TAYLOR Electronic Systems Engineers

Project Installation Engineers for
TV & Radio Transmitters
CCTV Public Address
Terrestrial & Satellite Distribution
Systems
Access Control Systems

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TV Reception Survey Report

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

The University of Manchester
Estates Design Services Group
4th Floor Beyer Building
Oxford Road
Manchester
M13 9PL

PROPOSED DEVELOPMENT:

National Graphene Institute
University of Manchester
Booth Street East
Manchester

THIS PRE CONSTRUCTION TELEVISION RECEPTION SURVEY WAS CARRIED OUT BY:

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

DATE OF SURVEY: 17th December 2012

Survey Reference Number: 9650

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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.

The purpose of this Pre Construction Television Reception Survey is to assess if the introduction of the proposed development will impact upon existing viewers' television reception.

This impact can by caused by either:-

SHADOWING

When a viewer is situated in an area where their television aerial beampath (direction) is through or within close proximity to the structure. Shadowing can result in the following types of interference:-

(i) Reduction or loss of television signal strength
(ii) Reduction in signal quality which can cause corruption to the digital services and, in some cases, loss of television reception.

REFLECTION

When a viewer is situated in the surrounding area to the structure and their television aerial receives delayed signals, which have been reflected from the structure, as well as the direct signal from the television transmitter. Reflection can result in the following types of interference:-

(i) Reduction of television signal strength
(ii) Reduction of the television signal quality which may cause corruption of the digital services

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, ie location, height, along with maps of the surrounding area and television transmitter broadcast information.

The field survey is then carried out using 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 reception, eg, signal strength and quality.
3. An alternative television transmitter is tested for and where receivable, results are recorded.
4. The direction and type of existing viewers' television aerials are 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

The survey is 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 coaxial cable
- Promax spectrum analyser/field strength meter
- Ordnance survey maps
- Garmin GPS receiver
- Compass
- Digital camera
- Monitor for both sound and vision
- Digital terrestrial television decoder

THE PROPOSED DEVELOPMENT

THE PROPOSED DEVELOPMENT

National Graphene Institute
University of Manchester
Booth Street East
Manchester

DETAILS

Proposed building height: 23.225 m

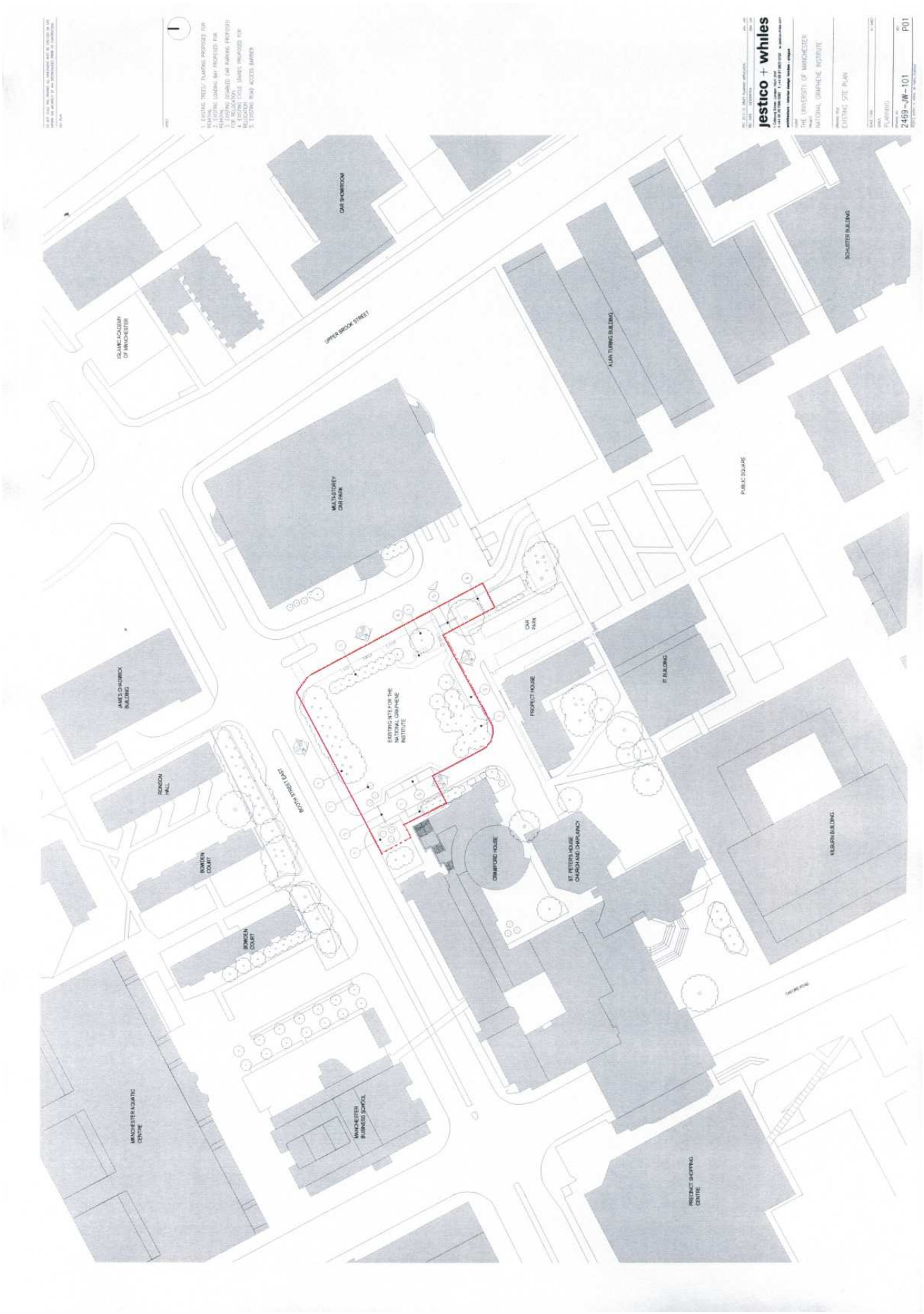
Please refer to Plan A for the location of the proposed development, and Plan B for its elevation.

COORDINATES

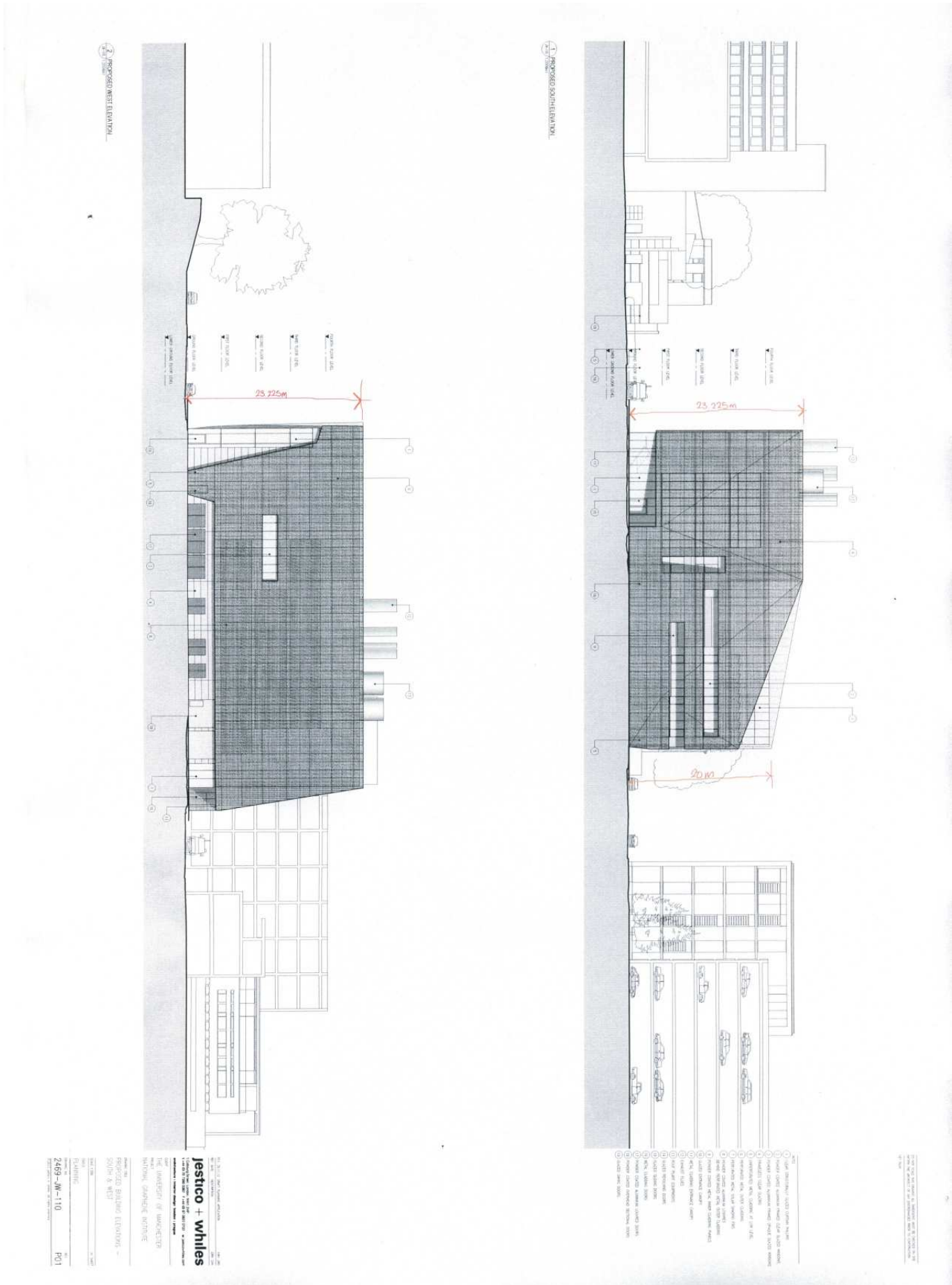
Prior to commencement of the survey, coordinates at the proposed development's location are entered into a GPS receiver unit, along with the coordinates for the television transmitter serving the area. This enables us to record a bearing and distance from each test point location to the proposed development, for comparison with the bearing and distance to the television transmitter.

The coordinates used for the proposed development are shown below:

NGR SJ 84591 96938



PLAN A – LOCATION OF PROPOSED DEVELOPMENT



PLAN B – ELEVATIONS OF PROPOSED DEVELOPMENT

TELEVISION TRANSMITTER SERVING THE AREA

TELEVISION TRANSMITTER SERVING THE AREA SURVEYED

WINTER HILL TRANSMITTER

TRANSMITTER No:	103.00
NGR:	SD 660 144
APPROXIMATE BEARING FROM THE DEVELOPMENT:	313°
APPROXIMATE DISTANCE FROM THE DEVELOPMENT:	25.65 km

TELEVISION BROADCASTS FROM THE WINTER HILL TRANSMITTER:-

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

UHF Channel	Multiplexer
54	BBCB (HD Services)
55	ARQB
58	SDN
59	D3+4
61	ARQA
62	BBCA

TEST POINTS

TEST POINT 1

TEST POINT LOCATION 1
On Campus (previously Clifford Street)

NGR: SJ 84685 96843

Alt: 39 m

Mast Height: 10 m

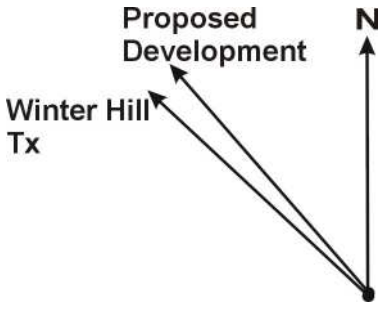
Existing Aerial Arrays: There are no visible TV aerials at this location. There is a 15 storey student accommodation building which will probably have a communal TV aerial located at roof top height, but this is not visible from the ground.

Existing Obstructions: No visible obstructions in the direction of the Winter Hill transmitter.

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
54	737.85	BBCB	-6	-	-	-
55	746.00	ARQB	-5	-7	26%	Pass
58	770.00	SDN	-4	-7	28%	Pass
59	778.00	D3+4	-5	-7	21%	Pass
61	793.85	ARQA	-5	-7	24%	Pass
62	801.85	BBCA	-5	-7	25%	Pass



Location	BRG	Distance
Proposed Development	319°	0.13 km
Winter Hill Tx	313°	25.64 km



PHOTOGRAPH 1: 15 STOREY BUILDING AT TEST POINT 1

TEST POINT 2

TEST POINT LOCATION 2
Booth Street East

NGR: SJ 84549 96921

Alt: 39 m

Mast Height: 10 m

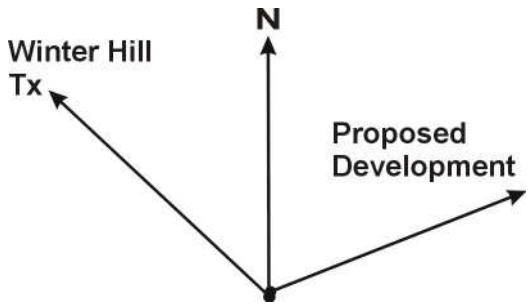
Existing Aerial Arrays: High gain aerials on 1 m, 2 m and 3 m masts, mounted at roof top height on 3, 4 and 5 storey buildings (probably feeding communal TV systems), directed towards the Winter Hill transmitter.

Existing Obstructions: Various multi storey buildings, including the Aquatics Centre, in the general direction of the Winter Hill transmitter.

REPORT

- TV signal strengths are low but the quality is acceptable.

Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
54	737.85	BBCB	-16	-	-	-
55	746.00	ARQB	-16	-7	24%	Pass
58	770.00	SDN	-15	-7	20%	Pass
59	778.00	D3+4	-17	-7	22%	Pass
61	793.85	ARQA	-16	-7	21%	Pass
62	801.85	BBCA	-16	-7	22%	Pass



Location	BRG	Distance
Proposed Development	69°	0.05 km
Winter Hill Tx	313°	25.49 km



PHOTOGRAPH 2: VISIBLE TV AERIALS IN THE AREA OF TEST POINT 2

TEST POINT 3

TEST POINT LOCATION 3
Junction of Bridgeford Street and Oxford Road

NGR: SJ 84541 96704

Alt: 39 m

Mast Height: 10 m

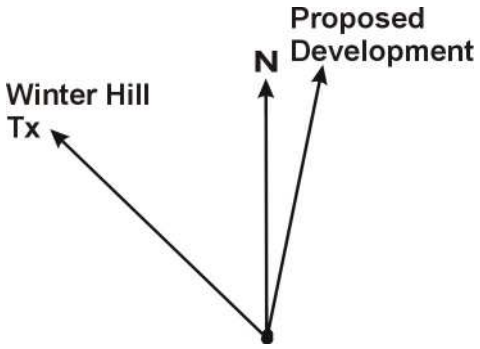
Existing Aerial Arrays: There are no visible TV aerials at this location.

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

REPORT

- TV signal strengths are low and corruption is being received.

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
54	737.85	BBCB	-28	-	-	-
55	746.00	ARQB	-29	-2	75%	Fail
58	770.00	SDN	-29	-2	80%	Fail
59	778.00	D3+4	-29	-1	80%	Fail
61	793.85	ARQA	-32	-2	85%	Fail
62	801.85	BBCA	-32	-2	78%	Fail



Location	BRG	Distance
Proposed Development	12°	0.24 km
Winter Hill Tx	314°	25.64 km

TEST POINT 4

TEST POINT LOCATION 4
Brunswick Street

NGR: SJ 84778 96673

Alt: 39 m

Mast Height: 10 m

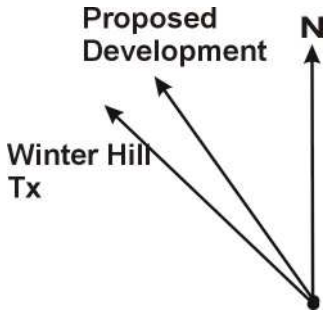
Existing Aerial Arrays: High gain aerial on a 4 m mast mounted at roof top height on a 3 storey building, directed towards the Winter Hill transmitter.

Existing Obstructions: 6, 7, 8 and 15 storey buildings in the direction of the Winter Hill transmitter.

REPORT

- TV signal strengths are low and corruption is being received.

Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
54	737.85	BBCB	-26	-	-	-
55	746.00	ARQB	-29	-1	89%	Fail
58	770.00	SDN	-32	-1	72%	Fail
59	778.00	D3+4	-31	-2	90%	Fail
61	793.85	ARQA	-28	-1	92%	Fail
62	801.85	BBCA	-32	-2	80%	Fail



Location	BRG	Distance
Proposed Development	325°	0.33 km
Winter Hill Tx	314°	25.84 km



PHOTOGRAPH 3: VISIBLE TV AERIAL IN THE AREA OF TEST POINT 4

TEST POINT 5

TEST POINT LOCATION 5
Junction of Lauderdale Crescent and Bryant Close

NGR: SJ 85324 96493

Alt: 39 m

Mast Height: 10 m

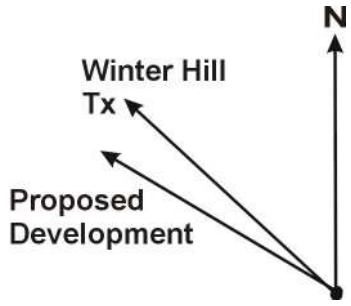
Existing Aerial Arrays: 10 element aerials on 2 m, 3 m and 4 m masts mounted at roof top and gutter height on 2 and 3 storey properties, directed towards the Winter Hill transmitter.

Existing Obstructions: Trees and various multi storey buildings in the direction of the Winter Hill transmitter.

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
54	737.85	BBCB	0	-	-	-
55	746.00	ARQB	0	-7	18%	Pass
58	770.00	SDN	-1	-7	18%	Pass
59	778.00	D3+4	-1	-7	18%	Pass
61	793.85	ARQA	0	-7	19%	Pass
62	801.85	BBCA	0	-7	18%	Pass



Location	BRG	Distance
Proposed Development	301°	0.85 km
Winter Hill Tx	313°	26.35 km



PHOTOGRAPH 4: TYPICAL TYPES OF TV AERIALS LOCATED IN THE AREA OF TEST POINT 5

TEST POINT 6

TEST POINT LOCATION 6
Plymouth View

NGR: SJ 85107 96649

Alt: 39 m

Mast Height: 10 m

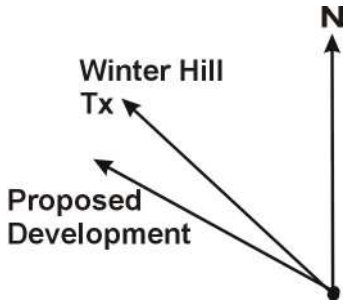
Existing Aerial Arrays: 10 element aerials on 1 m and 2 m masts mounted at roof top and gutter height on 2 and 3 storey properties, directed towards the Winter Hill transmitter.

Existing Obstructions: Various multi storey buildings in the general direction of the Winter Hill transmitter.

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
54	737.85	BBCB	-4	-	-	-
55	746.00	ARQB	-4	-7	18%	Pass
58	770.00	SDN	-3	-7	16%	Pass
59	778.00	D3+4	-4	-7	18%	Pass
61	793.85	ARQA	-4	-7	17%	Pass
62	801.85	BBCA	-3	-7	16%	Pass



Location	BRG	Distance
Proposed Development	299°	0.59 km
Winter Hill Tx	313°	26.09 km



PHOTOGRAPH 5: TYPICAL TYPES OF TV AERIALS LOCATED IN THE AREA OF TEST POINT 6

TEST POINT 7

TEST POINT LOCATION 7
Junction of Glenbarry Close and Cumberland Walk

NGR: SJ 84972 96760

Alt: 39 m

Mast Height: 10 m

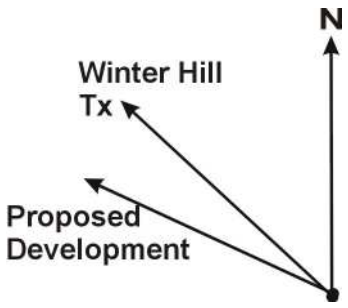
Existing Aerial Arrays: 10 element and 18 element aerials on 1 m, 2 m, 3 m and 4 m masts, mounted at roof top and gutter height on 2 and 3 storey properties, directed towards the Winter Hill transmitter.

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

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
54	737.85	BBCB	-2	-	-	-
55	746.00	ARQB	-2	-7	18%	Pass
58	770.00	SDN	-3	-7	17%	Pass
59	778.00	D3+4	-2	-7	18%	Pass
61	793.85	ARQA	-1	-7	20%	Pass
62	801.85	BBCA	-2	-7	18%	Pass



Location	BRG	Distance
Proposed Development	295°	0.42 km
Winter Hill Tx	313°	25.92 km



PHOTOGRAPH 6: TYPICAL TYPES OF TV AERIALS LOCATED IN THE AREA OF TEST POINT 7

TEST POINT 8

TEST POINT LOCATION 8
Kincardine Road

NGR: SJ 84906 96864

Alt: 39 m

Mast Height: 10 m

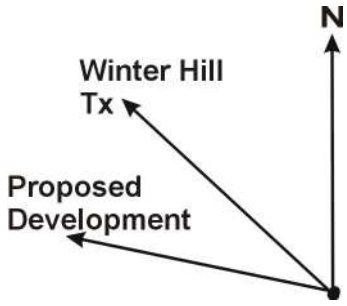
Existing Aerial Arrays: 10 element, 18 element and high gain aerials on 1 m, 2 m and 3 m masts, mounted at roof top and gutter height on 2 storey properties, directed towards the Winter Hill transmitter.

Existing Obstructions: 5 storey building in the general direction of the Winter Hill transmitter.

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
54	737.85	BBCB	+1	-	-	-
55	746.00	ARQB	+2	-7	17%	Pass
58	770.00	SDN	+1	-7	18%	Pass
59	778.00	D3+4	0	-7	18%	Pass
61	793.85	ARQA	+1	-7	18%	Pass
62	801.85	BBCA	+1	-7	18%	Pass



Location	BRG	Distance
Proposed Development	282°	0.32 km
Winter Hill Tx	313°	25.80 km



PHOTOGRAPH 7: TYPICAL TYPES OF TV AERIALS LOCATED IN THE AREA OF TEST POINT 8

TEST POINT 9

TEST POINT LOCATION 9
Whitekirk Close

NGR: SJ 84917 96967

Alt: 39 m

Mast Height: 10 m

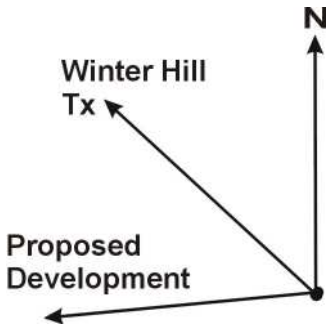
Existing Aerial Arrays: 10 element, 18 element and high gain aerials on 1 m, 2 m and 3 m masts, mounted at roof top and gutter height on 2, 3 and 4 storey properties, directed towards the Winter Hill transmitter.

Existing Obstructions: 5 storey building and trees in the general direction of the Winter Hill transmitter.

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
54	737.85	BBCB	-6	-	-	-
55	746.00	ARQB	-7	-7	26%	Pass
58	770.00	SDN	-6	-7	27%	Pass
59	778.00	D3+4	-5	-7	28%	Pass
61	793.85	ARQA	-6	-7	28%	Pass
62	801.85	BBCA	-7	-7	26%	Pass



Location	BRG	Distance
Proposed Development	265°	0.33 km
Winter Hill Tx	313°	25.73 km



PHOTOGRAPH 8: TYPICAL TYPES OF TV AERIALS LOCATED IN THE AREA OF TEST POINT 9

TEST POINT 10

TEST POINT LOCATION 10
Craigwell Walk

NGR: SJ 84683 97107

Alt: 39 m

Mast Height: 10 m

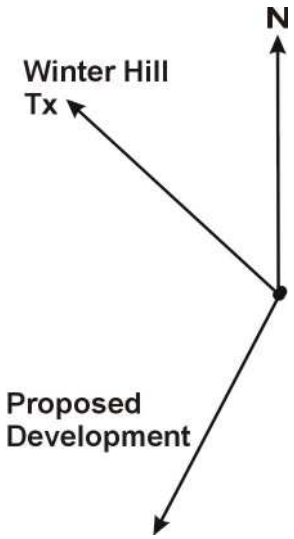
Existing Aerial Arrays: 10 element and high gain aerials on 1 m, 2 m and 3 m masts, mounted at roof top and gutter height on 2 storey properties, directed towards the Winter Hill transmitter.

Existing Obstructions: There are no visible obstructions in the direction of the Winter Hill transmitter.

REPORT

- TV reception is of an acceptable quality and strength.

Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
54	737.85	BBCB	+4	-	-	-
55	746.00	ARQB	+3	-7	18%	Pass
58	770.00	SDN	+5	-7	19%	Pass
59	778.00	D3+4	+6	-7	17%	Pass
61	793.85	ARQA	+5	-7	17%	Pass
62	801.85	BBCA	+6	-7	18%	Pass



Location	BRG	Distance
Proposed Development	208°	0.19 km
Winter Hill Tx	313°	25.47 km



PHOTOGRAPH 9: TYPICAL TYPES OF TV AERIAL LOCATED IN THE AREA OF TEST POINT 10

TEST POINT 11

TEST POINT LOCATION 11
Dover Street

NGR: SJ 84810 96605

Alt: 39 m

Mast Height: 10 m

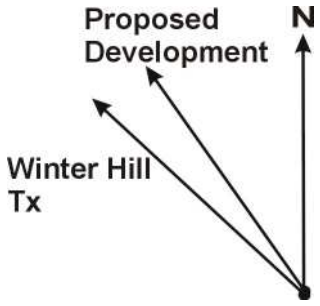
Existing Aerial Arrays: There are no visible TV aerials at this location.

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

REPORT

- TV signals could not be received at this location.

Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
54	737.85	BBCB	Could not receive terrestrial services at this location.			
55	746.00	ARQB				
58	770.00	SDN				
59	778.00	D3+4				
61	793.85	ARQA				
62	801.85	BBCA				



Location	BRG	Distance
Proposed Development	325°	0.40 km
Winter Hill Tx	313°	25.91 km

SUMMARY & CONCLUSIONS

SUMMARY

THE PROPOSED DEVELOPMENT

The proposed development, the National Graphene Institute, is to be located on Booth Street East at the University of Manchester Campus.

The development is to consist of one building, which is to be 5 storey with an overall height of 23.225 m.

At the time of surveying there was no existing building at the proposed development's location.

A series of photographs have been taken to highlight the proposed development's location and existing buildings in the surrounding area:-

Photograph A: The proposed development's location.

Photograph B: Existing multi storey building directly to the east.

Photograph C: Existing multi storey buildings directly to the south.

Photograph D: Existing multi storey building directly to the north.

TELEVISION RECEPTION

Viewers in the surrounding area to the proposed development are receiving their television signals from the Winter Hill transmitter, located to the north west.

The Winter Hill transmitter broadcasts six digital multiplexers required for the full range of Freeview services (digital terrestrial television).

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

CONCLUSIONS

The proposed development, the National Graphene Institute, is to consist of one building with an overall height of 23.225 m.

At present there is no existing building at the proposed development's location. Subsequently, the introduction of the National Graphene Institute will alter the existing skyline, which can result in an impact to television reception.

By taking into account the proposed development's location, the existing viewers' television aerial direction to the television transmitter, and the results and information recorded during the survey, we are able to assess where, or if, the proposed development has the potential to have an impact to television reception.

In the case of the National Graphene Institute, we do not envisage that the introduction of the proposed building will have an impact to television reception.

This is due to the existing multi storey buildings which are within close proximity and surround the proposed development's location.

These existing buildings will shadow the proposed development from the surrounding area, blocking any impact to television reception that it may have caused.



Signed:…… Dated: 19 December 2012

K BODEN



PHOTOGRAPH A: THE PROPOSED DEVELOPMENT'S LOCATION



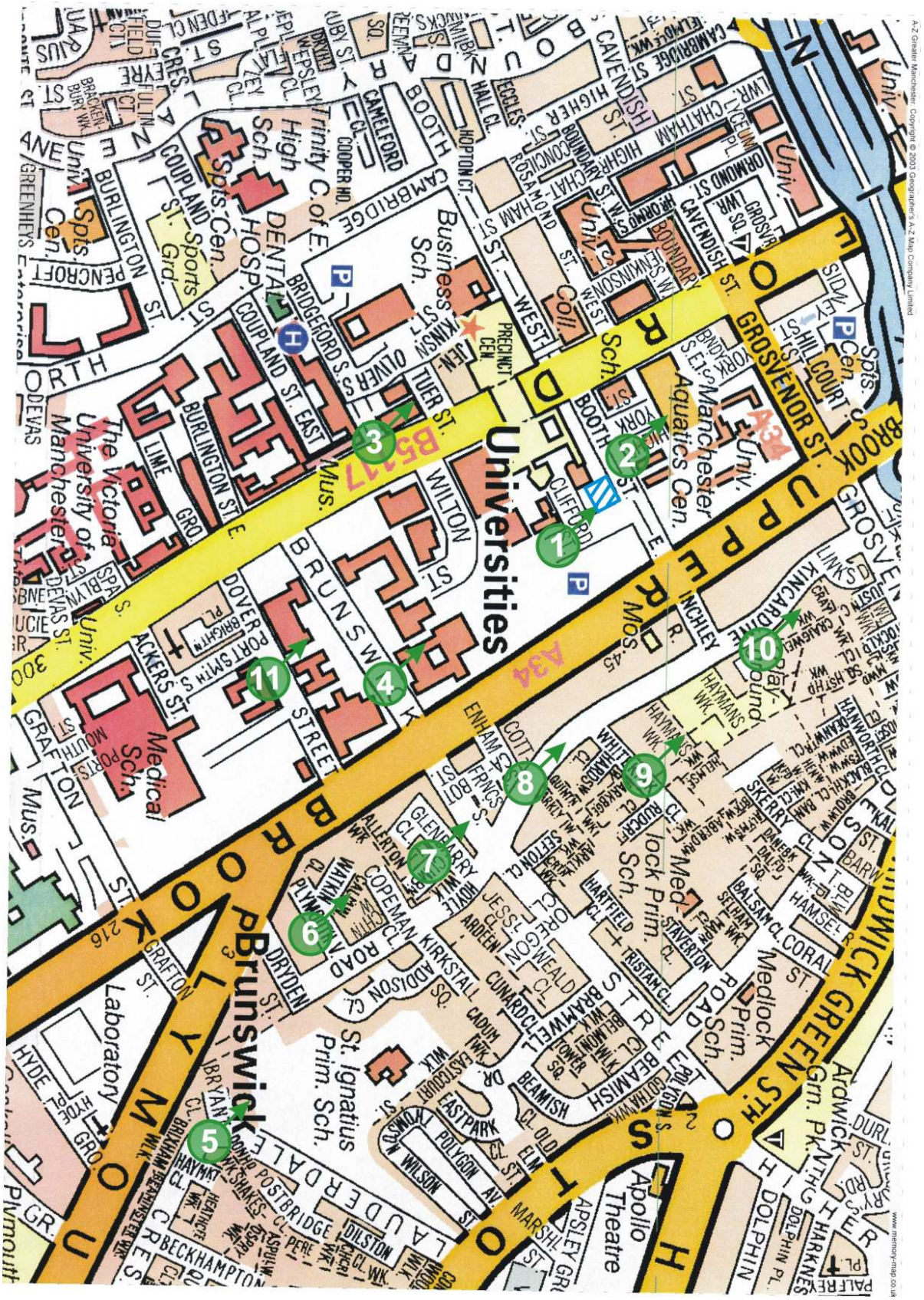
PHOTOGRAPH B: EXISTING MULTI STOREY BUILDING DIRECTLY TO THE EAST



PHOTOGRAPH C: EXISTING MULTI STOREY BUILDINGS DIRECTLY TO THE SOUTH



PHOTOGRAPH D: EXISTING MULTI STOREY BUILDING DIRECTLY TO THE NORTH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University
Brunswick
GROSVENOR ST.
OXFORD RD.
PORTSMITH STREET
WILMSLOW RD.
A34
B5117
Aquatics Cen.
Business Sch.
Medical Sch.
Laboratory
St. Ignatius Prim. Sch.
Apollo Theatre
Medlock Prim. Sch.
Ardwick Grn. Pk.
The Victoria University of Manchester
Univ. Mus.
Spts. Cen.
High Sch.
Trinity C. of E.
DENTAL HOSP.
COUPLAND ST. EAST
BRIDGEFORD ST.
BURLINGTON ST. E.
BOOTH ST. E.
WILTON ST.
BRUNSWICK ST.
ACKERS ST.
DOVER PL.
GRAFTON ST.
DEVAS ST.
LIME GRO.
CLIFFORD ST.
YORK ST.
TUER ST.
OLIVER ST.
HOPTON CT.
CAMELFORD CL.
COOPER RD.
HIGHER CHATHAM ST.
CAVENDISH ST.
OXFORD ST.
BOUNDARY ST. W.
ROSAMOND ST.
HILL COURT
INCHLEY RD.
KINCARDINE
ENHAM CT.
FRNCS. S.
BOLTON ST.
ALLERTON WK.
GLENDARRY CL.
COPEMAN CL.
KIRKSTALL ROAD
ADDISON CL.
DRYDEN ST.
PLYMTN. CL.
WATKIN CL.
OREGON CL.
JESSEL CL.
ARDEEN CL.
CUNARD CL.
CADUM WK.
EASTCOURT WK.
EASTPARK CL.
POLYGON AV.
WILSON ST.
BEAMISH CL.
BRAMWELL CL.
TRISTAN CL.
STAVERTON CL.
SETHAM WK.
BALSAM CL.
CORAL ST.
HAMSEL R.
HAVMANS WK.
HAVMT. CL.
POSTBRIDGE CL.
DILSTON CL.
BECKHAMPTON CL.
BRYAN CL.
HYDE PL.
HYDE GRO.
APSLEY GRO.
MARSHALL ST.
DOLPHIN ST.
DOLPHIN PL.
PALFREY ST.
HARKNESS ST.
SIDNEY ST.
PRECINCT CEN.
Coll.
Sch.
Mus.
Univ.
Spts.
Cen.
Grd.
Sq.
Pl.
Ct.
Cl.
Wk.
Gro.
Av.
Rd.
Gr.
Pk.
Thg.
Mos.
Prim.
Sch.
Hosp.
Enterprise
Laboratory
Theatre
Apollo
Ardwick
Medlock
Aquatics
Manchester
Victoria
Brunswick
Oxford
Grosvenor
Wilmslow
Princess
Parkway
Inner Ring Road
Mancunian Way
Pennine Way
Plymouth Grove
Wilbraham Road
Upper Brook Street
Oxford Road
Grosvenor Street
Wilmslow Road
Princess

REFERENCE OF TERMS

CH	The UHF Channel allocation from the transmitter.
MUX	The digital multiplexer allocation/operator.
dBμv	Carrier strength reading (decibel millavolt).
BER	Bit Error Rate, a measure of digital demodulation or decoding accuracy.
CSI	Level of carrier signal to interference.
NGR	National Grid Reference.
ALT	Altitude above sea level at the location.
BRG	Bearing from North.
GPS	Global Positioning System.
Tx	Transmitter.

OFCOM REPORT