

## 17. RADIO AND TELEVISION RECEPTION

### INTRODUCTION

- 17.1 This chapter has been written by Waterman Environmental with technical input from EMC Consultants Ltd. It assesses the likely effects of the four Development Scenarios upon local reception of radio and television signals. The chapter summarises the findings of a desk-based study undertaken by EMC Consultants which is presented in Technical Appendix 17a.
- 17.2 The chapter describes the policy context and the methods used to assess the effects of each of the four Development Scenarios, together with a general description of the baseline conditions that currently exist on and around the three application sites.
- 17.3 The potential effects of the Development Scenarios are assessed in turn and, following a discussion of appropriate mitigation measures, an assessment of residual effects is provided.

### PLANNING POLICY CONTEXT

#### National Planning Policy

##### Planning Policy Statement 8: Telecommunications, 2005

- 17.4 Planning Policy Statement 8 (PPS8) (Ref. 17.1) outlines the types of radio interference (e.g. electrical or physical) that can arise from new developments. Paragraph 39 states:
- “...Local Planning Authorities will need to satisfy themselves that the potential for [physical] interference has been fully taken into account in the siting and design of such developments.”*
- 17.5 Paragraph 40 further states that where problems with interference are likely:
- “...Local Planning Authorities may grant planning permission subject to a condition that, before development commences, the developer will ensure that the quality of any reception affected by the development will be restored.”*

#### Regional Planning Policy

##### The London Plan: Spatial Strategy for Greater London, 2008

- 17.6 There are no regional planning policies relating to telecommunications interference. However it is of note that Policy 4B.10 of the consolidated London Plan (Ref. 17.2) states new large scale developments must:
- “... be safe in terms of their own integrity and the safety of occupiers and have an acceptable relationship to...telecommunication networks.”*

#### Local Planning Policy

##### Westminster City Council Replacement Unitary Development Plan, 2007

- 17.7 Policy DES 3 of Westminster City Council’s (WCC) Replacement Unitary Development Plan (UDP) (Ref. 17.3) provides guidance regarding the design of tall buildings. In relation to development proposals, the Replacement UDP advises:
- “High buildings which may be exceptionally permitted...should...have no adverse impact upon telecommunications channels.”*

## ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

## Assessment Methodology

17.8 Communication transmissions considered within this assessment include:

- Broadcast radio;
- Satellite television; and
- Terrestrial television.

These signals operate at different transmission frequencies and possess different transmission wave properties. Broadcast radio waves operate between low and very high frequencies from approximately 150kHz to approximately 230MHz whereas terrestrial television signals operate at ultra high frequencies (approximately 470-855MHz). Satellite transmissions operate at super high frequencies (around 10GHz).

17.9 The effects of large structures (such as buildings) on airborne transmission signals are principally manifested in the following ways:

- **‘Shadowing’ effects:** Where an area behind a structure is effectively screened from the transmitter, preventing reception of the transmission or reducing the signal strength. Estimates have been made of the length and width of the electromagnetic shadows which would be caused by the four Development Scenarios. Shadows can be caused by any conductive obstruction and the extent of shadow is dependent on transmission frequency, propagation angle and the geometry and conductivity of the obstruction. Transmitted signals tend to bend around obstacles, with lower frequency signals being more affected than higher frequency signals. This bending is known as diffraction and can result in a reduction in shadow width and length; and
- **‘Ghosting’ effects:** Where the transmission signal is reflected and scattered by a conducting surface on the structure. This reflected and scattered ‘indirect’ signal arrives at the receiver out of synchronisation with the ‘direct’ signal. In the case of terrestrial television, this delay can cause a second ‘ghosted’ image to appear on the viewer’s screen. Terrestrial television signals reflect off objects, such as building facades with maximum reflection occurring from highly conductive surfaces such as polished metal, and minimum reflection occurring from less conductive surfaces such as plain glass or plastic. Radio and satellite television signals are not affected by ghosting.

17.10 Because the different types of signal respond to potential obstacles in different ways, this chapter considers the effects of the four Development Scenarios on existing sensitive receptors (i.e. residential properties) with respect to each broadcast medium in turn. The assessment has been informed by:

- The varying physical properties of radio, terrestrial television and satellite television signals;
- Information pertaining to the key design parameters of the detailed planning application(s), primarily siting of the proposed buildings, their height and their massing (refer to Chapter 5: The Proposed Development Scenarios);
- The location and elevation of transmitter locations;
- The approximate height of nearby buildings; and
- Adjacent land uses.

17.11 Given the description of the four Development Scenarios within Chapter 5: The Proposed Development Scenarios, it is assumed that all building facades facing the television transmitters would be constructed from structural steelwork and reinforced concrete and would have a high density of glazing fitted within metallic frames. The glazing is assumed to be slightly recessed into the perimeter of facades.

17.12 Further details on the precise methodologies employed within this assessment are presented within Technical Appendix 17a.

### Significance Criteria

- 17.13 The significance of radio and television reception effects has been established through the consideration of the occupancy of buildings likely to be affected by the four Development Scenarios (only residential properties are considered to be sensitive receptors), together with the type of television service likely to be in use in the buildings (for example, terrestrial, cable or satellite). In this way, the following 3-point scale of significance criteria can be defined:
- **Beneficial:** The Development Scenario in question would result in an anticipated noticeable improvement in received signal levels and quality;
  - **Negligible:** The Development Scenario in question would result in no noticeable anticipated effect upon signals;
  - **Adverse:** The Development Scenario in question would result in an anticipated noticeable deterioration in signal levels and quality.
- 17.14 In the absence of guidelines for assessing the relative significance such effects, the significance of the effects (i.e. whether substantial, moderate or minor) has been defined using professional judgement.

### BASELINE CONDITIONS

#### Potentially Sensitive Receptors

- 17.15 As noted above, the receptors which have the potential to be affected by disruption in television and radio signals are residential properties. The locations of existing residential receptors are primarily:
- Adjacent to the west of the three application sites on Buckingham Palace Road;
  - Adjacent to the southeast of the application sites on Carlisle Place and Vauxhall Bridge Road; and
  - Approximately 200m to the northeast of the application sites at Roebuck House.
- 17.16 The location of such receptors can be seen by reference to Figure 3.2 in Chapter 3: Existing Land Use and Activities.

#### Broadcast Radio

- 17.17 Radio transmissions received at the application sites and their surrounding areas are provided from transmitters at Crystal Palace approximately 9.45 km south-east of the application sites, Alexandra Palace approximately 11.2km north-east of the sites, and from Brookmans Park, approximately 17.8km north of the application sites (refer to Figure 17.1).
- 17.18 The application sites and their surroundings are likely to currently receive a reasonable quality of reception in respect to radio signals. This is due to the relatively low frequencies utilised for the transmission of broadcast radio which have the ability to travel around and over physical obstacles such as large buildings (i.e. diffraction).

#### Satellite Television

- 17.19 The geo-stationary satellites serving the UK are predominantly located in a southerly direction with a typical angle of elevation between 17-30 degrees above the horizon. The satellite television broadcast services in the London area are predominantly provided by the ASTRA 2 satellite which is located in a south-easterly direction, approximately 26 degrees above the horizon from the application sites. This high angle of incidence of satellite signals indicates that there are currently no on-site buildings that are likely to affect satellite transmission at nearby receptors.

### Terrestrial Television

- 17.20 Terrestrial television services in the UK are transmitted from a network of high, medium and low power ultra high frequency (UHF) transmitters located around the country. The majority of London receives BBC1, BBC2, ITV and Channel 4 television signals in both digital and analogue format from the high power transmitter at Crystal Palace, with Channel 5 being transmitted from a transmitter in Croydon.
- 17.21 The Crystal Palace transmitter is situated approximately 9.45km south-east of the application sites at a height of 313m Above Ordnance Datum (AOD). The Croydon Transmitter is located approximately 10.55km south-east of the application sites at a height of 271m AOD (refer to Figure 17.1).
- 17.22 Propagation modelling carried out by the transmission companies ensures that coverage from both the Crystal Palace and Croydon transmitters covers the entire London area. Despite this, the changing urban landscape of London has led to variations in the level of service coverage due to shadowing and ghosting effects. Consequently, a number of low power repeater transmitters are in existence to fill known gap sites in service coverage. However, the low power repeaters typically transmit only analogue terrestrial signals.
- 17.23 The existing buildings on the application sites most likely to cause interference to transmission signals include:
- 12-storey Lakeview House/Royal Westminster Hotel building, situated in the northwest of the application 1 site; and
  - 10-storey Carrier House, situated in the north of the application 1 site.
- 17.24 As the main transmitters are located to the south-east of the three application sites, these buildings may currently affect the area to the immediate northwest of the sites. However, the residential units within this area are likely to have already employed alternative techniques to improve their television reception.
- 17.25 The 27-storey Portland House is situated immediately to the east of the sites of applications 2 and 3. The location and orientation of Portland House in relation to the Crystal Palace and Croydon transmitters is such that it does not currently significantly affect radio and television reception at nearby sensitive receptors. Portland House would be physically unaffected by any of the four Development Scenarios. Therefore, it does not require further consideration within this chapter.

### POTENTIAL EFFECTS

#### Demolition and Construction

- 17.26 The proposed programmes of demolition and construction for each of the four Development Scenarios are described in Chapter 6: Demolition and Construction. Activities relevant to the assessment of potential effects during the demolition and construction phases include the erection of tower cranes and the progressive construction of steel-framed buildings across the application sites. The locations and durations of these potential sources of effects to radio and television signals would vary throughout the demolition and construction programme with the result that potential effects would be temporary and generally be relatively brief in duration.

**Development Scenarios 1, 2, 3 and 4*****Broadcast Radio***

- 17.27 As previously noted, the frequencies used for the transmission of broadcast radio are at the lower end of the frequency spectrum. At these frequencies, signal losses are low as longer transmission wavelengths have the ability to travel around and over many types of physical obstacles. This physical property reduces the extent of any shadows. Furthermore, radio waves do not suffer from ghosting effects. Consequently, the potential effects through the duration of the demolition and construction phases upon radio signals, for all four Development Scenarios, are anticipated to be **negligible**.

***Satellite Television***

- 17.28 It is considered that there are generally no current significant obstructions to satellite signals. Therefore, the demolition of buildings as part of all four Development Scenarios would result in a **negligible** effect to satellite television, even at the most sensitive receptors. There may, however, be some instances of **local, short to medium-term** effects of **minor beneficial** significance following the removal of the larger existing Lakeview House/Royal Westminster Hotel building as part of all four Development Scenarios.
- 17.29 It is considered that the temporary presence of cranes is unlikely to create shadowing effects to satellite television reception due to the elevated position (i.e. roof-mounted) of existing satellite antennae. Therefore, effects of **negligible** significance would result for all four Development Scenarios. However, it should be noted that some **local, short-term** effects of **minor adverse** significance cannot be ruled out until the precise locations, heights and on-site durations of the cranes has been determined.
- 17.30 As noted above, satellite signal reception is not affected by reflection and is not susceptible to ghosting. Therefore, potential effects to satellite television signals during demolition and construction due to ghosting, for all four Development Scenarios, would be **negligible**.

***Terrestrial Television***

- 17.31 The use of cranes or other metallic construction structures which exceed the height of the existing surrounding buildings have the potential to affect terrestrial television reception at nearby sensitive receptors. The magnitude of impeded reception would be related to the number of cranes used, their proximity to each other and their respective metallic masses. In certain instances, acceptable levels of terrestrial television reception may not be reinstated until cranes have been removed. It is therefore considered that, in the absence of any mitigation measures, there may be **local, short-term**, effects of **minor adverse** significance to television reception at some sensitive receptors due to temporary reflection and shadow effects. It is considered likely that, in all four Development Scenarios, cranes would have the potential to affect some sensitive receptors to the north-west of the site of application 1.
- 17.32 The tallest proposed buildings are Buildings 6b and 7a (within all four Development Scenarios) and Building 6a (within Development Scenarios 1 and 3 only). The heights of all the proposed buildings are presented in Chapter 5: The Proposed Development Scenarios. During the construction of the tallest proposed buildings, terrestrial television signals could be affected due to the increasing height and density of exposed structural steelwork, which can cause both reflections and shadow zones. This is considered to represent, in the absence of mitigation measures, **local, short to medium-term** effects of **minor adverse** significance to some sensitive receptors for each of the four Development Scenarios.

## Completed Development

### Development Scenarios 1, 2, 3 and 4

#### ***Broadcast Radio***

- 17.33 Since the radio frequencies used for the transmission of broadcast radio are at the lower end of the frequency spectrum, the longer transmission wavelengths have the ability to travel around and over many types of physical obstacles. This physical property reduces the extent of any shadows. Furthermore, the radio waves do not suffer from ghosting effects. Consequently, the potential effects upon radio signals once any of the four Development Scenarios are completed are anticipated to be **negligible**.

#### ***Satellite Television***

##### Shadowing

- 17.34 Due to the locations of the Croydon and Crystal Palace transmitters, all electromagnetic shadows created by the four Development Scenarios would be in an approximate north-westerly direction. The shadows created by Buildings 6a, 6b and 7b/c would be too short to affect any existing sensitive receptors. Only Buildings 5 and 7a would have the potential to affect satellite television reception at nearby sensitive receptors due to the influence of shadowing. Buildings 5 and 7a would form part of all four Development Scenarios.
- 17.35 Building 5 would create an electromagnetic shadow approximately 100m wide and ranging from 71m to 112m long due to the proposed building elevation being greater to the north than the south. The tallest proposed building, Building 7a, would create an electromagnetic shadow approximately 177m long and 60m wide.
- 17.36 These shadows are much shorter than those associated with terrestrial television (refer to later in this chapter) due to the elevated position of the satellite. In addition, it should be noted that any sensitive receptors which could potentially be adversely affected by the proposed buildings are likely to be currently affected by the presence of existing on-site buildings, particularly the 12-storey Lakeview House/Royal Westminster Hotel building in the north-west of the site of application 1.
- 17.37 It is therefore considered that all four Development Scenarios would generally have a **negligible** effect upon satellite television reception. However, in the absence of mitigation measures, it is possible that some **local, long-term** effects of **minor adverse** significance could occur at residential receptors closest to the north-west of the site of application 1.

##### Ghosting

- 17.38 As previously noted, satellite signals are not affected by reflections and ghosting, therefore the effect of all four Development Scenarios would be of **negligible** significance.

#### ***Terrestrial Television***

##### Shadowing

- 17.39 Figures 17.2 and 17.3 indicate the extent of the electromagnetic shadow zones which would be created for each proposed building with respect to terrestrial television signals from both the Crystal Palace and Croydon transmitters. When taken together, the five proposed buildings would create an overall shadow which would comprise individual elements of varying width and length determined by individual building heights and geometry, with a different composite shadow for each transmitter.

- 17.40 In relation to the Croydon transmitter, the overall shadow would be 180m wide, propagated in an approximate northwesterly direction. The shadow length would vary from 1.6-5km. In relation to the Crystal Palace transmitter, the overall shadow would be 179m wide, again propagated in an approximate northwesterly direction. The shadow length would vary from 1.2-3.7km. However, in each case, due to diffraction effects, shadow lengths would be reduced depending upon the specific signal wavelengths and the construction materials used for each building.
- 17.41 It can be seen from Figures 17.2 and 17.3 that Building 7b/c would not contribute to the overall composite shadow due to its location and its relatively small height and massing. Therefore, the composite shadow cast for Development Scenarios 1 and 3 would be identical to each other. For Development Scenarios 2 and 4, the composite shadow cast would also be identical to each other but, due to the absence of Building 6a, would be slightly less wide than for Development Scenarios 1 and 3. However, for the purposes of this assessment, this reduction in width is not considered to be significant.
- 17.42 The areas likely to be most affected by the composite shadow would be areas to the north-west of the site of application 1. It is considered that these areas could, for all four Development Scenarios and in the absence of mitigation, experience a **district level, long-term** effect of **moderate adverse** significance.
- 17.43 It is important to note that this assessment of predicted effect is based on worst-case assumptions without the implementation of mitigation. It is likely that a large proportion of sensitive receptors within the predicted shadow zone are currently adversely affected by electromagnetic shadowing from the existing large scale on-site structures such as the 12-storey Lakeview House/Royal Westminster Hotel building. Furthermore, the assessment does not specifically account for the benefits of diffraction.

#### Ghosting

- 17.44 It is anticipated that terrestrial television signals, which originate from the south-east of the application sites, would generally be reflected by the southern, south-eastern and eastern façades of the proposed buildings. The predicted effects of the four Development Scenarios would be generally similar with all potential reflection zones being relatively narrow, short and well separated. However, there would be some significant differences in potential effects between the Development Scenarios as described below. Detailed analysis of potential effects of each of the proposed buildings due to reflection is provided within Technical Appendix 17a.
- 17.45 The predicted reflections that would be caused by each building within Development Scenario 1 (i.e. Buildings 5, 6a, 6b, 7a and 7b/c) are illustrated on Figures 17.4 and 17.5.
- 17.46 For Development Scenario 1, some limited ghosting would be possible due to reflections from Buildings 5 and 7a of the Crystal Palace signal only. Additionally, Building 7b/c may result in some limited ghosting of signals from both the Crystal Palace and Croydon transmitters at receptors to the north-east of the site of application 2. However, since the width of this predicted reflection zone would be only approximately 4m wide, there is a low probability of such effects actually occurring. It is therefore considered that due to the potentially low number of sensitive receptors affected by these reflections, the potential effects of terrestrial television reflections from Buildings 5 and 7a are considered as a whole to be of **local, long-term** and **minor adverse** significance to sensitive receptors to the south-west of the site of application 1. However, there may be some instances of **local, long-term** effects of **moderate adverse** significance to sensitive receptors to the north-east of the site of application 2 due to reflections from Building 7b/c.
- 17.47 For Development Scenario 2, some limited ghosting would be again possible due to reflections from Buildings 5 and 7a of the Crystal Palace signal only. In the absence of Building 6a, an additional reflection would be created on the eastern façade of Building 6b which would propagate in a generally north-easterly direction, although the incident signal would be partially screened by the lower levels of Building 7b/c and the Victoria Palace Theatre. This new reflection would be approximately 3.7km long and 38m wide with respect to signals from the Croydon transmitter and approximately 2.7km long and 45m wide with respect to signals from the Crystal

Palace transmitter. Additionally, similarly to Development Scenario 1, Building 7b/c may result in some limited ghosting of signals from both the Crystal Palace and Croydon transmitters at receptors to the north-east of the site of application 2. However, since the width of this predicted reflection zone would be only approximately 4m wide, there is a low probability of such effects actually occurring. Due to the low number of potentially sensitive receptors to the south-west and the north-east of Development Scenario 2, the potential effects of reflections from Buildings 5, 6b and 7a are considered to be of **local, long-term** and **minor adverse** significance. However, there may be some instances of **local, long-term** effects of **moderate adverse** significance to sensitive receptors to the north-east of the site of application 2 due to reflections from Building 7b/c.

- 17.48 For Development Scenario 3, some limited ghosting would again be possible due to reflections of the Crystal Palace signal only from Buildings 5 and 7a. In the absence of Building 7b/c, the predicted reflections from this building would not exist. No significant alternative reflections are predicted to occur elsewhere in the absence of Building 7b/c. Therefore, it is considered that due to the potentially low number of sensitive receptors affected by the reflections from Buildings 5 and 7a, the potential effects of terrestrial television reflections are considered to be of **local, long-term** and **minor adverse** significance to sensitive receptors to the south-west of the site of application 1.
- 17.49 For Development Scenario 4, some limited ghosting would be again possible due to reflections from Buildings 5 and 7a of the Crystal Palace signal only. In the absence of both Buildings 6a and 7b/c, the predicted reflections from these buildings would not exist. However, an additional reflection would be created on the eastern façade of Building 6b (as described above for Development Scenario 2). Due to the potentially low number of sensitive receptors to the south-west and north-east of the site of application 1, the potential effects of reflections from Buildings 5, 6b and 7a are considered to be of **local, long-term minor adverse** significance.

## MITIGATION

### Demolition and Construction

#### Development Scenarios 1, 2, 3 and 4

##### *Broadcast Radio*

- 17.50 Due to the negligible potential effects of all four Development Scenarios upon radio reception during demolition and construction, no mitigation is required.

##### *Satellite and Terrestrial Television*

- 17.51 As isolated adverse effects to satellite and terrestrial television reception cannot be ruled out, the following mitigation measures should be considered in order to avoid, reduce or offset any potential effects.
- 17.52 An Environmental Management Plan (EMP) for the site of the consented Development Scenario would be adopted (refer to Chapter 6: Demolition and Construction). It is advised that the EMP should ensure that cranes are carefully sited to ensure they do not impair satellite or terrestrial television signals due to electromagnetic shadowing. Should the aligning of cranes fail to reduce shadowing and ghosting effects, additional measures could be adopted, including:
- Installation of new higher gain aerials and/or signal boosters;
  - Realignment or increase in height of aerials or satellite dishes to ensure optimum reception;
  - Realignment of aerials to an alternative transmitter (for example Worlds End, Kensal Town or Reigate transmitters, (refer to Figure 17.1 for transmitter locations));
  - Relocating aerials or satellite dishes on building façades or rooftops to maintain a direct line of sight to transmitters or satellites; and

- Switching to satellite, digital television or asymmetrical digital subscriber line (ADSL) telephone line.

### Completed Development

#### Development Scenarios 1, 2, 3 and 4

##### *Broadcast Radio*

- 17.53 No mitigation measures are required in relation to broadcast radio as the effects from all four Development Scenarios are considered to be negligible.

##### *Satellite and Terrestrial Television*

- 17.54 The adoption of one or more of the mitigation measures listed above (within the Demolition and Construction section) would be equally suitable for avoiding, offsetting or reducing potential adverse effects as a result of the completed Development Scenarios.
- 17.55 In addition, the effects from ghosting can be mitigated by tuning aerials to an alternative transmitter or repeater station or switching to an alternative service e.g. satellite or digital.
- 17.56 Notwithstanding the above, detailed pre-development and post-development measured interference surveys would be undertaken for terrestrial television. These surveys would allow for the accurate quantification of potential effects, taking other development proposals into account. In this way, the most appropriate mitigation measures would be implemented.
- 17.57 It is envisaged that an appropriate survey would be secured by a planning condition and precise recommendations for mitigation would be agreed with WCC. However, the proposed mitigation measures are all of a standard nature and, accordingly, it can be said with a reasonable degree of certainty that whatever combination of measures is agreed as being most appropriate, they would result in an acceptable mitigation strategy. This conclusion is based on experience of the levels of success achieved by these measures elsewhere.
- 17.58 It should be also noted that the effects of any terrestrial television reflections would be reduced on a national scale when all analogue television signals are replaced by digital signals. Digital television is not affected by the reflection effects which lead to ghosting. The digital switchover is anticipated to be completed in 2012. Therefore, any predicted effects to terrestrial television from ghosting due to ongoing construction works at the application sites would cease after this time.

### RESIDUAL EFFECTS

#### Demolition and Construction

#### Development Scenarios 1, 2, 3 and 4

##### *Broadcast Radio*

- 17.59 As there are no predicted effects to broadcast radio during the demolition and construction of all four Development Scenarios, the residual effect is considered to be **negligible**.

##### *Satellite Television*

- 17.60 It is considered that where isolated adverse effects to satellite television reception are predicted, the implementation of suitable mitigation measures would result in an overall **negligible** effect. Some **local, short to medium-term** effects of **minor beneficial** significance may be experienced due to the removal of existing on-site buildings.

*Terrestrial Television*

- 17.61 Mitigation measures such as the periodic repositioning of reception antennae and the retuning of aerials to alternative transmitters or repeater stations during demolition and construction would result in a **negligible** effect to terrestrial television signals due to on-site cranes, metallic construction structures and exposed buildings structural framework.
- 17.62 Additionally, ghosting effects would no longer occur subsequent to the switchover to digital television since digital television is not susceptible to ghosting. The digital switchover is currently scheduled to be completed throughout London by 2012.

**Completed Development****Development Scenarios 1, 2, 3 and 4***Broadcast Radio*

- 17.63 It is considered that none of the four Development Scenarios would affect broadcast radio signals. Therefore, the residual effect would be **negligible**.

*Satellite Television*

- 17.64 Where isolated adverse effects to satellite television reception are predicted, the implementation of suitable mitigation measures as suggested would result in an overall **negligible** effect.

*Terrestrial Television*

- 17.65 With the implementation of appropriate mitigation measures, as discussed above, including detailed interference surveys in areas predicted to be most affected by electromagnetic shadowing and/or reflection of terrestrial television signals, it is considered that the effects of all four Development Scenarios would be **negligible**.
- 17.66 Additionally, the proposed digital switchover in 2012 would remove any adverse effects due to reflection of analogue terrestrial television signals.

**SUMMARY AND CONCLUSIONS**

- 17.67 The four Development Scenarios have been assessed in terms of their potential effects upon broadcast radio, satellite television and terrestrial television transmissions received by existing sensitive receptors in the vicinity of the three application sites. Effects would be due to electromagnetic shadowing or reflection of signals due to the location and orientation of the proposed buildings within each of the four Development Scenarios.
- 17.68 It has been concluded that, with the adoption of appropriate mitigation measures, any potential effects can be resolved, resulting in **negligible** effects to all relevant sensitive receptors.