

Telecommunications Connectivity

Fixed Network and Mobile Coverage Assessment

Apex Tower
Grafton Road
New Malden
KT3 4LH



FIXED NETWORK SERVICES

BUILDING ENTRIES	
DUCT ENTRIES	YES – 2No.
LOCATION	BASEMENT FRAME ROOM
SECURITY	EXCELLENT
OWNERSHIP	BT
DIVERSITY AVAILABLE	NO
STATUS (CAPACITY)	SPARE CAPACITY AVAILABLE

CARRIERS	
BT OPENREACH	IN BUILDING
VIRGIN MEDIA	OUTSIDE BUILDING
LEVEL 3	OUTSIDE BUILDING
VODAFONE	OPPOSITE BUILDING

SERVICES	
BT OPENREACH	COPPER + FIBRE SERVICES – BASEMENT FRAME ROOM AND RISERS ADSL BROADBAND AT 10-19Mbps - EXCHANGE LINE ONLY

ADDITIONAL SERVICES	
LANDLORD	N/A
OTHERS	N/A

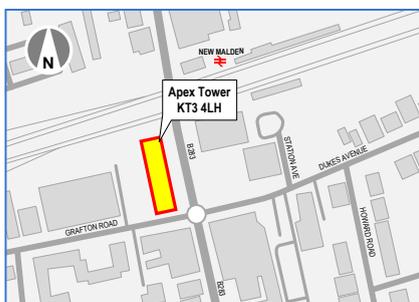
BUILDING DISTRIBUTION	
RESILIENCE	SECURE INTAKE LOCATIONS – BASEMENT FRAME ROOM
RISERS	SECURE RISER AVAILABLE – RESTRICTED ACCESS
SECURITY	GOOD SECURITY THROUGHOUT, INTAKE POSITION IN RESTRICTED ACCESS AREA.
TENANT FLOOR SPACE	GOOD CONNECTIVITY/EASE OF INSTALL FROM RISERS VIA RAISED FLOORS / CEILINGS

MOBILE NETWORK SERVICES

OPERATOR SERVICES	THREE, VODAFONE, O2, EE - 2G, 3G, 4G (THREE - 3G/4G ONLY)
COVERAGE SUMMARY	GOOD/VARIABLE COVERAGE ACROSS ALL OPERATORS, POTENTIAL DEGRADATION OF SERVICES ACROSS BASEMENT AND IN LIFTS
BUILDING SOLUTIONS	NO COVERAGE SOLUTIONS IN PLACE AT THIS TIME



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Fixed Network Services

BT Services	Excellent
Other Carriers	Good
Building Distribution	Good

Mobile Network Services

Operator	Voice	Data
Three	Good	Good
Vodafone	Good	Good
O2	Good	Good
EE	Good	Good

STRUCTURE

Apex Tower is an established office building located in the centre of New Malden. The building extends to ground floor reception and retail space with fifteen upper floors plus basement plant rooms. The building currently has available floors of up to approximately 6,540 sq ft (607 sqm) affording high quality accommodation with raised floors and suspended ceilings. Apex Tower is of typical frame construction with a mixture of clad and glazed facades to all elevations, and sits within an environment of other commercial and residential properties of varying height in all directions with good separation between adjacent buildings.

TOPOGRAPHY

Location Plan

BT Exchange locations

Routes and distances are indicative only

BT Exchange Information

Primary Exchange (400m approx)	MALDEN (LSMAL) KT3 4QN
Secondary Exchange (4,200m approx)	WIMBLEDON (LSWIM) SW19 4SR

BT SUMMARY

Apex Tower is located approximately 400m from the BT Malden Exchange, which is situated to the north of the building. This exchange provides excellent services including ADSL, ADSL+, SDSL, 21CN WBC and FTTC (to some areas) plus the availability of LLU services from Sky, Talk Talk and Vodafone all over BT infrastructure. Based on the existing standard copper services, the exchange can offer ADSL broadband speeds of around 10-19Mbps at this time. This exchange has been enabled to provide BT Infinity services over FTTC technology with speeds of up to 80Mbps download and 20Mbps upload. However, this building is noted as 'Exchange Only' and is not therefore connected to the local street cabinet and BT are currently 'exploring options' in respect of FTTC technology delivery but provides no timescales for deployment at this time (Data via the BT website). Wimbledon Exchange to the north east affords a similar range of services, and can provide a level of diversity and resilience across BT business services should it be required.

TELECOMS CARRIERS

Telecommunications carriers with owned infrastructure located adjacent to the building are listed below for information. In addition to these, there are a number of alternative carriers that can provide service, albeit over a third party network such as BT. It must be noted that the presence of infrastructure within the search area does not constitute availability of service.

British Telecom Tel: 0800 800 152 www.bt.com
Virgin Media Tel: 0800 953 0180 www.virginmedia.com
Level 3 Tel: 020 7954 5454 www.level3.com
Vodafone Tel: 020 7111 0047 www.vodafone.co.uk

SUMMARY

The BT copper and fibre services available at Malden Exchange, and added resilience of a second exchange afford Apex Tower an excellent/good level of services to meet today's business needs with the added advantage of potentially good diversity and resilience opportunities. The physical presence of alternative carriers infrastructure to BT from Virgin Media, Level 3 with Vodafone outside and in the local environs affords a good choice of alternative carrier to provide fibre services to any incoming tenant at this time albeit subject to new building entry requirements.

RATING	BT	OTHERS	
BT	4	1	None (No alternative carriers adjacent to site)
OTHERS	3	2	Fair (Carrier services in local environs)
	2	3	Good (Carrier services adjacent to building/site)
	3	4	Excellent (Carrier services in building/site)
	4		
		1	Low (Copper only)
		2	Fair (Copper internal / fibre in environs)
		3	Good (Copper internally / fibre externally)
		4	Excellent (Copper/fibre internally) with diversity

GLOSSARY OF TERMS

ADSL (Asymmetric Digital Subscriber Line) Asymmetric line speed, the speed from the internet to the user, and the user to the internet are different. Feed over copper cable, governed by distance from exchange to user. (co-exists with voice services)

ADSL+ (Asymmetric Digital Subscriber Line+) Asymmetric line speed as above, but with faster connections both downstream and upstream over similar distance following roll-out of BT's 21CN Wholesale Broadband Connect (WBC).

SDSL (Symmetric Digital Subscriber Line) Symmetric line speed, the speed between the user and the internet are the same in both directions but cannot co-exist with voice services over the same line.

FTTC (Fibre to the Cabinet) Provides fibre to the cabinet, shortening copper cable length requirements to enhance speed

FTTP (Fibre to the Premises) Provides fibre direct to the premises at a lower cost than that of standard lease line products

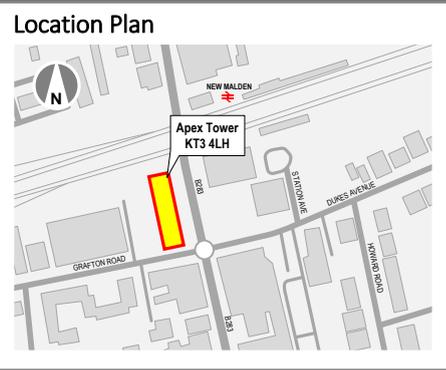
LLU (Local Loop Unbundling) Is the process by which third party network operators are able to install equipment into BT exchanges in order to deliver their own services without having to utilise BT's network.

BT Infinity (British Telecom) Fibre to the cabinet/premises delivered services from enabled exchanges providing broadband speeds of up to 80Mbps download (subject to conditions) at a lower cost to that of traditional leased fibre services.

STRUCTURE

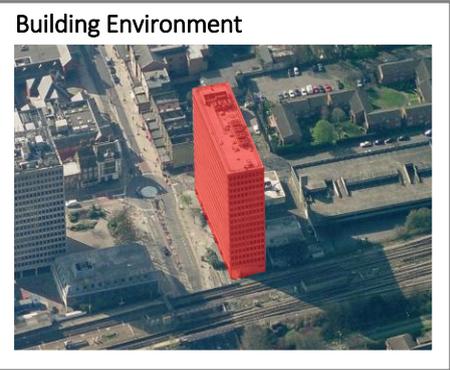
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TOPOGRAPHY

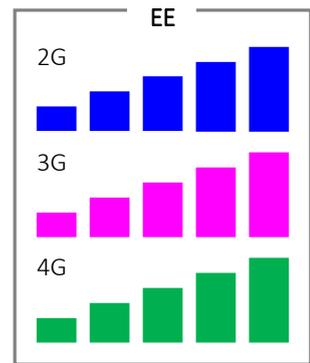
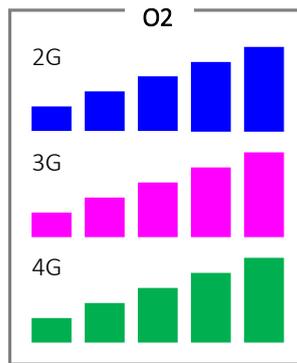
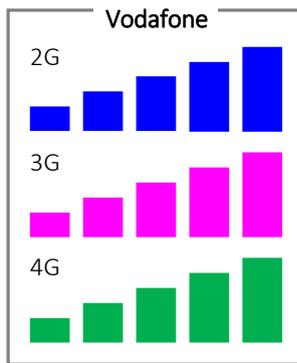
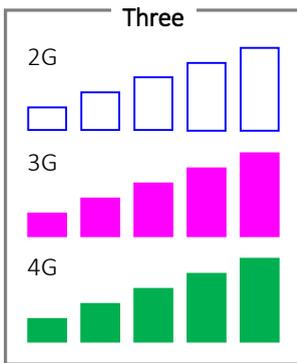


Building Observations

- Building sits in a commercial/residential property environment
- Adjacent buildings of varying height in all directions
- Building fabric consists of clad and glazed facades
- No noted mobile equipment located on roof top
- No noted in-building coverage solutions in place



STREET LEVEL COVERAGE



OBSERVATIONS

Following our review of the mobile operators coverage details it is clear that Apex Tower affords an excellent level of macro coverage from all operators for 2G, 3G and 4G services. Any high concentration of users within the building may impact on the capacity available especially if this is confined to any one single network operator. Based on this information it is considered to be a location that affords an excellent level of overall coverage across all operators at street level for 2G, 3G and 4G services.

COVERAGE KEY - Street Level

- No coverage at this location
- Limited external coverage, indoors unlikely
- External coverage variable with limited indoor capability
- External coverage most areas, variable indoor capability
- Good external coverage, indoor coverage in small buildings
- Excellent external coverage, good indoor coverage in most buildings

PREDICTIONS

Surrounding buildings, the distance and direction of the serving cells and building construction can all impact on the penetration of signal throughout a building. Based on the location and serving cells, it is envisaged that a good/variable level of coverage will be present throughout the building for 2G, 3G and 4G services with some potential degradation in the basement areas and in the lifts across all operators and technologies. In cases of coverage issues, each of the operators can provide solutions to enhance their service of which we can provide details and assist in their procurement and installation should they be required. This extends to full in-building coverage, or specific areas or floors by means of Femto Cell technology. Further to the coverage levels, the availability of service is dependant on capacity. This is the volume of data and simultaneous voice calls the macro cell can accommodate at any one time. Capacity issues result in 'network busy' messages or dropped calls. The level of capacity can be addressed by the operators should the building be populated with a high number of users on a single network which will impact on both them and others using the same cell.

INDOOR SUMMARY

OPERATOR	2G	3G	4G
Three	0	4	4
Vodafone	4	4	4
O2	4	4	4
EE	4	4	4

EE operates under both T-Mobile and Orange brands within the United Kingdom / Three operates a 3G/4G network only

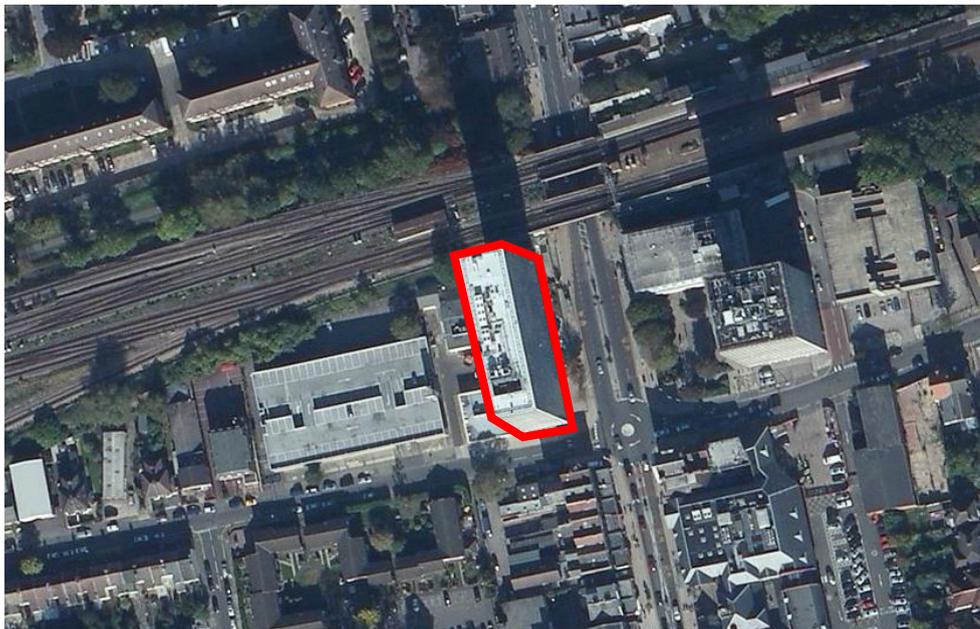
COVERAGE KEY - Indoor prediction

- 0 **NONE** (No indoor coverage at this location)
- 1 **POOR** (Indoor coverage unlikely)
- 2 **LOW** (Limited indoor coverage)
- 3 **FAIR** (Variable coverage in all buildings)
- 4 **GOOD** (Good to small buildings, variable in larger buildings)
- 5 **EXCELLENT** (Good coverage in most buildings and areas)

It should be noted that the location, building fabric / materials, surrounding environs impact on the ability of RF penetration and these predictions are for guidance only.

Fixed Telecoms Appraisal Summary

In addition to the Fixed Network carrier study completed, a review by survey of the building was undertaken on the 7th September 2018. The purpose of this survey was to clearly identify the presence of all fixed telecommunications carrier's infrastructure in the building, adjacent to or within the local environs.



SITE AERIAL VIEW (Building highlighted in red)



VIEW LOOKING NORTH ALONG THE B283



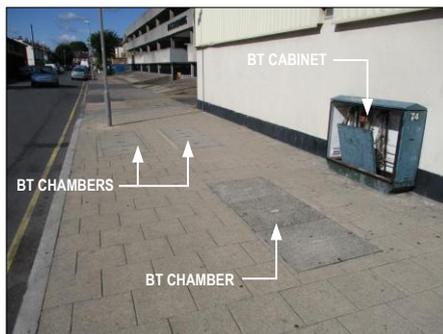
VIEW LOOKING EAST ALONG GRAFTON ROAD

Local Carriers

Apex Tower has telecommunications access from the east elevation from the B283 into the basement area. The survey located a good number of telecommunications chambers owned and operated by BT, Virgin Media, Level 3 and Vodafone outside and local to the building (See **Photographs 1 to 6**). The presence from BT is extensive in this area with noted cabinets, chambers and infrastructure running along Grafton Road and the B283 on both sides of the carriageway extending around the building on the southern and eastern elevations. The level of infrastructure from Virgin Media is also extensive in this area with infrastructure following a similar path to that of BT with a noted chambers adjacent to the building on the southern and eastern elevations, plus a connection 'tee' directly outside the entrance. It was also noted that an existing connection is in place on Grafton Road at footway level, with external cabling to the building. However, the destination of this could not be confirmed and is considered may be afforded to one of the ground floor retail units at this time. The Level 3 infrastructure is less comprehensive, albeit passing the building frontage with noted chambers in the footway. Vodafone's presence is similar to that of Level 3, albeit predominantly along the east side of the B283 with noted chambers in the footway. Access to the building would require extension across the B283 if required but is considered to be viable based on our initial inspection.



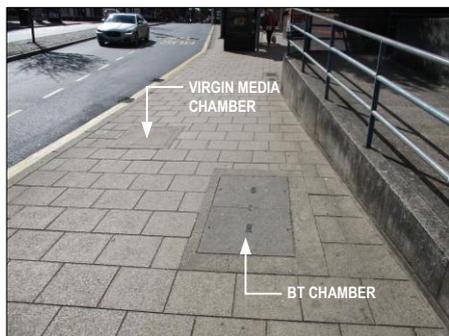
PHOTOGRAPH 1
EXISTING BT AND LEVEL 3 CHAMBERS IN FOOTWAY ON B283 OUTSIDE BUILDING ENTRANCE



PHOTOGRAPH 2
EXISTING BT CHAMBERS AND CABINET IN FOOTWAY ON GRAFTON ROAD TO SOUTH ELEVATION OF BUILDING



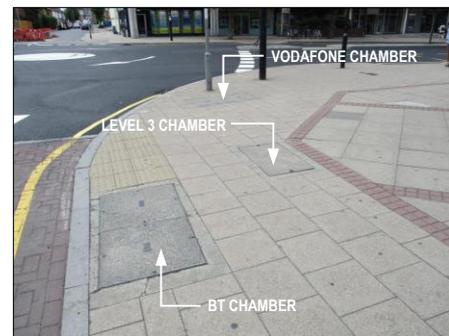
PHOTOGRAPH 3
EXISTING VIRGIN MEDIA CHAMBER IN FOOTWAY AT SOUTH EAST CORNER OF BUILDING



PHOTOGRAPH 4
EXISTING BT AND VIRGIN MEDIA CHAMBERS IN FOOTWAY ON B283 TO NORTH OF BUILDING



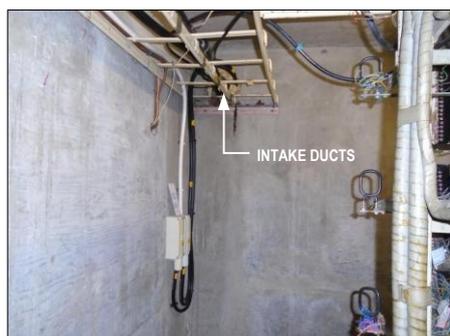
PHOTOGRAPH 5
EXISTING VIRGIN MEDIA CONNECTION TO BUILDING ON GRAFTON ROAD AT FOOTWAY LEVEL



PHOTOGRAPH 6
EXISTING BT, VODAFONE AND LEVEL 3 CHAMBERS IN FOOTWAY AT JUNCTION OF B283 WITH DUKES AVENUE

Building Presence

The telecommunications intake for the building is located within the BT frame in the basement area beneath the main entrance to the building. BT enter this location via 2No. 90mm diameter (approx) ducts providing access for their copper and fibre services (See **Photographs 7, 8 & 9**). The copper services are delivered over a number of incoming cables terminated in a distribution point (DP) on the wall plus an historic frame. Based on the incoming cable sizes we consider approximately 400 copper pairs are present, but this will be subject to confirmation from BT. The fibre services are delivered via 2No. incoming cables (multiple fibres/tubes) terminated in gas seals with outgoing blown fibre tubes to the riser. Based on the incoming cable sizes we conclude that a total of 8No. blown fibre tubes with a capacity of 4/12No. fibres per tube (32/96No. fibres total) are present at this time, albeit subject to confirmation from BT. All cabling exits the frame room running on high level containment to the building riser located within the adjacent plant room (See **Photographs 10, 11 & 12**). As detailed in the previous section, it is clear an existing service from Virgin Media is in place running externally from the footway up to first floor level. However, this is considered to potentially be serving one of the ground floor retail units at this time. No presence of such services were located elsewhere in the building on the accessible floors or riser. The location of the Virgin Media infrastructure and connection 'tee' to the front of the building is currently not utilised, but if connected would provide access for their services to all floors on a similar route to those of BT at this time. No other services from the highlighted carriers were identified in the building at the time of the inspection.



PHOTOGRAPH 7
EXISTING BT DUCT ENTRIES IN BASEMENT ON EASTERN ELEVATION OF BUILDING IN BT FRAME ROOM



PHOTOGRAPH 8
EXISTING BT COPPER DISTRIBUTION POINT ON WALL IN BT FRAME ROOM IN BASEMENT



PHOTOGRAPH 9
EXISTING INCOMING / OUTGOING FIBRE SERVICES AND GAS SEALS ADJACENT TO DUCT INTAKES IN BT FRAME ROOM



PHOTOGRAPH 10
EXISTING BT CABLING EXITING FRAME ROOM ON HIGH LEVEL CONTAINMENT TO BASEMENT CORRIDOR



PHOTOGRAPH 11
EXISTING BT COPPER AND FIBRE SERVICES ON HIGH LEVEL CONTAINMENT IN BASEMENT CORRIDOR TO RISER



PHOTOGRAPH 12
EXISTING BT COPPER AND FIBRE SERVICES ACCESSING RISER IN BASEMENT PLANT ROOM

Risers and Cable Routes

Access from the telecoms intake points in the basement are afforded by the vertical riser to all floors located in the centre of the main building core (See **Photographs 13, 14 & 15**). Based on our inspection of the building and riser we conclude that access to all upper floors is good in respect of riser location, with good access into the tenant areas to suit via the raised access floors and suspended ceilings.



PHOTOGRAPH 13
TYPICAL VIEW OF RISER ON UPPER FLOOR OF VACANT SUITE
INDICATING SERVICES AND AVAILABLE SPACE



PHOTOGRAPH 14
TYPICAL VIEW OF RISER ON UPPER FLOOR OF VACANT SUITE
INDICATING SERVICES AND AVAILABLE SPACE



PHOTOGRAPH 15
TYPICAL VIEW OF RISER ON UPPER FLOOR OF VACANT SUITE
INDICATING SERVICES AND AVAILABLE SPACE

Legacy Fixed Cabling Assessment

As part of the survey, we reviewed the level of historic cabling that has been left in place following tenant vacation or legacy services from any of the telecommunications carriers. The level of services place is low and extends mainly to distribution networks in or adjacent to the riser across a number of floors, which we consider will not impact of the provision of new services. This legacy cabling is predominantly cut off and is considered to be suitable for removal as part of any refurbishment works.

Service Availability

The standard services afforded by BT over its existing copper networks can offer ADSL broadband speeds of around 10-19Mbps. Malden Exchange has been enabled to provide BT Infinity services over FTTC technology with speeds of up to 80Mbps download and 20Mbps upload. However, this building is noted as 'Exchange Only' and is not therefore connected to the local street cabinet and BT are currently 'exploring options' in respect of FTTC technology delivery but provides no timescales for deployment at this time (Data via the BT website). The level of copper services available from BT and other companies that can utilise the BT network will be able to provide enhanced speeds by use of bonded ADSL products where required to increase speed. Typically two 19Mbps ADSL lines bonded can increase speed to 38Mbps, increasing with the number of lines bonded accordingly. In addition to the copper services, it is clear that an excellent level of fibre based business tariff services will be available from BT to provide any level of speed and bandwidth required over fibre products. For example, the introduction of a 100Mbps fibre bearer can be delivered over the existing ducted network affording un-contended upload and download port speeds from 10Mbps to 100Mbps based on the tenants requirements. These are also scalable from initial requirements up to the maximum available speeds in respect of the bearers. Higher bearer capacities are available to suit typically 500Mbps to 1Gbps and beyond where required. Furthermore, there are a host of companies that can provide enhanced products over the existing infrastructure potentially providing smaller businesses a more affordable level of service if so required.

Summary

Based on the level of infrastructure and the availability of services from BT's local exchange, we consider Apex Tower has an excellent/good level of connectivity with the ability to enhance this by means of fibre services where required in minimal timescales from order in respect of BT. The presence of Virgin Media, Level 3 and Vodafone outside the building and in the local environs, albeit with requirements for new building entries greatly enhances the connectivity of the building at this time.