

CONFIDENTIAL

RESEARCH DEPARTMENT

SOUTH DEVON TELEVISION SITE TESTS
INTERM REPORT

Report No. K.091

Serial No.1953/7

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Figures 1 & 2

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1. SUMMARY

The tests were made from two sites, North Hessary Tor on Dartmoor and Horner Down, near Totnes.

It was found that North Hessary Tor gave the better cover in Plymouth and over most parts of Devon and Cornwall, and had the advantage of providing a second-class service almost to the extremity of the Cornish Peninsula. The site at North Hessary Tor is, therefore, more suitable than Horner Down and is recommended.

2. INTRODUCTION

The site tests carried out in South Devon were undertaken with a view to providing South Devon and Cornwall with a television service from one medium power transmitter. Two sites have been tested. The first, North Hessary Tor, is very near Princetown on Dartmoor and is 1650 ft. above sea level, and the second, Horner Down, is approximately six miles south of Totnes, 680 ft. above sea level. The equipment and measurement technique employed was the same as that used on previous site tests.

It was originally intended to use horizontal polarisation for the South Devon transmitter, thereby reducing by at least 10 db the co-channel interference in the service area of the vertically polarised high power transmitter which shares Channel II (Holme Moss). In accordance, however, with the provisions of the Stockholm Agreement and Plans, vertical polarisation is to be used for the South Devon service, with the proviso that the effective radiated power in the direction of Caen must not exceed 10 kW. As a direct result of this decision to use vertical polarisation, the radiation in the direction of the westerly part of the Holme Moss service area must be decreased considerably below that of an omnidirectional aerial in order to avoid interference to parts of the existing service in that area. For these reasons, it is proposed to use a directional aerial, so that the effective radiated power in the direction of Cheshire and North Wales shall not exceed 1 kW.

3. RESULTS

Table I gives the mean field strengths predicted from the results of actual measurements for the most important towns in Devon, Cornwall and parts of Somerset and Dorset, assuming a directional aerial to be used, supported on a 750 ft. mast and fed from a 5 kW transmitter. The table is arranged in alphabetical order. The ratio in decibels, of the field strengths from North Hessary Tor to that from Horner Down, is given in the last column. Figs. 1 and 2 are maps showing the 5.0, 2.0, 1.0, 0.5, 0.2 and 0.1 mV/m field strength contours of North Hessary Tor and Horner Down respectively. All field strengths quoted in this report are for a receiving aerial 30 ft. above ground.

The directional aeriels assumed for both sites have the same horizontal radiation pattern, but since the sites are on different longitudes, the appropriate allowance has been made for reducing radiation in the direction of the western parts of the Holme Moss service area by suitable orientation. Re-orienting the aerial in order to fulfil this requirement results in the aerial radiating slightly more than the permissible 10 kW in the direction of Caen. If the Horner Down site be selected this could be corrected by a very slight change in aerial characteristics.

The effective radiated powers from both sites with the assumed directional aerial would be as follows.

North Hessary Tor	True bearing	10°	60°	130°	205°
	ERP (kW)	1	8	10	12
Horner Down	True bearing	332°-340°	30°	100°	175°
	ERP (kW)	1	8	10	12

4. DISCUSSION OF RESULTS

The relative merits of the two sites may be compared by reference to Table I and Figs. 1 and 2. The following salient points are worthy of mention.

4.1 Service in Cornwall

Over the western half of Cornwall, in general, the field strength from North Hessary Tor is about 6 db greater than that from Horner Down. For example, in Truro the ratio in favour of North Hessary Tor is 4 db and in St. Ives, 8 db. The eastern half of Cornwall is overlooked by, and relatively near to, Dartmoor but is largely screened from Horner Down by Dartmoor with the result that, on the whole, this area receives a field strength from North Hessary Tor about 10 db greater than that

from Horner Down. At a few receiving locations the ratio in favour of North Hessary Tor is as great as 26 db. The north of Cornwall will receive a field strength of less than 0.1 mV/m from Horner Down while, for example, the towns of Bude and Launceston receive field strengths of 0.33 mV/m and 3.1 mV/m respectively from North Hessary Tor. Considering Cornwall as a whole, it can be stated that the field strength ratio in favour of North Hessary Tor is approximately 8 db. In terms of the service these sites would provide, the whole of the eastern half of Cornwall would receive a very good to excellent service from North Hessary Tor and a fair to poor service from Horner Down. The western half would receive a fair to poor service from North Hessary Tor and a poor to very poor service from Horner Down.

4.2 Service in Devon

In Devon, North Hessary Tor gives, in general, a much better service although Horner Down provides a stronger field over much of the area between Plymouth and Torquay. Beyond these limits, the Horner Down signal is severely attenuated by the mass of Dartmoor. It should also be borne in mind that the effective radiated power in a northerly direction is restricted to 1 kW, so that the field strength in the vicinity of Dartmoor is 10 db less than if it were possible to use an omnidirectional aerial at Horner Down. The combined result of the reduced radiation in a northerly direction and the screening of Dartmoor is that the limit of the service (0.1 mV/m) of a transmitter sited at Horner Down does not extend north of Dartmoor. Thus, North Devon would receive no service from Horner Down, whereas the extreme northern limit of the North Hessary Tor service is roughly a line joining Bideford to Dulverton. The area beyond this limit is provided with a satisfactory service by Wenvoe. In south-east Devon, it will be seen from Figs. 1 and 2 that the coastal area east of Teignmouth is equally well served by either site. Inland, North Hessary Tor provides the better service; Exeter, the most important town in this area would receive 0.4 mV/m from North Hessary Tor and 0.29 mV/m from Horner Down. It should be noted that the signal is inadequate from either transmitting site - a field strength of at least 2 mV/m would be required in Exeter. There appears to be no satisfactory remedy for this.

Paignton, with a field strength of 3.7 mV/m from Horner Down, compared with 0.58 mV/m from North Hessary Tor, is the only large town to be appreciably better served by Horner Down. Torquay, with 2 mV/m from North Hessary Tor is adequately served from either site.

Plymouth, the largest town in the south-west of England, would receive an average field of 7.3 mV/m from North Hessary Tor, but only 3.3 mV/m from Horner Down.

4.3 General

It is evident from the foregoing results that a transmitter sited at North Hessary Tor would serve a much larger area than one sited at Horner Down. Table II, which gives comparative population figures for three grades of service emphasises even more the superiority of the North Hessary Tor site.

TABLE II

Site	Population that will receive field strengths greater than:		
	5.0 mV/m	0.5 mV/m	0.1 mV/m
North Hessary Tor	285,000	586,100	1,305,800
Horner Down	25,600	501,300	941,700

Finally, it should be noted that the area free from interference from Holme Moss, the limit of which is shown in Figs. 1 and 2, would be restricted to south-west Devon and south-east Cornwall with the transmitter sited at Horner Down, while the corresponding area for a transmitter at North Hessary Tor would extend over nearly half Cornwall and over a large amount of that part of Devon not served by Wenvoe.

5. CONCLUSIONS

This report shows that of the two sites tested for a medium power television station, the North Hessary Tor site is superior in all respects. It is therefore recommended as the site on which to build the South Devon television transmitter. The results of the tests clearly demonstrate that if South Devon and Cornwall are to be served from one transmitter, the site must be located somewhere on the high ground of Dartmoor. The North Hessary Tor site would provide most of Cornwall with a reasonable service and Plymouth with an excellent service. The only large town not satisfactorily served by North Hessary Tor would be Exeter; the service from the site at Horner Down would be even less satisfactory.

TABLE I

Comparison of predicted field strengths from alternative transmitter sites at North Hessary Tor and Horner Down.

Town	North Hessary Tor Mean field strength in mV/m 30 ft above ground level	Horner Down Mean field strength in mV/m 30 ft above ground level	Ratio field strength North Hessary Tor/ Horner Down in decibels
Axminster	0.26	0.27	- 0.35
Barnstaple	0.04	0.04	0
Bideford	0.37	<0.03	>+21.0
Bodmin	0.37	0.19	+ 6.0
Brixham	0.53	1.5	- 9.0
Bude	0.33	<0.09	>+11.0
Camborne	0.2	<0.14	>+ 3.0
Dartmouth	0.4	1.3	-10.0
Dawlish	0.21	0.2	+ 0.4
Dorchester	0.09	0.13	- 3.0
Exeter	0.4	0.29	+ 2.8
Exmouth	0.93	0.7	+ 2.4
Falmouth	0.37	0.24	+ 3.7
Holsworthy	1.4	<0.06	>+27.0
Honiton	0.36	0.13	+ 9.0
Launceston	3.1	0.15	+26.0
Lyme Regis	0.1	0.12	- 1.6
Modbury	1.65	7.8	-13.0
Newquay	0.24	<0.17	>+ 3.0
Okehampton	0.04	<0.03	>+ 2.2
Padstow	0.33	0.18	+ 5.0
Paignton	0.58	3.7	-16.0
Penzance	0.15	<0.15	0
Plymouth	7.5	3.3	+ 7.0
Redruth	0.18	<0.14	>+ 2.2
Seaton	0.09	0.14	- 4.2
Sidmouth	0.12	0.19	- 4.6
St. Austell	1.4	0.5	+ 9.0
St. Ives	0.43	0.17	+ 8.0
Taunton	0.22	0.05	+13.0
Teignmouth	0.88	0.82	+ 0.6
Tiverton	0.3	0.08	+12.0
Torquay	2.2	2.6	- 1.4
Truro	0.25	0.16	+ 3.8
Weymouth	0.13	0.17	- 2.2

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FIG.1
NORTH HESSARY TOR.

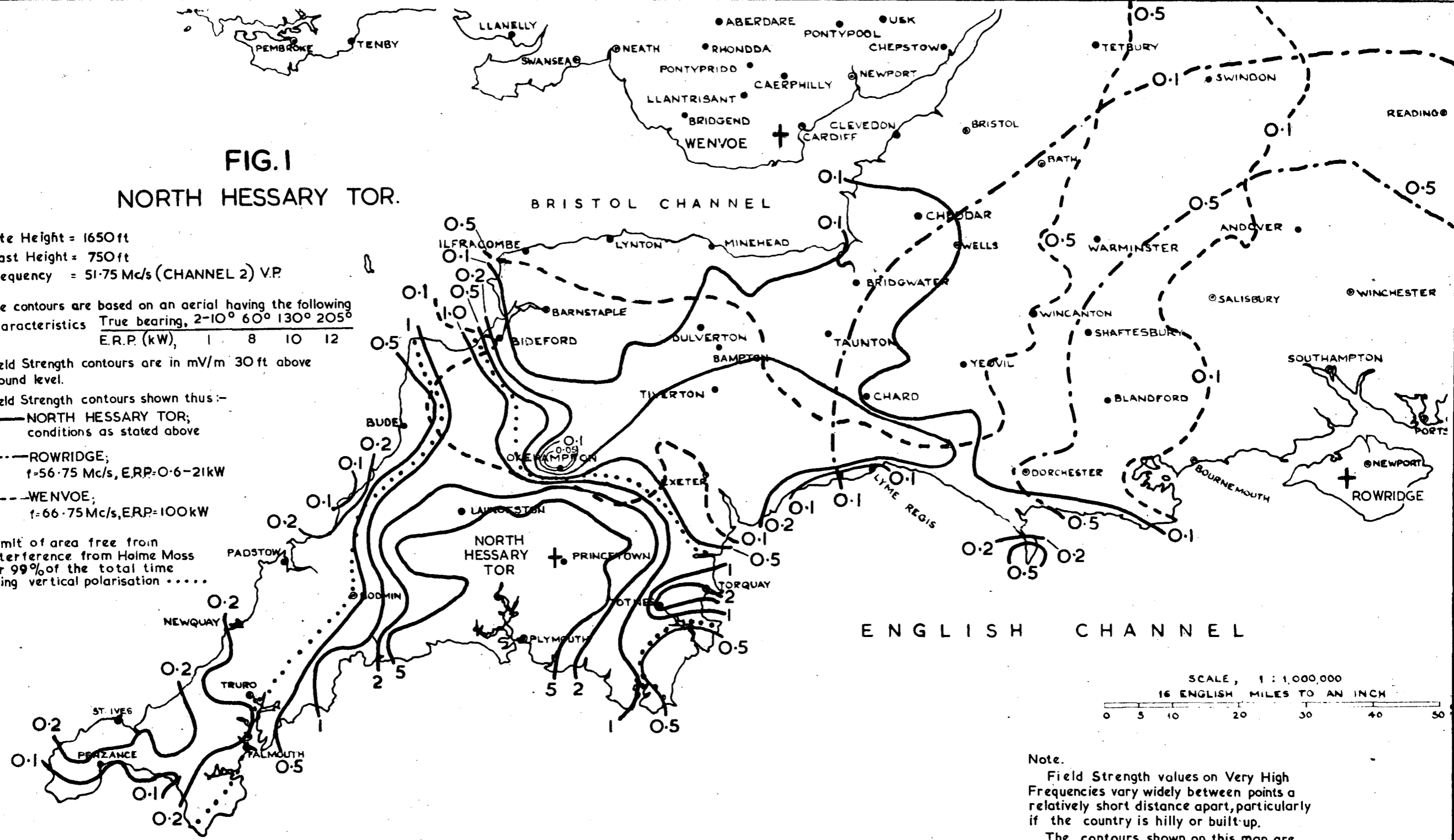
Site Height = 1650ft
Mast Height = 750ft
Frequency = 51.75 Mc/s (CHANNEL 2) V.P.

The contours are based on an aerial having the following characteristics
True bearing, 2-10° 60° 130° 205°
E.R.P. (kW), 1 8 10 12

Field Strength contours are in mV/m 30 ft above ground level.

- Field Strength contours shown thus:-
- NORTH HESSARY TOR; conditions as stated above
 - - - ROWRIDGE; f=56.75 Mc/s, E.R.P.=0.6-21kW
 - - - WENVOE; f=66.75 Mc/s, E.R.P.=100kW

Limit of area free from interference from Holme Moss for 99% of the total time using vertical polarisation



Note.
Field Strength values on Very High Frequencies vary widely between points a relatively short distance apart, particularly if the country is hilly or built-up.
The contours shown on this map are the average Field Strength in the areas concerned and are based on site test measurements. The Field Strength available at any particular location may differ over a range of ± 10 db from the value indicated by the contours, the degree of error being greatest in hilly or built up areas.

**FIG.2
HORNER DOWN**

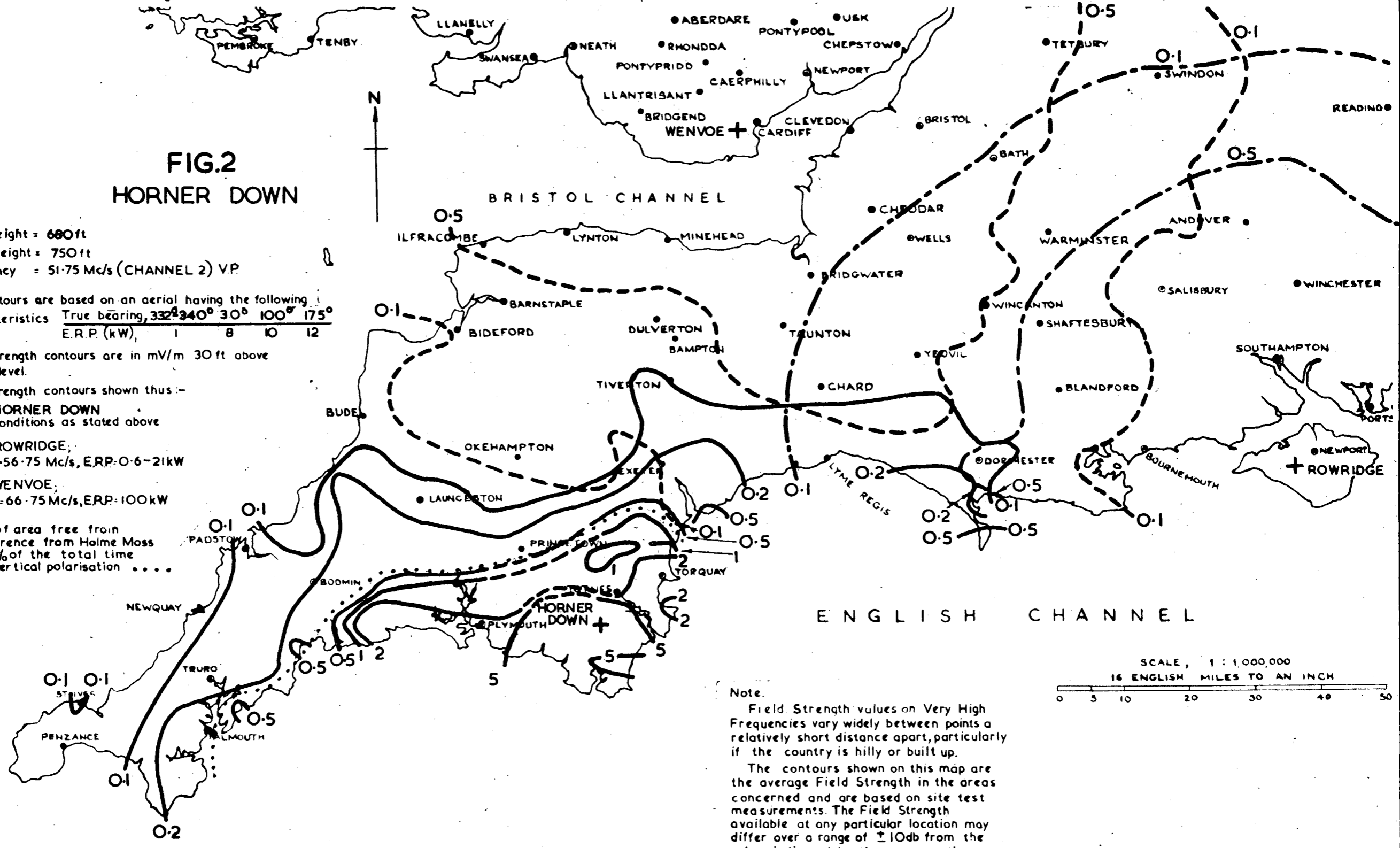
Site Height = 680ft
 Mast Height = 750ft
 Frequency = 51.75 Mc/s (CHANNEL 2) V.P.

The contours are based on an aerial having the following characteristics
 True bearing, $332^{\circ} 34' 30''$ $100^{\circ} 17' 5''$
 E.R.P. (kW), 1 8 10 12

Field Strength contours are in mV/m 30ft above ground level.

- Field Strength contours shown thus:-
- HORNER DOWN conditions as stated above
 - - - ROWRIDGE; f=56.75 Mc/s, ERP=0.6-21kW
 - - - WENVOE; f=66.75 Mc/s, ERP=100kW

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