Project Installation Engineers:-
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TV Reception Survey Report

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

Terrace Hill (Princess Street) Ltd
c/o Terrace Hill Projects Ltd
Westminster
St Mark's Court
Teesdale
Stockton on Tees TS17 6QP

THE PROPOSED DEVELOPMENT:

Princess Street Development
Princess Street
Manchester

THIS PRE CONSTRUCTION TV RECEPTION SURVEY WAS CARRIED OUT BY:

Taylor Bros Installations (Bolton) Ltd
Taylor Building
247 Crompton Way
Bolton
BL2 2RY

DATE OF SURVEY: 10th June 2015

Survey Reference Number: 10159Rev1

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INTRODUCTION

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

This impact can be caused by either “shadowing”, when the existing viewers are located in an area where their television aerial beampath (direction) is through or within close proximity to the structure; or “reflection”, when viewers are situated in the surrounding area to the structure and their television aerials receive delayed signals, which have been reflected from the structure, as well as the direct signal from the television transmitter.

Both shadowing and reflections can result in a reduction in television signal strengths and quality.

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

The desktop study is carried out using plans of the proposed development, re: location and size, along with maps of the surrounding area and television transmitter broadcast information.

The field survey is then carried out at a number of test point locations surrounding the proposed development. Results and information are recorded at each of these test point locations (please refer to Method).

By analysing all of the findings we are then able to draw up conclusions regarding the potential impact that the proposed development could have upon television reception.

METHOD

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

2. Test results are recorded regarding television signal strengths and quality.
   Strength: dBμv
   Quality: BER and C/N
   All readings undertaken with LTE filter applied.

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

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

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

6. Existing obstructions to television reception are recorded.

EQUIPMENT

This survey was carried out using the following equipment:-

- Specialist Vehicle complete with Telescopic Mast
- 360° Antenna Rotator
- 10 Element Wideband UHF Antennas with Ballums: one vertical and one horizontal polarisation.
- 20m x WF100 Twin Screened CAI Approved Coaxial Cable
- Promax Spectrum Analyser/Field Strength Meter
- Ordnance Survey Maps
- Mapping Software
- Garmin GPS Receiver
- Compass
- Digital Camera
- Laptop Computer
- Monitor for both Sound and Vision
- Digital Terrestrial Television Decoder

THE PROPOSED DEVELOPMENT

THE PROPOSED DEVELOPMENT: Princess Street Development
Princess Street
Manchester

DETAILS:

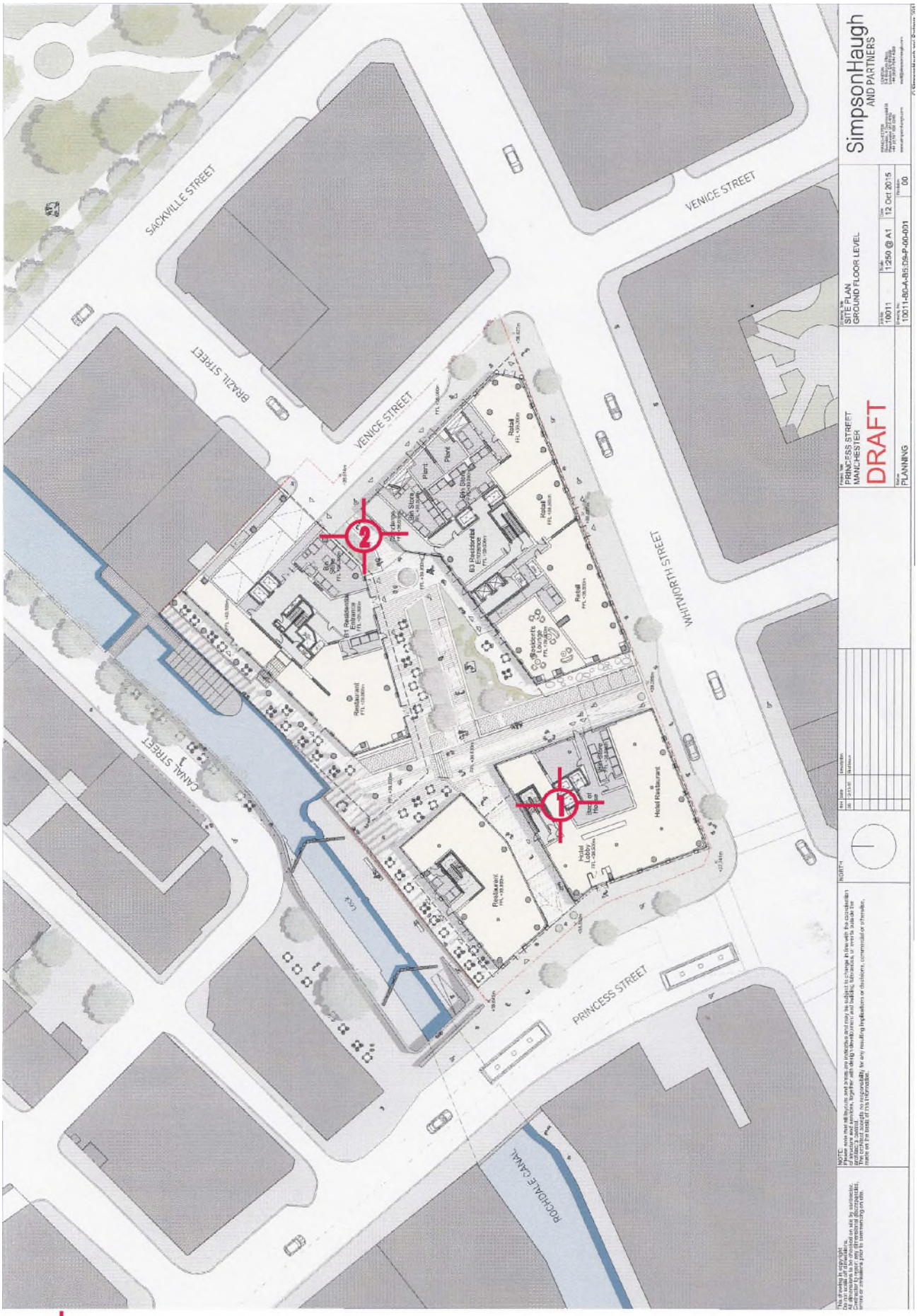
Development Type:	New build
Number of Blocks:	3
Proposed Building Heights:	Block 1: 51.30m Block 2: 41.20m Block 3: 47.78m

Please refer to Plan A which highlights the proposed development's location and Plans B and C which highlight the proposed elevations.

COORDINATES

Prior to the commencement of the survey, coordinates for the proposed development are entered into a GPS receiver unit 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 proposed development, for comparison with the bearing and distance to the television transmitter. The coordinates used throughout the survey are listed below, and the coordinates for the proposed development are also shown on Plan A

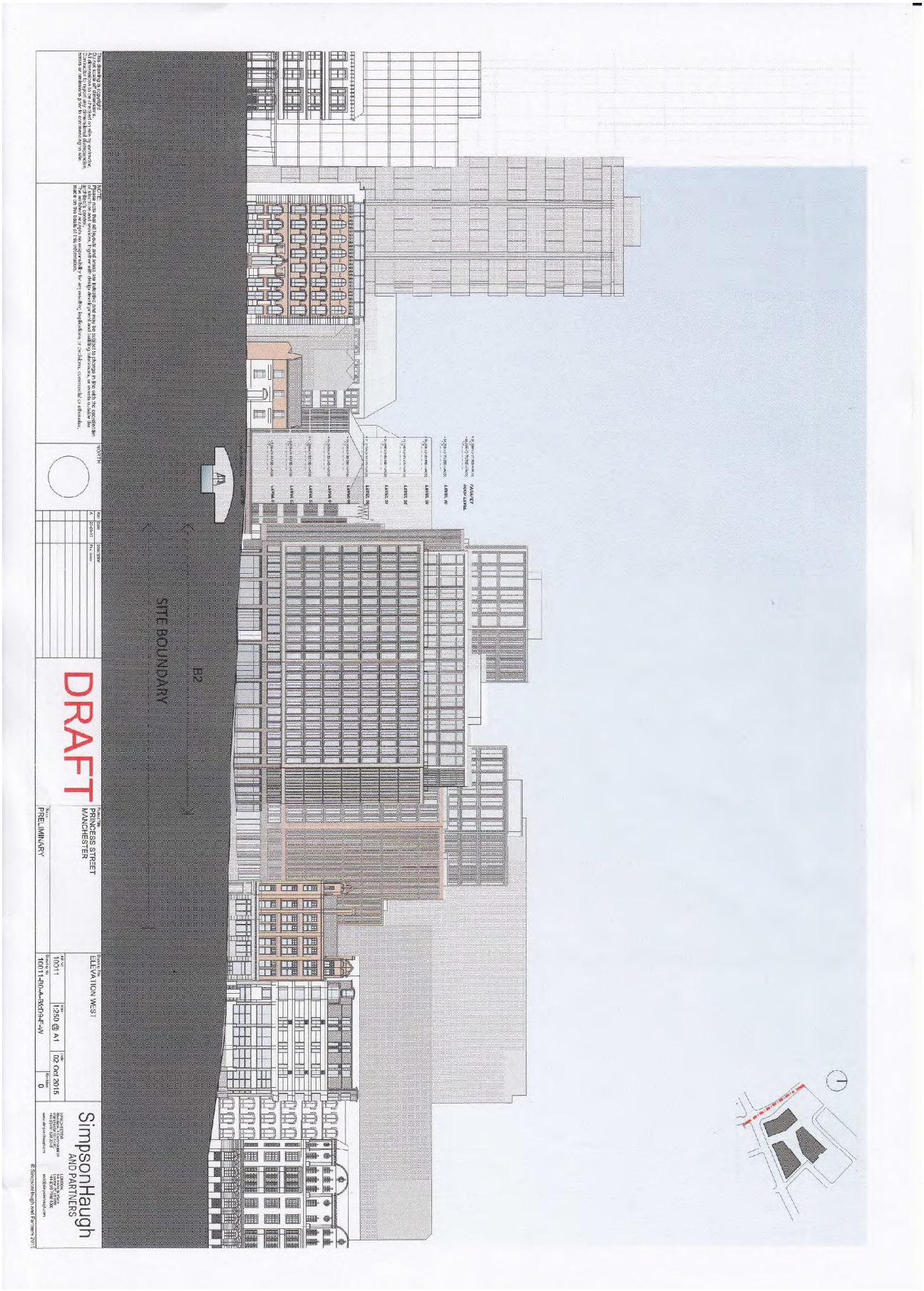
LOCATION	NGR
Winter Hill Transmitter	SD 66000 14400
Proposed Development 1	SJ 84301 97724
Proposed Development 2	SJ 84341 97748



PLAN A: PROPOSED DEVEOPMENT'S LOCATION



PLAN B: PROPOSED ELEVATIONS NORTH



PLAN C: PROPOSED ELEVATIONS WEST



PLAN D: PROPOSED ELEVATIONS SOUTH

TELEVISION TRANSMITTER SERVING THE AREA

WINTER HILL TRANSMITTER

Transmitter No:	103.00
NGR:	SD 660144
Approximate bearing from the proposed development:	312º
Approximate distance from the proposed development:	24.74 km

TELEVISION BROADCASTS FROM THE WINTER HILL TRANSMITTER

The Winter Hill transmitter broadcasts 8 digital multiplexers, providing the full range of digital terrestrial television services (DVB, Freeview).

UHF CHANNEL	MULTIPLEXER	FORMAT	FREQUENCY
31	COM7	HD	554.0
37	COM8	HD	602.0
49	ARQA	SD	698.0
50	BBCA	SD	706.0
54	BBCB	HD	737.8
55	ARQB	SD	746.0
58	SDN	SD	770.0
59	D3+4	SD	778.0

TEST POINT POSITIONS AND RESULTS

TEST POINT 1

TEST POINT LOCATION 1
Whitworth Street

NGR: SJ 84496 97762

Alt: 40m

Mast Height: 10m

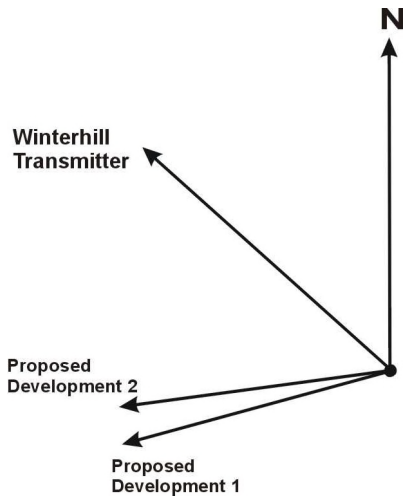
Visible Existing Aerial Arrays: The properties in this area are 6 and 7 storey, with no visible TV aerials from the ground. We would expect that there are communal TV aerials sited at rooftop height which will feed communal TV systems within the properties.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	37	6		-8	Pass
37	602.0	COM8	HD	32	1		-1	Fail
49	698.0	ARQA	SD	35	5	-3		Fail
50	706.0	BBCA	SD	35	4	-2		Fail
54	737.8	BBCB	HD	33	3		-1	Fail
55	746.0	ARQB	SD	33	2	-2		Fail
58	770.0	SDN	SD	36	5	-4		Fail
59	778.0	D3+4	SD	35	4	-5		Marginal



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.89km
Proposed Development 1	259°	0.20km
Proposed Development 2	264°	0.16km

TEST POINT 2

TEST POINT LOCATION 2
Whitworth Street (55)

NGR: SJ 84384 97718

Alt: 39m

Mast Height: 10m

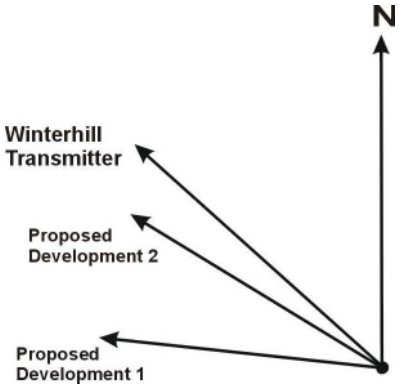
Visible Existing Aerial Arrays: 18 element and high gain aerials on 2m and 3m masts, mounted at rooftop height on 4 and 5 storey properties, directed towards the Winter Hill Tx. These TV aerials will be feeing communal TV systems within the properties.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	39	12		-8	Pass
37	602.0	COM8	HD	42	15		-8	Pass
49	698.0	ARQA	SD	36	10	-3		Fail
50	706.0	BBCA	SD	35	7	-3		Fail
54	737.8	BBCB	HD	36	9		-7	Pass
55	746.0	ARQB	SD	35	8	-4		Fail
58	770.0	SDN	SD	39	12	-8		Pass
59	778.0	D3+4	SD	40	13	-8		Pass



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.84km
Proposed Development 1	274°	0.08km
Proposed Development 2	304°	0.05km



PHOTOGRAPH 1: TYPICAL TYPE OF TV AERIAL LOCATED IN THE AREA OF TEST POINT 2

TEST POINT 3

TEST POINT LOCATION 3
Samuel Ogden Street

NGR: SJ 84370 97654

Alt: 38m

Mast Height: 10m

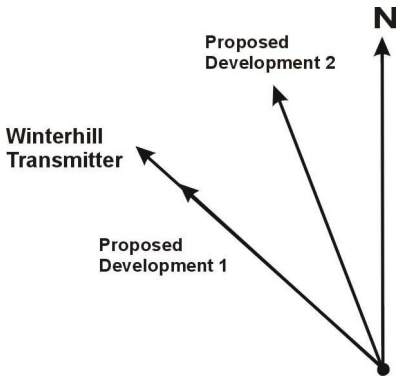
Visible Existing Aerial Arrays: High gain and anti reflection aerials on 2m and 3m masts, mounted at rooftop height, on 5 and 6 storey apartments, directed towards the Winter Hill Tx. These aerials will be feeding communal TV systems within the properties.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths but the quality is acceptable.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	41	14		-8	Pass
37	602.0	COM8	HD	44	16		-8	Pass
49	698.0	ARQA	SD	47	18	-7		Pass
50	706.0	BBCA	SD	49	19	-8		Pass
54	737.8	BBCB	HD	48	20		-8	Pass
55	746.0	ARQB	SD	46	17	-8		Pass
58	770.0	SDN	SD	44	15	-8		Pass
59	778.0	D3+4	SD	43	13	-7		Pass



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.87km
Proposed Development 1	312°	0.10km
Proposed Development 2	340°	0.09km



PHOTOGRAPH 2: TYPICAL TYPES OF TV AERIAL LOCATED IN THE AREA OF TEST POINT 3

TEST POINT 4

TEST POINT LOCATION 4
Sackville Street

NGR: SJ 84415 97790

Alt: 40m

Mast Height: 10m

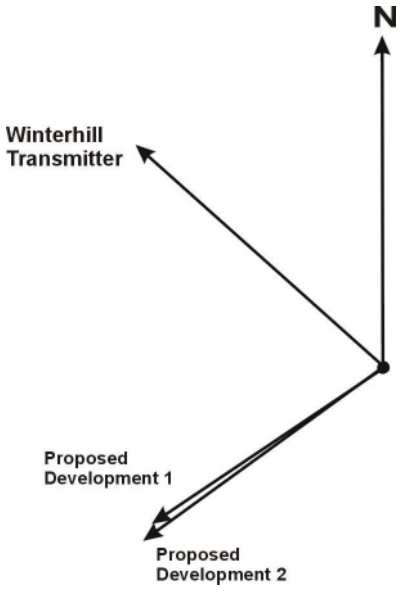
Visible Existing Aerial Arrays: The properties in this area are 4 and 5 storey with no visible TV aerials from the ground. We would expect that there are communal TV aerials at rooftop height feeding communal TV systems within the buildings.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths and corruption is being received on one multiplexer.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	37	2		-8	Pass
37	602.0	COM8	HD	37	2		-1	Fail
49	698.0	ARQA	SD	44	9	-6		Pass
50	706.0	BBCA	SD	43	8	-7		Pass
54	737.8	BBCB	HD	46	11		-7	Pass
55	746.0	ARQB	SD	46	11	-8		Pass
58	770.0	SDN	SD	45	9	-8		Pass
59	778.0	D3+4	SD	45	9	-7		Pass



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.81km
Proposed Development 1	237°	0.14km
Proposed Development 2	236°	0.09km

TEST POINT 5

TEST POINT LOCATION 5
Princess Street

NGR: SJ 84276 97738

Alt: 40m

Mast Height: 10m

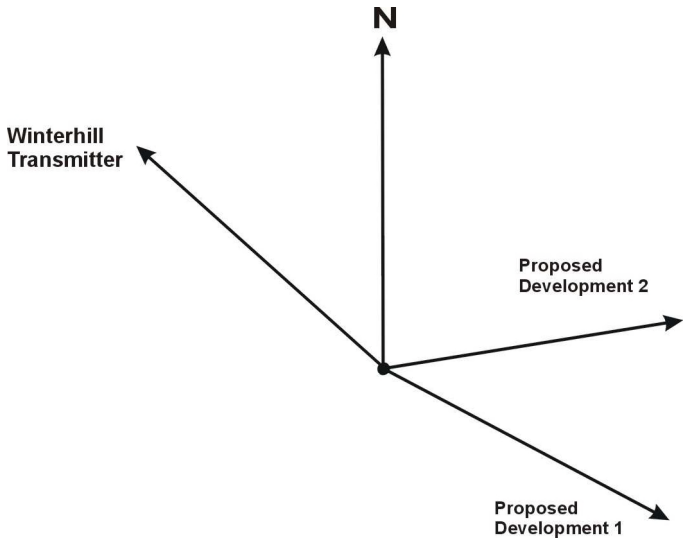
Visible Existing Aerial Arrays: High gain aerials on 2m, 3m and 4m masts mounted at rooftop height on 2 and 3 storey buildings, directed towards the Winter Hill Tx.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths, and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	34	4		-1	Fail
37	602.0	COM8	HD	33	3		-1	Fail
49	698.0	ARQA	SD	35	6	-5		Marginal
50	706.0	BBCA	SD	35	3	-2		Fail
54	737.8	BBCB	HD	33	3		-1	Fail
55	746.0	ARQB	SD	38	6	-4		Fail
58	770.0	SDN	SD	40	9	-8		Pass
59	778.0	D3+4	SD	39	8	-7		Pass



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.74km
Proposed Development 1	120°	0.03km
Proposed Development 2	82°	0.07km



PHOTOGRAPH 3: TYPICAL TYPE OF TV AERIAL LOCATED IN THE AREA OF TEST POINT 5

TEST POINT 6

TEST POINT LOCATION 6
Princess Street

NGR: SJ 84312 97639

Alt: 37m

Mast Height: 10m

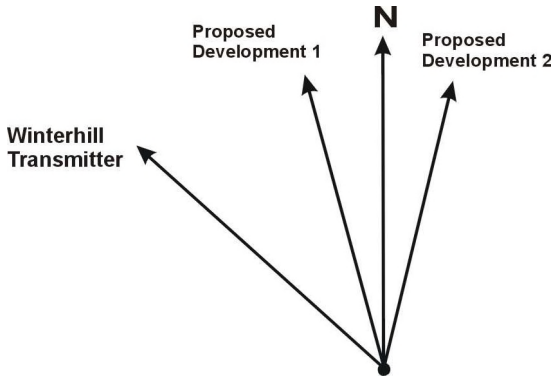
Visible Existing Aerial Arrays: The properties in this area are multi storey, ranging in height around 6-7 storey, with no visible TV aerials from the ground. We would expect that there are communal TV aerials sited at rooftop height which feed communal TV systems within the buildings

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths, and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμv)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	37	7		-3	Fail
37	602.0	COM8	HD	35	5		-2	Fail
49	698.0	ARQA	SD	36	6	-7		Pass
50	706.0	BBCA	SD	38	9	-8		Pass
54	737.8	BBCB	HD	37	8		-7	Pass
55	746.0	ARQB	SD	39	10	-4		Fail
58	770.0	SDN	SD	40	9	-7		Pass
59	778.0	D3+4	SD	41	10	-7		Pass



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.83km
Proposed Development 1	349°	0.08km
Proposed Development 2	14°	0.10km

TEST POINT 7

TEST POINT LOCATION 7
Charles Street

NGR: SJ 84377 97561

Alt: 35m

Mast Height: 10m

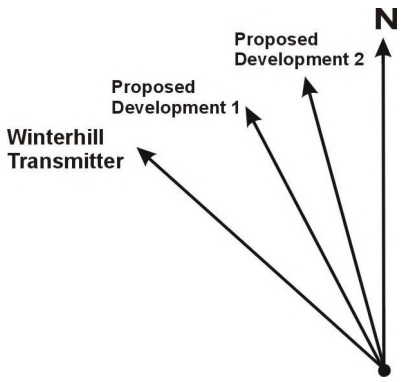
Visible Existing Aerial Arrays: The properties in this area are 8 storey apartment blocks, and an 8 storey hotel, with no visible TV aerials from the ground. We would expect that there are communal TV aerials sited at rooftop height which feed communal TV systems within the buildings

Visible Existing Obstructions: Various multi storey buildings and raised railway lines in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths, and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμv)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	33	3		-1	Fail
37	602.0	COM8	HD	37	4		-1	Fail
49	698.0	ARQA	SD	35	4	-3		Fail
50	706.0	BBCA	SD	32	2	-4		Fail
54	737.8	BBCB	HD	31	2		-1	Fail
55	746.0	ARQB	SD	32	2	-5		Marginal
58	770.0	SDN	SD	33	3	-4		Fail
59	778.0	D3+4	SD	36	5	-5		Marginal



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.93km
Proposed Development 1	334°	0.18km
Proposed Development 2	349°	0.19km

TEST POINT 8

TEST POINT LOCATION 8
Sackville Street

NGR: SJ 84500 97688

Alt: 35m

Mast Height: 10m

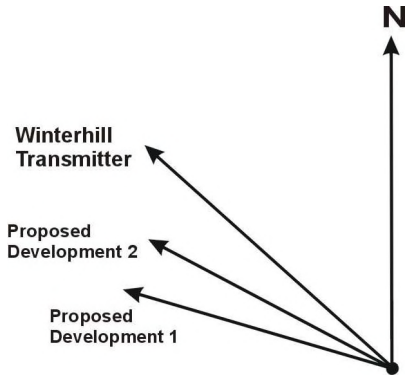
Visible Existing Aerial Arrays: The properties in this area are multi storey university buildings, with no visible TV aerials from the ground.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths and corruption is being received on two multiplexers.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	36	7		-2	Fail
37	602.0	COM8	HD	36	6		-2	Fail
49	698.0	ARQA	SD	36	6	-6		Pass
50	706.0	BBCA	SD	35	5	-6		Pass
54	737.8	BBCB	HD	37	7		-7	Pass
55	746.0	ARQB	SD	39	9	-7		Pass
58	770.0	SDN	SD	41	10	-7		Pass
59	778.0	D3+4	SD	41	10	-7		Pass



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.91km
Proposed Development 1	286°	0.18km
Proposed Development 2	296°	0.15km

TEST POINT 9

TEST POINT LOCATION 9
Abingdon Street

NGR: SJ 84253 97725

Alt: 39m

Mast Height: 10m

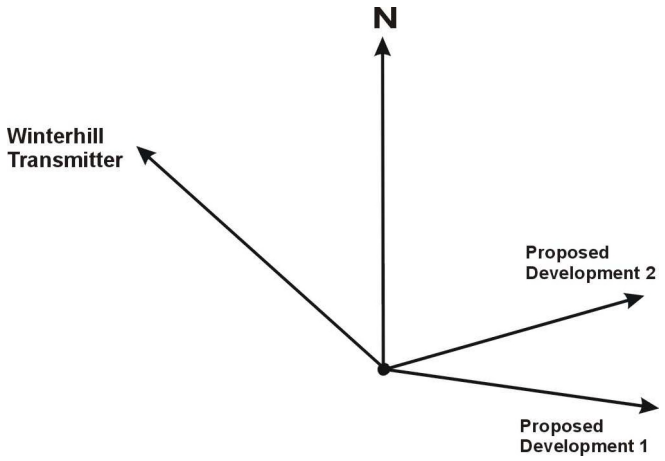
Visible Existing Aerial Arrays: 18 element and high gain aerials on 2m, 3m and 4m masts, mounted at rooftop height on 2, 3 and 4 storey buildings, directed towards the Winter Hill Tx.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	34	4		-1	Fail
37	602.0	COM8	HD	34	3		-1	Fail
49	698.0	ARQA	SD	38	7	-7		Pass
50	706.0	BBCA	SD	40	8	-7		Pass
54	737.8	BBCB	HD	35	5		-1	Fail
55	746.0	ARQB	SD	39	7	-5		Marginal
58	770.0	SDN	SD	39	7	-6		Pass
59	778.0	D3+4	SD	36	5	-4		Fail



LOCATION	BEARING	DISTANCE
Winter Hill Tx	312°	24.73km
Proposed Development 1	96°	0.05km
Proposed Development 2	78°	0.09km



PHOTOGRAPH 4: TYPICAL TYPE OF TV AERIAL LOCATED IN THE AREA OF TEST POINT 9

TEST POINT 10

TEST POINT LOCATION 10
Princess Street

NGR: SJ 84336 97480

Alt: 33m

Mast Height: 10m

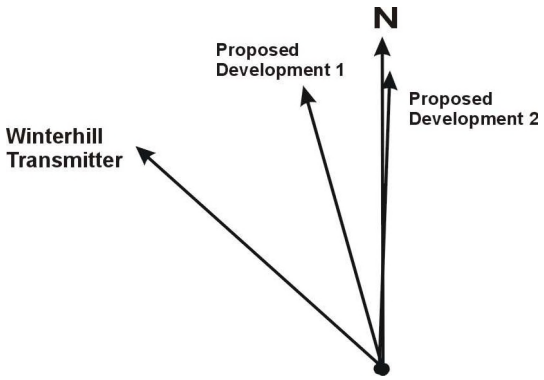
Visible Existing Aerial Arrays: The property in this area is a 12 storey apartment block with no visible TV aerial from the ground. We would expect that there is a communal TV aerial sited at rooftop height which feeds a communal TV system within the property.

Visible Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill Tx.

WINTER HILL TRANSMITTER - REPORT

- TV reception has low signal strengths and corruption is being received.

Channel	Frequency	MUX	FORMAT	Level (dBμV)	CN dB	VBER	LBER	Quality
31	554.0	COM7	HD	40	9		-7	Pass
37	602.0	COM8	HD	35	3		-1	Fail
49	698.0	ARQA	SD	35	3	-1		Fail
50	706.0	BBCA	SD	35	4	-3		Fail
54	737.8	BBCB	HD	36	4		-1	Fail
55	746.0	ARQB	SD	35	4	-1		Fail
58	770.0	SDN	SD	36	5	-3		Fail
59	778.0	D3+4	SD	35	4	-3		Fail



LOCATION	BEARING	DISTANCE
Winter Hill Tx	313°	24.96km
Proposed Development 1	351°	0.25km
Proposed Development 2	1°	0.27km

SUMMARY & CONCLUSIONS

SUMMARY

THE PROPOSED DEVELOPMENT

The proposed Princess Street Development is to be located on Princess Street, Manchester, on land bordered by Whitworth Street, Venice Street and the Rochdale Canal.

The development is to consist of three blocks with different elevations:-
Block 1 - 51.30m
Block 2 - 41.20m
Block 3 - 47.78m

At present there are no existing buildings at the location of the proposed development.

A series of photographs has been taken to highlight the location of the proposed development and existing buildings within close proximity:-

Photograph A: The proposed development's location.
Photograph B: Existing buildings located directly to the north.
Photograph C: Existing buildings located directly to the east.
Photograph D: Existing buildings located directly to the south.
Photograph E: Existing buildings located directly to the west.

TELEVISION RECEPTION

Viewers in the surrounding area to the proposed development are receiving their terrestrial television services from the Winter Hill transmitter, located to the northwest.

The Winter Hill transmitter broadcasts eight digital multiplexers, providing the full range of digital terrestrial television services (Freeview).

The test results recorded during the survey were carried out at a height of 10m and showed low signal strengths with corruption being received. These results aid as a guide, but we anticipate that the visible television aerials located at multi storey height have much improved reception.

During the survey tests were carried out to receive an alternative television transmitter to the Winter Hill transmitter that broadcasts the same number of services and regional programming. The result of these tests was that no alternative transmitter could be received at an acceptable quality and strength.

SATELLITE TELEVISION RECEPTION

Both Sky TV and Freesat are broadcast from the same fleet of Astra satellites, located at an orbital position of approximately 28.5°m east of south, with a required satellite dish elevation of approximately 23°.

Viewers in the surrounding area who are utilising satellite for their television viewing will be connected to a communal IRS system if they are located within one of the apartment blocks with this facility. If an IRS system is not present, individual viewers may have a satellite mini dish installed.



PHOTOGRAPH A: THE PROPOSED DEVELOPMENT'S LOCATION



PHOTOGRAPH B: EXISTING BUILDINGS DIRECTLY TO THE NORTH



PHOTOGRAPH C: EXISTING BUILDINGS LOCATED DIRECTLY TO THE EAST



PHOTOGRAPH D: EXISTING BUILDINGS LOCATED DIRECTLY TO THE SOUTH



PHOTOGRAPH E: EXISTING BUILDINGS LOCATED DIRECTLY TO THE WEST

CONCLUSIONS

The proposed Princess Street Development is to be located at Princess Street, Manchester, on land bordered by Whitworth Street, Venice Street and the Rochdale Canal. The development is to consist of three buildings with varying elevations of 51.30m, 41.20m and 47.78m. At present there are no existing buildings at the location of the proposed development. Subsequently the introduction of the Princess Street development will alter the existing skyline, which can result in an impact to television reception.

By taking into account the proposed development's location and elevations, the details collated during the desk top study and the results and information recorded during the field survey, we are able to ascertain where, or if, the introduction of the proposed development has the potential to impact upon television reception.

In the case of the Princess Street Development we have highlighted two potential impact zones (shown on Map 1); one for existing satellite reception and the other for existing terrestrial television reception.

The potential impact zone for satellite television reception covers an area to the north of the proposed development – a small area of Canal Street. We carried out a visual inspection of this area for satellite installations. The result of this was that only one visible satellite installation could be noted; this is located on the New Union Public House.

The potential impact zone for terrestrial television reception covers an area to the southeast of the proposed development.

A number of properties located within the potential impact zone have visible communal television aerials directed towards the Winter Hill transmitter, which is located to the northwest. The proposed elevation of the Princess Street development is to be greater in height than the existing buildings within the potential impact zone and subsequently it will shadow the existing television aerials from the Winter Hill transmitter, resulting in a loss of terrestrial television reception.

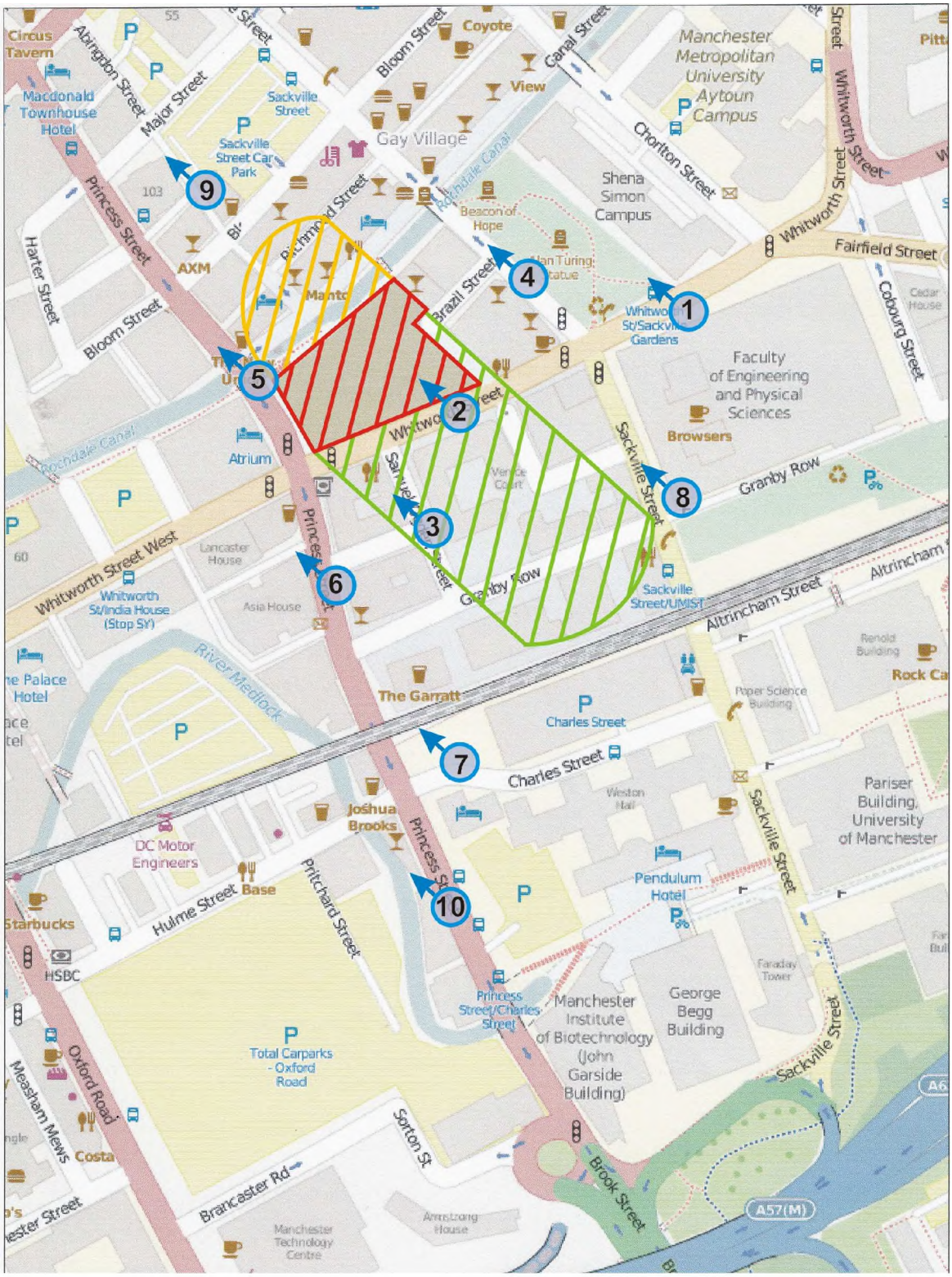
The properties within the potential impact zone are primarily residential buildings, for example Venice Court.

Please note, that if tower cranes are used on site during the construction process these have the potential to cause interference to television reception on a wider scale than the completed development. This interference would be present for the duration of time that the tower cranes are operating.



Signed:…… Dated: 09 October 2015

K BODEN



KEY

Proposed Development

Potential Impact Zone for Satellite TV Reception

Potential Impact Zone for Terrestrial TV Reception

1 Test Point Position showing local television aerial direction to the Winter Hill Tx

MAP 1: POTENTIAL IMPACT ZONES

MITIGATION

Due to the existing properties having the potential to be shadowed from the television transmitter due to the introduction of the proposed development, one of the following may be required to rectify viewer's television reception.

Remedial Aerial Work

One or all of the following may assist in rectifying interference being received:-

- Change of aerial type to one most suited to the type of interference being received.
- Re-siting the television aerial to a position on the property where interference is reduced, or is not present at all.
- Increase or decrease of the 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 reception (which could be a considerable distance from the obstruction) and the signals are brought back via a cable, amplifier and splitter network to each of the affected buildings.

Satellite Television Reception

If rectifying terrestrial television reception proves problematic, the installation of satellite TV systems may be required to rectify existing viewers' television reception.

The properties within the potential impact zone are apartment blocks. Some of the apartments are relatively new and may have communal satellite TV systems installed, (this would require confirming). Older developments may not have communal satellite systems and would require the following:-

The installation of communal satellite television systems within the apartments would comprise of the following (per block):

- Master satellite dish
- Amplification
- Active splitters
- Cable network (external or internal)
- Outlet sockets

Each television on the system would require a Freesat set top box in order to view the television services.

REFERENCE OF TERMS

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
FORMAT	SD Standard Definition HD High Definition
NGR	National Grid Reference
ALT	Altitude above sea level at the location
BRG	Bearing from North
GPS	Global Positioning System