

BUILDING THE NATIONAL BROADBAND NETWORK

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INTRODUCTION

From its conception aboard the Prime Minister's RAAF jet in 2009 to its completion on 23 December 2020,¹ the National Broadband Network ('NBN') has demonstrated remarkable resilience. It has survived six Prime Ministers, four Communications Ministers, countless Senate Committees, parliamentary reviews and investigations, bushfires, floods, cyclones and a pandemic.

During that time, endless pages of newspaper copy have been dedicated to opining on Labor's all-fibre 'FTTP' versus the Coalition's 'multi-technology mix' and the pros and cons of each.

The purpose of this article is not to opine on the merits of either NBN model or Australia's broadband policy; rather, it is to explain how the government-owned company created to build and operate the NBN, NBN Co Limited (NBN Co), together with its contractors and other industry stakeholders, navigated the political landscape and adopted collaborative contracting principles to successfully build Australia's largest infrastructure project.

We also seek to highlight some of the lessons NBN Co's experience offers future nation builders in constructing major infrastructure projects.

CREATION OF NBN CO

On 7 April 2009, the then Labor government announced the creation of NBN Co to 'build and operate a new super fast National Broadband Network',² which would be 'the largest nation building infrastructure project in Australian history'.³ This announcement followed the government's decision to terminate its existing NBN Request for Proposal process on the basis that none of the national proposals offered value for money.

The government-owned NBN would connect homes, schools and workplaces with optical fibre (fibre to the premises or 'FTTP') and use next generation wireless and satellite technologies for people in remote and rural Australia.⁴ The NBN was to be a wholesale-only, open-access telecommunications network to deliver high-speed broadband services to Australians and formed part of the then government's reform of the telecommunications market to separate the retail and infrastructure operations of Telstra.

NBN Co was incorporated as a Government Business Enterprise ('GBE') operating under the then *Commonwealth Authorities and Companies Act 1997* (Cth),⁵ the Commonwealth Government Business Enterprise Governance and Oversight Guidelines October 2011 and the *Corporations Act 2001* (Cth) to deliver the NBN. In December 2010, NBN Co's Shareholder Ministers⁶ released NBN Co's first Statement of Expectations ('SoE'), which provided direction to NBN Co regarding the construction and operation of the NBN.

The SoE relevantly provided:

*... the government's objective for NBN Co is to connect 93 per cent of Australian homes, schools and businesses with fibre to the premises technology providing broadband speeds of up to 100 megabits per second, with a minimum fibre coverage of obligation of 90 per cent of Australian premises.*⁷

FTTP DEPLOYMENT — 2011–2013

In mid-2009, the NBN Co Board appointed Mike Quigley as NBN Co's inaugural Chief Executive Officer and Patrick Flannigan as Head of Construction.

One of the first and most important tasks for NBN Co's executive team was to negotiate access to

Telstra's existing network facilities and infrastructure in which to deploy the NBN. After two years of complex negotiations, in June 2011, NBN Co and Telstra signed the Definitive Agreements (Telstra DAs).⁸ An analysis of the Telstra DAs is beyond the scope of this article; however, they provided the contractual framework for NBN Co to access and use existing Telstra infrastructure to build and operate the NBN.

Telstra's infrastructure included:

- lead-in conduits through which NBN fibre could be connected to each premises;
- underground ducts and pits through which the NBN fibre could run;
- dark fibre; and
- rack spaces in Telstra exchanges.

The Telstra DAs comprised a complex suite of agreements and ultimately ensured NBN Co would not be required to duplicate Telstra's existing infrastructure to deploy the NBN.

In parallel with negotiating the Telstra DAs, NBN Co developed its proposed contracting model to deploy the NBN. Given the immense size of the Australian continent, NBN Co developed a network deployment plan designed to rollout the NBN in a modular manner with defined network boundaries (rollout regions). The rollout regions were defined as 'fibre serving area modules' or 'FSAMs', each an area typically serving ~2,500 premises in the fixed line footprint (smaller for fixed wireless areas and the remainder being served by satellite).⁹

The first test sites for the NBN were at various locations in Tasmania, Melbourne, Townsville and South Australia. In June 2010, NBN Co invited 21 Australian companies to tender for the rollout of the NBN.

This followed a request for capability statement process in March 2010, to which 45 companies responded.¹⁰ As a result of higher than anticipated prices from the tender respondents, in April 2011, NBN suspended its network construction tender. NBN proposed a new approach to the market for the construction of the fibre network, taking into account 'recent supply chain arrangements, volume certainty, a gainshare for continuous improvement, and involve a national construction footprint'.¹¹

Notwithstanding the suspension of its initial network construction tender, NBN Co remained committed to outsourcing the construction of its fibre network rather than employing its own workforce to do so. As Mr Quigley explained in response to questions from the Joint Committee on the National Broadband Network:

*I think there are very capable companies in Australia to do that type of work. I think it would be a pity if we did not use them, and I am confident that we will— notwithstanding the suspension of the original process—find an accommodation that will be good for the contractors—we expect them to make money—but also good for the Australian taxpayer.*¹²

NBN Co's approach to market involved the development of the Network Services Master Agreement ('NSMA') under which NBN Co divided the construction of the fibre network into Modules based on specific geographic regions and comprising separate Contract Instructions for each FSAM.

The NSMA:

- operated as a standing offer agreement under which the parties could agree to enter into Modules for specific packages of work;

- contemplated a 'design then construct' delivery method, under which the contractor designed (under one Contract Instruction) and then separately constructed (under a subsequent Contract Instruction) the relevant works in each FSAM;

- provided contractors with certainty of volume of work in their respective geographical area; and

- sought to incentivise performance (at least contractually) by a traditional design and construct risk allocation (albeit tailored to the delivery method and the particular features of the local network / distribution network rollout) with the contractor assuming significant time, cost and quality risk.

NBN Co initially contracted four packages of work for its fibre network construction:¹³

- Work Package 1 (July 2011): Queensland, New South Wales and the Australian Capital Territory (Silcar);
- Work Package 2 (September 2011): Victoria (Transfield Services) and Western Australia (Syntheo Joint Venture);
- Work Package 3 (November 2011): South Australia and Northern Territory (Syntheo Joint Venture); and
- Work Package 4 (March 2012): Tasmania (Visionstream).

Despite NBN Co's best efforts, the FTTP rollout was unable to keep pace with NBN Co's construction targets set out in its first (2011–2013) or second (2012–2015) Corporate Plans. The then Communications Minister, Stephen Conroy, has since conceded these construction targets were 'overly ambitious' and overestimated the capacity of the construction industry.¹⁴ The FTTP rollout delays ensured the NBN was a key issue at the federal election

in September 2013, at which the Coalition government was elected on its platform of a fibre-to-the-node ('FTTN') NBN utilising existing copper cables to connect the final few hundred metres of the NBN to the home or business.

CHANGE OF GOVERNMENT AND STRATEGIC REVIEW—2013

In October 2013, the incoming Coalition Shareholder Ministers of NBN Co, the Hon Malcolm Turnbull MP, Communications Minister, and Senator the Hon Mathias Cormann, Finance Minister, commissioned a strategic review of NBN Co (Strategic Review). The Strategic Review, published on 11 December 2013, found that the rollout of the FTTP network had been affected by several factors, including:

- complexity in process and design tools;
- delays in NBN Co producing Network Design Documents (a necessary input to enable the contractors to produce Detailed Design Documents) taking on average 226 days compared to a target of 90 days;
- delays in turnaround on Detailed Design Documents by contractors (to enable construction documents to be issued);
- construction delays, in part, due to the complexity of the interfaces between NBN Co and its contractors, the uniqueness of an infrastructure build of this scale and nature in Australia, and the lack of deep project management resources, particularly as the volumes increased;
- ineffective collaboration between NBN Co and its contractors in resolving contract, design and construction issues; and
- delays in remediation caused by issues with asbestos.¹⁵

The Strategic Review found that the above factors (among others) had resulted in a backlog of commercially contentious issues, pressure on rates paid to contractors and subcontractors, and stalled mobilisation.¹⁶

The Strategic Review also highlighted that the inherent forecasting risk in completing the NBN rollout 'would challenge the world's largest telecommunications and construction organisations'.¹⁷ The Strategic Review recognised this risk could not be removed:

There is well established global research that shows that cost overruns on large infrastructure projects are the norm rather than the exception. Global experience shows that nine out of 10 large projects will have substantial cost over-runs and that the planning process is inherently unreliable. The more complex and unprecedented (unknown) the project, the larger the relative overrun is likely to be. Data from a 2009 study¹⁸ shows that cost overruns across 20 countries by project type as follows: rail projects (58 projects in study)—average cost overrun of 45 per cent; bridges and tunnel projects (33 projects in study)—average cost overrun of 34 per cent; road projects (167 projects in study)—average cost overrun of 20 per cent. This is also observed to be true for many telecommunications projects. For example, increases on three fibre projects across the United Kingdom, New Zealand and the United States range from ~20–30 per cent above original estimates. The most common causes for cost overrun (in order) are material price escalation, poorly defined scope, contractual disputes, time delay, design creep, and lower than expected productivity improvement.¹⁹

The Strategic Review evaluated several alternatives to an all-FTTP rollout deploying

different technology mixes and recommended that NBN Co implement an Optimised Multi-Technology Mix ('MTM') approach to rolling out the NBN. The MTM approach involved deploying the NBN using the following technologies (in addition to fixed wireless and satellite):

- FTTP to ~20–26 per cent of premises;
- FTTN to ~44–50 per cent of premises (including FTTB/dp);
- Fibre to the basement / distribution point (FTTB/dp); and
- Hybrid fibre coaxial (HFC) utilising the existing Telstra and Optus networks to ~30 per cent of premises.²⁰

Upon releasing the Strategic Review on 12 December 2013 and endorsing the MTM approach, the new Executive Chairman of NBN Co, Dr Ziggy Switkowski said:

The NBN can be rolled out faster and at a much lower cost by combining proven technologies with existing capable networks.

By 2019, at least two-thirds of Australians in the fixed-line footprint would have access to download speeds of up to 100Mbps from NBN Co compared to only 57 per cent under the re-evaluation of the previous plan. The proposed model could save taxpayers more than \$31 billion compared to the current Fibre to the Premises-only rollout. It would also mean less disruption and less invasiveness to the homes and driveways of millions of Australians.²¹

NBN Co, under Dr Switowski's leadership, refreshed its executive team and Board to deliver the MTM NBN. On 2 April 2014, Bill Morrow, the then Chief Executive Officer of Vodafone Hutchison Australia, was appointed as NBN Co's Chief Executive Officer, replacing Mike Quigley, who had announced his retirement in July 2013.

MTM IMPLEMENTATION— 2014–2015

The implementation of NBN Co's MTM approach necessitated the creation of a bespoke deployment contracting model to replace the NSMA, and a wholesale renegotiation of the Telstra DAs. The revised Telstra DAs, signed on 14 December 2014, progressively transferred ownership of elements of Telstra's copper and HFC networks to NBN Co,²² which enabled the NBN to be deployed over those networks. The revised Telstra DAs provided the foundation for NBN Co to deploy the MTM NBN.

The first phase of MTM build activity, after some initial FTTN trials, comprised a 1000 node trial across Queensland and New South Wales. On 26 June 2014, NBN Co engaged Telstra under the Joint Deployment Works Contract ('JDWC') to plan, design and construct the 1000 nodes to test the delivery of NBN using FTTN technology.²³ While the JDWC was intended as a trial engagement only, this represented Telstra's first significant involvement in the NBN rollout as a network contractor, rather than in its existing role as infrastructure owner.

The first scale MTM deployment contract was signed with Telstra on 19 December 2014—the Planning and Design Services Agreement ('PDSA'). Under the PDSA, Telstra was engaged to prepare network plans and designs to support NBN Co's MTM NBN rollout, including FTTN, FTTB and FTTP. NBN Co also signed PDSAs with two other leading network designers. The scale MTM model departed from the 'design then construct' model under the NSMA in which the same contractor would be engaged to design and then construct the NBN in the relevant FSAM. Addressing concerns regarding design delays identified in the Strategic Review,

NBN Co engaged separate design contractors (under the PDSA) and construction contractors (under the MIMA—described below) to deploy the MTM NBN.

In parallel with the PDSA, NBN Co developed its new standard construction contract, the Multi-technology Integrated Master Agreement ('MIMA'), under which NBN Co would deploy the MTM NBN from 2015 until its completion in 2020.

On 10 June 2015, NBN Co announced the signing of the first tranche of MIMAs with its construction contractors in the following terms:

... nbn has agreed a new contracting model with the Australian construction industry.

The performance-based contracts aim to increase significantly the quality and speed of the rollout to homes and businesses in the fixed-line footprint that will make up the vast majority of connections to the nbnymbol™ network.

The terms represent a marked departure from the old commercial model which guaranteed large volumes of work to suppliers in specified states and regions regardless of performance but also placed upon them a high administrative burden and no competition for that work.

Instead, the new contracts offer flexible volume commitments, competition between delivery partners, and pricing based on outcomes rather than inputs.

nbn CEO Bill Morrow said:

'What this means is that the performance of our construction partners, the quality of their work and their adherence to safe work practices will determine how much additional work they will receive.'

'We have worked closely with the industry to reduce the complexity of our contracts to make them

*easier to administer and to reward good work as we gear up to accelerate the rollout.'*²⁴

A second tranche of MIMAs were awarded to construction contractors in September 2015. NBN Co's new MTM operating model, as described in NBN Co's media release above, represented a significant shift along the spectrum of construction contracting from the traditional design and construct risk allocation to a bespoke collaborative management-style contract. NBN Co's MIMA and PDSA contracts did not fit neatly within a recognised form of project delivery and contained elements of managing contractor and alliancing, without the elements of a pure project alliance.

The key elements of the MTM contracting model included:

- a collaborative relationship between NBN and the contractor, including several joint governance forums and a focus on early resolution of disputes;
- non-binding forecasts of anticipated volume of work rather than fixed volume commitments;
- consultation between the parties regarding the volume and schedule of work;
- performance management via a comprehensive KPI regime to promote competition between contractors;
- work allocation based on contractor performance;
- proactive innovation mechanisms;
- streamlined variation processes;
- payments based on forecast volume of work and actual cost of work performed, plus a fixed margin;
- painshare / gainshare mechanisms; and
- flexibility for NBN Co:

- to amend the scope and regions in which the contractor performed work; and

- to remove and reallocate work depending on contractor performance.

The acceleration of the NBN deployment during 2015 necessitated the engagement of contractors to operate and maintain the MTM NBN. NBN Co developed its bespoke Operations and Maintenance Master Agreement ('OMMA') based on the same principles of flexibility, competition and incentives for high performance as contained in the MIMA and PDSA. NBN Co awarded OMMAs to three contractors, including Telstra, on 21 December 2015.²⁵

By the end of 2015, NBN Co had met or exceeded every target the Board had set for the company and nearly 1.7 million premises could order an NBN service through its retail service providers ('RSPs').²⁶

NBN HFC ROLLOUT COMMENCES—2016

From late 2015 to April 2016, NBN Co and Telstra were engaged in intensive negotiations to commence deployment of the NBN on Telstra's HFC network (which NBN would progressively acquire under the revised Telstra DAs). On 21 December 2015, NBN Co and Telstra signed a memorandum of understanding ('MoU') in relation to an engineering, procurement and construction management ('EPCM') contract under which Telstra would manage the design and build of the NBN on its HFC network, an estimated 34 per cent of the NBN footprint. NBN stated in relation to the MoU:

The MoU between Telstra and nbn relates to design and construction management. The proposed EPCM also provides for Telstra to undertake self-performed work (e.g. in

exchanges). Work under the proposed EPCM will also continue past RFS (e.g. management of nbn MIMA contractors, some Telstra self-performed work and defects liability work). All product development, related activities with retail providers, and work required once end-users are able to order a connection, continue to be managed by nbn.²⁷

The parties continued negotiations throughout early 2016 and signed the HFC Delivery Agreement ('HDA'), a bespoke form of EPCM contract, on 11 April 2016. Under the HDA, Telstra was engaged to carry out the design, part of the construction and the construction management of the remainder of the work under the MIMAs (Telstra was not a MIMA contractor) required to extend the NBN network over HFC.

The construction activities under the HDA were generally split into in-exchange works and limited upstream field activities, which Telstra performed directly, and field construction activities, which Telstra managed as NBN Co's agent under the MIMAs.²⁸ The HDA included a bespoke acceleration model aligned with NBN Co's rollout schedule to incentivise Telstra to meet or exceed NBN Co's targets.

Telstra was uniquely placed to perform the role as it was the then owner of its HFC network with significant experience in HFC design and construction. The Strategic Review had noted the potential for NBN Co to engage Telstra to perform tasks in its areas of expertise.²⁹ While Shadow Minister for Communications, Mr Turnbull had also expressed his view that Telstra should have been engaged to complete at least part of the NBN build.³⁰

The ACCC acknowledged that using Telstra's expertise would contribute to a quicker rollout of the NBN; however, it expressed concern that competition issues may arise from agreements that involve Telstra in the construction and maintenance of the NBN, including the HAD.³¹ Once the NBN build on the HFC network was completed, it was handed to NBN Co for operation.³²

NBN MTM SCALE ROLLOUT—2016–2020

The contracts for the NBN MTM now in place, NBN Co scaled its rollout of its fixed line network and expanded its footprint towards its goal of 'eight million happy homes' by end of 2020.

The key milestones of the rollout during this period included:

Date	Milestone
17 August 2016	3 million premises able to order an NBN service ³³
6 October 2016	Launch of 'Sky Muster II', NBN Co's second broadband satellite ³⁴
21 December 2016	NBN Co signed contracts for the deployment of FTTC ³⁵
8 February 2017	4 million premises able to order an NBN service ³⁶
31 May 2017	5 million premises able to order an NBN service ³⁷
23 August 2017	6 million premises able to order an NBN service ³⁸
16 August 2018	7 million premises able to order an NBN service ³⁹
31 December 2018	8 million premises able to order an NBN service ⁴⁰
24 July 2019	10 million premises able to order an NBN service ⁴¹
11 August 2020	11.7 million premises able to order an NBN service ⁴²
30 June 2020	NBN volume build complete ⁴³
23 December 2020	NBN declared built and fully operational ⁴⁴

It was not all smooth sailing for NBN Co during this period and the company faced criticism on several fronts including its decision to abandon scale deployment of the NBN on the Optus HFC network,⁴⁵ the pause of activations on its HFC network to improve service reliability,⁴⁶ RSPs compensating customers for limited NBN speeds,⁴⁷ and AFP raids on Labor offices arising from leaked internal NBN Co documents.⁴⁸

NBN Co's final year of initial construction, 2020, was perhaps its most challenging. The company was required to overcome the 'black summer' bushfires on Australia's east coast, widespread flooding, cyclones, and the onset of the COVID-19 pandemic. These events significantly hampered the ongoing construction of the NBN, in circumstances where many Australians, confined to their homes under widespread lockdown orders, relied on the NBN to work from home and support their way of life. NBN Co, its RSPs, and the telecommunications industry more broadly, played a critical role in enabling Australians to comply with lockdown orders, socially distance and work from home during 2020–2021.

A joint CSIRO–NBN Co study demonstrated that levels of remote working increased sharply in March 2020 from a baseline of around five per cent to 15–20 per cent of households showing high levels of uploads during working hours, which was likely to equate to 30–40 per cent of the labour force.⁴⁹ Against the backdrop of these events, NBN Co continued to deploy the fixed line network and, later that year, on 23 December 2020, the Minister for Communications, Cyber Safety and the Arts made a formal declaration under section 48 of the *National Broadband Network Companies Act 2011* (Cth) that the

NBN should be 'treated as fully built and operational'.

The rollout of the MTM NBN fixed line network was substantially completed under the MIMA, PDSA and HDA contracts described above.

FIXED WIRELESS AND SATELLITE NETWORK DEPLOYMENT — 2011–2020

The deployment of NBN Co's fixed wireless and satellite networks (servicing customers outside NBN's fixed line footprint) shared many of the challenges faced in the fixed line space. In July 2011, NBN Co announced its first commercially available services over the NBN via its Interim Satellite Service.⁵⁰ For its fixed wireless network, NBN Co selected Ericsson on 1 June 2011 as the contractor to design, build and operate its 4G fixed wireless network, in a 10-year contract worth \$1.1 billion.⁵¹ The Ericsson contract was a turnkey arrangement as NBN Co, as a start-up company, did not possess the specialised in-house construction or operational expertise.

NBN Co engaged Optus as its contractor to operate its two purpose-built satellites,⁵² Sky Muster I launched in October 2015,⁵³ and Sky Muster II launched one year later in October 2016.⁵⁴

As at the NBN build completion in 2020:

- NBN Co had constructed ~2,300 fixed wireless sites and deployed more than 18,000 radio cells;
- NBN Co's satellite network was dimensioned for the predicted capacity required at 2030, the nominal end-of-life date for NBN Co's Sky Muster I and II. The space segment of NBN Co's satellite capacity was fully in place upon the launch of Sky Muster II in October 2016;⁵⁵ and

- together, NBN Co's fixed wireless and satellite networks were ready to connect to over one million premises.⁵⁶

TRANSITION FROM BUILD TO RUN — 2017–2020

NBN Co's transition from the builder of Australia's largest infrastructure project to a sophisticated telecommunications wholesaler with a focus on customer experience commenced around mid-2017 at the half-way point of the build. At this stage, NBN Co had grown from 200,000 active users in mid-2014 to over 2.2 million in mid-2017 and revenue had grown over the same period from ~\$60 million to ~\$1 billion.

NBN Co recognised its organisational model needed to evolve from 'network build' to 'network operate and optimise' with a far greater emphasis on customers—both RSPs and end users.⁵⁷ The wholesale supply arrangements between NBN Co and its RSPs are beyond the scope of this article; however, NBN Co continued to rapidly increase its active users on the NBN and by the completion of the build in 2020, more than 50 RSPs had signed NBN Co's Wholesale Broadband Agreement and 7.9 million premises had connected to the NBN.⁵⁸

While NBN Co's focus may have shifted from a build to run organisation, today it continues to develop and upgrade the NBN. In March 2022 alone, NBN Co announced a \$750 million investment to upgrade the fixed wireless network to 5G⁵⁹ and a further \$4.5 billion to upgrade FTTN premises to FTTP technology.⁶⁰ In FY22, NBN Co rolled out 17,902 kilometres of fibre in network investment upgrades—greater than the distance between Sydney and London.⁶¹

NEW GOVERNMENT, NEW STATEMENT OF EXPECTATIONS—2023 AND BEYOND

The Labor government has committed that 90 per cent of Australians in the fixed line footprint—over 10 million premises—will have access to world-class gigabit speeds by 2025.⁶²

Promptly after commencing their new positions, NBN Co's Shareholder Ministers, Senator the Hon Katy Gallagher, Minister for Finance, and the Hon Michelle Rowland MP, Minister for Communications, issued a new Statement of Expectations for NBN Co on 19 December 2022.⁶³ From a network rollout / upgrade perspective, the new SoE ensures NBN Co will be busy implementing the following enhancements to the NBN:

- upgrades to increase the proportion of premises with full fibre access, ensuring that 90 per cent of premises in the fixed line footprint have access to peak wholesale download speeds of up to one gigabit per second;
- upgrades to the fixed wireless network and improving satellite services and data allowances; and
- proactive network planning, including for the transition of satellite services, and positioning itself to utilise emerging and future technologies to meet future demand, promote innovation, improve services and generate efficiencies in service delivery.

The new SoE also requires NBN Co to mitigate the effects of changing climate and natural disasters (which NBN Co experienced on an unprecedented scale in 2020) by developing disaster and crisis management plans and restoring services to disaster affected communities as soon as possible.

LEGACY AND LESSONS FOR FUTURE NATION BUILDERS

NBN comfortably holds the mantle as Australia's largest infrastructure project. From a construction contracting perspective, what legacy does NBN leave and what lessons may be learned?

First, NBN Co's achievement to complete the NBN build on schedule by 2020 is remarkable. NBN Co, its Board, executives, and employees, were subjected to intense political and media scrutiny since its inception. The external interest in NBN Co was understandable, however, the company rarely enjoyed clear air to implement the strategy set out in its various SoEs. Rarely has an infrastructure project stimulated such polarising political views. To leading commentators, the idea that the construction of telecommunications infrastructure would be one of the most heated political debates for over a decade sounds absurd,⁶⁴ yet that is what NBN Co has endured.

Politics aside, NBN Co developed a bespoke contracting model that has enabled completion of the

NBN on schedule. Lessons from NBN Co's experience in building the NBN include:

POWER OF EFFECTIVE RELATIONSHIP CONTRACTING

'Relationship contracting' is a broad term that may include various project delivery models, each of which include elements of risk sharing and mutual benefit for the client and contractor. Successful relationship contracting is ultimately determined by the strength of personal relationships, otherwise, despite lawyers' best efforts, the collaborative principles remain simply words on a page. Due to the nature of the NBN project and the duration of the build from 2010 to 2020, NBN Co developed deep working relationships with each of its contractors and focused intensively on project governance and open communication. Further, NBN Co promoted long contract terms to ensure the parties were incentivised to invest in the relationship and elevate it above the traditional principal-contractor dynamic.

Examples of the long contract terms include:

Deployment Contract	Term
Fixed Wireless MSA	10 years
Network Services Master Agreement	7 years
HFC Delivery Agreement	5 years
Multi-technology Integrated Master Agreement	5 years
Operations and Maintenance Master Agreement	4 years
Planning and Design Services Agreement	4 years

NBN Co scaled its resources over time in line with the build demands and was well placed to invest significant time and effort in implementing rigorous governance structures with its contractors. It was not a set and forget model—NBN Co and its contractors regularly co-located at each other's offices, created joint offices and project teams and genuinely

sought to operate together with its contractors as 'one team'.

The most important relationship for NBN Co to manage was Telstra. Telstra, initially excluded from the NBN build after lodging a non-conforming tender, ultimately became an ally for NBN Co and a key partner in achieving completion of the build by 2020. Malcolm Turnbull considers the

relationship between NBN Co and Telstra changed from one of bitter animosity to a collaborative partnership.⁶⁵

ALLOCATE WORK AND RISK TO THE PARTY BEST ABLE TO PERFORM AND MANAGE IT

This may seem trite, however, NBN Co adopted contrasting risk allocation models over the duration of the rollout and its experience is instructive. NBN Co's initial contracting model from 2011–2013 represented a traditional 'hard dollar' risk allocation with the contractors bearing much of the time, cost and quality risk.

The initial NSMA contracts contained fixed lump sum pricing, fixed completion dates for design and construction, payment of liquidated damages for delay, significant risk transfer to the contractor and placed a heavy contract administration burden on the parties. Whilst contractually, NBN Co had transferred much of the risk of rollout delay to the contractors, in the public's eyes, NBN Co was ultimately responsible for the progress of the NBN rollout and whether it met its targets.

The NSMA liability regime was standard in the context of traditional fixed time / fixed price contracting, however it sought to incentivise by punishing poor performance rather than rewarding exceptional performance.

In developing its new contracting model for the MTM NBN rollout, NBN Co reset the relationships with its construction contractors, resolved legacy claims and provided a contractual framework to maximise contractor performance. NBN Co's MTM contracts removed the traditional 'hard dollar' contracting elements and incentivised its contractors to perform by aligning interests and embedding a performance-based contracting model. NBN Co embraced rather than transferred

its delay risk and rewarded high-performing contractors with a tailored gainshare mechanism, acceleration incentives and greater work volumes. Similarly, contractors who did not perform or meet its KPIs experienced lower work volumes. While there was an inevitable lag in completing the final works as the incentive of future work diminished, the new model enabled the fast and efficient scale rollout to most premises.

NBN Co also embraced the principle that it should perform the work when it was best able to do so. For example, NBN Co procured and supplied the equipment to build the NBN to contractors on a free issue basis. NBN Co directly entered long term contracts with equipment suppliers and managed these relationships itself. NBN Co retained the risk in the performance of the network equipment and did not seek to transfer this risk to its contractors. If the equipment was faulty, NBN Co's contractors simply returned it to NBN Co, who would then manage the issue with the supplier.

PACKAGE WORK TO INCENTIVISE PERFORMANCE AND PROMOTE COMPETITION

NBN Co's initial deployment model, involving rollout regions or FSAMs of ~2,500 premises, formed the basis for its work packaging model from which NBN Co did not deviate for the duration of the rollout.

The work in each FSAM was issued to contractors as follows:

- separate Contract Instructions for design and construction under the NSMA;
- a 'Work Release' for design under the PDSA; and
- a 'Work Release' for construction under the MIMA.

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Packaging of work in this way enabled NBN Co to accurately forecast work volumes and align work to forecast for each construction contractor. In certain circumstances, contractors were allocated work in regions comprising multiple FSAMs, however, the fundamental packaging model remained unchanged.

Each project will be different, however, to the extent work can be packaged and distributed across multiple contractors, this may be of benefit to the principal.

The NBN, the largest single piece of infrastructure in Australia's history, represents a success story for all of those involved in its design, construction and ongoing operation. In this article, we have sought to offer some insight into how the NBN transformed from a sketch aboard an RAAF flight from Sydney to Brisbane to a colossal telecommunications network now available to service over 12 million Australian households and businesses.

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Disclosure: The authors worked in-house at NBN Co for various periods during the NBN rollout and continue to advise the company.
