

TV/FM & DAB RECEPTION SURVEY REPORT

THIS POST CONSTRUCTION TV/FM & DAB RECEPTION SURVEY WAS CONDUCTED BY:

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Contents

EXECUTIVE SUMMARY	3
INTRODUCTION	4
SCOPE	4
DISCUSSIONS	4
SIGNAL BLOCKING	5
FIELD SURVEY METHOD.....	6
FIELD SURVEY EQUIPMENT	6
SERVICES LIKELY TO BE AFFECTED	7
THE NEW DEVELOPMENT:	8
OVERVIEW OF NEW DEVELOPMENT	8
DETAILS OF DEVELOPMENT	8
COORDINATES.....	9
TECHNICAL BACKGROUND – WINTER HILL.....	10
PHOTO A: THE NEW DEVELOPMENT.....	11
PHOTO B: THE NEW DEVELOPMENT.....	12
TERRESTRIAL TELEVISION SERVICES.....	13
SATELLITE TELEVISION SERVICES	13
FIELD SURVEY TEST RESULTS AND INFORMATION.....	14
CONCLUSION.....	24
MITIGATION.....	25
IMPACT ZONE – MAP 1.....	26
IMPACT ZONE – MAP 2 LOCK HOUSE.....	27
REFERENCE OF TERMS	28

EXECUTIVE SUMMARY

This report has been produced to respond to the following Planning Condition attached to Decision Notice 126431/FO/2020.

"37) Notwithstanding the TV reception survey prepared by ME Engineers stamped as received by the City Council, as Local Planning Authority, on the 30 March 2020, within one month of the practical completion or at any other time during the construction of the development if requested in writing by the City Council as local planning authority in response to identified television signal reception problems within the potential impact area a study shall identify such measures necessary to maintain at least the pre-existing level and quality of signal reception identified in the survey carried out above. The measures identified must be carried out either before the building is first used or within one month of the study being submitted to the City Council as local planning authority, whichever is the earlier."

It should be noted that there have been no complaints received in relation to TV reception during the construction of the development.

The new building is now complete. Subsequently this Post Construction TV Reception Survey has been conducted, to ascertain whether the introduction of the development has caused an impact to existing viewers' television reception in the surrounding area.

Since the Pre- Construction TV Reception Survey, which was undertaken in September 2019, the Winter Hill television transmitter has undergone certain changes (please refer to the Transmitter Technical Background section of this report). Although these changes have taken place, we are still able to carry out the comparison of the Pre and Post Construction Survey results, as the Winter Hill broadcast powers have remained constant.

There has been a slight reduction in aerial signal to the southeast of the development. This is as largely as predicted in the initial Pre-construction report, this area has predominantly multi storey properties (with the only exception being 'Lock House'), so with this being the case we expect the reception will be much improved for aerials sited at rooftop height on these buildings.

A comparison of the remaining pre and post construction test results shows that there has not been any widescale impact to television reception caused by the new development and that the pre-existing signal levels have been generally maintained.

There were no satellite dishes highlighted on the Pre-construction survey that would be affected to the north of the development, and when assessing this on the post construction survey no satellite dishes were visible that were close enough to be affected from ground level.

In respect to Lock House, it was observed that a new aerial has been installed on the front of the property and as such no mitigation is proposed for Lock House.

INTRODUCTION

Theory predicts, and practical evaluation has confirmed, that the introduction of new structures into an area can cause interference to television reception.

This Pre-Construction TV/FM/DAB Reception Survey has been undertaken to record the existing baseline conditions and assess if the introduction of the new development has the potential to impact upon existing viewers' television reception in the surrounding area.

To enable us to make an assessment, an initial desktop study is conducted, followed by a comprehensive field survey.

The desktop study is carried out using plans of the development for example the building's location and elevations, along with maps of the surrounding area and details of local television transmitter broadcast information.

The field survey is then carried out at several test point locations surrounding the development. Television signal test results and relevant information are recorded at each of the test point locations.

This report includes the information collated during the desk top study and field survey along with an assessment of where, or if, the introduction of the development has the potential to cause interference to existing viewers' television reception, and mitigation if required.

SCOPE

To carry out a desktop study and comprehensive field survey to record existing baseline television reception conditions in the surrounding area to the development. To provide details of any potential impact zone and methods of mitigation if required, to conform to Local Planning Authority requirements.

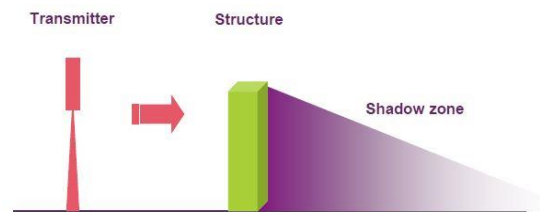
The results and information recorded during this field survey assist in assessing if, or where, the introduction of the development has the potential to impact upon existing viewers' television reception.

DISCUSSIONS

The introduction of a new building or structure into an area has the potential to cause interference to existing viewers' television and listeners radio reception.

SIGNAL BLOCKING

Wireless signals, especially those using relatively high frequencies such as television, behave much like light. Therefore, it is desirable to have a clear line of sight path between the transmitter and a receiving aerial to achieve the most reliable reception. The presence of a tall structure between the transmitter and receiver will cause a 'shadow' to be cast behind the structure on the side opposite the transmitter. This effect is like the way that an obstruction between a lamp and an observer's eye blocks out the light.

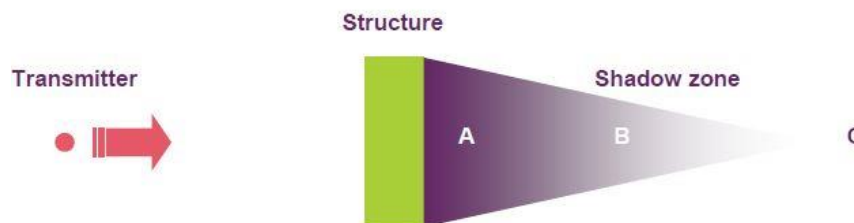


The shadow cast by a structure does not have hard edges though and does not usually extend indefinitely. While there would be a large reduction in signal levels immediately behind the structure, the blocking effect of the structure diminishes with distance because of diffraction. Diffraction is a process where signals appear to bend behind the structure and partially fill in the shadow.

Zone A - close behind the structure (typically a few tens of metres) there may be a large reduction in signal level with a possible complete loss of reception.

Zone B - further away (typically a few hundred metres) the signal reduction is less severe, and the shadow will be smaller as diffraction effects partially fill in the shadow. Depending on the size of the structure, some locations could still lose reception completely.

Zone C - some distance away (1-5km) the shadow will effectively have disappeared. The resulting shadow is therefore a triangular shape as shown in Figure 2.



It should be noted that the severity of the reduction and the actual size of the shadow will depend upon many factors including the construction of the structure and its height – the distances given above are for guidance only.

FIELD SURVEY METHOD

Tests are carried out at a selection of locations in the area surrounding the development.

Test results are recorded regarding television signal strength and quality: -

Strength is recorded in: dBμv.

Quality is recorded in: VBER (Standard definition SD)

LBER (High-definition HD)

Due to the rollout of the 4G Networks all results are recorded with a CAI approved benchmarked aerial with a balun and LTE filter.

An alternative transmitter is tested for and where receivable, results are recorded.

All tests are carried out at a 10m height above ground level.

The direction and type of existing viewers' television aerials is noted.

A bearing and distance to the development is recorded at each test point location, for comparison with the bearing and distance to the television transmitter serving the area.

Existing obstructions to television reception are noted.

FIELD SURVEY EQUIPMENT

The field survey is carried out using the following equipment: -

- Specialist vehicle complete with telescopic mast.
- 360° Antenna rotator
- 14 Element CAI approved wideband UHF antenna with balun and LTE filter, one vertical and one horizontal polarisation.
- FM Omni aerial
- DAB Omni aerial
- 20m x WF100 twin screened CAI approved coaxial cable.
- Televes spectrum analyser/field strength meter
- Ordnance survey maps
- Garmin GPS receiver
- Compass
- Digital camera

SERVICES LIKELY TO BE AFFECTED

TERRESTRIAL TELEVISION RECEPTION

There are two potential ways that the introduction of a new building or extension can cause interference to terrestrial television reception; these are obstruction and reflection.

Obstruction occurs when existing viewers are in an area where their television aerial beam path (direction) to the television transmitter is either through, or within very close proximity to, the new building or structure. This can result in a reduction of television signal strength and quality and in some cases (if existing viewers are located within proximity to the new building or structure); receiving terrestrial television signals can become problematic and may not be achievable.

Reflection occurs when the new building or extension reflects terrestrial television signals. These unwanted reflected signals are received on the existing viewer's television aerial along with the direct signals from the television transmitter, resulting in irregularities of television signal strength and quality. However, digital terrestrial television broadcasts are less prone to reflections than the previous analogue television broadcasts, but this must still be taken into account when assessing any potential impact.

SATELLITE TELEVISION RECEPTION

Satellite television reception requires a clear line of sight between the satellite antenna and the satellite it is aligned to. In most cases the angle of the satellite antenna to the satellite orbiting the earth is between 20- and 30-degrees elevation.

This elevation must be taken into account when assessing if the introduction of the new building or structure has the potential to obstruct existing viewers' satellite antenna beam path to the satellite.

Satellite reception is very rarely affected on a large scale and is mostly only relevant to existing viewers within proximity to the new building or structure.

FM & DAB RECEPTION

There are two potential ways that the introduction of a new building or extension can cause interference to radio reception; these are obstruction and reflection.

Obstruction occurs when existing listeners are in an area where their radio reception to the radio transmitter is either through, or within very close proximity to, the new building or structure. This can result in a reduction of radio signal strength and quality and in some cases (if existing listeners are located within proximity to the new building or structure); receiving radio signals can become problematic and may not be achievable.

Reflection occurs when the new building or extension reflects radio signals.

FM & DAB reception is very rarely affected on a large scale and is mostly only relevant to existing listeners within proximity to the new building or structure.

THE NEW DEVELOPMENT:

CO-OP Live (Eastlands Arena)
near Etihad Stadium
Manchester

CONDUCTED ON BEHALF OF:

Eastlands Arena Limited
55 New Bond Street,
London,
W1S 1DG

OVERVIEW OF NEW DEVELOPMENT

The development is a new development.

DETAILS OF DEVELOPMENT

Development Type:	New development
Building Height:	maximum elevation of approximately 35m.

COORDINATES

Prior to commencement of the survey, coordinates at the development's location are entered into a GPS receiver, along with the coordinates for the television transmitter serving the area. This enables us to record a bearing and distance from each test point location to the development, for comparison with the bearing and distance to the television transmitter. The coordinates used throughout the survey are listed below and shown on Plan A.

LOCATION

NATIONAL GRID REFERENCE

Development Position	SJ 86830 98873
Winter Hill Transmitter	SD 66000 14400
Holme Moss FM Transmitter	SE 09497 04077
Sunley Building (city tower) DAB Transmitter	SJ 84268 98194

TECHNICAL BACKGROUND – WINTER HILL

Transmitter No: 103.00
 NGR: SD 660144
 Approximate bearing from the development: 313°
 Approximate distance from the development: 25.51 km

Television Broadcasts from the Winter Hill Transmitter at the time of the Pre-Construction Television Reception Survey (September 2019):

UHF Channel	Frequency	Multiplexer	Format	Broadcast Power
31	554.0	COM7	HD	25,700W
37	602.0	COM8	SD	25,700W
49	698.0	ARQA	SD	100,000W
50	706.0	BBCA	SD	100,000W
54	737.8	BBCB	HD	100,000W
55	746.0	ARQB	SD	100,000W
58	770.0	SDN	SD	100,000W
59	778.0	D3+4	SD	100,000W

Television Broadcasts from the Winter Hill Transmitter at the present time (April 2024):

UHF Channel	Frequency	Multiplexer	Format	Broadcast Power
37	602.0	ARQB	SD	14,000W
31	554.0	ARQA	SD	100,000W
32	562.0	BBCA	SD	100,000W
35	585.8	BBCB	HD	100,000W
29	538.0	SDN	SD	100,000W
34	578.0	D3+4	SD	100,000W

PHOTO A: The new development



PHOTO B: The new development



TERRESTRIAL TELEVISION SERVICES

Viewers in the surrounding area to the development are receiving their terrestrial television services from the Winter Hill transmitter, located to the northwest of the building/structure, approx. 24 km away.

The Winter Hill transmitter broadcasts 6 digital multiplexers providing the full range of standard definition and high-definition digital terrestrial television services available on Freeview, with regional programming. Please refer to the transmitter details for further information

The test results recorded during the survey show that terrestrial television reception from the Winter Hill transmitter has good signal strengths and at the majority of test points the quality is good. Please note that the results are recorded at a 10mt aerial height, in accordance with TV reception survey specifications and that for existing television aerials sited at multi-storey height reception could be much improved.

During the survey, tests were carried out to receive an alternative transmitter to the Winter Hill transmitter. The result of these tests was that no alternative transmitter could be received at an acceptable quality or strength.

SATELLITE TELEVISION SERVICES

Both Sky TV and Freesat are broadcast from the same fleet of satellites located at an orbital position of 28.2° east of south, with a required satellite dish elevation of approximately 23°.

Sky TV is primarily a subscription-based service offering several packages of various television services at monthly subscription costs.

Freesat is a non-subscription-based service and offers a similar television service line up to Freeview and selectable regional programming.

FM RADIO SERVICES

Listeners in the surrounding area to the development are receiving their radio services from the Holme Moss transmitter, located to the northwest of the building/structure, approx. 23 km away at a compass bearing of 76 degrees.

DAB RADIO SERVICES

Listeners in the surrounding area to the development are receiving their radio services from the Sunley Building, (now city tower) Piccadilly transmitter, located to the east of the building/structure, approx. 2.5km away at a compass bearing of 257 degrees.

FIELD SURVEY TEST RESULTS AND INFORMATION

TEST POINT 1

Location Etihad Car Park H
NGR: SJ 86539 98955
Alt: 59 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	25.6 km
Development	101°	0.3 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter.

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	69	45	32		-6	Pass
37	602.0	COM8	SD	75	45	34	-8		Pass
49	698.0	ARQA	SD	75	45	33	-8		Pass
50	706.0	BBCA	SD	74	45	33	-8		Pass
54	737.8	BBCB	HD	75	45	32		-6	Pass
55	746.0	ARQB	HD	67	34	30		-6	Pass
56	754.0	LM	SD	59	29	27	-8		Pass
58	770.0	SDN	SD	73	39	35	-8		Pass
59	778.0	D3+4	SD	72	45	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBμV) FM	CN Db FM	Frequency DAB	Level (dBμV) DAB	CN Db DAB
BBC 1	98.9	75	45	225.64(12B)	85	45
BBC 2	89.3	74	44	225.64(12B)	85	45
BBC 3	91.5	73	42	225.64(12B)	85	45
BBC 4	95.1	76	44	225.64(12B)	85	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	35	32	-8		Pass
31	554.0	ARQA	SD	74	30	32	-8		Pass
32	562.0	BBCA	SD	72	42	36	-8		Pass
35	585.0	BBCB	HD	74	37	32		-6	Pass
29	538.0	SDN	SD	75	42	35	-8		Pass
34	578.0	D3+4	SD	71	38	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBμV) FM	CN Db FM	Frequency DAB	Level (dBμV) DAB	CN Db DAB
BBC 1	98.9	80	38	225.64(12B)	84	44
BBC 2	89.3	80	40	225.64(12B)	84	44
BBC 3	91.5	75	42	225.64(12B)	84	44
BBC 4	95.1	65	35	225.64(12B)	84	44

Television reception is of a good quality and strength.

TEST POINT 2

Location Etihad Car Park G
NGR: SJ 86789 99023
Alt: 56 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	25.7 km
Development	175°	0.35 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	74	45	32		-6	Pass
37	602.0	COM8	SD	79	45	34	-8		Pass
49	698.0	ARQA	SD	77	45	34	-8		Pass
50	706.0	BBCA	SD	78	45	34			Pass
54	737.8	BBCB	HD	75	45	35		-6	Pass
55	746.0	ARQB	HD	70	32	31		-6	Pass
56	754.0	LM	SD	69	35	29	-8		Pass
58	770.0	SDN	SD	74	39	35	-8		Pass
59	778.0	D3+4	SD	72	45	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBμV) FM	CN Db FM	Frequency DAB	Level (dBμV) DAB	CN Db DAB
BBC 1	98.9	70	35	225.64(12B)	80	45
BBC 2	89.3	69	35	225.64(12B)	80	45
BBC 3	91.5	66	33	225.64(12B)	80	45
BBC 4	95.1	65	28	225.64(12B)	80	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	76	40	34	-8		Pass
31	554.0	ARQA	SD	73	35	32	-8		Pass
32	562.0	BBCA	SD	74	40	35	-8		Pass
35	585.0	BBCB	HD	72	40	34		-6	Pass
29	538.0	SDN	SD	74	40	35	-8		Pass
34	578.0	D3+4	SD	72	40	35	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBμV) FM	CN Db FM	Frequency DAB	Level (dBμV) DAB	CN Db DAB
BBC 1	98.9	72	38	225.64(12B)	78	45
BBC 2	89.3	71	35	225.64(12B)	78	45
BBC 3	91.5	72	34	225.64(12B)	78	45
BBC 4	95.1	69	30	225.64(12B)	78	45

Television reception is of a good quality and strength.

TEST POINT 3

Location Stuart Street
NGR: SJ 86970 98843
Alt: 62 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	308°	25.9 km
Development	272°	0.10 km

Visible Existing Aerial Arrays: High gain aerial on 1m mast, mounted at rooftop height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	55	38	30		-6	Pass
37	602.0	COM8	SD	62	44	33	-8		Pass
49	698.0	ARQA	SD	57	38	32	-8		Pass
50	706.0	BBCA	SD	60	40	32			Pass
54	737.8	BBCB	HD	60	43	31		-6	Pass
55	746.0	ARQB	HD	52	30	29		-5	Pass
56	754.0	LM	SD	46	27	26	-8		Pass
58	770.0	SDN	SD	57	37	34	-8		Pass
59	778.0	D3+4	SD	56	40	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ V) FM	CN Db FM	Frequency DAB	Level (dB μ V) DAB	CN Db DAB
BBC 1	98.9	79	45	225.64(12B)	72	45
BBC 2	89.3	69	42	225.64(12B)	72	45
BBC 3	91.5	69	41	225.64(12B)	72	45
BBC 4	95.1	64	38	225.64(12B)	72	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	51	26	28	-7		Pass
31	554.0	ARQA	SD	48	25	28	-7		Pass
32	562.0	BBCA	SD	48	30	28	-7		Pass
35	585.0	BBCB	HD	47	28	28		-5	Marginal
29	538.0	SDN	SD	39	28	25	-6		Marginal
34	578.0	D3+4	SD	49	28	26	-7		Marginal

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ V) FM	CN Db FM	Frequency DAB	Level (dB μ V) DAB	CN Db DAB
BBC 1	98.9	78	44	225.64(12B)	68	40
BBC 2	89.3	66	38	225.64(12B)	68	40
BBC 3	91.5	65	38	225.64(12B)	68	40
BBC 4	95.1	60	35	225.64(12B)	68	40

Television reception is of an acceptable quality and strength.

TEST POINT 4

Location Willdale Close
NGR: SJ 87062 98889
Alt: 63 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	26.1 km
Development	265°	0.2 km

Visible Existing Aerial Arrays: 18 element and high gain aerials on 1m masts, mounted at rooftop height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ v)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	61	44	30		-6	Pass
37	602.0	COM8	SD	66	44	33	-8		Pass
49	698.0	ARQA	SD	65	43	34	-8		Pass
50	706.0	BBCA	SD	64	42	33			Pass
54	737.8	BBCB	HD	65	45	33		-6	Pass
55	746.0	ARQB	HD	58	33	28		-5	Pass
56	754.0	LM	SD	50	27	25	-8		Pass
58	770.0	SDN	SD	60	38	34	-8		Pass
59	778.0	D3+4	SD	61	43	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ v) FM	CN Db FM	Frequency DAB	Level (dB μ v) DAB	CN Db DAB
BBC 1	98.9	64	38	225.65(12B)	70	44
BBC 2	89.3	60	40	225.64(12B)	70	44
BBC 3	91.5	62	42	225.64(12B)	70	44
BBC 4	95.1	59	35	225.64(12B)	70	44

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ v)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	67	40	32	-8		Pass
31	554.0	ARQA	SD	64	35	34	-8		Pass
32	562.0	BBCA	SD	63	40	35	-8		Pass
35	585.0	BBCB	HD	64	40	30		-6	Pass
29	538.0	SDN	SD	58	35	30	-7		Pass
34	578.0	D3+4	SD	59	40	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ v) FM	CN Db FM	Frequency DAB	Level (dB μ v) DAB	CN Db DAB
BBC 1	98.9	60	32	225.64(12B)	64	38
BBC 2	89.3	61	36	225.64(12B)	64	38
BBC 3	91.5	61	40	225.64(12B)	64	38
BBC 4	95.1	58	36	225.64(12B)	64	38

Television reception is of a good quality and strength.

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Unless under a controlled document referenced by SCS Technologies Ltd

TEST POINT 5

Location Ashton New Road
NGR: SJ 87419 98494
Alt: 66 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	26.6 km
Development	299°	0.7 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various multi-storey buildings in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ v)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	61	44	30		-5	Pass
37	602.0	COM8	SD	66	44	33	-8		Pass
49	698.0	ARQA	SD	65	43	34	-8		Pass
50	706.0	BBCA	SD	64	42	33			Pass
54	737.8	BBCB	HD	65	45	33		-5	Pass
55	746.0	ARQB	HD	58	33	28		-6	Pass
56	754.0	LM	SD	50	27	25	-8		Pass
58	770.0	SDN	SD	60	38	34	-8		Pass
59	778.0	D3+4	SD	61	43	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ v) FM	CN Db FM	Frequency DAB	Level (dB μ v) DAB	CN Db DAB
BBC 1	98.9	66	39	225.65(12B)	71	42
BBC 2	89.3	62	42	225.64(12B)	71	42
BBC 3	91.5	68	40	225.64(12B)	71	42
BBC 4	95.1	61	33	225.64(12B)	71	42

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ v)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	65	40	33	-8		Pass
31	554.0	ARQA	SD	64	40	30	-8		Pass
32	562.0	BBCA	SD	62	40	35	-8		Pass
35	585.0	BBCB	HD	62	35	30		-6	Pass
29	538.0	SDN	SD	55	30	28	-7		Pass
34	578.0	D3+4	SD	59	32	30	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ v) FM	CN Db FM	Frequency DAB	Level (dB μ v) DAB	CN Db DAB
BBC 1	98.9	69	38	225.64(12B)	70	42
BBC 2	89.3	63	40	225.64(12B)	70	42
BBC 3	91.5	69	40	225.64(12B)	70	42
BBC 4	95.1	60	32	225.64(12B)	70	42

Television reception is of an acceptable quality and strength.

TEST POINT 6

Location Gibbon Street
NGR: SJ 86974 98687
Alt: 61 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	26.2 km
Development	324°	0.2 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various multi-storey buildings in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	74	45	33		-6	Pass
37	602.0	COM8	SD	77	45	34	-8		Pass
49	698.0	ARQA	SD	76	45	34	-8		Pass
50	706.0	BBCA	SD	76	45	33			Pass
54	737.8	BBCB	HD	74	45	32		-6	Pass
55	746.0	ARQB	HD	65	33	31		-6	Pass
56	754.0	LM	SD	62	31	27	-8		Pass
58	770.0	SDN	SD	68	38	35	-8		Pass
59	778.0	D3+4	SD	66	45	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBμV) FM	CN Db FM	Frequency DAB	Level (dBμV) DAB	CN Db DAB
BBC 1	98.9	70	40	225.64(12B)	76	45
BBC 2	89.3	65	30	225.64(12B)	76	45
BBC 3	91.5	68	42	225.64(12B)	76	45
BBC 4	95.1	71	38	225.64(12B)	76	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBμV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	50	28	25	-7		Pass
31	554.0	ARQA	SD	55	28	28	-8		Pass
32	562.0	BBCA	SD	48	25	26	-6		Marginal
35	585.0	BBCB	HD	44	28	26		-4	Fail
29	538.0	SDN	SD	40	22	20	-5		Fail
34	578.0	D3+4	SD	38	20	18	-4		Fail

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBμV) FM	CN Db FM	Frequency DAB	Level (dBμV) DAB	CN Db DAB
BBC 1	98.9	64	32	225.64(12B)	75	42
BBC 2	89.3	54	28	225.64(12B)	75	42
BBC 3	91.5	52	35	225.64(12B)	75	42
BBC 4	95.1	66	32	225.64(12B)	75	42

Television reception is of a poor quality and strength.

TEST POINT 7

Location Asda Car Park
NGR: SJ 87146 98555
Alt: 63 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	26.4 km
Development	308°	0.4 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµV)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	76	45	31		-6	Pass
37	602.0	COM8	SD	74	45	36	-8		Pass
49	698.0	ARQA	SD	77	45	32	-8		Pass
50	706.0	BBCA	SD	76	45	30			Pass
54	737.8	BBCB	HD	72	45	33		-6	Pass
55	746.0	ARQB	HD	70	33	31		-6	Pass
56	754.0	LM	SD	63	30	26	-8		Pass
58	770.0	SDN	SD	71	35	38	-8		Pass
59	778.0	D3+4	SD	70	45	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµV) FM	CN Db FM	Frequency DAB	Level (dBµV) DAB	CN Db DAB
BBC 1	98.9	76	45	225.64(12B)	76	45
BBC 2	89.3	75	40	225.64(12B)	76	45
BBC 3	91.5	75	45	225.64(12B)	76	45
BBC 4	95.1	77	41	225.64(12B)	76	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	72	38	30	-8		Pass
31	554.0	ARQA	SD	71	30	32	-8		Pass
32	562.0	BBCA	SD	69	30	30	-8		Pass
35	585.0	BBCB	HD	70	32	32		-6	Pass
29	538.0	SDN	SD	70	32	32	-8		Pass
34	578.0	D3+4	SD	71	40	35	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµV) FM	CN Db FM	Frequency DAB	Level (dBµV) DAB	CN Db DAB
BBC 1	98.9	64	38	225.64(12B)	70	44
BBC 2	89.3	60	40	225.64(12B)	70	44
BBC 3	91.5	62	42	225.64(12B)	70	44
BBC 4	95.1	59	35	225.64(12B)	70	44

Television reception is of a good quality and strength.

TEST POINT 8

Location Waterfront Sport City
NGR: SJ 87184 98736
Alt: 63 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	26.3 km
Development	290°	0.4 km

Visible Existing Aerial Arrays: High Gain aerial at rooftop height on multi-storey buildings.

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBBER	Quality
31	554.0	COM7	HD	45	30	17		-6	Marginal
37	602.0	COM8	SD	47	27	21	-7		Pass
49	698.0	ARQA	SD	47	29	23	-7		Pass
50	706.0	BBCA	SD	48	34	20			Pass
54	737.8	BBCB	HD	49	32	20		-5	Pass
55	746.0	ARQB	HD	42	26	16		-5	Pass
56	754.0	LM	SD	34	18	15	-5		Fail
58	770.0	SDN	SD	42	28	21	-7		Pass
59	778.0	D3+4	SD	43	28	21	-7		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ V) FM	CN Db FM	Frequency DAB	Level (dB μ V) DAB	CN Db DAB
BBC 1	98.9	73	45	225.64(12B)	80	45
BBC 2	89.3	72	45	225.64(12B)	80	45
BBC 3	91.5	71	45	225.64(12B)	80	45
BBC 4	95.1	73	43	225.64(12B)	80	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBBER	Quality
37	602.0	ARQB	SD	48	28	20	-7		Marginal
31	554.0	ARQA	SD	46	28	22	-7		Pass
32	562.0	BBCA	SD	46	30	22	-7		Pass
35	585.0	BBCB	HD	50	30	32		-6	Pass
29	538.0	SDN	SD	40	28	20	-5		Fail
34	578.0	D3+4	SD	42	28	24	-7		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ V) FM	CN Db FM	Frequency DAB	Level (dB μ V) DAB	CN Db DAB
BBC 1	98.9	70	38	225.64(12B)	72	42
BBC 2	89.3	72	38	225.64(12B)	72	42
BBC 3	91.5	70	40	225.64(12B)	72	42
BBC 4	95.1	70	40	225.64(12B)	72	42

Television reception is of an acceptable quality and strength.

TEST POINT 9

Location: Howarth Close
NGR: SJ 87080 98262
Alt: 65 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	307°	26.5 km
Development	336°	0.6 km

Visible Existing Aerial Arrays: High gain aerial on 1m mast, mounted at rooftop height on 2 storey properties, directed towards the Winter Hill Transmitter

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµV)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	61	44	30		-6	Pass
37	602.0	COM8	SD	66	44	33	-8		Pass
49	698.0	ARQA	SD	65	43	34	-8		Pass
50	706.0	BBCA	SD	64	42	33			Pass
54	737.8	BBCB	HD	65	45	33		-6	Pass
55	746.0	ARQB	HD	58	33	28		-6	Pass
56	754.0	LM	SD	50	27	25	-8		Pass
58	770.0	SDN	SD	60	38	34	-8		Pass
59	778.0	D3+4	SD	61	43	34	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµV) FM	CN Db FM	Frequency DAB	Level (dBµV) DAB	CN Db DAB
BBC 1	98.9	76	45	225.64(12B)	76	45
BBC 2	89.3	75	45	225.64(12B)	76	45
BBC 3	91.5	75	45	225.64(12B)	76	45
BBC 4	95.1	77	45	225.64(12B)	76	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dBµV)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	65	40	38	-8		Pass
31	554.0	ARQA	SD	62	42	36	-8		Pass
32	562.0	BBCA	SD	62	43	32	-8		Pass
35	585.0	BBCB	HD	65	38	34		-6	Pass
29	538.0	SDN	SD	55	28	28	-7		Pass
34	578.0	D3+4	SD	57	34	30	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dBµV) FM	CN Db FM	Frequency DAB	Level (dBµV) DAB	CN Db DAB
BBC 1	98.9	75	42	225.64(12B)	75	44
BBC 2	89.3	77	42	225.64(12B)	75	44
BBC 3	91.5	73	43	225.64(12B)	75	44
BBC 4	95.1	71	42	225.64(12B)	75	44

Television reception is of a good quality and strength.

TEST POINT 10

Location National Cycling Centre
NGR: SJ 87382 98646
Alt: 67 m
Mast Height: 10 m

LOCATION	BEARING	DISTANCE
Winter Hill Transmitter	306°	26.5 km
Development	289°	0.6 km

Visible Existing Aerial Arrays: none

Visible Existing Obstructions: Various buildings/Trees in the general direction of the Winter Hill Transmitter

Pre-Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBER	Quality
31	554.0	COM7	HD	52	34	24		-6	Pass
37	602.0	COM8	SD	62	41	35	-8		Pass
49	698.0	ARQA	SD	50	34	21	-8		Pass
50	706.0	BBCA	SD	56	37	31			Pass
54	737.8	BBCB	HD	56	42	28		-6	Pass
55	746.0	ARQB	HD	50	33	26		-6	Pass
56	754.0	LM	SD	45	28	27	-8		Marginal
58	770.0	SDN	SD	47	30	22	-8		Pass
59	778.0	D3+4	SD	48	32	22	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ V) FM	CN Db FM	Frequency DAB	Level (dB μ V) DAB	CN Db DAB
BBC 1	98.9	60	40	225.64(12B)	70	45
BBC 2	89.3	62	41	225.64(12B)	70	45
BBC 3	91.5	69	45	225.64(12B)	70	45
BBC 4	95.1	60	40	225.64(12B)	70	45

Post Construction Signal Levels (UHF)

Channel	Frequency	MUX	Format	Level (dB μ V)	CN dB	MER	VBER	LBER	Quality
37	602.0	ARQB	SD	60	38	32	-8		Pass
31	554.0	ARQA	SD	54	36	30	-8		Pass
32	562.0	BBCA	SD	52	31	32	-8		Pass
35	585.0	BBCB	HD	54	38	34		-6	Pass
29	538.0	SDN	SD	44	26	26	-7		Marginal
34	578.0	D3+4	SD	50	34	32	-8		Pass

FM/DAB TRANSMITTER – REPORT

Channel	Frequency FM	Level (dB μ V) FM	CN Db FM	Frequency DAB	Level (dB μ V) DAB	CN Db DAB
BBC 1	98.9	62	40	225.64(12B)	69	42
BBC 2	89.3	60	40	225.64(12B)	69	42
BBC 3	91.5	70	44	225.64(12B)	69	42
BBC 4	95.1	62	40	225.64(12B)	69	42

Television reception is of an acceptable quality and strength.

CONCLUSION

The new development is located at Alan Turing Way, Manchester. The development is a new development, with a maximum elevation of approximately 35m. Much of the impact zone for terrestrial television reception covers an area to the southeast of the proposed development, with the development now complete any interference would have happened during the build process.

Most of the potential impact zone covers a Car Park area where we do not envisage any issues. However, a portion of the impact zone covers a small area of Stuart Street and Gibbon Street where there has been a reduction in uhf signal.

One area of note is a small area between Stuart and Gibbon Street that is adjacent to Alan Turing Way, which also has a property called 'Lock House' as shown on the impact zone map 2 on page 35.

In respect to Lock House, it was observed that a new aerial has been installed on the front of the property.

MITIGATION

Terrestrial Television Reception

Remedial Aerial Work

One or all the following may assist in rectifying interference being received to terrestrial television reception.

Change of aerial type to one most suited to the type of interference being received.

Redirecting existing television aerial to an alternative transmitter that is not affected, in some cases the existing television aerial may not be suitable for redirecting and the installation of a suitable television aerial may be required.

Re-siting of the television aerial to a position on the property where interference is reduced or not present.

Increase or decrease of aerial height.

Installation of masthead amplification to improve television signal strengths being received.

Remote Television Aerial

When a remote television aerial is positioned at a location with good quality television reception, (which can be a considerable distance from the affected area), and the signals are brought back via a cable network to the affected properties.

Utilising Satellite Reception

Should rectifying terrestrial television reception prove problematic, the installation of satellite systems utilising the Freesat platform can assist in rectifying reception issues.

To provide satellite television reception for individual affected dwellings or commercial units requires the installation of a satellite dish and set top box.

Satellite Television Reception

Remedial Satellite Work

One or all the following may assist in rectifying satellite television reception issues.

Re-siting of the satellite antenna to a position on the property where a clear line of sight can be achieved.

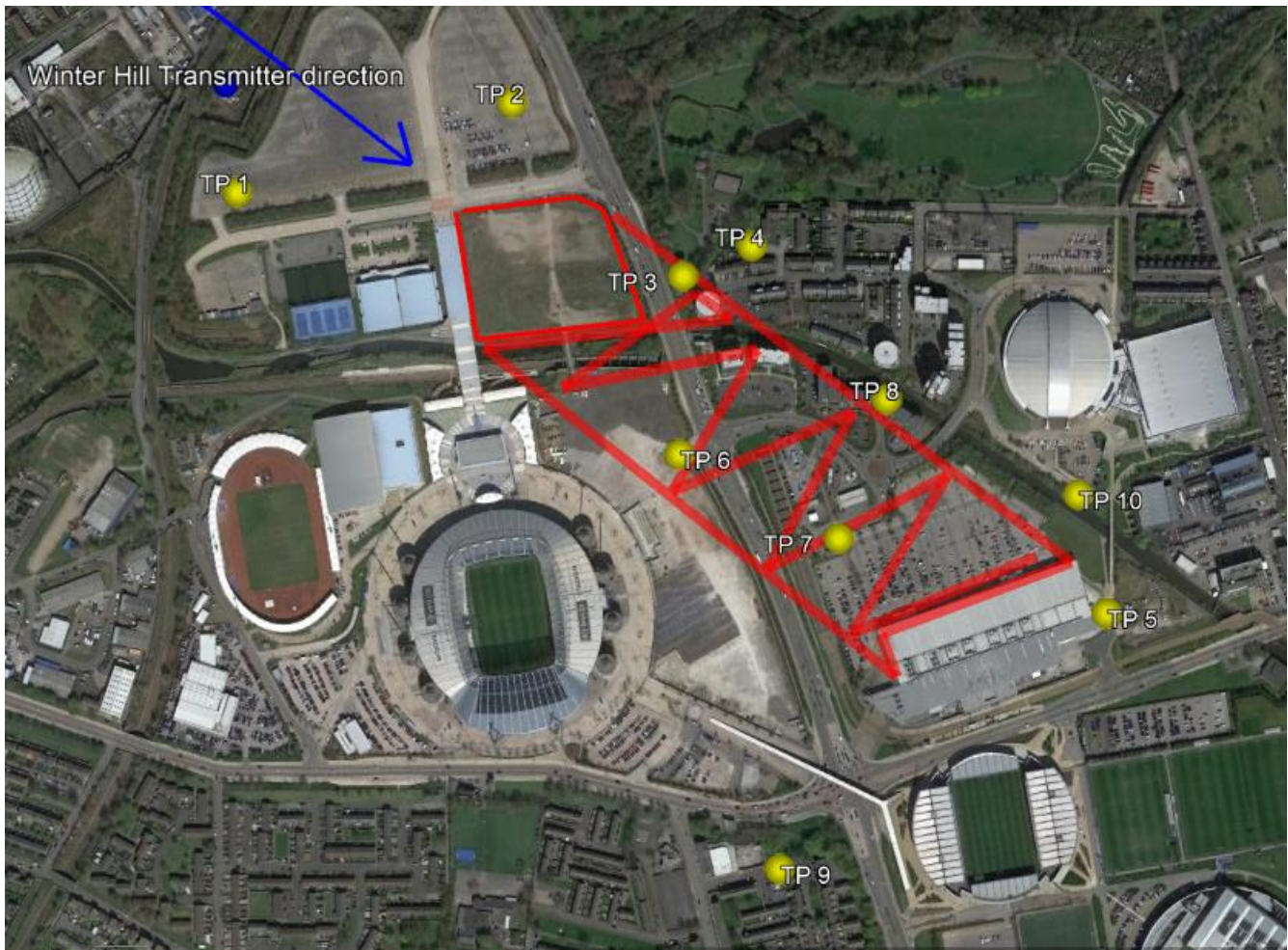
Increase in height of the satellite antenna to achieve a clear line of sight to the satellite.

Remote Satellite Dish

When the receiving satellite dish is sited in a position where a clear line of sight can be achieved; this can sometimes be a considerable distance from the affected property. In some instances, the satellite dish may require siting on the offending property to achieve a clear line of sight, or on an adjoining property where permission will have to be sought. The signals are brought back to the affected property via a cable and amplifier network.

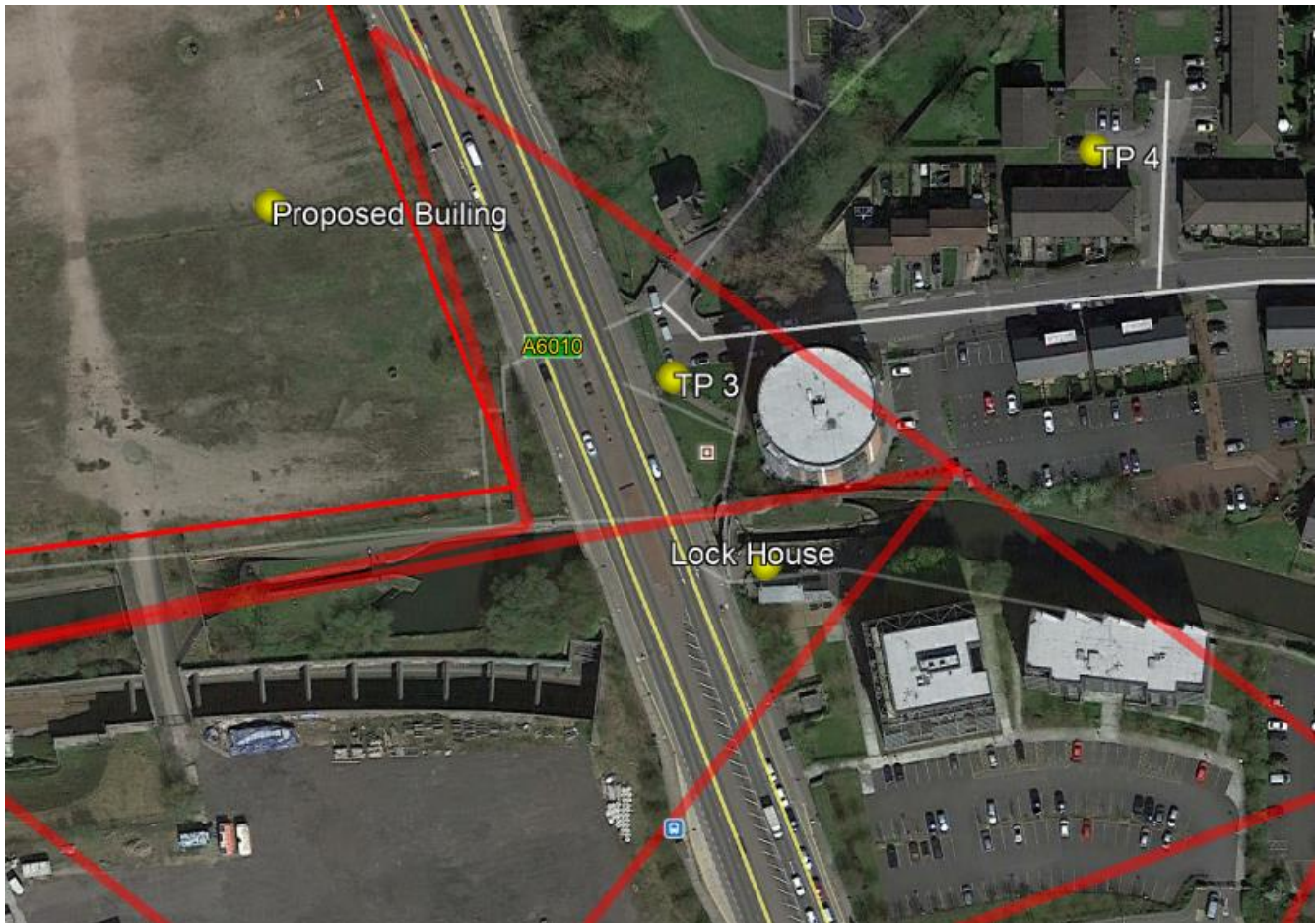
The need for such mitigation would need to be determined on a case-by-case basis.

IMPACT ZONE – MAP 1



Red area indicates area for interference of Freeview.

IMPACT ZONE – MAP 2 LOCK HOUSE



Red area indicates area for interference of Freeview.

REFERENCE OF TERMS

c.	Circa
CH	The UHF Channel allocation from the transmitter.
MUX	The digital multiplexer allocation/operator.
Tx	Transmitter.
dBμv	Carrier strength reading (decibel microvolt).
C/N	Carrier /Noise Ratio
VBER	Measurement for digital signal after error correction (BER after VITERBi)
LBER	BER after been applied the LDPC (low density parity check) error correction.
SD	SD Standard Definition
HD	HD High Definition
NGR	National Grid Reference
ALT	Altitude above sea level at the location.
BRG	Bearing from North.
GPS	Global Positioning System.