TAYLOR Electronic Systems Engineers

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

Taylor Bros. Installations (Bolton) Ltd
Taylor Building
247 Crompton Way
Bolton BL2 2RY
Tel: 01204 380 726
Fax: 01204 380 724
Email: taylors@taylorbros-uk.com

TV Reception Survey Report

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

2 Hardman Boulevard Investments Ltd
18-20 Bridge Street
Manchester
M3 3BZ

PROPOSED DEVELOPMENT:

2 Hardman Boulevard
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: 4th September 2013

Survey Reference Number: 9826

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INTRODUCTION

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

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

The desk top study is carried out using plans of the proposed development 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. Test results and information are recorded at each of the 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, e.g., 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 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

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: 2 Hardman Boulevard
Manchester

DETAILS

Proposed development's height: 9 storey – approximately 38.3 m

Number of buildings: 1 (one)

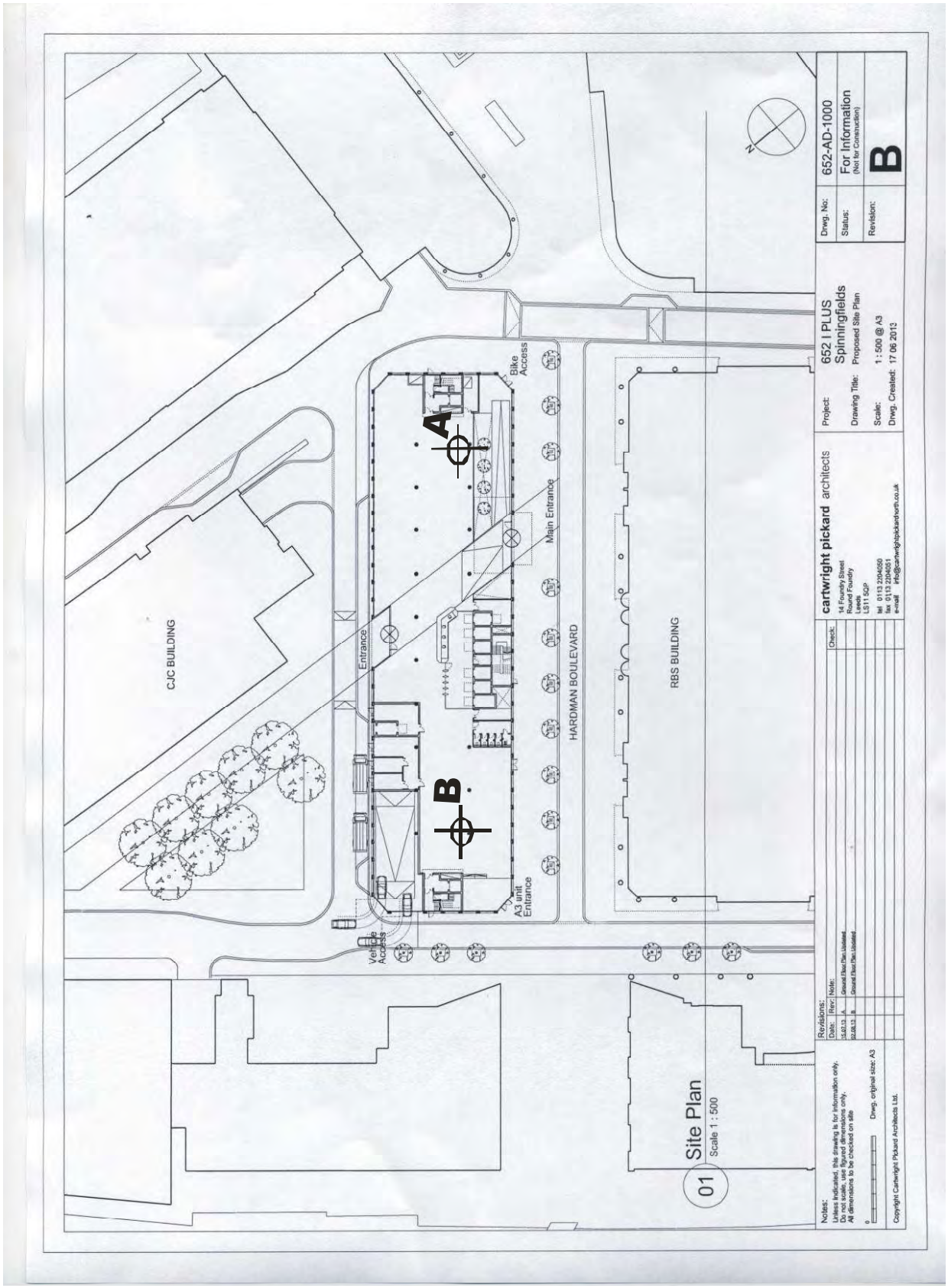
Please refer to Plan A, for the proposed developments location and Plan B, for the proposed developments elevation.

COORDINATES

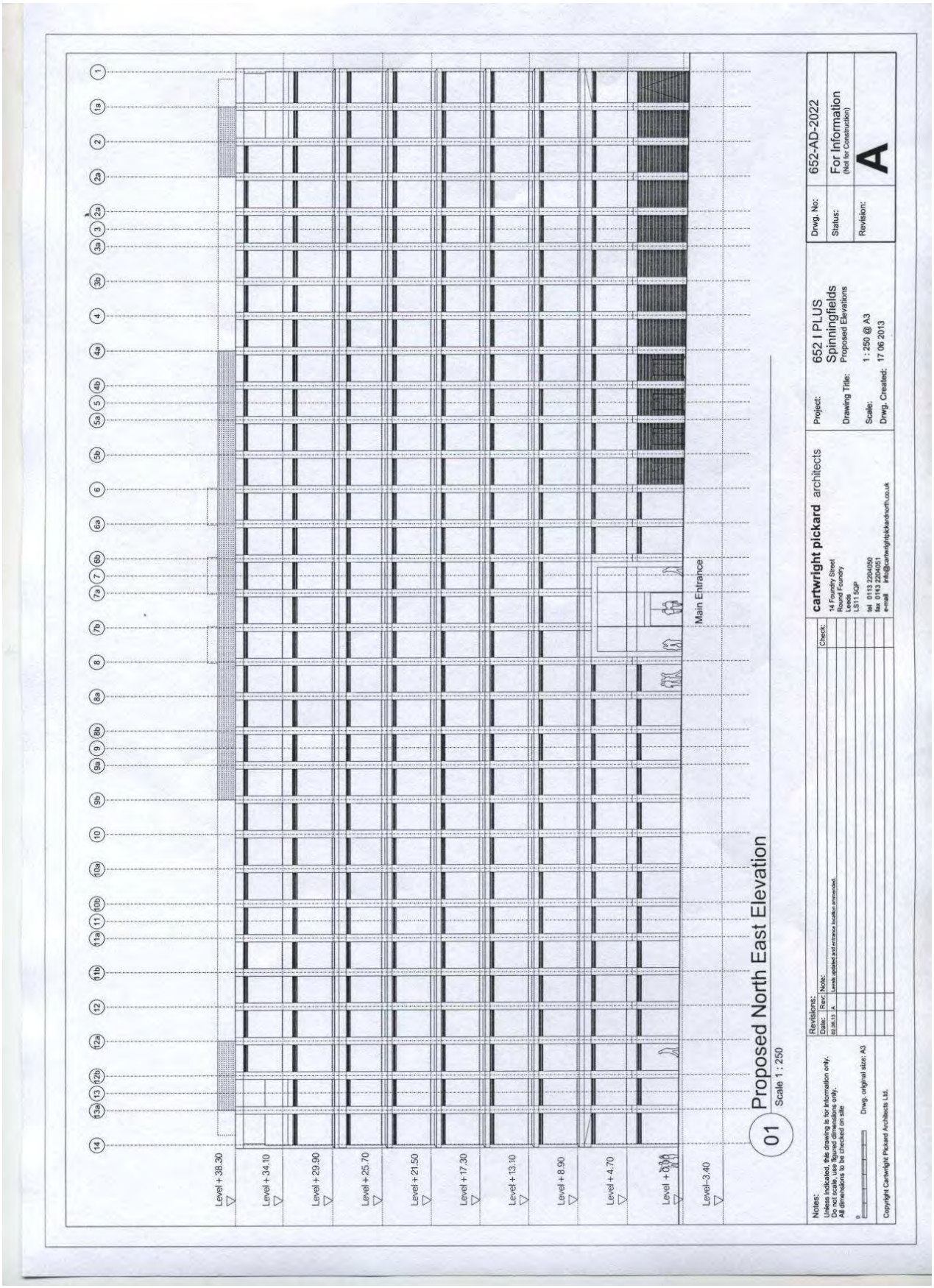
Prior to commencement of the survey, coordinates at the proposed development's location are entered into a GPS receiver, along with the coordinates for the television transmitters serving the area. This enables us to record a bearing and distance from each test point location to the proposed development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

The coordinates used for the proposed development are shown below and highlighted on Plan A.

POSITION	NGR
A	SJ 83298 98195
B	SJ 83275 98263


CJC BUILDING
Entrance
Bike Access
Main Entrance
A3 unit Entrance
Vehicle Access
HARDMAN BOULEVARD
RBS BUILDING
A
B
01
Site Plan
Scale 1 : 500
cartwright pickard architects
14 Foundry Street
Round Foundry
Leeds
LS11 5QP
tel 0113 2204050
fax 0113 2204051
e-mail info@cartwrightpickardnorth.co.uk
Project: 652 I PLUS Spinningfields
Drawing Title: Proposed Site Plan
Scale: 1 : 500 @ A3
Drwg. Created: 17 06 2013
Drwg. No: 652-AD-1000
Status: For Information (Not for Construction)
Revision: B
Notes:
Unless indicated, this drawing is for information only.
Do not scale, use figured dimensions only.
All dimensions to be checked on site
Drwg. original size: A3
Copyright Cartwright Pickard Architects Ltd.
Revisions:
Date: Rev: Note:
15.07.13 A Ground Floor Plan Updated
02.08.13 B Ground Floor Plan Updated
Check:

PLAN A


Level + 38.30
Level + 34.10
Level + 29.90
Level + 25.70
Level + 21.50
Level + 17.30
Level + 13.10
Level + 8.90
Level + 4.70
Level + 0.50
Level -3.40
Main Entrance
01 Proposed North East Elevation
Scale 1 : 250
Notes:
Unless indicated, this drawing is for information only.
Do not scale, use figured dimensions only.
All dimensions to be checked on site
Revisions:
Date: Rev.: Note:
02.09.13 A Levels updated and entrance location corrected.
Check:
cartwright pickard architects
14 Foundry Street
Round Foundry
Leeds
LS11 5QP
tel 0113 2204050
fax 0113 2204051
e-mail info@cartwrightpickardnorth.co.uk
Project: 652 I PLUS
Spinningfields
Drawing Title: Proposed Elevations
Scale: 1 : 250 @ A3
Drwg. Created: 17 06 2013
Drwg. No: 652-AD-2022
Status: For Information
(Not for Construction)
Revision: A
Drwg. original size: A3
Copyright Cartwright Pickard Architects Ltd.

PLAN B

TELEVISION TRANSMITTER SERVING THE AREA

WINTER HILL TRANSMITTER

TRANSMITTER NO:	103.00
NGR:-	SD 660144
APPROXIMATE BEARING FROM THE DEVELOPMENT:	313°
APPROXIMATE DISTANCE FROM THE DEVELOPMENT:	23.39 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).

UHFCHANNEL	MULTIPLEXER	FREQUENCY
49	ARQA	698.00
50	BBCA	706.00
54	BBCB	738.00
55	ARQB	746.00
58	SDN	770.00
59	D3+4	778.00

TEST POINTS

TEST POINT 1

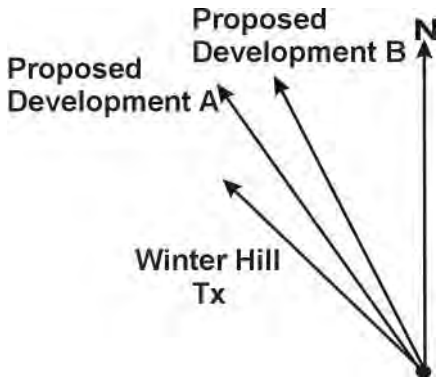
TEST POINT LOCATION 1
Byrom Street

NGR:	SJ 83348 98120
Alt:	30 m
Mast Height:	10 m
Existing Aerial Arrays:	High gain aerial on a 3 m mast, mounted at rooftop height, on the Opera House roof, directed towards the Winter Hill transmitter.
Existing Obstructions:	Various multi storey buildings in the direction of the Winter Hill transmitter.

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-16	-4	37%	Fail
50	706.00	BBCA	-17	-5	33%	Marginal
54	738.00	BBCB	-17	-	-	-
55	746.00	ARQB	-19	-2	44%	Fail
58	770.00	SDN	-17	-6	32%	Pass
59	778.00	D3+4	-17	-7	32%	Pass



Location	BRG	Distance
Winter Hill Transmitter	313°	23.80 km
Proposed Development A	325°	0.09 km
Proposed Development B	333°	0.16 km



PHOTOGRAPH 1: VISIBLE TV AERIAL LOCATED IN THE AREA OF TEST POINT 1

TEST POINT 2

TEST POINT LOCATION 2
Hardman Street

NGR: SJ 83475 98157

Alt: 31 m

Mast Height: 10 m

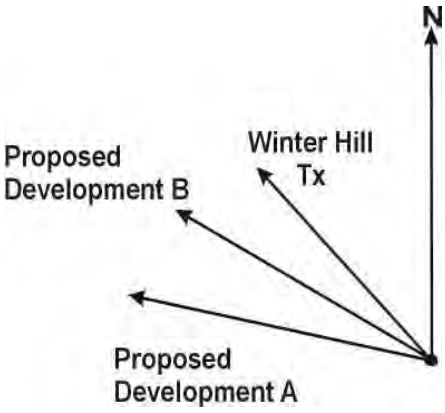
Existing Aerial Arrays: The buildings in this area are commercial, ranging in height from 4 to 9 storey, with no visible TV aerials from the ground.

Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill transmitter and within close proximity to the test point location.

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-21	-3	36%	Fail
50	706.00	BBCA	-19	-3	45%	Fail
54	738.00	BBCB	-18	-	-	-
55	746.00	ARQB	-19	-3	43%	Fail
58	770.00	SDN	-20	-3	37%	Fail
59	778.00	D3+4	-20	-4	37%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	23.86 km
Proposed Development A	281°	0.18 km
Proposed Development B	297°	0.22 km

TEST POINT 3

TEST POINT LOCATION 3
Junction of Jerusalem Street & Bootle Street

NGR: SJ 83619 98008

Alt: 32 m

Mast Height: 10 m

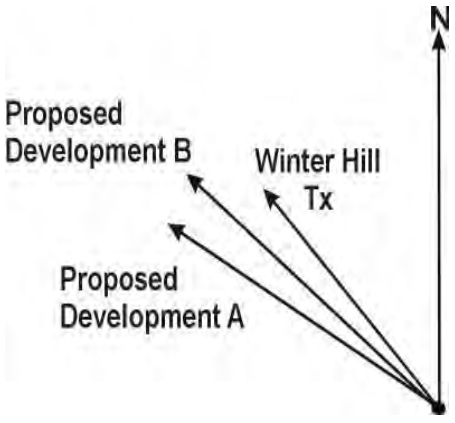
Existing Aerial Arrays: High gain aerial on a 3 m mast, mounted at gutter height, on a 2 storey building, directed towards a 'bounce' signal.

Existing Obstructions: Various multi storey buildings within close proximity to the test point location and in the direction of the Winter Hill transmitter.

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-18	-7	29%	Pass
50	706.00	BBCA	-19	-5	40%	Marginal
54	738.00	BBCB	-25	-	-	-
55	746.00	ARQB	-22	-3	41%	Fail
58	770.00	SDN	-19	-5	37%	Marginal
59	778.00	D3+4	-22	-3	42%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	24.07 km
Proposed Development A	300°	0.37 km
Proposed Development B	306°	0.43 km



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

TEST POINT 4

TEST POINT LOCATION 4
Bootle Street

NGR: SJ 83698 97968

Alt: 36 m

Mast Height: 10 m

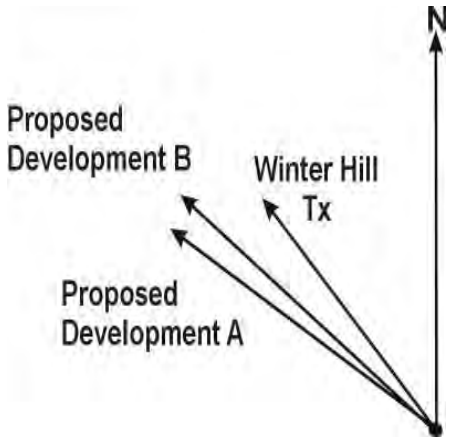
Existing Aerial Arrays: 10 element, 18 element and high gain aerials on 2 m and 4 m masts, mounted at rooftop height on 2, 3 and 4 storey buildings, directed towards the Winter Hill transmitter.

Existing Obstructions: Various multi storey buildings in the direction of the Winter Hill transmitter and in close proximity to the test point location.

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-20	-4	36%	Marginal
50	706.00	BBCA	-20	-5	35%	Marginal
54	738.00	BBCB	-18	-	-	-
55	746.00	ARQB	-22	-3	37%	Fail
58	770.00	SDN	-18	-7	26%	Pass
59	778.00	D3+4	-17	-7	25%	Pass



Location	BRG	Distance
Winter Hill Transmitter	313°	24.16 km
Proposed Development A	298°	0.46 km
Proposed Development B	304°	0.52 km



PHOTOGRAPH 3: TYPICAL TYPE OF TV AERIAL LOCATED IN THE AREA OF TEST POINT 4

TEST POINT 5

TEST POINT LOCATION 5
Jacksons Row

NGR: SJ 83650 98025

Alt: 35 m

Mast Height: 10 m

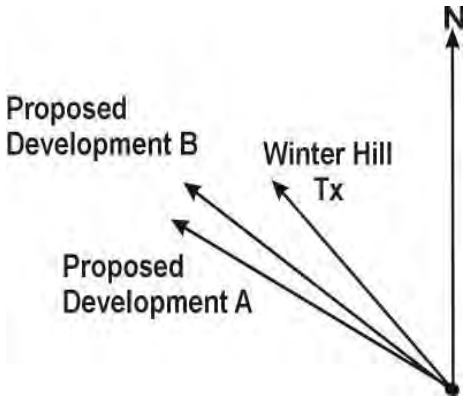
Existing Aerial Arrays: 10 element, 18 element and high gain aerials on 2 m and 3 m masts, mounted at rooftop height on 3, 4 and 6 storey buildings, directed towards the Winter Hill transmitter.

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

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-25	-1	48%	Fail
50	706.00	BBCA	-27	-2	49%	Fail
54	738.00	BBCB	-29	-	-	-
55	746.00	ARQB	-27	-1	49%	Fail
58	770.00	SDN	-30	-1	51%	Fail
59	778.00	D3+4	-27	-2	50%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	24.09 km
Proposed Development A	296°	0.39 km
Proposed Development B	303°	0.44 km



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

TEST POINT 6

TEST POINT LOCATION 6
Quay Street

NGR: SJ 83340 98060

Alt: 30 m

Mast Height: 10 m

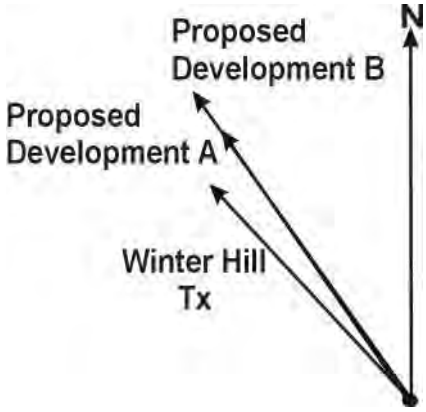
Existing Aerial Arrays: 10 element and high gain aerials on 2 m and 3 m masts, mounted at rooftop height on 3 and 4 storey buildings, directed towards the Winter Hill transmitter.

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

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-14	-7	25%	Pass
50	706.00	BBCA	-16	-5	27%	Marginal
54	738.00	BBCB	-10	-	-	-
55	746.00	ARQB	-14	-7	25%	Pass
58	770.00	SDN	-18	-5	29%	Marginal
59	778.00	D3+4	-10	-7	21%	Pass



Location	BRG	Distance
Winter Hill Transmitter	313°	23.84 km
Proposed Development A	341°	0.14 km
Proposed Development B	341°	0.21 km



PHOTOGRAPH 5: VISIBLE TV AERIAL LOCATED IN THE AREA OF TEST POINT 6

TEST POINT 7

TEST POINT LOCATION 7
Junction of Artillery Street & Byrom Street

NGR: SJ 83367 97985

Alt: 31 m

Mast Height: 10 m

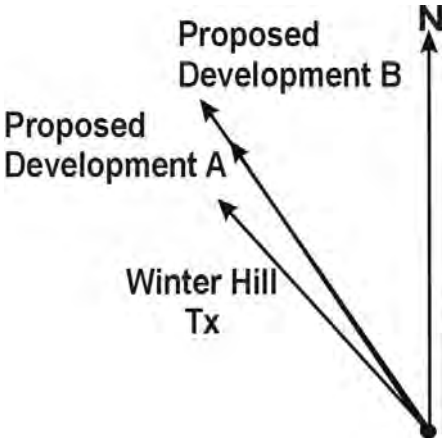
Existing Aerial Arrays: High gain aerials on 2 m masts mounted at rooftop height on 3, 4 and 6 storey buildings, directed towards the Winter Hill transmitter.

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

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-25	-1	53%	Fail
50	706.00	BBCA	-26	-1	57%	Fail
54	738.00	BBCB	-26	-	-	-
55	746.00	ARQB	-25	-1	56%	Fail
58	770.00	SDN	-28	-1	56%	Fail
59	778.00	D3+4	-28	-2	53%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	23.90 km
Proposed Development A	341°	0.22 km
Proposed Development B	341°	0.29 km



PHOTOGRAPH 6: VISIBLE TV AERIAL LOCATED IN THE AREA OF TEST POINT 7

TEST POINT 8

TEST POINT LOCATION 8
Camp Street

NGR: SJ 83454 97857

Alt: 34 m

Mast Height: 10 m

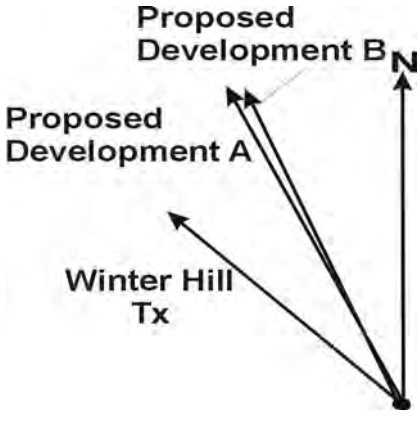
Existing Aerial Arrays: High gain aerials on 2 m and 3 m masts mounted at rooftop height on 3 and 4 storey buildings, directed towards the Winter Hill transmitter.

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

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-14	-7	25%	Pass
50	706.00	BBCA	-19	-7	30%	Pass
54	738.00	BBCB	-18	-	-	-
55	746.00	ARQB	-21	-3	43%	Fail
58	770.00	SDN	-23	-2	40%	Fail
59	778.00	D3+4	-25	-2	52%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	23.95 km
Proposed Development A	334°	0.37 km
Proposed Development B	335°	0.44 km



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

TEST POINT 9

TEST POINT LOCATION 9
St John Street

NGR: SJ 83425 97929

Alt: 33 m

Mast Height: 10 m

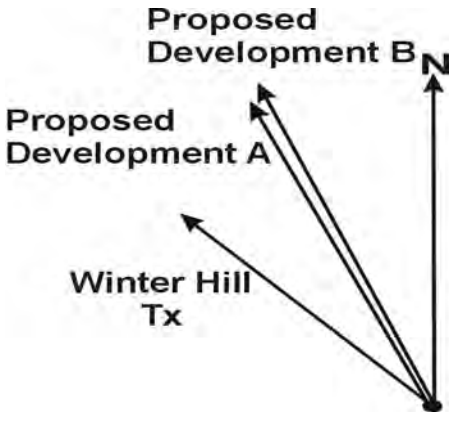
Existing Aerial Arrays: 10 element, 18 element and high gain aerials on 2 m, 3 m and 4 m masts, mounted at rooftop height on 3 storey buildings, directed towards the Winter Hill transmitter.

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

REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-26	-1	49%	Fail
50	706.00	BBCA	-26	-3	44%	Fail
54	738.00	BBCB	-27	-	-	-
55	746.00	ARQB	-32	-1	59%	Fail
58	770.00	SDN	-30	-1	57%	Fail
59	778.00	D3+4	-30	-1	54%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	23.99 km
Proposed Development A	334°	0.30 km
Proposed Development B	336°	0.37 km



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

TEST POINT 10

TEST POINT LOCATION 10
Peter Street

NGR: SJ 83640 97968

Alt: 36 m

Mast Height: 10 m

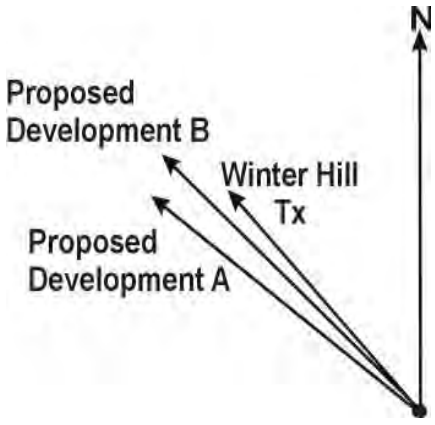
Existing Aerial Arrays: High gain aerial on a 4 m mast, c/w masthead amplification, mounted at rooftop height on a 3 storey building, directed towards the Winter Hill transmitter.

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

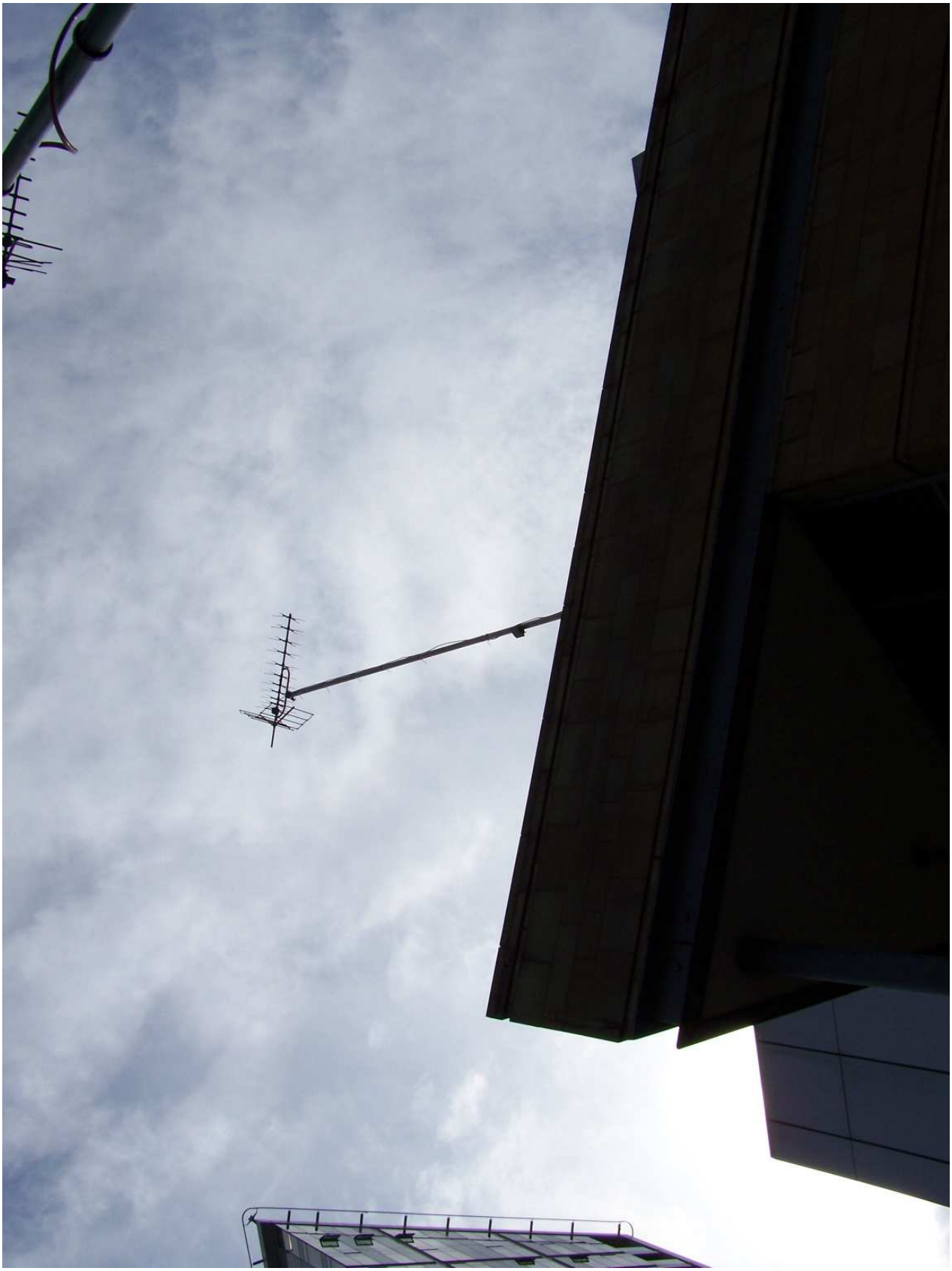
REPORT

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

Channel	Frequency	MUX	Level (dBμv)	BER	CSI	Quality
49	698.00	ARQA	-23	-3	41%	Fail
50	706.00	BBCA	-26	-2	52%	Fail
54	738.00	BBCB	-20	-	-	-
55	746.00	ARQB	-20	-5	28%	Marginal
58	770.00	SDN	-23	-3	40%	Fail
59	778.00	D3+4	-26	-2	47%	Fail



Location	BRG	Distance
Winter Hill Transmitter	313°	24.12 km
Proposed Development A	303°	0.41 km
Proposed Development B	309°	0.47 km



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

TEST POINT 11

TEST POINT LOCATION 11
Gartside Street

NGR: SJ 83322 98143

Alt: 29 m

Mast Height: 10 m

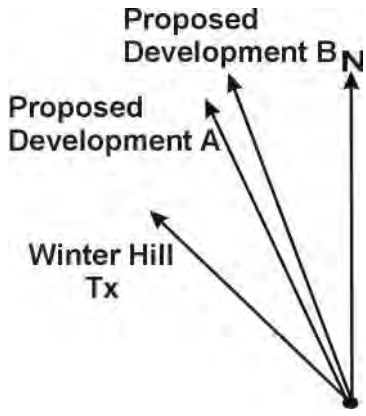
Existing Aerial Arrays: High gain aerial on a 4 m mast, c/w masthead amplification, mounted at rooftop height on buildings identified in photographs 10 & 11, directed towards the Winter Hill transmitter.

Existing Obstructions: Various multi storey buildings within close proximity to the test point location and in the general direction of the Winter Hill transmitter.

REPORT

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

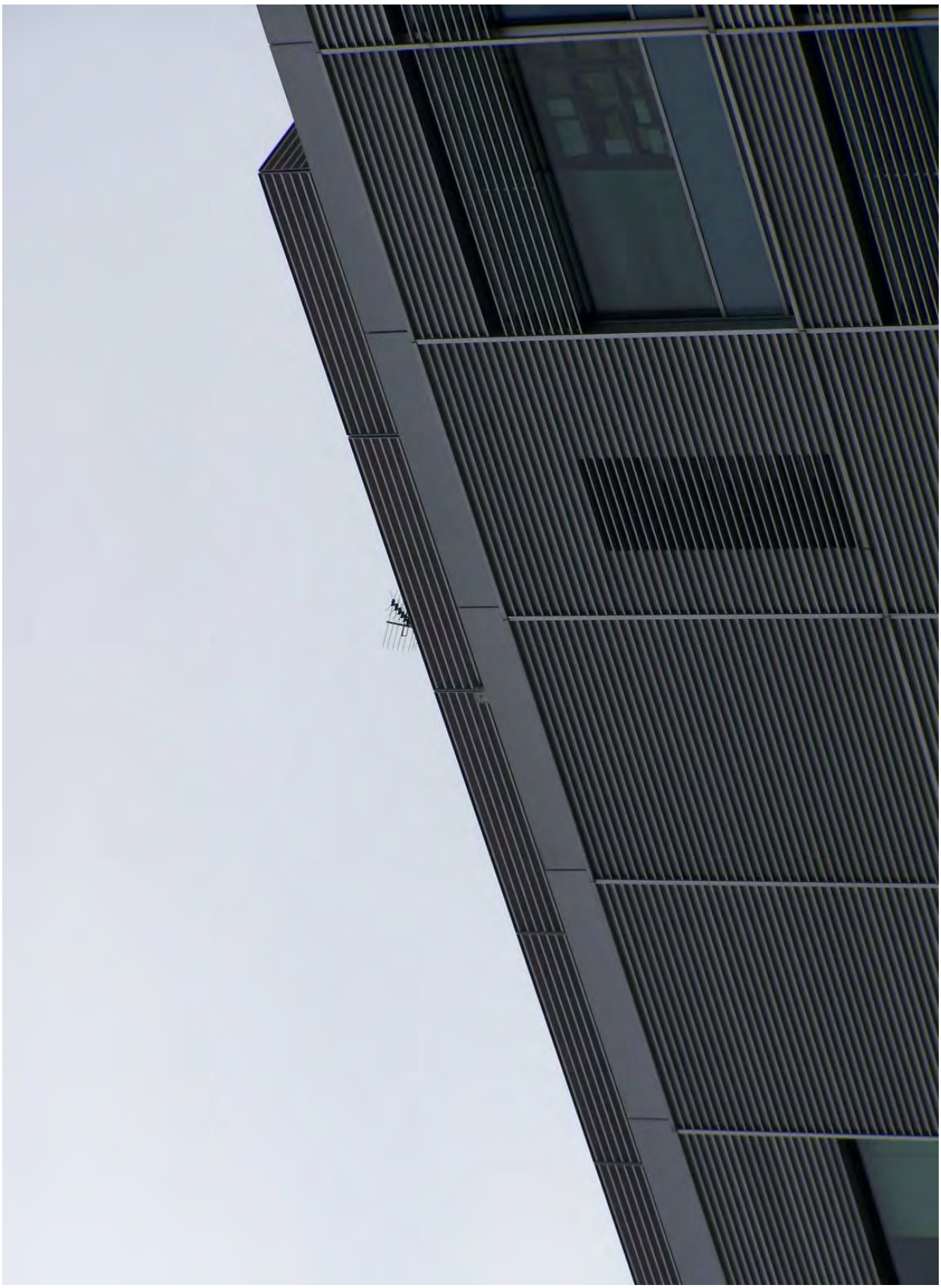
Channel	Frequency	MUX	Level (dBμV)	BER	CSI	Quality
49	698.00	ARQA	-15	-5	32%	Marginal
50	706.00	BBCA	-12	-7	28%	Pass
54	738.00	BBCB	-10	-	-	-
55	746.00	ARQB	-15	-6	28%	Pass
58	770.00	SDN	-14	-7	27%	Pass
59	778.00	D3+4	-14	-7	25%	Pass



Location	BRG	Distance
Winter Hill Transmitter	313°	24.12 km
Proposed Development A	334°	0.05 km
Proposed Development B	339°	0.13 km



PHOTOGRAPH 10: VISIBLE TV AERIALS LOCATED IN THE AREA OF TEST POINT 11



PHOTOGRAPH 11: VISIBLE TV AERIALS LOCATED IN THE AREA OF TEST POINT 11

SUMMARY & CONCLUSIONS

SUMMARY

THE PROPOSED DEVELOPMENT

The proposed development is to be located at 2 Hardman Boulevard, Manchester, and will consist of one, nine storey building (approximately 38.3m) which will run the entire length of Hardman Boulevard, opposite the existing RBS building.

At the time of surveying there was no existing building at the proposed developments location.

A series of photographs have been taken to highlight the proposed development's location and existing building within close proximity.

Photograph A: The proposed developments location.

Photograph B: Existing buildings directly to the north of the proposed development.

Photograph C: Existing buildings directly to the west of the proposed development.

Photograph D: Existing buildings directly to the south of the proposed development.

Photograph E: Existing buildings directly to the east of the proposed development.

TELEVISION RECEPTION

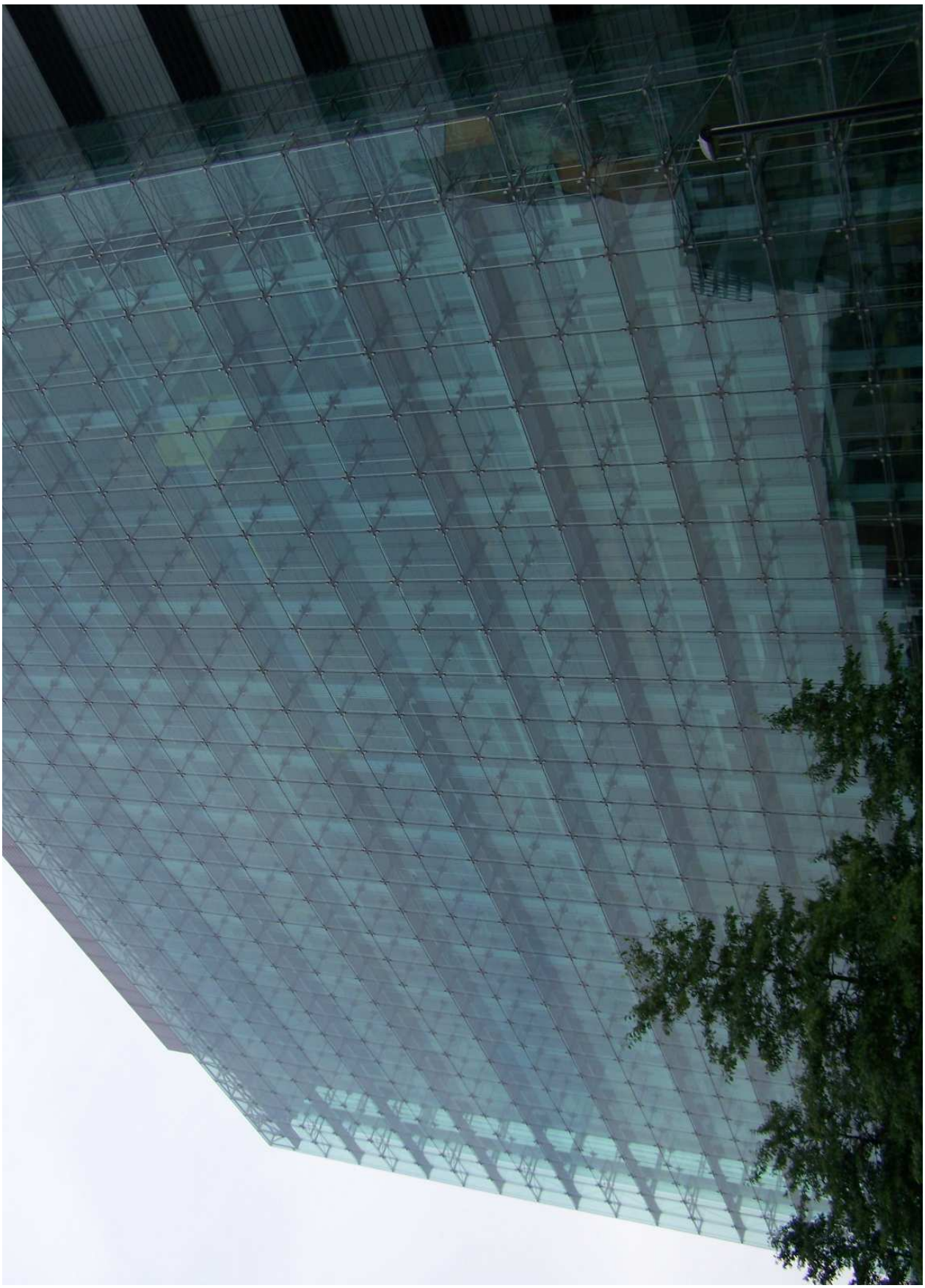
Viewers in the surrounding area to the proposed development are receiving their television signals from the Winter Hill transmitter located to the northwest.

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

During the survey tests were carried out to receive an alternative 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 or strength.



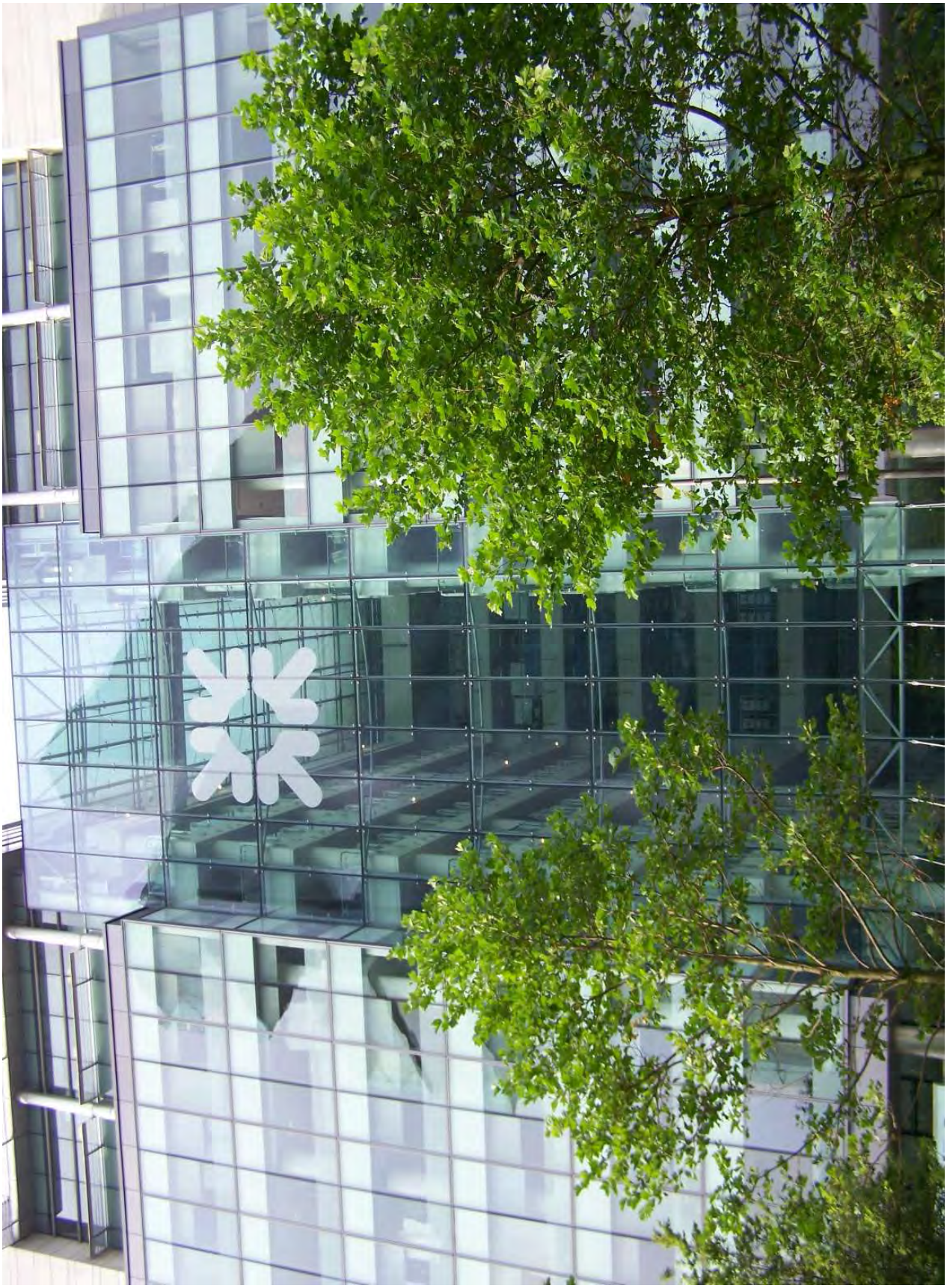
PHOTOGRAPH A: THE PROPOSED DEVELOPMENTS LOCATION.



PHOTOGRAPH B: EXISTING BUILDINGS DIRECTLY TO THE NORTH.



PHOTOGRAPH C: EXISTING BUILDINGS DIRECTLY TO THE WEST.



PHOTOGRAPH D: EXISTING BUILDINGS DIRECTLY TO THE SOUTH.



PHOTOGRAPH E: EXISTING BUILDINGS DIRECTLY TO THE EAST.

CONCLUSIONS

The proposed development, 2 Hardman Boulevard is to consist of one building which will be nine storey *(including ground floor)* and will run the entire length of Hardman Boulevard. At the time of surveying there was no existing building at the proposed developments location subsequently the introduction of the proposed development will change the existing skyline which can result in an impact to television reception.

By taking into account the proposed development's location and elevation, the existing viewers' television aerial beampath *(direction)* to the television transmitter, and the results and information recorded during the survey, we are able to assess where or if the introduction of the proposed development has the potential to impact upon television reception, this potential impact zone is shown on Map 1.

Even though the proposed 2 Hardman Boulevard is a large development the potential impact zone is relatively small. This is due to the existing buildings, which are within close proximity, being of a similar or greater in height than the proposed development and will shadow the proposed development from the surrounding area.

However the potential impact zone does cover a number of commercial buildings of which two have visible television aerials from the ground. These aerials are highlighted within the report at test point 11 and are shown on photographs 10 and 11.

Due to these aerials being sited on large commercial properties we would envisage that if reception is affected that rectifying it should not prove to problematic, please refer to possible remedies.

Directly to the west of the proposed developments locations is a large residential property highlighted on photograph C. Due to the height of this building, the direction to the winter hill transmitter and the direction to the Astra 28.2° satellite (Sky TV and Freesat) we do not envisage any reception issues due to the introduction of 2 Hardman Boulevard.

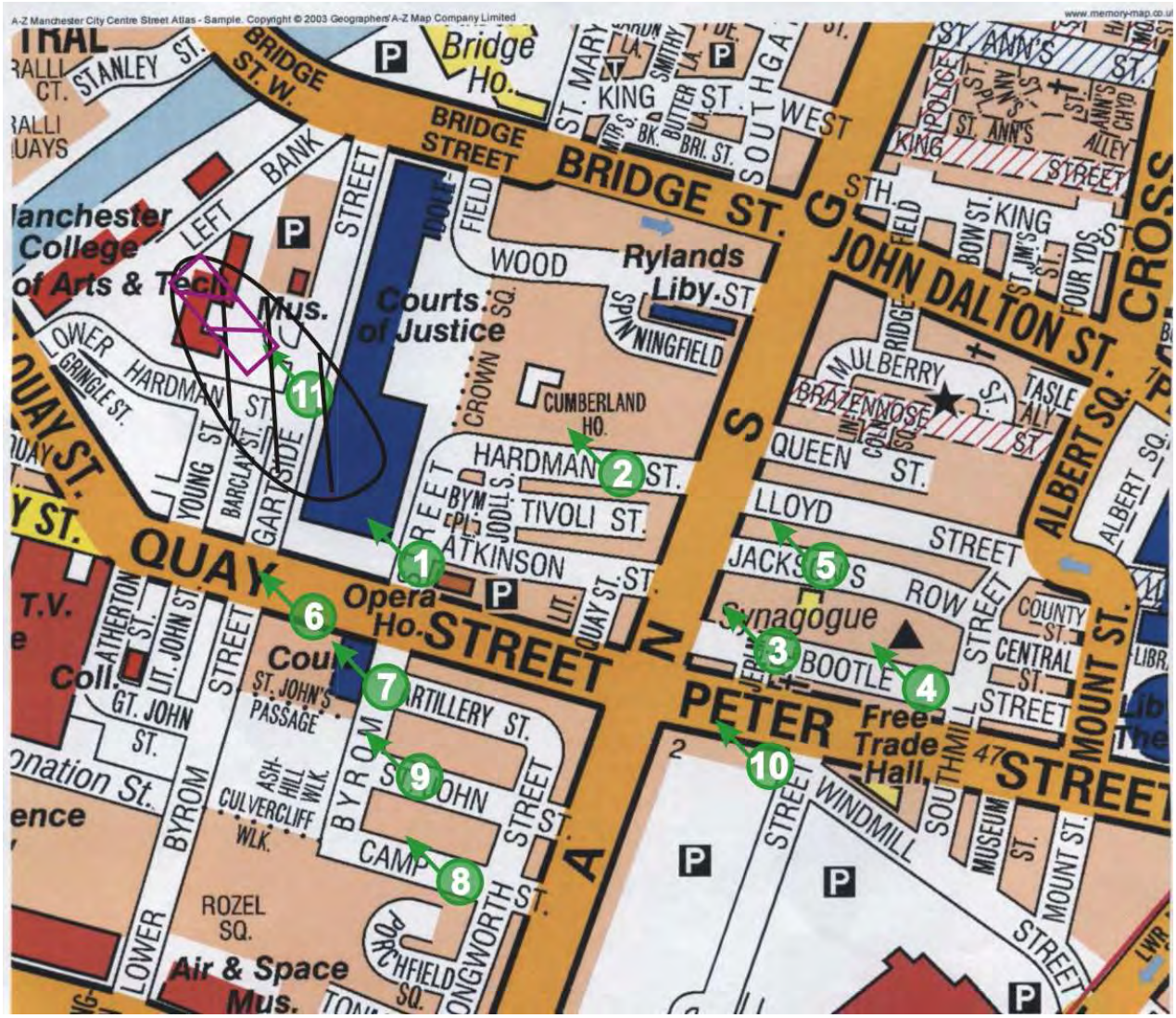
If tower cranes are used on site these could cause interference on a greater scale than the completed development. This interference would be for the duration of time that the tower cranes are present.



Signed:…… Dated: 12 September 2013

K BODEN

MAP 1: POTENTIAL IMPACT ZONE



KEY

Location of proposed development

Potential impact zone

Test point location showing local television aerial direction

POSSIBLE REMEDIAL MEASURES

1. REMEDIAL AERIAL WORK

   One or all of the following may help reduce impairments being received.

   (i) Change of Aerial Type:- Different types of aerials receive their signals in different ways and selection an aerial most suited for the interference being received may be required.

   (ii) Change of Aerial Height:- In some cases increasing or decreasing the aerial height can reduce interference being received.

   (iii) Relocation of the Aerial:- Moving the aerial to a position on the property where it is less prone to the interference.

2. SATELLITE TELEVISION

   When terrestrial telelvision signals cannot be received at an acceptable quality and strength the installation of a satellite dish and set top box utilising one of the Freesat platforms may be required.

REFERENCE OF TERMS

CH	The UHF Channel allocation from the transmitter.
MUX	The digital multiplexer allocation/operator.
dBμv	Carrier strength reading (decibel microvolt).
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