children when playing in other than clear areas. The island has many rats on it and the other usual animals such as deer and rabbits.

b. Special problems for station personnel.

None.

12. Morale.

Morale at the present station is only fair because the men in most cases do not have their dependents and there is little available in the line of recreation. Shortage of authorized personnel and rapid turn over has an adverse effect. The 9 and 15 dollar fares of round trips for personnel and cars to the mainland restrict liberties to a great degree which in turn is unfavorable for morale. The proposals contained in present planning should ~~allimate~~ ELIMINATE some of the problems for some of the personnel.

13. Berthing and messing.

Berthing and messing will be accomplished both on the station and in the proposed family quarters.

F. Logistics.

1. Transportation (supplies)

a. Mainland to General Location.

Generally the same as shown for Transportation of Personnel. A transient supply locker is maintained at the Brant Point Lifeboat Station where supplies coming the island by steamer are placed until a sufficient quantity has accumulated to warrant a trip to the Loran Station.

b. General locality to site.

Same as shown for Transportation of Personnel.

c. Emergency.

Coast Guard Aircraft from the Coast Guard Air Station at Salem, Mass.

2. Air Support.

For information concerning a.(1) through a.(10) below, see the Civil Engineering Section of this Site Survey Report.

a. Existing Airfields on or near site.

(1) Name of field - owners and operators of field.

(2) Runways - number, length, width, surface, weight restriction, special hazards to landing and takeoffs, elevation orientation.

(3) Hangars and repair facilities available.

(4) Fuel facilities (octane rating, method of handling).

(5) Crash and fire fighting facilities available.

(6) Night operations (field boundary, runway, approach and obstruction).

(7) Navigational Aids.

(8) Present operations of field.

(9) Weather forcasting facilities.

(10) Control tower.

(11) Access to field.

(a) Roads.

A paved asphalt road runs from the field to Nantucket and to the Loran-A Station which is about 6 miles from the field.

(b) Buses.

There are no year round bus accommodations from the field, however there may be some scheduled runs in summer. There are taxis availably for all flights. The fare would be about $3.00 from the field to the station.

(c) Railroads.

There are no railroads on the island.

(12) Suitability of field for UF operation.

The field is suitable for UF operation.

b. Is an airstrip needed for support?

(1) Explain.

The airstrip is not a requirement for support of the station. However it is a useful facility for expedient phases of support when or if needed. Support through the use of steamer traffic is adequate even though schedules are not too frequent and not always reliable during the winter months. During periods of extreme low visibility the steamers do not attempt to negotiate the channel approach to the harbor. Very seldom, however are long delays encountered.

c. Weather conditions.

Weather conditions are normally good with some exceptions caused by considerable fog which is most prevalent during May, June, July and August.

d. Distance to alternate served by an aid to navigation.

An alternate for this field has little meaning for purposes of this report due to the proximity of Nantucket Island to the mainland. Alternates could be most any field in Massachusetts, Rhode Island or even Connecticut and New York. Since Nantucket Island has only one field any alternate would not serve the direct needs of the station.

3. Communications facilities and needs.

a. Radio.

Equipment presently at station to remain, i.e., URC-7, R523A and 2 SCR 536D. Additional equipment recommended: Two (2) URT 17 transmitters, two (2) TT48A/UG teletypes, and two (2) R-840/URR receivers.

b. Telegraph, teletype or cable.

Radio teletype recommended for inter station communications. Also recommend that Radio Marshfield be provided compatible equipment for working Nantucket Loran Station RATT.

c. Telephone.

Telephone to local exchange (two incoming trunks). Leased pair to monitor station as long as required.

d. Messenger.

No messenger service required.

e. Crypto.

KAC-29.

f. Emergency.

Use URC-7, R-523A and SCR-536 is necessary.

g. Point-to-point Circuit.

(1) 24 hour communications are required.

(2) Nantucket to Cape Hatteras 445 miles. Nantucket to Marshfield 70-75 miles.

(3) A relay system could be used; however, because of the technical content of the messages, it is recommended that direct communications between Nantucket and Radio Marshfield be provided to prevent errors being made in voice relay. (See Electronics Engineering Report - last paragraph under H).

(4) No interference or noise level problems.

h. Ship/Shore Circuit.

None required.

i. Air/Ground Circuit.

None required.

j. SAR Circuit.

None required.

k. Radiomen.

Unless the station is responsible for CW traffic, a need for a radioman cannot be foreseen.

l. Telephone.

See paragraph c. above.

m. Teletype.

See paragraph b. above.

n. Amateur Station.

None required. - suggest reconsider!

o. General.

None.

4. Food.

a. Locally available.

All normal food supplies are available in Nantucket, however prices are estimated to run from 5 to 10 percent higher than on the mainland.

b. Special restrictions.

Possible problems may develop as a result of the higher prices on the island as some of the units present report difficulties of staying within present allowances.

G. Meteorological.

1. Climate.

For information concerning a. through f. below there has been a Local Climatological Data with Comparative Data Sheet enclosed at the end of this report. The sheet was prepared by the U. S. Department of Commerce Weather Bureau. The sheet is practically self explanatory however the following notes are offered. The Weather Bureau Station is now located at the Airfield. Prior to 1947, the bureau was located on Orange Street in Nantucket. The first table on page 2 is data for the year 1959. The second table gives the Normals, Means, and Extremes for the entire period since the Bureau has been located at the airfield. Any extremes recorded at the Orange Street location which exceeded the limits recorded at the airfield have been recorded in the notes at the bottom of the table.

a. General.

b. Wind.

c. Temperature.

d. Precipitation.

e. Visibility.

f. Sky Coverage.

2. Availability of weather forecasts and warning service.

The Weather Bureau at the airfield does not perform a forecasting function but is rather a recording and administrative office. Forecasting for the area is done in Boston, Mass. however the station on Nantucket is in good position to release up to date information as may be needed by Coast Guard Units on the island. The bureau at the airport has a radio theodolite on 1680 megacycles and also weather tracking radar.

3. Specisl Considerations.

None of significance other than the possibility that infrequently snow and ice on the island and some low visibility prohibit planes from using the airfield at times. No great amount of snow piles up on the island. It is doubted that snow plowing will present any problem at the site.

a. Local land conditions.

None of significance.

b. Harbor facilities affected by weather.

The harbor is well protected but on occasions of very low visibility or extreme ice conditions at the channel entrance, the steamers do not attempt to enter the harbor.

c. Severe conditions.

None of significance.

d. Unusual conditions prevailing.

None of significance know to exist.

H. Oceanography.

Oceanography is of no particular interest at the site itself since no piers, landings or anchorages are located near the site. The Civil Engineering Section of this reports describes channel and dock depths of Nantucket. The average tidal range in Nantucket Harbor is about 2-1/2 to 3 feet.

I. Authorized complement.

1. Present Loran-A Station.

14 Enlisted men.

2. Present Loran-C Station.

1 Officer and 17 enlisted men.

3. Recommendations for combined Loran-A and Loran-C Station.

LT	1
RELE	1
EMC	1
SN	5
CS1	1
ET1	4
ET2	4
ET3	4
EN1	1
EN3	1
FN	1
EM1	1
DC2	1
YN2	1

TOTAL---- 2 Officers
25 Enlisted Men.

a. Justification.

This recommended complement varies somewhat with the listing of a typical Loran A-C Station as shown in Headquarters letter dated 16 September 1960, file CAN GO 8/2-1. Upon consolidation of the station there will be three Loran-A rates in addition to the Loran-C rate. In addition to the 2 watch standers there will be a requirement for a supervisor being on watch at all time which should be a first class Electronics Technician. A Radioman has not been included because it

appears that there will be no CW traffic involved and there will be sufficient talent aboard to handle the other types of necessary traffic. In lieu of the Radioman a Yeoman has been recommended. A station of this size will obviously have considerable administrative work to perform in the way of reports, correspondence, records, supply functions and files. It is understood that a monitor unit for the station will be required for only about 6 months once the station is in operation.

After this short period of monitor operation, the personnel now assigned to the monitor could be used to fill out the authorized complement at the station if it were not completely filled at first.

NANTUCKET LORAN

SITE SURVEY REPORT

CIVIL ENGINEERING REPORT

A. Site and Antenna Location:

(1) Local name for site:

The proposed site is located at the existing Loran-A Transmitting Station, Siasconset, Nantucket, Mass. The site is on the Southeast side of Nantucket Island, approximately one (1) mile from Siasconset and eight (8) miles from the town of Nantucket. It is about 95 miles Southeast of Boston, Mass.

(2) Geographic Position of Loran Antenna:

The geographic position of the antenna will be determined at a later date by Hydrographic Engineers.

(3) Antenna Location Monument:

The Loran-C antenna site was marked with a brass survey marker set in a 6 inch diameter concrete post. The post was set in earth four feet deep. The marker is approximately four inches above ground level and is stamped "ANT". It was witnessed by three similar monuments stamped "WIT I", "WIT II", and "WIT III". The general area of the antenna monument is relatively clear of brush. A five foot wide path was cleared through heavy brush from the existing county road to the antenna monument. All monuments were marked with wooden stakes painted red. Two similar monuments were established at locations near the existing barracks and proposed family quarters. Witness distances and bearings to the antenna are shown on Drawing No. NANT-001.

(4) Chart Showing Site Location:

No charts are furnished with this report. Location maps are shown on Drawing No. NANT-001.

(5) Boundary Description:

First District Drawing No. 5438, Revised 9/12/60, Enclosed as Drawing No. NANT-003 shows the proposed boundaries and ownership. A contract for a property survey is in the process of negotiation with a registered land surveyor. Parcel E will not be required and its acquisition is not recommended. Negotiations with the owner of Parcel L have been in progress since August 1960 with negative results to date. If negotiations cannot be successfully completed it is recommended that condemnation proceedings for this parcel be initiated. Owners of the remaining parcels involved have executed options for purchase which have been accepted and will be delivered.

Description:

A complete boundary description is to be furnished by the Registered Land Surveyor suitable for Land Court Registration of the property. The existing Loran Station property consists of approximately 34 acres. New land, presently in the process of acquisition, consists of approximately 150 acres. Parcels J and L, yet to be acquired consist of approximately 14 acres. The total area of the proposed station will be approximately 218 acres.

A county road passes through the property from east to west. The road is asphalt paved from the east boundary of the present station westward to the entrance to the existing station. From the entrance to the West edge of the proposed CG property, the road is unimproved.

(6) Photographs:

Titled photographs are enclosed with this report. They include ground condition, existing facilities and general conditions of the site.

(7) Aerial Photos:

Titled aerial photos are enclosed with this report. Also enclosed is one set of colored slides, both aerial and ground photos.

B. Conditions Affecting Movement of Gear to Actual Site:

(1) Nearest Harbor or Anchorage:

The nearest harbor and anchorage is located in the town of Nantucket, 8 road miles from the site. A complete description of the harbor is given in the Atlantic Coast Pilot, Section B, 1950 Edition (Revised to 1959) on page 156. The Coast Pilot and current charts indicate the present channel depth as fifteen (15) feet. Local Sources (Harbormaster) stated that the harbor will accommodate vessels up to 10 foot draft at any time, and up to 14 foot draft on a full moon tide. Equipment for the existing U. S. Naval Facility was reported landed from an LST moored in Nantucket Harbor to the Steamer Wharf. Nantucket Harbor is the only suitable harbor on the island for discharge of cargo.

(2) Beaches for Landing:

No beach landings necessary at this site.

(3) Mobile Equipment Required:

a. For Transportation of cargo and construction material - Trucks to haul materials over asphalt surfaced roads to the site. A mobile crane for unloading at the site. Commercial truckers are available as noted below.

b. For construction - at the discretion of commercial contractor - should include the following: Concrete mixer, tractors with winch and blade, grader, front end loader, rough terrain fork lift, ditch digging machine, sheepsfoot roller, smooth roller, asphalt paving machine, mobile crane with bucket, dump trucks, air compressors.

(4) Existing Transportation Facilities:

There is daily ferry service between the island and the mainland. Steamers are operated by the New Bedford, Woods Hole, Martha's Vineyard, and Nantucket Steamship Authority. During the summer months (3 July to 11 September) there are three trips daily. The remainder of the year there is one trip daily. The largest steamer in service, approximately 180 tons, does not operate in the winter. According to Authority personnel, the large steamer will accommodate all types of trucks which can legally operate on Massachusetts roads. The height clearance for trucks boarding the ferry is 9 feet at New Bedford and 11 feet at Woods Hole. It is anticipated that after 1 January 1961, daily service to New Bedford will be discontinued, daily service to Woods Hole will remain.

The Steamship Authority operates the only pier capable of handling heavy cargo. The fees for handling heavy cargo are 10 cents per foot of vessel per day of dockage and one dollar per ton of cargo unloaded.

Surface mail arrives once daily aboard the steamer and air mail approximately twice daily aboard scheduled airlines.

Commercial truckers in the areas as follows:

a. ANDREWS & PIERCE, INC., 48 Lindsey St., New Bedford, Mass.
   (Transfer shipments to and from Nantucket via steamer)
b. NANTUCKET CONSTRUCTION CO., Nantucket, Mass.
   (Cargo carrying on Nantucket)
c. WALTER GLOWACKI, Nantucket, Mass.
   (Cargo carrying on Nantucket)
d. I. SAVRINO, Nantucket, Mass.
   (Cargo carrying on Nantucket)
e. TURNER & BREIVOGEL, INC., Falmouth Harbor, Mass.
   (Water transportation by Barge & Towboat between Mainland and Islands)

(5) Landing Craft Required:

No landing craft required.

(6) Availability of Stevedoring, Drayage, and Local Labor:

(a) No stevedoring companies on island. Paragraph 4(a) through (e) gives contractors for hauling.
(b) Local Labor - Local labor available at $1.25 to $1.50 per hour.

(7) Road Construction Necessary:

The existing county road to and through the station is asphalt paved and is satisfactory. The right of way is 40 feet wide, the pavement is 15 feet wide. It was constructed in 1946. This road is maintained by Nantucket County. West of the entrance to the existing station, the road is not improved. The owner of adjacent property to the west, Miss Landers, specifically requested that no paving be planned for the county road past the end of the present paving for her privacy. There is no need in the proposed expansion to pave any further on the county road. It will be necessary to rebuild the existing station road from the county road to the signal building, and construct a new road from the county road to the proposed transmitter building at the antenna site. Profile for these sections are shown on Drawing No.WANT-004. It will be necessary to construct a new road to the proposed family quarters. Asphalt paving is recommended for all surfaces.

(8) Air Transportation Facilities:

(a) General:

Nantucket Memorial Airport, owned and operated by the Town of Nantucket, located approximately six miles by road from the site. There are two asphalt paved runways.

(1) RUNWAY 06-24 is 5000 ft. long, 150 ft. wide.
(2) RUNWAY 15-33 is 4000 ft. long, 150 ft. wide.

Weight restriction 10,000 lb. per wheel. No hazards in vicinity of airport. During tourist season (July-September) there are approximately ten (10) commercial flights daily. The remainder of the year there are two (2) flights daily. Largest commercial aircraft presently using airport are DC-3's. DC-6's have used the airport, but not regularly. Hangar space and repair facilities are available for small aircraft only. 80 and 100 Octane AVGAS are available. There is 27,800 Gallon AVGAS storage. Airport fire equipment consists of two trucks, one 1600 gal. water and foam, one 200 gallon foam, plus CO_2 and dry chemical extinguishers. The Nantucket Fire Department is within 3 miles of the airport.

(b) Night Operation:

(1) Medium intensity lights now on both runways.
(2) High intensity lights for runway 06-24 planned by April 1961.

(c) Navigational aids:

(1) 50-1 high intensity approach lights for runway 06-24 planned by April 1961.

(2) Rotating Aero Beacon.

(3) Homer Beacon upon request.

(4) VOR located Northeast of airport at elevation of 82 feet above mean sea level at 41°16'51"N, 70°01'38" W.

(5) VHF DF located at 41°15'23"N, 70°03'52"W.

(6) Consolan located as follows:
MASTER: 41°16'07"N, 70°10'49"W
SLAVE: 41°15'03"N, 70°07'49"W

(7) ILS planned by April 1961.

(d) U. S. Weather Bureau Office in air terminal building. No forecasting facilities, all forecasting from Boston.

(e) No control tower at present. Control tower scheduled to be completed in April 1961. Flight Service Station in air terminal building.

(f) Details of Antenna Location in relation to Airstrip:

(1) Ground Elevation at Antenna: 12.9 ft.

(2) Airstrip Bearings: 006°T, 150°T

(3) Elevation of highest point of usable landing area: 48 ft.

(4) Bearing of antenna from Airstrip reference point: N88°05'E
(NOTE: Airstrip reference point is geometric center of two runways)

(5) Elevation of reference point: 43 ft.

(6) Distance from reference point to antenna: 22,480 ft.

C. Actual Site Conditions:

(1) Topography of site:

The topography is shown on Drawing No. NAN-002. The site is on a generally flat area adjacent to the Atlantic Ocean. There is a low ridge of sand dunes between the beach and station area. There are isolated small sand dunes in the area between the county road and the ocean. The highest elevation is 19.1 feet at the top of one dune. In the proposed antenna area elevations vary from 8 feet to 17.5 feet. All slopes are gentle except for dunes. An existing county road crosses the site. Power, water, and telephone utilities enter the site.

(2) Vegetation and Tree Cover:

South of the county road the only vegetation is clumps of grass. North of the road, there are some areas of heavy brush, up to 10 feet in height. General clearing of brush will be necessary only in the area of proposed family quarters. Ground radiats will require clearing of narrow strips of brush. There are no trees on the site. Scrub oak with trunk diameters up to 2" cover portions of the proposed antenna location.

(3) Ground Conditions and Geology of the Site:

The entire area is sandy. No boulders or rock outcroppings were noted. Some pea stone was encountered. Test pits dug in a previous survey disclosed various grades of beach sand. Ground water was found at from 3 to 5 feet above mean low water. The ground water table will not interfere with construction.

(4) Earthwork Required:

Normal foundation and trench work. A small amount of fill will be required for road construction as can be determined from profile on Drawing No. NAN-004.

(5) Foundations for Structures, Engines, etc:

Foundations can be normal depths. Depth of frost is 30 inches. Probable bearing value of soil is estimated at 7000#/Sq.ft.

(6) Termite Proofing:

Termite proofing is not required.

(7) Local Sources of Construction Materials:

Water and sand are available in abundance. No crushed rock on the island. Some gravel available. No ready-mix concrete is available on the island. All construction materials except sand, water, and gravel must be shipped to the island.

(8) Pier or Wharf:

No pier or wharf is required.

D. Utility Report:

(1) Potable Water Supply and Sewage Disposal:

(a) Water Supply:

The existing station is serviced by a 1-1/4" copper line tied in to the Siasconset Water Co., approximately 1450 feet to the east of the

present station boundary. The 1-1/4" copper line ties into the Water Co. 6 inch galvanized line at this point. The Water Co. plans to extend this 6" line 800 feet toward the station in the Spring of 1961. Mr. Kenneth Eldridge, of the Water Commission, advised that the cost of the 6" pipeline is $3./foot (includes pipe, excavating, and backfill). He stated that if we plan construction in the area, he would recommend extension of the 6" line to our property, but doubted that the Island budget would allow the cost of extension. It is recommended that consideration be given to the CG underwriting the cost (estimated as $2,000.) of the additional 450 feet of 6" line required to bring the 6" line to the station property.

The municipal water is taken from four dug wells averaging 28 to 30 feet and one gravel packed well 65 feet deep at the water plant. Water table in this area is 18 feet from the surface. Water is stored in a 192,000 gallon standpipe in the village of Siasconset. No water treatment is performed, samples are tested weekly by the State and treatment has never been indicated.

The existing Loran Station has a pump house adjacent to the garage to boost the pressure at the station. If the new 6" line is extended, the pump house could be eliminated. If it is desired or necessary to retain the pressure boosting equipment, it is recommended that it be relocated to the existing garage building to eliminate the pump house building. The garage builing has adequate space.

(b) Sewage:

(1) Existing Barracks and Signal building presently use septic tanks which will be satisfactory for disposal for additions proposed with no changes.

(2) Proposed family quarters: A municipal sewage filter bed exists approximately 1500 feet from the proposed site of the family quarters, as shown on Drawing No.NANT-003. Mr. Rounsville, Sewer Commissioner for Nantucket indicated to the survey party that there would be no objection to proposed units utilizing these beds, but he expressed doubt that the town would pay for the necessary sewer line. Such a line could require easements over private property, but is recommended over the use of septic tanks due to probable lower initial cost and lower maintenance. The Town has an $80. per house connection charge.

(2) External Electric Power Supply:

The existing commercial power supply to the station is single phase 120/240 volt, 3-wire AC from the secondary side of our transformers (4 ea. 25 KVA). Primary line is 4800 volt. Recently, the overhead power line serving the existing station was replaced with an underground line. Capacity on the new line is 2000 KW 3 phase, 3-wire, 4800 volt. Mr. C.G. Snow of the

Nantucket Gas and Electric Co. stated that if CG furnishes and maintains transformers and switching equipment, a contract at primary service rate will be available. Rate as follows: (For 3 phase power).

(a) Demand Charge:

On peak demand @ $2.00 per KW per month
Plus: Off peak demand @ $1.00 per KW per month but not less than $90.00 per month.
PLUS:

(b) Energy Charge:

3.5¢ per KWH first 15,000 KWH per month
3.0¢ per KWH next 10,000 KWH per month
2.5¢ per KWH balance

Nantucket Gas and Electric Co. plant has 3 diesel plants of 1250 KW, 1000 KW, and 700 KW capacity plus a 100 KW steam generator as standby. Variation of a fraction of a cycle at most. 5% maxim voltage regulation. The peak load on the plant, which serves the entire island, this past year was 2520 KW.during July.

Two standby generators are recommended in the proposed generator room addition to the Signal Building.

(3) Garbage Disposal:

Garbage disposal can be handled as is being done at existing station. Underground garbage containers, common to New England, should be furnished for each family quarter (Collection is made periodically at no cost). Trash to be disposed of at nearby town dump by station personnel.

(4) Heating and Air Conditioning Requirements:

(a) Signal and Power Building - existing building has insufficient heating. Present heat consists of 2 Propane gas heaters and 4 electric heaters. Plans for addition to Signal Building should include provisions for adequate heating of existing portion in addition to new portion. Air conditioning required in Timer rooms. Dehumidified Electronic Storage recommended.

(b) Barracks - Existing system is oil burning hot air system. Existing system is adequate for existing building. Capacity of present furnace is 158,000 BTU. If capacity insufficient for proposed additions, new furnace will be required. No air conditioning required.

(c) Garage - Presently heated with space heater. Adequate.

(d) Proposed Quarters - Recommend oil forced hot water baseboard heating for all quarters. No air conditioning required.

E. Climatology and Sea Conditions:

(1) Precipitation and Temperatures:

See USWB data sheet enclosed with Operation report.

(2) Winds, Storms, and Earthquakes:

See USWB data sheet enclosed with Operation report.

(3) Atmospheric, Dust, and Humidity Condition:

Dust condition poor during dry periods from blown sand. Dehumidified electronics storage recommended.

(4) Sea Conditions Affecting Landings:

Not applicable.

(5) Construction Season:

Construction feasible all year, but from April through October recommended.

F. Conditions Affecting Construction Force:

(1) Nearest Habitation:

Siasconset (1 mile) nearest village. Private accomodations available there and in Nantucket (8 miles).

(2) Endemic Diseases:

No endemic diseases.

(3) Transportation, Communications, and Postal Facilities:

As previously stated in this section and in Operations Report.

(4) Construction Camps:

No existing facilities at station. Rooms and meals available in Siasconset and Nantucket (1 and 8 miles away).

G. Miscellaneous:

(1) Recommended Type of Construction:

(a) Signal and Power Building - similar to existing concrete block with wood frame roof, built up roofing recommended. Existing Loran-A Timer room will require screening. Proposed addition should include provisions for adequately heating both existing building and new building.

(b) Barracks Building - proposed additions should be similar to existing concrete block with wood frame roof, built up roofing. Insulation on exterior walls and roof is recommended. In addition, a paved parking area and an outdoor recreation area consisting of at least a paved basketball court and barbecue pit should be constructed in the vicinity of the barracks. All existing furniture in the barracks requires renewal. There is a noted absence of recreational equipment at the existing station. The proposed addition on the south end would furnish a recreation room. Pool table, shuffle board should be furnished. The addition of 6 rooms on the northern end would allow one man to a room, with the exception of non-rated men doubled up, and would provide one room for transient personnel. Existing toilet facilities are adequate. Recommend enlargement of CO office space by removal of wall as indicated on Drawing No. NANT.005.

(c) Proposed Family Quarters - Wood frame construction with full or partial basement recommended. Following features considered desireable:

(1) Design similar to present Headquarters design for Inadequate Public Family Quarters with some minor modifications.

(2) Cemented asphalt shingle roofs due to high winds.

(3) Stained wood exteriors in lieu of paint to decrease maintenance.

(4) Use of copper drainage, waste, and vent lines in all units.

(5) Oil heat, forced hot water baseboard heating with tankless hot water for each unit.

(6) Provision of outdoor recreational area with equipment for children, also barbecue pit for families.

(7) Include a fireplace in the living room of each Officers Quarters.

(8) Provide washing machines and dryers in each unit and include provisions in plans for water and power for these machines.

(9) Paved roadways and sidewalks should be furnished in the quarters area.

(10) Include grading, seeding, and landscaping in contract.

(11) Include provisions for fire hydrants in family quarters area.

(2) Recommended Storage Facilities:

(a) Electronics - See proposed addition to Signal Building on Drawing No. NANT-005 for rearranged storage for electronics.

(b) GSK - Sufficient storage exists in present garage building.

(c) Commissary - Present barracks has walk-in chill box, upright freezer, and small dry-stores storeroom. These are considered adequate for increased complement due to closeness of local stores.

(d) Garage - Present three stall garage is adequate for new station.

(3) Fuel Delivery and Storage:

(a) Commercial Power will require only storage for standby fuel for generators in vicinity of Signal Building proposed extension. Two weeks storage capacity sufficient. To be delivered by tank trucks.

(b) Storage for heating units - (To be commercially delivered by tank truck).

(1) Signal Building - presently propane gas. If oil used, one month supply adequate.

(2) Barracks - presently 1000 gallon tank above ground. Should be adequate.

(3) Family quarters - one 275 gallon tank in each basement.

(c) Gasoline Storage - Presently, there is a 500 gallon underground tank in front of the garage with an electric pump. With commercial vendors available within one mile of the station, and with no other requirements for gasoline except vehicles, this tank and pump should be removed and Credit Cards used.

(4) Prospective Contractors:

(a) There are no contractors on the Island capable of a construction project as large as the one planned.

(b) See attached list of Prospective Contractors.

(5) Antenna Obstruction Lighting:

Tower will require obstruction lights due to height and proximity to Nantucket Memorial Airport.

H. DRAWINGS AND SKETCHES:

NANT-001 - Location Map, Witness sketch
NANT-002 - Plot Plan and Topographic Map
NANT-003 - Preliminary Property Map (CCGD1 DWG. 5438)
NANT-004 - Profile of Road (2 sheets)
NANT-005 - Proposed Alterations to Existing Buildings

NOTE: Complete plans of existing Barracks and Signal Building will be forwarded to Headquarters on request.

I. CONCLUSIONS:

(1) Construction should be accomplished in seven (7) to nine (9) months.

(2) The existing buildings are of permanent type construction except for generator building and pump house. Alterations proposed for Signal Building include a generator room. The pump house and generator building to be razed and a trailer pump furnished for fire protection.

(3) Alterations proposed to the barracks should include complete new furnishings, new galley range, and new recreational equipment.

(4) The location chosen for family quarters is the closest to town, closest to existing utilities, and will decrease road work which would be required in any other area. Acquisition of Parcel "L" shown on Drawing No. NANT-003 is necessary to use this area for quarters.

(5) General clearing of brush will be required only in the area of the family quarters and transmitter building. Antenna radials can be laid on the surface after brushing along radial lines, and pinned.

(6) Wooden fences are recommended along both sides of the county road and along the eastern edge of the property. Suitable signs should be posted in other areas. Fences also are indicated in vicinity of family quarters.

(7) The Option for Purchase of Parcel G from Miss Landers included a reservation that the CG would bulldoze an 8 foot road from the county road along the western edge of the proposed CG property to the ocean.

SUBMITTED: R. A. Seufert

R. A. SEUFERT, LT, USCG
Civil Engineer Officer, Site Survey

APPROVED: G. H. Lawrence

G. H. LAWRENCE, CDR, USCG
Senior Member Site Survey Party

LIST OF PROSPECTIVE CONTRACTORS

M. S. Kelliher Co.
10 Tremont St.
Boston, Mass.

Wm. M. Bailey Co.
1 Court St.
Boston, Mass.

Conti & Donahue, Inc.
239 Commercial St.
Lynn, Mass.

Poley - Abrams Corp.
2 Elm Place
Brookline, Mass.

John F. Griffin Co.
34 Regent St.
Cambridge, Mass.

Agostini Constr. Co., Inc.
70 Beacon St.
Pawtucket, R.I.

W. M. Bogart Co.
35 South Eden St.
Charlestown, Mass.

Connolly Bros. Inc.
20 Oak St.
Beverly, Mass.

Perini Corp.
73 Montwatt Ave.
Framingham, Mass.

John A. Volpe Const. Co.
54 Eastern Ave.
Malden, Mass.

James F. Kelliher Inc.
1245 Hancock St.
Quincy, Mass.

Anderson Const. Co., Inc.
68 Park Ave.
Braintree, Mass.

NANTUCKET LORAN

SITE SURVEY REPORT

ELECTRONICS ENGINEERING REPORT

A. Stations Involved:

(1) Y Slave: Siasconset, Nantucket Island, Mass. 41°15'N, 69°59'W.

(2) Master: Cape Hatteras, Va., 445 nautical miles, 218° T from Nantucket.

(3) X Slave: Jupiter, Fla., 993 nautical miles, 211° T from Y Slave, 550 nautical miles, 206° T from Master.

(4) System Monitor: Bermuda, 580 nautical miles, 154° T from Y Slave; 568 nautical miles, 107° T from Master.

(5) Cape Cod Canal LBS: (Baseline Ext Monitor): 39 nautical miles, 322° T from Nantucket; 457 nautical miles, 211° T to Hatteras; 1007 nautical miles, 209° T to Jupiter.

(6) Chatham LBS: (Alternate Baseline Ext Monitor): 26 nautical miles, 002° T from Nantucket; 467.5 nautical miles, 214° T to Hatteras; 1016 nautical miles 210° T to Jupiter.

B. Recommended Frequency and Rate:

(1) 100 KC, SO.

C. Calculated Signal Strengths:

(1) Based on 300 KW peak radiated power:

LOCATION	FIELD STRENGTH IN MICROVOLTS/METER FROM		
LOCATION	NANTUCKET	HATTERAS	JUPITER
Nantucket	-----	2750	219
Hatteras	2750	----	1640
Bermuda	1380	1550	389
Jupiter	219	1640	---
Cape Cod Canal LBS	69,100	2440	206
Chatham LBS	109,700	2510	206

D. Measured and Computed Values of Signals from Existing East Coast Loran-C Signals:

(1) Based on peak transmitted power of 100 KW at Marthas Vineyard, Cape Fear, and Jupiter and 300 KW at Wildwood. (AN/PRM-2 Serial No. 9) was used with a 40 ft. vertical antenna calibrated by comparison with loop on Marthas Vineyard Signal:

STATION	COMPUTED	MEASURED
Marthas Vineyard	39,800	39,000
Wildwood	7,750	6,600
Cape Fear	891	600
Jupiter (Probably Skywave, Accuracy poor)	(630 First hop skywave (126 Ground wave	390
Noise (Accuracy poor)		150

E. Signal to Noise Ratios:

(1) Figure 1 gives predicted median four-hour block rms noise levels in db above 1 microvolt per meter computed from NBS circular 557 for 25 KC bandwidth at 100 KCS. Annual median is 31.5 db, 51 db (354 microvolts/meter) will be exceeded 5% of the time (computed from average precentages of time 50 db will be exceeded). Figure 1 also gives noise measured by AN/PRM-2 (poor measurement) and by AN/URM-6. AN/URM-6 direct measurements were increased by a factor of two to increase effective bandwidth to 25 KC and rewe decreased by 12 db to reflect the NBS circular 557 plotted decrease in noise at 100 KC from the 60 KC point where noise was actually measured.

(2) Noise could not be measured above 60 KC on the AN/URM-6 due to strong Marthas Vineyard Signal. Noise measurements on the AN/PRM-2 were very poor due to extreem trace disturtion by Marthas Vineyard and Wildwood Signals and due to presence of interfering teletype and cw signals.

(3) No Loran-C signals on other rates were observed, but night-time, second-hop skywaves of 350 microvolts per meter should be expected from Iceland.

(4) Based on predicted 354 microvolts meter noise level, the signal to noise ratios that will not be exceeded 95% of the time are:

LOCATION	SIGNAL FROM NANTUCKET	HATTERAS	JUPITER
Nantucket	----	4:1 7.9:1	0.6:1
Cape Cod Canal LBS	198:1	3.5:1 7:1	0.6:1
Chatham LBS	314:1	3.6:1 7.2:1	0.6:1

F. Propagation Considerations:

(1) At Nantucket the signal paths to paired stations will be over water. Paths to the service area will be over water from about 045° T to 250° T. From 250° T to 045° T Nantucket Island will interrene with a maximum initial overland path of 10.5 miles at 280° T. The path to Chatham LBS is 26 nautical miles, over water, except for 2.8 nautical miles initial land path. The path to Cape Cod Canal LBS is 39.5 nautical miles with 4.1 nautical miles initial land path, and 11 nautical miles of land path at the Cape Cod End.

(2) Soil at Nantucket is deep sand with a maximum elevation of about 100 ft. at 305° T, 2.8 nautical miles distant. Vegation in the transmitting antenna area consists of scrub oak trees about 4 to 6 feet tall. Other portions of the Island have similar scrub oak, scrub pine up to 15 ft. tall or grass. If the immediate paths of transmitting antenna radials are cleared and radials fastened to the earth, clearing of the entire area should not be necessary, and due to wind errosion of exposed sand, is not recommended. Areas for communications and receiving antennas should be cleared and have grass planted.

G. Interference Considerations:

(1) Actual monitoring on the site disclosed the following signals:

Frequency	Emission	Field Strength	Bearing ° T
194 KC	Consol	180,000	272
138.5	Teletype	2,400	235
132.5	AØ	1,100	258
128	TTY (Newport)	2,000	280
124	TTY	320	230
122	TTY	320	320
121	TTY	1,900	250
118	AØ	360	220
117.5	TTY	460	215
113.5	AI	460	240
112.8 (WSL)	TTY	640	263
109	AØ	360	345
103	TTY	740	235
92.5	TTY	1,400	305
85.7	AI	1,000	257
83	AØ	440	273
80	TTY	300	216
77.5	AØ	220	307
72.5	TTY	5,000	240
69.7	AØ	360	281
63.5	TTY	3,000	250
62.5	AØ	800	303
60.0	Noise level	40 to 60	---
47.5	AØ	1,900	302

(2) Known MF Operations:

(a) Nantucket consol on 194 KC produces 180,000 microvolts per meter at the Loran site. This could cause receiver overloading, particularly during the X Slave interval. Conversly, the loran signal will be about 3×10^6 microvolts per meter at the consol station. If the spectrum is 80 db down at 192 KC the radiated signal will be 3×10^2 microvolts per meter. The effect of this signal strength on consol monitor operations is not known, but a definite possibility exists that their phase monitor receiver might be effected. FAA Airway Technical Field Office (Mr. Mack), (Mr. Earl C. Burtlett is Chief of Office) Federal St., Nantucket, Mass. was contacted. They anticipated no problem. Signal is fed to the remote antenna at 97 KC through an underground cable at a 5 volt level. Pickup of 100 KC Loran pulses over this long cable is possible.

In the past the consol station occasionally radiated a strong 97 KC subharmonic. Mr. Mack said this had been found due to an equipment fault and has been eliminated. The signal was not heard at the Siasconset site.

(b) U.S. Naval Facility, Tom Nevers Head, Nantucket, Mass. is located on the shore about 1 mile from the station site. Commanding Officer is LCDR RAY L. HUMPHRIES, USN (Phone CL-7-6306) LTJG HATHAW E. WHITE, Communications Officer, and Mr. Stankloc, Western Electric Co., Tech Rep, were contacted.

Station mission is classified. Neither LTJG WHITE or Mr. KLOCK forsaw any particular interference to their operations. Radio Communications are held on 2, 3, and 8 MC frequencies. No inteference is expected to Loran-C.

(c) VOR. A VOR facility is located 1.9 nautical miles inland on the centerline of runway 24 of Nantucket Airport. An ILS system is presently also being installed. The VOR is located on the top of a small rise of land and overlooks all other objects and land in the vicinity. It is about 16,500 ft. from the Loran-C Tower Site. The Loran-C 625 ft. tower should subtend a vertical angle of about $2^{\circ}10.3'$ at the VOR, and a horizontal angle at the base of the tower top loading guys of about $6^{\circ}13'$ at the VOR. Some distortion of VOR pattern might result. FAA was not contacted in this matter.

(d) Naval Communication Facility, Newport, R.I., transmitts a Fox teletype schedule on 128 KC for local fleet use. Ships in the area have experienced interference from Loran-C in the past, and undoubtedly this will continue to occur. The Distance from Nantucket to Newport is 62 nautical miles compared to the present 27 nautical miles. Expected field strength is 90 db at Newport from Nantucket compared to 95 db from Marthas Vineyard. If energy is 40 db down at 128 KC, interfering field strengths would be 50 db (314) microvolts per meter from Nantucket compared to present 55 db (560 microvolts per meter) from Marthas Vineyard.

Field strength from Newport was measured as 2000 microvolts per meter on 128 KC at Nantucket.

No other interference problems are expected from or to Newport.

(e) Station WCC, Chatham, Mass. guards and transmits on 130.35, 143, 147.5, 436, 500 KC CW andon 2182 KC and 8 and 12 MC bands, commercial marine service. This station is 26 nautical miles from Nantucket and 44 nautical miles from Marthas Vineyard. Field strength from Marthas Vineyard and Nantucket at Chatham would be 101 db and 91 db above 1 microvolt/meter respectively at 100 KC. For 40 db down at 130.3 K KC these signal strengths would be 61 db (1120 microvolts/meter) and 51 db (355 microvolts/meter). Interference to signals received by WCC may be increased to a degree that will cause trouble, particularly on 130.35 KC.

Signals from WCC were not heard while monitoring but should be in the order of 3 to 10 milivolts/meter and might pose a serious problem requiring filtering.

(f) WVO, Army Radio Boston operates on 159 KC. There should be no mutual interference.

(g) WPC in Quincy operates on 472 KC with no mutual interference expected.

(h) Air Force Aerobeacons operate on 254 KC at New Bedford, Mass., and on 396 KC (WZW) at Westover Field, Mass. Mr. Sharkey, Communications Specialist at Hanscomb Air Force Base, Bedford, Mass. was contacted and gave the above as their only MF operation in the area. No interference is expected to Air Force operations.

(i) Local FCC was contacted for a check of MF operations in the vicinity of 100 KC. They reported an experimental station in Tulsa, Oklahoma on 101.7 KC. Bendix operates experimental stations on 113.3 KC at Andover, N.J., Red Hook, N.J. and Yaphank, N.J.. A marine station (WSL) utilizing 112.8 KC, AL operates at Amagansett, Long Island, N.Y. All these stations may be expected to interfere with Loran-C operation, at least to the extent of masking signals and causing delays during resynchonization.

(j) There are no known carrier systems operating in the area in the vicinity of 100 KC. The Pawtucket Power Co., power line carrier telemetering system that previously caused interference at Nantucket changed to phone-line operation.

(k) The many signals observed in the 100 KC band will be detrimental to Loran-C users (particularly M-X rate in this area), and especially those users hoping to make manual pulse matches using a 100 KC convertor for a Loran-A receiver. Elimination of as many of these on-band frequencies as early as possible will foster user acceptance of Loran-C.

H. Communication Facilities:

(1) Commercial telephone connection exists at the Loran-A station. Additionally the Loran-A station has an AN/URC-7 transceiver operating directly into a whip ant at the timer room used for emergency communication only. This set has good communications with Brant Point LBS and Chatham LBS. Communications with Woods Hole Secondary Radio Station, the closest district teletype station, are doubtful. Communication with Cape Cod Canal LBS is not usually possible. Retention of existing AN/URC-7, R-523A, and 2 ea. SCR-536 is recommended to supply communications to District Radio Station (via a LBS) and for emergency communications and WWV checks.

Communication between Nantucket and the Baseline Extension Monitor by landline is strongly recommended. A private leased telephone Co. circuit is available from Siasconset to either Cape Cod Canal LBS or Chatham LBS for a initial service charge of 10.00 at either place and monthly recurring charges of $98.50 to Chatham LBS and $155.25 to Cape Cod Canal LBS. Leased line is presently used at Marthas Vineyard and is very advantageous.

If SSB is used to the Baseline monitor, groundwave coverage would probably be required. Due to overland path at Cape Cod Canal LBS, Chatham LBS would be a preferable monitor site from this point of view.

Duplicate installation of AN/URT-17 SSB with TT-48A/UG teletype, and R-840/URR receiver is recommended for inter-station communications. The existing Collins SSB at Marthas Vineyard is slightly underpowered for the existing quality of watchstanding. It is found at Marthas Vineyard that location of the guard speaker outside the shielded room reduced the tendency to decrease receiver gain to lower ambient noise level while still allowing the watchstander to hear stations calling. The existing SSB net is unsucessful due to poor watchstanding caused by turning down receiver volumn to reduce noise level and by the fact that frequency availability does not allow all stations to guard the same best frequencies. A better family of frequencies for the net is mandatory. Net

control should be more tightly exercised to insure best operation.

AN/FPN-41 and AN/FPN-42 test equipment should be supplied.

A district spare teletype should be allowed to facilitate maintenance. No TT-48A/UG spare equipment is available at present although installations are completed or scheduled for 12 district vessels.

Since district primary radio station is scheduled to get a SSB installation in the future, expediting this installation is recommended to allow direct communications between the District primary radio station and the Loran-C station. The present system at Marthas Vineyard, and the system that will have to be used in the absence of common facilities with the primary radio station, is relay via lifeboat stations and secondary radio station, Woods Hole. Since the lifeboat stations and other operators involved do not understand the technical content of many of the messages, excessive errors are made.

I. Location of Baseline Extension Monitor:

(1) Cape Cod Canal LBS is the present location, 30 miles from Marthas Vineyard. This is about 6.5 miles off the baseline extension. Some difficulty has been experienced with low remote signal strength resulting from shortening the antenna to prevent receiver limiting of the Y-Slave signal. Recently this has been considerably improved by increasing the differential gain voltage.

(2) Cape Cod Canal LBS would be 39.5 nautical miles from Siasconset, Nantucket. This would result in a somewhat lower local slave signal, improving operations. It would be about 164 microseconds from the baseline extension TD.

(3) Chatham LBS would present a nearly overwater path (first 2.8 and last 0.4 miles of a 32 mile path would be overland), a desirable feature. It would be about 25 microseconds from the baseline extension TD, also desirable.

(4) If the baseline monitor were to be permanent, a move to Chatham LBS would be desirable. However, since it is understood the monitor would be retained only for 6 months it is recommended that it remain at Cape Cod Canal LBS for economic reasons. The movement to Chatham would cost about $500.-$700.00 for electrical installation and closing down cost for the present site. Personnel who now live in the Cape Cod Canal area would have to be moved.

J. General:

(1) Operation of the present East Coast Chain is ample evidence of the practicality at the proposed relocated chain.

(2) The cable run from the transmitting antenna to the proposed Loran-C timer room is somewhat over 1900 feet. It is considered most important that the Loran-C and Loran-A timer rooms be located as close together as possible if there is to be any joint use of watchstanders. If Headquarters decides that this cable run is too long, rather than moving the Loran-A and Loran-C buildings toward the antenna, it is suggested that the antenna be moved toward the present Loran-A building with the entrance roads running under the top loading elements. This has not been discussed with local authorities (as to their feelings on the top loading guys running over the road) but it is considered that there is sufficient precedent in high voltage power lines, telephone lines, and telephone and power pole guys crossing over public streets to make a strong argument in its favor. Ground radicals could be run under the street using heavier gage wire or stranded cable for this portion of the run. Elements could be terminated ten feet short of building.

SUBMITTED: W. M. Thorsson

W. M. THORSSON
Electronic Survey Officer

APPROVED: G. H. Lawrence

G. H. LAWRENCE
Senior Member Site Survey Party

Encl: (1) Figure 1: Predicted noise levels
(2) U. S. Geological Survey, Charts of Nantucket.

FIGURE 1

NOISE LEVEL AT NANTUCKET
BASED ON NBS CIACHAM ET7