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**Interference to analogue TV reception due to building developments at Canary Wharf**

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**Abstract**

Since early spring 2001, BBC Reception Advice has received a number of complaints from residents to the north of Docklands on the Isle of Dogs, east London about the deteriorating quality of their analogue TV reception. This document describes a brief investigation undertaken to determine the cause of the problem. It concludes that recent building developments at Canary Wharf are responsible, and goes on to discuss possible remedial action.

**Key words:** interference, television reception, Canary Wharf

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## Interference to analogue TV reception due to building developments at Canary Wharf

P. D. Parsons

### Introduction

The **Canary Wharf** tower and other developments in London Docklands affected the quality of television reception from Crystal Palace, in both the 'shadow zone' and 'reflection zone'. To overcome the problems in the shadow zone, the Poplar relay station was built in 1991. Building developments in and around the Isle of Dogs area continue, most recently with the **HSBC** and **Citigroup** towers that are adjacent to the original tower at One Canada Square. There are also a number of other new buildings, of significant size, under construction in the area. These include the **Excel Building** and the tower block (currently known as HQ5) at West India Docks that is predicted to obstruct the re-broadcast link from the analogue television transmitter at Crystal Palace to the Poplar analogue television relay station.

Since early spring 2001, BBC Reception Advice has received from residents to the north of Docklands a number of complaints about the deteriorating quality of analogue television reception. When the addresses of the complainants are plotted onto a map it can be seen that they are located within a narrow corridor apparently in the shadow of the Canary Wharf, HSBC and Citigroup towers.

The map in Figure 1 shows the location of the Canary Wharf development, the Poplar transmitter and the narrow corridor on approximately 21 degrees ETN from Crystal Palace and Croydon (Channel 5) where viewers who have contacted Reception Advice reside.

### Investigation

The problem appeared to be on a significant scale and, on 30<sup>th</sup> July and 2<sup>nd</sup> August 2001, BBC R&D undertook a brief investigation into the problem. The investigation showed that the complaints were fully understandable, with, at some locations Grade 1 (as measured on the ITU-R 5-point scale of picture impairment, see Appendix 1) multiple delayed image interference (DII), commonly referred to as 'ghosting' seen both in our survey vehicle and in viewers' homes. The delay times were measured as between 0.5  $\mu$ s and 10  $\mu$ s indicating that the reflections are from one or more of the many local commercial or residential tower blocks up to 5 km from the direct signal path. A number of residents were keen for us to see the poor quality of reception in their homes. The broadcasters' transmitters at Crystal Palace and Croydon are on virtually the same bearing when viewed from the affected area, and reception problems are common to both the national services (Crystal Palace) and Channel 5 (Croydon). Some have overcome the problem by subscribing to D-Cable or D-Sat TV, but highlighted the problem that Teletext is not available and that they are not able to watch and record programmes simultaneously.

The photograph shows the three towers as seen (on 2<sup>nd</sup> August 2001) from the road adjacent to Balfron Towers, the site of the Poplar relay. At this bearing, they form a continuous wall, behind which reception of Crystal Palace is affected. Measurements indicate that group field strengths at affected locations are up to 25 dB lower than those at unaffected points. It is likely that where building clutter (due to the three Docklands towers and existing buildings) reduces the wanted signal strength, the difference between the strengths of the wanted and unwanted reflected signals is also reduced. Prior to the construction of the new Docklands towers, the affected locations probably experienced some DII, but now it has been made significantly worse (by up to 3 grades on the ITU scale).



Surprisingly, not all points along the narrow shadow zone suffer DII. This is thought to be due to the strength of reflected signals varying along the narrow corridor in which the wanted signal strength is reduced. Neighbourhoods affected include Stratford, Wanstead Flats, Wanstead, and Woodford Bridge (Postcode areas E7 0\*\*, E7 9\*\*, E11 1\*\*, E11 2\*\*, E11 3\*\*, E15 1\*\*, E15 4\*\* and IG8 8\*\*).

Alternative sources of off-air terrestrial analogue reception were assessed. The transmitter at Sandy Heath contributes a service in the northern part of the affected area and some viewers could be re-tuned to this service. It's worth pointing out that as this area is on the boundary of this transmitter's service area, it being limited by field strength, its usage is likely to be minimal. Also Sandy Heath transmits BBC East and Anglia regional programmes whereas Crystal Palace transmits BBC South East and Carlton/LWT. There is no usable Channel 5 service from Sandy Heath as the ERP is 20 dB below the four national services.

The Poplar relay, built before the arrival of Channel 5, provides a four channel service in its vicinity but it is limited in the area it can serve by the impact of co-channel interference (CCI) from transmitters at Walthamstow North (101.25), Dover (113.00), Hannington (126.00) and Heathfield (139.00). It also was seen to suffer DII, probably from some of the same buildings that are causing DII to Crystal Palace reception. Its service area could be extended by the implementation of precision offset between it and the most significant interferers, and by modifying its antenna to increase the ERP (signal strength) towards the affected area. Further work would be required to assess whether such modifications would be of overall value. Even if this approach were possible, and some viewers re-tuned to Sandy Heath or Poplar, there are still many who would remain unserved by any terrestrial analogue transmitter.

Digital Terrestrial Television (DTT) reception was obtainable on the free-to-view multiplexes at all the survey points where we tested it. This is not however a reliable indicator that it would provide a service throughout the affected area.



## **Conclusion**

It is currently impossible to quantify the final impact of new building developments at Docklands because the factors affecting reception conditions are extremely complex, and the situation is still undergoing significant change. At the time of writing, construction of the HSBC and Citigroup towers progresses and a number of other smaller buildings are under construction on the Canary Wharf development site. It is also difficult to predict accurately the number of households affected, it may be as many as ten thousand.

These uncertainties make it extremely difficult to offer specific remedial advice at present, and a fuller survey may be required at a later date.

Although there is currently considerable uncertainty as to which solutions are appropriate to this significant and complex problem in individual cases, it is likely that adoption of one of the three digital means of receiving television (DTT, D-Sat, D-Cable) is, in many of them, the only practical way forward. BBC R&D will actively monitor the situation and, as it becomes possible to give specific guidance on ways of addressing the reception problems that have arisen, it will be available through BBC Reception Advice (see Appendix 2).

## **Appendix 1**

### **ITU 5-point scale of picture impairment**

Grade 5	No perceptible interference
Grade 4	Perceptible but not annoying
Grade 3	Slightly annoying
Grade 2	Annoying
Grade 1	Very annoying

## **Appendix 2**

### **Contact details**

BBC Reception Advice  
Television Centre  
London W12 7RJ

Tel: 0870 0100123 (national rates)  
[www.bbc.co.uk/reception](http://www.bbc.co.uk/reception)