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Dr Tony Warren
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Dear Dr Warren

ANALYSYS COST MODEL FOR AUSTRALIAN FIXED NETWORK SERVICES VERSION 1.2

I refer to your letters of 6 and 12 March 2009 in relation to the Analysys cost model for Australian fixed network services (Analysys cost model) in which Telstra has identified a number of concerns.

Copper cable gauge

First, Telstra considers the Analysys cost model gives no account for heavier grade copper cables (ie. 0.64mm gauge and 0.90mm gauge).

This is a design assumption. The Analysys cost model includes only one grade of copper cable (0.40mm gauge). When designing the model it was considered that heavier gauge cables were not required. This is because for those Exchange Service Areas (ESAs) run using the urban algorithm, current geo-analysis assumptions limit the maximum copper distance to 6900m. Where links exceed 6900m a large pair gain system (LPGS) is deployed under the model assumptions.

Building terminal strips

Second, Telstra considers the Analysys cost model does not account for the cost of building terminal strips.

The ACCC notes the Analysys cost model simulates a generic copper network termination point (NTP) device labelled ‘master wall socket’ for each copper SIO. The ACCC considers that the capital cost per SIO for a master wall socket (current input AUD 13.93, plus a 15 per cent installation mark up) would be higher than the cost per SIO for a building terminal strip.

Variation in provisioned duct on a route

Third, Telstra considers the Analysys cost model does not aggregate demand correctly and, accordingly, there are unexplained variations in the size of the conduit routes.

The ACCC notes that Telstra refers to the Torquay exchange as an example of this issue.

Telstra's concern is related to the number of ducts provisioned on a route. The duct provisioning rules are also outlined in section 5.3.3 of the Analysys cost model documentation, and are briefly described below.

Duct provisioning rules

For each link in the spanning tree network, the duct provisioning algorithm separately identifies the amount of duct required for each cable type. For each link, the algorithm then adds these requirements up to give a total number of ducts needed. To get the number of duct provisioned, the algorithm then chooses the smallest value from the list of options {1, 2, 4, 6, 8, 12, 16, 20, 24, 28} that is larger than the number needed.

As an example, take a (FDP-DP) link between a copper-fed FDP and its parent DP very close to the local exchange containing the following cables:

- 5 distribution network (intra-pillar) copper cables passing through back to the pillar at the local exchange
- 8 main network copper cables passing through back to the local exchange from pillars deployed in the ESA
- 1 fibre cable from a LPGS deployed in the ESA
- 10 fibre cables from FDPs using point-to-point fibre links in the ESA.

The algorithm determines that the link needs the following duct:

0) 1 duct since the link is a FDP-DP link

1) 2 ducts for the intra-pillar copper cables (since they hold at most 4 sheaths per duct)

2) 2 ducts for the inter-pillar copper cables (since they hold at most 6 sheaths per duct)

3) 1 duct for the LPGS-RAU fibre

4) 1 duct for the fibre cables from the fibre-fed FDPs.

This gives 7 ducts in total, which corresponds to 8 being provisioned using the algorithm.

Analysys has verified the duct provisioning for the Torquay exchange and considers that it is consistent with the provisioning rules in the model. It considers the variation in the number of provisioned ducts along a conduit route may be due to the absence of unnecessary DP-FDP ducts along routes. An example of this can be found in Appendix 1.

Ducts entering exchange

Fourth, Telstra considers the Analysys cost model to have fewer ducts entering the Torquay exchange than are present in the section further down the road.

Analysys have identified three links with eight ducts provisioned (the largest number of ducts on an individual link within the Torquay ESA).

Referring to the duct provisioning rules described above and detailed in section 5.3.3 of the Analysys cost model documentation, Analysys considers it may not be necessary for all of these ducts to connect back to the exchange. This is because the sample duct provisioning above relates to DP-FDP links. For links that connect to the exchange or RAU, DP-FDP ducts are unnecessary under the model assumptions. Subsequently, the number of ducts entering the exchange would decrease, corresponding to fewer ducts being provisioned.

Appendix 1 provides further explanation regarding this concern as it applies to the Torquay exchange.

Lightning protection

Fifth, Telstra considers the Analysys cost model does not account for lightning protection systems.

The ACCC considers that customer lightening protection systems require:

- a surge protection device at the customer network termination point (NTP), connected to the building's electrical earthing system
- guard wire installed along the length of the trench from the NTP to the MDF
- surge protection at the MDF

A surge protection device is standard in the NTPs included in the model. The ACCC considers that additional lightning protection is only required in high risk areas of Australia, which may be defined by exchange service area (ESA) or distribution area (DA).

The ACCC also notes that guard wires and surge protection at the MDF are included in the Analysys cost model. Guard wires are explicitly detailed in the cost module (UnitCost.Access worksheet, P21:P30 and U21:U30) and are included for all trenches.

Fibre fed DAs

Sixth, Telstra considers the Analysys cost model eliminates all main cable and muxing costs associated with providing ULLS in fibre fed distribution areas (DAs), and then spreads the remaining copper main cable costs over all fibre and copper fed lines.

Telstra's concern is related to the situation where an access seeker has use of the copper loop from the exchange to a customer in a DA where Telstra serves other customers in that DA direct from the remote equipment.

In the geo-analysis, a fibre-fed large pair gains system (LPGS) is used in a DA when the length of a copper loop from the exchange exceeds 6900m. A copper loop longer than this distance will have poor DSL performance and therefore would be of limited interest to access seekers and end users. Accordingly, from a cost-modelling perspective it would be *inefficient* to deploy a main copper cable to the LPGS.

Cost components in equipment

Seventh, Telstra has asked for a list of components for the following equipment:

- Fibre cables
- Pillars
- Pits and manholes
- LPGS

The ACCC has not provided an explicit list of items included in each asset because modelling the Australian fixed network services requires a degree of simplification. Further, the ACCC considers that the use of benchmark costs data should also reasonably include all appropriate cost if a similar level of detail is taken.

However, the ACCC considers costs included in the direct assets contain internal components required for the services modelled, such as:

- Basic equipment cost (AUD)
- Spares uplift (currently zero for all assets)
- Installation uplift (per cent)
- Indirect asset cost uplift (currently zero for all assets)
- Operational and maintenance cost (as a percentage of capital costs).

As noted in section 9.2.1 of the Analysys Fixed LRIC Cost Model Documentation, the cost of jointing is included in the fibre cable; and the pillars modelled are of the 900 pair variety. The cost of jointing in pits and manholes is quantified explicitly in the cost module (UnitCost.Access worksheet, E58:E65 and E32:E37 respectively).

For the LPGS, the costs for the line card and the Network unit are modelled explicitly in the cost module (UnitCost.Core worksheet, D29:D31, D39 and D49:D50 respectively). This is a simplified approach as it assumes that cost and deployment of the line card in the LPGS will be similar to those in the remote access unit (RAU).

General

The ACCC is now finalising the Analysys cost model.

Yours sincerely

R. Wright.

Mr Robert Wright
General Manager
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Appendix 1: Duct provisioning example

It is noted that the amount of duct of a particular type *usually* never goes down as you head back to the exchange. However, the exception to this is where a **cable reaches a node and is jointed onto a different cable**.

An example of this exception is TQAY and the FDP-DP cable.

The attached diagram sets out a simple cluster of two FDPs and its parent DP (DP B) on a road, with another DP (DP A) further along the road.

The diagram shows the following:

(1) DP-pillar (100-pair) cable (solid green line) is going back to the pillar from DP A via DP B, so it occurs along the whole stretch of road in the diagram

(2) There is no FDP-DP cable in the trench between DP A and FDP B1: this is because they are in different DP clusters.

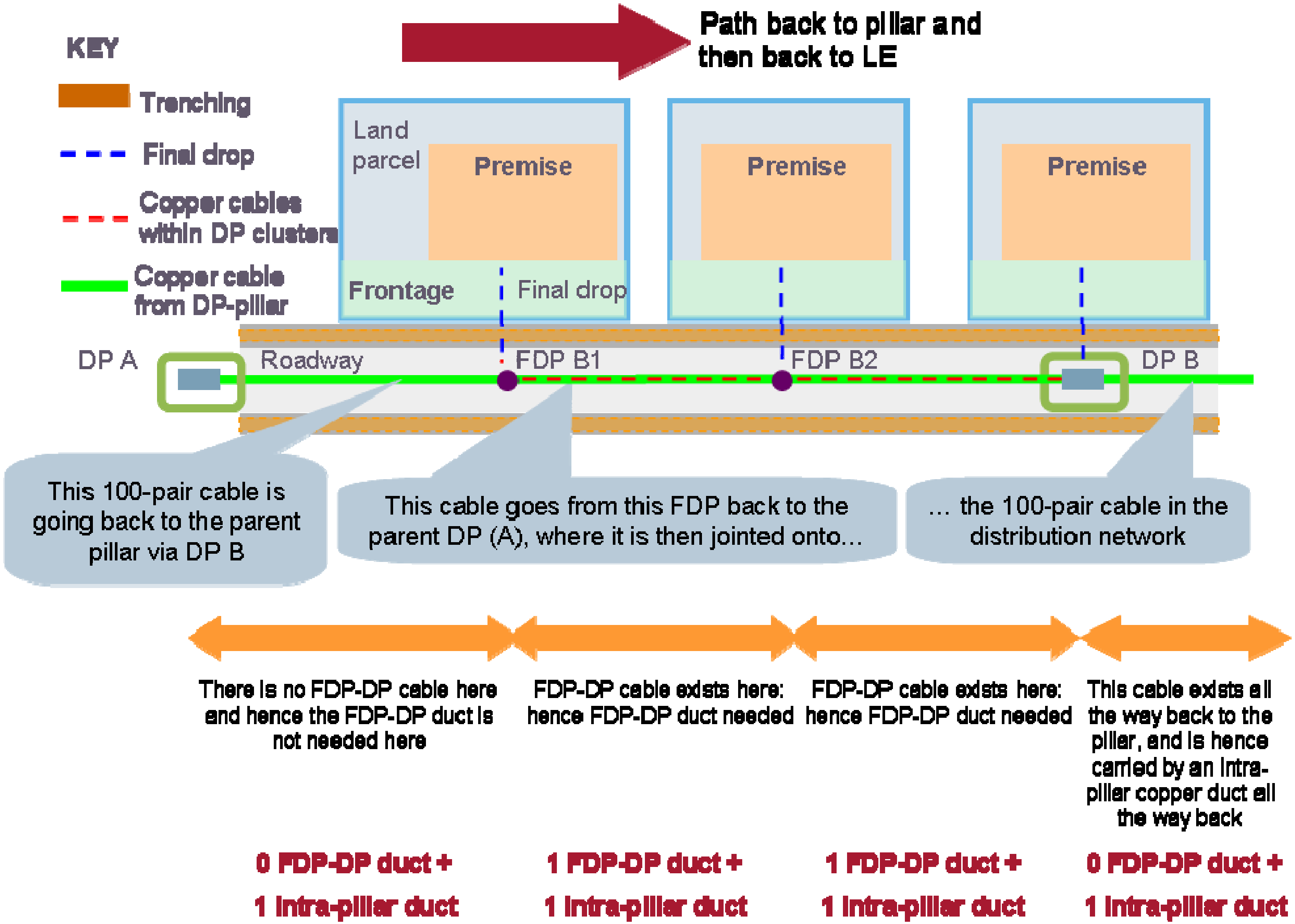
(3) There is FDP-DP cable (red dotted lines) joining FDP B1 and FDP B2 back to the parent DP (DP B). Hence the middle two links need FDP-DP duct

(4) At DP B, the FDP-DP cable from FDP B1 and FDP B2 is jointed onto the 100-pair cable: the FDP-DP cable hence terminates at that DP.

(5) Hence, in the final link on the far right, there is no need for a FDP-DP cable and hence no need for FDP-DP duct, so we do not provision it.

Hence, the total number of duct needed goes 1, 2, 2, 1 across the four links on the diagram.

The crucial bit is that the FDP-DP cable does not exist past DP B: it goes into the DP B and gets jointed onto the 100-pair distribution network cable.


KEY
Trenching
Final drop
Copper cables within DP clusters
Copper cable from DP-pillar
Path back to pillar and then back to LE
Land parcel
Premise
Premise
Premise
Frontage
Final drop
DP A
Roadway
FDP B1
FDP B2
DP B
This 100-pair cable is going back to the parent pillar via DP B
This cable goes from this FDP back to the parent DP (A), where it is then jointed onto…
… the 100-pair cable in the distribution network
There is no FDP-DP cable here and hence the FDP-DP duct is not needed here
FDP-DP cable exists here: hence FDP-DP duct needed
FDP-DP cable exists here: hence FDP-DP duct needed
This cable exists all the way back to the pillar, and is hence carried by an intra-pillar copper duct all the way back
0 FDP-DP duct + 1 intra-pillar duct
1 FDP-DP duct + 1 intra-pillar duct
1 FDP-DP duct + 1 intra-pillar duct
0 FDP-DP duct + 1 intra-pillar duct