



Post-Construction
Signal Reception Impact Survey

Sky Gardens, Manchester

22nd May 2019

THIS TELEVISION RECEPTION SURVEY HAS BEEN CARRIED OUT ON BEHALF OF:

DeTrafford
Suite 26G
Building 26
Alderley Park
Alderley Edge
Cheshire
SK10 4TG

Instructed by: Darren Lewis

NAME OF THE DEVELOPMENT:

Sky Gardens
Chester Road
Manchester

PLANNING APPLICATION NUMBER:

TBA

THIS TV RECEPTION SURVEY WAS CARRIED OUT BY:

Astbury / Global Security Systems (NW) Limited
Unit 5b Albert Street Works
Albert Street
Droylsden
Manchester
M43 7BA

DATE OF SURVEY:

22dn May 2019

SURVEY METHODOLOGY

- During the period of testing, the vehicle will be parked in a safe & legal location, ensuring that no obstruction to the highway and pedestrians is caused.
- After carrying out a dynamic risk assessment of the location, the test equipment will be erected and signals readings taken.
- Signal measurements will be taken at pre-selected locations in the area surrounding the development.
- Results will be recorded regarding all signals including strength and quality.
- Where more than one transmitter is receivable, signals will be recorded and submitted as part of the report.

The survey is carried out using the following equipment:-

- Blake SR10 10 Element Wideband UHF Antenna (CAI Approved / Benchmarked). This is the typical type of aerial that would be present on the majority of properties in the area tested.
- Omni-Directional FM Antenna. This is the typical type of aerial that would be present on the majority of properties in the area tested.
- Single Element DAB Antenna. This is the typical type of aerial that would be present on the majority of properties in the area tested.
- 15m x WF100 Twin Screened Coaxial Cable (CAI Approved / Benchmarked). This type of cable is typical of the type of cables that would be present in the majority of properties in the area tested.
- Promax Explorer Digital Spectrum Analyser with monitor for both Audio and Video
- Vehicle mounted 12m Fibreglass Telescopic Mast

INTERFERENCE & REFLECTIONS

Signal quality can be affected in two distinct and different ways. The first is by 'obstruction' where the proposed development creates a shadow area behind the structure where the television signals are effectively 'blocked' to varying degrees depending on the distance away from the proposed development.

Television signals do not create such a 'hard' shadow as visible light, and for the purposes of explanation, a 'shadow' zone must be considered which is divided into three sub-zones.

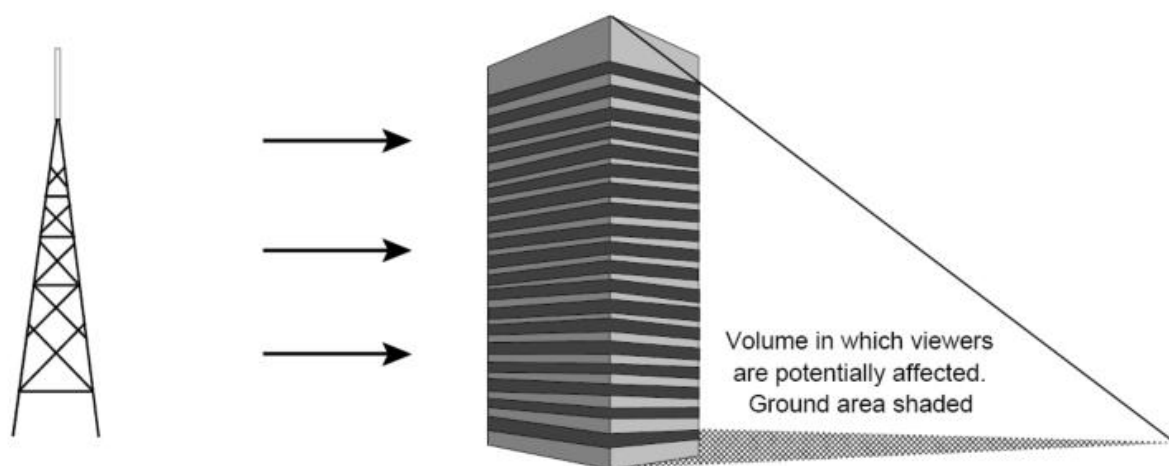
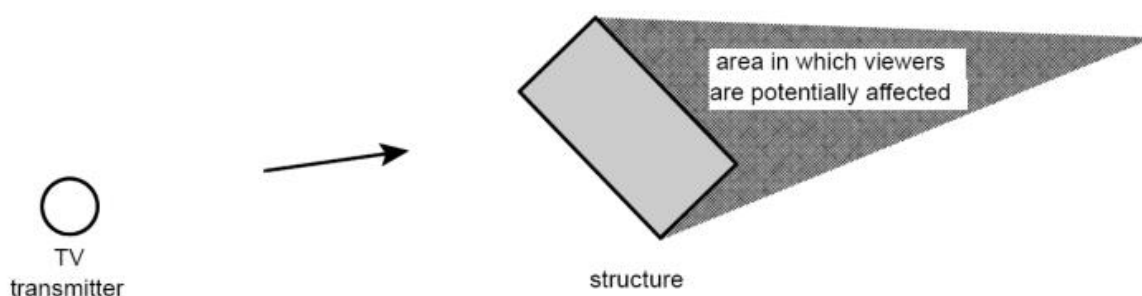


Figure 2 - Affected area in the 'shadow' zone behind the structure



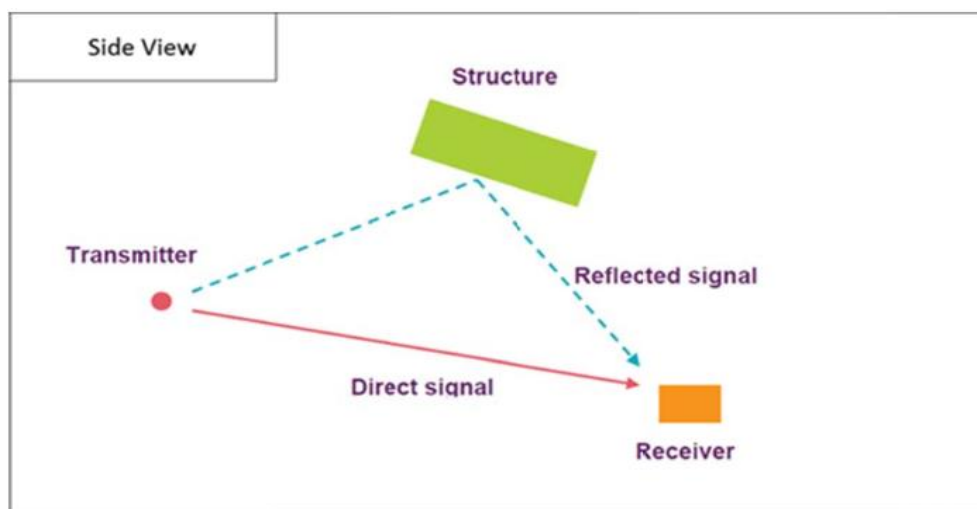
Within a few tens of metres from a solid structure, over the region where optical view of the transmitter is lost, the reduction in signal strength is critically dependent on the specific design and composition of the structure. For most brick and concrete buildings, the reduction is severe and in some cases almost total.

Further away from the structure (e.g. beyond 250 metres, but this varies depending on its size) the limit of the 'shadow' zone and signal reduction are determined by diffraction at the edges of the structure and reflection off surrounding structures. The simple condition of whether or not a location has an optical view of the transmitter is not enough to classify the potential interference zone adequately. In general, the effect is that the signal appears to bend around the sides of the structure; the shadow zone reduces in size and the signal strength is reduced by much less than simple ray optics would suggest.

Even further away from the structure (e.g. 5 km) complex multiple reflections and diffraction, caused by structures in the locality, may result in the 'shadow' zone becoming almost non-existent, against interfering signals that arrive on significantly different bearings. This can result in an increase in the ratio of wanted to unwanted signal as presented to the television receiver.

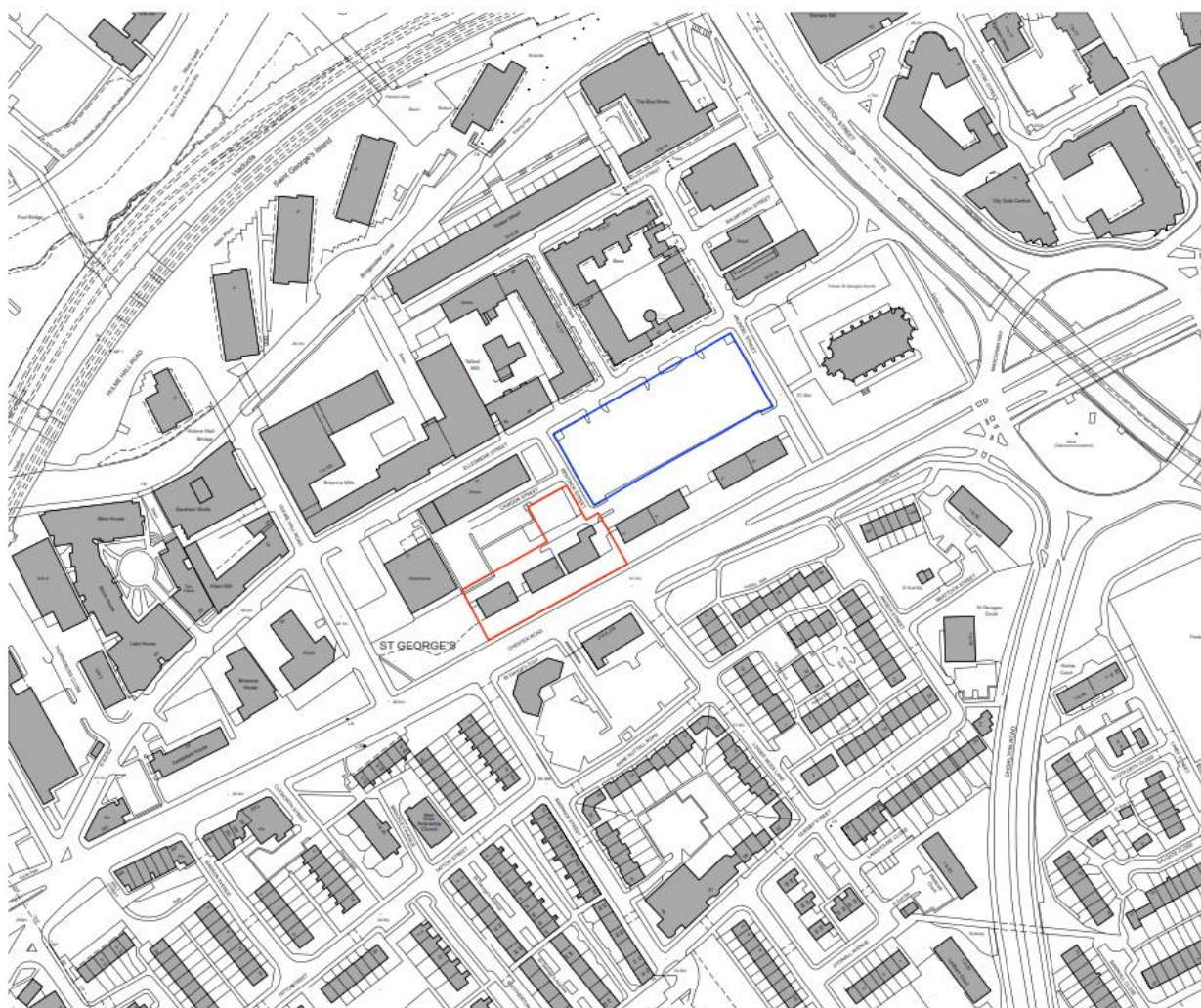
Larger developments with straight edges can reflect signals. This causes multipath interference which, with analogue signals, can manifest itself on the viewed images as 'ghosting'. The 'direct' signal arrives first (Shorter distance to travel) with the reflecting signals arriving, in a weaker state, causing the multiple image effect.

The images below (Taken from OFCOM) illustrate this:



DEVELOPMENT SITE PLAN

**Sky Gardens
Chester Road
Manchester**



POST CONSTRUCTION SURVEY

The purpose of this Post-Construction survey is to confirm the findings and observations / conclusions of the original Pre-Construction survey of 2014

As the original test locations were logged, this information was utilised to ensure comparability of the test results between Pre and Post construction surveys

The signal strength of the television signals was measured and can be categorised as follows:

Average Signal Strength (dB)	Strength Definition
<35	Low
35-45	Average
45-55	Good
55+	Excellent

TELEVISION TRANSMITTER SERVING THIS AREA

WINTER HILL TRANSMITTER

- TRANSMITTER No: 103.00
- NGR: SD 660144
- AERIAL HEIGHT: 718m AOD
- Approximate bearing from the Proposed Development: 130.53 Degrees
- Approximate distance from the Proposed Development: 24.14 Kilometres

TELEVISION BROADCASTS FROM THE WINTER HILL TRANSMITTER

Digital Multiplexes tested:

- RF Channel 31 (554.00 MHZ) Transmission Power @ 1,000 Watts
- RF Channel 37 (602.00 MHZ) Transmission Power @ 14,000 Watts
- RF Channel 49 (698.00 MHZ) Transmission Power @ 100,000 Watts
- RF Channel 50 (706.00 MHZ) Transmission Power @ 100,000 Watts
- RF Channel 54 (737.80 MHZ) Transmission Power @ 100,000 Watts
- RF Channel 55 (746.00 MHZ) Transmission Power @ 100,000 Watts
- RF Channel 56 (754.00 MHZ) Transmission Power @ 1,000 Watts
- RF Channel 57 (762.00 MHZ) Transmission Power @ 1,000 Watts
- RF Channel 58 (770.00 MHZ) Transmission Power @ 100,000 Watts
- RF Channel 59 (778.00 MHZ) Transmission Power @ 100,000 Watts

RADIO BROADCASTS FROM THE WINTER HILL TRANSMITTER

Analogue Frequencies tested:

• BBC Radio 2	(89.3 MHZ)	Transmission Power @ 2,000 Watts
• BBC Radio 3	(91.5 MHZ)	Transmission Power @ 2,000 Watts
• BBC Radio 4	(93.7 MHZ)	Transmission Power @ 2,000 Watts
• Rock FM	(97.4 MHZ)	Transmission Power @ 1,000 Watts
• BBC Radio 1	(98.9 MHZ)	Transmission Power @ 2,000 Watts
• Smooth Radio	(100.4 MHZ)	Transmission Power @ 2,500 Watts
• BBC Radio Lancs	(103.9 MHZ)	Transmission Power @ 2,500 Watts
• Real Radio	(105.4 MHZ)	Transmission Power @ 2,500 Watts

Digital Multiplexes tested:

• Manchester 11C (218.64 MHZ)	Transmission Power @ 760 Watts
• D1 National 11D (222.064 MHZ)	Transmission Power @ 10,000 Watts
• BBC National DAB 12B (225.648 MHZ)	Transmission Power @ 10,000 Watts

SIGNAL MEASUREMENT POSITIONS

The same locations were used as previously indicated in the Pre-Construction Signal survey from 2014.



Measurement Location No. 1

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	70%
Date	22nd May 2019
Time	10:34
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°28'0" N / 2°15'34"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	66.0	68.1
BBC Radio 3	91.5	27.6	64.9
BBC Radio 4	93.7	43.3	67.4
Rock FM	97.4	42.7	39.3
BBC Radio 1	98.9	68.7	34.1
Smooth Radio	100.4	56.5	49.9
BBC Radio Lancs	103.9	26.5	36.8
Real Radio	105.4	55.9	46.4

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	26.8	39.8
11D	222.064 MHz	57.0	77.9
12B	225.648 MHz	51.0	77.4

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	66.5	14.0	72.4	72.9	74.4	73.1	28.9	43.7	74.6	74.8
Field Strength (dBµV/m) Post-Const	48.2	50.3	49.8	54.1	54.9	43.4	40.8	28.2	44.1	46.1

Measurement Location No. 2

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	17° C
Relative Humidity (%)	70%
Date	22nd May 2019
Time	10:51
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°28'13" N / 2°15'40"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	60.6	62.6
BBC Radio 3	91.5	58.2	61.4
BBC Radio 4	93.7	58.0	63.1
Rock FM	97.4	27.0	35.5
BBC Radio 1	98.9	61.0	57.2
Smooth Radio	100.4	48.5	43.2
BBC Radio Lancs	103.9	23.2	41.2
Real Radio	105.4	45.2	42.8

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	23.8	24.2
11D	222.064 MHz	66.3	65.1
12B	225.648 MHz	72.9	67.0

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	60.7	14.2	65.6	65.5	58.3	57.3	14.7	37.3	64.9	65.0
Field Strength (dBµV/m) Post-Const	49.9	57.2	55.7	55.8	54.3	47.7	42.9	29.3	56.2	54.9

Measurement Location No. 3

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	69%
Date	22nd May 2019
Time	11:03
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°28'5" N / 2°15'22"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	56.8	65.5
BBC Radio 3	91.5	63.2	56.7
BBC Radio 4	93.7	65.5	63.8
Rock FM	97.4	33.7	38.2
BBC Radio 1	98.9	67.0	50.9
Smooth Radio	100.4	54.8	46.2
BBC Radio Lancs	103.9	30.2	40.3
Real Radio	105.4	56.3	45.2

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	19.9	18.3
11D	222.064 MHz	61.2	68.0
12B	225.648 MHz	71.3	69.0

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	58.3	15.1	66.6	65.6	65.9	65.6	15.1	36.5	65.6	65.7
Field Strength (dBµV/m) Post-Const	55.4	58.7	61.5	64.5	63.0	60.1	48.1	39.2	60.5	61.9

Measurement Location No. 4

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	69%
Date	22nd May 2019
Time	11:17
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°27'59" N / 2°15'22"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	69.0	63.7
BBC Radio 3	91.5	63.9	65.2
BBC Radio 4	93.7	72.1	60.3
Rock FM	97.4	39.2	27.9
BBC Radio 1	98.9	72.8	60.5
Smooth Radio	100.4	55.7	45.5
BBC Radio Lancs	103.9	30.8	35.5
Real Radio	105.4	50.5	47.5

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	18.8	23.9
11D	222.064 MHz	60.1	74.1
12B	225.648 MHz	59.1	76.1

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	69.2	14.0	73.1	73.3	75.0	76.1	32.6	47.8	75.5	76.0
Field Strength (dBµV/m) Post-Const	52.4	62.8	62.8	62.7	61.3	54.7	44.3	25.2	62.7	62.0

Measurement Location No. 5

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	69%
Date	22nd May 2019
Time	11:25
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°27'57" N / 2°15'11"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	54.4	60.2
BBC Radio 3	91.5	68.3	53.2
BBC Radio 4	93.7	66.7	60.3
Rock FM	97.4	37.1	29.2
BBC Radio 1	98.9	69.2	55.4
Smooth Radio	100.4	41.7	41.4
BBC Radio Lancs	103.9	30.2	39.0
Real Radio	105.4	53.2	46.1

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	19.9	21.2
11D	222.064 MHz	60.7	59.5
12B	225.648 MHz	57.7	57.2

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	68.3	13.5	74.2	74.8	75.4	75.4	38.3	43.3	75.6	75.2
Field Strength (dBµV/m) Post-Const	61.2	65.7	62.2	62.2	63.9	56.4	45.1	37.1	61.6	63.9

Measurement Location No. 6

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	69%
Date	22nd May 2019
Time	11:35
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°27'50" N / 2°15'7"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	54.4	66.3
BBC Radio 3	91.5	63.2	58.3
BBC Radio 4	93.7	64.8	57.8
Rock FM	97.4	40.1	32.8
BBC Radio 1	98.9	63.2	63.8
Smooth Radio	100.4	52.3	42.8
BBC Radio Lancs	103.9	32.9	34.8
Real Radio	105.4	55.8	46.0

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	23.4	13.2
11D	222.064 MHz	58.1	68.4
12B	225.648 MHz	65.7	62.2

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	73.0	13.9	74.8	76.2	76.5	76.4	23.6	48.0	76.3	76.4
Field Strength (dBµV/m) Post-Const	71.1	78.4	76.3	76.1	74.5	70.1	59.8	49.1	75.0	74.5

Measurement Location No. 7

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	69%
Date	22nd May 2019
Time	11:44
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°27'50" N / 2°14'59"W

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	59.9	58.9
BBC Radio 3	91.5	63.4	63.0
BBC Radio 4	93.7	67.2	63.6
Rock FM	97.4	36.4	38.2
BBC Radio 1	98.9	60.3	59.3
Smooth Radio	100.4	62.3	41.2
BBC Radio Lancs	103.9	30.3	44.6
Real Radio	105.4	49.6	47.2

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	22.5	13.5
11D	222.064 MHz	68.8	55.6
12B	225.648 MHz	69.2	64.0

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	71.0	14.3	72.6	73.1	73.7	73.4	25.2	44.2	71.8	72.2
Field Strength (dBµV/m) Post-Const	68.0	74.2	72.8	72.8	73.2	68.8	59.0	49.4	74.1	72.3

Measurement Location No. 8

TYPICAL PROPERTY TYPE AT TEST LOCATION

Residential

Antennae Position and Environmental Conditions

Temperature (°C)	16° C
Relative Humidity (%)	64%
Date	22nd May 2019
Time	12:03
DAB & VHF Antenna Height	2m AGL
UHF Antenna Height	10m AGL
OS Grid Reference (x,y)	53°27'42" N / 2°14'58"W

Astbury TV Aerials Limited (T/A Astbury)

Unit 6, Charlestown Industrial Estate
Robinson Street, Ashton-under-Lyne
Lancashire. OL6 8NS
0161 330 5700

Registered in England & Wales: 980805

service@astbury.co.uk
www.astbury.co.uk

Analogue (FM) Radio Transmissions From Winter Hill Transmitter

Channel	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
BBC Radio 2	89.3	57.4	63.4
BBC Radio 3	91.5	55.7	51.4
BBC Radio 4	93.7	62.0	60.0
Rock FM	97.4	37.3	30.6
BBC Radio 1	98.9	55.5	55.0
Smooth Radio	100.4	57.7	47.2
BBC Radio Lancs	103.9	24.6	46.0
Real Radio	105.4	50.8	52.1

Digital (DAB) Radio Transmissions From Winter Hill Transmitter

DAB Block	Frequency (MHz)	Field Strength (dBµV/m)	
		Pre-Const	Post-Const
11C	218.64 MHz	19.9	18.2
11D	222.064 MHz	65.6	64.5
12B	225.648 MHz	59.7	68.4

Digital Terrestrial Television from Winter Hill Transmitter

UHF Channel Allocation	31	37	49	50	54	55	56	57	58	59
Frequency (MHz)	554.0	602.0	698.0	706.0	737.8	746.0	754.0	762.0	770.0	778.0
Multiplex	Com7	Com8	COM5 ArqA	PSB1 BBCA	PSB3 BBCB	COM6 ArqB	LM / LL / LPR	GIM	COM4 SDN	PSB D3+4
Field Strength (dBµV/m) Pre-Const	76.4	14.4	78.0	79.0	79.8	80.5	31.3	54.7	80.3	80.1
Field Strength (dBµV/m) Post-Const	74.5	78.5	77.8	76.5	75.5	72.2	61.1	51.8	75.3	75.4

OBSERVATIONS

It is our considered opinion, that the construction of the development has had a negligible effect on signal levels.

Since our initial Pre-Construction signal survey in March 2014, a number of high rise building have been built in the local area, all of which will have an effect on the received signals at the properties in the shadow area of this development (Sometimes the impact can be positive by way of reflected signals, and sometimes negative by way of blocking signals). However the resilience of digital transmissions has mitigated most issues resulting in continued adequate reception of digital TV and radio transmissions.

Although not a specific requirement of the Post-Constuction Signal Impact Survey, our engineers also carried out satellite signal checks for confirmation and can confirm that satellite signals have not be affected by the development as the satellite signals come from the opposite direction.

Chris Threadgold

Chris Threadgold
Astbury