

# Telecommunications Connectivity

## Fixed Network and Mobile Coverage Assessment

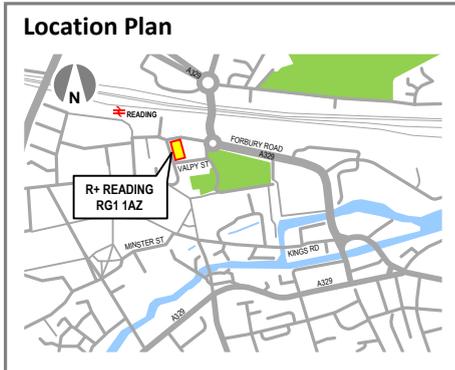
**R+**  
Valpy Street  
Reading  
RG1 1AZ



STRUCTURE

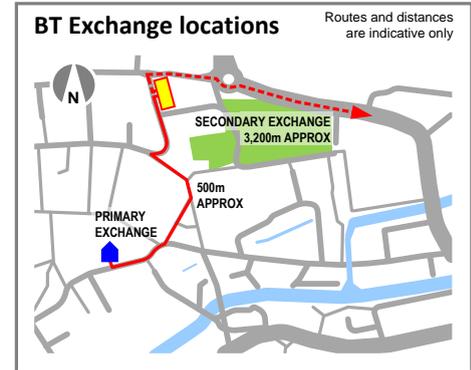
R+ is currently under construction and when completed will provide a headquarters office building extending to six floors in the centre of Reading. The building will afford approximately 101,397 sq ft (9,420 sqm) of Grade A office accommodation over open floor plates. R+ is situated on Valpy Street to the south and Blagrove Street to the west with access to the public highway from the north, west and south. The building will have predominantly glazed facades to all elevations, and sits within an environment of similar height commercial buildings in all directions.

TOPOGRAPHY



**BT Exchange Information**

<b>Primary Exchange</b> (500m approx)	READING CENTRAL (THRG) RG1 2JB
<b>Secondary Exchange</b> (3,200m approx)	READING EARLY (THEAR) RG6 1QA



BT SUMMARY

R+ is located approximately 500m from the BT Reading Central Exchange, which is situated to the south west of the building. Reading Central Exchange provides excellent services including ADSL, ADSL+, SDSL, 21CN WBC and FTTC (to some areas) plus the availability of LLU services from AOL, O2/Be, C&W, Sky, Talk Talk, Tiscali and Zen Internet all over BT infrastructure. Based on the existing standard copper services, Reading Central Exchange can offer broadband speeds of around 15Mbps at this time. However, this exchange has been enabled to provide BT Infinity services over fibre with potential speeds of up to 80Mbps download and 20Mbps upload and is currently accepting orders (Data via the BT website). Reading Early Exchange to the south east affords a similar range of services, and could provide a level of diversity and resilience across BT business services should it be required.

TELECOMS CARRIERS

Telecommunications carriers with owned infrastructure located within easy reach of 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 at the building location.

<b>British Telecom</b> Tel: 0800 800 152 <a href="http://www.bt.com">www.bt.com</a>	<b>Easynet</b> Tel: 0845 333 3500 <a href="http://www.easynet.com">www.easynet.com</a>
<b>Vodafone</b> Tel: 020 7111 0047 <a href="http://www.vodafone.co.uk">www.vodafone.co.uk</a>	<b>Verizon</b> Tel: 0800 018 1818 <a href="http://www.verizonenterprise.com/uk">www.verizonenterprise.com/uk</a>
<b>Virgin Media</b> Tel: 0845 6000789 <a href="http://www.virginmedia.com">www.virginmedia.com</a>	<b>Colt Telecommunications</b> Tel: 0207 390 3900 <a href="http://www.colt.net">www.colt.net</a>
<b>Level 3</b> Tel: 020 7954 5454 <a href="http://www.level3.com">www.level3.com</a>	<b>Kingston Communications (Kcom)</b> Tel: 0800 915 5226 <a href="http://www.kcom.com">www.kcom.com</a>
<b>Telia</b> Tel: 0800 028 7406 <a href="http://www.teliasonera.com">www.teliasonera.com</a>	

SUMMARY

The BT services available at Reading Central Exchange, and added resilience of a second exchange afford R+ an excellent level of services to meet today's business needs. The ongoing roll-out of BT Infinity services add's significant financial benefits to smaller business's requiring a premium product over other fibre services. The actual presence of alternative carriers infrastructure over and above that of BT including that from Vodafone, Virgin Media, Level 3 and Telia adjacent to the building, and Easynet, Verizon, Colt Telecommunications, and Kingston Communications in the environs is one that affords the building with an excellent choice of carriers with varying civil infrastructure requirements to provide service to the building across all carriers.

<b>RATING</b>	<b>BT / LLU</b> <span style="border: 1px solid green; padding: 2px;">4</span>	<b>BT / LLU</b> <span style="border: 1px solid red; padding: 2px;">1</span> Limited services available from BT only	<b>CARRIERS</b> <span style="border: 1px solid red; padding: 2px;">1</span> Limited infrastructure available / no infrastructure
	<b>CARRIERS</b> <span style="border: 1px solid green; padding: 2px;">4</span>	<span style="border: 1px solid orange; padding: 2px;">2</span> Good BT services, limited by LLU Operators	<span style="border: 1px solid orange; padding: 2px;">2</span> Adequate level of infrastructure with limited access issues
		<span style="border: 1px solid blue; padding: 2px;">3</span> Good BT/LLU services now, or planned	<span style="border: 1px solid blue; padding: 2px;">3</span> Good level of infrastructure with limited access issues
		<span style="border: 1px solid green; padding: 2px;">4</span> Excellent BT/LLU services now, with diversity	<span style="border: 1px solid green; padding: 2px;">4</span> Excellent level of infrastructure with no access issues

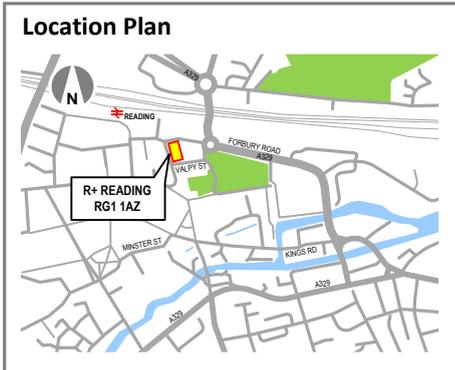
GLOSSARY OF TERMS

- 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 delivered broadband service from enabled exchanges and cabinets via FTTC providing broadband speeds of up to 80Mbps download (subject to conditions) at a lower cost to that of traditional leased fibre services.

STRUCTURE

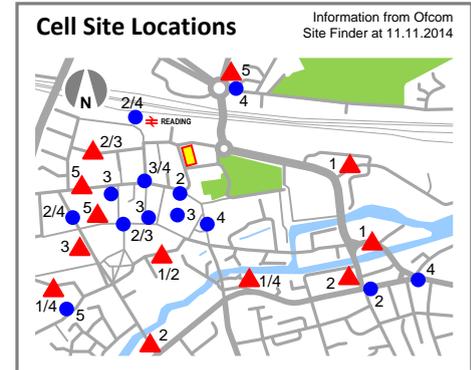
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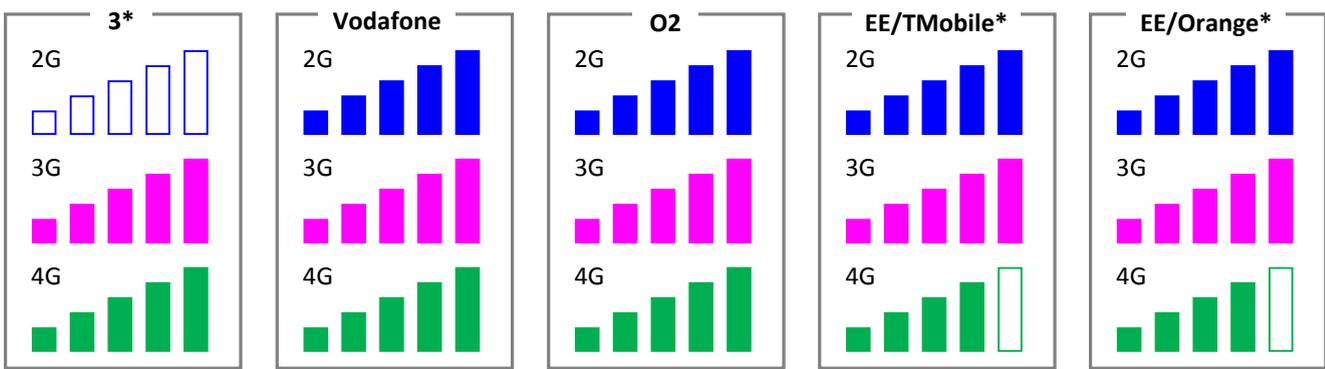


**Cell Site Information**  
 ▲ Macro site typically >10m above ground level  
 ● Street level micro cells typically <10m above ground level  
 All locations are approximate only

**Operators**  
 1. 3  
 2. Vodafone  
 3. O2  
 4. EE/T-Mobile  
 5. EE/Orange



STREET LEVEL COVERAGE



OBSERVATIONS

R+ affords an excellent level of macro coverage from all of the four mobile operators for 2G, 3G and 4G services as shown in the plan above. The closest serving cells are detailed in respect of 2G, 3G and 4G services and can be seen vary in location and distance, providing general coverage to the building. 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.

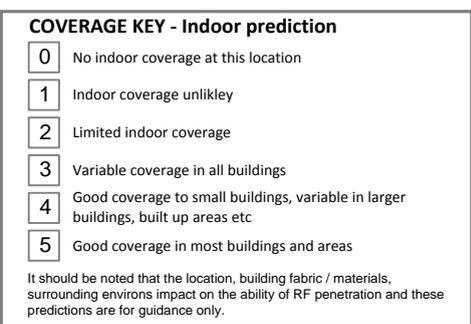


PREDICTIONS

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. However, there may be some isolated coverage issues on the lower floor in any internal offices or areas. 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. 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.

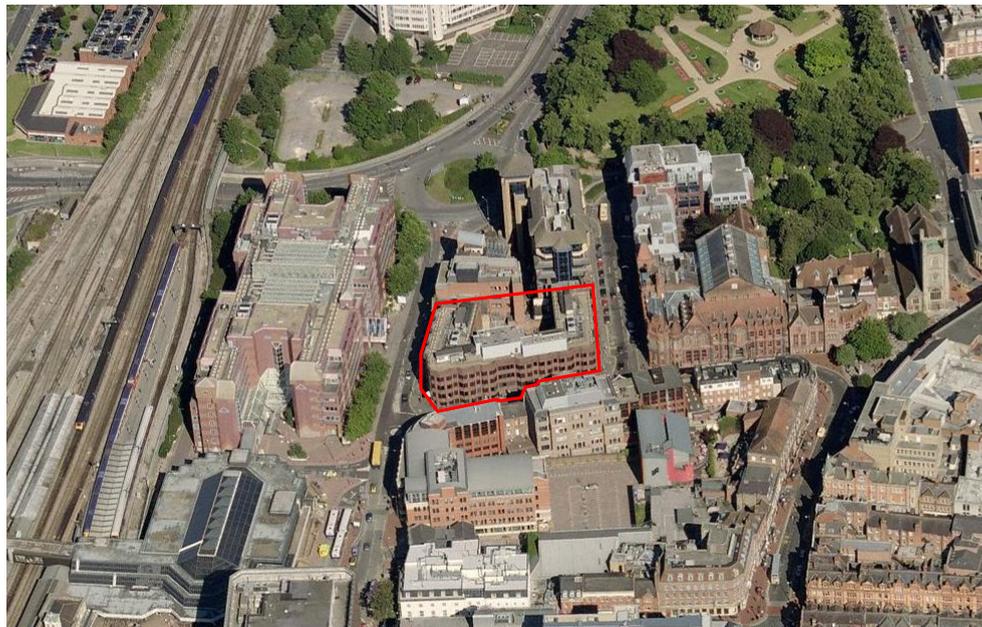
INDOOR SUMMARY

OPERATOR	2G	3G	4G
3*	0	4	4
Vodafone	4	4	4
O2	4	4	4
EE/T-Mobile*	4	4	3
EE/Orange*	4	4	3



## Fixed Telecoms Appraisal Summary

In addition to the Fixed Network carrier study completed, a review by survey of the site was undertaken on the 10<sup>th</sup> November 2014 accordingly. The purpose of this survey was to clearly identify the presence of existing fixed telecommunications carrier's infrastructure on/adjacent to the site, or within the local environs.



SITE AERIAL VIEW (Building site highlighted in red)



VIEW LOOKING SOUTH ALONG BLAGRAVE STREET



VIEW LOOKING EAST ALONG VALPY STREET

## Local Carriers

R+ is accessed from Valpy Street to the south, Blagrove Street to the west and Forbury Road to the north and is bounded by existing buildings to the east. The survey located an extensive number of telecommunications chambers owned and operated by the following carriers adjacent to the building including BT, Vodafone, Virgin Media, Level 3 and Telia (See **Photographs 1, 2 and 3**). These carriers are located such that services could be provided with minimal requirements for any civil infrastructure to connect into their existing infrastructure.



**PHOTOGRAPH 1**  
MULTIPLE BT CHAMBERS IN FOOTWAY ALONG  
VALPY STREET



**PHOTOGRAPH 2**  
BT AND VODAFONE CHAMBERS IN CARRIAGEWAY AT JUNCTION  
OF VALPY STREET WITH BLAGRAVE STREET - SOUTH



**PHOTOGRAPH 3**  
VIRGIN MEDIA AND TELIA CHAMBERS IN FOOTWAY AT  
JUNCTION OF VALPY STREET WITH BLAGRAVE STREET - NORTH

Additional infrastructure for these carriers was also identified within the local environs along with that of further carriers. Typically a large cluster of chambers exist at the junction of Valpy Street with The Forbury (See **Photograph 4**) extending into Forbury Road. In addition, there is an extensive carrier presence running along the length of Forbury Road with additional carriers that include Easynet, Colt Telecommunications, Verizon and Kingston Communications, with multiple chamber presence at the the junction of The Forbury with Forbury Road (See **Photographs 5 and 6**). The locations of these chambers and the additional carriers locally, afford an excellent level of infrastructure, with potentially good levels of diversity available by separation where required.



**PHOTOGRAPH 4**  
MULTIPLE CHAMBERS LOCATED AT JUNCTION OF VALPY  
STREET WITH THE FORBURY



**PHOTOGRAPH 5**  
ADDITIONAL CARRIER CHAMBERS ON THE FORBURY AT  
JUNCTION WITH FORBURY ROAD



**PHOTOGRAPH 6**  
MULTIPLE CARRIER CHAMBERS ALONG THE FORBURY AT  
JUNCTION WITH FORBURY ROAD

### Service Availability

The standard services afforded by BT over its existing copper networks provides a level of broadband services with speeds expected in the region of 15Mbps as the exchange is close to the building. Reading Central Exchange is BT Infinity enabled, and is currently in roll-out and accepting orders, potentially providing future speeds of up to 80Mbps download, and 20Mbps upload (subject to conditions) providing an alternative to other business tariff services. (Data obtained via the BT website). However, the current level of business tariff services available from BT will provide an excellent level of service at this time. In addition, there are a host of companies that can provide enhanced products over the existing infrastructure providing smaller businesses a more affordable level of service. The presence of Vodafone, Virgin Media, Level 3 and Telia adjacent to the building, and Easynet, Verizon, Colt Telecommunications and Kingston Communications in the environs affords an excellent alternative to BT, and will be able to offer a host of business services to suit any requirements.

### Summary

Based on the local carrier infrastructure and the availability of services from BT's local exchange including the ongoing roll out of FTTC services, we consider R+ has an excellent level of connectivity with the ability to enhance this by means of fibre services where required in minimal timescales from order. The presence of the additional carriers affords an excellent alternative provision of service and diversity at this time with varying requirements for external street works albeit subject to rights of access requirements.