ADSL Availability Report

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Contents

Background

In 2016, the majority of broadband services in Australia are available through ADSL technology delivered over the copper network by Telstra and other telecommunications providers. Consumers are often unaware of the complex service qualification factors such as port availability and line distance from exchange that go on behind the scene when a service is ordered. When a consumer is told their premises cannot be served, it is not always clear what steps they might be able to take to remedy the situation.

The Telecommunications Industry Ombudsman (TIO 2015) recognised in its Regional Telecommunications Review submission that it receives a higher number of enquiries about the unavailability or performance limitations of landline and internet services due to a lack of infrastructure. This is particularly so for consumers living outside of urban areas, with around 40% of enquiries logged by regional and remote consumers related to a lack of infrastructure.

The National Broadband Network (NBN) is set to fill these infrastructure gaps. It is designed to be a wholesale network, eventually reaching 100% of Australian premises at the completion of the rollout expected in 2020. The NBN will bring broadband to all Australians using a mix of access technologies, including satellite, fixed wireless and fixed-line technologies. However, at the time of writing, the NBN is still being rolled out with only around 25% complete.

This analysis, the *ADSL Availability Report (AAR)*, identifies areas which are currently under-served and uses the NBN 3 year construction plan to model how these under-served areas change over time. The aim of this study is to highlight areas where infrastructure supply may not be meeting consumer demand. It is hoped that this data will be used to encourage the development of alternative interim services and improve consumer information around the availability, or lack thereof, of services.

This analysis examines the availability of fixed line ADSL. Telstra HFC and mobile broadband coverage are not examined in determining if an area is served. Other providers may also serve areas with their own technology which is not included in this analysis.

Methodology

The base unit: a neighbourhood

Since the majority of Australia currently access broadband through the Telstra copper network, the analysis is conducted at a Telstra Distribution Area (DA) level. Typically, a Telstra Distribution Area represents the group of premises serviced by a common Telstra neighbourhood pillar.

On average, a single pillar services a cluster of around 150 premises. However, this is only an indicative average. There are instances where Telstra Distribution Areas have several thousand premises. There are also some smaller, regional exchanges which do not have any distribution areas.

To help break down some of these areas into a more granular level, some Telstra Distribution Areas have been split into smaller areas based on the work done by the Department of Communications (Department of Communications 2013).

For the purposes of this analysis, this base unit is called a "*neighbourhood*".

Approximate Premises Count

An approximate number of premises in each *neighbourhood* was derived by overlaying the February 2016 release of the PSMA Geocoded National Address File (G-NAF) database (DPMC 2015).

The approximate premises count is omitted from parts of this report, particularly in cases where including the number will cause confusion. For example, if an exchange has no remaining ADSL ports, only new connections are affected by this limitation. Premises which are already connected to ADSL are not affected. It would not be appropriate to describe all premises within that exchange as under-served.

For the purpose of this analysis, neighbourhoods with less than 5 premises were excluded in this final report.

DSLAM Location

DSLAM, or Digital Subscriber Line Access Multiplexer, is equipment used to transmit and receive ADSL/ADSL2+ signals along the copper pairs.

DSLAM equipment is typically located at Telstra exchanges and should be capable of delivering ADSL/ADSL2+ services to any premises within the exchange area (provided they pass the service qualification checks).

However, at the time of writing, Telstra also operates DSLAMs at 5,408 CAN sites (Copper Access Network sites) in the field in addition to the DSLAM equipment housed in 2,962 exchanges around Australia. These CAN site DSLAMs are installed in cabinets near neighbourhood pillars and can only service specific neighbourhoods.

Telstra Wholesale publishes a list of Telstra Distribution Areas (*neighbourhoods*, for the purpose of this analysis) associated with each CAN site (Telstra 2016a).

When examining port capacity for each neighbourhood, this analysis takes into account the ADSL port capacity at the exchange and at any CAN sites which are connected to the neighbourhood.

Under-served Definition

For the purposes of this analysis, an area is considered under-served if any of the following conditions are met:

- the Telstra DA is not connected to an ADSL-enabled exchange or CAN site (Telstra 2016b)
- the Telstra DA is connected to an ADSL-enabled exchange or CAN with no or less than 5 ADSL/ADSL2+ ports remaining
- the Telstra DA is too far from the exchange to order an ADSL/ADSL2+ service above 4 Mbps. This was calculated by matching the Telstra distribution area data from Pitney Bowes with the *median speed* data for each distribution area from the MyBroadband "data cube" spreadsheet on the Department's website. The 4 Mbps filter was then applied onto it to exclude areas we considered to be "too far from the exchange".

The minimum 4 Mbps figure was arrived at by considering the Telstra service quality check, the minimum quality the line must meet for Telstra to offer service to a household, where attenuation on the line must be less than 56dB (Telstra 2015). On a typical copper line, a line with 56dB loss can attain a line rate of around 4 Mbps on both ADSL and ADSL2+ (Internode 2007).

Telstra ADSL/ADSL2+ Port Data

The analysis considers the availability of ADSL/ADSL2+ ports in each exchange or CAN site. This information is published by Telstra and is available on the Telstra Wholesale website. However, this data only shows the number of ports remaining and does not indicate how many ports in total are at the exchange or a CAN site.

It should also be noted that port availability data can change over time as customers take-up services, cancel services or if Telstra increases port capacity.

The analysis uses port data as at 21st June 2016, published 24th June 2016.

The data excludes port availability information on non-Telstra DSLAMs such as those installed by Optus and TPG in certain exchanges. Although, in regional, rural and remote areas Telstra is virtually the only provider of DSLAM coverage (ACCC 2015).

NBN three-year construction schedule

This analysis takes into account the effect of the NBN rollout on the under-served classification.

The three-year schedule, found on the NBN Co website, lists indicative suburbs as well as an estimated start date (nbn 2015b). An approximate network footprint can be derived from this. The under-served status of each Telstra DA is then calculated for every half-year by including the estimated start date and assuming an average build time of 12 months rounded to the nearest half year.

There are limitations to the accuracy of this information. The footprint of the rollout is only approximate, based on the indicative list of suburbs provided by NBN Co. The footprint is conformed to broadly align with existing Telstra exchange service areas and is further refined in outer-metropolitan fringes by considering the land use classification from 2011 ABS Mesh Blocks (ABS 2011).

The analysis also assumes the entire Fixed-line service area listed on the three-year construction plan is completed within 12 months based on the NBN average build time (nbn 2014). However, NBN Co may separate the rollout into several blocks based on technology.

NBN's Long Term Satellite (LTS) was also made available consumers in April 2016. Since NBN has not released a detailed satellite footprint, these neighbourhoods are flagged as partially served if at least one premises in the neighbourhood is eligible for the satellite service.

Other considerations

Pair gain systems

This analysis does not consider the impact of small/medium pair gain devices in the copper network since the location of these pair gain systems are not publicly available. Pair gain systems is a way of carrying (multiplexing) multiple phone lines over a single copper wire. These systems will ensure that phone services can be delivered to new developments, however, may prevent ADSL/ADSL2+ broadband services from being delivered.

Larger and more modern pair gain systems with in-built ADSL/ADSL2+ functionality such as a Remote Integrated Multiplexer (RIM) or a Customer Multiplexer (CMUX) are considered as part of the CAN site analysis input described in section 1.3 (DSLAM Location).

Findings

The findings section is broken into three outlook sections:

1. short term (to June 2017),
2. medium term (to December 2018), and
3. long term (to June 2020).

Over time, the number of under-served or partially under-served neighbourhoods is expected to decline as the rollout of the NBN continues.

Figure 1: Graph of satellite footprint overlap with exchange areas

- ▨ Neighbourhood partially served by satellite
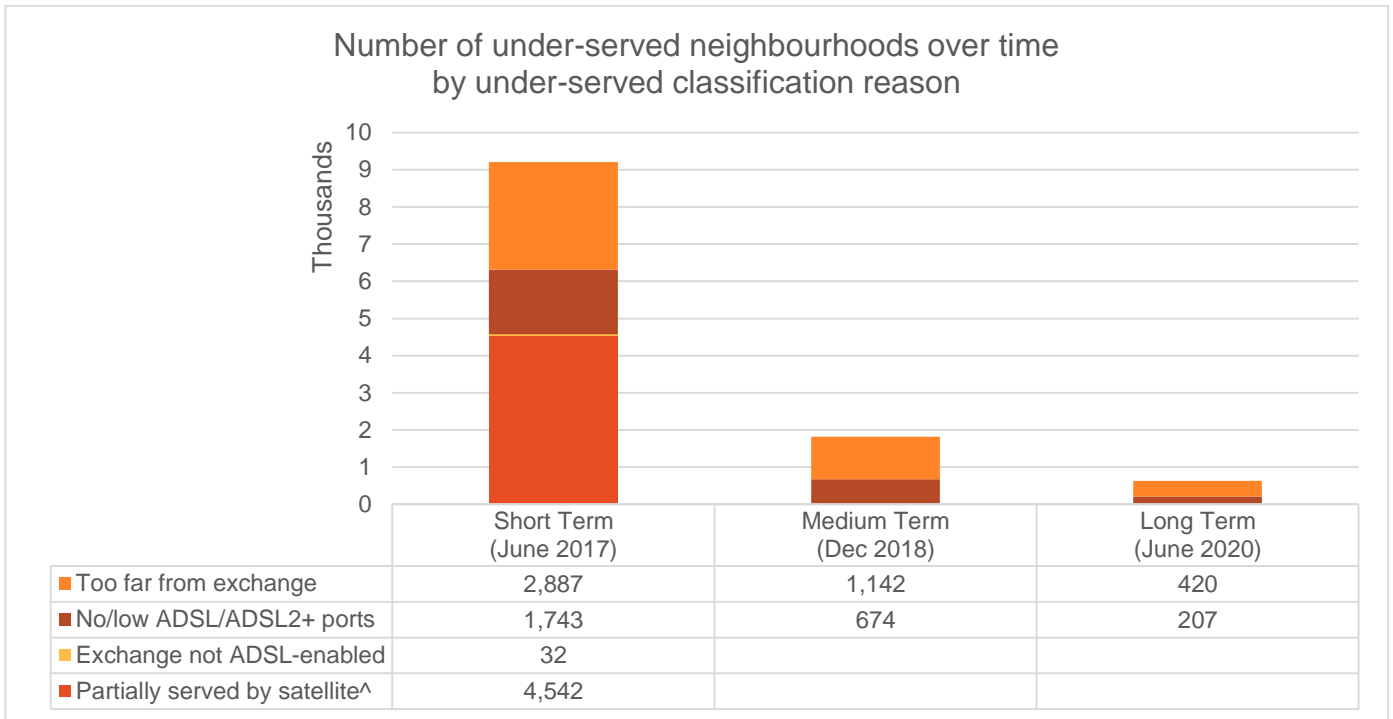- ▰ Future NBN Fixed Wireless/Fixed-line footprint
- • Premises
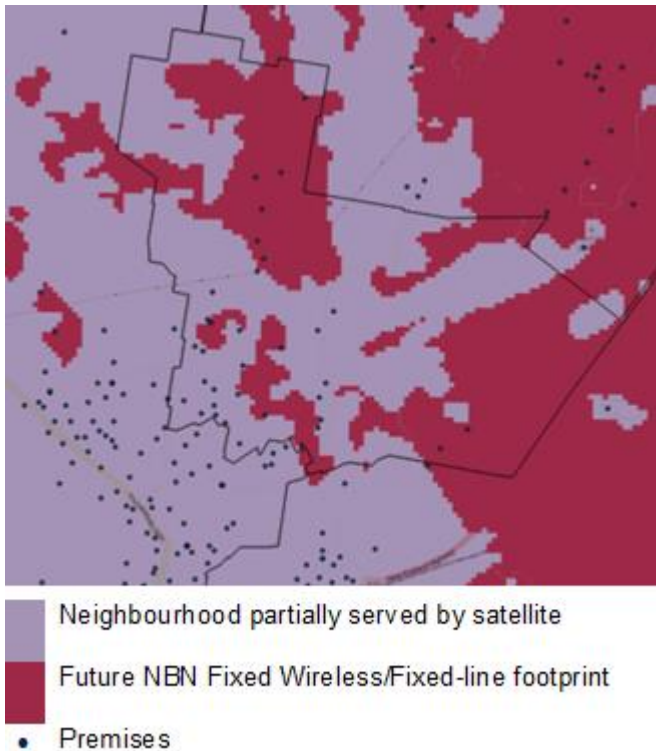
Due to the lack of a published NBN satellite footprint, neighbourhoods with at least one premises eligible for NBN's long term satellite (LTS) are flagged and accounted separately in the Short Term.

These partially served areas may contain premises which are ineligible for the LTS service because they are planned to be in an NBN Fixed Wireless and Fixed-line footprint. Typically, these are located at the outskirts of towns or suburbs in outer-metropolitan or regional areas. The map on the right shows an example of this partially served classification.

The neighbourhoods shown are considered partially served by satellite. The red shaded area indicates the expected future NBN Fixed Wireless or Fixed-line footprint. Premises outside of the red shaded footprint are currently eligible for the NBN LTS service, whereas premises within the shaded red area are currently ineligible for an NBN LTS service since they are expected to be served by another NBN technology in the future.

Over the medium term, the NBN Fixed Wireless network is scheduled for completion (nbn 2015a) The remaining fixed-line 3 year construction plan is accounted for in the model. As a result, it is assumed from December 2018 onwards, all premises in neighbourhoods previously classified as "partially served by satellite" are served by at least one form of NBN access technology or are considered as part of the construction plan.

Figure 2: Number of neighbourhoods by reason and time period

Number of under-served neighbourhoods over time by under-served classification reason

	Short Term (June 2017)	Medium Term (Dec 2018)	Long Term (June 2020)
■ Too far from exchange	2,887	1,142	420
■ No/low ADSL/ADSL2+ ports	1,743	674	207
■ Exchange not ADSL-enabled	32		
■ Partially served by satellite^	4,542		

^ Some premises within these "Partially served by NBN satellite" neighbourhoods are ineligible for NBN's satellite service because they are planned for NBN's fixed-line or fixed-wireless network in the future.

Short Term Outlook

The analysis has identified approximately 4,662 neighbourhoods in Australia as under-served at the end of June 2017 (H1-2017).

An additional 4,542 neighbourhoods are partially serviced by the NBN Long Term Satellite (LTS) service, as some premises in the area are ineligible for the satellite service and would therefore be considered under-served.

Within these 4,542 neighbourhoods, there may be premises which are currently ineligible for NBN's satellite service as they are planned for NBN's fixed-line or fixed-wireless network. These planned premises are unable to obtain either an ADSL or NBN service and are therefore considered under-served.

Figure 3: Short term findings

Reason for being considered Under-served	Total number of neightbourhoods	Of which partially served by NBN satellite	Of which will be served by future NBN Fixed-line or fixed wireless services
Too far from exchange	4516	1629	2887
Exchange not ADSL enabled	2576	2544	32
No/Low ADSL/ADSL2+ ports	2112	369	1743
Total	**9204**	**4542**	**4662**

Too far from exchange

The majority of neighbourhoods are classed as under-served due to their distance from the exchange. This is particularly prevalent in outer metropolitan and rural areas due to the lower population density.

While these neighbourhoods await the rollout of the NBN, Telstra continually augments its ADSL network by servicing neighbourhoods further away from the exchange with DSLAMs at newly established CAN sites. At the time of writing, Telstra Wholesale has listed 193 proposed CAN sites serving 287 neighbourhoods in its *Proposed ADSL Enabled – CAN* spreadsheet (21st June 2016). These are expected to become active between July 2016 and January 2017. Such an upgrade would see the DSLAM equipment moved closer to the neighbourhood, hence, increasing the attainable line speed.

No/Low remaining ADSL/ADSL2+ ports

Neighbourhoods which are serviced by exchanges with less than 5 ADSL/ADSL2+ ports remaining are classified as under-served, however, only those currently without a service who wish to take one up will be impacted by this shortfall.

The analysis has identified a total of 2,112 neighbourhoods spread out across 169 exchange areas as having a low number of remaining ports.

Comparing this against Telstra Wholesale's *Planned ADSL Capacity Increases – Exchanges* and *Planned ADSL Capacity Increases – CAN* spreadsheets (21st June 2016), there are planned port capacity increases for 149 exchanges and 217 CAN sites between July 2016 and July 2017.

While increasing capacity at a particular CAN site does not directly increase port capacity at an exchange level, it can be expected that customers currently connected to the exchange DSLAM can be moved to the DSLAM at the CAN site – thus augmenting the number of ports available to the broader exchange area.

Taking this into account, the scheduled port capacity relief at 149 exchanges and 217 CAN sites is expected to increase port capacity at 873 of the 2,112 identified neighbourhoods (41%) by June 2017.

A table of exchanges scheduled to be relieved can be found in the table section (4.1) at the end of the report.

Example: Seaham, NSW

Figure 4: Example map of Seaham, NSW

Served

No/Low ADSL/ADSL2+ ports

Too far from exchange
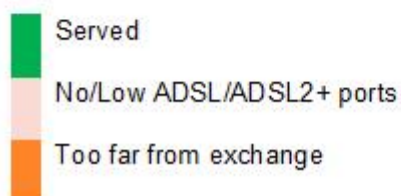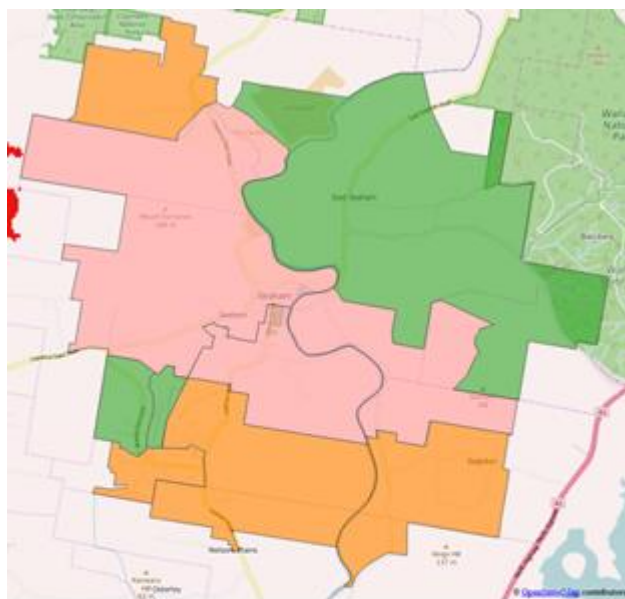
The Seaham exchange is an example of an outer metropolitan area which affected by both low port availability and having neighbourhoods too far from the exchange to receive an ADSL/ADSL2+ service.

Seaham has 0 ports remaining at the exchange. The three central neighbourhoods serviced by the exchange DSLAMs are considered underserved with no/low ports.

However, the neighbourhood covering East Seaham and the two western neighbourhoods of Seaham are served by a CAN site with 5 or more ports remaining in each. They are therefore considered served.

The remaining neighbourhoods in the northern and southern ends of Seaham are considered underserved as they are too far from the exchange to receive an ADSL service, as explained in section 1.4.

Exchange not ADSL enabled

The analysis has found that the majority of neighbourhoods which are not currently ADSL enabled will now be partially serviced by the NBN Long Term Satellite (LTS). As explained previously, some premises within these neighbourhoods may be ineligible for the satellite service as they are planned for a fixed-line or fixed wireless NBN connection. In the short term, this infrastructure shortfall will likely not be remedied.

Telstra does not intend to expand its ADSL network significantly in the near future. According to Telstra Wholesale's *Proposed ADSL Exchange Service Areas* spreadsheet (20th June 2016), there are only two exchanges in the forward plan for receiving new ADSL services.

These are in the exchange areas of Haddon and Georgina (Southern Queensland) with expected completion dates of December 2016 and June 2017 respectively. Both of these exchange areas also currently appear to be eligible for the NBN LTS service.

Based on current modelling, the remaining 32 neighbourhoods which are not partially serviced by satellite will likely be serviced by NBN's fixed wireless network in the future.

Medium Term Outlook

The analysis has found that the number of neighbourhoods under-served in medium term outlook falls significantly from 4,662 in H1-2017 to 1,816 at the end of December 2018.

This is due in part to the completion of the NBN Fixed Wireless network at the end of 2018 (nbn 2015a). Given the remaining fixed-line rollout is accounted for in the analysis model, the neighbourhoods originally considered "Partially served by NBN satellite" in the Short Term Outlook are now considered served. Likewise, the remaining 32 neighbourhoods considered under-served due to the exchange not being ADSL enabled from H1-2017 are assumed to be serviced by NBN's fixed-wireless network

Figure 5: Medium term findings

Under-served Reason (H2-2018)	Number of neighbourhoods affected
Too far from exchange	1,142
Exchange not ADSL enabled	0
No/Low ADSL/ADSL2+ ports	674
Total (under-served)	**1,816**

Too far from exchange

The number of neighbourhoods under-served for being too far from the exchange drops from 2,887 in H1-2017 to 1,142 in H2-2018. This is attributable to the extended reach of the National Broadband Network as the rollout progresses.

No/Low remaining ADSL/ADSL2+ ports

The drop in the number of low remaining ADSL ports is attributed to the ramp up of the NBN rollout and the planned port capacity increases from Telstra. However, this is based on current port availability data and does not take into account ADSL take up in the medium term. The actual figure is dependent on Telstra's ability to keep up with ADSL demand.

If Telstra remains proactive in increasing port capacity at exchanges, the number of neighbourhoods affected may be stable or fall over time. If in the contrary, Telstra neglects to keep up with port demand, the number of neighbourhoods affected will likely increase.

Long Term Outlook

Figure 6: Long term findings

Under-served Reason (H1-2020)	Number of neighbourhoods affected
Too far from exchange	420

Under-served Reason (H1-2020)	Number of neighbourhoods affected
Exchange not ADSL enabled	0
No/Low ADSL/ADSL2+ ports	207
Total (under-served)	**627**

By June 2020, the rollout of the National Broadband Network is expected to near its completion. The analysis finds the number of under-served neighbourhoods will fall from 1,816 in December 2018 to 627 in June 2020.

The remaining areas are in exchange areas where NBN has scheduled rollout completion to be between June 2020 and December 2020.

Figure 7: Exchanges in NBN rollout in 2020

Exchange Name	State
Mount Hawthorn	WA
Monash	ACT
Crace (Giralang area)	ACT
Maylands	WA
Morley (Dianella, Noranda)	WA

There are also some areas where rollout plans are currently unknown. For example, the town centre of Vacy (NSW) is currently ineligible for NBN's Long Term Satellite service and appears to be a likely candidate for NBN's Fixed Wireless network. However, it was not listed in the NBN three-year construction plan.

Due to the limitation of data availability, areas such as Vacy are considered under-served in H1-2020. However, it is expected that the next release of the NBN three-year construction plan will include an expected build commencement date throughout Australia.

Conclusions and observations

ADSL availability

The analysis has identified areas which will remain under-served for an extended duration of time due to the lack of available fixed line services. Neighbourhoods not currently in the NBN rollout plan or three-year construction schedule would benefit from alternative network infrastructure being made available in the medium to long term.

Addressing neighbourhoods too far from the exchange

Telecommunications companies could increase the provisioning of mobile broadband or fixed wireless technologies in these areas to complement the availability of fixed-line services in the future.

For example, Vivid Wireless (an Optus subsidiary) is offering "unlimited 4G" plans selected metropolitan areas using its 2300 MHz LTE network. Technology used by Lightning Broadband and Uniti Wireless can also deliver fixed-wireless style services through the open Wi-Fi spectrum.

Addressing neighbourhoods with low ports

With the progressive rollout of the National Broadband Network, DSLAM equipment is expected to be freed as the existing ADSL network is decommissioned in exchange areas where NBN has been switched on.

Telstra and other service providers could investigate repurposing this decommissioned DSLAM equipment in neighbourhoods with low port to meet the demands in other areas.

Reporting of network availability

One of the challenges of this analysis is identifying what network providers and technologies are available in each area.

Telstra Wholesale ADSL

Telstra Wholesale regularly updates detailed information on its ADSL services to the public on its website. Amongst many other things, the company publishes a list of ADSL enabled exchanges, the number of ports at each exchange or CAN site, a list of proposed exchange upgrades and capacity increases.

However, the analysis has also found that some port capacity increases are not reported in Telstra's *Planned ADSL Capacity Increases – Exchanges* spreadsheet.

For example, exchanges such as Engadine (NSW), Coogee (NSW), Ryde (NSW), Wembley (WA), Miller (NSW) and Newtown (NSW) all recently saw increases of over 1,000 in port availability between 10th May 2016 to 21st June 2016. However, none of the exchanges are listed in the capacity increases spreadsheet.

Figure 8: Telstra Wholesale ADSL capacity increases

State	Exchange Name	Number of free ports (as at 10th May 2016)	Number of free ports (as at 21st June 2016)	Net increase in ADSL/ADSL2+ ports
NSW	ENGADINE	1	3,223	3,222
NSW	COOGEE	44	2,220	2,176
NSW	RYDE	85	2,239	2,154
WA	WEMBLEY	4	1,985	1,981
NSW	MILLER	231	2,046	1,815
NSW	NEWTOWN	175	1,710	1,535

The relieving of port availability in areas especially in Engadine, Coogee, Ryde and Wembley indicates that Telstra is still committed to addressing ADSL/ADSL2+ port shortages in areas where NBN is not expected to rollout in the near future.

Other ADSL providers

Public visibility of other ADSL providers with own DSLAM equipment in exchanges including Optus, TPG Group and M2 Group could be improved.

ADSL2Exchanges.com.au does provide a crowdsourced list of providers, however, the information does not appear to be updated frequently.

Consumers would benefit from knowing which network providers have a presence in each exchange and whether there are ports are remaining. This could be published in spreadsheet format similar to that of Telstra Wholesale.

Noting that there may be commercial sensitivities, having a centralised search tool for consumers to determine which providers have excess ADSL services capacity with timely updates would assist consumers in choosing broadband providers and plans. This could come as a form of a third-party data aggregator, provided that other ADSL providers will publicly publish this availability information.

However, the need for such a tool is expected to diminish over the next 4-5 years as the NBN is expected to supersede the ADSL network by the end of 2020.

National Broadband Network

nbn publishes information about its current network footprint and areas that are currently under construction on its interactive rollout map.   It also publishes a list of indicative suburbs or localities covered under its three-year construction schedule.

While all of the NBN access technologies are considered served as part of this analysis, the variability in "up to" speeds being delivered over Fibre to the Node, Fibre to the Basement and Fixed Wireless access technologies means that consumers will benefit from getting a speed estimate on its interactive rollout map.

This will allow consumers to make more informed decisions when deciding on an internet plan and may also assist consumers to make better rental or property purchase decisions based on broadband availability.

Consumers who live in areas where NBN construction is underway would also benefit from knowing an estimated rollout completion date for their area.

Other networks

Visibility of the availability of other infrastructure providers independent of Telstra's copper network is poor. This makes it difficult for consumers to make rental or property purchase decisions based on broadband availability.

For example, it is difficult to ascertain which buildings are in the network footprint of TPG's Fibre to the Basement network without performing a service qualification for each building on TPG's website.

Similarly, information on the footprint of Telstra and Optus' HFC networks is severely limited. However, as the NBN subsumes most of these networks as the HFC rollout progresses, the problem will be alleviated.

Appendix

Appendix A: Tables

Short Term Outlook: Port shortage

Planned port capacity increases – exchange level

The following table lists the exchanges with neighbourhoods identified to be in shortage of ADSL/ADSL2+ ports and are planned for exchange-level port capacity increases (Telstra 2016c).

Figure 9: Low port exchanges with planned increases

Exchange Name	State	Planned upgrade date
ALBANY	WA	Sep 2016
BIRREGURRA	VIC	Sep 2016
COLLARENEBRI	NSW	Sep 2016
DEEPWATER	NSW	Oct 2016
ECHUCA	VIC	Oct 2016
FORRESTDALE	WA	Oct 2016
HENLEY BEACH	SA	Sep 2016
HAZELBROOK	NSW	Jan 2017
JUNDAH	QLD	Sep 2016
KANIVA	VIC	Oct 2016
KEPPEL SANDS	QLD	Nov 2016
KULIN	WA	Nov 2016
LETHBRIDGE	VIC	Oct 2016
LAKE CATHIE	NSW	Oct 2016
MUNDIJONG	WA	Oct 2016
MOUNT WILSON	NSW	Aug 2016
MOUNT WHITE	NSW	Dec 2016
PAYNESVILLE	VIC	Oct 2016
PERTH	TAS	Oct 2016
RICHMOND	VIC	Dec 2016
ROSEBUD	VIC	Sep 2016
SPRINGWOOD	NSW	Oct 2016
TWEED HEADS	NSW	Oct 2016
TRUNDLE	NSW	Nov 2016
TRENTHAM	VIC	Sep 2016

Planned port capacity increases – CAN site level

The following table lists the exchanges with neighbourhoods identified to be in shortage of ADSL/ADSL2+ ports and are planned for CAN site-level port capacity increases.

This is expected to increase the number of ports available at the exchange as customers are migrated to the DSLAM at the CAN site (Telstra 2016d).

Figure 10: Low port exchanges with planned CAN increases

Exchange Name	State	Planned upgrade date
BEECHBORO	WA	Oct 2016
BANORA POINT	NSW	Sep 2016
CESSNOCK	NSW	Dec 2016
HEIDELBERG	VIC	Sep 2016
HENLEY BEACH	SA	Oct 2016
INGLESIDE	QLD	Dec 2016
LAKE CATHIE	NSW	Dec 2016
LOWOOD	QLD	Oct 2016
LITTLE GROVE	WA	Dec 2016
MUNDIJONG	WA	Aug 2016
ROSEBUD	VIC	Nov 2016
TAMBORINE MOUNTAIN	QLD	Sep 2016

Exchange Name	State	Planned upgrade date

Appendix B: Datasets used

Figure 11: Data sets used in Analysis

Dataset	Last updated by dataset provider
ExchangeInfo dataset	Feb 2016
Geocoded National Address File (G-NAF)	Feb 2016
Telstra Wholesale ADSL Reports • ADSL Enabled ESA's • Available ADSL Capacity – Exchanges • Available ADSL Capacity – CAN • Proposed ADSL Enabled Exchanges • Planned ADSL Capacity Increases - CAN • Planned ADSL Capacity Increases - Exchanges	June 2016
MyBroadband Analysis	December 2013
NBN 3 year construction plan	October 2015
NBN rollout plan (in build / active)	June 2016
ABS 2011 Mesh Blocks	July 2011

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