Downer
Relationships creating success

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12 August 2015

VERSION FOR PUBLIC ISSUE

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This brief submission is intended to review the Beca Ltd submission, "FPP Corridor Cost Analysis – Report 3, New Rates and General Recommendations", prepared for the Commerce Commission dated 5 June 2015. We also address some of the comments in the "Further draft pricing review determination for Chorus' unbundled copper local loop service, Attachment J: Trenching costs".

We have made this submission because we are of the view that the report prepared does not accurately reflect the NZ environment and address the full range of relevant issues including the nature of and reasons for the selection of particular methodologies and the associated cost and productivity considerations.

This submission seeks to alert the Commission to factors that we consider need to properly form part of any investigation if it is to have any value. This submission is submitted in good faith in the interest of furthering collective understanding, but is necessarily limited in scope because customer demands regarding the way we operate (continual improvement and more for less) mean we do not carry superfluous staff. Those of my staff that have prepared this document have compiled this document on top of existing responsibilities and day to day workloads and so it may not be as comprehensive as we would have wanted but we believe it provides a more accurate basis for further work that needs to be done and poses questions the Commission can itself seek to get broader industry answers on.

Downer New Zealand Limited is a company that is undertaking the installation of the UFB and NGA networks across a number of geographic regions of the country.

We have been doing Telecommunication network installation under various company names and incarnations for 50 plus years (our business is based on the former engineering business operated by the New Zealand Post office) and have seen the development of new methodologies and products over time and believe we can accurately reflect the methodologies and costs for the installation of telecommunications plant.

The following comments apply to the specific numbered sections and appendices in the Beca Document "FFP Corridor Cost Analysis – Report 3, New rates and General Recommendations"

1. Report Scope

   a. The report scope is based around common trenching methodologies for rural and urban applications.

   b. The report does not consider any difference between inside boundary (customer connection) and outside boundary (communal network) installation methodologies and costs. In fact it does not appear to consider the inside boundary methodologies and costs at all.

c. In terms of providing network to each customer the outside boundary trenching requirement is generally around 20m per premise (typical property frontage length in urban situations) and the inside boundary requirement is typically approx. 14m (distance from boundary to the house), so the inside boundary work is a considerable portion of the scope when looking at a complete new network build.

d. Inside boundary trenching is typically quite different to outside boundary trenching as:

    i. It is demand driven by customer connection requests, this makes volume of work difficult to predict.

    ii. It is typically small sections of work (single customer connections) in multiple locations (demand driven) which limits productivity, rather than planned work in long sections where productivity is higher and more predictable.

    iii. Inside boundary trenching can be at much reduced cover and the duct requirements are smaller. Other underground services are less congested, however a lack of plans still presents a high risk of utility strikes, and there is also the need to accommodate ultimate customers' sensitivity around gardens and other specific onsite factors which of their nature involve different considerations.

e. The report also makes no mention of the requirement to install laterals from the main trench line to the property boundary, to provide connection points for each customer.

f. The report mentions trench reinforcement requirements for 3-4 ducts containing over 5000 lines, this methodology is not used at all in New Zealand.

g. The report appears to be based around 50mm and 100mm (internal diameter) ducts which until recently were used to provide capacity for loose tube fibre cable networks and traditional copper cable networks. Please note this architecture has now largely been superseded by PE multiducts (typically 26x5mm microducts contained in a 40-50mm diameter sheath) for the majority of new Fibre to The Home (FTTH) network build that is occurring in New Zealand by all Local Fibre Companies (LFC) and also widely used internationally for FTTH networks.

h. In total the scope does not seem to be accurately based around the real construction methodology, network architecture and costs in the New Zealand situation as mandated in agreements between LFCs and Crown Fibre Holdings (CFH) or by Local Councils and Road Controlling Authorities.

2. Introduction to trenching methodologies

    a. The selection of trenching methodologies referenced is largely complete with one major exception.

    b. That exception is hydro-trenching, which is fast becoming a preferred installation methodology in urban areas. Hydro trenching basically uses a water jet to displace soil to create the trench, with the displaced soil being extracted at the same time using vacuum.

    c. Hydro-trench has the following advantages:

        i. There is much lower risk of damaging existing services (utility strikes) using a water jet and vacuum rather than mechanical plant to extract soil.

ii. Generally a much narrower trench can be dug (minimum width as required for multiducts as low as 40mm wide).

iii. Reduced reinstatement requirements for narrower trenches and a very clean methodology. (Although many councils still require minimum width "reinstatements" including footpaths etc. that can exceed the area excavated or impacted – for aesthetic reasons).

iv. More flexibility to lay close to existing services, this means lay lines can be brought closer to the boundary to reduce lateral requirements.

d. There are also some disadvantages of hydro-trenching:

i. Plant costs are high so high productivities are required to make it cost effective. The hydro-trenching trucks are large so access inside boundary can limit use in this area.

ii. Generally extracted soil is unsuitable for backfill and must be disposed of and replaced, (the narrow trench requirement ameliorates this somewhat), although even for open trench methods most Local Authorities do require the disposal of excavated materials and replacement with clean fill anyway.

e. Generally hydro-trenching is more suited to urban outside boundary trenching, especially in grass berms where high productivity can be achieved.

f. Hydro-trenching is practical in soft/medium/hard soils but is unsuitable for loose rock or hard rock applications.

3. Open Cut Trenching

a. 3.1 Benefits, bullet point 4: states: "Provides best trench access for dealing with underground congestion". Hydro-trenching as detailed above would now be the preferred excavation methodology around congested services due to much lower risk of damage to other services.

b. Generally for telecommunications trenching a minimum trench width would be 200mm or 300mm rather than 400mm referenced

4. Chain trenching

a. This methodology is little used in New Zealand, generally as noted it is most suitable for rural type 1 or 2 soils, and in these situations a mole plough is generally more cost effective.

5. Mole ploughing

a. We agree with this section of the report. Mole ploughs are used extensively in rural areas for Telco trenching (e.g. RBI) for cable and multiduct installation where long runs are possible and economic to deliver.

6. Trench Surface Reinstatement

a. As noted trench surface reinstatement can be a significant cost. This cost is largely determined by local council requirements for minimum widths to be replaced, i.e. the full width of the footpath reinstatement is often mandated rather than just the trench line.

7. Horizontal directional drilling (HDD)

    a. This section notes that directional drilling can be used for 500m to 2km lengths.

    b. While these lengths can be achieved by very large machines in some situations, the reality is that limitations on the loads that can be applied when pulling back telecommunications cables and ducts, and network topology, limits installation lengths to typically 100-150m per drill shot.

    c. Directional drilling also has limited usefulness for inside boundary work as there is often limited space to position the machines, and the typical short (~14m) lengths limit productivity as set up time can be high relative to the distances required. They would generally be a last resort for this application.

    d. Although the directional drilling head can be steered to some extent this is general limited to 25m radius so drilling can be difficult on curved routes.

    e. Hydro-trenching is in many cases now more cost effective than drilling, especially in grass berms.

    f. It should also be noted that there are rock drills in New Zealand that can be effectively used for drilling solid rock in circumstances where it is preferable to avoid open cut rock methods.

    g. Under the benefits section of the Beca report there is a statement that '*Deep and long installations are possible'.* It may be perceived that plant can be installed at any depth to avoid other services but for telecommunications plant the newly installed plant normally needs to be accessed at every second boundary to allow the installation of the connection to the premises being passed so the new plant has to be installed at standard depths which means all other services must be identified by piloting to avoid damage to those other services.

8. Thrust boring

    a. As noted limitations to accuracy and control of the thrust limit this methodology to short sections.

    b. It can be used effectively instead of drilling machines for short shots as set up times, plant costs and working room requirements are reduced.

    c. Pipe ramming is mentioned in this section this methodology can be used occasionally to cross driveways and footpaths without the need to cut the surface.

9. Trenching Methods - Summary of recommendations:

    a. The recommendations are based around 110mm (outside diameter) duct installation. This is no longer the preferred methodology for FTTH networks as noted above.

    b. Hydro trenching also as noted above is now becoming a preferred methodology which needs to be considered in the recommendations.

10. Contractor Discounting.

    a. In the Telco market it needs to be noted that civil/trenching work is largely carried out by numbers of small contracting companies working on contract for one or more of the three large service companies. This allows the service companies to spread the risk in terms of work volumes and locations etc. which would be unsustainable for the individual small companies. The larger service companies also provide much of the regulatory framework required to operate in the NZ environment and systems around say design service, mapping technology, health and safety best practice, software development etc. As a general rule (there will be exceptions) subcontractors tend not to have the systems or risk appetite for the contractual requirements that apply, the financial substance, or corporate longevity to meet the upstream requirements.

b. There are few if any "Tier 1" civil contractors (e.g. the likes of Fulton Hogan etc.) involved in the Telco civils market, and even the three major Service Companies tend to subcontract this work out to small subcontractors where using internal plant and resources to self-deploy is uneconomic or lacks sufficient scale. In part, this trend is driven by the need to rapidly scale up and down to meet variable demand requirements from their clients and ultimate consumer demand.

11. Long term price trends.

a. We concur with the Beca report and further comments in Attachment J: Trenching costs in the Draft Determination, that there is unlikely to be any discount available based on the large scale of the network build, given the widespread use of smaller subcontractors across the regions of the country.

12. Rates for Reinstatement.

a. Minimum width reinstatement for Asphalt is generally 600mm, so 400mm rates are not relevant.

b. 30mm asphalt depth is allowable for footpaths, but there is a good proportion of work on heavy duty driveways or roads which requires increased depth (40-60mm). This does not appear to be allowed for.

c. AC10 asphalt mix is generally used (not AC14), but there is little difference in cost.

d. Most Councils specify 100mm minimum depth of concrete now for footpaths and often 150mm for driveways, so the 70mm rate is largely irrelevant and not used.

e. Some councils (example: Wellington, Napier) require immediate temporary reinstatement in circumstances where it is not practical to do the final reinstatement on the same day as the trenches are closed. This temporary and then permanent reinstatement process does not appear to have been allowed for.

f. Generally for concrete footpath work the full width of the footpath must be replaced (1200mm wide). This also does not appear to be allowed for.

g. There is no allowance for the specialised cobbles or pavers used in many town centre areas, or exposed aggregate surfaces used to a significant extent for driveways and in some cities for footpaths.

h. There is also a note regarding reinstatement in section 12 alluding to the fact that the reinstatement rates provided do not include any allowances for road crossings, road markings, manhole lids, and kerb and channel, leaving these elements potentially unaccounted for.

i. Given all the notes above this element of the reinstatement work appears to be significantly under-priced in the report. Downer has provided a more realistic table of reinstatement costs at the end of this statement.

j. Based on the mix of reinstatement experienced to date on the UFB and RBI projects we estimate the rates supplied by Beca are at least 50% under-priced. A more realistic average would be approximately $60 to $75 per lineal trench metre.

13. Rates for Trench Reinforcement

    a. This methodology is very rarely used for Telco work. Generally route protection of cables carrying 5000+ lines is provided by route diversity (i.e. traffic can be switched between two geographically diverse cables/routes in the event of damage to one of the cables.)

14. Rates for HDPE

    a. The report seems to allow for HDPE ducting up to 12 ducts in one trench. This methodology as mentioned previously has now largely been replaced by blown fibre multiducts for telecommunications networks.

15. Traffic Management

    a. The calculation of approximately $5 per lineal trench metre for traffic management is in line with current costs.

    b. We note the various comments around chain trenching along roads and concur with Beca that this methodology would not be used to any extent in new network build apart from maybe occasionally for long run remote rural applications. Even in that situation, moleplough would generally be more cost effective, and therefore more commonly used.

16. Final Comments

    a. As noted above we believe the report does not accurately reflect the current mix of trenching methodologies and network architecture prevalent in the New Zealand Telco environment.

    b. There does not appear to be any consideration for the different mix of methodologies and requirements for customer lead in work, including the breakout at each second boundary taking the connection point to the boundary.

    c. In terms of reinstatement costs, the report does not appear to reflect some of the mandated requirements of New Zealand local councils, or any reinstatement apart from basic seal or concrete footpath replacement over the trench line. As detailed, there are many different surface types and often there is a requirement by Local Authorities to undertake full width reinstatement.

    d. It is not clear that the Beca report takes into account all the direct and indirect costs incurred in installing plant including costs passed on by third parties, e.g. the cost of locating and protecting existing services, the installation of pits and manholes, the cost of Ground Penetrating Radar to identify other services in congested areas, mapping and as-built plan and post lay record requirements and loading into asset owners' GIS systems.

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Beca report Appendix 2 HDPE Rates tables:

Notes on the Beca Rural price tables:

- No indication is given of the mix/weighting given to various methodologies. Our experience indicates mole-plough and drill are used predominantly.
- Clarifications and assumptions indicate only grass reinstatement is allowed for, this is unrealistic, there will be road crossings and footpaths to consider (low volume but still significant), and in some cases gravel replacement/reinstatement is required when mole ploughing in the road or road shoulder.
- We are unaware of there being any machinery capable of mole ploughing even 1 x 110mm duct in New Zealand, so the fact that rates have been included for mole ploughing multiple 110mm ducts do not appear to be based on any realistically available resource or methodology, and should therefore be removed from the calculations. (Use of 110mm duct is low in rural applications anyway, would be mainly used for drilled road crossings).

Notes on Beca Urban Price tables:

- The cost of reinstatement is likely to be well under-priced (as indicated in reinstatement section above)
- Clarifications and assumptions note that "Rates for Urban trench allow for highest cost reinstatement i.e. imported backfill with 30mm AC 14 Asphalt". This is not the highest cost reinstatement, on a national basis at least 50% will be 100mm concrete footpaths which are much higher cost to reinstate.
- There is no allowance for high cost town centre and CBD type areas.
- There are no rock soil type rates included. Loose and hard rock soils are present in many urban areas in New Zealand. (Auckland, Wellington, Levin, Masterton, Queenstown for example).

The following comments apply to the specific numbered sections in the "Further draft pricing review determination for Chorus' unbundled copper local loop service, Attachment J: Trenching costs"

Downer agree with Chorus, L1 Capital and Analysis Mason submissions (points 1541-1554 in attachment J) that the Chorus UFB and RBI costs are a more accurate indication of real build costs than the Beca analysis.

We disagree with the following specific points in the analysis of this response as follows:

- **1562, (the costs on which Chorus and Analysis Mason base use elements of Chorus copper network where possible)**. This is correct but a large portion of the UFB network (at least 50% +) is complete new network being laid with no reliance on the existing Chorus network and ducts, the costs for this portion of the work are easily separated, and are identical to what any new operator would have to pay for new network installation.

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- **1563, (the UFB and RBI network is not nationwide, and trenching costs are primarily related to Auckland and Wellington)**. This is incorrect, the UFB and RBI network (including Chorus and other LFCs) will reach approx. 80% of the New Zealand population, and includes a wide variety of cities, large and small towns, and rural areas. The UFB and RBI pricing we believe is definitely representative of a nationwide rollout. If this pricing is weighted towards Auckland and Wellington in any way that is because a large percentage of the population is in these two cities, and consequently the same percentage of the network will be built in these two cities.
- **1564-1571, (The Beca data is a well-documented thorough representation estimate of costs)**. As we have indicated above the Beca representation is flawed in terms of reinstatement costs, current installation methodologies, and types of network installed for FTTH networks.
- **1572 (Use of HDPE ducts).** The UFB network being built by all LFC's in New Zealand and many FTTH deployment internationally now use PE Multiducts for air blown fibre networks. HDPE ducts and traditional loose tube fibre cables are no longer commonly used.

Summary of feedback.

1. The Beca report does not accurately represent the practical considerations and applications of the various trenching methodologies and the more recent introduction of hydro-trenching.
2. The Beca report does not adequately cost the actual trench reinstatement requirements as dictated by New Zealand local authorities.
3. The Beca report is based around HDPE ducts and associated network architecture that is not current best practice.
4. The Beca report does not clearly show that it covers the full scope and cost of trenching for new network installation in the New Zealand regulatory environment and taking into account the full range of local working conditions.
5. Downer believe the Chorus and Analysis Mason models if correctly interpreted will provide a much more accurate estimate of the costs of network construction in New Zealand.

Yours sincerely

M Maunsell.

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