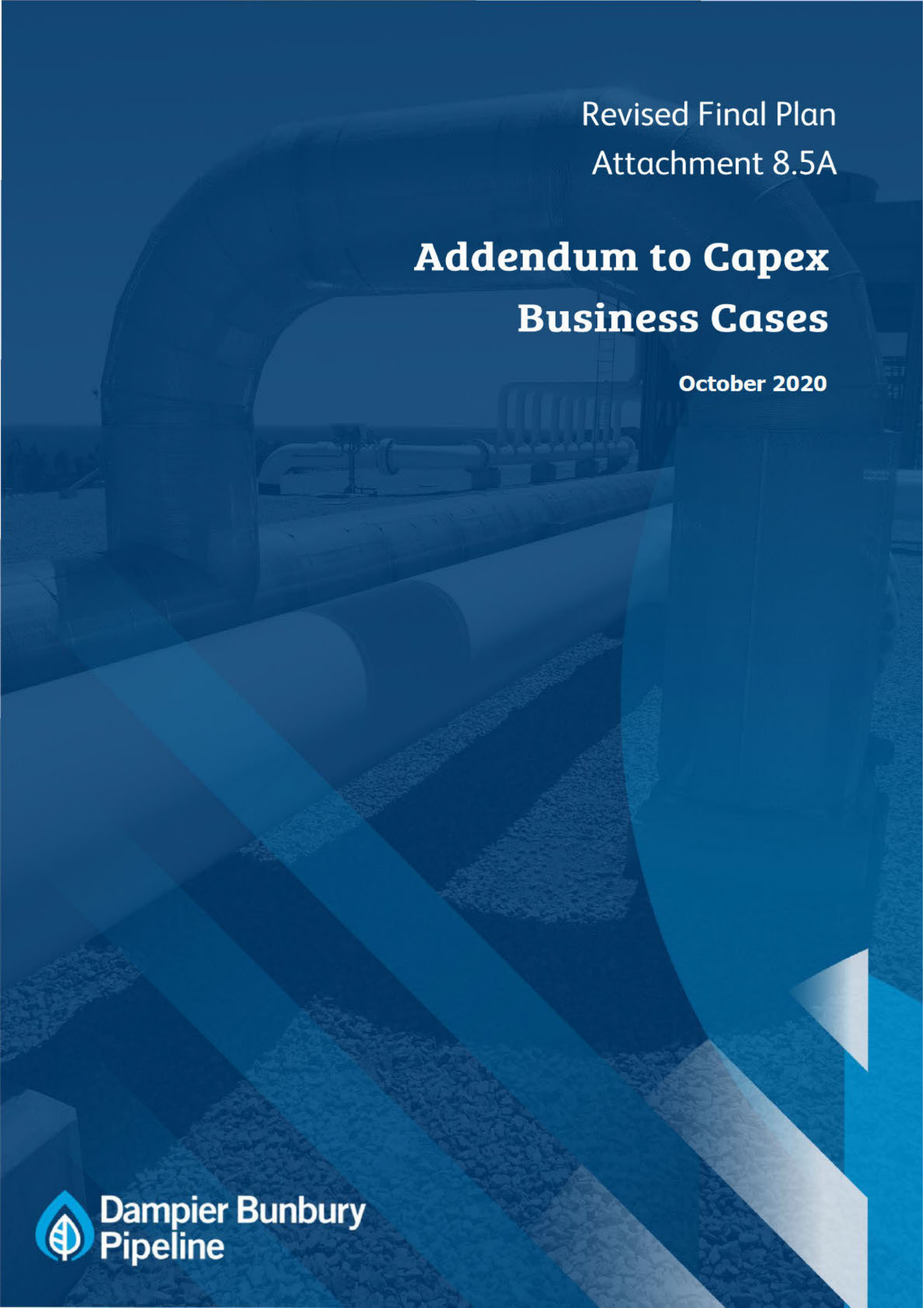
Revised Final Plan
Attachment 8.5A

Addendum to Capex Business Cases

October 2020



Dampier Bunbury Pipeline

Contents

DBP01 Compressor Stations

Project Summary	
Project	Compressor Stations
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	The original business case 'Compressor Stations - DBP01' (prepared in Q3 and Q4 2019) estimated $33.0 million for end of life replacement, proactive works and upgrades required to maintain the performance of Compressor Stations on the DBNGP. The next five years (AA5) will see a number of assets reach their 15 and 30-year replacement cycles. There are also a number of software items and pieces of equipment that either are or will become obsolete in AA5. In its AA5 Draft Decision, the Economic Regulation Authority (ERA) accepts that some of the work deferred in the AA4 period would need to be carried out in AA5 to ensure the safety and integrity of services, increasing the level of expenditure required compared to AA4. This conclusion is supported by technical advice from its consultants EMCa, that DBP's explanation of the driver for the increase in the AA5 capital expenditure (the timing of replacement cycles) is reasonable. However, the ERA has determined a reduction of 20% to $28.9 million (real unescalated dollars of December 2019), contending that we have the ability to deliver a portion of our planned work for less than the amount forecast. The ERA has also determined there is scope to reduce investment levels whilst still achieving 100% reliability. This 20% reduction is based on technical advice that we can prudently defer some of our planned AA5 compressor stations work at no material risk to the DBNGP's performance, reliability or attainment of our asset management objectives. We have taken on board the ERA and EMCa's feedback and conducted a review of the compressor stations program of work, based on the latest information, to assess what work can be prudently deferred. A summary of our review is provided in Appendix A. We submit that the 20% assumption by EMCa is not achievable (nor has it been arrived at on a reasonable basis), however, a deferral of approximately $2.6 million, or 7% can be achieved. This revised forecast is based on a reassessment of the prudence of all projects in the compressor stations portfolio. We have identified one project where detailed design (which was not available at the time of the initial submission) indicates the project can be delivered at a lower overall cost, and three projects that can be deferred by a year to push costs into the following AA period (AA6) without materially increasing asset risk. We have also reviewed the compressor station portfolio as a whole to identify if there are any opportunities to integrate proposed projects with related projects at a lower combined cost. However, we have found no further obvious opportunities to optimise the program beyond the project bundling/optimisation already built into the forecast. We will, however, endeavour to deliver the program for the lowest sustainable cost and seek savings in-period where practicable.
Estimated cost	The estimated total cost of the Compressor Stations program is $33.0 million. The total cost in each year is shown in the table below.

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Compressor Stations	9,118.5	5,125.0	5,740.0	7,190.0	5,835.0	33,008.5

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	This capital expenditure conforms with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. We have tested EMCa's proposed 'option 3a' and consider the 20% reduction would materially impact risk and our ability to meet to our asset management objectives. However, the revised 7% reduction will allow us to achieve a saving during the period while not compromising risk and/or asset management objectives. **NGR 79(2)** – renewal of rotating, electrical control and instrumentation (ECI), power supply and mechanical equipment, repair/rectification and proactive works, are all necessary to protect from corrosion and safety hazards or maintain performance, ensuring the continued operation of compressor stations. Compressor station functionality is a core process in the transportation of gas required to meet contracted obligations and maintain the safety and integrity of services along the DBNGP. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case addendum. The revised forecast is based on a review of the prudence of all compressor station projects, updating assumptions (for example with regard to detailed design) to reflect the most up to date information where practicable. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Hugo Kuhn, Head of Engineering
Reviewed by:	Hugo Kuhn, Head of Engineering
Approved by:	Tawake Rakai, GM Transmission Asset Management
Other Relevant Documents	
This addendum should be read in conjunction with: • the original business case 'Compressor Stations – Capex DBP01', which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5); and • our responses to information requests EMCa09, EMCa10, EMCa34.	

1.1 Original business case

Our original business case 'Compressor Stations – Capex DBP01' included $35.6 million to complete work deferred from AA4 while delivering a prudent forward-looking compressor station program in AA5. These works are necessary to maintain the performance of our compressor station assets.

The compressor station works program comprises the following work categories:

- **end of life asset replacement** – this includes replacing rotating equipment, electrical control and instrumentation (ECI), power supply, and mechanical equipment;
- **proactive works** – activities to protect compressor station assets from corrosion and safety hazards, or required to maintain current performance or improve deteriorated performance; and

- **upgrades** – this includes upgrades of corrosion protection, ECI, software, rotating and mechanical equipment.

Over AA5 we will see a number of assets reach their 15 and 30-year replacement cycles. There are also a number of software items and equipment that either are or will become obsolete in AA5.

In the original business case, we considered three options:

- Option 1 - Maintain the volume of activity and expenditure levels undertaken during the AA4 period;
- Option 2 - Move to a replacement on failure policy for all compressor stations projects; and
- Option 3 - Deliver the volume and activities identified in the Asset Management Plan (AMP) as required, applying good asset management practice, and adopting emerging techniques / technologies where appropriate.

We recommended Option 3 because the option aligns with our Operational Risk Framework, asset management principles and the primary manufacturer's specification. This option supports our vision and values and delivers for its customers on public safety, reliability of performance and customer service.

1.2 ERA Draft Decision

In its Draft Decision, the ERA accepts that some of the work deferred in AA4 needs to be carried out in AA5 to ensure the safety and integrity of services, increasing the level of expenditure required compared to AA4. This conclusion was based on technical advice from its technical experts (EMCa) that DBP's explanation that the driver for the increase in the AA5 capital expenditure (the timing of replacement cycles) is reasonable.[1]

However, the ERA has disallowed a portion of the forecast capex for the compressor station portfolio of work based on EMCa's advice that:

- *DBP's pipeline supply performance reliability of 100 per cent for the last two years indicates that there is some scope for reducing investment in the 'Compressor stations' program and still satisfying the 100 per cent reliability target.*
- *DBP has demonstrated in previous access arrangement periods its ability to deliver a portion of its planned work for less than the amount forecast, including due to finding that the condition of assets was sufficient to allow deferral and integrating proposed projects with other, related projects at a lower combined cost.*[2]

The ERA considers:

> *that DBP is likely to be able to deliver the work comprising this business case at less than DBP's proposed cost by deferring some of its planned work to the next access arrangement period or by delivering the work at a lower cost than allowed for in the preliminary cost estimate. The ERA has therefore adjusted the proposed capital expenditure for the 'Compressor stations' business case by 20 per cent.*[3]

[1] ERA Draft Decision, [618]
[2] ERA Draft Decision, [619]
[3] ERA Draft Decision, [620]

The ERA states that:

> *The 20 per cent adjustment is based on technical advice that DBP can prudently defer some of its planned AA5 'Compressor stations' work at no material risk to the DBNGP's performance reliability or attainment of its asset management objectives and a 20 per cent reduction is reasonable. This is supported by information supplied by DBP that the replacement of some of its compressor station assets is conducted based on condition, rather than age, which provides scope for deferral of replacement of some assets.*[4]

Accordingly, the ERA has reduced the level of proposed expenditure by 20% to $28.9 million (real unescalated December 2019 dollars).

1.3 Our response

We have taken on board the ERA and EMCa's feedback and have reviewed our compressor stations capex forecast accordingly. Applying more up-to-date information, and conscious of the need to minimise any potential price impact on customers during the AA5 period, we have sought opportunities to defer costs where prudent to do so, as well as providing a further top-down challenge to identify where projects could be bundled and/or delivered at a lower cost.

As per the technical advice from EMCa, we have looked at what projects within the program we can prudently defer at no material risk to the DBNGP's performance reliability or attainment of our risk and/or asset management objectives. We have re-assessed the prudence of all 30+ projects in the compressor stations program (noting that a similar review was beyond EMCa's scope[5]) and amended the forecast accordingly. An overview of the review process and our assessment of the compressor station projects is provided in Appendix A.

Following our review, we submit that a 20% reduction is not achievable within the AA5 period. However, we have identified the opportunity to reduce the forecast by 7%, based on deferring three projects to the AA6 period and updating the scope of a further project (based on detailed design) so that we can deliver it for less than originally anticipated.

We have also reviewed the compressor station program of work to identify whether there are any further opportunities to integrate proposed projects with related projects at a lower combined cost, as suggested by the ERA in its Draft Decision. However, we have found no further obvious opportunities to optimise the program beyond the project bundling/optimisation already built into the forecast.

We submit that the revised forecast of $33.0 million is the minimum amount necessary to undertake the outstanding works from the AA4 period and ensure the integrity of services provided by our compressor stations over the AA5 period without materially impacting risk or inhibiting achievement of our asset management objectives.

We will endeavour to deliver the program at a lower cost than forecast, however, based on current information we do not consider it prudent to commit to savings beyond the 7% identified. The AA5 forecast is based on more mature asset information and our forecasting approach has been subject to greater rigour than that put forward during the AA4 period. We therefore consider there is less opportunity to outperform the forecasts than there has been historically.

[4] ERA Draft Decision, [620]

[5] EMCa Technical Review, p.119

We submit that the revised forecast of $33.0 million has been arrived at on a reasonable basis, and represents the best forecast possible in the circumstances.

1.3.1 Project deferrals

We are conscious of the impact of our capex program within and across AA periods and the need to reduce impact on customers to the extent we can. We have therefore conducted a review of our works program and sought to identify opportunities to defer some costs into the AA6 period where safe and prudent to do so. A summary of our review process and findings is provided in Appendix A.

We have identified four projects that present opportunities for costs savings during the AA5 period. Three of these projects are works that can be deferred into the AA6 without materially impacting risk. The fourth has been revised following more detailed design information being available. Information on each is provided in Table 1.

Table 1: Opportunities for savings during the AA5 period

Project deferral	Rationale	$'000
Upgrade of Station & Unit F&G monitoring system at CSs (Inc SESD & MLESD)	Deferral to AA6	350
CS unit F&G control system replacement (Stage 2)	Deferral to AA6	300
CS unit F&G control system replacement (Stage 4)	Deferral to AA6	1,200
Refurbishment of below ground pipework	Cost reduction due to detailed design information	700
Total expenditure reduced/deferred	-	**2,550**

The deferred projects will still need to be completed during the AA6 period, therefore these cost savings do not represent efficiencies (i.e. delivering the same outcome for lower cost). As prudent asset managers, we will continue to monitor the risk and drivers for these projects and may opt to deliver them during the AA5 period if the risk becomes untenable.

The projects and the rationale for deferral is discussed below.

Upgrade of station and unit fire and gas (F&G) monitoring system

This project was originally forecast to be undertaken during the final year of the AA5 period (2025). However, a review of the risk associated with not upgrading the current F&G control system suggests that the risk can be tolerated for a further 12 months (subject to ongoing review), allowing us to push the project commencement back to 2026. The risk profile in this case is tolerable because these systems were last upgraded early in the AA3 period, therefore deferring their replacement by a year will broadly align with their replacement cycle without materially impacting risk.

This means the $0.35 million originally planned for AA5 will be pushed into AA6.

CS unit F&G control system replacement (Stage 2)

This project was originally forecast to be undertaken during the final year of the AA5 period (2025). However, a review of the risk associated with maintaining the current F&G control system suggests that the risk can be tolerated for a further 12 months (subject to ongoing review), allowing us to push the program commencement back to 2026. The risk profile in this case is tolerable because CS9/1 was last upgraded late in the AA3 period and CS6/2 was last upgraded early in the AA4

period. Therefore, deferring their replacement by a year will broadly align with the replacement cycle without materially impacting risk.

This means the $0.3 million originally planned for AA5 will be pushed into AA6.

CS into F&G control system replacement (Stage 4)

This project was originally forecast to be undertaken during the final two years of the AA5 period (2024 and 2025). However, a review of the risk associated with maintaining the current F&G control systems suggests that the risk can be tolerated for a further 12 months (subject to ongoing review), allowing us to push the program commencement back to 2025. This means half of the project ($1.2 million) will be delivered during the AA5 period, with the remaining $1.2 million deferred to AA6.

Deferring these three F&G projects to AA6 increases the probability of asset failure. However, based on the available data and asset life extension strategies, we believe the risk can be managed. Increasing the risk is not the preferred option, and we do not believe that deferring these projects further, or deferring other projects within the compressor station portfolio, would be considered the action of a prudent operator acting in the long-term interest of the asset and our customers.

Refurbishment of below ground pipework

The costs of undertaking the refurbishment of below ground pipework project has been reduced from $6.5 million to $5.8 million (an 11% reduction), as a result of detailed design undertaken since we developed our initial submission. Detailed design indicates an opportunity to deviate from the unit rates at CS10 (only), as there is proportionally more pipework above ground than below. This decreases the cost of undertaking work at this compressor station.

The net result of the three deferrals and re-scoped project is a $2.6 million reduction (7%) from our original AA5 forecast capex of $35.6 million, to $33.0 million. Of this reduction, $1.9 million will result in an equivalent increase to the AA6 forecast.

1.3.2 Improved asset information and forecasting accuracy

The information used to inform the AA5 forecast represents a more mature suite of asset data and insight into how to best optimise compressor station works.

Incremental improvements have been made to our investment governance process over the course of AA4. We have taken on board feedback during the AA4 determination process (notably from EMCa) regarding the limitations of our forecasting approach.[6] For example, when developing the AA5 forecasts we have incorporated more clearly defined project scopes, provided options analyses, and considered a more detailed sense check of deliverability.[7] Though we are still seeking further improvements over AA5, our business cases, asset management strategies and supporting information are in a significantly more advanced stage of their project lifecycle than compared with AA4.

In its technical review, EMCa comments that our *governance and management system does not appear to have been changed significantly from its approach at the beginning of the AA4 period.*[8] However, we submit that this statement does not recognise the improvements we have made in our forecasting approach, and infers that because of this it could be expected that there will be

[6] ERA Draft Decision, [465]
[7] The lack of these was a criticism highlighted by EMCa during its AA4 review.
[8] EMCa Technical Review, [115]

significant cost variance at the business case level and significant underspend in planned pipeline related work in AA5. While we concede there was considerable variation to forecast for the AA4 period, this was due to the forecast setting process at the beginning of that period. This is an area we have had significant focus on and have implemented a number of improvements leading into AA5.

We have worked extensively on projects included as part of the AA5 submission to provide more accurate estimates and information. We submit the bottom-up build used to develop the compressor stations work program forecast is more robust and has a greater degree of certainty than was achieved during the AA4 review.

We have considered opportunities to find synergies across the entire portfolio of capex projects, as well as to defer projects to future years, resulting in significantly less opportunity to find even further efficiencies or savings. Programming efficiency already built into the compressor forecasts includes bundling activities when our field staff are undertaking works at each compressor station. For example, we coordinate station programmable logic controller (PLC) replacements, battery replacements, rectifier upgrades and sensor upgrades, savings costs by getting the work done in fewer visits. We have also standardised the emergency shutdown system, which allows us to deliver that program at a lower cost than if disparate systems were maintained.

1.3.3 DBP's forecast meets the requirements of NGR 74

While EMCa has provided a high level explanation at how it arrived at the 20% cost reduction, we note that it was not able (due to it being outside EMCa's scope) to conduct a full review of all 34 projects. As such, we do not consider EMCa's assumption that 20% of the forecast costs, ultimately adopted by the ERA, could be deferred to AA6 without materially impacting risk has been arrived at on a reasonable basis.

However, we appreciate the need to reduce price impacts on our customers and (as described above) have sought to defer some projects as per the ERA and EMCa's advice. We submit that our revised forecast has been arrived at on a reasonable basis as it considers historical performance, incorporates expenditure optimisation assumptions, and is founded on a detailed assessment of asset condition and the risk associated with deferring each of the 34 projects. The forecast therefore provides the best estimate in the circumstances and therefore meets the requirements of NGR 74.

1.4 Summary

1.4.1 Estimating efficient costs

As noted in the 'Final Plan Attachment 8.7 - Cost Estimation Methodology', the forecast unit rates used for all projects managed within this program include internal labour, external labour and materials/other costs.

Where possible, the unit rate used to determine the cost of the program in AA5 is based on a three-year average actual cost incurred in AA4.

Where this has not been possible, due to infrequent or new activities identified for AA5, these activities have been estimated based on the historical cost of the same or similar program of work. These programs include replacing assets at the end of their useful life or what is referred to as 'one off' activities, which are expected to be required in the AA5 period but have not been required in the past and are not expected to be required in to the future (for example the Compressor Sites Cladding Removal project). The cost of these activities would usually be determined through a competitive tender process.

Where a competitive tender has not yet occurred, the associated cost is estimated in two ways:

1. where the work is sufficiently comparable to other work – the most recent historical average unit rate or actual cost and matched to similar locations where the program is delivered externally; and

2. where the work is unique or greater than $5 million – an estimate is developed based on internal estimates from different engineering disciplines or from external engineering specialists.

Specialist engineering disciplines, procurement and construction management activities are provided utilising internal resources, supplemented by external specialist input as required. This is the model that has been successfully deployed and implemented on the DBNGP under the existing AA4 and previous arrangements.

Table 2 summarises the total unescalated costs by cost type for the revised compressor stations capital works program. Table 3 shows the escalation into real dollars of December 2020, including labour cost escalation of 0.57% per annum.

Table 2: Compressor stations capital works program cost estimate, by cost category ($'000 June 2019)

	2021	2022	2023	2024	2025	Total
Internal labour	2,115.7	885.4	785.1	2,796.5	1,732.8	8,315.5
Contractors/ consultants	3,492.2	1,944.6	2,405.3	2,312.3	1,731.1	11,885.5
Materials & services	3,251.2	2,141.9	2,292.3	1,822.1	2,225.2	11,732.8
Travel & others	259.4	153.1	257.2	259.2	145.9	1,074.7
Total	**9,118.5**	**5,125.0**	**5,740.0**	**7,190.0**	**5,835.0**	**33,008.5**

Table 3: Compressor stations capital works program cost estimate, by cost category, ($'000 December 2020)

	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 19)	9,118.5	5,125.0	5,740.0	7,190.0	5,835.0	33,008.5
Escalation	211.8	130.4	158.8	214.9	187.4	903.3
Total escalated ($ Dec 20)	**9,330.3**	**5,255.4**	**5,898.8**	**7,404.9**	**6,022.4**	**33,911.8**

1.4.2 Consistency with National Gas Rules

NGR 79(1)

The revised forecast conforms with NGR 79(1)(a), which requires that capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

The proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services.

We have tested EMCa's proposed 'option 3a' and consider the 20% reduction would materially impact risk and our ability to meet to our asset management objectives. However, the revised 7% reduction will allow us to achieve a saving during the period while not compromising risk and/or asset management objectives.

NGR 79(2)

Renewal of rotating, ECI, power supply and mechanical equipment, repair/rectification and proactive works, are all necessary to protect from corrosion and safety hazards or maintain performance, ensuring the continued operation of compressor stations. Compressor station functionality is a core process in the transportation of gas required to meet contracted obligations and maintain the safety and integrity of services along the DBNGP. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(ii).

NGR 74

The forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case addendum. The revised forecast is based on a review of the prudence of all 34 projects, updating assumptions (for example with regard to detailed design) to reflect the most up to date information where practicable.

The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A

In response to the ERA's AA5 Draft Decision, we have reviewed the pipeline asset management program for the AA5 period. On 5 and 6 August 2020, we held a series of workshops with our engineering, project management and senior management staff to reassess the capex program in light of more up to date asset information, the prevailing economic and risk environment, and the recommendations made by the ERA and its technical consultant EMCa.

The purpose of the workshops was to identify further opportunities across the entire pipeline asset replacement portfolio of work to reduce costs, optimise the work program, and/or defer projects to the AA6 period. The broad challenges put forward for each project were:

1. Have there been any changes in scope/design since the initial submission?
2. Are there any further synergies between projects?
3. Can this project be prudently deferred?

A summary of the outcomes from the session relating to DBP01 Compressor Stations is provided in the table below.

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BC01 - Compressor Stations	Refurbishment of below ground pipework	Yes	No	No	Further detailed design undertaken since we developed our initial submission. Detailed design indicates an opportunity to deviate from the unit rates at CS10 (only), as there is proportionally more pipework above ground than below. This decreases the costs of undertaking work at this compressor station and therefore the overall project can be delivered for a lower sustainable cost. Estimate a $700k reduction.	Revise costs and update business case addendum to reflect ~$700k saving in the AA5 period.
BC01 - Compressor Stations	Compressor Station CP Visibility	No	No	No	Further consideration was given to the ability to coincide the works with the compressor station dig ups (civil activities) however, the resource skill sets don't align and coordination wouldn't be realistically achievable. The requirement for the project remains in place and the scope remains consistent with	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					the original submission. Cathodic Protection visibility remains at the same priority level, in fact we are typically finding the condition of assets more deteriorated than originally forecast. The additional corrosion inspects conducted through AA4 validate the requirement for the project.	
BC01 - Compressor Stations	Painting of Aboveground Facility	No	No	No	The percentage of the assets that are over 30 years old, with painting significantly overdue, remains high. Consistently getting reports of significant corrosion, reinforcing the need to adhere to a structured proactive condition based painting program. For example, reports on corrosion on horizontal flanges on [redacted] sites. The program is well established with market tested unit rates and the skill set is unique, so synergies in this instance are not practicable. Reactive approach is not possible as once pipework is corroded beyond repair or leaking, it is too late.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Unit isolation valve replacement	No	No	No	The risk hasn't changed. New information has confirmed asset condition is deteriorating the need for a proactive approach with a structured program based on condition is required to maintain the integrity of the plant. Actual leakage through PE report confirms the leaking valves. The valve portfolio of works is already controlled by one Project Manager and is optimised to be efficient, with costs reflective of the plan in place.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Station isolation valve replacement	No	No	No	The risk hasn't changed. New information has confirmed asset condition is deteriorating the need for a proactive approach with a structured program based on condition is required to maintain the integrity of the plant. Actual leakage through PE report confirms the leaking valves. The valve portfolio of works is already controlled by one Project Manager and is optimised to be efficient, with costs reflective of the plan in place.	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BC01 - Compressor Stations	Recycle valve replacement/overhaul	No	No	No	Recycle valves are part of critical control of the compressor and a reactive approach is untenable. The scope remains consistent with the submission and it is essential that it is maintained with a structured program as recommended by the AMP. The valve portfolio of works is already controlled by one Project Manager and is optimised to be efficient, with costs reflective of the plan in place.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	As-build of CP Equipment at Compressor Stations	No	No	No	The scope of the project has not altered since submission, as builds of cathodic protection systems remain a critical component of asset life maximisation, asset failure prevention and emergency management. The project delivery, cost estimation and delivery is already aligned to the CP visibility project to ensure optimisation.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Upgrade of Station & Unit F&G monitoring system at CSs (Inc SESD & MLESD)	No	No	Yes	Risk can be tolerated for a further 12 months (subject to ongoing review). Push program commencement back to 2026. The 350k million originally planned for AA5 will be pushed into AA6.	Revise costs and update business case addendum to reduce forecast by $350k.
BC01 - Compressor Stations	CS unit F&G monitoring system replacement (ACS)	No	No	No	ACS systems installed in 1987. Already past due for their third replacement cycle. Not prudent to defer these works.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	CS unit F&G control system replacement (Stage 2)	No	No	Yes	Risk can be tolerated for a further 12 months (subject to ongoing review). Push program commencement back to 2026. The $300k originally planned for AA5 will be pushed into AA6.	Revise costs and update business case addendum to reduce forecast by $300k.
BC01 - Compressor Stations	CS unit F&G control system replacement (Stage 4)	No	No	Yes	Re-evaluation of the project it was established that it can be deferred by 12 months without materially impacting integrity of services, or exceeding a reasonable aggregate asset life. The project phasing isn't ideal, however it is still manageable and will	Revise costs and update business case

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					result in a cost reduction of 50% in AA5. Note that this now impacts on the AA6 forecast.	addendum to reduce forecast by $1.2M
BC01 - Compressor Stations	UPS system 110v	No	No	No	The forecasts have not changed for this project since submission. The proactive asset management measures still apply as the battery comes with self life and requires replacement at the appropriate times. Based on condition reports, observations and experience, its retainment in the plan is critical to the assurance of plant reliability, with batteries failing at different rates and exposures particularly [redacted] batteries that are 120v. The portfolio of battery related activities are coordinated and controlled by one Project Manager and further optimisations are not forecast.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	UPS system 24v	No	No	No	The forecast have not changed for this project since submission. The proactive asset management measures still apply as the battery comes with self life and requires replacement at the appropriate times. The condition of batteries at CS10 and CS07 is such that it confirms that have reached end of life, including the charging equipment. The portfolio of battery related activities are coordinated and controlled by one Project Manager and further optimisations are not forecast.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	24VDC Batteries&Charger Replacement	No	No	No	The forecast have not changed for this project since submission. The proactive asset management measures still apply as the battery comes with self life and requires replacement at the appropriate times. The condition of batteries at DF has reached at their end of life as well as the chargers. The portfolio of battery related activities are coordinated and controlled by one Project Manager and further optimisations are not forecast.	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BC01 - Compressor Stations	Upgrade of Fuel Gas pressure control loop for CS01/U1, CS03/U1, CS05/U1 & U2, CS08/U2	No	No	No	The units identified have been specifically selected due to their current poor asset condition and priority need for upgrade, it does not include a forecast of any units that may deteriorate to such poor condition during the AA5 period. The units are required to be fit for purpose as they ensure efficient and reliable control of fuel gas to the gas turbines, within the compressor site. The scope of work is controlled under one Project Manager for an optimised program of works.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Dry gas seal replacement.	No	No	No	This project has already been optimised to complete [redacted] unit per year from originally forecasting [redacted]. It is not reasonable to defer the project further as it will result in a machine being taken off service from the system, which is not acceptable in meeting operational reliability standards. No new information is suggesting that this rate of replacement is too high.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	[redacted] Software Upgrade/Licensing	No	No	No	The scope of the project has not changed since submission and these are planned upgrades have been aligned with the end of life schedule to ensure an optimised project delivery.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Installation of Fire Suppression System on Stage 3A Units	No	No	No	This project is a safety requirement, which was unfortunately deferred from AA4 due to other priorities, however the need remains and it is now essential as the lack of a suitable system cannot continue to be tolerated and should something happen, we need an adequate fire system to respond. The project will be managed by one Project Manager to ensure efficiency.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Turbine combustion air inlet filter system replacement	No	No	No	The inlet filter system protects from Foreign Object Damage (FOD) to the turbine. The units identified have already deteriorated to the point of needing replacement. Specialist contractors are required and the project will be managed by a	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					single internal resource to ensure accountability of delivery to budget.	
BC01 - Compressor Stations	Hazardous area inspection and rectification	No	No	No	The scope of works hasn't changed since the original submission and remains a requirement to comply with Australian Standards. The project has been assessed against the wider ECI portfolio of works already in determining if projects can be combined or similar resources used simultaneously on other projects at the same location.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Loadbank Control Panel Redesign and Replacement Programme	No	No	No	We already have an unacceptable failure rate of components associated with the units and therefore the design is in need of upgrade. The current situation is not acceptable as it poses a hazardous source of fire when components fail. The project has already been assessed against the wider portfolio of projects.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Upgrade of [redacted] HMI software to latest Windows version	No	No	No	The asset management strategy remains as per submission, in that [redacted] HMI software needs to be replaced on a seven-year replacement cycle, while the [redacted] Turbine HMI software will be replaced only on failure. The project was assessed along with the portfolio of other ECI project opportunities, but its unique skill set determines it to be a standalone project, with no further cost savings identified at this time.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Station PLC replacement	No	No	No	The Programmable Logic Controller (PLC) no longer has vendor support and therefore needs replacement/upgrade to ensure we have contingency in place should it fail. With very limited used spares, which will inherently be more unreliable, it is not good asset management practice to run the risk with such poor reactive options.	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BC01 - Compressor Stations	Refurbishment of underground oil sump tanks.	No	No	No	The project scope remains the same as per the original submission in ensuring we are compliant from an environmental perspective. The project is a standalone project with no opportunities for synergies with other activities.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	[redacted] Compressor Package Dynamic Vibration Data Visibility Annual upgrade	No	No	No	The project scope remains the same, as per submission. The management of vibration is a key component of overall asset management and integrity assessing. This project has been optimised already and is managed by the same project manager as the vibration monitoring system project.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Compressor Units Online Dynamic Data Vibration Monitoring System - Server based	No	No	No	The project scope remains the same, as per submission. The management of vibration is a key component of overall asset management and integrity assessing. This project has been optimised already and is managed by the same project manager as the vibration visibility annual upgrade.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Replacement of Air Conditioning at Compressor Stations	No	No	No	This is an ongoing established programme of works based on reliable end of life data. There are no obvious opportunities for synergies with other projects in the portfolio of works.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Instrument air system replacement.	No	No	No	A continuation of an established program of works to replace compressed air systems with dryers and storage pressure vessels operating in duty and standby mode. Reactive failure of the system is not acceptable due to their importance at the compressor site.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Relocate Unit Piping to above ground at CS3	No	No	No	The scope remains the same as per the original submission, with the piping in poor condition. As space allows at the site it will be relocated above ground, which will reduce all future ongoing operational costs of pipeline integrity inspections and repairs.	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BC01 - Compressor Stations	Compressor Sites Cladding Removal	No	No	No	No change to the original scope in devising a better long term asset maintenance strategy by removing the cladding and painting. The project has been considered to be completed with other compressor site activities involving the same skill base and ensuring no conflict of works / permit systems, however no further efficiencies can be identified.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Fuel gas heater	No	No	No	Project scope remains the same as at the time of the submission. Progressive move towards lower cost immersion of heaters remains prudent. The project has already accounted for economies of scale and given the significant nature of site works required, the project is treated in isolation and not to be combined with other site related projects. The project will be completed sequentially to optimise project management.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Replacement of Corroded Exhaust Flange at CS10U3	No	No	No	No new information, this is a specifically identified corrosion issue at the site. No future estimates included in AA5 for other similar issues.	No revision to AA5 forecast - review as per normal business planning cycle
BC01 - Compressor Stations	Measurement of Earthing grid resistance to Remote earth in Compressor No 7	No	No	No	No new information, this is a specifically identified issue at the site. No future estimates included in AA5 for other similar issues.	No revision to AA5 forecast - review as per normal business planning cycle

DBP02 Pipeline and Main Line Valves

Project Summary	
Project name	Pipeline and Main Line Valves
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	Our original business case 'Pipeline and Main Line Valves – DBP02' (prepared in Q3/Q4 2019) proposed capex of $9.4 million during the AA5 period. The proposed expenditure is to continue the program of capital works over next five years to ensure the pipeline and main line valve (MLV) assets are operating safely, reliably, within acceptable risk tolerances, and are providing a level of performance consistent with that expected by customers. The proposed capex for AA5 is an increase of $3.2 million compared to works undertaken during AA4. The increase is due to a greater number of assets that are at or will reach the end of their technical design life during AA5, as well the need to enhance corrosion protection on the asset due to the pipeline's age and deteriorating condition. The Pipeline and Main Line Valve work program comprises 14 individual projects. The ERA has reduced the level of proposed expenditure by 30% to $6.7 million (real unescalated dollars of December 2019). The ERA has made this cut by assuming the pig barrel isolation valve replacement project can be deferred by two years, and applying a 20% reduction to the remainder of the forecast, on the assumption DBP can achieve savings commensurate with those achieved during the AA4 period. We have taken on board the ERA's feedback and conducted a review of the program of work, based on the latest information, to assess what projects could be prudently deferred, or whether the scope of works has changed. A summary of our review is provided in Appendix A. We submit that a 30% reduction is not practicable and that the 20% assumption is not consistent with the savings achieved during the AA4 period (15%) or the advice from the ERA's technical expert (EMCa) which considers a 10% reduction (outside of the pig barrel valve project) to be reasonable. However, we have identified that [redacted] of the [redacted] pig barrel isolation valve replacements can be safely deferred to the AA6 period without materially impacting risk or asset management outcomes. We have also reduced our forecast spend on the Lister GEA Replacement (10KW) project, which has had to be accelerated and delivered during the AA4 period (due to increased risk and technical obsolescence), with only a small residual amount of capex being required to complete this project during the AA5 period. These changes have reduced the AA5 forecast for the Pipeline and Main Line Valve work program by 8%.
Estimated cost	The revised estimated total cost of the Pipeline and Main Line Valves work program is $8.7 million. The total cost in each year is shown in the table below:

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Pipeline and MLV	2,004.6	1,643.9	2,345.0	1,683.0	1,010.0	8,686.5

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	**NGR 79(1) –** the proposed Pipeline and MLV work program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services.

	We have tested the ERA and EMCa's views and consider the 30% reduction would materially impact risk and our ability to meet to our risk and asset management objectives. However, the revised 8% reduction will allow us to achieve a saving during the period while not compromising these objectives. **NGR 79(2)** – pipeline and MLV assets are critical to providing gas transmission services. Replacement/refurbishment of ECI and mechanical equipment, and repair/rectification and proactive works to protect assets from corrosion and safety hazards, or maintain performance are all necessary to ensure the continued operation of the pipeline and MLVs. This in turn maintains the safety and integrity of services along the DBNGP. Pipeline and MLV functionality are core to the transportation of gas required to meet contracted obligations. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i) and (ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. The revised estimate is based on a re-assessment of all 14 projects in the Pipeline and MLV work program in light of the latest asset condition, risk and delivery information. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Hugo Kuhn
Reviewed by:	Tawake Rakai, GM Transmission Asset Management
Approved by:	Tawake Rakai, GM Transmission Asset Management
Other Relevant Documents	
This addendum should be read in conjunction with: • the original business case 'Pipeline and Main Line Valves - Capex DBP02', which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5); and • our responses to information request EMCa11, EMCa30 and EMCa34.	

1.1 Original business case

Our original business case 'Pipeline and Main Line Valves – DBP02' included capex of $9.4 million in AA5. The proposed expenditure allows us to continue the program of capital works over next five years to ensure the pipeline and main line valve (MLV) assets are operating safely, reliably, within acceptable risk tolerances, and are providing a level of performance consistent with that expected by customers. The Pipeline and MLV work program comprises 14 projects to be undertaken over the AA5 period.

The proposed capex for AA5 is an increase of $3.2 million compared to works undertaken during AA4. The increase is due to there being a greater number of assets that are at or will reach the end of their technical design life during AA5, as well the need to enhance corrosion protection on the asset (due to the pipeline's age and deteriorating condition).

In the original business case, we considered the following three options:

- Option 1 - Maintain the volume of activity and expenditure levels undertaken during AA4;
- Option 2 - Move to a replacement on failure policy for all pipeline and MLV assets; and
- Option 3 - Deliver the volume and activities identified in the Asset Management Plan (AMP) as required, applying good asset management practice, and adopting emerging techniques/technologies where appropriate.

We recommended Option 3 as it ensures we continue to deliver safe and reliable pipeline services. This approach is consistent with good industry practice and follows the recommendations of our equipment providers and manufacturers, thereby ensuring continued repair and replacement.

1.2 ERA Draft Decision

In its Draft Decision, the ERA accepts the prudence of the proposed Pipeline and MLV work program, stating:

> *the Pipeline and Mainline Valves work program DBP proposed would contribute to maintaining the safety and integrity of services on the DBNGP and that replacing pipeline and mainline valve assets at the end of their design life is commensurate with good industry practice.*[9]

The ERA's technical consultant similarly accepts that the work program is prudent and that *DBP's stated driver for the increase compared to AA4 capex that a significant number of pipeline and MLV assets at or will reach the end of their design life is commensurate with good industry practice*.[10]

However, EMCa has recommended reductions to the AA5 forecast, highlighting that it considers the pig barrel isolation valve replacements scheduled for 2023 can be deferred by two years to commence in 2025. This pushes around $1.2 million of AA5 capex into the AA6 period.

EMCa also advises that DBP's pipeline supply performance reliability of 100% for the last two years indicates that there is some (small) scope for reducing investment and still satisfying the reliability target.[11] On this basis, EMCa has reviewed DBP's 15% underspend during the AA4 period and considers that:

> *After reviewing the proposed balance of work, we consider that DBP will reasonably require 10% less (-$0.8m) to achieve its asset management objectives.*[12]

Note that this 10% reduction is in addition to the pig barrel isolation project deferral, resulting in a total reduction of $2.0 million (21%).[13]

However, the ERA has reduced the Pipeline and MLV forecast to $6.7 million, which is a 31% reduction.[14] This amount has been derived by reducing the proposed forecast capital expenditure by:

- *Assuming the 'Pig barrel isolation valve replacement' commences in 2025, rather than 2023 as currently scheduled.*
- *Reducing the proposed capital expenditure remaining after taking into account the reduction from assuming the 'Pig barrel isolation valve replacement' commences in 2025 by 20 per cent.*
- *Adjusting the real labour cost escalation rate included in the forecast to 0.30 per cent, as outlined at paragraph 608.*[15]

[9] ERA Draft Decision, [630]
[10] EMCa Technical Review, p.120
[11] EMCa Technical Review, p.120
[12] EMCa Technical Review, p.120
[13] Real unescalated December 2019 dollars
[14] Real unescalated December 2019 dollars
[15] ERA Draft Decision, [632]

1.3 Our response

We have taken on board the ERA and EMCa's feedback and have reviewed our Pipeline and Main Line Valve work program in light of more up-to-date information on asset condition, program delivery and risk. We have looked at what projects within the program we can prudently defer at no material risk to the DBNGP's performance reliability or attainment of our risk and/or asset management objectives, as well as providing a further top-down challenge to identify where projects could be bundled and/or delivered at a lower cost.

We have re-assessed the prudence of all 14 projects (noting that a similar review was beyond EMCa's scope[16]) and amended the forecast accordingly. An overview of the review process and our assessment of the pipeline and main line valve projects is provided in Appendix A.

Following our review, we submit that a 30% reduction is not practicable, and based on current asset condition and risk, would not reflect a prudent level of replacement/refurbishment of these critical assets. Moreover, we note that the assumed 20% reduction the ERA has applied to the broader program (excluding the pig barrel isolation project) is greater than the actual underspend achieved during the AA4 period, which was 15%. The ERA's assumption is also twice that of its technical experts EMCa, who advise that a 10% reduction reflects a reasonable level of saving that could be achieved.

We do not consider that the underspend compared with the AA4 forecast is a reasonable basis on which to assume similar savings can be achieved during AA5. Our forecast for the AA5 period is based on more mature asset information and we have worked extensively on projects included as part of the AA5 submission to provide more accurate estimates and information.

We submit the bottom-up build used to develop the Pipeline and MLV forecast is more robust and has a greater degree of certainty than was achieved during the AA4 review. Therefore, we expect there is less opportunity to outperform the forecast during the AA5 period than there was during AA4. Though we will endeavour to deliver the Pipeline and MLV work program for less than forecast, we do not believe it is reasonable to assume that the magnitude of savings achievable during AA5 would be greater than those achieved during the AA4 period.

However, we are conscious of the need to minimise any potential price impact on customers during the AA5 period, and believe we can prudently reduce the forecast by approximately 8% ($0.7 million).

We have looked at the pig barrel isolation project highlighted by EMCa for further review, and consider we can defer part (although not all) of this project into the AA6 period without materially impacting risk. We have also identified that the Lister GEA control system replacement (10 kW) project can be delivered for less in the AA5 period, as this project has been accelerated and delivered during the AA4 period (in 2020), meaning only a small residual amount of capex is required to complete this project in AA5.

We have also reviewed the Pipeline and Main Line Valves work program to identify whether there are any further opportunities to integrate proposed projects with related projects at a lower combined cost, as suggested by the ERA in its Draft Decision. However, we have found no further obvious opportunities to optimise the program beyond the project bundling/optimisation already built into the forecast.

These matters are discussed in the following sections.

[16] EMCa Technical Review, p.120

We submit that the revised forecast of $8.7 million is the minimum amount necessary to ensure the integrity of services provided by our pipeline and main line valves over the AA5 period without materially impacting risk or inhibiting achievement of our asset management objectives.

We will endeavour to deliver the program at a lower cost than forecast, however, based on current information we do not consider it prudent to commit to savings beyond the 8% identified. The revised forecast of $8.7 million has been arrived at on a reasonable basis, and represents the best forecast possible in the circumstances.

1.3.1 Project deferrals

We have undertaken another detailed review of the projects in the Pipeline and MLV work program, and sought to identify opportunities to defer costs into AA6, or to deliver programs at a lower overall cost. A summary of our review process and findings is provided in Appendix A.

The projects identified for deferral/reduction are discussed below.

Pig Barrel Isolation Valves

In line with EMCa's observations, there is scope to defer some of the expenditure associated with Pig Barrel Isolation Valves. Currently, [redacted] big barrel isolation barrels are scheduled for replacement during the AA5 period, at a steady rate of replacement ([redacted] per year) commencing in 2025. These [redacted] replacements are part of a broader program to replace [redacted] valves over ten years, in preparation for the next round of in line inspections (ILI).

EMCa suggests the program can be pushed back by two years to commence during 2025, which effectively means [redacted] of the [redacted] valves will be replaced during the AA6 period instead. We have reviewed the scheduling of works, along with the current condition of the valves, and consider that the program could be deferred by one year to commence in 2024. However, we submit that only [redacted] of the valve replacements can be prudently deferred to the AA6 period if we are to meet the critical path for ILI inspections and address the risk with the currently leaking valves.

We propose to replace [redacted] valves per year commencing 2024, which is a $0.3 million reduction during the AA5 period. The deferred valve will still need to be completed during the AA6 period, therefore these cost savings do not represent efficiencies (i.e. delivering the same outcome for lower cost). As prudent asset managers, we will continue to monitor the risk and drivers for these projects and may opt to deliver them during the AA5 period if the risk becomes untenable.

Pig barrel isolation valves are required to allow launch and removal of pigging equipment during the ILI program. The current valves do not have sufficient sealing capacity to provide positive isolation from mainline pressure when installing pigging equipment and therefore must be replaced ahead of the commencement of the next round of ILIs. Under our licence and Safety Case requirements, the next ILIs must commence in AA6, therefore the valves must be replaced at a steady rate prior to commencing ILI.

The condition of these assets is such that [redacted] of the [redacted] valves originally forecast in AA5 have minor leakage that we are monitoring closely, and should this leakage show signs of further deterioration, the replacement project will be accelerated. [redacted] valves are currently not leaking, however, asset performance history would suggest that by the end of AA5, at least one of these will also be in poor enough condition to be leaking.

We therefore do not believe that deferring [redacted] of the [redacted] valves to AA6, of which at least two would be already leaking, would be the actions of a prudent asset manager. However, we are willing to defer [redacted] of the [redacted] pig barrel isolation valves that are not leaking, to be completed in the first year of the AA6 period.

The deferral of [redacted] unit, which will now be completed in 2026, will not have a material effect on efficiency of the replacement works, nor the critical timeline path to complete the ILI works program.

To defer more than [redacted] unit will not allow sufficient time in the ILI works program for replacements to occur, and could therefore impact on the critical path of the ILI program. To defer more units would therefore not be aligned to good project management or standard industry practices.

Lister GEA control system replacement (10 kW)

As part of ongoing asset maintenance and performance we have been closely monitoring the Lister GEA control system replacement works program, as these units have been known to be deteriorating. The gas engine control systems were forecast to reach their design life in AA5 and the original plan proposed to commence the replacement program with a new engine control system between 2023 and 2025.

While the actual gas engines have been in operation for 35 years, they have experienced relatively low utilisation as they are the secondary source of power supply. Therefore, we originally assumed the risk associated with these GEA control systems to be low. However, the electronic engine control system has become obsolete and can no longer be repaired. Though we have attempted to defer the project as a prudent operator, the condition of the assets deteriorated such that replacements were required during the current period, and have been undertaken during 2020.

The remaining scope will carry over into AA5, which means we still expect to incur $195,000 during the AA5 period, however this is a $420,000 reduction from our original AA5 forecast.

1.3.2 Improved asset information and forecasting accuracy

The information used to inform the AA5 forecast represents a more mature suite of asset data and insight into how to best optimise compressor station works.

Incremental improvements have been made to our investment governance process over the course of AA4. We have taken on board feedback during the AA4 determination process (notably from EMCa) regarding the limitations of our forecasting approach.[17] For example, when developing the AA5 forecasts we have incorporated more clearly defined project scopes, provided options analyses, and considered a more detailed sense check of deliverability.[18] Though we are still seeking further improvements over AA5, our business cases, asset management strategies and supporting information are in a significantly more advanced stage of their project lifecycle than compared with AA4.

Forecasts for the Pipeline and Main Line Valves works program are based on a more intensive corrosion detection programs initiated in AA4, which were linked to the [redacted], that have uncovered more corrosion that expected. Having a more robust corrosion detection regime has therefore given significantly more certainty and credibility to the forward forecasts, as we know more accurately what we are dealing with.

In its technical review, EMCa comments that our *governance and management system does not appear to have been changed significantly from its approach at the beginning of the AA4 period*[19].

[17] ERA Draft Decision, [465]

[18] The lack of these was a criticism highlighted by EMCa during its AA4 review.

[19] EMCa Technical Review, [115]

However, we submit that this statement does not recognise the improvements we have made in our forecasting approach, and infers that because of this it could be expected that there will be significant cost variance at the business case level and significant underspend in planned pipeline related work in AA5. While we concede where was considerable variation to forecast for the AA4 period, this was due to the forecast setting process at the beginning of that period. This is an area we have had significant focus on and have implemented a number of improvements leading into AA5.

We have worked extensively on projects included as part of the AA5 submission to provide more accurate estimates and information. We submit the bottom-up build used to develop the pipeline and main line valves forecast is more robust and has a greater degree of certainty than was achieved during the AA4 review.

We have considered opportunities to find synergies across the entire portfolio of capex projects, as well as to defer projects to future years, resulting in significantly less opportunity to find even further efficiencies or savings.

The pipeline and MLV assets are older than in AA4 and increasing the level of investment in planned preventive measures, especially relating to corrosion, must reasonably be expected and would be considered good industry practice.

1.3.3 DBP's forecast meets the requirements of NGR 74

The ERA has provided only a high level explanation of how it arrived at the 20% cost reduction for work outside the pig barrel isolation project. The ERA's 20% assumption is not aligned with the advice of its technical experts EMCa, that reduction of 10% is reasonable, and is also greater than the actual cost reduction achieved during the AA4 process.

Further, EMCa's assessment was based on a high level application of assumed project deferrals across the Pipeline and MLV work program. EMCa was not able to conduct a full review of the prudence of all 14 projects (due to it being outside EMCa's scope).

Taking these limitations into consideration, we are not confident that the ERA's revised forecast has been arrived at on a reasonable basis and submit that it does not represent the best forecast possible in the circumstances. However, we appreciate the need to reduce price impacts on our customers and have sought to defer some projects as per the ERA and EMCa's advice.

As described above, we have reviewed our capex portfolio, including undertaking a review of the prudence of the 14 projects that make up the Pipeline and MLV work program. We therefore submit that our revised forecast has been arrived at on a reasonable basis and is founded on a re-assessment of asset condition and the risk associated with deferring each of the 14 projects, using contemporary information. The forecast therefore provides the best estimate in the circumstances and therefore meets the requirements of NGR 74.

1.4 Summary

1.4.1 Estimating efficient costs

Table 1 shows the revised profile for the Pipeline and MLV work program for the AA5 period.

Table 1: Revised Pipeline and MLV cost estimate, $'000

Pipeline and MLV program activity	2021	2022	2023	2024	2025	AA5
Lister GEA control system replacement	-	-	195.0	-	-	**195.0**
RTU replacement	-	-	340.0	350.0	350.0	**1,040.0**
Replacement of solar panels	-	-	500.0	-	-	**500.0**
Replace batteries at MLV and meter stations	290.0	290.0	-	-	-	**580.0**
DC power upgrade MLV6	65.0		-	-	-	**65.0**
MLV redesign for closing operation	260.0	260.0	-	-	-	**520.0**
Replacement of original DBNGP signage	450.0	450.0	450.0	373.0	-	**1,723.0**
Pig barrel isolation valve replacement	-	-	300.0	600.0	300.0	**1,200.0**
Annual dig up program based on Runcom results	150.0	-	-	-	-	**150.0**
TRU replacement	60.0	80.0	60.0	60.0	60.0	**320.0**
Impressed current ground beds replacement	100.0	100.0	100.0	100.0	100.0	**500.0**
CP visibility on non-visible sites	115.0	-	-	-	-	**115.0**
Piping interface wrap removal	414.6	263.9	200.0	-	-	**878.5**
Long range ultrasonic testing of unpiggable facilities	100.0	200.0	200.0	200.0	200.0	**900.0**
Total	**2,004.6**	**1,643.9**	**2,345.0**	**1,683.0**	**1,010.0**	**8,686.5**

Table 2 shows the escalation applied to escalate the Pipeline and MLV work program to real dollars of December 2020, including labour cost escalation of 0.57% per annum.

Table 2: Pipeline and MLV forecast capex for DBP, $'000 Dec 2020

Application	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 19)	2,004.6	1,643.9	2,345.0	1,683.0	1,010.0	8,686.5
Escalation	46.6	41.8	64.9	50.3	32.4	236.0
Total escalated ($ Dec 20)	**2,051.2**	**1,685.7**	**2,409.9**	**1,733.3**	**1,042.4**	**8,922.5**

The unit rates used for all projects managed within this program of include the internal labour, external labour and materials/other costs forecast. Where possible, the unit rate used to determine the cost of the program in AA5 is based on a three-year average actual cost incurred in AA4.

Where this has not been possible activities have been estimated based on the historical cost of the same or similar programs of work. The cost of these activities would usually be determined through a competitive tender process. Where a competitive tender has not yet occurred, the associated cost is estimated in two ways:

3. where the work is sufficiently comparable to other work – the most recent historical average unit rate or actual cost and matched to similar locations where the program is delivered externally; and

4. where the work is unique or greater than $5 million – an estimate is developed based on internal estimates from different engineering disciplines or from external engineering specialists.

Specialist engineering disciplines, procurement and construction management activities are provided utilising internal resources, supplemented by external specialist input as required.

1.4.2 Consistency with the National Gas Rules

Rule 79(1)

The option is consistent with the requirements of NGR 79(1), specifically we consider that the capital expenditure is:

- **Prudent** – the expenditure is necessary in order to address the identified ongoing operational requirements. The program is also broadly consistent with the approach adopted in AA4. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- **Efficient** – the forecast expenditure is based on historical average actuals and tender contract values. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – the proposed expenditure considers industry learned lessons from the [redacted] and focuses on preventative measures to ensure the long-term health of the asset. It also follows good industry practice by ensuring that critical infrastructure is maintained within its useful life and to current technological standards, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- To achieve the **lowest sustainable cost of delivering pipeline services** – the proposed option achieves the lowest sustainable cost delivery of services by undertaking works that reduce risks to as low as reasonably practicable while maintaining reliability of supply. This mitigates the costs of reactive works and penalties resulting from asset failure. We are undertaking works in a proactive, planned and scheduled manner, with the volume of activity based on useful life and in line with manufacturer's guidance and associated support. It also considers continuous improvement in the way we manage assets throughout their lifecycle by introducing new and emerging techniques and technologies, which may reduce costs over the medium to long term.

Rule 79(2)

Pipeline and MLV assets are critical to providing gas transmission services. Replacement / refurbishment of ECI and mechanical equipment, and repair/rectification and proactive works to protect assets from corrosion and safety hazards, or maintain performance are all necessary to ensure the continued operation of the pipeline and MLV assets. This in turn maintains the safety and integrity of services along the DBNGP. Pipeline and MLV functionality are core to the transportation of gas required to meet contracted obligations. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i) and (ii).

NGR 74

The forecast costs are based on market rate testing, and consider opportunities for optimising the works program or deferring costs where prudent to do so based on the latest information. Cost assessments have been conducted based on the best information available at the time of developing the original business case and revised to reflect any changes outlined in this addendum.

The revised estimate is based on a re-assessment of all 14 projects in the Pipeline and MLV work program in light of contemporary asset condition, risk and delivery information. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A

In response to the ERA's AA5 Draft Decision, we have reviewed the pipeline asset management program for the AA5 period. On 5 and 6 August 2020, we held a series of workshops with our engineering, project management and senior management staff to reassess the capex program in light of more up to date asset information, the prevailing economic and risk environment, and the recommendations made by the ERA and its technical consultant EMCa.

The purpose of the workshops was to identify further opportunities across the entire pipeline asset replacement portfolio of work to reduce costs, optimise the work program, and/or defer projects to the AA6 period. The broad challenges put forward for each project were:

1. Have there been any changes in scope/design since the initial submission?
2. Are there any further synergies between projects?
3. Can this project be prudently deferred?

A summary of the outcomes from the session relating to DBP02 - Pipeline and Main Line Valves is provided in the table below.

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
DBP02 – Pipeline and MLV	Annual dig up program based on Runcom results	N	N	N	No new information for the program of works and remains a critical aspect of testing the efficacy of our cathodic protect systems. Dig ups required to verify defects to ensure pipeline is still fit for purpose as well as dig ups required to investigate active corrosion. No geographical optimisation, however the project is managed sequentially and under the control of one project management team who have estimated the forecast based on the efficiencies inherent in the way they operate.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Impressed current groundbeds replacement	N	N	N	Forecast remains consistent with original proposal and performance of systems continues to deteriorate as expected. Current survey results indicate diminishing performance of at least [redacted] groundbeds and more are anticipated in the near future.	No revision to AA5 forecast - review as per

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					Groundbeds are very old (over 35 years) and we have deferred the work for as long as we reasonably could have. Portfolio of works sits with the same project manager as other CP activities, however no further efficiencies are foreseeable.	normal business planning cycle
DBP02 – Pipeline and MLV	TRU replacement	N	N	N	No forecast change to this ongoing programme of works. However it should be noted the TRUs installed are not supported anymore. Existing units are maintained from old, decommissioned units where possible, however this is proving to be challenging as used parts are inherently more unreliable. A balanced program of [redacted] per year is forecast, and is planned to be delivered by one team as the opportunities to replace during other activities is limited.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Replacement of Original DBNGP signage	N	N	N	AS/NZS2885 compliance and safety issue, signs have only further deteriorated as forecast - signs deteriorated beyond recognition. Project to be completed in isolation due to the remote locations and unique scope of works, it is not feasible to bundle the works.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	MLV Redesign for Closing Operation	N	N	N	The drivers and forecast for this project remain the same, with unacceptable consequences of mail line valves failing in unlooped sections. The project manager has considered bundling of works with other programs, however this isn't practical for this unique project and further cost savings are not forecast at this time.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Pig barrel isolation valve replacement	N	N	Y	There are [redacted] units planned to be replaced. [redacted] units are already leaking and a minimum of [redacted] must be replaced to maintain an efficient works program. It is reasonable to assume that based on asset performance at least [redacted] more will be leaking within the next couple of years. [redacted] unit can be considered for deferral to AA6. The project is being delivered by one project manager and sequentially to minimise risk of interruption to supply, as well as optimise the rate of replacement.	Review costs and update BC Addendum and update to reflect 300k saving in the AA5 period

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
DBP02 – Pipeline and MLV	Lister GEA control system replacement (10KW)	Y	N	N	Work has been re-prioritised in AA4 as the electronic engine control system performance has deteriorated. The unit has become obsolete and can no longer be repaired. The forecast cost has therefore been reduced, with some expenditure still required in AA5 to complete the full scope of works	Review costs and update BC Addendum and update to reflect 420k saving in the AA5 period
	RTU replacement	N	N	N	No change to the forecast scope of work, the Remote Terminal Unit replacements follow a 15 year replacement program to ensure they are fit for purpose and that we stay just ahead of end of life failures. Delivering the project in the manner keeps information flowing back to the control room in a timely manner and we do not want to take the risk of escalating the risk due to the criticality of the infrastructure being monitored at predominantly remote locations. The risks of not delivering the project escalate very quickly should failures occur, and costs increase quickly due to the need to respond reactively in a prompt manner. Rates have been market tested for this proactive project and remain applicable.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	CP visibility non visible sites	N	N	N	No forecast change to the project as unknown cathodic protection performance will eventually result in undetected corrosion. The sites identified remain the same and the forecast costs have been reconfirmed.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Piping Interface Wrap Removal	N	N	N	No change to this project. The driver is based on learnings from [redacted] incident and we are detecting serious corrosion at interface locations, rectification must continue. The project will be combined with general maintenance site visits by internal personnel, which has already been factored into the forecast.	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
DBP02 – Pipeline and MLV	DC Power Upgrade MLV6	N	N	N	Forecast and requirement remains for this small standalone project. Work has already been considered for synergies within the ECI portfolio and factored into the forecast.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Replacement of solar panels.	N	N	N	End of life solar panel replacement forecast remains the same as the original submission and is a well-established requirement. Many units have already been deferred based on in service condition, however performance is now dropping and replacement is required. No changes to material costs and program is integrated into site visits and other maintenance activities by internal staff.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Long range Ultrasonic or digup of unpiggable pipes at facilities	N	N	N	A compliance driven project to understand the condition of our assets that are unpiggable. We now have the opportunity to utilise technology to understand the internal condition of critical high pressure infrastructure, as per AS2885, which we have not previously had an ability to do. The project is phased in a balanced way and sequentially. No further synergies to other projects within the portfolio were identified.	No revision to AA5 forecast - review as per normal business planning cycle
DBP02 – Pipeline and MLV	Replace Batteries at MLV and Meter Stations	N	N	N	End of life replacement volumes remain as per original submission. Batteries to be replaced with industry standard units. No changes to material costs and program is integrated into site visits and other maintenance activities by internal staff.	No revision to AA5 forecast - review as per normal business planning cycle

DBP09 Compressor Package Control System Replacement

Project Summary	
Project name	Compressor Package Control System Replacement
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	The original business case 'Compressor Package Control System Replacement - DPB09' (prepared in Q3/Q4 2019) included $18.4 million to replace [redacted] of the 20 turbine compressor package control systems (turbine control systems) during AA5, which are reaching the end of their technical design life. In its AA5 Draft Decision, the Economic Regulation Authority (ERA) has determined that [redacted] of the [redacted] units identified for replacement units should be deferred to AA6, reducing the forecast by 25% to $14.0 million (real unescalated dollars of December 2019). This decision is based on an assumption that 'cannibalised' parts from replaced units can be used to extend asset lives, meaning only [redacted] units will be replaced during AA5, with no units replaced before they are 17 years old. This approach would increase the average age at replacement to 18.5 years, which is above the technical design life of 18 years. We have taken on board the ERA and EMCa's feedback and conducted a review of the program of work, based on the latest information, to assess what work can be prudently deferred. We submit the deferral of the replacement of [redacted] units is not prudent asset management, nor in line with good industry practice, and would materially impact the risk of asset failure and the integrity of services. However, we believe an opportunity exists to defer [redacted] unit to AA6 while still managing risk within tolerable levels and without severely compromising the efficiency of the forward-looking replacement program over AA6. The deferral of one compressor control system reduces the capex forecast by $2.3 million, or 12.5%.
Estimated cost	The estimated total cost of the Compressor Package Control System work program is $16.1 million. The total cost in each year of AA5 is shown in the table below:

$'000 real June 19	2021	2022	2023	2024	2025	Total AA5
Capex	-	4,600.0	4,600.0	4,600.0	2,300.0	16,100.0

Consistency with NGR	This capital expenditure conforms with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. We have tested EMCa's proposal and consider the 25% reduction would materially impact risk and our ability to meet to our asset management objectives. However, the revised 12.5% reduction will allow us to achieve a saving during the period while not compromising risk and/or asset management objectives. **NGR 79(2)** - Turbine control systems provide critical safety and control functions for effective compressor station operation. Their replacement and upgrade, in line with

	manufacturer specifications and technical design lives, maintains the safety and integrity of our transportation services and is therefore consistent with NGR 79(2)(c)(i) and (ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Project approval	
Prepared by:	Jignesh Shah, Senior Electrical Control and Instrumentation Engineer
Reviewed by:	Hugo Kuhn, Head of Engineering
Approved by:	Tawake Rakai, GM Transmission Asset Management

Other Relevant Documents
This addendum should be read in conjunction with: • the original Capex DBP09 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5); and • our response to information request EMCa13.

1.1 Original business case

Our original business case 'Compressor Package Control System Replacement - DBP09' included capex of $18.4 million in the next five years (AA5). The forecast expenditure is required for the works necessary to replace [redacted] of the 20 turbine control systems during AA5, which are reaching the end of their technical design life.

Each turbine control system has a technical design life of 18 years, after which the manufacturer's recommendations are to replace these systems. The manufacturer has also advised us to plan for system replacement following the recommended upgrade path as technical support for the assets has ceased, and spare parts can no longer be sourced.

In the original business case, we considered three options:

- Option 1 - Upgrade all remaining turbine control systems to the latest version in AA5;
- Option 2 - Move to a replacement on failure policy; and
- Option 3 - Upgrade the number of turbine control systems identified in the AMP (eight) with new technology as they become obsolete/reach end of life.

Option 3 was the recommended option due to its alignment with our Operational Risk Framework, asset management principles and the relevant manufacturers' specification. It supports our vision and values and delivers for our customers on public safety, reliability of performance and customer service.

1.2 ERA Draft Decision

In its Draft Decision, the ERA has reduced the level of proposed expenditure by 25% to $14.0 million (real unescalated December 2019 dollars). This is based on the advice from its

technical experts EMCa, that we can defer the replacement of two control systems to AA6 by employing the life extension strategy which we used during AA4.

EMCa states:

> *We consider that by employing its life extension strategy (using 'cannibalised' parts from replaced units), it can prudently defer two of the eight units into AA6, with no units replaced before 17 years of age. This would increase the average age at replacement to 18.5 years.*[20]

This approach would increase the average replacement age of the systems to 18.5 years, which the ERA considered would be a minimal risk. The ERA further noted that our proposed schedule of control system replacements for AA5 has an average replacement age of 17.5 years, which is less than the technical design life of 18 years.

1.3 Our response

We have taken on board the ERA and EMCa's feedback and have reviewed our Compressor Package Control System Replacement forecast accordingly. Applying more up-to-date information, and conscious of the need to minimise any potential price impact on customers during the AA5 period, we have sought opportunities to defer costs where prudent to do so, as well as providing a further top-down challenge to identify where projects could be bundled and/or delivered at a lower cost.

As per technical advice from EMCa, we have looked at what control system replacements we can prudently defer at no material risk to the DBNGP's performance reliability or attainment of our risk and/or asset management objectives.

Following our review, we submit that the deferral of [redacted] units, a 25% forecast reduction in expenditure, is not consistent with the actions of a prudent service provider. We do not consider it prudent to operate the compressor package control systems beyond the manufacturer's recommended asset life for longer than is absolutely necessary, and wherever practicable we will replace units before they reach 18 years old. As highlighted by EMCa in Table 0.6 of its report[21], by the time each of the proposed eight control systems have been replaced during the AA5 period, two of them will be beyond their recommended lives (19 years). This is already at the threshold of a risk level we are comfortable with, particularly given the lack of technical support and spare parts for these units.

Deferring [redacted] replacements into AA6 would result in [redacted] control systems being operated at least two years beyond their design life. We submit this is not a prudent course of action.

However, we have identified an opportunity to extend the asset life of [redacted] unit within tolerable risk levels, deferring replacement until early in the AA6 period. While the unit will be 20 years old when replaced, we can use 'cannibalised' spare parts to safely operate one compressor station with a greater degree of confidence than [redacted]

This revised proposal will reduce the capex forecast by 12.5% rather than the 25% proposed by the ERA.

We submit that the revised forecast of $16.1 million is the minimum amount necessary to ensure the integrity of services provided by our compressor stations over the AA5 period without materially impacting risk or inhibiting achievement of our asset management objectives.

[20] EMCa Technical Review, p.124

[21] EMCa Technical Review, p.124

We will endeavour to deliver the program at a lower cost than forecast, however, based on current information we do not consider it prudent to commit to deferring more than one unit. We submit that the revised forecast of $16.1 million has been arrived at on a reasonable basis, and represents the best forecast possible in the circumstances.

These matters are discussed further in the following sections.

1.3.1 Project deferrals

As briefly discussed above, we do not accept the ERA's Draft Decision based on EMCa's advice that [redacted] compressor package control systems can be deferred to AA6 without materially impacting risk.

EMCa is correct in asserting that the average asset life of the control systems under the original proposal is 17.5 years, and deferring [redacted] to the AA6 period (assuming they are replaced in 2026), will increase that average to 18.5 years. At face value it may appear that 18.5 years would be tolerable, and although the technical design life is not the only factor that determines the scheduled replacement, we accept that in some circumstances we can manage assets to operate past their technical design lives.

However, operating assets beyond their design lives is only possible where sufficient spare parts and technical support is available, and the consequences of asset failure are not severe. Neither of these conditions hold true for compressor package control systems.

While age is not an absolute determinant of the replacement date for turbine control systems, the manufacturer advises there is an increasing risk of failure when operating them beyond their design lives. The impact of control system failure is severe, as it compromises our ability to operate the compressor stations, which has a direct impact on the flow of gas to customers. The risk associated with operating these particular control systems is exacerbated by the original equipment manufacturer (OEM) no longer supporting the units and there being a lack of spare parts. As EMCa acknowledges, *alternatives to OEM support is not viable in this case.*[22]

Under our original proposal, we would already be operating [redacted] turbine control systems ([redacted] and [redacted]) one year beyond their design lives (see Table 1).

Table 1: Turbine control systems scheduled for replacement

Facility	Unit	Installation	Replacement	Age at replacement
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

This situation is not ideal, however, the time and effort required to replace each control system means it is not practicable to replace all [redacted] by 2024. Our original proposal was based on the premise we can manage the risk associated with the [redacted] 19-year-old units by drawing on what

[22] EMCa Technical Review, p.124

spare parts we have and using parts from units already replaced. We considered this was tolerable as we would only be managing this heightened risk for up to 12 months.

If we were to defer replacement of [redacted] units to 2026 (the AA6 period), this would significantly increase our risk exposure. For example, if we deferred replacing units [redacted] by 12 months, they will have been operating for around two years past their design life. We do not consider it prudent to manage [redacted] control systems for so long past their technical life when spare parts and support are increasingly limited.

Further, while we appreciate the objective of reducing capex during the AA5 period in order to reduce the impact on regulated revenue and tariffs, we do not consider it prudent to defer control system replacements from 2025 completely. As a prudent asset manager it makes little sense to cease the program for 12 months solely for the purpose of shifting costs into AA6, as would occur if we pushed replacement of [redacted] out to 2026.

If we do push both [redacted] out to 2026, one option could be to spread the other six turbine control system replacements over the AA5 period, delivering some in 2025. However, this would only serve to increase the overall number of units being operated beyond 18 years old. Assuming we replaced all six units by 2024 as planned, we do not think it would reflect good asset management practice if we did not commence replacement of at least one of the deferred units during 2025 rather than carrying the risk for another year.

We are, however, conscious of the impact of our capex program within and across AA periods and the need to reduce impact on customers to the extent we can. We have therefore conducted a review of our works program and sought to identify opportunities to defer some costs into the AA6 period where safe and prudent to do so. A summary of our review process and findings is provided in Appendix A.

1.3.2 Revised program

Having reviewed current asset condition, more detailed operational information, availability of spares, opportunities to optimise the work program, and our risk tolerances, we submit we can prudently defer replacement of [redacted] turbine control unit to 2026. This is a saving in the AA5 period of $2.3 million, or 12.5%.

We propose to defer the replacement of control unit [redacted] to 2026, meaning it will be around 20 years old when replaced. While we would prefer not to operate the unit for this long past its design life, we consider we can tolerate and sufficiently mitigate this increased risk of failure if it is only at [redacted] compressor station (rather than [redacted] We believe we can use emergency spares and parts recovered from replaced units to manage the risk associated with this [redacted] control system. We will, of course monitor the performance of this turbine control system during the AA5 period and bring forward its replacement if we identify a material deterioration in performance.

Pushing [redacted] unit out to AA6 will result in an average age at replacement of the eight control systems of 18 years rather than the 18.5 years put forward by EMCa or the 17.5 we originally proposed. While we maintain that for these assets an aggregated average life at replacement is not necessarily the most prudent way to assess replacement requirements, the change in approach at least keeps us within the manufacturer's recommendations on average.

1.3.3 Efficient program of works

Another factor to consider is that the compressor package control system program of works extends past AA5, and is part of a broader scope complete [redacted] compressor sites over ten years.

As highlighted by EMCa:

> *…scheduling the replacement of compressor packages in blocks gives DBP economies of scale in the purchase of equipment and project delivery.*[23]

Deferring more than [redacted] turbine control system from AA5 to AA6 would impact the efficient procurement and delivery of the overall program of works. However, by only deferring [redacted] we can still achieve a reasonable balance of equipment purchase and program delivery.

As shown in Table 2, the original business case proposed a smoothed and optimised replacement of [redacted] units during AA5 and [redacted] during AA6. Our revised proposal will see [redacted] units replaced during AA5 and [redacted] during AA6. While this profile is not ideal from a balanced delivery perspective, we consider it is acceptable.

If we were to adopt the recommendation in the Draft Decision, the step up in replacement during AA6 would be steeper, with [redacted] replacements in AA5 and [redacted] in AA6. Jumping from [redacted] turbine control units to [redacted] units will likely increase the delivery risk and potential for scheduling conflicts, as well as necessitate greater resource/contractor deployment. It may also impact our ability to bundle works into efficient work packages. We would advise against pushing replacements out further into the AA7 period, as this would only serve to increase the risk profile further as more units are running even longer beyond their design lives.

Table 2: Profile of turbine control unit replacements over AA5 and AA5

	Original DBP submission	DBP Response to Draft Decision	ERA Draft Decision
Delivery profile	Optimum	Acceptable	Inefficient
AA5 – units	[redacted]	[redacted]	[redacted]
AA6 – units	[redacted]	[redacted]	[redacted]
Total Units Replaced	[redacted]	[redacted]	[redacted]

We therefore submit deferring replacement of [redacted] turbine control systems would not result in an overall work program that would achieve the lowest sustainable cost of providing services.

1.4 Summary

1.4.1 Estimating efficient costs

Table summarises the total unescalated costs by cost type for the Compressor Package Control System Replacement work program.

Table 4 shows the escalation applied to escalate the program to real dollars of December 2020, including labour cost escalation of 0.57% per annum.

[23] EMCa Technical Review, p.124

Table 3: Revised compressor package control system replacement cost estimate, $'000

($'000)	2021	2022	2023	2024	2025	Total
Units to be replaced	-	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Internal labour	-	752.9	752.9	752.9	376.5	2,635.3
Contractors / consultants	-	1,060.2	1,060.2	1,060.2	530.1	3,710.7
Materials & services	-	2,594.9	2,594.9	2,594.9	1,297.5	9,082.2
Travel & other	-	191.9	191.9	191.9	96.0	671.8
Total	-	**4,600.0**	**4,600.0**	**4,600.0**	**2,300.0**	**16,100.0**

Table 4: Revised compressor package control system replacement cost estimate, by cost category, ($'000 December 2020)

	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 19)	-	4,600.0	4,600.0	4,600.0	2,300.0	16,100.0
Escalation	-	117.0	127.3	137.5	73.9	455.7
Total escalated ($ Dec 20)	-	**4,717.0**	**4,727.3**	**4,737.5**	**2,373.9**	**16,555.7**

The unit rate for the replacement of turbine unit control systems includes the internal labour, external labour and materials/other costs forecast.

The unit rate used to determine the cost of the program in AA5 is based on historical experience, and actual costs have been further tested against a recent formal quote from [redacted] for a unit replacement cost, their contractual yearly increase and the cost for local resources.

Specialist engineering disciplines, procurement and construction management activities are provided utilising both internal and external resources.

1.4.2 Consistency with the National Gas Rules

Rule 79(1)

The revised capex program is consistent with the requirements of Rule 79(1) of the National Gas Rules. Specifically, we consider that the capital expenditure is:

- **Prudent** – The project is based on the replacement of an existing asset which has arrived at the end of its useful life. The control system is obsolete, no longer supported by the manufacturer and spare parts are not readily available. The history of failures for the CS4/3 compressor package control system demonstrates the deterioration of these assets as they approach twenty years in service. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- **Efficient** – The forecast expenditure is based on the actual unit replacement cost incurred in the replacement of similar unit control system in AA4. The OEM-provided equipment will be purchased in bulk where possible under existing contracts to ensure optimised unit pricing and minimised foreign exchange exposure and/or the need for multiple engineering design engagements also. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – The proposed project follows good industry practice of aligning replacement activity with commitments embedded within the Asset Management Plan and manufacturer's recommendations. Therefore, the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the replacement program in a proactive, planned and scheduled manner with the most appropriate volume of activity based on useful life and in line with manufacturer's guidance and associated support.

Rule 79(2)

Control systems provide critical safety and control functions for effective compressor station operation. Their replacement and upgrade, in line with manufacturer specifications and obsolete equipment, maintains the safety and integrity of our transportation services and is therefore consistent with NGR 79(2)(c)(i) and (ii).

Rule 74

The forecast costs are based on market rate testing, and consider opportunities for optimising the works program or deferring costs where prudent to do so based on the latest information. Cost assessments have been conducted based on the best information available at the time of developing the original business case and revised to reflect any changes outlined in this addendum. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A

In response to the ERA's AA5 Draft Decision, we have reviewed the pipeline asset management program for the AA5 period. On 5 and 6 August 2020, we held a series of workshops with our engineering, project management and senior management staff to reassess the capex program in light of more up to date asset information, the prevailing economic and risk environment, and the recommendations made by the ERA and its technical consultant EMCa.

The purpose of the workshops was to identify further opportunities across the entire pipeline asset replacement portfolio of work to reduce costs, optimise the work program, and/or defer projects to the AA6 period. The broad challenges put forward for each project were:

1. Have there been any changes in scope/design since the initial submission?
2. Are there any further synergies between projects?
3. Can this project be prudently deferred?

A summary of the outcomes from the session relating to DBP09 Compressor Package Control System Replacement is provided in the table below.

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BP09	Compressor unit control system replacements (Stage 3 and 4 units)	No	No	Yes	The [redacted] Stage 3 and 4 units will all reach the end of their design life by 2024. Only proposing to replace [redacted] per year. This means at least [redacted] will be 19 years old before replace. If we defer, these units will be at least 20 years old. The history of failures for the [redacted] control system demonstrates the deterioration of these assets as they approach twenty years in service. It is not prudent and we do not have sufficient spare parts to manage the risk of [redacted] 20-year old control systems. We could potentially tolerate [redacted] Deferring [redacted] will likely make it more challenging to package a more intensive program in AA6. We cannot push the lives out further into AA7.	[redacted] to de deferred to 2026. A 12.5% reduction in AA5 forecast

DBP10 Jandakot Site Redevelopment

Project Summary	
Project Name	Jandakot Site Redevelopment
Risk	High
Budget Category	Capital Expenditure (Capex)
Amendments to Original Business Case	We have adjusted the allocation of funds through the AA5 period to allow us to bring forward the planning and development approval processes for the Jandakot Site Redevelopment project from 2022 to 2021 and to better reflect the construction works to be completed in each year of the build across 2024 and 2025. Initiating the planning and development approval processes in 2021 will ensure there is adequate time for the development approval to be granted and redevelopment works to commence in 2024 and conclude by the end of 2025. We have done this as it will deliver the redevelopment project at a lower net present cost (a total saving of $0.6m) compared to deferring by a year and staging across AA5 and AA6 as was suggested in the ERA's Draft Decision and EMCa's technical review. This Addendum outlines the further options analysis we have undertaken following the ERA's Draft Decision to assess the prudence and efficiency of delaying the Jandakot Site Redevelopment (and thereby staging it across AA5 and AA6) as per Option 5 in our original business case. Our assessment shows that Option 5 will cost customers an additional $0.6 million compared to modifying our preferred Option 2 to bring forward the planning and development processes by one year. We therefore recommend to modify Option 2, which will see us complete the Jandakot Site Redevelopment by 2025 at a total cost of $8.6 million, consistent with the total project costs included in our Final Plan.
Estimated Cost	The estimated total capex investment on the Jandakot Site Redevelopment in AA5 is $8.6 million. The total cost in each year is shown in the table below.

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Jandakot Redevelopment	754.7	-	-	5,741.8	2,053.6	8,550.0

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	Jandakot is a critical operational and training facility for DBP with extensive warehousing for necessary equipment to ensure the safe and reliable operation of the DBNGP. The current facility experiences significant safety, security and operational constraints which will best be mitigated through redevelopment on the existing site, therefore is consistent with 79(2)(c)(iii) to comply with a regulatory obligation or requirement. The proposed redevelopment is also consistent with NGR 79(1)(a), which requires lowest sustainable cost of delivering pipeline services.
Project Approval	
Prepared By:	James Smith, GM Transmission Operations
Reviewed By:	Tawake Rakai, GM Transmission Asset Management
Approved By:	James Smith, GM Transmission Operations

Other Relevant Documents

This addendum should be read in conjunction with:

- the original Capex DBP10 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5);

- our response to information requests EMCa08 (NPV models) provided on 21 February 2020, EMCa19 provided on 3 March 2020, ERA21b provided on 5 June 2020, ERA23(1) provided on 9 July 2020 and ERA24 8 July 2020; and
- Supporting information to Attachment 8.5A_DBP10 Updated NPV analysis.

1.1 Original business case

Our original proposal for DBP10 Jandakot Site Redevelopment included capex of $8.5 million in AA5. The project included construction of a purpose-built facility at Jandakot to provide backup SCADA control room, server and communications facilities, warehousing, modern office and training facilities, and accommodation for the Transmission Operations division. This redevelopment will replace existing 30-year old facilities which no longer meet business requirements, operational or safety needs.

We considered the following five options:

- Option 1 – Reactive approach to addressing issues;
- Option 2 – Redevelop facilities on existing site;
- Option 3 – Lease a new facility;
- Option 4 – Build new facilities at a different location; and
- Option 5 – Staged redevelopment.

In our original proposal, Option 2 was recommended because it was the only option that will comprehensively address the identified safety and operational risks in an efficient and prudent manner.

The recommended Jandakot Site Redevelopment is a new project, with the main construction planned to be undertaken in 2024 and 2025. The timeline proposed in our original business case is summarised in Table below.

1.2 ERA Draft Decision

In its Draft Decision, the ERA accepted that the proposed redevelopment of the Jandakot site is necessary to improve the safety of services on the DBNGP and to comply with our regulatory obligations.[24]

However, the ERA reduced the proposed expenditure to $4.6 million (real unescalated dollars of December 2019) because it considered that a prudent service provide would pursue Option 5, which is the redevelopment in stages across AA5 and AA6. This would allow the office and traffic management issues being addressed in AA5 and the construction of the warehouse facility being deferred until the AA6 period. The ERA considered that this option involves the same scope of work, however, defers the timing of the work by one year, resulting in a lower net present cost for the work.

[24] ERA Draft Decision, [667]

The ERA observed that delays to the work compared to the planned schedule may occur in any case based on technical advice from EMCa that the work is likely to be delayed compared to the schedule due to:[25]

- the prevailing on-site conditions (the development site is on a class A water mound with limits on development); and
- the likelihood of a more protracted approvals process, which it said was typical with projects of this nature, highlighting our work schedule only allows six months for the approvals process for environmental, heritage and class A water mound approvals to be secured.

1.2.1 EMCa's recommendation to the ERA

EMCa noted it was satisfied that:[26]

- the current facilities will need to be improved to offset the risks and constraints outlined in the business case within the next 10 years;
- leasing warehouse facilities and/or training facilities at a nearby location has been considered by DBP as part of its options analysis and it is not a sustainable long term alternative to the proposed redevelopment;
- of the options identified, options 2 and 5 are superior to the other options (on the basis of risk mitigation and/or NPC);
- DBP has considered means of reducing the need for hotel nights for regional staff engaging in training at the Jandakot depot e.g. by changing the staff rosters; and
- Option 5 delivers approximately the same outcome as option 2 in physical terms (i.e. the scope is the same) albeit with a one year delay. The NPC reduction compared to option 2 from deferring the capex in 2024 and 2025 by one year is likely to be offset by ongoing operating costs (accommodation, warehouse stock damage, training opex).

In regards to timing EMCa raised a number of concerns. It stated:[27]

> *The current development is on a class A water mound with imposed limits on development which may constrain DBP's proposed redevelopment, particularly given the proposed establishment of what is effectively a hotel on the site to provide overnight accommodation. DBP has allowed only 6 months for the approvals process involving environmental, heritage and Class A water mount approvals to be secured. In our view DBP has not demonstrated that it has adequately considered the likelihood of a more protracted approvals process which are typical with projects of this nature.*
>
> *We consider that the project is likely to be delayed by at least 12 months and that Option 5 is a more likely scenario. The delay will incur additional opex (stock losses/damage, hotel nights). In our view, AA5 capex of $4.0m is likely to satisfy the capex criteria (i.e. an adjustment of -$3.8m).*

[25] ERA Draft Decision, [669]
[26] EMCa, Report to the ERA, p.125
[27] EMCa, Report to the ERA, p.125

1.3 Our Response

While we recognise the concerns raised by the ERA and EMCa around the timeline for approvals, we do not think it is prudent and efficient to defer the project build and continue to incur additional opex (increased ongoing operating costs, stock losses/damage and accommodation) to allow a longer timeframe for approvals.

We have therefore modified our Option 2 to bring the approvals process forward by one year within the AA5 period to enable sufficient time for the approval processes and for construction to occur in 2024 and 2025. To enable this, we have determined we can defer the capex solution for the Industrial Automated Control Systems (IACS) office, workshop and test laboratory, which was scheduled in 2021, to 2024, so it will be delivered once with the redevelopment of the Jandakot Facility.

This deferment comes at an additional annual operating cost of around $10,000 for increased travel to site of the specialist IACS technicians as there is currently insufficient workshop and storage space at Jandakot to complete all works there. This deferment also comes at a higher risk to health and safety. However, we believe we can manage this in the short term, with the planned risk mitigation by 2024 in line with our operational risk management framework to address identified risks to low or ALARP as soon as possible. The overall cost saving from deferral is commensurate with the short-term increase in the level of risk and, therefore, this solution is such as would be incurred by a prudent service provider acting efficiently.

Our modified Option 2 is a more prudent approach that will address the concerns around the protracted nature and uncertainty of the approval processes and deliver the redevelopment at the lowest sustainable cost.

Our updated project timeline brings forward the design and approvals by one year (from 2022 to 2021). This is summarised in Table 1 below.

Table 1: Jandakot site redevelopment timeline

Key milestones	Original Business Case (Final Plan)	ERA Draft Decision	Business Case (Revised Final Plan)
Conduct survey	March - May 2022	March - May 2022	March - May 2021
Engage the City of Cockburn to commence the environmental, heritage, and class A water mound approvals process	June 2022	June 2022	June 2021
Approval's process	June 2022 – June 2023	June 2022 – June 2024	June 2021 – June 2023
Engage with staff to gather ideas and suggestions on operational requirements and functional/aesthetic requests for the redevelopment;	January 2023	January 2023	January 2023
Finalise design	May 2023	May 2024	May 2023

Key milestones	Original Business Case (Final Plan)	ERA Draft Decision	Business Case (Revised Final Plan)
Issue Request for Tender for the construction of the redevelopment	June 2023	June 2024	June 2023
Award contract following competitive tender process	September 2023	September 2024	September 2023
Design complete, approvals obtained and early works commence	December 2023	December 2024	December 2023
Relocating staff from Jandakot to facilitate construction works to commence	February 2024	February 2025	January 2024
Construction period		January 2025 to June 2026	February 2024 to June 2025
Redevelopment complete and facility fully operational	June 2025	June 2026	June 2025

In concluding that our modified Option 2 is the prudent and efficient option for the redevelopment, we have reconsidered Options 2 and 5 from the original Business Case (noting the ERA considers Option 5 may be the prudent and efficient option).

We do not consider modified Option 5 as a prudent and efficient solution. This is because staging the development of works across AA5 and AA6 as proposed by the ERA's Draft Decision:

- Does not address the identified risks related to insufficient warehousing;
- Allows safety of site ingress and egress to persist into AA6 (although the ERA notes this could be addressed in 2025, it makes the most practical sense to address traffic flows as one of the last items during construction due to the nature of the construction activities and heavy machinery that will be required to access the site during construction); and
- Our annual opex costs at the site are higher for a further one to two years.

Additionally, Option 5 will require capex in 2021 of $234,000 to provide an interim solution for the IACS workshop, office space and laboratory as deferral of risk mitigation for a further two years until the redevelopment is complete in 2026 would not be consistent with our operational risk management framework which requires us to 'moderate the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.

Table 2 provides a summary of the costs and risks under Options 2 and 5. It shows that the funding benefit received from deferring some of the works into AA6 is offset by the additional opex and capex costs incurred. Therefore we can achieve a low risk outcome cheaper and quicker under Option 2.

Table 2: Summary of costs and risk under options 2 and 5

	2021	2022	2023	2024	2025	2026	Total NPV (20 years)*	Untreated risk	Treated Risk at 2025
Modified Option 2									
Capex	747.9	-	-	5,689.6	2,034.9	-	8,192.4	High	Intermediate (ALARP)
Incremental Opex**	173.4	238.9	321.3	295.7	(6.4)	(179.0)	(886.7)		
Total	**921.2**	**238.9**	**321.3**	**5,985.3**	**2,028.5**	**(179.0)**	**7,305.7**		
Modified Option 5									
Capex	234.0	747.9	-	-	4,015.2	3,709.4	8,133.5	High	High
Incremental Opex**	173.4	238.9	321.3	425.2	425.2	123.1	(193.7)		
Total	**407.4**	**986.7**	**321.3**	**425.2**	**4,440.4**	**3,832.5**	**7,939.8**		

*We note the NPC analysis is conducted over 20 years and assumes there will be $700,000 of maintenance capex required at the site every five years beginning ten years after the redevelopment (consistent with ad hoc capex requirements at the site over the AA4 period). This is incurred under both options in line with the timing of the redevelopment capex.

**Incremental opex is opex costs minus opex benefits

More detail on modified Option 2 and modified Option 5 is provided in the sections below.

1.3.1 Modified Option 2

Under our modified Option 2 for the Jandakot Redevelopment we will initiate the development approval process with the City of Cockburn in 2021, one year earlier than we had originally proposed. We have done so to address the concerns raised by the ERA and EMCa that our project schedule for the Jandakot Redevelopment had not allowed for adequate time to complete the development approvals process before construction was due to commence. This had lead the ERA and EMCa to conclude the redevelopment was likely to actually commence in 2025, deferring half of the proposed spend into the AA6 period.

Along with the initiation of the approval process in 2021 we have determined that it would be prudent to defer $234,000 of funds in 2021 that would have been used to provide an interim IACS workshop, office space and test laboratory. This deferral will cost an additional $45,000 opex in the period.

After submission of our Final Plan in January 2020 we approached an independent building firm to confirm our high-level cost estimate for the planned redevelopment works, including a breakdown of forecast costs against each of the key redevelopment activities. The total cost provided was $9.3 million. Through our competitive procurement process, further refinement and optimisation of the plans, and direct allocation of AGID (formerly DDG) costs associated with improved warehousing, logistics and hardstand facilities to the AGID business, we plan to deliver the redevelopment in line with the $8.5 million proposed in our Final Plan.

While our forecast of the build cost remains unchanged we have modified the profile of spend over AA5 to allow sufficient funds for staff engagement, detailed design and submission to the City of Cockburn under environmental, heritage, and class A water mound approvals in 2021.

This modification represents better value for money for our customers compared to our original proposal and compared to the ERA's Draft Decision by:

- Deferring the IACS workshop, office space and laboratory works until the redevelopment in 2024 at a total saving of $189,000 (build cost minus additional opex);
- Reducing identified risks to health, safety and environment to ALARP within the AA5 period;
- Addressing increasing opex costs associated with the ongoing operations of the site; and
- Reducing stock loss and ongoing accommodation costs sooner.

It is therefore such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)(a)).

1.3.1.1 Cost assessment

Under modified Option 2 for the Jandakot redevelopment we will invest $8.6 million capex and $1.0 million incremental opex in AA5. Table 3 below sets out the AA5 capex and opex by year as well as the total net present cost of this option over 20 years of $7.4 million.

Table 3: Summary of costs Jandakot redevelopment modified Option 2 ($'000 June 2019)

	2021	2022	2023	2024	2025	Total AA5	Total AA6	Total NPC (20 years)*
Scope of works	Preliminaries			Offices, Accom, Warehouse extension	Warehouse fit out, Earthworks, Demo, Parking and ingress/egress			
Capex	754.7	-	-	5,741.8	2,053.6	8,550.0	-	8,192.4
Opex	174.9	241.1	324.3	298.4	(6.5)	1,032.2	(903.2)	(886.7)
Total	**929.7**	**241.1**	**324.3**	**6,040.1**	**2,047.1**	**9,582.2**	**(903.2)**	**7,305.7**

1.3.1.2 Risk assessment and alignment with our vision

The risk assessment and alignment with our vision for our modified option 2 has not changed from that of option 2 presented in our original submission of DBP10 in January 2020. In particular any deferment of the redevelopment would not align with our vision of being a good employer in relation to health and safety and would not be sustainably cost efficient as it would allow our operating costs associated with stock loss and deteriorated facilities to continue to increase meaning higher overall costs are incurred over the medium term and will continue to be incurred the longer the redevelopment is deferred.

The risk and vision alignment tables have been reproduced in Table 4 and Table 5 below.

Table 4: Risk assessment modified Option 2

Risk category	Untreated	Treated
DBP	High	Intermediate
People	Intermediate	Low
Environment	Negligible	Negligible
Reputation/Outrage	Intermediate	Low
Asset Damage	Low	Negligible
Supply	Intermediate	Negligible
Priority rating	**High**	**Intermediate**

Table 5: Achieving objectives modified Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.3.2 Modified Option 5

Under modified Option 5, the ERA Draft Decision has proposed a staged redevelopment of the Jandakot facility commences in 2025, with the remainder of the work deferred into AA6. We have assumed construction still spans two years and therefore concludes in 2026.

The reason for a 2025 commencement date is to allow sufficient time for the approvals process.

The ERA's Draft Decision assumes just under half of the construction costs are deferred into 2026 by delaying the construction of warehousing and other site modifications to complete the redevelopment.

While the ERA states site ingress and egress risks can be addressed first in 2025, we have concluded that this is not practical or cost effective. It makes the most sense for traffic flow to be one of the last items during construction due to the nature of the construction activities and heavy machinery that will be required to access the site during construction. These factors mean there is a high potential for there to be damage to, or double up of works required, for traffic flow and site ingress and egress at an additional cost.

This option is more costly to customers compared to the modified Option 2 as:

- An interim IACS workshop, office space and laboratory will be required in 2021 at a forecast cost of $234,000 as it would be inconsistent with our operational risk framework to not address this for a further two years until 2026;

- Even if we did defer the IACS workshop, office space and laboratory a further two years until 2026, we would incur $65,000 in additional opex associated with extra travel to site required by specialist IACS technicians as there is inadequate space for them to do the work at Jandakot;
- It does not reduce the identified risks to health, safety and environment to ALARP within the AA5 period;
- It takes longer to address increasing opex costs associated with the ongoing operations of the site; and
- It takes longer to reduce stock loss and ongoing accommodation costs.

It therefore would not be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)(a)).

1.3.2.1 Cost assessment

Under modified Option 5 for the staged redevelopment of Jandakot we will invest $4.8 million capex and $1.6 million incremental opex in AA5. Table 6 below sets out the AA5 capex and opex by year as well as the total net present cost of this option over 20 years of $7.9 million.

Table 6: Summary of costs for modified Option 5 Jandakot redevelopment ($'000 June 2019)

	2021	2022	2023	2024	2025	Total AA5	Total AA6	Total NPC (20 years)*
Scope of works		Preliminaries			Offices and Accom		Warehouse extension and fit out, Earthworks, Demo, Parking and ingress/egress	
Capex	-	754.7	-	-	4,052.0	4,806.7	3,743.3	8,133.5
Opex	169.9	231.0	314.2	419.0	419.0	1,553.0	(603.4)	(193.7)
Total	**169.9**	**985.7**	**314.2**	**419.0**	**4,471.0**	**6,359.7**	**3,139.9**	**7,939.8**

1.3.2.2 Risk assessment and alignment with our vision

As stated in section 1.5.5.1 Risk Assessment of the original DBP10 Business Case staging the redevelopment does not 'moderate the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'. The treated risk under modified Option 5 is shown in Table 7 below.

Table 7: Risk assessment modified Option 5

Risk category	Untreated	Treated
DBP	High	High
People	Intermediate	Intermediate
Environment	Negligible	Negligible

Risk category	Untreated	Treated
Reputation/Outrage	Intermediate	Low
Asset Damage	Low	Low
Supply	Intermediate	Intermediate
Priority rating	**High**	**High**

Specifically, this option does not reduce the risks to DBP or People associated with a site that has known safety and operational risks related to traffic flow and insufficient warehousing.

Further risks identified with the existing Jandakot facility that should be noted (but have not been costed in this assessment) are:

- Incomplete fire intercom system – the intercom system that is linked to the fire bell notification system is not complete, with a number of non-permanent buildings utilised on an ongoing basis at the site are not covered for notification in the event of a fire. These areas therefore rely on procedural controls and appropriate action by personnel on site in line with these procedures, putting people at a higher risk if there were a fire at the facility.
- Security and Covid-safe measures – Since our original Business Case submitted in January, we have experienced significant changes to the operational procedures at our Jandakot Facility as a result of the COVID-19 crisis. These changes warrant enhanced visitor management where self-locking gates are required to ensure there is no access for visitors to occur without presenting at the reception areas beforehand. It is likely we will look to enhance security in line with Covid-safe measure on an ongoing basis and therefore it is appropriate to complete the redevelopment project as soon as reasonably practical.

As Option 5 was not considered a viable option due to risk, we did not assess it further in our original Business Case. Following the ERA's Draft Decision that Option 5 may in fact be the preferred option of a prudent and efficient service provider, we have assessed its alignment to our vision objectives. This assessment confirms modified Option 5 does not align with our vision as it allows identified safety risks to continue into AA6 and is a higher net present cost compared to modified Option 2.

Table 8: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	N
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.4 Summary

In summary we have undertaken further options analysis for the Jandakot Facility redevelopment and determined that the most prudent and efficient option is to bring forward the planning and

development approval processes from 2022 to 2021. We have also updated the allocation of funds across AA5 to better reflect the construction works to be completed in each year of the build.

Initiating the planning and development approval processes in 2021 will ensure there is adequate time for the development approval to be granted and redevelopment works to commence in 2024 and conclude in 2025. We have done this as it will deliver the redevelopment project at a lower net present cost (a saving of $0.6 million) compared to deferring by a year and staging across AA5 and AA6 as was suggested in the ERA's Draft Decision.

Table 9 below provides a summary of the further option assessment between modified options 2 and 5. The net present cost analysis shows the funding benefit of the deferral of approximately half of the redevelopment capex into AA6 is outweighed by the increased opex incurred and interim capex required in AA5.

Table 9: Summary of Cost/Benefit Analysis

Option	Objectives	AA5 Capex	AA5 Opex	NPC (20 years)	Risk
Modified Option 2 – Redevelop facilities on existing site in AA5	This option achieves our objectives of being sustainably cost efficient, delivering for customers and being a good employer	$8.6m	$1.0m	$7.3m	This option addresses the high risk to DBP by 2025
Option 5 – Staged redevelopment across AA5 and AA6	This option does not meet our objectives of being sustainably cost efficient, delivering for customers and being a good employer	$4.8m	$1.6m	$7.9m	This option does not reduce the overall rating to ALARP by 2025

1.4.1 Consistency with the National Gas Rules

Modified Option 2 is the preferred solution as it mitigates the safety risks identified in an appropriate timeframe, addresses increasing opex associated with the ongoing operation of the current facility, and reduces ongoing stock loss and accommodation costs, while addressing our future operational requirements, at the lowest sustainable cost.

Rule 79(2)

The option is consistent with Rule 79(2)(c)(i) as the capex is necessary to maintain and improve the services, specifically by:

- Improving the surety that all materials stored for pipeline maintenance and/or repairs are available and in good condition (without risk of theft or weather damage) and can be used safety consistent with the intended use.
- Improving the safety for all staff and contractors through improved ingress and egress conditions on site, enabling the overall supply chain of services (which includes transportation and storage of materials and provision of office facilities for field crew) to be safer, more efficient and more reliable.

Rule 79(1)

The option is consistent with Rule 79(1)(a), to achieve the lowest sustainable cost of providing services. Consistent with the requirements of Rule 79 of the National Gas Rules, we consider that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified safety concerns as soon as reasonably possible. The project is also based on the replacement of an existing asset which has arrived at the end of its useful economic life. The proposed option for redevelopment provides the best value for money for customers and DBP and is therefore of a nature that would be incurred by a prudent service provider.

- **Efficient** – The forecast expenditure is based on an estimate that we have validated with an independent building firm and have assumed a 5% reduction can be delivered through our competitive tender process and further refinement and optimisation of the redevelopment design. A formal procurement process will be undertaken once we have received in principle support for the redevelopment to commence in 2024. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – The proposed project involves providing a work environment to employees, contractors and visitors which is safe from harm, and which is shown as the lowest cost option for meeting the continued needs of our business. It also follows good industry practice and design specifications for comparable utilities and for employers of choice who offer contemporary work spaces, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs. Our NPV analysis of modified Options 2 and 5 shows modified Option 2 achieves a lower net present cost compared to modified Option 5.

1.4.1 Estimating efficient costs

Each of the two options further considered have utilised estimates as detailed in this Business Case Addendum for capex associated with design and build of facilities, as well as ongoing operating and maintenance costs.

Table 10 summarises the total unescalated costs by cost type of the preferred option. The total cost of $8.6 million is in line with the total costs presented in the initial Business Case DBP10 submitted in January 2020. Table 11 shows the escalation applied to escalate the Jandakot Redevelopment to real dollars of December 2020 including labour cost escalation of 0.57% per annum.

Table 10: Jandakot Redevelopment cost estimate by cost category ($'000 June 2019)

($000)	2021	2022	2023	2024	2025	Total
Internal Labour	30.9	-	-	234.8	84.0	349.6
Contractors / Consultants	57.5	-	-	437.1	156.3	650.9
Materials & Services	665.9	-	-	5,066.2	1,811.9	7,544.0
Travel & Others	0.5	-	-	3.7	1.3	5.5
Total	**754.7**	**-**	**-**	**5,741.8**	**2,053.6**	**8,550.0**

Table 11: Jandakot Redevelopment total escalated cost real dollars December 2020

($'000)	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 19)	754.7	-	-	5,741.8	2,053.6	8,550.0
Escalation	17.5	-	-	171.6	66.0	255.1
Total escalated ($ Dec 20)	**772.2**	**-**	**-**	**5,913.4**	**2,119.5**	**8,805.1**

Appendix A – Breakdown of redevelopment costs

Table 12: Summary of redevelopment costs by scope of work ($ June 2019)

Description	Quantity	Unit	Rate	Total Ex. GST	Procurement & design optimisation efficiency	Costs attributable to AGID	Total DBNGP costs	Year delivered Option 2	Year delivered Option 5
Preliminaries - Including all documentation and consultations fees and approvals.	[redacted]	allow	[redacted]	$798,085.00	-$39,904.25	-$3,468.91	$754,711.84	2021	2022
Office Facility to accommodate Administration and reception area, Planning and Scheduling, Management, Technical team, Training Facility that can be used as business forum function centre for up to 200 staff, amenities, hot desking for roster handover days.	[redacted]	sqm	[redacted]	$3,300,000.00	-$165,000.00	$0.00	$3,135,000.00	2024	2025
Accommodation establishment – Housing to fit up to 8 persons. Design to accommodate Single room with wet areas in each room, Shared Kitchen, Dining & Lounge room Facilities, Air conditioning throughout, with ambient outdoor area.	[redacted]	sqm	[redacted]	$965,250.00	-$48,262.50	$0.00	$916,987.50	2024	2025
Earthworks & Demolition Removing old transportable buildings from site.	[redacted]	allow	[redacted]	$159,655.00	-$7,982.75	-$693.95	$150,978.30	2025	2026
Environmental, water mound management and Landscaping	[redacted]	sqm	[redacted]	$461,160.00	-$23,058.00	$0.00	$438,102.00	2025	2026
Concrete Safe Footpaths for staff transitioning around complex.	[redacted]	sqm	[redacted]	$149,775.00	-$7,488.75	-$651.00	$141,635.25	2025	2026
Warehouse extension to accommodate additional undercover storage area.	[redacted]	sqm	[redacted]	$1,815,000.00	-$90,750.00	-$34,485.00	$1,689,765.00	2024	2026
Internal Modification to existing Workshop and Office areas to accommodate Monday to Friday field staff and workshop area,	[redacted]	sqm	[redacted]	$292,875.00	-$14,643.75	$0.00	$278,231.25	2025	2026

Description	Quantity	Unit	Rate	Total Ex. GST	Procurement & design optimisation efficiency	Costs attributable to AGID	Total DBNGP costs	Year delivered Option 2	Year delivered Option 5
and IACS office and workshop area.									
Heavy Vehicle Parking & Driveway – Includes Concrete pavement, storm water drainage and lighting	[redacted]	sqm	[redacted]	$658,400.00	-$32,920.00	$0.00	$625,480.00	2025	2026
Light Vehicle Car Park – Includes asphalt pavement, storm water drainage and lighting	[redacted]	sqm	[redacted]	$441,200.00	-$22,060.00	$0.00	$419,140.00	2025	2026
Contingency	[redacted]	allow	[redacted]	$300,000.00	-$300,000.00	-$3,468.91	-		
Total				**$9,341,400.00**	**-$452,070.00**	**-$39,298.87**	**$8,550,031.13**		

DBP12 Safety Case Revisions

Project Summary	
Project Name	Safety Case Revisions
Risk	High
Budget Category	Capital Expenditure (Capex)
Amendments to Original Business Case	We have not made any changes to our original business case for the Safety Case revisions. This addendum provides additional information to demonstrate the total cost of $0.5 million to undertake this work in 2021.
Estimated Cost	The estimated total cost of the Safety Case Revisions is $0.5 million. The work will be completed in 2021, as the revised Safety Case is required to be submitted no later than 4 November 2021.
Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	The Safety Case Revisions complies with the capex criteria in Rule 79 of the National Gas Rules (NGR) because: • NGR 79(1) - The expenditure is necessary to address ongoing operational requirements of the Safety Case. The proposed expenditure is therefore such as would be incurred by a prudent service provider. The proposed expenditure reflects good industry practice by adopting a 5-yearly review, leveraging and building the expertise of internal resources, supported by a small number of specialist external resources. It is therefore such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice to achieve the lowest sustainable cost. • NGR 79(2) - the Safety Case is the primary document outlining how the operation of the DBNGP is conducted in compliance with legislative obligations under the *Petroleum Pipelines Act* (PPA), *Management of Safety of Pipeline Operations* (MoSoPO) Regulations and other licence conditions, and therefore is necessary to comply with a regulatory obligation or requirement as per 79(2)(c)(iii).
Project Approval	
Prepared By:	Jeff Kong, Head of Transmission Asset Strategy
Reviewed By:	Tawake Rakai, GM Transmission Asset Management
Approved By:	Tawake Rakai, GM Transmission Asset Management
Other Relevant Documents	
This addendum should be read in conjunction with: • the original Capex DBP12 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5)	

1.1 Original business case

Our original proposal for DBP12 Safety Case Revisions included capex of $0.5 million in AA5 to undertake a comprehensive review and revision of the DBNGP Safety Case, which is required to be revised every 5 years in accordance with the *Petroleum Pipelines Act 1969* (WA).

The current Safety Case was accepted by the Minister via Department of Mines, Industry Regulation and Safety (DMIRS), as the Minister's Delegate, in November 2016. Therefore, we are required to submit a revised safety case no later than November 2021.

We are proposing to undertake the review and revision with internal personnel by knowledgeable staff who have in-depth and extensive experience in operating and maintaining the pipeline, thereby understanding its condition and operating environment.

In the original proposal we considered the following options:

- Option 1 – Undertake the Safety Case review with internal resources; and
- Option 2 – Undertake the Safety Case review with external resources.

We recommended Option 1 as it complies with our legislative requirements and supports a prudent approach to safety and risk management at the lowest sustainable cost. This approach ensures that any changes to operating conditions that occur within the 5-year period are taken into consideration in the Safety Case Revision at an individual and aggregate level, and that business knowledge and internal expertise are maintained.

1.2 ERA Draft Decision

In its Draft Decision, the ERA reduced the level of proposed expenditure on the Safety Case revisions by 40% from $0.5 million to $0.3 million (real unescalated dollars of December 2019) based on technical advice that the revision of the safety case should be straightforward given the incremental nature of the work.[28]

ERA's technical consultant EMCa considered that:[29]

> *using internal resources is preferable to using external resources given the cost savings and what we expect will be a relatively straight forward and incremental update of the current version.*
>
> *Based on the incremental nature of the work (as identified by DBP), we consider that approximately 50% of the $0.6m expenditure to produce the 2016 version is likely to be required to develop the 2021 version. Any cost involved with incorporating the non-covered pipeline assets introduced since the 2016 version of the safety case was approved should be charged to the un-covered assets.*
>
> *Forecast capex of $0.3m is a reasonable amount to produce the updated Safety Case (i.e. an adjustment of -$0.2m).*

We have not seen any detail as to the activity and hours of effort EMCa considered was appropriate in forming this view.

[28] ERA Draft Decision, [682]
[29] EMCa Technical Review, p.126

1.3 Our Response

We maintain the proposed expenditure of $0.5 million during AA5 represents the best estimate of costs to undertake the Safety Case Revisions. To support this, we have provided additional information to demonstrate how we came to a total cost of $0.5 million to undertake this work in 2021.

1.3.1 Background to Safety Case revisions

The DBNGP Safety Case has been in place since 1998 following the privatisation of the pipeline. Since then the Safety Case has undergone numerous revisions approved by DMIRS, including the regular 5-yearly revisions as well as special revisions to incorporate new assets including the Stage 4 and 5 Expansion projects.

As with the previous 5-yearly revision submitted and approved in 2016, the revision required in 2021 must satisfy the MoSoPO Regulations. There have been further revisions undertaken in addition to the 5 yearly revision to reflect changes that have occurred, such as changes to integrity management strategy or inclusion of additional assets. However, in accordance with the MoSoPO Regulations, these 'minor' updates do not reset the 5 yearly revision schedule, which requires a comprehensive and impartial review to ensure the safety case remains valid for the DBNGP.

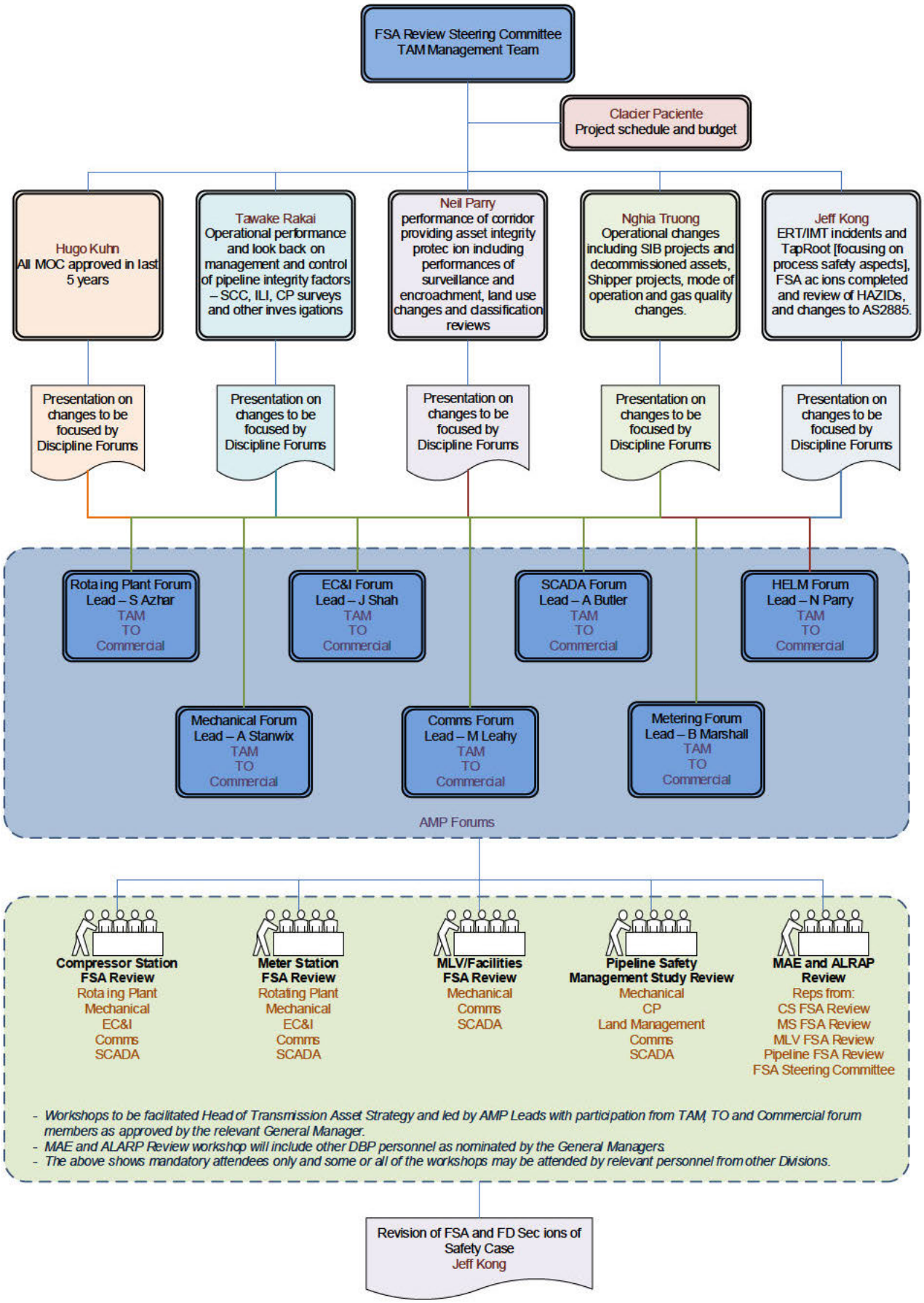
Accordingly, we will adopt the same methodology as has previously been accepted by DMIRS to deliver a similar scope of revision in the upcoming 2021 revision. The MoSoPO Regulations require a revised safety case to demonstrate that the pipeline's operation and all associated machinery, equipment and systems are kept in good condition and fit for purpose. Demonstrating this requires a systematic and thorough review to ensure all changes in pipeline operations, equipment, machinery and systems that have occurred are captured and to confirm that the risks associated with these remain acceptable and ALARP.

1.3.2 Our approach to Safety Case revisions

Figure below shows our approach to the review, the project team members involved, responsibilities and key stakeholders.

It shows there is significant input required from across the whole of the gas transmission business in particular Transmission Asset Management, Commercial and Transmission Operations (Maintenance) areas of the organisation. A number of other key business areas will also be involved as required. The assessments include changes that have occurred or likely to occur that alter the risks for the entire DBNGP assets for each and all disciplines, to enable risks within each discipline to be considered as well as combined risks for multiple disciplines across different pipeline and facility assets.

Figure 1: Our approach to the Safety Case revision



As outlined, the Safety Case revision requires a detailed review by subject matter experts and a number of workshops with all key stakeholders. Sufficient participation in the review is necessary to ensure:

- Validity of the assessment;
- Capture of corporate knowledge;
- Maintaining our internal capability and required skill set; and
- Compliance with the Regulations which require "effective consultation with, and participation of, members of the workforce" in the revision of the Safety Case.

We consider the Safety Case as our most important document. The Safety Case clearly demonstrates our obligations and case for safety to the Technical Regulator and forms the basis of our actions in driving process safety standards across our work programs both in the way they are structured and the way performance is measured. The introduction of Industrial Manslaughter law reinforces the importance of ensuring the quality and veracity of our Safety Case is assured.

1.3.3 Additional support for forecast costs

We have included a summary of the activities, number of personnel, hours of effort and cost of external facilitation required to undertake the Safety Case revisions implementing the approach outlined at 0 above. As shown in Table below, we forecast a total cost of $0.5 million. Further detail is provided in Appendix A.

Table 1: Summary of Safety Case revision costs ($'000 June 2019)

Activity	No. Personnel	Hours	Cost ($'000)
Introduction	4	[redacted]	4.4
Facility Description	16	[redacted]	31.6
Formal Safety Assessment	28	[redacted]	240.3
Safety Management System	10	[redacted]	47.9
Audit and Training	6	[redacted]	157.7
Other (eg Project Management, Travel)	3	[redacted]	19.2
Total		[redacted]	**501.0**

1.3.4 Risks of reduced allowance

Any reduction to the proposed expenditure for the Safety Case revision will significantly reduce the number of key participants involved in the revision process. This would compromise the quality of outcomes across all activities and stages of the review and could lead to:

- Crucial information being missed in the assessment; and
- Misalignment in the identification and control of hazards across asset facilities and engineering disciplines.

Both of these would place the acceptance of the Safety Case by DMIRS at risk which in turn will lead to further costs incurred to rework and reengage with DMIRS to achieve approval.

1.4 Summary

In summary, we have provided additional information to demonstrate the total cost of $0.5 million represents the best possible forecast for the Safety Case revisions in 2021 as required by NGR74.

Any reduction to this would severely compromise the quality of the revision process and risk the revisions not being accepted by DMIRS. Therefore the proposed expenditure of $0.5 million is consistent with that of a prudent service provider acting efficiently to achieve the lowest sustainable cost.

1.4.1 Consistency with the National Gas Rules

Rule 79(2)

As agreed by the ERA in its Draft Decision, the expenditure on the Safety Case revisions is necessary to:

- maintain and improve the safety of services 79(2)(c)(i);
- maintain the integrity of services by ensuring we can demonstrate that the pipeline and all associated machinery, equipment and systems are kept in good condition and fit for purpose 79(2)(c)(ii); and
- meet our regulatory obligations with DMIRS, with an approved Safety Case being a condition of our licence to operate the pipeline 79(2)(c)(iii).

Delivering the Safety Case revision for a lesser cost would severely compromise the quality of review which could impact on our compliance with legislative requirements and diminish our corporate knowledge and internal capabilities for the Safety Case.

Rule 79(1)

Consistent with the requirements of Rule 79(1)(a) of the NGR, and as outlined in our original business case, the expenditure of $0.5 million for the Safety Case revision is:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational requirements of the Safety Case. The proposed expenditure is based on the required activities and hours by our personnel to conduct the review in line with the approach we have implemented for previous revision processes that have lead to acceptance of our Safety Case by DMIRS and therefore can be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The expenditure is consistent with what we have historically incurred to deliver Safety Case revisions successfully, utilises and builds on our corporate knowledge and internal capabilities, with some external facilitation competitively procured, aiming to undertake a comprehensive and thorough review to achieve acceptance from DMIRS. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed expenditure reflects good industry practice by adopting the same approach that has seen prior revisions accepted and leveraging the expertise of internal resources to ensure corporate knowledge and capability is maintained. The proposed capital expenditure is therefore such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- **To achieve the lowest sustainable cost of delivering pipeline services** – The investment of $0.5 million represents the lowest cost and risk balance to ensure acceptance of the revised Safety Case by DMIRS (which includes demonstration that the pipeline and all associated machinery, equipment and systems are kept in good condition and fit for purpose). This ensures that the safety and integrity of the DBNGP is maintained so it can continue to deliver reliability of supply to customers.

Rule 74

The forecast cost is based on the key activities, level of effort required and recent labour and external costs to undertake these. This has been informed by our proven approach to the Safety Case revisions which we are required to undertake every five years. It has therefore been formed on a reasonable basis and represents the best possible forecast in the circumstances.

1.4.2 Estimating efficient costs

The costs are informed by the historical costs of undertaking previous reviews and revisions to the Safety Case, with the most recent expenditure incurred in 2015-2016. In response to EMCa's technical advice that this work could be done at the lower cost of $0.3 million, we have set out additional information that details each of the activities, personnel, hours of effort and external costs required to undertake the Safety Case revision in line with our proven approach. This can be found at sections 1.3.2 and 1.3.3 above, as well as in Appendix A.

As noted in the 'Final Plan Attachment 8.7 2021-2025 Cost Estimation Methodology', the forecast unit rates for all projects/initiatives managed within this program are inclusive of internal labour, external labour/contractors, materials, travel and other costs.

Table 2: Safety Case Revisions cost estimate by cost category summarises the total unescalated costs by cost type.

Table 2: Safety Case Revisions cost estimate by cost category ($'000 June 2019)

	2021	2022	2023	2024	2025	Total
Internal Labour	386.9	-	-	-	-	386.9
Contractors / Consultants	105.1	-	-	-	-	105.1
Materials & Services	-	-	-	-	-	-
Travel & Others	9.0	-	-	-	-	9.0
Total	**501.0**	-	-	-	-	**501.0**

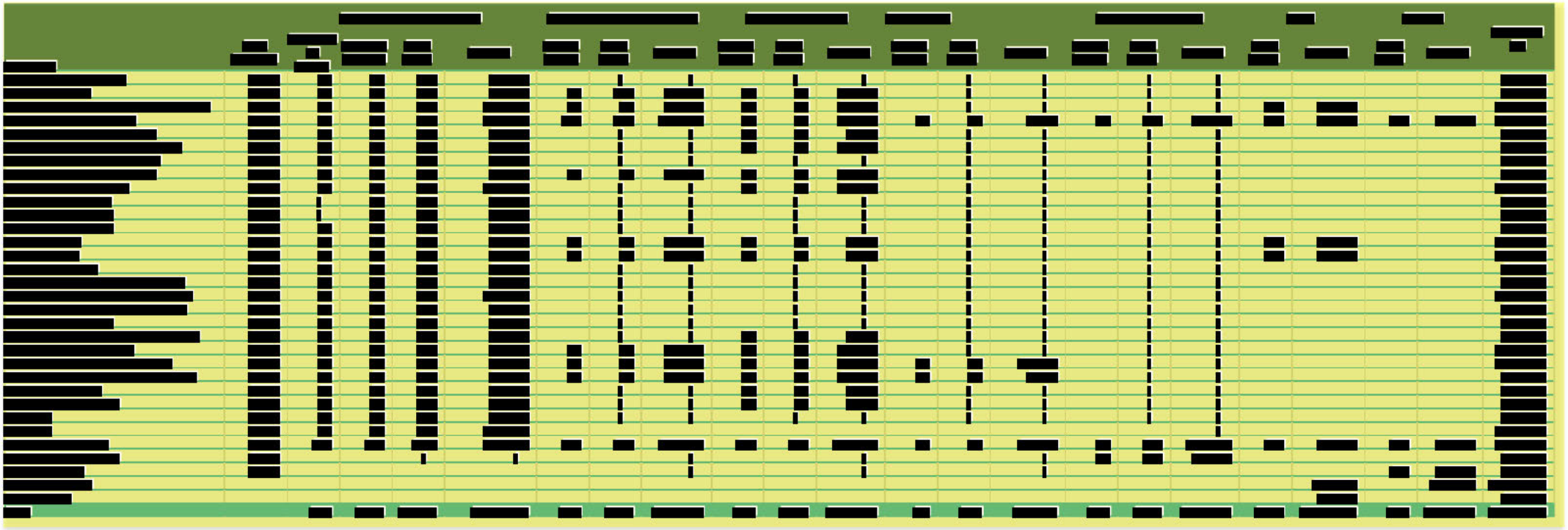
Table 3 shows the escalation applied to escalate the Safety Case Revisions to real dollars of December 2020 including labour cost escalation of 0.57%.

Table 3: Safety Case Revisions total escalated cost real dollars December 2020

($'000)	2021	2022	2023	2024	2025	Total
Total unescalated ($ June 19)	501.0	-	-	-	-	501.0
Escalation	11.6	-	-	-	-	11.6
Total escalated ($ Dec 2020)	**512.6**	-	-	-	-	**512.6**

Appendix A – Detailed work and cost breakdown for the Safety Case revisions (Confidential)

Table 4: Detailed breakdown of Safety Case revisions Option 1 ($ June 2019)



DBP15 Meter Stations

Project Summary	
Project name	Meter Stations
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	The original business case 'Meter Stations – DBP15' (prepared in Q3/Q4 2019) included $7.7 million in capex in the next five years (AA5) to complete ten projects related to the proactive replacement and refurbishment of metering facilities. Meter station equipment is relied upon to deliver gas at our agreed contractual standard reliability (98% uptime) and with tolerable levels of risk. Meter station accuracy is critical to ensure all billing data is accurate and reliable, thereby being consistent with good industry practice and customer expectations, and complying with various standards and obligations. In its Draft Decision, the Economic Regulation Authority (ERA) has found our preventative maintenance approach, and the proposed schedule of meter station activities to be prudent. This conclusion is supported by advice from its technical experts (EMCa) that our preventative asset management approach and proposed schedule of activities reflect good industry practice and are appropriate. However, the ERA has determined a reduction of 10%, or $0.8 million (real unescalated dollars of December 2019), contending that we have the ability to deliver a portion of our planned work for less that the amount forecast. This reduction is based on the EMCa's feedback that the meter station projects have either consistent annual expenditure, or high annual capital costs, or are based on rounded-up estimates. The ERA has also assumed we may be able to achieve savings during the AA5 period by deferring some of the meter stations projects, on the basis we have been able to defer projects in other work programs during AA4. We have reviewed our proposed AA5 meter stations program and sought opportunities to defer works where prudent and safe to do so. However, we have not identified any works within the meter stations program we believe could be deferred without materially impacting risk. A summary of our review is provided in Appendix A. We have also considered the ERA and EMCa's view that we should be able to identify efficiencies within the meter stations program on the assumption that historical underspends in other categories of work are translatable. We disagree with this view and submit that the lower than forecast spend in other programs during the AA4 period were due to project deferrals (doing less work) rather than finding efficiencies (doing the same work for less), and that achieving further efficiencies in the meter stations program will be challenging. While we agree with EMCa that there is more scope for finding efficiencies in larger programs of work (for example due to economies of scale and scope), we highlight that the meter stations program delivering during the AA4 period was around three times that proposed for AA5. The AA5 unit rate estimates are based on those achieved during the larger AA4 program, therefore the economies of scale and efficiencies achieved during the AA4 program are already built into the AA5 meter stations forecast. Given the AA5 program is smaller, it is not reasonable to expect to achieve a further unit cost saving. Moreover, we do not agree with the premise that savings or deferrals in unrelated work programs are a reliable indicator that similar saving or deferrals can be achieved in the meter stations program. We also submit that applying annualised average profiling and rounding when preparing large capex forecasts is common practice and is not a reasonable indicator that forecasts are overstated. We therefore submit that a 10% reduction is not practicable, and submit that our original forecast has been arrived at on a reasonable basis and represents the best estimate available in the circumstances. The proposed scope of work is prudent (as noted by the ERA and EMCa), and we have found no further obvious opportunities to optimise the program beyond

	the project bundling/optimisation already built into the forecast. Our forecasts therefore meet the requirements of NGR 74.
Estimated cost	The estimated total cost of the meter stations work program is $7.7 million as shown in the table below.

$'000 real June 19	2021	2022	2023	2024	2025	Total AA5
Capex	1,909.0	1,360.0	1,560.0	1,360.0	1,535.0	7,724.0

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	This capital expenditure conforms with the following National Gas Rules (NGR): **NGR 79(1)** - the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice and manufacturer's advice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. The program forecast reflects historical revealed costs, adjusted for expected efficiency assumptions and expenditure optimisation. We have considered the impact of EMCa's proposed 10% reduction and consider it would impact risk and our ability to meet to our asset management objectives. **NGR 79(2)** - the proactive replacement and refurbishment of meter station assets maintains the safety, integrity and reliable delivery of gas along the DBNGP. The projects are scoped in in line with age and condition-based asset needs and are necessary to maintain the safety and integrity of services along the DBNGP. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(ii). **NGR 74** – the forecast has been arrived at on a reasonable basis as it considers historical unit rates and manufacturer's advice, incorporates expenditure optimisation assumptions, and is founded on a detailed assessment of asset condition and past operating experience. The forecast therefore provides the best estimate costs in the circumstances and therefore meets the requirements of NGR 74.
Project Approval	
Prepared by:	Tim Aujard, Senior Process Engineer
Reviewed by:	Hugo Kuhn, Head of Engineering
Approved by:	Tawake Rakai, GM Transmission Asset Management
Other Relevant Documents	
This addendum should be read in conjunction with the original business case 'Meter Stations - DBP15', which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5).	

1.1 Original business case

Our original business case 'Meter Stations – DBP15' included capex of $7.7 million in AA5. The forecast expenditure allows us to continue with the capital program of works necessary to maintain the performance of our meter stations. Meter station equipment is relied upon to deliver gas at our agreed contractual standard reliability (98% uptime) and with tolerable levels of risk. Meter station accuracy is critical to ensure all billing data is accurate and reliable, thereby being consistent with good industry practice and customer expectations, and complying with various standards and obligations.

Over the next five years (AA5) we will see a number of assets reach the end of their technical design lives, requiring replacement (or refurbishment where this is more economical). The forecast meter stations work program comprises the following activities:

- replace or refurbish end of life flow measurement equipment including ultrasonic flow meters, Coriolis flow meters and turbine flow meters;
- replace end of life gas quality analysis equipment (gas chromatographs);
- replace and refurbish gas heating equipment including gas fired water bath heaters, with gas electric immersion heaters, and replace or refurbish associated utilities (fuel gas trains and thyristors);
- replace and refurbish pressure, temperature and flow control equipment such as control valves, pressure regulators, safety control valves and pressure safety valves; and
- replace or refurbish electrical and instrumentation equipment required to monitor and control the field equipment. This includes flow computers, PLCs, process controllers, remote terminal units, IS barrier installations, power distribution and earthing systems.

In our original business case, we considered three options:

- Option 1 - Maintain the volume of activity and expenditure levels undertaken during the AA4 period;
- Option 2 - Move to a replacement on failure policy for all meter station assets; and
- Option 3 - Deliver the volume and activities identified in the Asset Management Plan (AMP) as required, applying good asset management practice and adopting emerging techniques/technologies where appropriate. This was the recommended option.

We recommended Option 3 because it aligns with our Operational Risk Framework, asset management principles and the primary manufacturer's specifications. This option supports our vision and delivers for our customers on public safety, reliability of performance and customer service.

1.2 ERA Draft Decision

In its Draft Decision, the ERA accepts that the meter stations work program we proposed would contribute to maintaining the safety and integrity of services on the DBNGP as well as complying with DBP's regulatory obligations. This was based on the advice of the ERA's technical experts EMCa, that good industry practice for meter stations assets is for preventative management of the assets rather than reactive management, and that our proposed schedule of activities reflects a preventative management approach.[30]

However, the ERA has disallowed a portion of the forecast capex for the meter stations work program based on technical advice from EMCa that:

> *…of the 10 projects proposed for AA5, based on historical expenditure, DBP is likely to be able to prudently reduce its expenditure on five of these due to these being either recurring annual expenditures or having high annual capital costs and/or rounded-up estimates.* [31]

[30] ERA Draft Decision, [689]

[31] ERA Draft Decision, [690]

In its report EMCa states:

> *Option 3 does not recognise DBP's demonstrated ability in the AA3 and AA4 periods to prudently defer or deliver planned work for less than the ERA allowance. Of the ten projects, we consider that based on its 'track record' DBP is likely to be able to prudently reduce its expenditure on five [Earthing replacement and AC mitigation of facilities, Meter station valves and control valves overhauls, Heater fuel gas train replacement at meter stations, MLV and meter station hazardous area inspection and rectification works, Meter station piping repair] of them. These projects either have one or more of the following characteristics: consistent annual expenditure, high annual capital cost and what appear to be rounded-up estimates.*
>
> *We consider a reduction of 10% to the proposed option 3 cost (i.e. an adjustment of -$0.8m) is likely to result in a reasonable AA5 capex allowance.*[32]

The ERA considers:

> *that $7.06 million is the best estimate possible of the prudent and efficient amount of capital expenditure for the 'Meter stations' business case for AA5, and therefore satisfies rule 74 of the NGR. This amount has been derived by:*
>
> - *Reducing the un-escalated costs included in the proposed forecast by 10 per cent*
> - *Adjusting the labour cost escalation included in the forecast to reflect a real rate of 0.30 per cent as outlined at paragraph 608.*
>
> *The adjustment to the un-escalated costs has been made based on DBP's demonstrated ability during the AA4 period to identify opportunities to prudently defer planned work or identify efficiencies in executing that work for other business cases, and technical advice that a reduction of 10 per cent is likely to result in a reasonable amount for the 'Meter stations' work.*[33]

Accordingly, the ERA has reduced the level of proposed expenditure from $7.89 million to $7.06 million (real unescalated December 2019 dollars).

1.3 Our response

We have taken on board the ERA and EMCa's feedback and reviewed our meter stations work program accordingly. Applying more up-to-date information, and conscious of the need to minimise any potential price impact on customers during the AA5 period, we have sought opportunities to defer costs where prudent to do so, as well as providing a further top-down challenge to identify where projects could be bundled and/or delivered at a lower cost.

The ERA and EMCa appear to accept[34] that the proposed program is consistent with NGR 79(2)(c)(i) and (ii), stating that our preventative management approach:

- is good industry practice; and
- would contribute to maintaining the safety and integrity of services on the DBNGP, as well as complying with DBP's regulatory obligations.

[32] EMCa Technical Review, p.127. Real unescalated December 2019 dollars

[33] ERA Draft Decision, [691 and 692]. Real unescalated December 2019 dollars

[34] ERA Draft Decision, [689]

Despite this, the ERA has determined that although it considers the proposed meter stations work program prudent, we could reduce our expenditure by deferring some of this work or by identifying efficiencies. The ERA reaches this conclusion on the basis that because deferrals have been achieved in other work programs, similar deferrals/efficiencies to the value of 10% can be achieved with meter stations.[35]

We maintain that the proposed work program outlined in our original business case and underpinned by our Asset Management Plan is prudent. Nevertheless, we reassessed all ten projects within our meter stations work program for any work to be prudently deferred without materially impacting risk or inhibiting achievement of our asset management objectives (noting that a similar review was beyond EMCa's scope[36]).

Following our review, we do not consider it prudent to defer the planned work into AA6. This is because the assets in questions are already in poor condition, are affected by corrosion, are obsolete, or are already reaching the end of their design lives.

The meter station assets are fundamental to our ability to provide gas transportation services, and it is essential that the meter stations remain functional and the measurement and monitoring equipment within them remain accurate. This is demonstrated by our strategic decision during the AA4 period to prioritise meter station work when reprofiling our expenditure in-period (hence the higher-than-forecast spend during AA4).

An overview of the review process and our assessment of the prudence of the various meter stations projects is provided in Appendix A.

Given we have not identified any work we believe would be prudent to defer, to comply with the ERA's Draft Decision, we would need to deliver the 10% capex reduction for the AA5 period by identifying efficiencies, which the ERA assumes is possible on the basis deferrals and efficiencies have been achieved in other projects.[37]

We do not agree that this is practicable. It is important to note that the underspends achieved on other projects were achieved by making project deferrals (i.e. doing less work). The underspends were not achieved by findings efficiencies (i.e. achieving the same outcome for a lower cost).

This difference between deferrals and efficiencies is an important distinction. Where we have been able to defer projects from AA4, while this results in lower costs during that period (and therefore lower impact on regulated tariffs), it is only pushing the costs into future periods. We still have to deliver the work at some point.

As described above, as with all our pipeline capex projects, we have reviewed our AA5 work program for meter stations and sought to identify work we can defer. While in other programs (such as compressor stations and main line valves) we have found opportunities to push some costs into the AA6 period, this is not the case for meter stations.

We will seek to deliver the meter stations program for less than forecast and where we able to find efficiencies, we will repurpose capex to help deliver other programs. However, we do not consider it practicable nor prudent to assume the meter stations program can be delivered in full for 10% less than our estimate.

Moreover, we highlight that the ability to achieve cost reductions in other, unrelated capex programs does not necessarily translate to an ability to make similar savings in all projects. The

[35] ERA Draft Decision, [692]
[36] EMCa Technical Review, p.127
[37] ERA Draft Decision, [692]

drivers for replacing/refurbishing a particular asset can vary significantly by program, and as highlighted by the fact that we had to repurpose capex from other programs to increase our actual expenditure on meter stations during the AA4 period to address the poor condition meter station assets.

As highlighted in our original business case, in AA4 we undertook a $25.8 million program of work on our meter stations. This is compared to our proposed AA5 program of $7.7 million. We have based our unit cost estimates on the rates achieved in the three years of AA4 with highest spend, meaning that our forecasts already incorporate efficiencies associated with a program more than three-times the proposed AA5 program. In contrast to the ERA and EMCa's view that we can achieve efficiencies in the meter stations program, we are more likely to have increased unit rates when compared to the AA4 period, and therefore do not consider it reasonable to achieve any further efficiencies.

EMCa further implied our forecasts include a level of overestimation on the basis of the use of annualised average cost profiling and rounding of our expenditure forecasts. These methods are standard practice, and do not in and of themselves demonstrate the resulting forecasts are overestimated.

The application of developing a five-year work program and allocating the forecast capex relatively uniformly over the period is standard practice. While the forecast will necessarily diverge from the actual delivery (and therefore expenditure) profile, we aim to deliver a balanced work program to minimise any inefficiencies such as workforce ramping costs.

We have used actual historical costs for each project type to develop our capex forecasts. In some instances where we have made adjustments[38] to actual historical costs we have rounded our project estimates. The rounding has, in some circumstances increased the project cost, and in others has decreased the cost.

We contend that averaging our cost profile over the AA period, and rounding our forecasts are reasonable practices, and are in fact required to ensure that the unit rates and volumes for such programs of work reflects our best estimate as required by NGR 74. Any differences in profiling or rounding are unlikely to be material, and are expected to be far outweighed by other cost factors, such as exchange rates, market rates, asset conditions, changes in volumes, changes in manufacturer specifications and unforeseen circumstances.

These matters are discussed in the following sections.

The ERA considers *that $7.06 million is the best estimate possible of the prudent and efficient amount of capital expenditure for the 'Meter stations' business case for AA5, and therefore satisfies rule 74 of the NGR*.[39] However, we submit that making an assumption DBP will be able to achieve 10% of savings based on its ability in AA4 to defer planned work or achieve efficiencies on the basis of other unrelated programs of work is not be a reasonable basis on which to arrive at forecast savings going forward.

We contend that our approach, which is to arrive at a forecast based on the best asset data available in the circumstances, only factoring in cost savings reasonably within our control, results in a more reasonable forecast.

[38] These adjustments include for example, additional sparing generation, the use of various emerging technologies and expenditure optimisation.

[39] ERA Draft Decision, [691]. Real unescalated December 2019 dollars

We submit that the original forecast of $7.7 million to conduct the necessary meter stations replacement and refurbishment works is consistent with NGR 79 and 74, has been arrived at on a reasonable basis, and remains the best estimate of the costs of undertaking this work.

1.3.1 Project deferrals

While the ERA and EMCa accept[40] that the proposed program is consistent with NGR 79(2)(c)(i) and (ii), the ERA considers we could reduce our expenditure by deferring some of this work[41].

As was demonstrated by re-prioritising our capex program to deliver meter stations work in the AA4 period (at the expense of lower risk projects), projects in our meter stations program are critical and deferrals are unlikely. Deferring the proposed meter station works would be inconsistent with the industry practice, preventative management approach, and would put at risk the safety and integrity of services on the DBNGP, as well as lead to our non-compliance with our regulatory obligations.

We maintain that the proposed work program outlined in our original business case and underpinned by our Asset Management Plan is prudent. Nevertheless, we reassessed the prudence of each of our 10 meter stations projects, with a view to identifying any projects able to be prudently deferred without materially impacting risk or inhibiting achievement of our asset management objectives.

In particular, we have reviewed the five projects[42] for which EMCa has used as the basis for its recommended capex reduction. These are:

- meter station valves and control valves overhauls;
- heater fuel gas train replacement at meter stations;
- MLV and meter station hazardous area inspection and rectification works;
- meter station piping repair; and
- earthing replacement and AC mitigation of facilities.

We have not found any further opportunities to defer planned work into AA6. The assets in question in each of these projects are either in poor condition, are obsolete, or will reach the end of their design lives during the AA5 period. It is therefore not prudent to defer them.

An overview of the review process and our assessment of the prudence of the various meter stations projects is provided in Appendix A.

1.3.2 Economies of scale and scope

EMCa suggests there is scope to reduce our meter stations capex because some of our projects had a high capital cost.[43] In its technical review, EMCa does not expand on its rationale, however we expect EMCa is suggesting we could achieve further economies of scale and scope within our program, for example from bulk discounts on materials and labour contracting, and bundled program delivery.

[40] ERA Draft Decision, [689]
[41] ERA Draft Decision, [692]
[42] EMCa Technical Review, p.127
[43] EMCa Technical Review, p.127

We agree with EMCa that there are greater opportunities to achieve economies of scale and scope in larger programs of work. During the AA4 period, our meter stations program was $25.8 million and was one of the largest programs undertaken during the period.

In AA5 we are forecasting to spend $7.7 million. This is significantly lower than AA4, which in-turn reduces our ability to achieve the efficiencies seen in AA4. Nevertheless, we have based our unit cost estimates on the rates achieved in the three years with highest spend, meaning that our forecasts already incorporate efficiencies associated with a program of more than three-times the proposed AA5 program.

Given the AA5 program is significantly smaller than AA4, it may well be the case that the unit rates we achieve during the AA5 period will be higher than in AA4. However, we will endeavour to deliver the program within the more conservative forecast we have put forward. We therefore do not consider it reasonable to assume further reductions in unit rates or efficiencies.

1.3.3 Annualised profiling of expenditure and rounding

EMCa has cited the used of annualised average project profiling of costs and rounded-up forecasts for some projects as a key reason for recommending the ERA apply a 10% capex reduction to the overall meter stations work program. EMCa seems to be implying that these forecasting methods result in a level of overestimation in relation to those forecasts.[44]

We consider that applying annualised averages and rounding when developing five-year capex forecasts are standard practices, and by extension do not mean the resulting forecasts are overestimated.

Developing a five-year work program and allocating the forecast capex relatively uniformly over the period is common, and is often a preferred option when using the forecasts to determine a smooth revenue/price path. When forecasting large volumetric programs, we will develop our forecasts consistent with a smooth delivery profile, which helps us minimise the cost of providing pipeline services. For example, smoothing the capex profile to the extent we can helps avoid costs such as resource ramping.

There are two methods of achieving a smooth profile – we can either allocate volumes, or expenditures between years. While they may result in different expenditure profiles, the overall value of the program is unaffected. For this program, we have chosen to allocate average expenditure between the years.

While the delivery profile and therefore expenditure will necessarily diverge from the forecast, we consider the annualised average profiling approach arrives at a forecast on a reasonable basis, provides the best estimate in the circumstances, and therefore meets the requirements of NGR 74.

Using rounded project estimates is standard practice. This is evidenced in the ERA and EMCa applying a rounded cost reduction of 10% to our meter stations work program. While we accept rounding can have a significant impact on values, we submit that in the context of the developing a $7.7 million forecast for a major asset replacement program, it is immaterial.

As discussed in our original business case, we have used actual historical costs for each project type to develop our capex forecasts. In some instances where we have made adjustments to these costs, we have rounded our project estimates. These adjustments include for example, differences

[44] EMCa Technical Review, p.127

in detailed scope of work, the use of various solutions such as emerging technologies and opportunities for expenditure optimisation with other work.

Specific estimates of such adjustments are unlikely to be accurate, or result in a material difference. For example, in developing our project estimate for meter station valves and control valves overhauls, we have estimated we will overhaul or replace the historical average number of valves across our [redacted] meter stations. This program includes the replacement of [redacted] four-inch valves over the AA5 period at an estimated, rounded unit cost of [redacted] This compares with the most recent replacement at our [redacted] meter station which cost [redacted]. The difference in cost relates to variations including for example, site specific design and engineering, installation and commissioning costs, as well as exchange rates on materials at the time of purchasing.

The use of rounding has, in some circumstances increased the project cost, and in others decreased the cost. We do not consider that the use of rounding in our forecast meter station program has resulted in a material overestimation of the costs.

Importantly, it is the actual cost, rather than any estimate, rounded or otherwise, that will be assessed for its prudence by the ERA at the end of the AA5 period.

We contend that averaging our cost profile over the AA5 period, and rounding our forecasts are reasonable, standard practice, and in fact in many cases required to ensure that the unit rates and volumes for such programs of work reflects our best estimate of the costs as required by NGR 74. Any differences in profiling or rounding are unlikely to be material, and are expected to be far outweighed by other cost factors, such as exchange rates, market rates, asset conditions, changes in volumes, changes in manufacturer specifications and unforeseen circumstances.

1.3.4 ERA's revised forecast

We consider that the ERA's top-down reduction of 10% of the meter station program is inconsistent with NGR 74 as it has not been arrived at on a reasonable basis and therefore would not represent the best forecast or estimate currently possible. This is because:

- the top-down reduction does not appear to recognise the economies of scale and scope that has already been factored into the estimated costs of delivering the meter stations program, as well as the broader AA5 capex forecast;
- it is not industry practice, nor realistic, to achieve further significant operational cost savings (beyond those already built into the forecast) in the absence of clear technological or other overt drivers;
- high, rounded (up or down) or consistent average annual forecasts do not imply overestimation. Rounding and averaging are valid estimation techniques where projects are in an early lifecycle phase, and reflect the best information at the time. A high estimate can as easily be overspent as underspent, evidenced by the $18.1 million higher than forecast spend in the AA4 period for this program; and
- EMCa's forecast reduction does not appear to have been based on an assessment of asset condition, economic environment, risk, forecast error or identification of specific opportunities for deferrals. Rather, the 10% reduction seems to be based on assuming circumstances during the AA4 period similar to those that were relevant to other programs, would be relevant to the metering stations program in the AA5 period. We do not consider this set of assumptions is a reasonable basis on which to develop a forecast and would result in a better forecast than the one put forward by DBP.

The ERA's reduction will not allow DBP to recover at least its efficient costs, and has the potential to incentivise the implementation of lower cost options in the short-term that are inconsistent with the long-term lowest cost. It is therefore inconsistent with the National Gas Objective (NGO) and revenue and pricing principles (as set out in the National Gas Law).

Conversely, the forecast provided by DBP is consistent with the NGO, NGR 74 and 79, and the revenue and pricing principles because:

- there is little scope for further efficiencies (i.e. doing the same volume of work at a lower unit cost) in AA5. The proposed scope of work required is necessary to achieve the lowest sustainable cost of maintaining the assets and is accepted good industry practice, therefore meeting the requirements of NGR 79; and
- the forecast has been arrived at on a reasonable basis as it considers historical unit rates and manufacturer's advice, incorporates expenditure optimisation assumptions, and is founded on a detailed assessment of asset condition and past operating experience. The forecast therefore provides the best estimate of costs in the circumstances and therefore meets the requirements of NGR 74.

1.4 Summary

1.4.1 Estimating efficient costs

As described in the original meter stations business case, the cost estimate for this work program is based on historical expenditure, reflecting that these projects are consistent with similar previous works. In addition, the estimates use:

- contractual rates of vendors that will be utilised;
- resource costing that reflects similar current or prior period projects; and
- original equipment manufacturer contractual rates for spares and labour that are part of our services agreements.

Table below summarises the total unescalated costs for Meter stations in real June 2019 dollars.

Table 1: Meter stations cost estimate, $'000

Category	2021	2022	2023	2024	2025	Total
Earthing replacement and AC mitigation of facilities	100.0	100.0	100.0	100.0	100.0	**500.0**
Meter station valves and control valves overhauls	922.0	740.0	740.0	740.0	740.0	**3,882.0**
Flow computer replacement	-	-	-	-	150.0	**150.0**
Coriolis meter replacement	160.0	-	-	-	-	**160.0**
Turbine meter replacement	-	-	-	-	225.0	**225.0**
Heater fuel gas train replacement at meter stations	240.0	240.0	240.0	240.0	240.0	**1,200.0**
MLV and meter station hazardous area inspection and rectification works	-	200.0	400.0	200.0	-	**800.0**

Category	2021	2022	2023	2024	2025	Total
Meter station piping repair	80.0	80.0	80.0	80.0	80.0	**400.0**
Upgrade of gas chromatographs	123.0	-	-	-	-	**123.0**
Cockburn Power Station and PEPL flow meter	284.0	-	-	-	-	**284.0**
Program total	**1,909.0**	**1,360.0**	**1,560.0**	**1,360.0**	**1,535.0**	**7,724.0**

Table 2 summarises the total unescalated costs by cost type for the revised meter stations works program.

Table 3 shows the escalation into real dollars of December 2020, including labour cost escalation of 0.57% per annum.

Table 2: Meter stations capital works program cost estimate, by cost category ($'000 June 2019)

($'000)	2021	2022	2023	2024	2025	Total
Internal labour	275.2	190.9	237.2	190.9	188.4	1,082.6
Contractors/ consultants	557.6	479.7	560.3	479.7	541.2	2,618.4
Materials & services	1,038.5	647.0	713.0	647.0	765.0	3,810.6
Travel & others	37.7	42.4	49.5	42.4	40.4	212.5
Total	**1,909.0**	**1,360.0**	**1,560.0**	**1,360.0**	**1,535.0**	**7,724.0**

Table 3: Meter stations capital works program cost estimate, by cost category, ($'000 December 2020)

	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 19)	1,909.0	1,360.0	1,560.0	1,360.0	1,535.0	7,724.0
Escalation	44.3	34.6	43.2	40.7	49.3	212.1
Total escalated ($ Dec 20)	**1,953.3**	**1,394.6**	**1,603.2**	**1,400.7**	**1,584.3**	**7,936.1**

1.4.2 Consistency with the National Gas Rules

Rule 79(1)

The proactive replacement and refurbishment of meter stations assets is consistent with the requirements of NGR 79(1)(a), Specifically, we consider that the capital expenditure is:

- **Prudent** – meter station assets are necessary in order to deliver gas safely and reliably to customer outlet points, as well as to ensure accurate measurement and billing of services occurs. The proposed program of work reflects age and condition-based asset needs, in line with DBPs asset management approach. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- **Efficient** – the forecast expenditure is based on revealed historical actuals and future tender contract values, and incorporates expected future efficiency improvements and expenditure optimisation assumptions. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – the proposed expenditure follows good industry practice by ensuring that critical infrastructure is maintained within its useful life and to current technological standards, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- To achieve **the lowest sustainable cost of delivering pipeline services** – Undertaking the meter stations program in a proactive, planned and scheduled manner based on appropriate age or condition parameters reduces total costs over the life of these assets, where unplanned failure could lead to damage requiring full replacement. Estimates incorporate proven new and emerging technologies adopted where these techniques reduce long-term costs.

Rule 79(2)

The proactive replacement and refurbishment of meter station assets maintains the safety, integrity and reliable delivery of gas along the DBNGP. The projects are scoped in in line with age and condition-based asset needs and are necessary to maintain the safety and integrity of services along the DBNGP. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(ii).

Rule 74

The forecast has been arrived at on a reasonable basis as it considers historical unit rates and manufacturer's advice, incorporates expenditure optimisation assumptions, and is founded on a detailed assessment of asset condition and past operating experience. The forecast therefore provides the best estimate costs in the circumstances and therefore meets the requirements of NGR 74.

Appendix A

In response to the ERA's AA5 Draft Decision, we have reviewed the pipeline asset management program for the AA5 period. On 5 and 6 August 2020, we held a series of workshops with our engineering, project management and senior management staff to reassess the capex program in light of more up to date asset information, the prevailing economic and risk environment, and the recommendations made by the ERA and its technical consultant EMCa.

The purpose of the workshops was to identify further opportunities across the entire pipeline asset replacement portfolio of work to reduce costs, optimise the work program, and/or defer projects to the AA6 period. The broad challenges put forward for each project were:

1. Have there been any changes in scope/design since the initial submission?
2. Are there any further synergies between projects?
3. Can this project be prudently deferred?

A summary of the outcomes from the session relating to DBP15 Meter Stations is provided in the table below.

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
BC15 - Meter Stations	Earthing replacement and AC mitigation of facilities	No	No	No	Cathodic protection surveys indicate deterioration of existing anodes at, or worse than, the expected rate. Some meter station earthing has been found heavily corroded when excavation was performed. The program of works remains consistent with the original business case and the portfolio of works is already balanced evenly across the period to make sure we are providing the lowest cost of service.	No revision to AA5 forecast - review as per normal business planning cycle
BC15 - Meter Stations	Meter station valves and control valves overhauls	No	No	No	[redacted] valves are already progressively underperforming/failing through leakage and not creating adequate seals on closure. Control valves are deemed the most critical process control element on the DBNGP, and the performance of these assets are critical to the safe operation of the pipeline. This program of	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					works remains aligned to the original submission and the portfolio of works is balanced over the period to ensure a balanced and efficient program for delivery. Given the scale of the program it is being managed sequentially by one project team, which has allowed us to further consider opportunities to optimise the program. We have not found any additional opportunities for optimsation. This program does not provide an opportunity to prudently defer expenditure, and it is the best estimate with the available information.	
BC15 - Meter Stations	Flow computer replacement	No	No	No	No new information has been available since the original business case was developed. The end of life program of works was substantially completed in AA4, however, there remain a number of SCADA packs identified for replacement in AA5. Each of these will be at least 15 years old at replacement, and will need replacement before performance deteriorates below minimum acceptable standards. This program does not provide an opportunity to prudently defer expenditure, and it is the best estimate with the available information. The work volumes from AA4 allowed us to forecast efficient costs going forward.	No revision to AA5 forecast - review as per normal business planning cycle
BC15 - Meter Stations	Coriolis meter replacement	No	No	No	This program is the last and final part of the ongoing Coriolis meter replacement project due to be completed in 2021. This Coriolis meter is already failing and will not be able to remain functional for another 5 years into AA6. This project does not provide an opportunity to prudently defer expenditure, and it is the best estimate with the available information.	No revision to AA5 forecast - review as per normal business planning cycle
BC15 - Meter Stations	Turbine meter replacement	No	No	No	The scope of works remains the same as the original business case. The turbine meter will be at the end of its design life, and technically obsolete. We have already prudently deferred the replacement of this unit as far as we reasonably can, and will need to replace it before 2025. This project does not provide an	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					opportunity to prudently defer expenditure, and it is the best estimate with the available information.	
BC15 - Meter Stations	Water bath heater replacement at meter stations	No	No	No	This is the continuation of an established program of works addressing the extensive corrosion detected on water bath heaters at meter stations. We are assessing the rate of deterioration and intend to address the risk of corrosion as soon as practicable. We are currently undertaking repairs on several assets, and are considering whether we need to accelerate this program. We will consider seek to balance the risk with our commitment to a balanced portfolio of works, which is the most cost effective and has been considered for combination with other projects on site. Given the increased risk, this project does not provide an opportunity to prudently defer expenditure, and it is the best estimate with the available information.	No revision to AA5 forecast - review as per normal business planning cycle
BC15 - Meter Stations	MLV and meter station hazard area inspection and rectification works	No	No	No	This program is directly driven by a regulatory requirement and is required to enable us to comply with our Safety Case. This is a well-established program and has been profiled over 3 years. The skill set and expertise required for the works do not allow them to be combined with other projects in the portfolio. However, the program has been estimated, and planned for delivery by one project manager to ensure we deliver on our optimised budget.	No revision to AA5 forecast - review as per normal business planning cycle
BC15 - Meter Stations	Meter station piping repair due to corrosion	No	No	No	The scope of works remains the same as the original business case. The program is directly related to the increase in corrosion found as part of our corrosion inspection program. It is required to avoid loss of containment at critical sites identified on the DBNGP, and therefore expenditure cannot be prudently deferred. The program was considered further for synergies within several cathodic protection projects, however no further opportunities were identified at this time. The program of works	No revision to AA5 forecast - review as per normal business planning cycle

Business case	Project	Has there been a change in scope since the initial submission?	Are there any further synergies between projects?	Can this project be prudently deferred?	Commentary	Outcome
					remains consistent with the original business case and the portfolio of works is already balanced evenly across the period to make sure we are providing the lowest cost of service.	

DBP16 Tools

Project Summary	
Project Name	Tools
Risk	Intermediate
Budget Category	Capital Expenditure (Capex)
Amendments to Original Business Case	We have not made any material changes to our original business case for Tools. This addendum provides additional information to support the total costs outlined in the original business case and we have adjusted these from an average amount per year for some programs, to a specific bottom up build for tooling purchasing requirements in each year. In particular this Business Case Addendum includes: • Tabulated list of tools to be purchased year on year in AA5 under the Transmission Asset Management (TAM) and Transmission Operations (TO) programs; and • Further explanations made to clarify points raised on the cost of borescope replacements made in the ERA's Draft Decision.
Estimated Cost	The estimated total cost of the Tools program is $1.6 million. The total cost in each year is shown in the table below and reflects our change to detail the tooling purchasing requirements in each year for TAM and TO tools programs, rather than an average value each year as was done in the original business case.
Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	The Tools program complies with the capex criteria in Rule 79 of the National Gas Rules (NGR) because it is: • necessary to maintain and improve the safety of services and maintain the integrity of services (rules 79(1)(b) and 79(2)(c)(i) and (ii)); and • such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)(a)).

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Tools	451.6	506.2	201.5	169.1	313.3	1,641.7

Project Approval	
Prepared By:	Hugo Kuhn, Head of Engineering
Reviewed By:	James Smith, GM Transmission Operations
Approved By:	Tawake Rakai, GM Transmission Asset Management

Other Relevant Documents

This addendum should be read in conjunction with:

- the original Capex DBP16 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5)

1.1 Original business case

Our original proposal for DBP16 Tools included capex of $1.6 million in AA5 to continue with the regular replacement and upgrade of tools required to manage, operate and maintain the DBNGP to ensure the tools are in proper, safe working order and any tools deemed unsuitable or unsafe for use are promptly removed from service and replaced or repaired as soon as practicable.

This ensures that the technicians, tradespeople and engineers who carry out work on the DBNGP and related assets have reliable, fit for purpose tools to perform their work in a safe and efficient manner which in turn ensures continued reliability for our customers.

In our original proposal, we considered the following two options:

- Option 1 – Replace tools on failure
- Option 2 – Proactive replacement of tools

We recommended option 2 as it is consistent with the historical requirements of the business, reflects good industry practice, and meets the regulatory requirements to have National Association of Testing Authorities certified equipment for gas measurement. It also provides surety that the emergency response containers have sufficient equipment at all times that is safe and in proper working order for rapid deployment in an emergency situation.

When forecasting the costs of the Transmission Asset Management (TAM) and Transmission Operations (TO) tools programs in AA5, we undertook a bottom up analysis of the tool replacements required. This was then translated into an average annual cost for each of the programs over the five years, specifically $75,000 per annum for TAM tools and $200,000 per annum for TO tools.

1.2 ERA Draft Decision

In its Draft Decision, the ERA accepted that the regular inspection and periodic replacement of the tools and equipment used to perform work on the DBNGP is necessary to maintain and improve the safety of services and maintain the integrity of services on the DBNGP, as well as to comply with our regulatory obligations, and would therefore be undertaken by a prudent service provider acting consistently with good industry practice.[45]

However, the ERA was not satisfied that the forecast capital expenditure for the business case is consistent with an efficient amount, and has reduced the proposed expenditure from $1.7 million to $1.3 million (real unescalated dollars of December 2019). The ERA stated that we have not adequately explained the reasoning for the increase in expected costs for the tools program of work from AA4 to AA5.

EMCa's technical advice to the ERA advised that the increase in expenditure for TO and TAM tools appears to relate at least in part to the addition of un-regulated assets.[46]

Further, the ERA noted that we cited our historical AA4 cost for one borescope replacement cycle as [redacted], however, our forecast cost for the AA5 business case effectively applied a unit cost of [redacted]

1.3 Our Response

We reinforce our proposed capex of $1.6 million for tools in AA5 and have provided additional information in this addendum, including the bottom-up analysis of our tool register and year by year replacements required that formed the basis for our forecast costs in AA5. All tools included

[45] ERA Draft Decision, [698] to [702]
[46] EMCa Technical Review, p.128

in this assessment are directly related to the management, operation and maintenance of the regulated DBNGP asset. We have also clarified the borescope replacement costs.

The table below sets out the detailed cost estimates and tooling requirements during AA5, by program.

Table 1: Breakdown of cost estimates for Tools in AA5, by program ($ June 2019)

Tool Description	Volume						Unit Cost	Total AA5 Cost
	2021	2022	2023	2024	2025	Total AA5		
TAM Tooling								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
TAM Tooling Sub-total								$372,000
TO Tooling								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								

Tool Description	Volume						Unit Cost	Total AA5 Cost
	2021	2022	2023	2024	2025	Total AA5		
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								

Tool Description	Volume						Unit Cost	Total AA5 Cost
	2021	2022	2023	2024	2025	Total AA5		
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
TO Tooling Sub-total								$999,741
Borescope Tooling								
[redacted]								
[redacted]								
Borescope Tooling Sub-totals								$200,000
Emergency Tooling								
[redacted]								
[redacted]								
[redacted]								
[redacted]								
Totals								$70,000
Program total								**$1,641,741**

Table 2 below provides a summary of the AA5 tooling costs by program.

Table 2: Summary of AA5 tooling costs by program ($'000 June 2019)

	2021	2022	2023	2024	2025	Total AA5
TAM Tooling	105.4	85.9	50.9	72.4	57.4	372.0
TO Tooling	246.2	420.3	150.6	96.7	85.9	999.7
Borescope Tooling	100.0	0.0	0.0	0.0	100.0	200.0
Emergency Tooling	0.0	0.0	0.0	0.0	70.0	70.0
Total	**451.6**	**506.2**	**201.5**	**169.1**	**313.3**	**1,641.7**

The additional information provided in Table shows that a reduction of $0.4 million (as made in the ERA's Draft Decision) will not allow for the critical tools to be replaced to service the pipeline to a reliable and safe standard.

Further, due to the linear nature of the DBNGP (where sites are hundreds of kilometres apart), the need to carefully balance compressor station outages with customer requirements, and the 90-day planning cycle for maintenance, we hold multiple test equipment for each site of the transmission operations field teams. This enables efficient and optimised workforce planning and utilisation, where the workforce may be conducting work at multiple locations at any one time. This approach also ensures strong performance in terms of customer service and pipeline reliability.

One particular note made by the ERA in its Draft Decision was that the AA4 expenditure for one borescope was [redacted] and the forecast submission in AA5 was $[redacted] As shown in the table above, this can be explained by the inclusion of the vibration testing equipment costs in the cost estimate for replacement of borescope equipment (both being utilised when conducting internal inspections of pressure vessels and external online manual monitoring/testing of vibration). This is a separate requirement to the vibration monitoring equipment which provides constant monitoring of vibration on some key equipment, such as gas turbine units. The cost of this component was not itemised in the original submission.

Further, we confirm that all tools included are required to safely maintain and operate the DBNGP, and the increase between AA4 and AA5 does not relate to the addition of unregulated assets as supposed by EMCa. In undertaking a bottom-up assessment of our tooling requirements for AA5, only tooling related to DBNGP assets and locations was included. Costs for tools related to unregulated assets are allocated to the unregulated business as they are coded directly to the AGID business through the identification of the specific asset or location it is related to (e.g. Tubridgi or FRGP).

1.4 Summary

In summary, our forecast capex of $1.6 million for tools in AA5 reflects a bottom-up assessment of our register and replacement requirements for tools utilised in managing, operating and maintaining the DBNGP. This Addendum to our original Business Case provides additional information of the tools that will be replaced in AA5, and the unit cost, to support the uplift in costs compared to that incurred in AA4. An arbitrary reduction to this program will compromise our ability to ensure that the technicians, tradespeople and engineers who carry out work on the DBNGP and related assets have reliable, fit for purpose tools to perform their work in a safe and efficient manner which in turn ensures continued reliability for our customers.

1.4.1 Consistency with the National Gas Rules

The proposed capex of $1.6 million will provide DBP with safe, sufficient and fit for purpose tools to utilise for all work undertaken to manage, operate and maintain the DBNGP, including emergency response works.

Rule 79(2)

As agreed by the ERA in its Draft Decision, the regular inspection and periodic replacement of the tools and equipment used to perform work on the DBNGP is necessary to maintain and improve the safety of services and maintain the integrity of services on the DBNGP, as well as to comply with our regulatory obligations, as per Rule 79(2)(c)(i), (ii) and (iii).

Rule 79(1)

The option is consistent with Rule 79(1)(a), to achieve the lowest sustainable cost of providing services. Consistent with the requirements of Rule 79 of the National Gas Rules, DBP considers that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational requirement to provide safe and reliable tools of trade to core operational teams. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The forecast unit costs are based on historical average actuals, and forecast volumes based on the replacement requirements of the individual tool types. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed expenditure relates to work broadly consistent with prior AA periods. It also follows good industry practice, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.
- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant useful life.

1.4.2 Estimating efficient costs

The costs are estimated by identifying the tooling replacement and purchasing required in each year of AA5 along with the most recent information on pricing from the suppliers or using historical costs.

Procurement of tools is undertaken in a manner which is consistent with the procurement policy and purchasing procedure and includes a competitive tender process, where appropriate, such as for large value or volume items.

In limited circumstances where specific tools are produced by a limited amount of competitors, single source supplier/OEM may be selected due to performance or quality of the tool, with approval having to be granted with clear reasons for this sole supplier approach to procurement.

As noted in the 'Final Plan Attachment 8.7 Cost Estimation Methodology 2021-2025', the forecast unit rates for all projects/initiatives managed within this program are inclusive of internal labour, external labour/contractors, materials, travel and other costs.

Table 4 below summarises the total unescalated costs by cost type.

Table 4: Tools cost estimate by cost category ($'000 June 2019)

	2021	2022	2023	2024	2025	Total
Internal Labour	16.2	18.2	8.1	8.2	9.5	60.2
Contractors / Consultants	0.8	1.4	0.5	0.3	0.3	3.3
Materials & Services	432.4	482.8	191.6	159.7	302.8	1,569.2
Travel & Others	2.2	3.8	1.4	0.9	0.8	9.0
Total	**451.6**	**506.2**	**201.5**	**169.1**	**313.3**	**1,641.7**

Table 5 below shows the escalation applied to escalate the tools costs to real dollars of December 2020 including labour cost escalation of 0.57%.

Table 5: Tools total escalated cost real dollars December 2020

($'000)	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 19)	451.6	506.2	201.5	169.1	313.3	1,641.7
Escalation	10.5	12.9	5.6	5.1	10.1	44.1
Total escalated ($ Dec 20)	**462.1**	**519.1**	**207.1**	**174.2**	**323.4**	**1,685.8**

DBP17 Fleet and civil equipment replacement

Project Summary	
Project Name	Fleet and civil equipment replacement
Risk	High
Budget Category	Capital Expenditure (Capex)
Amendments to Original Business Case	We have not made any changes to our original business case for fleet and civil equipment. This addendum provides additional information to support the need to replace [redacted] fleet vehicles in each year, totaling [redacted] for AA5.
Estimated Cost	The estimated total cost of the fleet and civil equipment replacement is $4.7 million. The total cost in each year, and each AA period is shown in the table below.

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Fleet and civil	1,010.0	810.0	1,010.0	810.0	1,010.0	4,650.0

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	Providing a safe working environment for all staff and contractors is a critical obligation of any employer. Management and maintenance of fleet and civil equipment assets is therefore considered critical to our core operations and is consistent with 79(2)(c)(ii) and 79(2)(c)(i) to improve or maintain the safety of services. The proposed volume of activity is also consistent with NGR 79(1)(a), which requires lowest sustainable cost of delivering pipeline services
Project Approval	
Prepared By:	Gary Fanderlinden, Contracts Administrator
Reviewed By:	Hugo Kuhn, Head of Engineering
Approved By:	Tawake Rakai, GM Transmission Asset Management

Other Relevant Documents

This addendum should be read in conjunction with:

- the original Capex DBP17 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5);
- Our response to EMCa44 provided on 31 March 2020.

1.1 Original business case

Our original proposal for DBP17 Fleet and civil equipment replacement included capex of $4.7 million in AA5 to:

- Replace [redacted] DBNGP fleet vehicles a year at a forecast expenditure of $4.1 million; and
- Replace and/or major service for civil equipment at a forecast expenditure of $0.6 million.

Our fleet are replaced regularly on an age and/or condition basis to ensure the safety and reliability of the fleet, minimise potential risk to employees and minimise whole of life costs. We have identified a target of between 150,000 and 250,000 kilometres or 5 years as a trigger

for fleet vehicle replacement based on an assessment of escalating maintenance costs and increased risk profile after these milestones.

We have separately identified [redacted] years as a trigger for replacement of some civil equipment based on escalating maintenance costs and increased risk profile after these milestones.

The three options considered were as follows:

- Option 1 – Undertake volume and activities consistent with the AA4 program;
- Option 2 – Adopt a replacement on failure policy; and
- Option 3 – Replace consistent with the AMP. This was the recommended option.

In response to EMCa44 we explained we will spend $4.5 million on the annual replacement of fleet vehicles in AA4 (our actual spend in 2019 was $817,000 compared to our forecast of $870,000 for that year). This is $1.1 million (or 33%) higher than the approved forecast of $3.4 million. Our AA4 forecast assumed we would replace an average of [redacted] vehicles per annum, at an average cost of [redacted] per vehicle. We have actually replaced an average of [redacted] vehicles per annum, at an average cost of [redacted] per vehicle, replaced the canopy of one vehicle and have purchased an additional [redacted] vehicles in the period (a portion of the cost of a vehicle purchased in the 2015/16 financial year has been captured in calendar year 2016).

The particularly high costs in 2016 relate to delayed delivery of replacement vehicles for the 2015/16 financial year. This delay means there were [redacted] replacements in the second half of the financial year, plus [redacted] replacements in the first six months of 2016/17 (totalling [redacted] for the 2016 calendar year). 2017 to 2020 average [redacted] vehicle replacements per year.

We purchased two additional maintenance vehicles in 2018 due to an increase in the number of personnel on the day teams roster resulting from our optimisation review and restructure of our field workforce.

1.2 ERA Draft Decision

In its Draft Decision, the ERA reduced the proposed expenditure from $4.7 million to $4.3 million.

The ERA considered "the forecast AA5 cost for civil equipment replacements would be incurred by a service provider acting efficiently and in line with good industry practice."[47] It came to this view "based on technical advice that the rate of replacement activity assumed for civil equipment for AA5, which aligns with historical replacement activity, is reasonable."[48]

However, for fleet vehicle replacement, the ERA reduced the volume of replacements for fleet vehicles to [redacted] per year in AA5. It stated [redacted] per year was consistent with the average replacement rate for AA4 and that without further information it was not satisfied that a prudent operator acting efficiently would increase its rate of vehicle replacement.[49] In determining an average of [redacted] per year in AA4 it appears the ERA has excluded the [redacted]

[47] ERA Draft Decision, [707]
[48] ERA Draft Decision, [707]

[49] ERA Draft Decision, [708]

delayed vehicles delivered early in 2016, as well as the additional purchase of [redacted] vehicles. Excluding these [redacted] vehicles reduces the [redacted] vehicles purchased in AA4 to [redacted]

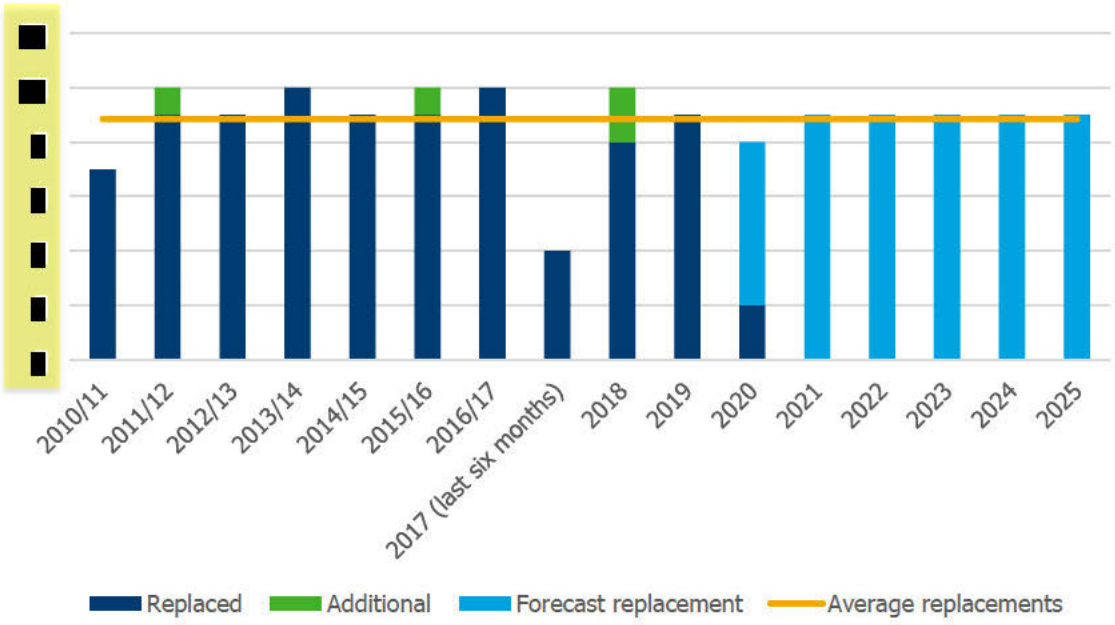
1.3 Our Response

In response to the ERA's concerns we did not account for the increase in the number of vehicle replacements per year between AA4 and AA5 in our original Business Case, we have provided further information in this Addendum on the history of our annual vehicle replacement program and our bottom-up approach to forecasting the vehicles required to be replaced in AA5.

1.3.1 History of our annual vehicle replacement program

As shown in Figure below, our annual replacement rate for DBNGP fleet vehicles over the last nine and a half years is [redacted] and we are forecasting [redacted] replacements per annum over AA5.

Figure 1: Annual replacement of DBNGP fleet vehicles from 2010/11*



*In 2017 we moved from financial year to annual year reporting, therefore the last six months of 2017 are reported separately and the average annual replacements is calculated over 9.5 years

Table 1 below provides the three, five and 9.5-year average replacement volumes for DBNGP fleet vehicles.

Table 1: Average replacement volumes of DBNGP fleet vehicles

Period	Total DBNGP vehicles replaced	Annual average replacements
Last three years (2017-2019)	[redacted]	[redacted]
Last five years (2015-2019)	[redacted]	[redacted]

Last 9.5 years (2010/11-2019)	[redacted]	[redacted]

As Table 1 shows, the average number of annual replacements has varied over the last three years compared to longer time periods. This reflects the individual factors that are considered to determine which vehicles are highest priority for replacement each year. Over AA5 we expect annual replacement numbers to reflect the longer term average.

1.3.2 Determining the vehicles to be replaced each year

As mentioned above, there are a number of individual factors that are considered to determine which vehicles are highest priority for replacement each year. The process for identifying vehicles to replace involves the following steps:

- review all vehicles which have a history of safety or reliability concerns;
- identify all vehicles with over 150,000 kilometres or more than 5 years old;
- consider safety, maintenance costs and remote area exposure of these identified higher risk vehicles;
- where appropriate, reallocate aging or high kilometre vehicles to locations which are less vulnerable (due to geography or distances covered);
- identify vehicles for disposal; and
- confirm replacement need.

Information about each of the vehicles in our fleet is required to support this assessment. This information includes:

- Age
- Kilometres
- Proportion of kilometres off-road
- Condition/wear and tear (as determined by annual servicing records)
- Annual servicing costs
- Safety history and installed safety features
- No longer 'Fit for Purpose'

We have a total fleet of 88 vehicles with a mix of wagons and single and dual cab tray top utilities. In line with continuous improvement asset management principles we review our replacement methodology on a regular basis to ensure it is updated for new information and continues to appropriately balance risk and cost.

As noted above, our replacement methodology also looks to move fleet vehicles around to increase the total utilisation of each vehicle while managing safety risks to our staff working in remote areas.

1.3.3 Vehicles forecast to be replaced in AA5

At Appendix A we have listed all DBNGP fleet vehicles in service, their purchase date and the current kilometres on the odometer as at 30 June. We have then shown the year in which each is forecast to be replaced, the age they will be at replacement and the forecast kilometres travelled at replacement. We have replicated this for our Final Plan and Revised Final Plan forecast of [redacted] vehicle replacements per annum and for the ERA's Draft Decision forecast of [redacted] vehicle replacements per annum.

Table 2 below provides a summary of the replacements under the Final Plan and Draft Decision scenarios. Table 3 compares the characteristics of the fleet under the Final Plan and Draft Decision scenarios.

As Table 3 shows, the Draft Decision replacement scenario increases the average age at which vehicles are replaced to 10.1 years, from 9.8 years under the Final Plan scenario. While an increase of 0.2 years may appear small, we are not comfortable with increasing the average age our fleet vehicles are replaced at to over 10 years as this significantly increases the safety risk to our employees and also the likelihood we incur costly repairs (see section below).

Further the Draft Decision scenario increases the number of vehicles aged 6-10 years and with over 200,000 kilometres on the odometer at the start of AA6, putting pressure on replacements in the first few years of AA6.

Table 2: Summary of vehicle replacements under Final Plan and Draft Decision replacement scenarios

	2021	2022	2023	2024	2025	Total AA5
Final Plan – Vehicles replaced	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Final Plan # vehicles	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Draft Decision – Vehicles replaced	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Draft Decision # vehicles	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 3: Characteristics of fleet under Final Plan and Draft Decision replacement scenarios

	Final Plan ([redacted] pa)	Draft Decision [redacted] pa)	Increase under Draft Decision scenario
Average age when replaced	9.8	10.1	0.2

Average forecast km travelled when replaced*	238,955	244,571	5,616
Average age at Dec 2025	5.2	5.6	0.3
Average forecast km at Dec 2025	127,580	136,558	8,978
No. of fleet 6-10 years at Dec 2025	42	46	4
No. of fleet >200,000km at Dec 2025	22	26	4

1.3.4 Vehicle servicing and repairs costs

As the age and the kilometres travelled increase, so do the maintenance costs. We have analysed our vehicle servicing and repair costs for 131 of our fleet vehicles since 2007 to show the average costs incurred over each stage of the vehicle's life.

Figure 2 shows the average servicing and repair costs by vehicle age. It shows the maintenance costs of our vehicles increase each year over the first six years of the vehicle's life, reduce again for 3-4 years and then start to increase again as the vehicle exceeds 10 years. By targeting an average replacement age across our fleet of under 10 years, we can avoid the second spike in maintenance costs.

Figure 2: Average servicing and repair costs by vehicle age (dollars of the day)

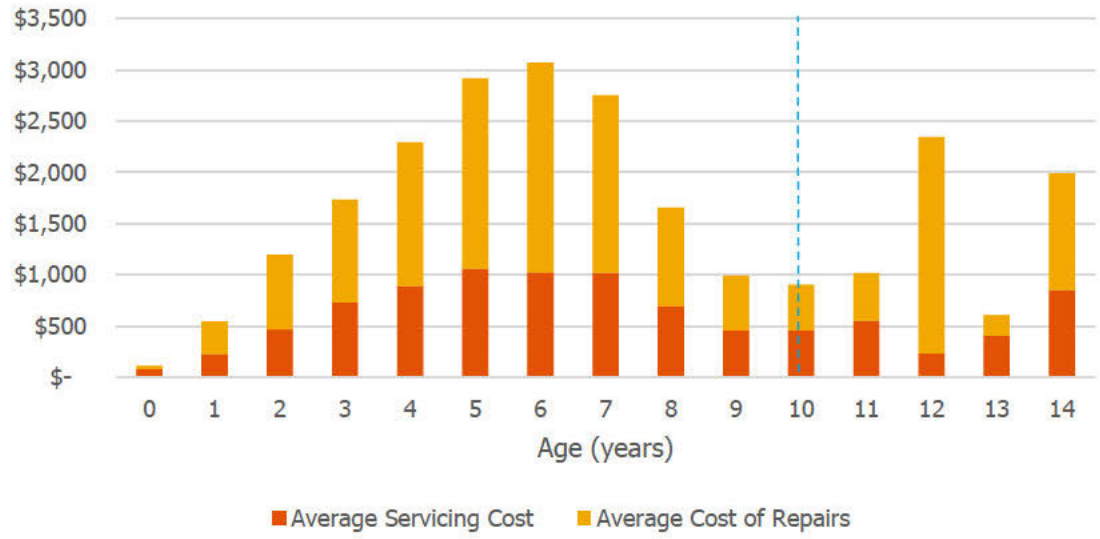
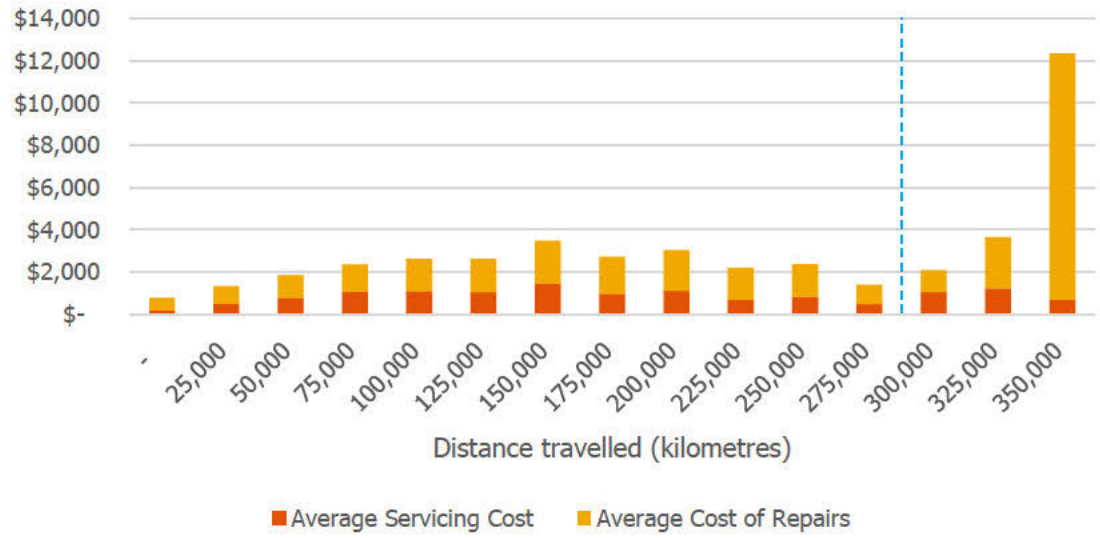


Figure 3 below shows the average servicing and repair costs by vehicle kilometres. It shows the maintenance costs of our vehicles increase each 25,000 kilometres over the first 150,000 kilometres of the vehicle's life, reduce again for the next 100,000 or so kilometres and then increase quite significantly over 300,000 total kilometres. By targeting replacement across our fleet vehicles under 300,000 kilometres, we can avoid the significant increases in maintenance costs incurred after 300,000 kilometres.

Figure 3: Average servicing and repair costs by vehicle kilometres (dollars of the day)



The ERA's Draft Decision replacement scenario pushes our vehicles right up to these two points where maintenance costs increase. Therefore, in addition to increasing the safety risk to our staff, it is likely any funding benefit received in pushing out the vehicle replacements is exceeded by higher maintenance costs to keep these vehicles in service.

1.4 Summary

In summary, we have provided further information to the ERA to account for the increase in vehicle replacements in AA5 compared to number of replacements it considers have occurred in AA4 (i.e. excluding the [redacted] vehicles that were delayed in 2016 and [redacted] additional vehicles purchased in 2018). In doing so, we have shown that:

- over the last 9.5 years, our annual vehicle replacement excluding additional vehicles purchased has averaged [redacted] per annum, and therefore [redacted] replacements per annum is consistent with our historical replacements;
- the deferral of [redacted] vehicle replacements into AA6 will increase operational risk by increasing the average age and kilometres at replacement to over 10 years and by around 5,000 kilometres. It will also put pressure on replacements in the first few years of AA6; and
- vehicle maintenance (servicing and repair) costs spike for a second time as vehicles pass 10 years of age, and increase significantly once 300,000 kilometres is exceeded and therefore the replacement of vehicles by around 10 years or before 300,000 kilometres is consistent with a prudent service provider acting efficiently to achieve the lowest sustainable cost of delivering services.

1.4.1 Consistency with the National Gas Rules

Rule 79(2)

The replacement of fleet vehicles is necessary to maintain the integrity of services by ensuring our field crews and asset managers can rely on safe and fit for purpose vehicles to support the operations, maintenance and management of the DBNGP consistent with Rule 79(2)(c)(ii).

Rule 79(1)

The option is consistent with the requirements of Rule 79 of the National Gas Rules, we consider that the capital expenditure is:

- **Prudent** – It is prudent to balance cost and risk in maintaining and replacing the fleet of vehicles that are used to service the operational, maintenance and management requirements of the DBNGP. The proposed replacement program of [redacted] per year is also consistent with activity over the last 10 years. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The forecast expenditure is based on historical average actuals and tender contract values. The indicators for vehicle replacement consider both age and kilometres of vehicles, which based on analysis of our annual servicing and repairs costs across our fleet over a period of around 13 years are shown to influence the continued maintenance costs of vehicles. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed expenditure relates to replacement that is consistent with prior AA periods. It also follows good industry practice by ensuring that vehicles are replaced within their useful life to ensure they remain safe, fit for purpose and do not incur the significantly increased maintenance costs that occur when they exceed 10 years of age or 300,000 kilometres. It also allows us to adopt current technological standards (such as improved safety and fuel efficiency) in a manner that balances costs to customers. Therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.
- **To achieve the lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking replacement in line with the relevant useful life.

1.4.2 Estimating efficient costs

As per the original business case, all forecast replacement costs are based on recent historical actuals. These have all been achieved based on commercially negotiated rates secured in line with our Procurement Policy and Purchasing Procedure.

A competitive commercial procurement process was undertaken in April 2019. Three quotes were formally presented to us for consideration by [redacted] and [redacted] was selected as representing the best value for money against criteria for fleet procurement.

As noted in the 'Final Plan Attachment 8.7 Cost Estimation Methodology 2021-2025', the forecast costs for all projects managed within this program are inclusive of internal labour, materials, travel and other costs. No external labour/contractor costs are forecast.

Table 4 below summarises the total unescalated costs for fleet vehicles and civil equipment replacement in real dollars in June 2019.

Table 4: Fleet vehicle and civil equipment cost estimate ($'000 June 2019)

Project	2021	2022	2023	2024	2025	Total
Fleet vehicles	810	810	810	810	810	4,050
Civil equipment	200	-	200	-	200	600
Total cost ($'000)	**1,010**	**810**	**1,010**	**810**	**1,010**	**4,650**

Table 5 summarises the total unescalated costs by cost type.

Table 5: Fleet vehicle and civil equipment cost estimate, by cost type ($'000 June 2019)

Category	2021	2022	2023	2024	2025	Total
Internal Labour	21.5	7.2	21.5	7.2	21.5	78.8
External Contractors/ Consultants	-	-	-	-	-	-
Materials & Services	986.2	801.9	986.2	801.9	986.2	4,562.2
Travel & Others	2.4	1.0	2.4	1.0	2.4	9.0
Total cost	**1,010.0**	**810.0**	**1,010.0**	**810.0**	**1,010.0**	**4,650.0**

Table 6 below shows the escalation applied to escalate the fleet vehicles and civil equipment costs to real dollars of December 2020 including labour cost escalation of 0.57%.

Table 6: Fleet vehicle and civil equipment total escalated cost real dollars December 2019

	2021	2022	2023	2024	2025	Total
Total ($ Jun 2019)	1,010.0	810.0	1,010.0	810.0	1,010.0	4,650.0
Escalation	23.5	20.6	27.9	24.2	32.4	128.7
Total ($ Dec 2020)	**1,033.5**	**830.6**	**1,037.9**	**834.2**	**1,042.4**	**4,778.7**

Appendix A – Summary of the DBNGP Fleet

Table 7: Forecast replacement of DBNGP fleet vehicles (Final Plan and revised Final Plan, average of [redacted] vehicles pa)

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	27/11/2005	408,500	[redacted]	[redacted]	435,733	4	108,933
[redacted]	15/02/2008	219,694	[redacted]	[redacted]	219,694	5	91,539
[redacted]	29/02/2008	184,833	[redacted]	[redacted]	184,833	5	77,014
[redacted]	21/10/2008	224,611	[redacted]	[redacted]	224,611	5	93,588
[redacted]	14/01/2009	283,500	[redacted]	[redacted]	283,500	5	128,864
[redacted]	08/01/2009	221,755	[redacted]	[redacted]	221,755	5	100,798
[redacted]	18/05/2009	310,300	[redacted]	[redacted]	310,300	5	141,045
[redacted]	20/04/2009	200,000	[redacted]	[redacted]	218,182	4	72,727
[redacted]	19/10/2009	182,611	[redacted]	[redacted]	199,212	4	66,404
[redacted]	12/05/2010	157,678	[redacted]	[redacted]	189,214	3	47,303
[redacted]	12/05/2010	191,221	[redacted]	[redacted]	210,343	4	76,488
[redacted]	12/05/2010	254,255	[redacted]	[redacted]	279,681	4	101,702
[redacted]	18/02/2011	146,497	[redacted]	[redacted]	195,329	2	32,555
[redacted]	12/08/2011	235,430	[redacted]	[redacted]	261,589	4	104,636
[redacted]	18/10/2011	200,212	[redacted]	[redacted]	244,704	3	66,737
[redacted]	18/10/2011	246,248	[redacted]	[redacted]	273,609	4	109,444
[redacted]	21/01/2008	386,941	[redacted]	[redacted]	386,941	5	161,225
[redacted]	19/07/2012	332,118	[redacted]	[redacted]	332,118	5	207,574
[redacted]	19/07/2012	221,036	[redacted]	[redacted]	276,295	3	82,889
[redacted]	04/09/2012	220,569	[redacted]	[redacted]	275,711	3	82,713
[redacted]	04/09/2012	197,100	[redacted]	[redacted]	271,013	2	49,275
[redacted]	13/11/2013	214,609	[redacted]	[redacted]	275,926	3	91,975
[redacted]	14/06/2013	263,939	[redacted]	[redacted]	301,645	4	150,822
[redacted]	08/02/2013	205,327	[redacted]	[redacted]	293,324	2	58,665
[redacted]	08/02/2013	158,041	[redacted]	[redacted]	225,773	2	45,155
[redacted]	30/01/2013	204,000	[redacted]	[redacted]	262,286	3	87,429

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	19/02/2013	150,401	[redacted]	[redacted]	236,344	1	21,486
[redacted]	26/11/2013	199,000	[redacted]	[redacted]	284,286	2	56,857
[redacted]	26/11/2013	223,500	[redacted]	[redacted]	287,357	3	95,786
[redacted]	26/11/2013	177,349	[redacted]	[redacted]	253,356	2	50,671
[redacted]	23/12/2013	158,405	[redacted]	[redacted]	226,293	2	45,259
[redacted]	23/12/2013	170,556	[redacted]	[redacted]	243,651	2	48,730
[redacted]	20/01/2014	157,576	[redacted]	[redacted]	262,627	1	26,263
[redacted]	29/01/2015	158,000	[redacted]	[redacted]	284,400	1	31,600
[redacted]	17/02/2015	34,181	[redacted]	[redacted]	82,034	10	68,362
[redacted]	21/04/2015	135,850	[redacted]	[redacted]	244,530	1	27,170
[redacted]	21/04/2015	150,272	[redacted]	[redacted]	270,490	1	30,054
[redacted]	21/04/2015	70,454	[redacted]	[redacted]	140,908	10	140,908
[redacted]	22/06/2015	122,100	[redacted]	[redacted]	219,780	1	24,420
[redacted]	09/06/2015	202,335	[redacted]	[redacted]	283,269	3	121,401
[redacted]	20/07/2015	137,441	[redacted]	[redacted]	247,394	1	27,488
[redacted]	25/02/2016	88,700	[redacted]	[redacted]	221,750	9	199,575
[redacted]	01/02/2016	124,100	[redacted]	[redacted]	248,200	1	31,025
[redacted]	01/02/2016	90,920	[redacted]	[redacted]	227,300	9	204,570
[redacted]	01/02/2016	121,427	[redacted]	[redacted]	273,211	9	273,211
[redacted]	29/04/2016	138,250	[redacted]	[redacted]	276,500	1	34,563
[redacted]	19/05/2016	39,429	[redacted]	[redacted]	108,430	9	88,715
[redacted]	14/04/2016	175,820	[redacted]	[redacted]	263,730	3	131,865
[redacted]	29/06/2016	111,681	[redacted]	[redacted]	251,282	9	251,282
[redacted]	14/04/2016	105,720	[redacted]	[redacted]	264,300	9	237,870
[redacted]	19/05/2016	92,806	[redacted]	[redacted]	232,015	9	208,814
[redacted]	19/05/2016	91,190	[redacted]	[redacted]	227,975	9	205,178
[redacted]	09/11/2016	113,392	[redacted]	[redacted]	255,132	9	255,132
[redacted]	15/11/2016	50,225	[redacted]	[redacted]	138,119	9	113,006

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	25/11/2016	91,880	[redacted]	[redacted]	229,700	9	206,730
[redacted]	03/02/2017	72,697	[redacted]	[redacted]	242,323	8	193,859
[redacted]	02/12/2016	94,668	[redacted]	[redacted]	236,670	9	213,003
[redacted]	13/12/2016	80,750	[redacted]	[redacted]	201,875	9	181,688
[redacted]	29/12/2016	69,798	[redacted]	[redacted]	191,945	9	157,046
[redacted]	02/03/2017	90,191	[redacted]	[redacted]	300,637	8	240,509
[redacted]	02/03/2017	83,450	[redacted]	[redacted]	278,167	8	222,533
[redacted]	21/04/2015	229,196	[redacted]	[redacted]	275,035	4	183,357
[redacted]	29/12/2016	165,000	[redacted]	[redacted]	288,750	2	82,500
[redacted]	19/03/2018	59,770	[redacted]	[redacted]	298,850	7	209,195
[redacted]	11/04/2018	65,971	[redacted]	[redacted]	296,870	7	230,899
[redacted]	18/04/2018	67,155	[redacted]	[redacted]	268,620	7	235,043
[redacted]	23/05/2018	42,344	[redacted]	[redacted]	211,720	7	148,204
[redacted]	23/05/2018	47,580	[redacted]	[redacted]	237,900	7	166,530
[redacted]	19/06/2018	64,077	[redacted]	[redacted]	288,347	7	224,270
[redacted]	14/08/2018	43,550	[redacted]	[redacted]	217,750	7	152,425
[redacted]	14/08/2018	67,347	[redacted]	[redacted]	269,388	7	235,715
[redacted]	17/09/2018	48,987	[redacted]	[redacted]	244,935	7	171,455
[redacted]	20/09/2018	81,000	[redacted]	[redacted]	283,500	7	283,500
[redacted]	18/10/2018	77,384	[redacted]	[redacted]	270,844	7	270,844
[redacted]	02/11/2018	62,000	[redacted]	[redacted]	279,000	7	217,000
[redacted]	21/12/2018	55,162	[redacted]	[redacted]	275,810	7	193,067
[redacted]	25/01/2019	43,515	[redacted]	[redacted]	261,090	6	261,090
[redacted]	11/02/2019	44,746	[redacted]	[redacted]	268,476	6	268,476
[redacted]	24/07/2019	21,007	[redacted]	[redacted]	210,070	6	126,042
[redacted]	02/08/2019	10,000	[redacted]	[redacted]	110,000	6	60,000
[redacted]	05/09/2019	21,162	[redacted]	[redacted]	211,620	6	126,972
[redacted]	18/09/2019	9,954	[redacted]	[redacted]	109,494	6	59,724

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	27/11/2019	8,287	[redacted]	[redacted]	91,157	6	49,722
[redacted]	27/11/2019	9,924	[redacted]	[redacted]	109,164	6	59,544
[redacted]	27/11/2019	8,209	[redacted]	[redacted]	90,299	6	49,254
[redacted]	27/11/2019	23,008	[redacted]	[redacted]	230,080	6	138,048
[redacted]	10/08/2020	10000	[redacted]	[redacted]	120,000	5	60,000
[redacted]	21/07/2020	20000	[redacted]	[redacted]	120,000	5	60,000
Average				**9.8**	**238,955**	**5.2**	**127,580**

*based on average kilometres travelled per year since purchase

**where the vehicle has been replaced between now and the end of the AA5 period, the age and forecast km at December 2025 reflect a forecast for the new vehicle which has replaced the vehicle listed

Table 8: Forecast replacement of DBNGP fleet vehicles (Draft Decision, average of [redacted] vehicles pa)

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	27/11/2005	408,500	[redacted]	[redacted]	435,733	4	108,933
[redacted]	15/02/2008	219,694	[redacted]	[redacted]	219,694	5	91,539
[redacted]	29/02/2008	184,833	[redacted]	[redacted]	184,833	5	77,014
[redacted]	21/10/2008	224,611	[redacted]	[redacted]	224,611	5	93,588
[redacted]	14/01/2009	283,500	[redacted]	[redacted]	283,500	5	128,864
[redacted]	08/01/2009	221,755	[redacted]	[redacted]	221,755	5	100,798
[redacted]	18/05/2009	310,300	[redacted]	[redacted]	310,300	5	141,045
[redacted]	20/04/2009	200,000	[redacted]	[redacted]	218,182	4	72,727
[redacted]	19/10/2009	182,611	[redacted]	[redacted]	199,212	4	66,404
[redacted]	12/05/2010	157,678	[redacted]	[redacted]	189,214	3	47,303
[redacted]	12/05/2010	191,221	[redacted]	[redacted]	210,343	4	76,488
[redacted]	12/05/2010	254,255	[redacted]	[redacted]	279,681	4	101,702
[redacted]	18/02/2011	146,497	[redacted]	[redacted]	195,329	2	32,555
[redacted]	12/08/2011	235,430	[redacted]	[redacted]	287,748	3	78,477
[redacted]	18/10/2011	200,212	[redacted]	[redacted]	244,704	3	66,737
[redacted]	18/10/2011	246,248	[redacted]	[redacted]	273,609	4	109,444

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	21/01/2008	386,941	[redacted]	[redacted]	386,941	5	161,225
[redacted]	19/07/2012	332,118	[redacted]	[redacted]	332,118	5	207,574
[redacted]	19/07/2012	221,036	[redacted]	[redacted]	276,295	3	82,889
[redacted]	04/09/2012	220,569	[redacted]	[redacted]	275,711	3	82,713
[redacted]	04/09/2012	197,100	[redacted]	[redacted]	271,013	2	49,275
[redacted]	13/11/2013	214,609	[redacted]	[redacted]	275,926	3	91,975
[redacted]	14/06/2013	263,939	[redacted]	[redacted]	301,645	4	150,822
[redacted]	08/02/2013	205,327	[redacted]	[redacted]	293,324	2	58,665
[redacted]	08/02/2013	158,041	[redacted]	[redacted]	248,350	1	22,577
[redacted]	30/01/2013	204,000	[redacted]	[redacted]	291,429	2	58,286
[redacted]	19/02/2013	150,401	[redacted]	[redacted]	236,344	1	21,486
[redacted]	26/11/2013	199,000	[redacted]	[redacted]	284,286	2	56,857
[redacted]	26/11/2013	223,500	[redacted]	[redacted]	287,357	3	95,786
[redacted]	26/11/2013	177,349	[redacted]	[redacted]	278,691	1	25,336
[redacted]	23/12/2013	158,405	[redacted]	[redacted]	248,922	1	22,629
[redacted]	23/12/2013	170,556	[redacted]	[redacted]	243,651	2	48,730
[redacted]	20/01/2014	157,576	[redacted]	[redacted]	262,627	1	26,263
[redacted]	29/01/2015	158,000	[redacted]	[redacted]	284,400	1	31,600
[redacted]	17/02/2015	34,181	[redacted]	[redacted]	82,034	10	68,362
[redacted]	21/04/2015	135,850	[redacted]	[redacted]	271,700	10	271,700
[redacted]	21/04/2015	150,272	[redacted]	[redacted]	270,490	1	30,054
[redacted]	21/04/2015	70,454	[redacted]	[redacted]	154,999	10	140,908
[redacted]	22/06/2015	122,100	[redacted]	[redacted]	244,200	10	244,200
[redacted]	09/06/2015	202,335	[redacted]	[redacted]	283,269	3	121,401
[redacted]	20/07/2015	137,441	[redacted]	[redacted]	274,882	10	274,882
[redacted]	25/02/2016	88,700	[redacted]	[redacted]	243,925	9	199,575
[redacted]	01/02/2016	124,100	[redacted]	[redacted]	279,225	9	279,225
[redacted]	01/02/2016	90,920	[redacted]	[redacted]	250,030	9	204,570

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	01/02/2016	121,427	[redacted]	[redacted]	273,211	9	273,211
[redacted]	29/04/2016	138,250	[redacted]	[redacted]	276,500	1	34,563
[redacted]	19/05/2016	39,429	[redacted]	[redacted]	108,430	9	88,715
[redacted]	14/04/2016	175,820	[redacted]	[redacted]	307,685	2	87,910
[redacted]	29/06/2016	111,681	[redacted]	[redacted]	279,203	9	251,282
[redacted]	14/04/2016	105,720	[redacted]	[redacted]	264,300	9	237,870
[redacted]	19/05/2016	92,806	[redacted]	[redacted]	232,015	9	208,814
[redacted]	19/05/2016	91,190	[redacted]	[redacted]	250,773	9	205,178
[redacted]	09/11/2016	113,392	[redacted]	[redacted]	283,480	9	255,132
[redacted]	15/11/2016	50,225	[redacted]	[redacted]	150,675	9	113,006
[redacted]	25/11/2016	91,880	[redacted]	[redacted]	229,700	9	206,730
[redacted]	03/02/2017	72,697	[redacted]	[redacted]	242,323	8	193,859
[redacted]	02/12/2016	94,668	[redacted]	[redacted]	236,670	9	213,003
[redacted]	13/12/2016	80,750	[redacted]	[redacted]	222,063	9	181,688
[redacted]	29/12/2016	69,798	[redacted]	[redacted]	191,945	9	157,046
[redacted]	02/03/2017	90,191	[redacted]	[redacted]	300,637	8	240,509
[redacted]	02/03/2017	83,450	[redacted]	[redacted]	278,167	8	222,533
[redacted]	21/04/2015	229,196	[redacted]	[redacted]	275,035	4	183,357
[redacted]	29/12/2016	165,000	[redacted]	[redacted]	288,750	2	82,500
[redacted]	19/03/2018	59,770	[redacted]	[redacted]	298,850	7	209,195
[redacted]	11/04/2018	65,971	[redacted]	[redacted]	296,870	7	230,899
[redacted]	18/04/2018	67,155	[redacted]	[redacted]	268,620	7	235,043
[redacted]	23/05/2018	42,344	[redacted]	[redacted]	211,720	7	148,204
[redacted]	23/05/2018	47,580	[redacted]	[redacted]	237,900	7	166,530
[redacted]	19/06/2018	64,077	[redacted]	[redacted]	288,347	7	224,270
[redacted]	14/08/2018	43,550	[redacted]	[redacted]	217,750	7	152,425
[redacted]	14/08/2018	67,347	[redacted]	[redacted]	269,388	7	235,715
[redacted]	17/09/2018	48,987	[redacted]	[redacted]	244,935	7	171,455

Vehicle	Purchase date	Odometer	Forecast year replaced	Age when replaced	Forecast km travelled when replaced*	Age at Dec 2025 **	Forecast km at Dec 2025 **
[redacted]	20/09/2018	81,000	[redacted]	[redacted]	283,500	7	283,500
[redacted]	18/10/2018	77,384	[redacted]	[redacted]	270,844	7	270,844
[redacted]	02/11/2018	62,000	[redacted]	[redacted]	279,000	7	217,000
[redacted]	21/12/2018	55,162	[redacted]	[redacted]	275,810	7	193,067
[redacted]	25/01/2019	43,515	[redacted]	[redacted]	304,605	6	261,090
[redacted]	11/02/2019	44,746	[redacted]	[redacted]	268,476	6	268,476
[redacted]	24/07/2019	21,007	[redacted]	[redacted]	210,070	6	126,042
[redacted]	02/08/2019	10,000	[redacted]	[redacted]	110,000	6	60,000
[redacted]	05/09/2019	21,162	[redacted]	[redacted]	211,620	6	126,972
[redacted]	18/09/2019	9,954	[redacted]	[redacted]	109,494	6	59,724
[redacted]	27/11/2019	8,287	[redacted]	[redacted]	91,157	6	49,722
[redacted]	27/11/2019	9,924	[redacted]	[redacted]	109,164	6	59,544
[redacted]	27/11/2019	8,209	[redacted]	[redacted]	90,299	6	49,254
[redacted]	27/11/2019	23,008	[redacted]	[redacted]	230,080	6	138,048
[redacted]	10/08/2020	10000	[redacted]	[redacted]	120,000	5	60,000
[redacted]	21/07/2020	20000	[redacted]	[redacted]	120,000	5	60,000
Average				**10.1**	**244,571**	**5.6**	**136,558**

*based on average kilometres travelled per year since purchase

**where the vehicle has been replaced between now and the end of the AA5 period, the age and forecast km at December 2025 reflect a forecast for the new vehicle which has replaced the vehicle listed

DBP18 Turbine Exhaust Replacement

Project Summary	
Project Name	Turbine Exhaust Replacement
Risk	High
Budget Category	Capital Expenditure (Capex)
Amendments to Original Business Case	We are proposing to continue with the planned replacement of seven turbine exhausts in AA5 however we are adjusting the timing for two units based on up to date information on the condition of some of these assets. Also, we will no longer undertake the inspection work for the CS6/2 exhaust originally scheduled for 2021.
Estimated Cost	The estimated total cost of the turbine exhaust replacement is $4.8 million. The total cost in each year, and each AA period is shown in the table below.

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Turbine exhausts	1,100.0	1,100.0	850.0	850.0	850.0	4,750.0

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	This capital expenditure conforms with the following National Gas Rules (NGR): **NGR 79(1)** - the proposed asset replacement is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** - Turbine exhaust systems are critical to performance and safe operation of compressor units at compressor stations. Proactively repairing, upgrading and/or replacing turbine exhaust systems is required to ensure the integrity and availability of these assets to deliver the gas requirements of our customers. Therefore, the proposed replacement of end-of-life exhaust systems is consistent with NGR 79(2)(c)(i) and (iii). **NGR 74** - the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances
Project Approval	
Prepared By:	Andrew Stanwix, Senior Mechanical Engineer
Reviewed By:	Hugo Kuhn, Head of Engineering
Approved By:	Tawake Rakai, GM Transmission Asset Management
Other Relevant Documents	

This addendum should be read in conjunction with:

- the original Capex DBP18 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5); and
- our response to information request EMCa14 and EMCa15 provided on 3 March 2020.

1.1 Original business case

Our original proposal for DBP18 Turbine Exhaust Replacement included capex of $4.8 million in AA5 to replace seven turbine exhaust. Each of the exhausts are now overdue for replacement, with

utilisation of each asset maximised with an increasing risk of failure systems based on their age and condition.

Table 1: Original proposal - Turbine exhaust replacements in AA5 ($'000 June 2019)

CS unit	Stage	Material/Design	Installed	Years in service*	2021	2022	2023	2024	2025
CS2/2	Stage 3	Stainless steel Square profile	1999	[redacted]		[redacted]			
CS5/1	ACS	Stainless steel Square profile	1991	[redacted]				[redacted]	
CS5/2	ACS	Stainless steel Square profile	1991	[redacted]					[redacted]
CS6/2	Stage 2	Stainless steel liner, Plain Steel outer Round profile	1997	[redacted]	[redacted]				
CS7/2	Stage 3	Stainless steel Square profile	1999	[redacted]	[redacted]				
CS8/1	ACS	Stainless steel Square profile	1991	[redacted]		[redacted]			
CS8/2	ACS	Stainless steel Square profile	1991	[redacted]			[redacted]		
Total					**1,100**	**1,100**	**850**	**850**	**850**

*As at proposed replacement

In our original proposal we considered the following three options:

- Option 1 – Proactively replace turbine exhausts on condition once they have reached end-of-life as per AMP;
- Option 2 – Replace all turbine exhausts that have reached 20 years in age in AA5 ($10.0 million); and
- Option 3 – Move to a replacement on failure policy.

Option 1 was the preferred option as it is consistent with the AMP and manufacturer requirements, as well as reflecting good industry practice.

1.2 ERA Draft Decision

In its Draft Decision, the ERA stated:[50]

> *While proactive replacement of the turbine exhaust systems is consistent with good industry practice based on technical advice the ERA considers that the following work would not be conducted by a prudent service provider during AA5.*

50 ERA Draft Decision, [715]

The ERA considered $3.1 million is the best estimate possible of the prudent and efficient amount of capital expenditure for the 'Turbine exhaust replacement' business case for AA5, and therefore satisfies rule 74 of the NGR. [51]

The ERA's draft decision was based on its technical advisor, EMCa's finding:[52]

> *DBP has not provided sufficiently compelling information in its response to explain why it is replacing the [redacted] ACS units at less than 35 years old and why patching would not be effective (i.e. for at least 2 years life extension). In the absence of compelling information to the contrary, we consider that [redacted] ACS units planned for 2024 and 2025 are likely to be prudently able to be deferred until AA6 (a combined roll-out of $1.7m).*

In terms of cost, EMCa stated:[53]

> *Given that DBP has recent experience with turbine cost replacements we consider the unit costs are reasonable.*
>
> *DBP has allowed for $85k for further inspection of the CS6/2 exhaust – we consider this is likely to be uneconomic given that the exhaust will be 7 years past its typical useful life by then. On this basis we consider that $3.0m capex is likely to be a reasonable level for the AA5 period (i.e. an adjustment of -$1.8m) for replacing five turbine exhausts.*

1.3 Our Response

On further review of our proposed replacement program, we are proposing to continue with the planned replacement of [redacted] turbine exhausts in AA5, however more up to date information on the condition of some of these assets has lead us to adjust the timing for some of the units. Specifically, we propose to:

- defer the replacement of CS05 unit 1, originally planned for replacement in 2024, to AA6 as per the ERA's Draft Decision;
- maintain the scheduled replacement of CS05 unit 2 in 2025; and
- bring forward the scheduled replacement of CS03 unit 1 originally planned for AA6 to 2024.

Also, we will no longer undertake the inspection work for the CS6/2 exhaust scheduled for 2021.

Our revised schedule is set out in Table 2 below.

Table 2: Revised proposal - Turbine exhaust replacements in AA5 ($'000 June 2019)

CS unit	Stage	Material/design	Installed	2021	2022	2023	2024	2025
CS2/2	Stage 3	Stainless steel Square profile	1999		[redacted]			
CS3/1	ACS	Stainless steel, round profile	1991				[redacted]	
CS5/2	ACS	Stainless steel Square profile	1991					[redacted]

51 ERA Draft Decision, [716]
52 EMCa Technical Review, pp.129-130
53 EMCa Technical Review, pp.129-130

CS6/2	Stage 2	Stainless steel liner, Plain Steel outer Round profile	1997	[redacted]				
CS7/2	Stage 3	Stainless steel Square profile	1999	[redacted]				
CS8/1	ACS	Stainless steel Square profile	1991		[redacted]			
CS8/2	ACS	Stainless steel Square profile	1991			[redacted]		
Total				**1,100**	**1,100**	**850**	**850**	**850**

1.3.1 Condition of ACS exhausts

Table 2 below provides a summary of the ACS exhausts and their condition.

Table 2: Summary of ACS exhausts and their condition

ACS Unit	Year installed	Forecast replacement	Age at replacement	Condition	Repair History
CS1/1	1991	[redacted]	[redacted]	Cracking to external exhaust	Structural flange cracking identified and repaired 2019.
CS3/1	1991	[redacted]	[redacted]	Cracking to external exhaust	Multiple repairs to recurring cracking of structural flanges. Repairs 12 monthly since 2017.
CS5/1	1991	[redacted]	[redacted]	Cracking to external exhaust	Multiple repairs to recurring cracking of structural flanges. Repairs 12 monthly since 2018.
CS5/2	1991	[redacted]	[redacted]	Cracking to external exhaust Cracking to the exhaust bellows	Multiple repairs to recurring cracking of structural flanges. Repairs 12 monthly since 2017.
CS8/1	1991	[redacted]	[redacted]	Cracking to external exhaust	Multiple repairs to recurring cracking of structural flanges. Repairs 12 monthly since 2017.
CS8/2	1991	[redacted]	[redacted]	Cracking to external exhaust	Multiple repairs to recurring cracking of structural flanges. Repairs carried out in 2018 and again in 2020.

During annual inspections of the ACS exhausts we have found cracking to the external exhaust structure for all six ACS units. We have attached photos at **Appendix A**. These cracks shown are reflective of the typical cracking seen on these assets, and similar cracking is widespread across multiple locations on the exhaust.

Cracking is principally at the corners on structural sectional flanges, which then propagate into the main exhaust duct. Such cracking is typical for exhausts of this age and is due to a combination of heat affected material (embrittlement due to prolonged operation at high temperatures) and thermal stress cycling.

1.3.2 Proactive replacement of exhaust units reduces risk of unplanned unit failure

In rectifying these issues, we have made repairs to the cracking by grounding out the cracking and applying a weld repair. This technique has been applied on multiple occasions, but we have found that the cracking consistently recurs within 12 months of repairs. Specifically:

- CS05 Unit 2 – Cracking was repaired in 2018. However subsequent inspections in August 2019 showed that repairs have failed and the cracking had recurred;
- CS03 Unit 1 – Cracking was repaired following inspection in 2018 however, follow up inspections in August 2020 showed that the repair had failed and the cracking had recurred.

The cracking compromises the structural integrity of the exhaust and therefore cannot be effectively mitigated by repairs in the medium to long term. This form of cracking can escalate rapidly from moderate to severe cracking, at which point the exhaust is no longer fit for service and results in failure of the exhaust system.

This is evidenced by exhausts on other units that are of similar materials, design, and operation. For example, in late 2017 we welded repairs to the cracking on the CS04 Unit 2 exhaust, which is of similar design and materials as the ACS units. However, the unit exhaust failed earlier this year. By the time a new exhaust can be fabricated and installed, the turbine unit will have been out of service for over six months. Due to the long lead-time for replacement, a replace on failure approach for the deteriorated ACS unit exhausts is likely to remove the turbine units from service for a period of six to nine months.

While the unavailability of one turbine unit due to a failure of the exhaust in and of itself does not have significant consequences for the pipeline, it reduces the critical redundancy and operational flexibility for that site. In the event of an unplanned failure of an ACS unit as discussed above, the duration for which the turbine unit would be unavailable (i.e. up to 9 months) significantly increases the risk that, should the other unit on the same site become unavailable for any reason, the capacity of the pipeline would be impacted. It also reduces the window for any maintenance and replacement activities to be undertaken at the second unit at that site which is likely to restrict our ability to optimise the timing of these activities with other required works at that location and to meet the needs of our shippers.

Failure of the exhaust system can also expose the compressor station and pipeline to excessive heat or pressure which affects the turbine unit as they cannot be safely operated without an effective exhaust system. This is a high risk of asset damage to other assets at the site and could see further costly replacements required if asset damage were to occur.

Replacing the exhausts in a proactive, condition based manner reduces that risk window from nine months down to two or three days, and the timing of the replacement could be such that the risk of unavailability is effectively reduced to zero. For example, where we undertake replacement during a shoulder period rather than a peak period.

While the repairs themselves are relatively inexpensive at under $10,000 per repair, the structural integrity of the exhausts have deteriorated to the point that it cannot be effectively mitigated by repairs as discussed above. This presents a real risk of failure in the near future, which if not appropriately planned for will see the turbine unit offline for up to nine months.

Extended periods of unit unavailability severely impacts our ability to reliably and efficiently manage gas flows on the pipeline and maintain the strong levels of reliability required to meet the needs of our customers and more broadly the energy needs of Perth.

Therefore we are proposing to prudently replace CS05 unit 2 and CS03 unit 1 in AA5 as delaying replacement to AA6 will put at risk the integrity and safety of the services in the event these exhaust units with significant cracking defects fail and have resulting long lead times to be replaced reactively.

1.4 Summary

In summary, we maintain the need to replace [redacted] units in AA5, inclusive of [redacted] ACS units. On review of our turbine exhaust replacement schedule, we propose to defer the replacement of CS5 Unit 2 to AA6 in line with the ERA and EMCa's recommendations, but have determined the replacement of CS3 Unit 1 should be brought forward to 2024 due to significant cracking defects found during inspections carried out in August of 2020. These inspections showed that previous repairs, carried out following similar inspections in 2018, had failed and significant structural cracking had recurred.

1.4.1.1 Consistency with the National Gas Rules

We submit that the revised capex forecast remains consistent with what a prudent operator would incur, and satisfies the requirements of NGR 74 and 79. Specifically:

Rule 79(1)

The proposed turbine exhaust replacements is consistent with the requirements of NGR 79(1)(a), specifically we consider that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational requirements of our compressor units and includes consideration of age and condition before replacement. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- **Efficient** – The forecast expenditure is based historical average actuals and tender contract values. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – The proposed expenditure relates to a two pronged approach to asset replacement at end of life. It also follows good industry practice by ensuring that critical infrastructure is maintained within its useful life and continues to perform as required, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- **To achieve the lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant useful life and condition.

Rule 79(2)

The forecast capex conforms with the requirements of NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. Turbine exhausts are critical for the required temperature and pressure controls at our compressor stations to ensure safe and reliable supply. The proactive replacement of turbine exhaust systems is based on their age and condition, as outlined in our Asset Management Plan and dictated by good industry practice.

Rule 74

The forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.4.2 Estimating the Efficient Costs

As noted in the 'Final Plan Attachment 8.7_Cost Estimation Methodology 2021-2025', the unit rates used for all projects managed within this program include the forecast internal labour, external labour/contractors, materials, travel and other costs.

Table 3: Turbine Exhaust Replacement Estimate, by cost category ($ June 2019)

($'000)	2021	2022	2023	2024	2025	Total
Internal Labour	176.0	176.0	136.0	136.0	136.0	760.0
Contractors / Consultants	220.0	220.0	170.0	170.0	170.0	950.0
Materials & Services	693.0	693.0	535.5	535.5	535.5	2,992.5
Travel & Others	11.0	11.0	8.5	8.5	8.5	47.5
Total	**1,100.0**	**1,100.0**	**850.0**	**850.0**	**850.0**	**4,750.0**

Table 4 shows the escalation to real dollars of December 2020 including labour cost escalation of 0.57% per annum.

Table 4: Turbine exhaust replacement, total cost escalated to dollars of December 2020

($'000)	2021	2022	2023	2024	2025	Total
Total cost ($ Jun 19)	1,100.0	1,100.0	850.0	850.0	850.0	4,750.0
Escalation	25.5	28.0	23.5	25.4	27.3	129.8
Total ($ Dec 20)	**1,125.5**	**1,128.0**	**873.5**	**875.4**	**877.3**	**4,879.8**

Appendix A

Figure 2 below shows sectional flange cracking on CS3 Unit 1 (which is typical of these exhausts), with cracking propagating into the main exhaust duct.

Figure 2: Sectional flange cracking on CS3 U1 (August 2020)

Figure 3, Figure 4 and Figure 5 show cracking of exhaust bellows, cracking of the exhaust structural support member and sectional flange cracking (which is typical of these exhausts) at CS5 Unit 2. In the case of the bellows cracking is propagating into the main exhaust duct. In the case of the sectional flange, cracking is propagating from the weld into the main flange material. Figure 3 and Figure 5 also show previous weld repairs have failed.

Figure 3: Exhaust bellows cracking on CS5 U2 (August 2019)

Figure 4: Cracking of exhaust structural support member, CS5 U2 (August 2019)

.

Figure 5: Sectional flange cracking CS5 Unit 2 (August 2019)

Figure 6 and Figure 7 show sectional flange cracking and top flange cracking (which is typical across these exhausts). In both instances, cracking is propagating into the main exhaust duct and it can be seen that previous weld repairs have failed.

Figure 6: Sectional flange cracking CS8 Unit 1 (2020)

Figure 7: Top flange cracking CS8 Unit 1 (2020)

DBP20 Customer Reporting System (CRS)

Project Summary	
Project Name	Customer Reporting System (CRS)
Risk and Priority	High
Budget Category	Capital Expenditure (Capex)
Amendments to Original Business Case	We have not made any changes to our original business case for CRS. This addendum provides additional information to support the selection of Option 2 over Option 3, at this time, and that the total cost of $2.8 million is prudent and efficient, and represents the lowest sustainable cost of providing services.
Estimated Cost	The estimated total cost of the CRS AA5 program is $2.8 million. The total cost in each year is shown in the table below.

$'000 June 2019	2021	2022	2023	2024	2025	Total AA5
Capex	602.8	250.0	150.0	1,634.6	150.0	2,787.4
Opex	75.0	75.0	75.0	75.0	75.0	375.0

Basis of cost estimates	All costs are presented in real non-escalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	The CRS program capital expenditure conforms with the following National Gas Rules (NGR): • NGR 79(1) – It is prudent and efficient to ensure appropriate support and reliability for our customer billing platform and that it can continue to provide the functionality that is required by us and our Shippers into the future at the lowest cost and risk. We have undertaken options analysis and risk assessment to ensure we deliver a reliable and fit-for-purpose billing engine consistent with good industry practice and at the lowest sustainable cost. • NGR 79(2) - Securing ongoing support and reliability of our customer billing platform is required to maintain the integrity of services and meet our regulatory obligations for reporting to the Australian Energy Market Operator (AEMO) and is therefore consistent with NGR 79(2)(c)(ii) and (iii). • NGR 74 - the forecast costs are based on latest market testing, and a mix of options were considered. Cost and risk assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Project Approval	
Prepared By:	Gerard Donaldson, Commercial Advisor
Reviewed By:	Brian McGinley, Head of Gas Accounting & Billing
Approved By:	Andrew Staniford, Chief Customer Officer

Other Relevant Documents

This addendum should be read in conjunction with:

- the original Capex DBP20 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5); and
- Our response to EMCa18 provided on 19 March 2020.

1.1 Original business case

Our original proposal for DBP20 Customer Reporting System included capex of $2.8 million to:

- modernise the platform to allow employees and customers to access CRS on mobile devices;
- control the source code in the event the vendor is unable to support; and
- provide greater flexibility and response time to changing business and customer needs.

In the original proposal, we considered the following four options:

- Option 1: Do nothing – continue with CRS and [redacted] with current support and technology platform;
- Option 2: Continue with CRS and [redacted] with enhanced support and technology platform;
- Option 3: Continue with CRS and move to a new vendor with enhanced support and technology platform; and
- Option 4: Implement a replacement for CRS.

We recommended option 2 at this time as it delivers against our objectives, responds to customer feedback by modernising the CRS application for mobile use, follows good industry practice in terms of ensuring core business applications are current, fit-for-purpose and supported, with the lowest combination of costs and risks, as well as minimal impacts to effective operations.

We provided additional information to EMCa and the ERA in response to a formal information request, EMCa18. This response outlined:

- the current vendor's unresponsiveness can be overcome with a formal minimum support agreement underpinning extra vendor resources;
- updated costs for option 3 of $2.2 million;
- further detail on the expression of interest (EOI) costs highlighting the responses from vendors varied widely in cost and scope;
- that option 2 can be upgraded in two stages, but options 3 and 4 cannot; and
- the basis of our support cost estimates.

1.2 ERA Draft Decision

In its Draft Decision, the ERA considered[54]:

> *that some enhancement of the CRS will be necessary to maintain the integrity of services on the DBNGP and to comply with our regulatory obligations during AA5 however, the ERA considers that an operator acting prudently and efficiently would have selected 'Option 3' rather than the selected option based on the following:*
>
> - *'Option 3' has a lower net present cost than the option DBP selected.*

[54] ERA Draft Decision, [722]

- *Technical advice that 'Option 3' is likely to achieve the same or better outcomes as the option selected.*

The ERA considered that:[55]

> *$2.27 million is the best estimate possible of the prudent and efficient amount of capital expenditure for the 'Customer reporting system' business case for AA5, and therefore satisfies rule 74 of the NGR.*

In its technical report to the ERA, EMCa concluded:[56]

- options 1 and 4 are inferior to options 2 and 3;
- option 2 ties DBP to a formerly unresponsive vendor for the foreseeable future; the proposed minimum support contract mitigates the risk of non-performance, but the overall cost of the option is relatively high;
- option 3 should be able to be implemented in stages (i.e. like Option 2); it provides negotiating leverage over the incumbent vendor, it is $0.4m (-16%) albeit with increase transition risk (which is offset by the $120k provision for transition support);
- option 3 is likely to achieve the same or better outcomes as option 2 at a significantly lower cost; risks are manageable with extra transition support provision; and
- that expenditure of $2.4m is likely to be a reasonable allowance in the AA5 period to modernise the CRS (i.e. an adjustment of -$0.4m).

1.3 Our Response

This addendum provides additional information to support the selection of Option 2 over Option 3 at this time and that the total cost of $2.8 million represents the lowest sustainable cost of providing services, with the additional $0.4 million compared to Option 3 commensurate with the risk reduction achieved by Option 2 compared to Option 3.

We highlight that "prudent and efficient" does not mean "cheapest". In forming the view that Option 3 would have been selected by an operator acting prudently and efficiently, the ERA and EMCa have not had proper consideration of the key risks associated with Option 3, which has been measured as a "High" risk as discussed in our original Business Case.

We would also highlight that while we are choosing to stay with the existing vendor and CRS for AA5, we will continue to periodically review our options to ensure we continue to deliver a fit-for-purpose and value for money platform for our business and our customers.

1.3.1 Option 3 to move to a new vendor is assessed as "high" risk

The key reasons for Option 3 being measured as "high" under our risk assessment are:

[55] ERA Draft Decision, paragraph 724
[56] EMCa Report to ERA, p 131

- The new vendor does not have access to the source code or any supporting documentation from the current vendor which is critical for them being able to understand the system and provide ongoing and timely support. This could cause implementation delays as the new vendor is likely to need more time to get up to speed. It is also likely to lead to increased unforeseen costs both for vendor time and DBP internal labour effort. Appendix A outlines the new vendors documentation requirements (what it assumed would be available to it for the transition of support) and the current status of each of these documents.
- The new vendor does not have demonstrated experience with AEMO's requirements which can lead to a risk of regulatory non-compliance.
- Any glitches or delays in the successful transition to a new system has the potential to cause localised customer supply impacts as well as potential interruptions to our current billing cycle, cause billing errors or reporting delays under our obligations to AEMO and our shippers.
- The costs and timeframes presented by the proposed new vendor had a level of uncertainty and were only the result of an EOI process, not a detailed RFP. The level of uncertainty is expected to be +/- 30% and could see us incur costs similar to or above those forecast for Option 2, if we were to proceed with Option 3, as well as the potential for lengthy delays in the delivery of enhancements. This is in contrast with the current vendor, where the upgrades are performed under fixed price contracts.

The issues outlined above puts at risk the success of the transition to the new vendor at this time. This was highlighted by the concerns expressed by the new vendor that the likely success of the transition is unknown and would not be fully understood until the transition has been completed.

Risk mitigation option - transition support costs

The $120,000 provision for transition support costs included 13 weeks of time for the new vendor to spend on learning the system. It also included ensuring sufficient technical training and technical reference material would be made available to the new vendor to assist the transition to be successful.

Only a portion of this work is controllable by the new vendor and DBP, with the new vendor and DBP both reliant on the current vendor to enable successful transition by providing (and in some cases developing) sufficient technical training and reference material, including detailed procedure documents, for the system.

Therefore, it is incorrect for EMCa to conclude the risks associated with option 3 can be sufficiently mitigated by the transition support costs. The transition support costs do not mitigate the risks as:

- The new vendor starts with no technical experience with the "pypIT" system, whereas the current vendor now has multiple staff with over 20 years' experience.
- It will take some time for the new vendor to gain the technical experience required which in the interim will result in increased time and effort to rectify issues around the daily billing and reporting cycle. If we are unable to issue the daily reports in a timely fashion this could impact the ability for our shippers to effectively manage their imbalances on a day to day basis, with financial implications to our business as well as our shippers.
- The ability for the new vendor to gain the technical experience required will be subject to staff retention, other competing workloads, project work and the quality of technical documentation from the current vendor. This leaves many unknowns as to how long the experience deficiency with the new vendor will persist.

- The new vendor recognised that while it had provided some "Ball Park" estimates for support transition, the full extent of the requirements for support transition would be unknown until the transition is underway.

Further, there is potential for additional spend to be incurred if the transition to the new vendor is unsuccessful. An EOI process into other existing "Contract Management and Gas Accounting" systems undertaken in May 2019 returned an average cost of $8 million to implement a new system. We therefore considered the total costs incurred under Option 3 could very easily exceed the $0.4 million potential saving under this option over AA5.

The worst case scenario of unsuccessful transition of support to the proposed new vendor and an inability to return to the current vendor would see replacement of the entire system required at an average spend of $8 million and significant disruption to the business.

While it is unlikely we could not return to the current vendor in the event of an unsuccessful transition, we would certainly expect this to come at a cost premium to continuing with the current vendor in the first instance.

1.3.2 Benefits of staying with the current vendor

The existing product "pypIT" (also known as CRS) is the leading gas transmission contract management and gas accounting system in Australia. It is a custom software solution utilised across the industry with support provided to system users by the current vendor [redacted].

Therefore the current vendor has extensive specialist experience with the system across multiple Australian jurisdictions and the current vendor has multiple staff with over 20 years' experience. This means issues are identified and resolved much quicker and have less potential to impact the regulatory obligations of daily reporting to the AEMO WA Gas Market, as well as reporting obligations to our shippers. It also allows for learnings and improvements made in other jurisdictions, or for other service providers, to be applied quickly and smoothly to DBP.

The current vendor has a detailed understanding and demonstrated experience of AEMO requirements and our Standard Shipper Contracts allowing it to make tweaks to the system to reflect ongoing changes with ease. Given the vendors experience with the system and our requirements, we expect the actual timeframe and cost estimates for the enhancements in AA5 are likely to be within +/- 5-10% of the estimate.

The current vendor has demonstrated improvements to its service delivery

One of the issues raised by ERA and its technical advisers, EMCa, is that Option 2 locks us in with a potentially unresponsive vendor. While we have had concerns with the responsiveness and availability of support from the current vendor in the past, we have recently worked together to resolve these.

The current vendor has improved its responsiveness by taking on additional staff and integrating other existing staff to assist in support of the product. These changes deliver a more stable support platform that will support our needs over AA5 by having an increased local support team available as well as extended capability to undertake application upgrades within the current vendor's organisation.

This has been demonstrated recently (mid-2020) with the kick-off of scoping and design work for functional enhancements to CRS. These functional enhancements will increase the sophistication on how gas is allocated for services and meters, while simplifying the shipper view to display each meter once, rather than once per service. It will also incorporate the principles of the Pilbara Spot Service. Feedback from the business is that the improvements to the performance, reporting, scheduling and general support has been well received. The improvements we have seen from the current vendor, along with an enhanced support agreement in place, give us the confidence the current vendor will meet our service standards moving forward.

Additional factors that influenced our decision

Some additional factors influenced our decision to choose Option 2 over Option 3 that we would like to highlight to the ERA. The first is succession planning within our billing team. We are planning for the retirement of multiple billing team members and see too high a risk of disruption to the billing process if we were to combine this with transitioning to a new vendor or a new system.

The second is the replacement of our finance system. As outlined in Addendum 1 to DBP21, we have started the replacement of Dynamics AX with SAP S4/Hanna at DBP, which is Phase 1 of the AGIG One ERP project. Again, we see too high a risk of disruption to the business if we were to combine this with transitioning to a new vendor or a new system for gas accounting.

After considering all factors of cost and risk, undertaking system enhancements and implementing an enhanced support agreement with the current vendor is prudent and efficient, with the extra $0.4 million in forecast capital costs in AA5 commensurate with the reduced risk of this option. In particular we have confidence the required changes can be delivered within the forecast timeframe and cost envelope, without impacting the customer and business experience.

1.4 Summary

In summary we have provided additional support for our recommended Option 2 to continue with the current vendor that shows the additional cost of $0.4 million in capital works forecast to be incurred in AA5 to deliver CRS enhancements is commensurate with the additional risk reduction this option provides compared to option 3 which would see us undertake enhancements and transfer support to a new vendor.

1.4.1 Consistency with the National Gas Rules

The capex forecast remains consistent with what a prudent operator would incur, and satisfies the requirements of NGR 74 and 79.

Rule 79(2)

As agreed by ERA and EMCa, the investment in a mobile friendly platform for CRS and enhanced support arrangements to ensure new business requirements can be met in a timely manner is necessary to maintain the integrity of services and to comply with regulatory obligations as per NGR 79(2)(c)(ii) and (iii). CRS is a key business tool that supports customer relationship management, billing and market reporting functions to ensure the effective operation of DBP.

Rule 79(1)

The proposed capex is consistent with the requirements of Rule 79(1) of the National Gas Rules, specifically the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational and customer requirements for mobile access to CRS and more timely functional improvements. The option to continue with the current vendor under an enhanced support agreement provides the most certainty on the delivery of the enhancements and support in line with the proposed timeline and cost, without the risk of disruption to our billing processes. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- **Efficient** – The proposed costs for the recommended option is based on vendor quotes, with the proposed option selected after extensive market testing and careful balancing of cost and risk outcomes to reduce the potential for additional costs to be inefficiently incurred. Therefore the proposed expenditure is consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – The proposed expenditure will ensure CRS remains current, fit-for-purpose and supported, in line with accepted good industry practice for core business applications. Further, other utilities have been investing significantly in their IT systems and digital capabilities and in particular to deliver a mobile workforce.

- **To achieve the lowest sustainable cost of delivering pipeline services** – mobile access to CRS and access to enhanced support arrangements that will allow more timely configuration changes to meet business needs and will improve the efficiency of customer relationship management, market reporting and billing functions. Option 2 is the lowest cost and risk option for achieving this change, with Option 3 having a high potential to incur additional costs or extended delays in implementation, as well as potential disruption to billing processes which could result in billing errors, regulatory non-compliance or contractual penalties. Therefore the proposed investment of $2.8 million in AA5 will achieve the lowest sustainable cost of delivering pipeline services.

NGR 74

The forecast costs are based on latest market testing, and project options consider a mix of options. Cost and risk assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.4.2 Estimating the Efficient Costs

As noted in the 'Final Plan Attachment 8.7 Cost Estimation Methodology 2021-2025', the costs for this project include the internal labour, external labour, materials, travel and other costs forecast.

Table below shows AA5 capex by cost categories.

Table 1: AA5 capex, by cost type ($'000 June 2019)

Category	2021	2022	2023	2024	2025	Total AA5
Internal Labour	52.8	50.0	30.0	331.6	30.0	494.4
Contractors / Consultants	500.0	200.0	120.0	1,250.0	120.0	2,190.0
Materials and Services	50.0	-	-	50.0	-	100.0

Travel and Accommodations	-	-	-	3.0	-	3.0
Total	**602.8**	**250.0**	**150.0**	**1,634.6**	**150.0**	**2,787.4**

Table 2 below shows the cost escalation applied to escalate to real dollars of December 20 including labour cost escalation of 0.57% per annum.

Table 2: AA5 capex, including cost escalation ($'000 December 2020)

	2021	2022	2023	2024	2025	Total AA5
Unescalated ($ Jun 19)	602.8	250.0	150.0	1,634.6	150.0	2,787.4
Escalation	14.0	6.4	4.1	48.9	4.8	78.2
Escalated ($ Dec 20)	**616.8**	**256.4**	**154.1**	**1,683.4**	**154.8**	**2,865.6**

Appendix A – Documentation requirements of new vendor

The following shows the gap analysis of documentation that would be required as a reasonable starting point prior to beginning a transition of support for CRS to the new vendor. We are currently focused on improving and tracking the development of this documentation as part of our business as usual activities. To completion of documentation in this manner (i.e. without additionally resourcing its development) will likely take us well into the AA5 period.

Chapter	Complete %	Est. Hrs Effort	Comments on Requirements	Other Doc Ref
Technical documentation				
[redacted]				
General application support				
[redacted]				

Chapter	Complete %	Est. Hrs Effort	Comments on Requirements	Other Doc Ref
[redacted]				
Business Information				
[redacted]				
Tools Outside CRS				
[redacted]				
Business Process				
[redacted]				

Chapter	Complete %	Est. Hrs Effort	Comments on Requirements	Other Doc Ref
[redacted]				
CRS Support Framework				
[redacted]				
Other Searchable sources				
[redacted]				

Chapter	Complete %	Est. Hrs Effort	Comments on Requirements	Other Doc Ref
Training Material				
[redacted]	[redacted]		[redacted]	
		[redacted]	Hours Effort Weeks Effort	

DBP21 IT Sustaining Applications – Addendum 1 – One ERP

Project Summary	
Project Name	One ERP (SAP implementation)
Risk	High
Category	Capital Expenditure (Capex)
Amendments to Original Business Case	The Finance Management System initiative (I-03) has been revised and will be implemented as part of Australian Gas Infrastructure Group's (AGIG) broader One ERP program. The One ERP program has been brought forward so that the new enterprise resource planning (ERP) system (SAP S/4HANA) will be implemented in 2021. There is no longer an 'interim solution' as contemplated by the original business case. The original business case, which contemplated an interim / short-term tactical solution for DBP prior to the AGIG-wide One ERP program, estimated ERP system implementation costs of $5 million, with $3 million to be incurred during the AA4 period and $2 million in AA5 (this was subsequently revised to $4.2 million in AA5 in the response to question EMCa34). Following a Group assessment of the One ERP program of work and increasing issues with the current DBP ERP system (Microsoft Dynamics AX), the scope and timing of the project has since been revisited. We have decided to accelerate the timing of the One ERP program in place of the interim solution originally contemplated. The revised business case now includes the full costs of a SAP S/4 HANA implementation, which were not available at the time of making the initial submission. As such, the revised cost estimate for implementing SAP S4/HANA at DBP is $12.7 million, with $3.2 million to be incurred during AA4 (2020) and $9.5 million in AA5 (2021) in real dollars of June 2020. The total implementation cost will be apportioned between DBP and its sister company Australian Gas Networks (AGN) in order to reduce implementation costs and adopt the most prudent and cost efficient approach for both AGN and DBP customers. The revised forecast represents the full cost estimate of implementing the new ERP system, which has been developed via an exhaustive competitive tender process conducted over March to August 2020. By delivering the new ERP system as part of the broader AGIG-wide One ERP program, which is expected to cost approximately $60.5 million, DBP is getting a functional, fully supported, industry-standard system at a considerably lower cost than if the new ERP system was implemented as a standalone project. The estimated cost of implementing SAP at DBP alone (i.e. without the efficiencies of being part of the broader One ERP program) would be $17.7 million.
Estimated Cost	The estimated total cost of implementing SAP at DBP is $12.7 million. These costs are split across the final year of the AA4 period and the first year of the AA5 period. The total cost in each year, and each AA period is shown in the table below ($'000, June 2020).

2020	2021	2022	2023	2024	2025	Total AA4	Total AA5	Total project
3,175.0	9,525.1	-	-	-	-	3,175.0	9,525.1	12,700.1

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2020 unless otherwise stated.

Consistency with NGR	This capital expenditure conforms with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed One ERP program is prudent, efficient and consistent with good industry practice, as it introduces an industry-standard ERP system to replace the poorly performing, unreliable and costly Microsoft Dynamics AX. The SAP S/4HANA implementation is being delivered as part of AGIG's One ERP program, which will see SAP S/4HANA rolled out across all AGIG businesses over the next six years. By accelerating the implementation of a new ERP as part of the One ERP program in place of adopting a staggered approach to initially adopt a short term tactical solution before fully implementing One ERP, the cost to DBP is approximately $4.95 million less than what a new ERP system would cost if delivered as a standalone project. DBP will also benefit from ongoing efficiencies in terms of more responsive and effective IT support and the ability to share operating and upgrade costs with the other AGIG business. Cost estimates are based on the outcome of third party competitive tenders, and several practicable solutions have been considered. The capex forecast is therefore consistent with achieving the lowest sustainable cost of delivering the service. **NGR 79(2)** – the proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. The current Microsoft Dynamics AX system is unreliable, underperforming and requires numerous manual workarounds on a daily basis. This gives rise to a higher potential for system failure and errors, which have already led to poor customer service, administrative issues and delays in payments. An ERP failure in October 2019, which resulted in a two-week complete system outage, highlights the risk associated with retaining the current system. DBP's statutory auditors have reported the Microsoft Dynamics AX ERP as a significant risk and all efforts to remediate the ERP have failed. The ERP must therefore be replaced with a more reliable, industry-standard ERP system as soon as practicable. **NGR 74** – the forecast costs have been tested in the market and validated by third party technical experts through an exhaustive five-month competitive tender process. The project scope is based on the most recent view of DBP's requirements and the implementation activities necessary to deliver a fully-integrated SP S4/HANA solution. The estimates have therefore been arrived at on a reasonable basis and represent the best forecast possible in the circumstances.

Project Approval	
Prepared By:	Wayne Smith, Financial Controller Wayne Samuels, Manager IT Commercial
Reviewed By:	Paul May, Chief Financial Officer
Approved By:	Andrew Staniford, Chief Customer Officer

Other Relevant Documents

To help clarify the change in IT sustaining applications requirements compared with the AA5 proposal, and to explain how we are efficiently replacing our finance management/ERP system, we have prepared two addendums to the original business case DBP21. This Addendum 1 discusses the **finance management system replacement (ERP replacement) program only**. The other IT sustaining applications are discussed in Addendum 2.

This addendum should therefore be read in conjunction with:

- the original Capex DBP21 Business Case, which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5);
- our response to information request EMCa34 provided on 1 April 2020; and
- DBP21 - Addendum 2 – Applications renewal and upgrades.

1.1 Original business case

The original business case (DBP21), developed during Q3 and Q4 of 2019, proposed forecast capex during the AA5 period of $3.3 million to replace/upgrade a number of IT sustaining applications, as presented in Table .

Table 1: AA5 IT sustaining applications capex forecast as per original business case DBP21, $'000 June 2019

Application	2021	2022	2023	2024	2025	Total
I-01 CRS Billing Revenue Management System upgrade	94.0	-	-	-	-	**94.0**
I-02 Maximo Asset Management System Upgrade	170.0	-	-	-	-	**170.0**
I-03 Finance Management System	1,000.0	500.0	250.0	250.0	-	**2,000.0**
I-04 Customer Support/Service Desk	23.0	101.0	-	-	-	**124.0**
I-05 Other Core Systems	194.0	70.0	145.0	70.0	145.0	**624.0**
Program & Change Management	84.0	150.0	20.0	30.0	20.0	**304.0**
Total	**1,565.0**	**821.0**	**415.0**	**350.0**	**165.0**	**3,316.0**

The original business case also identified expenditure incurred (and forecast to be incurred) during the AA4 period. Business case DBP21 highlighted that actual expenditure on IT sustaining applications is estimated to be $3.6 million greater than the amount approved by the ERA in its AA4 determination. Of this, $2.6 million was for upgrade/replacement of the existing finance management/ERP system, Microsoft Dynamics AX. The remaining $1.0 million variance was incurred for upgrades on a number of other business applications, including MOE and Office 365, Pay Global, Install Documents, CAD, Windows, SPOT Journey Management, corporate IT, the land asset management system, and the AGIG common email system. Expenditure on these upgrades was offset by lower than forecast expenditure on the Maximo Upgrade and INX.

Table 2 shows the variance between the AA4 approved forecast and AA4 actuals.[57]

Table 2: AA4 approved forecast v actuals on IT sustaining applications, $'000 June 2019

Application	AA4 approved	AA4 actual and forecast					
	Total	2016	2017	2018	2019	2020	Total
INX upgrade and rollout	**7.3**	-	-	-	-	-	-
MOE and Windows/Office Upgrades	**209.0**	820.4	64.8	72.4	79.0	-	**1,036.6**
Maximo upgrade	**1,729.7**	250.6	221.3	-7.8	-	216.0	**680.1**
Land asset management (safety management) system	**40.3**	-	76.4	-15.3	-	-	**61.1**
Microsoft Dynamics AX critical enhancements	**873.4**	277.6	208.0	0.4	-	-	**486.8**
Provision for upgrade of finance system / replacement of Dynamics AX	-	-	-	-	-	3,000.0	**3,000.0**
AGIG common email and intranet	-	-	721.2	-41.7	-	-	**679.5**
SPOT Journey Management	-	-	336.1	-	-	-	**336.1**
DBP Design Office CAD	-	7.5	98.3	-16.3	-	-	**89.4**
Corporate data backup and recovery improvements	-	0.1	77.4	-	-	-	**77.5**
Pay Global enhancements	-	54.3	-	-	-	-	**54.3**

[57] Noting Table 2 was not provided as part of the original business case.

Application	AA4 approved	AA4 actual and forecast					
	Total	2016	2017	2018	2019	2020	Total
Total	2,859.7	1,410.7	1,803.0	-8.3	79.0	3,216.0	6,500.3

As shown in Table 2, the AA4 determination included provisions to upgrade the managed operating environment (MOE) and Windows/Office Upgrades, Maximo and Microsoft Dynamics. However, the requirement to upgrade the other systems listed in Table 2 was not foreseen at the time of developing the AA4 forecast in 2015.

The largest component of the AA4 and AA5 sustaining applications capex relates to replacing Microsoft Dynamics AX. These costs are shaded light blue in the above tables.

The $0.5 million for Microsoft Dynamics AX critical enhancements was incurred across 2016 and 2017, and was essential to fix our failing ERP system and ensure it could continue to operate until we could implement a better system (the issues with Microsoft Dynamics are discussed at length in this addendum). The $3.0 million in 2020 was proposed as part of the original solution to replace Dynamics over the AA4 and AA5 period.

This Addendum 1 discusses these finance management system/ERP costs only.[58]

ERP interim solution

The original business case DBP21 proposed total expenditure of $5.0 million as a short-term tactical solution, to replace Microsoft Dynamics AX, which is unreliable, underperforming and comes out of technical support in October 2021 (meaning patches and updates will no longer be issued). Of this, $3.0 million was to be incurred during the AA4 period (in 2020), with the remaining $2.0 million to be incurred during AA5.

This interim solution included work in preparation for the transition from Dynamics to SAP S/4HANA, which was to be implemented as part of AGIG's One ERP solution after 2023. Costs post-2023 for the full One ERP solution were not included in the original business case, as the full costs and scope of AGIG-wide SAP S/4HANA implementation had not yet been defined. We therefore did not have sufficient information to be able to apportion One ERP costs to DBP and arrive at a forecast of these costs on a reasonable basis at that time (as required by NGR 74).

Consistent with NGR 74, the cost of the interim solution was the best estimate possible in the circumstances. Our plan was to revise the forecast during the access arrangement review process, once better information became available from the tender process.

In response to question EMCa34 (provided on 1 April 2020), the $2.0 million estimate was revised to $4.2 million to reflect an improved understanding of requirements following development of the AGIG IT Strategy Roadmap by Deloitte. We also signalled we were progressing implementation of SAP S/4HANA and were conducting an exhaustive competitive tender process to identify a final cost for implementation, which would be available in Q3 2020. Our intent was to provide a forecast of these implementation costs during our response to the ERA's Draft Decision.

[58] The other sustaining applications are discussed in Addendum 2 to business case DBP21.

1.2 ERA Draft Decision

In its Draft Decision, the ERA approved the AA5 forecast capex on IT sustaining applications, making an adjustment for the ERA's alternative estimate of real labour cost escalation. The ERA states:

> *The ERA considers that the proposed work for the IT sustaining applications business case is in line with good industry practice and is justified to maintain the integrity of services on the DBNGP, and the proposed costs are those that would be incurred by a prudent service provider acting efficiently. This is informed by technical advice that the scope of the work for the 'IT sustaining applications' business case for AA5 includes initiatives that are in line with good industry practice and are necessary to maintain the integrity of services on the DBNGP.*
>
> *However, as outlined at paragraph 608, the ERA considers that the best estimate of the real labour cost escalation rate for AA5 is 0.30 per cent. While the ERA considers that DBP's un-escalated cost estimates are reasonable, it has adjusted the labour cost escalation included in the proposed forecast to reflect a real labour cost escalation rate of 0.30 per cent.*[59]

The revised forecast amount approved for AA5 is therefore $3.37 million. This amount includes the $2.0 million forecast to complete the finance management system upgrade in AA5.

However, the ERA has disallowed the $3.0 million proposed for the ERP application upgrade in 2020 from inclusion in the opening regulated asset base (RAB). The ERA has only approved the costs incurred during 2015 and 2016 to conduct critical updates to Microsoft Dynamics AX.

The ERA states:

> *The planned Microsoft Dynamics replacement, commencing in AA4 with the planned upgrade expenditure in 2020 and continuing into AA5, is described in AGIG's IT initiative roadmap as being "subject to further investigation."179 The options analysis for the replacement work does not take into account the planned expenditure of $3.53 million in 2020 and when this is corrected, the total capital expenditure for the replacement is higher than the alternative options considered.*[180] *The ERA is not satisfied on this basis that the planned work for this project would be undertaken by a service provider acting prudently and efficiently and in accordance with good industry practice.*[60]

The ERA's technical consultants, EMCa, also highlight concerns with the $3.0 million expenditure proposed for the AA5 period. EMCa identifies that the $3.0 million proposed for 2020 was part of:

> *…an 'Interim DBP finance solution' that according to BC21 is forecast to cost a further $2.0m ($2019) capex in AA5 (plus change management charges plus opex). AGIG's IT initiative roadmap notes that '[t]he interim DBP finance solution is still subject to further investigation…'. The roadmap shows work across Q3 and Q4 of 2020 and Q1 of 2021.*[61]

Due to the uncertainty around the interim finance solution, coupled with the potential inefficiency of implementing an interim solution when a more permanent solution (in the form of the One ERP program) appears to only a few years away (post-2023), EMCa recommends DBP should consider

[59] ERA Draft Decision, [729] and [730].
[60] ERA Draft Decision, [533].
[61] EMCa Technical Review, [246].

delaying or deferring the replacement of Microsoft Dynamics AX to enable DBP to leverage the benefits of undertaking the work as part of the One ERP program. EMCa states:

> *BC21 discusses, but dismisses, the option of delaying the replacement of Dynamics until the planned AGIG-wide 'One ERP' solution is adopted in 2023…*
>
> *…We consider that a further option should be considered by DBP, which is to defer replacement of Dynamics until the AA5 period and, if necessary, advance the One ERP project, sharing the cost across all AGIG businesses.*[62]

In conclusion, EMCa also states:

> *In summary, we consider that DBP has not provided sufficiently compelling information to support undertaking the MS Dynamics AX replacement program in the AA4 period.*[63]

1.3 Our Response

We have considered recommendations made by the ERA and EMCa in the Draft Decision, along with the continuing issues with the current DBP ERP system (Microsoft Dynamics AX), and have revised our approach. We will accelerate the timing of the AGIG-wide One ERP program, bringing it forward to start the SAP S/4HANA roll out at DBP. We will no longer pursue the short-term tactical solution.

The AGIG One IT Strategy, of which One ERP is a key program, was delivered in November 2019 and is being rolled out across the AGIG businesses over the next five years. The One IT Strategy proposes implementation of SAP S/4HANA across all AGIG business. The original intent was for SAP S/4HANA to be partially implemented at DBP (short-term tactical solution) with the One ERP program commencing in earnest in 2022/2023 at DBP and Multinet Gas (as a result of the system conversion requirements at the time associated with Multinet Gas's SAP ECC solution reaching end of life in December 2024).

However, a total failure of DBP's Microsoft Dynamics AX system in October 2019, alongside its continued underperformance in day-to-day transactional activities has led us to reconsider the timing of the DBP roll out. Continuing with Microsoft Dynamics AX to 2023 and beyond is unsustainable and has been highlighted as a significant risk by DBP's statutory auditors Deloitte. We will therefore accelerate the timing of the One ERP program, transitioning AGN and DBP to SAP S/4HANA by 2021 with Multinet following in 2022/2023.

This revised approach is consistent with the option suggested by EMCa and the ERA, and should be considered as an addendum to the original business case.

Further discussion of One ERP and the revised approach to implementing a new ERP system is provided in the following sections.

1.3.1 One ERP

The One ERP program is an AGIG-wide initiative, which seeks to bring all AGIG's network and pipeline businesses under a common ERP system.

[62] EMCa Technical Review [247].
[63] EMCa Technical Review, p. 113.

AGIG (comprising AGN, DBP and Multinet) operates across multiple Australian jurisdictions, bringing together a wealth of expertise and experience that allows its various businesses to share knowledge, information, resources and costs. AGIG's scale and breadth of resources presents opportunity to deliver benefits for DBP's customers in Western Australia. Not least, it allows us to review and rationalise our IT systems and infrastructure across the group, moving to shared platforms where practicable.

In 2019, we developed the AGIG One IT Strategy and Roadmap (see Appendix A). The strategy is designed to deliver stable and aligned IT management processes, architectures, procurement, cyber security and core technology platforms across the Group.

Our aim is to achieve economies of scale, while keeping pace with technological advances. In the short term, this has required national coordination of applications renewals, replacement and upgrades. This initial coordination means there has been an increase in IT investment across all our businesses compared to historical levels. This is necessary to bring some of our legacy systems up to a reasonable standard, or to invest in the new systems that will replace the multitude of state-based technologies and cyber security arrangements. However, over the longer term we expect coordinating our IT investment into a national program will reduce the overall ongoing cost for our customers, and better support the provision of pipeline services at the lowest sustainable cost.

The largest and most significant cost component of the 2019-2024 AGIG IT Strategy and Roadmap is the One ERP program. When AGIG came together in 2017, a review of existing IT systems across the Group found that each business (AGN, DBP and Multinet) was using a markedly different suite of IT systems and cyber security arrangements, with little or no commonality between key IT sustaining applications.

The variety of ERP systems in use was highlighted as an opportunity for consolidation. DBP currently uses Microsoft Dynamics AX, Multinet uses SAP ECC, and AGN uses a combination of SAP Business One and Oracle.

Bringing the businesses onto a single ERP system will enable consistent finance processes - reporting, budgeting and auditing, as well as greater organisational agility and fewer manual processes. It will also enable AGIG to create a group-wide IT shared service centre, which we expect will increase the efficiency of IT maintenance and investment going forward.

One ERP seeks to implement SAP S/4HANA across all AGIG businesses. SAP S/4HANA is a proven, industry standard ERP system, that can be combined with IBM Maximo to create an integrated finance, asset and resources management system.

Why SAP S/4HANA?

In 2019 we appointed Deloitte IT Strategy Consulting to provide advice on delivering an integrated AGIG Finance System. We worked with Deloitte to consider:

- **what platform to choose** – three options were studied (Microsoft Dynamics D365, Oracle Cloud and SAP S/4HANA in conjunction with IBM Maximo for Enterprise Asset Management) and cross-referenced against those platforms currently in use at AGN, DBP and Multinet. SAP S/4HANA was identified as the optimal platform owing to the fact that it is widely used in the utilities industry, common to the majority of AGIG entities and related sister companies and is fully FIRB[64] compliant. Oracle was the costliest of the three solutions considered and could not be confidently confirmed to be fully FIRB compliant. Microsoft Dynamics D365 was seen as an unestablished product (supported by the fact that D365 is not widely utilised in the utilities industry);

- **future fit and alignment** – we considered the scalability of the solution to deliver functional benefit to all entities on a platform that would also enable the realisation of operational efficiencies;

- **cost** – we identified Oracle as the most expensive solution followed by SAP S/4HANA and then Microsoft Dynamics 365. Microsoft Dynamics is only slightly cheaper than SAP S/4HANA , including an allowance for training and risk, however our experience with Microsoft Dynamics AX at DBP led us to be wary of choosing the cheapest option by default. We also considered the fact that D365 is not well established as a product, which suggests additional customisation/patches may be required post implementation, which may result in higher lifetime costs

- **experience** – DBP previously operated SAP ECC but moved to Microsoft Dynamics AX in 2014. Both AGN and Multinet operate SAP products (albeit different SAP applications). Our employees and contractors/vendors are therefore more familiar with SAP, which means the roll out, training, and integration process is likely to be more efficient and cost effective; and

- **good industry practice** – we looked at what other ERP systems are commonly used by other Australian utility providers. SAP S/4HANA is currently used by South Australian Power Networks (SAPN)[65], Sydney Water, TasNetworks and WaterCorp, and has become the industry standard for ERP.

A summary of our assessment of the three products is provided in Appendix E.

Viewed in aggregate and benchmarked against other Australian utility providers, SAP S/4HANA in conjunction with IBM Maximo for enterprise asset management was selected as the AGIG-wide ERP system of choice.

It should also be noted that in recent (Sep 2020) AER Draft Decisions for the electricity distribution networks, upgrades to SAP S/4HANA have been approved for CitiPower, Powercor and United Energy, and other distributors outside Victoria has required similar SAP upgrades. The move from legacy platforms to SAP S/4HANA among utility businesses, combined with an associated cyber security uplifts are becoming commonplace and the accepted industry standard.[66]

Timing and roll out

The proposed timing of the SAP S/4HANA roll out across AGIG is as follows:

[64] Foreign Investment Review Board. See: https://firb.gov.au/about-firb

[65] SAPN is also part of the CKI Group that owns AGIG.

[66] See, for example CitiPower/Powercor AER Draft Decision September 2020, available at: https://www.aer.gov.au/system/files/AER%20-%20Draft%20decision%20-%20Powercor%20distribution%20determination%202021-26%20-%20Attachment%205%20-%20Capital%20expenditure%20-%20September%202020.pdf

- Phase 1 – AGN and DBP conversion from SAP Business 1 and Microsoft Dynamics respectively (2020/2021);
- Phase 2 – Multinet conversion from SAP ECC to SAP S/4HANA (2022/2023); and
- Phase 3 – Readiness to on-board the AGN Oracle component onto SAP S/4HANA (2024-2027).

The timing of the SAP S/4HANA roll out has changed since DBP's initial submission was put forward. Noting that Microsoft Dynamics AX was coming out of support in October 2021, the initial business case contemplated applying an interim solution to allow DBP to continue to run Microsoft Dynamics until a new ERP could be implemented as part of One ERP after 2023. This interim solution was proposed to be a precursor to the full SAP S/4HANA implementation, and at the time was considered a low risk and efficient method of transitioning to a better ERP.

However, in the time since preparing the initial business case we have continued to encounter issues with Microsoft Dynamics AX, confirming concerns of its reliability and suitability in the near term. In late 2019 a complete ERP failure occurred, which resulted in the system being completely offline for two weeks. During this time no transactional activity was possible and all vendor payments were suspended until the system was restored.

We have therefore taken the reasonable and prudent decision accelerate the timing of the One ERP program, and implement SAP S/4HANA at DBP as soon as reasonably practicable.

The problem with Microsoft Dynamics AX

Microsoft Dynamics AX was implemented as a replacement for SAP in 2013/14. Microsoft Dynamics was a lower cost option than SAP, and it was assumed it would be a more cost-effective ERP solution for DBP. This has proven not to be the case. Microsoft Dynamics has been fraught with problems, leading us to incur in excess of $2.0 million in reactive opex for upgrades, patches, specialist support and fixes over the past six years, plus the unquantifiable costs of lost productivity.

In addition to the ongoing reactive opex costs, $0.5 million of capex (highlighted in Table 2) was incurred in an attempt to enhance Dynamics so that it would remain operable and integrate with our other applications more effectively. While this expenditure was prudent (as it was necessary to maintain integrity of services), it was not sufficient to prevent the ongoing limitations of Microsoft Dynamics.

The issues with Microsoft Dynamics AX can be summarised as follows:

- the system was implemented with the intent of mimicking the legacy SAP operating environment required by other systems in place at DBP at the time (CRS and Maximo). However, we found Microsoft Dynamics AX could not fully replicate the SAP environment, even with significant customisation;
- the extent of customisation has degraded the system's core reliability and functionality, and has resulted in mandatory annual security patching being unable to be performed since 2014 exposing the system to a cyber event;
- Microsoft support for the system ends in October 2021, which means no support outside of a bespoke and expensive support agreement will be available after then;
- despite attempts to customise the solution to mimic the legacy SAP solution, the age and state of the system now limits integration with other IT applications, notably a contemporary shippers portal;

- system outages of various degrees of severity are common which impacts delivery for customers; and
- the organisational risk for DBP is too high to wait for an AGIG-wide ERP system implementation post-2023.

Specific examples of the challenges we have encountered with Microsoft Dynamics AX are provided in Appendix B.

1.3.2 Forecast expenditure

The forecast expenditure covered by this business case addendum is for the DBP cost component only. As discussed above, SAP S/4HANA is being rolled out as part of the One ERP program, which will see the new ERP system implemented at both DBP and AGN during 2020 to the end of 2021.

The total capital cost of all three phases of the SAP S/4HANA implementation across AGIG is ~$60.5 million. DBP implementation occurs during Phase 1 of One ERP only. Phase 1 is forecast at $19.1 million to be incurred in 2020 and 2021.

Various options for allocating this $19.1 million Phase 1 cost between AGIG businesses have been considered. Our objective was to find a method that would provide an appropriate allocation under NGR 74, i.e. arrived at on a reasonable basis; and representing the best forecast or estimate possible in the circumstances.

One option considered was to allocate costs between businesses based on the number of customers. This a common practice AGIG uses to allocate costs between its gas distribution network businesses. However, applying this approach for allocating IT system costs between DBP and AGN would not produce an appropriate allocation, as the small number of large volume DBP transmission customers are incomparable to the large number of small volume distribution customers associated with AGN.

We also considered allocating costs based on total gas volumes, however the disparity between transmission and distribution pipelines again makes this an inappropriate basis for sharing costs.

Ultimately, we consider the most reasonable allocation methodology is to use the number of SAP users. This will result in a cost allocation that reasonably reflects the level of usage of the new ERP system. This is consistent with standard industry practice, and will result in a cost allocation that is the best forecast or estimate possible in the circumstances and is therefore consistent with NGR74.

Allocating costs by the number of SAP users equates to 33.5% of costs being allocated to AGN (63 users) and 66.5% to DBP (125 users) (see Table 3). DBP has 242 FTE staff of which 117 are assigned to the Transmission Operations business unit responsible for Enterprise Asset Management. Those staff represent field based employees responsible for the maintenance operations in DBP. All Enterprise Asset Management work is undertaken in IBM Maximo, these users will not make use of SAP.

Table 3: One ERP Phase One forecast capex allocation, $'000 2019

AGIG business	Number of users	% allocation	Forecast capex
AGN	63	33.5%	6,400.8

DBP	**125**	**66.5%**	**12,700.1**
Total	**188**	**100.0%**	**19,100.9**

Phases 2 and 3 of One ERP comprise the residual $41.4 million and will be incurred by Multinet and AGN respectively. These phases of work are more complex than Phase 1, which is why DBP's allocation only amounts to approximately one-fifth of the total cost. At the completion of Phase 3 there will be some harmonisation costs of around $2-3 million which will be split across the three entities. These are expected to occur in around 2026/2027.

Forecasting approach

The $19.1 million forecast was developed as the result of an exhaustive competitive tender process undertaken between March and August 2020. The tender process invited nine SAP gold/platinum implementation partners to submit a fixed price, fixed duration offer to implement SAP S/4HANA (integrated with IBM Maximo) at AGN and DBP commencing Q4 2020 and running through to Q3 2021. A copy of the AGIG One ERA Solution Request for Proposal (RFP) document is provided at Appendix D.

With the aid of technical support from SAP and PricewaterhouseCoopers, and specialist legal support from Johnson Winter & Slattery (JWS), we reduced the number of potential implementation partners to a shortlist of three, giving consideration to:

- compliance with the request for proposal;
- a range of qualitative factors including experience and capability to deliver the required services; and
- commercial and legal contracting requirements.

Table 4 provides an overview of the three shortlisted options.

Table 4: One ERP Phase 1 tender process shortlist, $'000 June 2020

Cost element	Vendor A	Vendor B	Vendor C
Internal labour	11,993.3	5,772.2	5,891.7
Contractors / Consultants	13,077.5	11,598.9	11,587.6
Materials and services	1,676.8	1,655.3	1,621.6
Total	**26,747.7**	**19,026.4**	**19,100.9**

Given the recent poor experience with Microsoft Dynamics AX, we guarded against selecting the lowest cost provider by default, and considered each of the remaining three vendors' proposals based on experience, capability, risk, scalability of the solution, expected commercial outcomes, ongoing support capability, and quality assurance. Vendors A, B and C all put forward similar proposals. Though Vendor A's proposal was significantly higher in cost than the other two, we proceed to include them in the quantitative and qualitative assessment process we used to inform our ultimate decision.

Each vendor's RFP response was assessed individually and scored by a ten-member working group comprised of our external technical advisors and DBP/AGIG subject matter experts. Each proposal

was given a qualitative and a quantitative score based on the criteria contained in the RFP. A summary of the assessment criteria when selecting the vendor is provided in Appendix F.

After extensive and careful deliberation we selected Vendor C on the basis that the expected commercial and legal outcomes were most likely to result in expenditure consistent with a prudent service provider seeking to efficiently manage and minimise costs. Vendor C has worked with the AGIG Group already to deliver a major SAP project (assisting Multinet to separate its IT environment from United Energy following the acquisition of Multinet Gas Networks by CKI in 2017). Our experience in working with them alongside the competitive costing proposal inclusive of an 'at-risk' element of the fee (which provides that the vendor will earn no profit from the implementation until the system is fully implemented and free from all material defects) was seen as the differentiator between Vendor B and C.

Cost breakdown

Table 5 shows a breakdown of the full $19.1 million phase one costs.

Table 5: One ERP Phase 1 forecast capex, $'000 June 2020

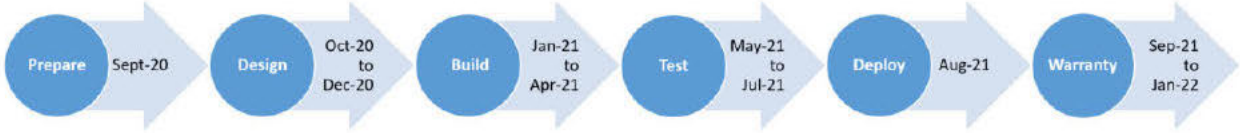
Component	$'000
Vendor implementation cost	10,787.6
SAP licence procurement & Year 1 licence costs	1,189.8
Microsoft Azure hosting procurement	431.8
External technical support (JWS and PwC)	800.0
Internal/ External labour*	5,891.7
Total design, build and implement project value	**19,100.9**

As discussed above, DBP will incur $12.7 million of these costs, allocated based on the comparative number of SAP users (66.5%). As shown in Table 6, $3.2 million of these costs will be incurred during the AA4 period (2020), with the balance incurred in AA5 (2021).

Table 6: One ERP Phase 1 forecast capex – SAP S/4HANA implementation at DBP, $'000 June 2020

Project	AA4	AA5					Total
	2020	2021	2022	2023	2024	2025	
One ERP Phase 1 – DBP share	3,175.0	9,525.1	-	-	-	-	**12,700.1**

The timeline for the project is summarised below as follows:



The proposed $3.2 million to be incurred during 2020 is materially consistent with the $3.0 million we originally forecast for the AA4 period. However, the scope of the solution has changed. Similarly, the $9.5 million proposed for the AA5 period is based on a detailed market-tested scope (arising from the tender process), and reflects the full costs of implementing a more strategic, holistic and sustainable ERP system. There is no longer an interim/ short-term tactical solution.

The variations to scope and resulting costs are discussed in the following section.

Change in scope since the initial business case

The original business case was developed in 2019 using the best information available in the circumstances, and reflected a reasonable estimate of what we thought was required at the time. The initial $5.0 million project was a more tactical solution, designed to extend the use of the existing Microsoft Dynamics AX application while developing an interim/ short-term tactical solution that would lay the foundations for the full SAP implementation as part of One ERP after 2023.

Costs post-2023 for the One ERP solution were not included in the original business case. This is because at the time we did not have sufficient information to be able to apportion the $60.5 million total project cost associated with the AGIG-wide One ERP system. We therefore felt we could not provide a forecast of these costs on a reasonable basis (as required by NGR 74). As signalled in our response to question EMCa34 in April 2020, the tender process for SAP S/4HANA implementation was to be completed by Q3 2020. Our intent was to provide the revised costs once the outcomes of the tender process were known.

Our original plan (as contemplated by the AGIG One IT Strategy) was for SAP S/4HANA to be partially implemented at DBP (short-term tactical solution) with the One ERP program commencing in earnest in 2022/2023 at DBP and Multinet. Since developing the initial plan, we have encountered further issues with Microsoft Dynamics (see Appendix B for further detail). This prompted us to review the risk associated with Microsoft Dynamics AX and ultimately led us to conclude it would be prudent to bring One ERP forward and implement the new ERP system at DBP as soon as reasonably practicable.

Bringing the implementation of SAP S/4HANA forward means we no longer require an interim/ short term tactical solution, and can instead move to the full SAP implementation. We therefore reviewed the original project scope and mapped it against the full requirements for implementing the new SAP system and integrating it with other critical applications (IBM Maximo in particular).

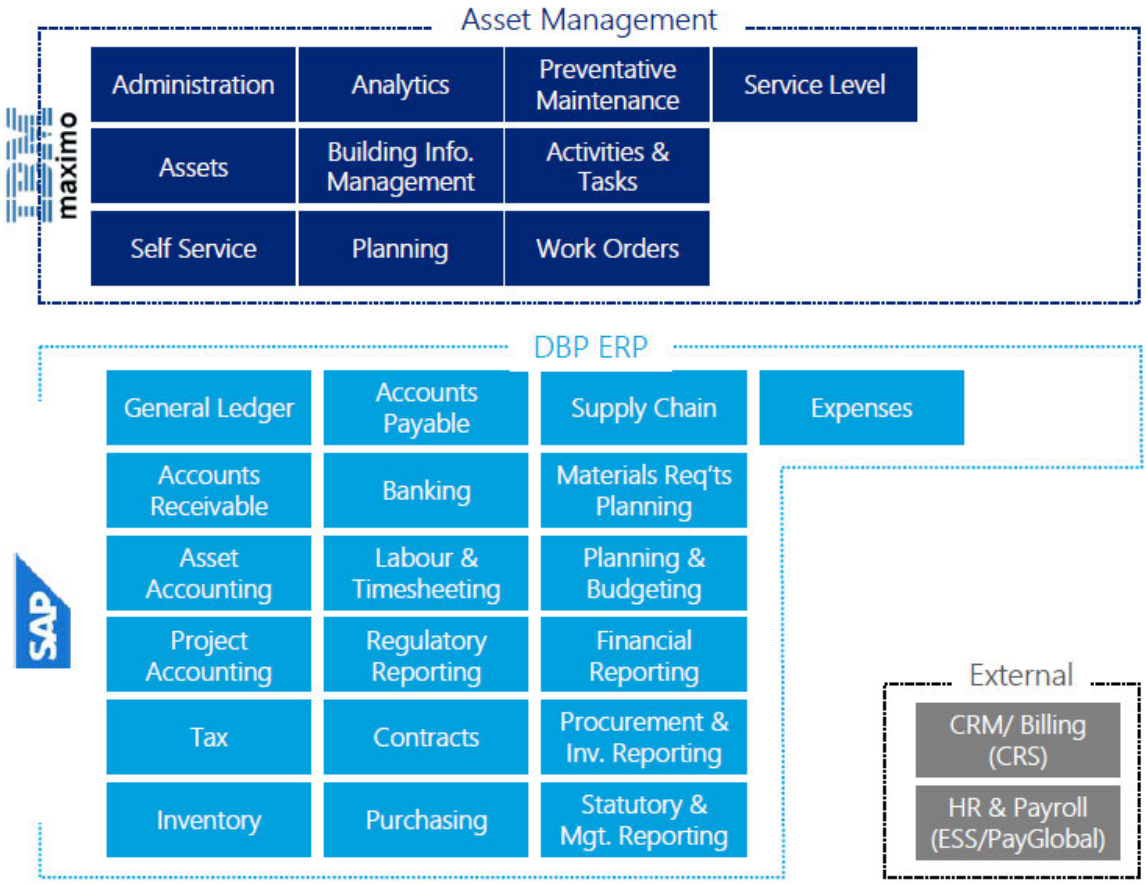
The full scope of the SAP S/4HANA implementation includes the licence, build and testing of the new system, as well as costs for:

- data migration;
- organisational change management;
- Maximo uplift and integration;
- program management requirements;
- SAP configuration complexity; and
- infrastructure and security requirements.

We have built this scope into the tender requirements when going to market. This ensures the revised forecast captures all necessary works to implement SAP S/4HANA, and reflects the best estimate available in the circumstances (as per the requirements of NGR 74).

Figure shows the full scope of services/activities that will be managed via the integrated SAP S/4HANA and IBM Maximo solution.

Figure 1: Integrated SAP S/4HANA and IBM Maximo solution



The revised program of work will implement an industry-standard ERP system at DBP and AGN. The new ERP system will be fully integrated with IBM Maximo, which DBP currently uses for enterprise asset management. DBP will ultimately move onto the same suite of applications as the other AGIG businesses, which means DBP will benefit from centralised IT support, and the economies of scale from being serviced as part of a large organisation.

As EMCa points out in its review of our forecast capex, combining DBP's ERP Microsoft Dynamics AX replacement as part of One ERP will reduce the overall cost to DBP, and means *the project cost to DBP is likely to be significantly reduced by amortising the implementation of SAP Hana across the whole of AGIG's business*.[67]

We have tested this assumption, and we estimate the capital cost of implementing SAP S/4HANA at DBP as a standalone system would be $17.7 million. By delivering the new ERP in conjunction with AGN, DBP saves approximately $4.9 million in capital costs, with ongoing patch/upgrade costs also being shared across the three businesses over the life of the application.

While DBP is incurring a greater share of the One ERP Phase 1 costs than AGN, no further capital costs are proposed for DBP during Phases 2 and 3. Table 7 shows the forecast cost allocation between the AGIG business of the entire One ERP program.

[67] EMCa, Technical Review, p 131

Table 7: One ERP forecast capex allocation, $'000 2019

AGIG business	Forecast capex	Allocation
AGN	33.1	54.8%
DBP	12.7	21.0%
Multinet	14.6	24.2%
Total	**60.4**	**100.0%**

Opex requirements

The integrated SAP S/4HANA and IBM Maximo solution is a higher quality and more holistic solution than the existing Microsoft Dynamics AX system (see Appendix C). As a result, there will be an associated uplift in operating costs. Table 8 shows the ongoing annual costs associated with the One ERP system.

Table 8: One ERP platform forecast annual operating costs, $'000 June 2020

Component	Total Forecast Opex	DBP Share of Forecast opex
Vendor applications management support	1,314.0	873.7
SAP perpetual licences	431.8	287.1
Microsoft Azure hosting charges	459.5	305.6
Total annual operating costs	**2,205.4**	**1,466.3**

Current annual operating costs associated with Microsoft Dynamics AX are approximately $500,000 per year. However, it is important to note that this $500,000 per year is for a limited support service, with a capped number of support hours that only extends to basic support and patches.

As a result, this $500,000 per year cost does not include additional opex incurred for reactive maintenance since we installed Dynamics AX. We estimate we have incurred in excess of $2 million in reactive opex for upgrades, patches, specialist support and fixes over the past six years, plus the unquantifiable costs of lost productivity. We have also had to incur an additional $463,000 of capex during the AA4 period for the necessary enhancements and customisation to keep Microsoft Dynamics AX operable.

In comparison, the $1.5 million per year operating cost for SAP S/4HANA includes more comprehensive vendor support, with uncapped service hours for application and infrastructure management (all technical and operational activities required to manage all applications formed under the ERP System implementation). As a result, we do not anticipate incurring additional reactive maintenance costs, and any major issues that arise with SAP S/4 HANA that fall outside of the vendor support agreement would be shared across the AGIG businesses.

We do not anticipate reactive opex of this magnitude to occur with SAP S/4HANA. Any ongoing issues that did occur with SAP S/4HANA would be shared across the AGIG businesses, and we expect would be covered by the ongoing $1.5 million per year charge.

The expected higher costs of operating our refreshed IT applications was signalled in our Final Plan. Our intent is to absorb these higher IT operating costs (for example this $1.0 million p.a. increase in ERP system costs) in lieu of a productivity adjustment being applied to our opex forecast.[68]

1.4 Summary

1.4.1 Estimating efficient costs

Table 9 shows the forecast capital costs of implementing the revised ERP solution. Table 10 provides a summary of AA5 capex for One ERP, including escalation to dollars of December 2020.

Table 9: One ERP Phase 1 forecast capex – SAP S/4HANA implementation at DBP ($'000 June 2020)

Project	AA4	AA5					Total
	2020	2021	2022	2023	2024	2025	
One ERP Phase 1 – DBP share (Jun 2020)	3,175.0	9,525.1	-	-	-	-	**12,700.1**

Table 10: One ERP summary of AA5 capex

	2021	2022	2023	2024	2025	Total AA5
Total capex (Jun 2019)	9,407.5	-	-	-	-	9,407.5
Escalation	218.5	-	-	-	-	218.5
Total capex (Dec 2020)	**9,626.0**					**9,626.0**

In summary:

- the forecast costs for implementing the integrated SAP S/4HANA solution as part of One ERP have been developed via an exhaustive five-month competitive tender process;
- the initial plan was to implement an interim / short-term tactical solution at a cost of $5.0 million (later revised to $7.2 million as per the response to EMCa34), with the subsequent costs to implement a full SAP S/4HANA solution to be incurred after 2023. The full implementation costs were not known at the time of preparing the initial AA5 submission, as the competitive tender process had not commenced;
- however, continuing and escalating issues with Microsoft Dynamics AX has prompted us to change our plans and bring the implementation of SAP S/4HANA at DBP forward to 2020;
- as a result, the interim / short-term tactical solution is no longer necessary, and we will move straight to SAP S/4HANA as part of the AGIG-wide One ERP program of work. The benefit of doing so is that DBP will not bear the full cost associated with a stand-alone migration to SAP S/4HANA, rather sharing these costs with sister company AGN. One ERP is anticipated to cost $60.5 million, phased over six years;

[68] Note our ability to absorb these costs will be reviewed in the light of the 0.5% productivity factor applied by the ERA in its draft decision. An opex step change may be necessary to enable DBP to recover its efficient business costs.

- phase one of One ERP, which includes the full implementation of the new ERP system at DBP and AGN, is forecast at $19.1 million, of which $12.7 million is allocated to DBP;
- the cost allocation between DBP and AGN is 66.5%/33.5%, based on the number of anticipated SAP users in each business; and
- the ongoing operating cost of the new ERP system apportioned to DBP is $1.5 million. This compares with the ~$0.5 million per year and ~$2 million of reactive opex costs, plus lost productivity, plus capex upgrades incurred to operate Microsoft Dynamics AX since 2014. DBP will not bear the full cost associated with a standalone operation of SAP S/4HANA, rather sharing these costs with sister company AGN saving DBP customers $1 million per annum.

1.4.2 Consistency with the National Gas Rules

Though the overall cost of the solution has increased compared to the original forecast, the drivers for the upgrade remain the same. The main change is the timing and urgency of the program due to the issues with Microsoft Dynamics AX.

The new ERP system is necessary to maintain the integrity of our IT systems. The proposed solution is commensurate with good industry practice. Costs have been prepared using reasonable assumptions, including relevant historical costs and vendor pricing.

We therefore submit that the revised capex forecast remains consistent with what a prudent operator would incur, and satisfies the requirements of NGR 74 and 79.

Specifically:

Rule 79(1)

The forecast capex confirms with Rule 79(1)(a) in that it is:

- **Prudent** – the expenditure is necessary in order to address the risk associated with the underperforming Microsoft Dynamics AX system. Given the continuing and escalating failure of Dynamics, the impact it is having on our ability to provide services, and the significant potential for similar failures, it is no longer prudent to extend use of Dynamics as originally planned. As highlighted by the ERA and EMCa, we submit it is both reasonable and prudent to bring the One ERP program of work forward and roll out the new SAP system at DBP as soon as practicably possible.
- **Efficient** – the forecast expenditure is based on an exhaustive competitive tender process using reasonable assumptions based on a scope developed with the appropriate technical and legal input from third party experts. Nine implementation providers were invited to tender, and the costs of the selected vendor were consistent with the other shortlisted respondents. The solution has been selected based on capability, experience, risk, scalability of the system, expected commercial outcomes, ongoing support capability, and quality assurance. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – SAP S/4HANA is currently used by South Australian Power Networks, Sydney Water, TasNetworks and WaterCorp, and has become the industry standard for ERP systems.

- To achieve the **lowest sustainable cost of delivering pipeline services** – by delivering the ERP replacement project as part of the broader OneERP program, DBP is getting a higher quality solution at a lower cost than it would if SAP S/4HANA was implemented as a standalone DBP project. DBP will also benefit from shared costs in the future, as well as centralised IT support which will lower operating costs. The forecast capex is therefore consistent with providing ERP services at the lowest sustainable cost.

Rule 79(2)

The forecast capex conforms with the requirements of NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. The current Microsoft Dynamics AX system is underperforming and requires numerous manual workarounds on a daily basis. This leads to a higher potential for system failure and errors, which lead to poor customer service, administrative issues and delays in payments. Microsoft Dynamics AX must therefore be replaced with a more reliable, industry-standard ERP, to maintain the integrity of services going forward.

Rule 74

The forecast costs have been tested in the market and validated by third party technical experts. The project scope is based on the most recent view of DBP's requirements and the implementation activities necessary to deliver an integrated SP S4/HANA system. The estimates have therefore been arrived at on a reasonable basis and represent the best forecast possible in the circumstances.

Appendix A – AGIG One IT Strategy 2019-2024

Appendix B – Microsoft Dynamics AX issues

The continued use of Microsoft Dynamics AX poses a significant business risk to DBP. The system is failing and there have been outages that affect our ability to make payments and serve customers.

As a result we have decided to accelerate One ERP and implement SAP S/4HANA in 2020/21 rather than wait for 2023 as originally planned. A summary of some of the practical issues encountered with Microsoft Dynamics is provided below.

- In October 2019, Microsoft Dynamics AX went offline for two weeks. This was due to a then-unknown system process, which caused the journal number sequence to create and then delete system records resulting in journal numbers 'jumping' by up to 6,000 records in a matter of minutes. The total available number of journals was 99,999. When this total was reached the system stopped functioning, resulting in no accounting or vendor payments being able to be made for the duration of the outage. Emergency work was undertaken by the service provider to increase the total number of available journals to 999,999 – beyond this no further changes are possible in the system. Based on continued 'jumping' the system will reach this ceiling within approximately 2-3 years, assuming no further stability issues are encountered. The service provider has been unable to fully diagnose or correct the issue. Should the journal ceiling be reached the system will stop functioning immediately and prevent finance management altogether.

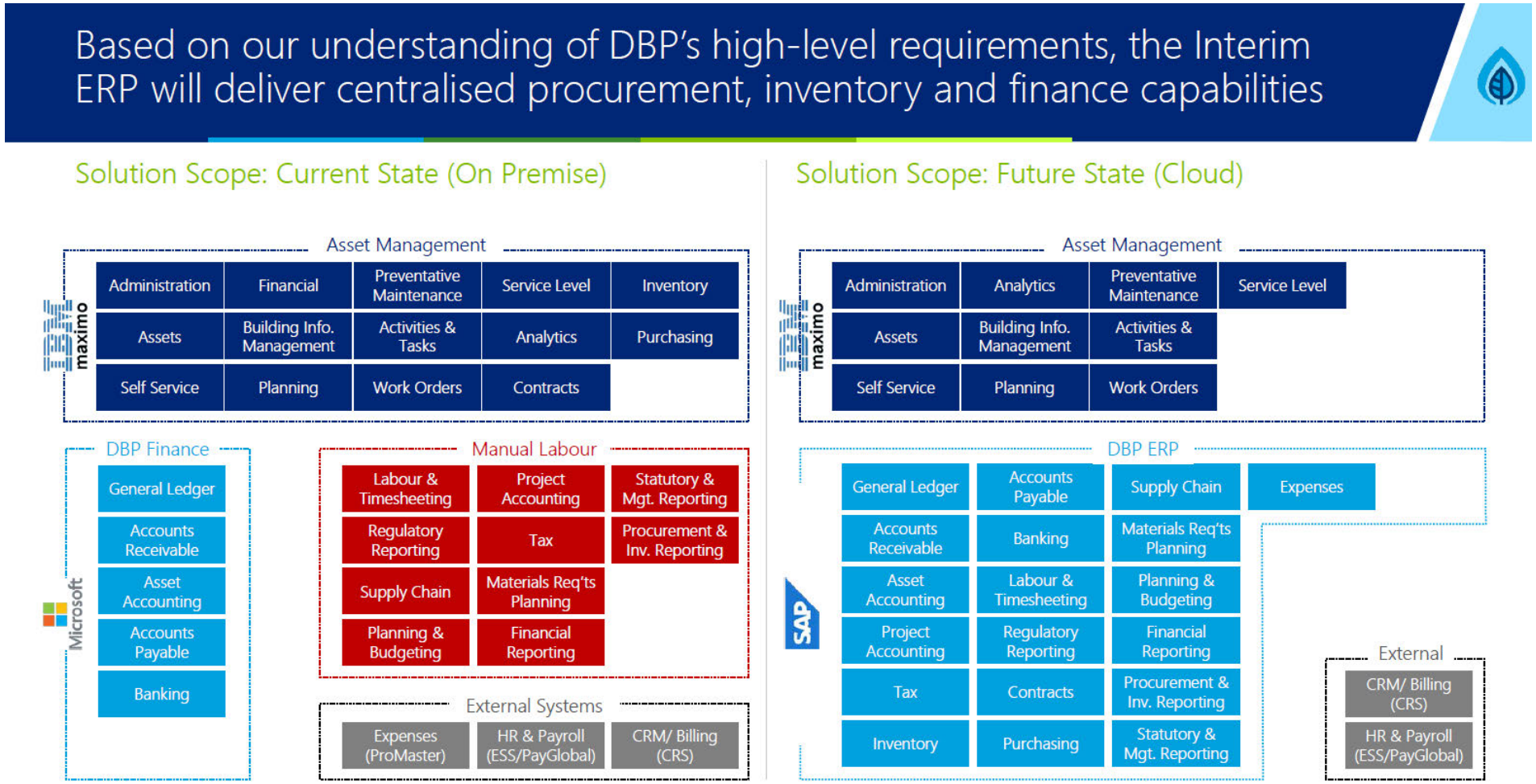
- The limitations of Microsoft Dynamics AX means our users are regularly applying manual workarounds and using Microsoft Excel as a substitute. Four different vendors have attempted to improve Dynamics AX over the course of 2016 to 2019 but have been unable to resolve the limitations. This means we are still routinely calculating records in Microsoft Excel, which poses an information integrity and security risk.

- We found that 67,799 manual journals were processed in 2019 (noting some journals are over 20,000 lines long). This high volume of manual calculation represents a material financial and audit risk and has been noted as an area of concern by our auditors.

- The link between Microsoft Dynamics and IBM Maximo routinely generates errors in financial values as records are transferred between the two systems each day. In 2019, errors to the value of $2.3 million occurred (Inventory ~$0.8 million, GRNI ~$1.0 million and Payroll Leave Accruals ~$0.5 million). To correct these errors the individual records associated with each needed to be individually investigated and elevated system access granted to hard-delete and recapture the records. DBP did not have the spare labour capacity to achieve this and had to employ a combination of fixed-term contractors and service providers to correct these system errors. The service provider was unable to completely diagnose and correct the reason for these errors and as a result the situation is continuing.

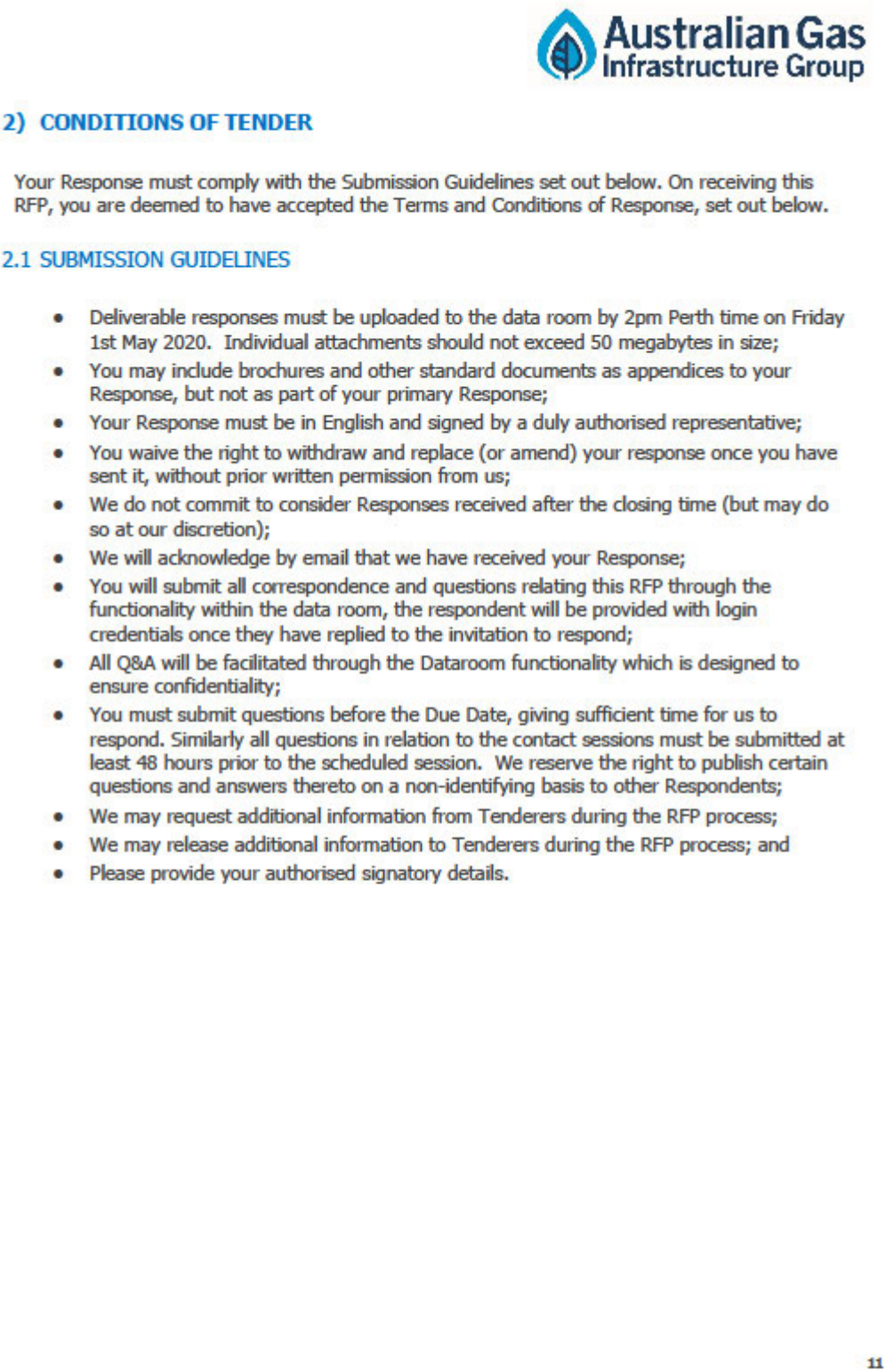
- All fixed asset accounting/ reporting occurs in Microsoft Excel. In 2019, we attempted to configure the fixed asset register to allow for the revision of asset lives and incorporation of a tax fixed asset register within the ERP system. This was unsuccessful, as a result all accounting, tax and regulatory fixed accounting is performed manually in Microsoft Excel. Each month around 6,000 asset records across four Microsoft Excel workbooks are recalculated with manual journals uploaded into Microsoft Dynamics to record the summary outcomes.

Appendix C – Microsoft Dynamics (current state) vs SAP S/4HANA (future state)



Appendix D – AGIG One ERP RFP document

[double-click image to open PDF]



Australian Gas Infrastructure Group

2) CONDITIONS OF TENDER

Your Response must comply with the Submission Guidelines set out below. On receiving this RFP, you are deemed to have accepted the Terms and Conditions of Response, set out below.

2.1 SUBMISSION GUIDELINES

- Deliverable responses must be uploaded to the data room by 2pm Perth time on Friday 1st May 2020. Individual attachments should not exceed 50 megabytes in size;
- You may include brochures and other standard documents as appendices to your Response, but not as part of your primary Response;
- Your Response must be in English and signed by a duly authorised representative;
- You waive the right to withdraw and replace (or amend) your response once you have sent it, without prior written permission from us;
- We do not commit to consider Responses received after the closing time (but may do so at our discretion);
- We will acknowledge by email that we have received your Response;
- You will submit all correspondence and questions relating this RFP through the functionality within the data room, the respondent will be provided with login credentials once they have replied to the invitation to respond;
- All Q&A will be facilitated through the Dataroom functionality which is designed to ensure confidentiality;
- You must submit questions before the Due Date, giving sufficient time for us to respond. Similarly all questions in relation to the contact sessions must be submitted at least 48 hours prior to the scheduled session. We reserve the right to publish certain questions and answers thereto on a non-identifying basis to other Respondents;
- We may request additional information from Tenderers during the RFP process;
- We may release additional information to Tenderers during the RFP process; and
- Please provide your authorised signatory details.

11

Appendix E – Analysis and comparison of ERP applications

The following table outlines the considerations made during December 2019, when AGIG commenced the process of selecting a common ERP application for DBP, AGN and Multinet. Note that the costs and technical scope have been revised since December 2019, however the change in costs/scope since December 2019 would equally apply to each solution therefore the comparisons remain valid.

Consideration	Oracle Cloud	SAP S/4HANA	Microsoft Dynamics 365	Maintain status quo
Functional fit	Yes. The Oracle ERP Cloud has appropriate functionality and can be integrated with Maximo and is compatible with AGIG's broader suite of sustaining applications. Pre-developed integration connectors exist between Maximo and Oracle with proven implementations within Australian distribution network service providers. Using Oracle would require a complete change in a approach for all three businesses (DBP, AGN, Multinet) as SAP and Microsoft products are being used currently.	Yes. SAP S/4Hana Cloud for Enterprise Management has appropriate functionality and can be integrated with Maximo and is compatible with AGIG's broader suite of sustaining applications. Pre-developed integration connectors exist between Maximo and SAP with proven implementations within Australian distribution network service providers. SAP products are currently used at AGN and Multinet, and have been used at DBP in the past.	No. We believe Microsoft Dynamics 365 Finance & Operations may have appropriate functionality and can be integrated with Maximo and may be compatible with AGIG's broader suite of sustaining applications. However, some customisation may be required (as per Microsoft Dynamics AX). Pre-developed integration connectors exist between Maximo and Dynamics 365. = D365 is not commonly used or tested within the utility industry or the CKI Group of companies, creating a 'first of a kind' implementation risk. It would also require a complete change in approach for AGN and Multinet, which use SAP product currently.	No. While the individual systems are fit for each individual businesses, the lack of integration between the various ERP applications being used means the current solution is not fit for supporting Group-wide resource planning nor achieving synergies/efficiencies through sharing IT support.
Scalability	Meets requirements. An Oracle path would simplify and de-risk a transition to a single ERP in the long-term if Oracle is chosen as the target solution on the basis of	Meets requirements. A SAP path would simplify and de-risk a transition to a single ERP in the long-term if SAP is chosen as the target solution on the basis of	Meets some requirements, but higher risk. Based on AGIG's long-term ambitions to operate as one business on a single ERP and transition APA in	Poor. Maintaining a suite of uncommon ERP applications does not allow the overall solution to be scaled up (or down). It does not deliver

Consideration	Oracle Cloud	SAP S/4HANA	Microsoft Dynamics 365	Maintain status quo
	simplifying Multinet's SAP refresh in 2025	simplifying Multinet's SAP refresh in 2025	2027, Microsoft does not align target ERP solution options - SAP considering its Multinet footprint and Oracle considering its APA footprint	functional benefit to all entities and realise operational efficiencies.
Cost (relative to SAP S/4HANA)*	• Capex total: $19.63million • Recurring annual opex : $2.83 million Oracle Cloud is the highest overall cost option, and has significantly higher ongoing operating costs than SAP and Dynamics.	• Capex total: $19.1 million • Recurring annual opex : $2.21 million SAP S/4HANA is a lower cost option than Oracle, but significantly higher than Microsoft Dynamics. However, user familiarity with SAP may enable a more efficient roll out of the ERP application, with less intensive training requirements.	• Capex total: $18.83 million • Recurring annual opex: $1.98 million Though Microsoft Dynamics has the lowest up front cost, our experience with Microsoft Dynamics AX at DBP led us to be wary of choosing the cheapest option by default. We also considered the fact that D365 is not well established as a product, which suggests additional customisation/patches may be required post implementation, which is likely to result in higher lifetime costs.	Upfront cost = $0 Recurring annual opex = $3.5 million There would be no upfront cost per se as the various ERPs are already implemented. However, as the various systems fall out of support, they will need to be replaced/upgraded anyway. For example, Microsoft Dynamics AX at DBP would need to be replaced in 2021/22 regardless, as the application will no longer be subject to technical support and no further patches will be issued. Therefore maintaining status quo is only deferring costs rather than saving them. Moreover, if the disparate ERP applications are replaced individually, with no commonality, the opportunity to achieve savings via economies of scale will be foregone. The estimated recurring opex charges for all three AGIG ERP systems is estimated to be $3.5m per year ($0.4m AGN, $2.3m Multinet and $0.8m DBP)

Consideration	Oracle Cloud	SAP S/4HANA	Microsoft Dynamics 365	Maintain status quo
Experience	Oracle is used by APA, so is familiar to a small part of the delivery arm of our businesses. However Oracle is not common across the group and most of our users have limited experience of it. A lot of training and change management would be required.	SAP products are currently used by AGN and Multinet, and SAP was used by DBP before it switched to Dynamics. Experience across our users is therefore common and less training would be required than with the other applications. Our IT services function has considerable experience of working with SAP.	Dynamics is known to DBP users, but AGN and Multinet users have limited experience. Some training and change management would be required. Our IT services function has experience of working with and rectifying issues with Dynamics	No change to current systems, experience levels are high and little or no training and change management would be required. However, a number of systems are unsupported, unstable, not secure and require manual work arounds.
Consistency with good industry practice	Yes. Oracle is used by several utilities businesses, including APA.	Yes. SAP S/4HANA is currently used by SAPN, Sydney Water, TasNetworks and WaterCorp, and has become the industry standard for ERP. Note in recent (Sep 2020) AER Draft Decisions for the electricity distribution networks, upgrades to SAP S/4 HANA have been approved for CitiPower, Powercor and United Energy, and other distributors outside Victoria have required similar SAP upgrades.	No, Dynamics 365 is as yet unestablished as an ERP platform commonly used by utilities businesses.	No. The current suite of ERP systems being used across AGIG is inconsistent and suffer from compatibility issues. Having disparate systems requires disparate IT support and reduces the ability to coordinate updates and patches.
FIRB compliance	No. Oracle Cloud has 100% cloud deployment, which does not meet AGIG's FIRB requirements. AGIG requires an 'on-prem' deployment to satisfy its FIRB compliance.	Yes	Yes	Yes but unsupported and potentially not secure.

* Important note. The cost estimates in this table are based on the delta between the costs of each of the Oracle Cloud, SAP S/4HANA and Microsoft Dynamics 365 packages when assessed in December 2019. As described in this addendum, the detailed design and scoping since this initial estimate shows that the overall cost of the final solution, which applies SAP S/4HANA is greater than the December 2019 estimate. For comparative purposes, we have assumed the same detailed design and scope changes would be applied to Oracle Cloud and Microsoft Dynamics 365 if they were pursued as the proposed solution. We therefore present the assumed total cost of each solution +/- the delta from the initial December 2019 estimate.

Appendix F – ERP vendor assessment

The working group appointed to assess the vendor proposals each scored the vendor submissions, inclusive of responses to subsequent questions and interactions with the vendors. Scores were initially evaluated for compliance based on the criteria contained in the RFP and a qualitative outcome provided. Deliverables that passed the qualitative assessment were then scored using the quantitative rating scale below:

Qualitative	Description
Exceeds	Proposal exceeds the requirement specified in the RFP in a manner which offers significant additional benefit to AGIG
Conforms	Proposal meets the requirement specified in the RFP or, where it exceeds the requirement, there is no significant additional benefit to AGIG
Partially Conforms	Proposal does not meet the requirements specified in the RFP but the deficiency: - does not affect the validity of the Proposal - is not a material deviation to the commercial or technical requirements of the RFP - is a material deviation to the commercial or technical requirements of the RFP but can be reasonably valued in monetary terms for financial adjustment to the price
Non-Conforming	The Proposal does not meet the requirements specified in the RFP and the deficiency: - affects the validity of the Proposal - is a material deviation to the commercial or technical requirements of the RFP that cannot be reasonably valued in monetary terms for financial adjustment to the price

Quantitative	Description
5	Superior: Response is highly convincing and credible. Response demonstrates superior capability, capacity, experience and/or understanding relevant to the requirements of the evaluation criteria. Comprehensively documented with all claims fully substantiated. Insignificant risk.
4	Excellent: Response complies and is convincing and credible. Response demonstrates excellent capability, capacity, experience and/or understanding relevant to the requirements of the evaluation criteria. Some minor of substantiation but the Respondent's overall claims are supported. Low risk.
3	Good: Response complies and is credible but not completely convincing. Response demonstrates adequate capability, capacity, experience and/or understanding relevant to the requirements of the evaluation criteria. Respondent's claims have some gaps. Medium risk.
2	Poor: Response is barely convincing. Response has shortcomings and deficiencies in demonstrating the respondent's capability, capacity, experience and/or understanding relevant to the requirements of the evaluation criteria. High risk.
1	Unacceptable: Response is unconvincing. Response is significantly flawed and fundamental details are lacking. Minimal information has been provided to demonstrate the respondent's capability, capacity, experience and/or understanding relevant to the requirements of the evaluation criteria. Very high risk.
0	No Response: Respondent was not evaluated as it did not provide any requested information relevant to the evaluation criteria. Very high risk.

Scores were then evaluated and outliers harmonised by the lead scorers per evaluation stream.

DBP21 IT Sustaining applications – Addendum 2 – Applications renewal and upgrades

Project Summary	
Project name	Applications renewal and upgrades
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	The original business case IT Sustaining Applications – Capex DBP21 (prepared in Q3/Q4 2019) included $3.3 million in the 2021-25 access arrangement period (AA5) to complete major and minor upgrade works to a number of software applications. The business case also discussed the $6.5 million incurred during the AA4 period, which again was to complete major and minor upgrades to a range of applications. These AA4 upgrades were essential to ensure the integrity, security and reliability of our IT environment, manage technology risks and ensure applications remain fit-for-purpose. The proposed upgrades for AA5 have the same driver. However the work undertaken during AA4 means the sustaining applications program for AA5 is less onerous as many of our applications have been brought up to a contemporary standard – with the notable exception of our Finance Management System. Of the $3.3 million originally forecast for AA5, $2.0 million was for the Finance Management System project (I-03), with the remaining $1.3 million for other applications. Of the $6.5 million incurred during AA4, $3.5 million was for the Finance Management System, with the remaining $3.0 million for other applications. As discussed in Addendum 1 to Business Case – Capex DBP21, the Finance Management System project has since been revised and will be implemented as part of AGIG's broader One IT Strategy. The revised costs for the new Finance Management System (SAP S/4HANA) are explained in Addendum 1. **This Addendum 2 discusses the other sustaining applications only.** The $1.3 million required for sustaining applications in AA5 has not been revised, and remains the efficient amount required to upgrade apps during the AA5 period. We note the AA5 forecast was subject to a minor adjustment for real labour cost escalation in the ERA's Draft Decision, but was approved in principle. This Addendum 2 focuses on the $3.0 million renewal and upgrade program undertaken in the current 2016-20 access arrangement period (AA4) for the IT applications other than the replacement of the Finance Management System. The ERA considered that insufficient information was provided in the original business case to enable it to determine that the capex incurred on these applications during AA4 conforms with NGR 79. We have therefore prepared this addendum, which includes additional information on the: • federation of AGIG environments and move to common email and intranet platforms; • adoption of current managed operating environment (MOE) including the rollout of current versions of Windows and Office, and the associated updates to applications to accommodate this; • upgrades to our asset management system (Maximo); • replacement of our journey management system; • upgrades to our computer-aided design (CAD) program; • improvements to our corporate data backup and recovery solution; • delivering a new safety management system (X-Info SMS); and • planning for enhancements to our HR platform.

	We submit that the $3 million incurred on sustaining apps (which excludes the $3.5 million Microsoft Dynamics AX enhancement and replacement costs discussed in Addendum 1) meets the requirements of NGR 79 and should be added to our opening capital base for the AA5 period.
Estimated cost	The estimated total cost of the applications renewal and upgrades program (excluding Finance Management System / Microsoft Dynamics costs) was $3.0 million over AA4. Forecast costs for AA5 remain $1.3 million. The total cost of the program in each year is shown in the table below.

$'000 June 2019	2016	2017	2018	2019	2020	Total AA4	Total AA5
IT Sustaining Apps	1,133.1	1,595.0	-8.8	79.0	216.0	3,014.4	1,316.0

Basis of cost estimates	All costs are presented in real unescalated dollars of June 2019 unless otherwise stated.
Consistency with NGR	This capital expenditure incurred during the AA4 period conforms with the following National Gas Rules (NGR): **NGR 79(1)** – the IT sustaining applications program undertaken during the AA4 period was prudent, efficient and consistent with good industry practice. The program delivered renewals and upgrades that were necessary to bring our IT applications up to current versions in line with manufacturer's recommendations and industry standards. Renewing and upgrading applications is necessary to ensure continued provision of support and maintenance of our key IT systems. By keeping versions and support up to date, software issues and security vulnerabilities can be addressed in a timely manner. Prior to AA4, the majority of our core IT applications had not been updated for many years. Over the past five years we have moved to the standard industry practice of applying version upgrades to business systems periodically. This approach is being applied at all of the AGIG businesses, and we expect to achieve further Group-wide integration and coordination over the next access arrangement period. AA4 was essentially the start of this journey. The AA4 program was delivered using internal resources, supported by our IT service partners. Our service partners (ZettaServe) were selected through a competitive tender process undertaken in late 2013, and the IT service costs incurred were based on long-term contract rates. This arrangement ensured we had access to specialists who were familiar with our IT environment, and allowed us to avoid contingency risk and third party vendors applying a risk premium. We therefore submit that the work was conducted at the lowest sustainable cost. **NGR 79(2)** – the AA4 capex is justifiable under NGR 79(2)(c)(ii), as it was necessary to maintain the integrity of services, and has supported the ongoing integrity of services today. Many of the applications upgraded during AA4 were several versions out of date. Operating heavily outdated versions of software can lead to IT systems becoming unreliable and insecure, therefore it was vital that we incurred the expenditure to address this risk during the AA4 period. By incurring these costs during AA4 and bringing software up to date, we have reduced the likelihood of application failure/obsolescence during AA5 and established an efficient baseline for maintaining the integrity of the applications going forward.

Project Approval	
Prepared by:	Amber Smith, IT Manager
Reviewed by:	Wayne Samuels, Manager IT Commercial

Approved by:	Andrew Staniford, Chief Customer Officer

Other Relevant Documents

To help clarify the change in IT sustaining applications requirements compared with the original Business Case DBP21 in our Final Plan, and to explain how we are efficiently undertaking our applications renewal and upgrade program, we have prepared two addendums to the original business case DBP21. Addendum 1 discusses the finance management system replacement (One ERP) program. This Addendum 2 deals with all other IT sustaining applications.

This addendum should be read in conjunction with:

- the original business case 'IT Sustaining Applications – Capex DBP21', which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5);
- the associated addendum to the business case, 'Capex DBP21 – Addendum 1 – One ERP'; and
- our response to information request EMCa45 provided on 24 April 2020.

1.1 Original business case

IT systems are updated on a continual basis. This includes applying software patches that upgrade applications to the latest version as per the vendors' recommendations. Renewing and upgrading applications ensures the continued provision of ongoing support and maintenance of our key IT systems and that any known issues, including security vulnerabilities, can be addressed.

In the AA4 review process, the ERA approved capital expenditure of $2.9 million for expected works to upgrade and renew ('sustain') our existing IT systems. During the period, DBP joined the Australian Gas Infrastructure Group (AGIG) and has changed its approach to IT from reactive to a more proactive approach.

Prior to AA4, the majority of our core IT applications had not been updated for many years. In AA4 we completed a number of projects to increase our IT capability to contemporary standards, and start to develop common platforms across the Group.

This change in ownership and approach means we have completed several major IT projects that were not anticipated at the start of AA4. In order to complete the projects, we have prioritised our budget not only within the IT asset category, but also between asset categories. At the end of AA4, we expect to have spent $6.5 million on our IT Sustaining Applications program.

The original business case IT Sustaining Applications – Capex DBP21 (prepared in Q3/Q4 2019) included $1.3 million for the AA5 period to complete necessary renewal and upgrade works to ensure the integrity, security and reliability of our IT environment, manage technology risks and ensure applications remain fit-for-purpose. It also included $2.0 million associated with the remediation works and replacement of our Finance Management System (Microsoft Dynamics AX).

The Finance Management System initiative has been revised and will be implemented as part of AGIG's broader One ERP' program. The size and complexity of the One ERP program as now proposed warrants a separate discussion, and is outlined in Addendum 1 to Business Case – Capex DBP21.

This addendum focusses on the renewal and upgrade program undertaken in the AA4 period for the IT applications other than the Finance Management System.

A breakdown of capex by project over the current AA period is provided in Table .

Table 1: AA4 approved forecast v actuals on IT sustaining applications

Application	AA4 approved	AA4 actual and forecast					
	Total	2016	2017	2018	2019	2020	Total
INX upgrade and rollout	7.0	-	-	-	-	-	-
MOE and Windows/Office Upgrades	209.0	820.0	65.0	72.0	79.0	-	1,037.0
Maximo upgrade	1,730.0	251.0	221.0	-8.0	-	216.0	680.0
Land asset management (safety management) system	40.0	-	76.0	-15.0	-	-	61.0
Microsoft Dynamics AX critical enhancements	873.0	278.0	208.0	0.0	-	-	485.0
Provision for upgrade of finance system / replacement of Dynamics AX	-	-	-	-	-	3,000.0	3,000.0
AGIG common email and intranet	-	-	721.0	-42.0	-	-	679.0
SPOT Journey Management	-	-	336.0	-	-	-	336.0
DBP Design Office CAD	-	7.0	98.0	-16.0	-	-	89.0
Corporate data backup and recovery improvements	-	0.0	77.0	-	-	-	78.0
Pay Global enhancements	-	54.0	-	-	-	-	54.0
Total	2,860.0	1,411.0	1,803.0	-8.0	79.0	3,216	6,500.0

Note the line items highlighted in light blue are discussed in DBP21 – Addendum 1.

As part of the review process, the ERA's technical consultants asked us to provide the AA4 business case(s), close out report(s) and other relevant documentation for the expenditure in AA4 on the IT Sustaining Applications program. In response to this request, we provided business cases for each of the nine projects that were completed under the program, and project management plans and close out reports where they were available.

We appreciate there was significant and potentially disparate information in the project governance documents, as they were produced at different times throughout the business as usual project governance lifecycle. This addendum therefore seeks to summarise the information on each project, and address comments made in the ERA's draft decision.

1.2 ERA Draft Decision

In its draft decision[69], the ERA states:

> *EMCa found that except for the work covered by DBP's capital expenditure for its 'IT sustaining applications' business case, information supplied by DBP was satisfactory to explain and support the reasonableness of the variations at the business case level and that in general most of the variations were due to scope changes.*

The ERA further notes[70]:

> *DBP proposed $3.05 million of capital expenditure for nine* ['IT sustaining applications' projects other than the replacement of the Finance Management System]*, of which two were included*

[69] ERA Draft Decision, [460].

[70] ERA Draft Decision, [534].

in the AA4 final decision forecast. The ERA agrees with technical advice received that this was indicative of poor IT asset management, which is supported by DBP's statements regarding its ad hoc approach to IT application lifecycle maintenance which is 'not consistent with industry standard practice'.

DBP has not demonstrated that the capital expenditure incurred for the work covered by these nine projects in excess of the AA4 final decision forecast for projects other than the Microsoft Dynamics annual enhancement and maintenance would be incurred by a prudent service provider acting efficiently and in line with good industry practice.

The ERA's technical advisors, EMCa considers[71]:

A further $1.0m increase in AA4 was for implementing an AGIG email system, Office 365 and other update projects (Pay Global, INX, CAD and Windows, SPOT journey) offset by a delay to its Maximo upgrade (see BC11, above).

DBP further advise that the variations from the ERA allowance were '…caused due to the ad-hoc approach towards application lifecycle management which will be corrected for under the proactive approach recommended in AA5.'

…

DBP's ERA approved capex for other IT sustaining applications in the AA4 period was $2.0m. It now forecasts spending $3.1m. Seven of the ten IT initiatives had zero ERA allowance. This is indicative of poor IT asset management, which DBP appears to acknowledge in its comments regarding its 'ad hoc approach'. DBP has not adequately explained this overspend (i.e. why spending on other initiatives could not be reduced). In the absence of this information, we cannot be confident that the $1.0m overspend satisfies the capex criteria.

Overall, we consider that $2.9m (i.e. the ERA allowance) is likely to satisfy the capex criteria for IT Sustaining Applications.

This addendum provides further information on the projects not originally in the AA4 forecast, including a discussion of each of the projects that we have included as general renewal and upgrades, and those required to facilitate our integration with AGIG.

1.3 Our response

As part of our AA4 sustaining IT forecast, we included $2.9 million on the following six projects in our IT sustaining applications program:

- $1.7 million to upgrade our asset management system (IBM Maximo) to the current version;
- $0.9 million to maintain our finance management system (Microsoft Dynamics AX) – this is discussed in Addendum 1 to DBP21;
- $116,000 on the upgrade of Windows to the current version;
- $93,000 on the upgrade of Microsoft Office to the current version;
- $40,000 to deliver a new safety management system (X-INfo SMS); and

[71] EMCa Techincal Review, pp. 112 and 113.

- $7,000 for upgrading the INX application.

The AA4 forecast was based on our IT plan as it was in 2014/15. In 2017, DBP, Australian Gas Networks (AGN) and Multinet came together to form AGIG. A review of existing IT systems across the Group found that each business (AGN, DBP and Multinet) was using a markedly different suite of IT systems and cyber security arrangements, with little or no commonality between key IT sustaining applications.

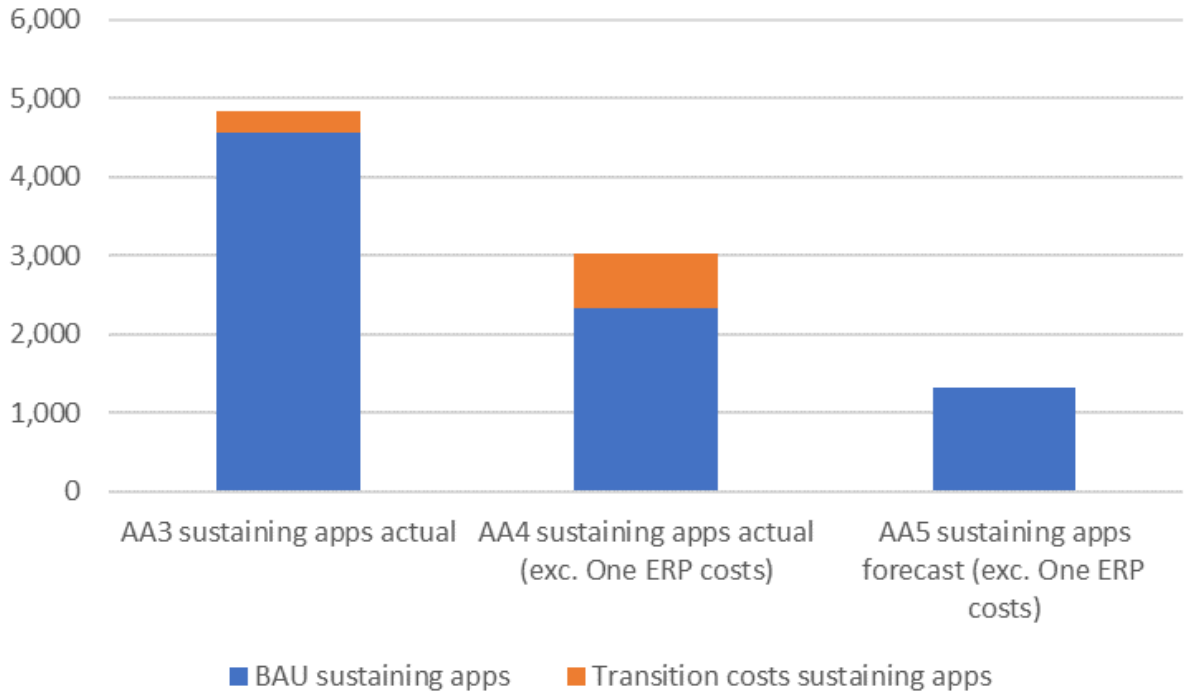
DBP therefore started the transition from a standalone IT environment, to integration into AGIG, and more recently, to establish an AGIG-wide common IT platform. This transition to AGIG was not foreseen when the AA4 submission was developed, and therefore did not form part of the AA4 forecast.

The changes to our IT operating environment have each necessitated a change our plans during AA4 and the associated program of works. This has driven the higher than forecast spend during the period.

Figure below shows expenditure incurred on sustaining apps over AA3 and AA4, broken down into costs incurred to transition applications (from ATCO to DBP during AA3 and then DBP to AGIG during AA4) and costs incurred to renew/upgrade apps as part of business as usual (BAU). Note that for the purpose of this Addendum, costs associated with the Finance Management System/One ERP are excluded.

We can see that the actual cost of the BAU applications upgrades and renewal program during the AA4 period is lower than AA3 expenditure on sustaining apps, and consistent with the amount allowed for sustaining apps in the AA4 determination ($2.9 million). Figure also shows that the amount incurred for the transition of apps from DBP to AGIG during AA4 is comparable with costs to transition some applications from ATCO to DBP during AA3.

Figure 1: Comparison of actual and forecast IT sustaining applications renewal and upgrade expenditure, $'000 unindexed



Note: Transition costs in AA3 were for transitioning a number of applications from the shared platform with ATCO into DBP. Transition costs in AA4 were for the transition from the standalone DBP IT environment into AGIG

The IT expenditure for transitioning apps to AGIG was necessary to maintain integrity of services, and was a prerequisite for ongoing development of a common AGIG-wide IT platform as envisaged by AGIG's One IT strategy.[72] The expenditure incurred during AA4 has also established an efficient baseline from which to update/renew apps, as most of our applications are now running contemporary versions. This means the BAU expenditure on renewing and upgrading our applications during AA5 will be lower than in AA5, excluding One ERP costs.

A discussion of each IT applications renewal projects undertaken in AA4 is provided in the following sections.

1.3.1 INX upgrade and roll out

Our AA4 forecast included $7,000 for upgrading the INX application. The INX application is used to support our HSE system InControl, and also for training and development. However, a review of our ongoing IT requirements, coupled with DBP joining AGIG IN 2017 and commencing the move towards a common IT environment, we opted to defer the INX upgrade. The $7,000 estimated for the INX project was repurposed and contributed towards other IT sustaining projects during the AA4 period, such as the rollout of common email and intranet.

1.3.2 MOE and Microsoft Windows/Office upgrades

This project, 'Project Sapphire', delivered a contemporary, fit-for-purpose managed operating environment (MOE), including the rollout of Microsoft Windows 10 and Office 2016 on all IT assets between August 2016 and February 2017. Note this was prior to DBP joining AGIG.

Project Sapphire was delivered for $1.0 million in total, compared to the original estimate of $0.2 million. The original estimate comprised establishing a new MOE and updates to Windows, however, there were fundamental differences in scope between the original estimate and the work that was actually delivered.

The original $0.2 million estimate was based on upgrading from Windows 7 to Windows 8.1, and from Office 2010 to Office 2013. This was to be conducted in 2016/17 as Windows 7 and Office 2010 was unsupported from January 2015 onwards, presenting unacceptable security and compatibility risks.

A subsequent upgrade from these versions to Windows 10 and Office 2016 was planned for the AA5 period (hence why it was not in the AA4 forecast). The $0.2 million estimate was based on the upgrade from Windows XP to Windows in 2012/13, which cost $0.3 million.

However, when scoping the scheduled MOE and Windows upgrades across AA4 and AA5, we identified that the subsequent move from Windows 10 and Office 2016 (originally planned for AA5), would require full re-testing and update of our operational applications that interface with Windows and/or Office.[73] These re-testing and update costs of would need to be incurred irrespective of when we made the move to Windows 10/Office 2016, or whether we had moved to Windows 8.1/Office 2013 first.

In light of this, we reconsidered this two-stage upgrade approach, noting that we would need to incur the higher-cost Windows 10/Office 2016 upgrades at some point. We decided it was more efficient to move straight from Windows 7 to Windows 10 and Office 2010 to Office 2013, in one

[72] The One IT strategy is discussed in DBP21 – Addendum 1.

[73] Examples include our asset management system, our incident and safety management applications, flow management, trading platform and disaster management applications and processes.

step. This allowed us to eliminate the costs associated with conducting two upgrades in quick succession, thus saving the ~$0.2 million we would have incurred had we conducted the Windows 7 to 8.1/Office 2012 to 2013 upgrade.

The higher cost of making the jump straight to Windows 10/Office 2016 is due to the exhaustive testing and updates required to operational applications. During Project Sapphire we had to work with more than 200 vendors to integrate new versions of software applications, to make certain our existing operational applications would work with Windows 10. These are costs we would have had to incur when made the move to Windows 10 during AA5 as originally planned.

In taking the prudent step of moving straight to Windows 10/Office 2016, we have essentially brought forward these costs from AA5 and avoided a significant portion of the costs we would have incurred during AA4 had we stayed with our original plan. Moving to Windows 10 and updating our MOE accordingly has also enabled us to move to standard industry practice in desktop building, deploying and maintaining, as well as configuration management and remote management. It allowed us to remove the legacy configuration remaining from the transition from ATCO and Westnet to DBP, and has minimised the amount of effort and cost to manage workstations across the business.

We therefore submit that the $1.0 million incurred on MOE and Windows/Office updates during the AA4 period was prudent, was consistent with achieving the lowest sustainable cost of providing services, and conforms with the requirements of NGR 79.

1.3.3 Upgrades to Maximo asset management system

In our AA4 forecast we included $1.7 million in to upgrade our asset management system, IBM Maximo, to the most recent version. This was planned for 2017 and 2018, after the upgrades to Windows and Office. The Maximo upgrade was required because:

- disaster recovery exercises had found the current disaster recovery environment was under-specified and had been unpatched for several years. This meant it was not fit for purpose;
- the Maximo servers were at the end of their technical lives and out of the warranty period;
- the existing version of the application, 6.2.3, was no longer supported by IBM; and
- the existing version of the application was incompatible with the planned Windows upgrade.

The AA4 forecast was based on our previous IT approach of fewer, but more significant upgrades. The last upgrade was undertaken in 2014, which is longer than recommended by the manufacturer to ensure business continuity and system security and reliability.

As well as addressing the above issues, as part of the Maximo project we also:

- implemented additional security features and an enhanced user-experience by way of a single-sign on;
- transitioned the invoicing (accounts payable) functions from Microsoft Dynamics AX to Maximo, due to us experiencing significant problems with Dynamics (see Addendum 1); and
- removed much of the customisation of Maximo, which was resulting in additional time and effort to implement each upgrade;
- improved the reporting capability of the asset management system.

We were able to deliver the Maximo program for $0.7 million[74], more than one million dollars less than forecast. This was achieve primarily a result of removing much of the Maximo customisations, which materially reduced the cost of each upgrade. We have also developed internal capability to perform the minor upgrade works, resulting in efficiencies during AA4 and moving forward.

We therefore submit that the capex incurred on the Maximo upgrades during AA4 conforms with the requirements of NGR 79, and should be added to our opening capital base for the AA5 period.

1.3.4 Delivering a new safety management system

In 2015 we implemented the X-INfo Suite as the Land Management System. This solution has become an integral part of our daily operations. Our original estimate to undertake this work was $40,000, which was for the software licence to extend the use of X-INfo to provide a commercial-off-the-shelf safety management system (SMS).

The new SMS allows us to gather, store, display and report on information pertaining to design, safety and operational hazards that cause or are capable of causing loss of pipeline integrity. Capturing and monitoring these hazards are a requirement of Australian Standard 2885. The SMS also helps us manage operational and maintenance tasks, including suspensions of operation, decommissioning and abandonment of transmission pipeline assets. The system provides project workflows, quality control and reporting.

The original $40,000 estimate was for the annual software licence costs, and we submit that this was arrived at using the best information available at the time of preparing the AA4 forecast. However, when conducting the detailed design and implementation of the system, we found additional costs were required for integration and data transfer with our geographic information system, as well as some application, maintenance, training and support costs. The final project cost was $61,000.

We submit that these costs were necessary to maintain the safety of services, the costs were efficient, and that the $61,000 incurred to upgrade the application conforms with the requirements of NGR 79 and should be added to the opening capital base for the AA5 period.

1.3.5 Integration of DBP into AGIG – common email and intranet

In 2017, we started the integration of DBP into AGIG. This required two business-critical projects to be undertaken as the first step towards brining DBP into the Group, ahead of a broader One IT Strategy that was to be developed. The two business-critical projects were:

- the federation of AGIG IT environments; and
- establishing common email and intranet platforms.

The federation project was undertaken in June 2017 and saw the implementation of federation trust, which was a quick, interim solution to enable staff from each of the AGIG businesses to access information about others, including providing visibility of each business' staff directories, email, calendars, and the ability to use Skype between businesses. This project was required urgently to allow for effective communication and collaboration across AGIG, which is necessary for any business to operate efficiently.

[74] Note this is a forecast as one remaining upgrade will be delivered at the end of 2020.

In August 2017, we established a more robust solution to amalgamate the various businesses across the group, and rolled-out a common email and intranet platform. As part of this project DBP staff were given an AGIG email, a single AGIG-wide common address book and calendar functionality was established.

As the transition to AGIG was not foreshadowed at the time the forecasts for AA4 were developed, no costs for this project were included in the AA4 forecast. We therefore re-prioritised some of the forecast spend on the IBM Maximo upgrade and the INX upgrade and rollout to enable completion of this critical integration work. The work was completed in 2017 at a cost of $0.7 million.

The capex incurred on implementing a common email and intranet during the AA4 period was prudent and necessary to maintain the integrity of services as we transitioned into AGIG. The costs are efficient and we were able to manage them by repurposing expenditure earmarked for other projects (IBM Maximo and INX). We therefore submit that the $0.7 million incurred for this project conforms with the requirements of NGR 79 and should be added to our opening capital base for the AA5 period.

1.3.6 New journey management system

DBP has a fleet of around 90 vehicles required for operation and maintenance of the pipeline. Each of our vehicles is fitted with GPS to enable monitoring of the fleet and the safety of personnel, as well efficient scheduling of resources. We also have around 40 portable devices, which can be installed in other vehicles, including for example for contractors.

In 2013, we leased these early technology systems and – following market research and procurement processes – contracted a monitoring service from SecuraTrak, an established and reliable industry supplier.

As part of ongoing reviews and system performance we identified that the SecuraTrak system presented some unforeseen safety and functionality concerns for our particular fleet and operations, including:

- cables were required to be set up between seats, with one key cable routed underneath the driver's feet, having the potential to interfere with driving;
- early systems were sometimes difficult to restrain, creating a potential projectile during emergency braking; and
- connecting to the system was not as easy as foreseen and was awkwardly located.

These safety risks to our staff posed a significant concern. We therefore considered alternatives, and in 2015, undertook a feasibility study and a three-month trial to assess alternative viable options.

By the beginning of 2016 we had completed a proof of concept system (the SPOT Journey Management System) that met the occupational health and safety and journey management requirements. Technology improvements meant the unit was compact and light to carry, easy to set up and use, had a long battery life, used proven technology and was supported by a proven service provider.

The new solution was rolled out to a test group by mid-2016, and then implemented later that year. The project costs included:

- purchasing SPOT satellite devices with connection to GlobalStar GPS system;
- uninstalling the existing units and replacing them with the new SPOT devices;

- incorporating an appropriate IT infrastructure to stage the SPOT application;
- establishing a service level agreement to secure the service as an operating system; and
- commissioning and handover.

The SPOT Journey Management solution is expected to achieve opex savings over five years when compared to the current SecuraTrak solution, including both direct and indirect benefits. To date, we have achieved a quantifiable direct opex reduction of around $114,000 per annum from 2018, which is built into our opex forecasts for AA5. These efficiencies relate to the removal of the need to provide satellite messaging and associated IT infrastructure for hosting DBP travel service management.

The cost of the SPOT Journey Management system is $0.3 million, and was completed in 2017. Thought these costs were unforeseen at the beginning of the AA4 period, they were necessary to improve the safety of our employees as well as allowing us to manage our fleet more efficiently.

We therefore submit the $0.3 million incurred during the AA4 period conforms with the requirements of NGR 79, and should be added to the opening capital base for the AA5 period.

1.3.7 Upgrades to CAD application

DBP uses two computer aided design (CAD) applications for design and drafting:

- Intelligent OpenPlant Piping and Isometric CAD software; and
- Building Information Modelling AECOSIM 3D Modelling CAD software.

These were previously run on the Bentley SELECTseries version 8i, the industry standard and most contemporary version at the time of adoption. In 2017, we were advised that version 8i would move to 'expiring support' status, and to 'discontinued support' status by December 2020. The vendor was unable to ensure the security and privacy of information for organisations using software in discontinued support status.

Our design and drafting processes are integral to the safe and reliable development, emergency response, expansion, operation, refurbishment and decommissioning of our assets. An extended application failure or significant data breach is therefore considered a significant risk.

We considered various options to replace our existing design and drafting applications. We looked at other vendors, however we determined that the benefits of remaining with Bentley (who provide cost competitive, industry benchmarked systems that our users are familiar with) outweighed the benefits (and risks) of switching to another application.

Bentley provided two credible options. One was to upgrade each licence from the SELECTseries to the CONNECT Edition with an associated subscription entitlement service. The other involved a machine-based license environment and required the registration of one license per machine.

After system user and procurement consultation, we considered upgrading to the CONNECT Edition was the optimal choice from a business continuity, costs, and risk basis. The upgrade delivered improvements in the following areas, enabling consistency with good industry practice:

- project management – up to date and accurate information has resulted in better project analysis, reporting, projections, planning and estimation;

- design – all functions of design and drafting operate efficiently due to accurate up to date information that can be retrieved or entered easily. Engineering analysis can be executed using a single database in conjunction with the model;
- process – all lists, reports and data sheets are produced from a single database driven by project piping and instrumentation diagrams. Data is entered once and can be retrieved in multiple forms;
- procurement – all project information and quantities are easily accessed via the model and database. Modifications and additions are efficiently tracked and automatically reported. Omissions and delays to equipment delivered to site are vastly reduced, and in some cases eliminated;
- document control – document control software is directly linked to the model database and to drawings. Document and drawing information is directly linked to values within individual files, eliminating manual entry and updating; and
- construction – an accurate 3D model and database ensures that most construction issues have been identified and eliminated at design level rather than on site, and this greatly reduces or eliminates construction down time. The model is an electronic replica of the project and therefore most, if not all items will fit correctly into the final location when offered into position.

The cost of upgrading to the Bentley CONNECT Edition was $89,000. This was not included in the AA4 forecast as we were unaware that the existing Bentley application was to be unsupported/discontinued within the AA4 period. However, these costs were necessary to maintain the integrity of services and represent the lowest sustainable cost of undertaking our drafting and design services.

As described above, Bentley CONNECT has delivered considerable improvements to our design capabilities. The upgrade was made in 2017 and we do not expect to incur similar upgrade costs during the AA5 period.

We submit that the $89,000 incurred during AA4 conforms with the requirements of NGR 79, and should be added to our opening capital base for the AA5 period.

1.3.8 Corporate data backup and recovery improvements

DBP utilises Microsoft System Centre Data Protection Manager (DPM) 2012 to provide backup and archiving services to the servers at the primary and secondary data centres.

During the AA4 period, the DPM backup solution reached capacity. This was due to growth in the DBP IT environment, a large amount of backup jobs, and storage constraints on the current backup server in DC3 as the result of the existing architecture.[75] A failure in backup capacity would mean we would not be able to restore data in the event of a breach or data loss.

We did not anticipate that the DPM would reach capacity during the AA4 period, therefore no costs were included in the AA4 forecast to deliver this work.

Addressing the DPM cost $78,000 and was incurred during 2016 and 2017. As part of this program of work, we improved the corporate data backup and recovery solution by:

[75] The existing architecture resulted in capacity constraints on the current backup server in DC3. This is because all backups from the servers at the primary data centre (DC3) and secondary data centre (DC2) are to the backup unit at DC3 with replication of DPM from DC3 to DC2.

- Upgrading software to System Centre Data Protection Manager 2016;
- Installing new hardware at the secondary data centre;
- configuring cross-site backups; and
- removing existing DPM replication.

This expenditure was necessary to maintain the integrity of services, as data integrity and security is essential to the ongoing operation of our business. Expanding the capacity of our DPM backup solution is consistent with the actions of a prudent operator.

We therefore submit that the $78,000 million incurred during the AA4 period conforms with the requirements of NGR 79, and should be added to the opening capital base for the AA5 period.

1.3.9 Planning for enhancements to our HR platform

In 2014/15, DBP adopted the Pay Global platform to provide payroll and associated self service functions. Following the success of the Pay Global platform, we decided to also adopt the Pay Global Human Resources (HR) module to provide a one-stop shop for all HR data.

This project systemised the existing manual processes by implementing additional functionality in the Pay Global platform allowing self-service and reporting in relation to:

- on-boarding, off-boarding, termination, workers compensation, probation and disputes management and reporting; and
- performance management and succession planning, remuneration, achievements and membership management.

The project was well underway when DBP transitioned to being an AGIG business. As part of the transition to AGIG we took stock of our priorities and expenditures, and some projects, including the Pay Global enhancement project, were put on hold.

The $54,000 of capex we incurred in 2015/16 includes the purchase of the Pay Global HR module and configuration costs. The remaining project costs related to HR and finance resources required to process and input data and conduct training. These costs were classified as opex, and were incurred in 2016 when the project was restarted.

The capex incurred on Pay Global HR was a prudent investment, which has improved the integrity and efficiency of our HR services. We therefore submit the $54,000 capex incurred conforms with the requirements of NGR 79, and should be added to the opening capital base for the AA5 period.

1.4 Summary

1.4.1 Consistency with the National Gas Rules

The applications upgraded over AA4 were necessary to maintain the integrity of our IT and operational systems. The drivers for these project upgrades were clear and immediate and the solutions deployed were commensurate with good industry practice.

Though the overall cost of this program of work was higher than the original forecast, costs incurred were efficient and, where appropriate, subject to competitive tender processes.

We therefore submit that the capex incurred during the AA4 period on the IT sustaining applications is consistent with what a prudent operator would incur, and satisfies the requirements of NGR 79.

Specifically:

NGR 79(1)

The capex conforms with Rule 79(1)(a) in that it is:

- **Prudent** – Consistent upgrading of software applications is necessary to bring our IT applications up to current versions and in line with manufacturer's recommendations and industry-standards, as well as to mitigate the high risks associated with operating outdated software. This includes the potential for non-compliance with relevant regulations and legislation, customer and business interruptions and corresponding adverse financial and reputation impacts.

- **Efficient** – The AA4 program was delivered using internal resources, supported by our IT service partners. Our service partners (ZettaServe) were selected through a competitive tender process undertaken in late 2013, and the IT service costs incurred were based on long-term contract rates. This arrangement ensured we had access to specialists who were familiar with our IT environment, and allowed us to avoid contingency risk and third party vendors applying a risk premium. We therefore submit that the work was conducted at the lowest sustainable cost.

- **Consistent with accepted and good industry practice** – Prior to AA4, the majority of our core IT applications had not been updated for many years. Over the past five years we have moved to the standard industry practice of applying version upgrades to business systems periodically. This approach is being applied at all of the AGIG businesses, and we expect to achieve further Group-wide integration and coordination over the next access arrangement period. AA4 was essentially the start of this journey.

  The applications installed are supported by reputable software providers. This will result in all critical systems being up to date, secure and supported by vendors, consistent with good industry practice.

- To achieve the **lowest sustainable cost of delivering pipeline services** – the ongoing upgrade of core IT systems is the lowest sustainable cost for long-term risk mitigation. Implementing solutions that generate future efficiencies such as removing Maximo customisations and journey management system efficiencies will also reduce the long-term costs of these services for consumers. As part of the original business case, several practicable solutions were considered, including moving back to a reactive approach. DBP will also benefit from shared costs in the future, as well as centralised IT support. The forecast capex is therefore consistent with providing ERP services at the lowest sustainable cost.

NGR 79(2)

The proposed capex is justifiable under 79(2)(c)(ii), as it is necessary to maintain the safety and integrity of services. Many of the applications upgraded during AA4 were several versions out of date. Operating heavily outdated versions of software can lead to IT systems becoming unreliable and insecure, therefore it was vital that we incurred the expenditure to address this risk during the AA4 period. Failure or non-availability of critical IT systems, for example due to a security breach, may affect safety or integrity of services, or result in non-compliance with regulatory obligations.

By incurring these costs during AA4 and bringing software up to date, we have reduced the likelihood of application failure/obsolescence during AA5 and established an efficient baseline for maintaining the integrity of the apps going forward.

DBP22 IT Enabling

Project Summary	
Project name	IT Enabling
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	Our original business case 'IT Enabling – DBP22' described three streams of work to improve the existing DBP technological landscape, specifically business reporting; information management; and decision-making systems. This was to be delivered as a standalone program for DBP, at an estimate of $5.1 million (real unescalated dollars of June 2019). The aim of the original DBP IT Enabling program was to enable compliance with regulatory obligations, as well as to drive efficiencies through improved information management and quality, workforce productivity and asset performance. Since December 2019, when the original IT Enabling business case was submitted, the scope of the program has been significantly progressed, with this work now being incorporated into Australian Gas Infrastructure Group's (AGIG) IT Strategy and Roadmap. This has resulted in a revised costing for the business case of $5.6 million. The revised IT Enabling program will achieve the same objectives as the original DBP standalone project, plus additional functionalities and benefits for DBP. In particular, DBP will benefit from economies of scale of this work being delivered as part of a larger program, as well as the ability to share ongoing support costs with the other AGIG businesses. While our original business case forecasts were based on high level estimates and assumptions provided by BlueZoo (described in the response to information request EMCa16), updated forecasts provided in this document reflect revised cost (and benefit) estimates provided by independent experts KPMG. The KPMG estimates have been developed during Q3 2020 on the basis of technical expertise, practical experience of implementing similar projects at other infrastructure businesses, and an assessment of the likely benefits the various IT Enabling initiatives will provide to DBP. The cost to DBP consists of a DBP-specific component and an apportionment of shared costs between DBP and other AGIG businesses. This consolidated approach will reduce implementation costs as well as ongoing operating costs, and therefore represents the most prudent and cost-efficient approach of delivering this critical IT enabling work. The benefits of the program have also been re-assessed and then stress tested to ensure viability. While this work provides significant business benefits in its own right, the majority of tangible benefits result from its interconnectedness with the One ERP program. The re-scoped work described in this Addendum is necessary to ensure that the SAP S/4HANA ERP software being implemented across AGIG can be leveraged to its fullest, providing cost reductions and process efficiencies on an ongoing basis. The revised NPV of the project is $6.1 million, and shows an internal return rate of 14%. Our supporting sensitivity analysis shows that the NPV will be positive even under higher cost and lower benefit scenarios. The work is expected to start in 2021, in line with the One IT Strategy timeline. The timeframe for completion is driven by interdependencies between this work and other parts of the AGIG IT Strategy (in particular the SAP S/4HANA implementation).

Estimated cost

The estimated total cost of implementing IT Enabling at DBP is $5.6 million. The cost in each year is shown in the table below.

$'000 June 2020	2021	2022	2023	2024	2025	Total AA5
Capex	3,848.8	1,768.2	-	-	-	5,617.0

There will also be ongoing opex costs associated with licensing and support for the IT Enabling initiatives of $0.4 million per annum as shown in the table below.

$'000 June 2020	2021	2022	2023	2024	2025	Total AA5
Opex	9.5	310.3	414.1	414.1	414.1	1,562.1

Basis of cost estimates

All costs are presented in real unescalated dollars of June 2020 unless otherwise stated.

Consistency with NGR

This capital expenditure conforms with the following National Gas Rules (NGR):

NGR 79(1) - the proposed IT Enabling capex is consistent with accepted good industry practice, several alternative options have been considered and unit rates and timing of refreshes have been tested to ensure prudent investment to achieve the lowest sustainable cost of delivering pipeline services.

NGR 79(2) - the proposed IT Enabling capex will implement systems and processes that enable decision making based on more accurate and timely information which will translate into cost efficiencies and therefore lower future prices than they otherwise would have been. It is also expected to deliver $1.9 million per annum of tangible benefits, with further intangible benefits in terms of improved safety, customer service, information management, data quality, asset integrity and reliability. Therefore, this capex is consistent with NGR 79(2)(a).

NGR 74 - the forecast costs are based on the latest market rate testing, and project options consider the requirements of our business (including focus areas where the most value can be derived). Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Project Approval	
Prepared by:	Praveen Desari, Solution Architect
Reviewed by:	Kay Nolte, Head of IT Architecture & Strategy Wayne Samuels, Manager IT Commercial
Approved by:	Andrew Staniford, Chief Customer Officer

Other Relevant Documents

This addendum should be read in conjunction with:

- the original Capex DBP22 Business Case, which was provided to the ERA as Attachment 8.5 to the Access Arrangement (AA5);
- responses of information requests EMCa08 and EMCa16;
- Supporting information to Attachment 8.5A_DBP22 Updated NPV Analysis; and
- AGIG One IT Strategy and Roadmap.

1.1 Original business case

Our original business case 'IT Enabling - DBP22' proposed $5.1 million (real unescalated dollars of June 2019) of forecast capex during the AA5 period to develop a fit-for-purpose IT architecture for

DBP, which will enhance productivity and IT asset performance. The revised IT architecture would provide an efficient and effective platform for our reporting, data management and collaboration activities.

The original IT Enabling program comprised three work streams:

- **Business intelligence** – define a master data model, consolidate data from a variety of sources, introduce a data governance framework, identify and implement an enterprise business intelligence platform with models, toolsets and dashboards for reporting and migration of current reporting to the new platform where viable;
- **Data management and analytics** – extend the business intelligence platform and people skills to incorporate data analytics and machine learning to enable predictive analytics; and
- **Digital transformation** – implement fit-for-purpose document management solutions and establish process automation capabilities to automate repetitive manual processes between DBP's operational technology systems.

The forecasts for each of the workstreams are shown in Table 1.

Table 1: AA5 IT Enabling capex forecast as per original business case DBP22, $'000 June 2019

Work stream	2021	2022	2023	2024	2025	Total
Business Intelligence	775.0	641.0	398.0	-	-	1,814.0
Data Management and Analytics	-	-	765.0	449.0	458.0	1,672.0
Digital Transformation	684.0	618.0	158.0	98.0	98.0	1,656.0
Total	**1,459.0**	**1,259.0**	**1,321.0**	**547.0**	**556.0**	**5,142.0**

In the original business case, we considered the following three options:

- Option 1 – Do nothing differently – continue with current approach to reporting, document management and collaboration;
- Option 2 – Deliver customised IT Enabling initiatives; and
- Option 3 – Deliver out-of-the-box IT Enabling initiatives.

We recommended Option 2 because it achieves our objectives and addresses known document management and collaboration inefficiencies. It introduces systems that bring more accuracy, reliability and timeliness to the reporting we use to make business decisions and provide information to regulators and other key stakeholders.

The information available at the time also showed that this solution provided the maximum benefit relative to the costs incurred and therefore the highest 10-year NPV of the potential options. This was because it provided additional opportunities for cost avoidance and efficiencies that would not be available under an out-of-the-box solution. At this time, we submitted the program would provide quantifiable net benefits of $0.5 million as well as intangible benefits such as improved safety, customer services, information management, data quality, asset integrity and reliability.

As the program development was still underway at the time of the initial AA5 submission, we based our view of the scope of works, estimates of cost and potential benefits on similar initiatives undertaken within AGIG, as well as advice from third party IT experts and market specialists. We stated our expectation that these would be refined as the project was developed further.[76]

[76] 'IT Enabling - DBP22' business case, p.349

Consistent with NGR 74, the cost of our original proposal was arrived at on a reasonable basis and was the best estimate possible in the circumstances.

In response to an information request (EMCa16) from the ERA's technical experts EMCa, we provided:

- information to support the third party consultant forecast of $5.1 million[77] (EMCa16a);
- the source documentation on which the benefit forecasts were based (EMCa16b); and
- an explanation of why additional opex costs were not included in the calculation of the net present value (NPV) for the program (EMCa16c).

In response to a further information request (EMCa20), we provided:

- a more detailed explanation of the benefits and cost of introducing 'group services' in AA5 (EMCa20b);
- confirmation that no further capex would be expected to be incurred in relation to the IT Enabling program (EMCa20c); and
- confirmation that there was no doubling-counting of costs between the various IT programs of work, including IT Enabling (DBP22), Sustaining Applications (DBP21) and IT Security (DBP23) (EMCa20c).

1.2 ERA Draft Decision

In its Draft Decision, the ERA has not included any forecast expenditure for the IT Enabling business case as it was not satisfied that the program of work would be undertaken by a prudent operator, or would convey any benefit to gas consumers.[78]

The ERA cited the reason for this conclusion as:

> *Based on information provided by DBP about the net present value analysis of its proposed initiatives and technical advice received, the ERA considers that DBP did not adequately demonstrate that the benefits of the proposed initiatives are likely to be sufficient to justify DBP's proposed capital expenditure for the 'IT enabling' business case for AA5. This view takes into account technical advice regarding the proposed initiatives which included the following:*
>
> - *The benefits and costs of the proposed initiatives are preliminary given it is still in the early stages of planning.*
> - *DBP's approach and the resulting benefits are based on Australian Gas Network's distribution experience and 'rule of thumb' assumptions of the benefits (costs avoided) of pursuing the planned initiatives, which in EMCa's view, do not translate to management of a linear transmission pipeline.*

[77] Real unescalated dollars of June 2019
[78] ERA Draft Decision, [737]

- *60 per cent of DBP's proposed $0.5 million net present value is derived from the business intelligence initiatives based on the rule of thumb benefit, but given the number of customers DBP has, it is questionable how much benefit the business intelligence initiative will convey.*
- *The net benefit is marginal and the project would likely not be viable under a range of cost-benefit scenarios.*[79]

In providing its advice to the ERA, EMCa noted that:

> *Whilst there are likely to be benefits from the proposed initiatives, in our view DBP has not adequately demonstrated that the benefits of the five initiatives are likely to be sufficiently high or robust to justify proceeding on the basis proposed.*[80]

In addition, EMCa recommended that the ERA allow $1.5 million for DBP to undertake the initiatives with the highest benefits to achieve the best return for investment and provide a platform for developing further cost-saving initiatives in AA6 (which may be self-funding).[81] EMCa further recommended that:

> *if the initiatives are to proceed, each should be supported by a robustly-derived NPV that achieves the equivalent of a hurdle rate (IRR) of 20% or more.*[82]

However, in its Draft Decision the ERA has opted to exclude the entire IT Enabling program from the AA5 capex forecast.

1.3 Our response

In developing our response to the ERA's Draft Decision, we have considered recommendations made by the ERA and EMCa, along with our revised IT strategy.

The AGIG 'One IT Strategy and Roadmap' was delivered in November 2019. It will result in the implementation of a program of work to significantly uplift AGIG's IT capability across all of its businesses (DBP, AGN and Multinet Gas). This Addendum describes the updated approach we are taking to deliver IT Enabling initiatives, incorporating them as part of the broader AGIG-wide One IT program of work. As such, this Addendum also provides revised costings and benefits analysis.

The scope of the proposed AGIG work program has since materially advanced. We have conducted detailed design and established a broader understanding at what IT Enabling initiatives are required at DBP and the other AGIG businesses, as well as identifying opportunities to share costs and optimise delivery.

As a result, we are changing our approach, moving away from the original plan to deliver IT Enabling initiatives for DBP as a standalone project with disparate applications. We are instead building the expected outcomes from the original standalone DBP project into an IT uplift program for the entire Group, with common applications being delivered across DBP, AGN and Multinet Gas.

[79] ERA Draft Decision, [736].

[80] EMCa Technical Review, p. 133.

[81] EMCa Technical Review, p. 133.

[82] EMCa Technical Review, p. 133.

Consistent with the original business case[83], the revised AGIG-wide IT enabling program will deliver the following outcomes for DBP:

- an organisational data model that enables DBP's data to be copied into a centralised repository in a structured way;
- a fit-for-purpose data governance and management processes to ensure current and future systems can participate in the centralised repository and business intelligence systems;
- a centralised repository and the mechanisms to both initially and then on an ongoing basis bring the identified information into the repository such that it can be leveraged by business intelligence tools;
- enterprise data, reporting and dashboard tools that support integration of operational data from (or about) assets with commercial data to improve decision-making intelligence, dashboards and reporting systems;
- transformed reporting and dashboards;
- predictive data analytics capabilities including artificial intelligent systems to identify advanced insights;
- fit-for-purpose document management systems that utilise the specific products for specific business needs (e.g. contracts in a system that supports review and signature workflows, engineering documents and procedures in a system designed specifically for large asset drawings and the supporting business processes); and
- Office365 configured for optimal collaboration and accessibility to documents and document workflows.

The broader AGIG-wide program will also deliver the following additional outcomes for DBP:

- greater integration with SAP S/4HANA, maximising the features and benefits of the new ERP system;
- shared licensing costs with other AGIG businesses;
- centralised reporting intelligence capabilities;
- improved metadata management; and
- shared IT support and upgrade/patch costs.

The advantage of this change in approach is that DBP will receive a material uplift in IT greater than originally proposed, however new applications can be implemented in a more efficient manner. The cost to DBP of this broader program is $5.6 million (real unescalated dollars June 2020), compared with the $5.1 million (real unescalated dollars June 2019) originally proposed.

DBP will benefit by being able to share implementation costs and ongoing expenditure with the other AGIG businesses. Delivering DBP's IT Enabling outcomes as part of a cohesive, integrated Group-wide IT strategy is expected to result in substantial economies of scale benefits as well as ongoing cost efficiencies. Essentially, DBP is benefitting from a significantly better solution for only a relatively small increase in investment.

[83] As described in the proposed 'Deliver customised IT Enabling initiatives' option (option 2) from our original business case.

The further scoping and development work on this business case has resulted in an ability to more accurately and robustly quantify the business benefits anticipated from the IT Enabling program. We have also been able to complement the use of 'rule of thumb' estimates (criticised by the ERA), with more detailed estimates of potential benefits based on an assessment of how the new applications can better support management of a transmission pipeline business. Independent technical experts KPMG have conducted a detailed analysis of whole-of-Group requirements, including an assessment of how each individual business would benefit from the integrated IT environment. This includes an assessment of how DBP stands to benefit in practice.

The revised costs and benefits result in a positive financial outcome with an NPV of $6.1 million. This positive result is considerably greater than the original NPV, stands up better to sensitivity analysis, and is closer to the optimal hurdle rate of 20% suggested by EMCa.

Further discussion of the revised IT Enabling, including the costs and benefits of the program, is provided in the following sections.

1.3.1 One IT

AGIG (comprising AGN, DBP and Multinet Gas) operates across multiple Australian jurisdictions, bringing together a wealth of expertise and experience that allows its various businesses to share knowledge, information, resources and costs. AGIG's scale and breadth of resources presents opportunity to deliver benefits for DBP's customers in Western Australia. Not least, it allows us to review and rationalise our IT systems and infrastructure across the group, moving to shared platforms where practicable.

In 2019, we developed the AGIG One IT Strategy and Roadmap (see Appendix A). The strategy is designed to deliver stable and aligned IT management processes, architectures, procurement, cyber security and core technology platforms across the Group.

Our aim is to achieve economies of scale, while keeping pace with technological advances. In the short term, this has required national coordination of applications renewals, replacement and upgrades. This initial coordination means there has been an increase in IT investment across all our businesses compared to historical levels. This is necessary to bring some of our legacy systems up to a reasonable standard, or to invest in the new systems that will replace the multitude of state-based technologies and cyber security arrangements. However, over the longer term we expect coordinating our IT investment into a national program will reduce the overall ongoing cost for our customers, and better support the provision of pipeline services at the lowest sustainable cost.

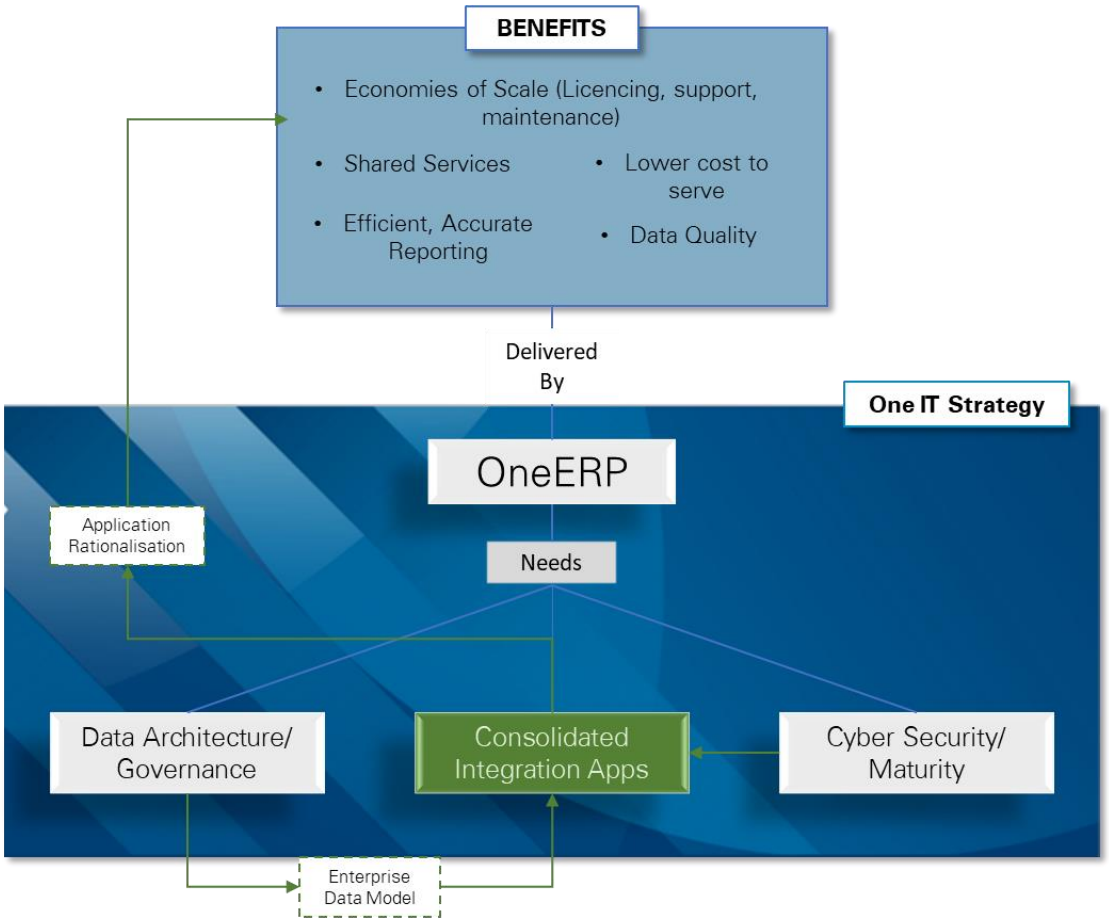
The AGIG One IT Strategy and Roadmap incorporates several streams of work designed to:

- consolidate data centres, modernise infrastructure and networks;
- optimise and unify end user environments;
- uplift and strengthen cybersecurity;
- establish AGIG data architecture and governance;
- rationalise and uplift application integration platforms;
- implement an enterprise reporting solution; and
- implement a standard enterprise resource planning solution across the Group.

The overall success of the strategy is dependent on the cohesion of these work streams. This is shown in Figure , whereby benefits are leveraged from the successful integration of the various components, including:

- OneERP (see Addendum 1 to business case DBP21);
- Data Architecture / Governance and Consolidated Integration Apps (this revised IT Enabling program); and
- Cyber Security (see Addendum to business case DBP23).

Figure 1: Benefits deliverable by One IT work streams



The interconnectedness of these initiatives relates to four key themes. These are identified in the diagram below, with each of the initiatives dependent on capabilities delivered by the other business cases in order to achieve the full benefits of the broader strategy.

Figure 2: One IT themes

OneERP	Integration Platforms	Cyber	Data Architecture
A single source of truth			
An enterprise wide ERP solution captures core business information necessary for decision making and smooth running of the business	Enables simpler, cheaper integration by simplifying the technology landscape and streamlines the consolidations of applications	Allows identity management of personnel and control of access rights to data and information. This also enables Availability Confidentiality and Integrity	Enterprise Data Model (EDM) supports a common data language and ensures data is captured and consumed consistently
Standardised Business Processes			**N/A**
Enables the consolidation of resources and the transferability of skills across the Group	Enables simpler, cheaper integration by transforming inefficient adhoc processes for efficient ones and allows simpler, more cost effective integration	Enables consistent Business Continuity Planning and Disaster Recovery for Cyber events across the three entities	
Information Security			
Enables compliance with industry standard security protocols included within the platform	Simplifies the technology landscape which reduces vulnerabilities and improves effectiveness of mitigation actions	Enables AGIG to achieve MIL2 & 3 Compliance	Enables the definition of consistent security classifications and access rules
Information and Data Management			
Drives appropriate cataloguing and classification of data, data quality (for migration & maintaining post-go-live)	Supports data integration and interoperability. Enables Simpler, cheaper integration and reduces double handling	Enables improved security, privacy, compliance. Supports the treatment of data as an 'asset'	Enables common data standards to be maintained across all entities. Enables consistent Metadata Management and data quality across all entities.

Further benefits of the SAP S/4HANA ERP software become available when coupled with application integration and data management capabilities. Essentially, the revised IT Enabling program has evolved from a standalone IT uplift program for one business entity with discrete applications, to a more integrated solution that maximises the benefit to be extracted from a larger suite of standardised applications (most notably SAP), while sharing the costs between several business entities.

1.3.2 IT Enabling

The IT Enabling program can be categorised into two broad workstreams:

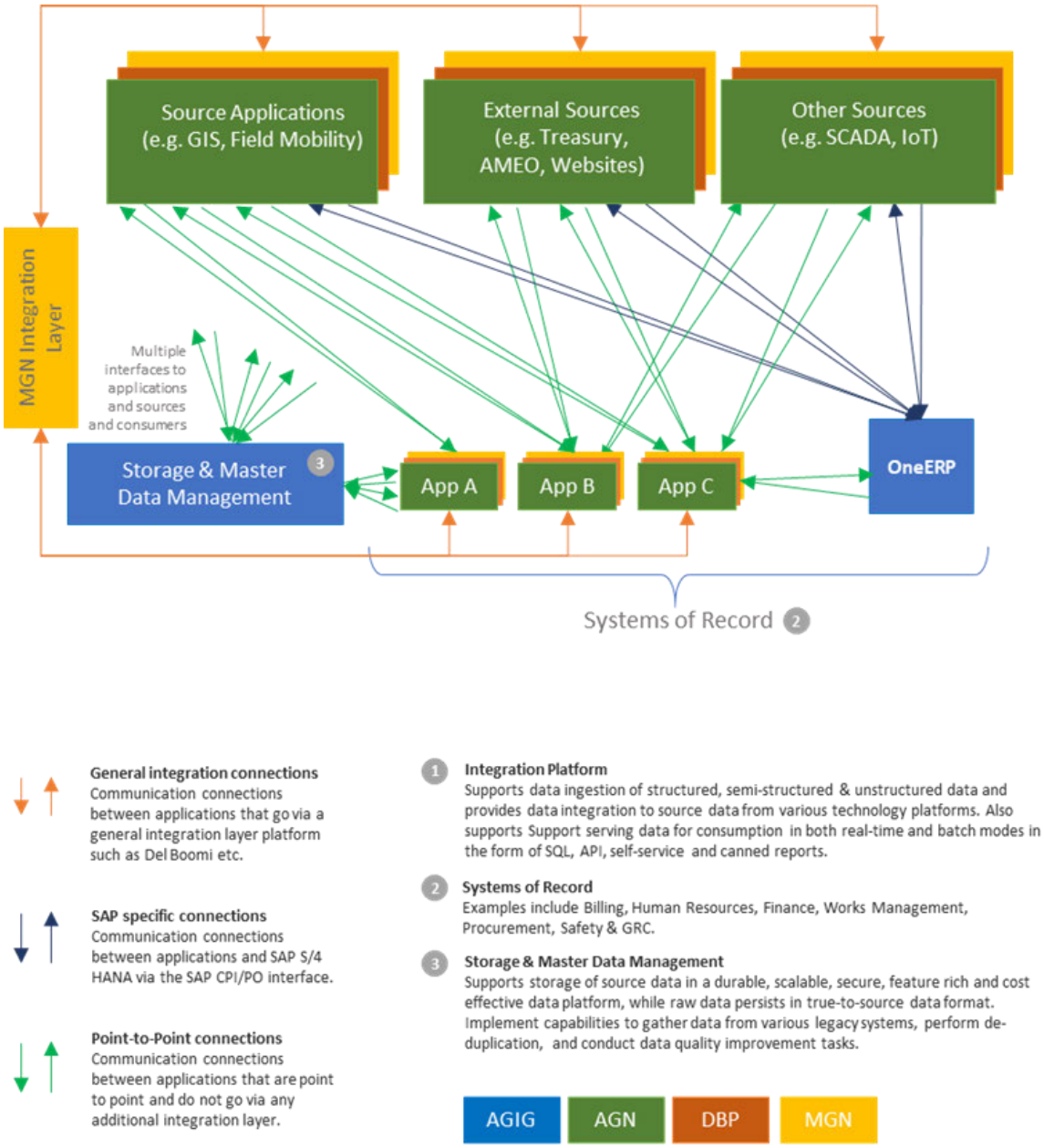
- developing an application integration platform; and
- establishing data architecture, reporting and governance capabilities.

Application integration platform

Application integration supports and facilitates connectivity and communication between the various applications and systems within the IT environment. There is currently a significant amount of complexity in AGIG's IT application environment due to use of multiple integration platforms and point-to-point interactions. This introduces unnecessary technical and business risks, and means that any continuous improvement or innovation initiatives are difficult to implement.

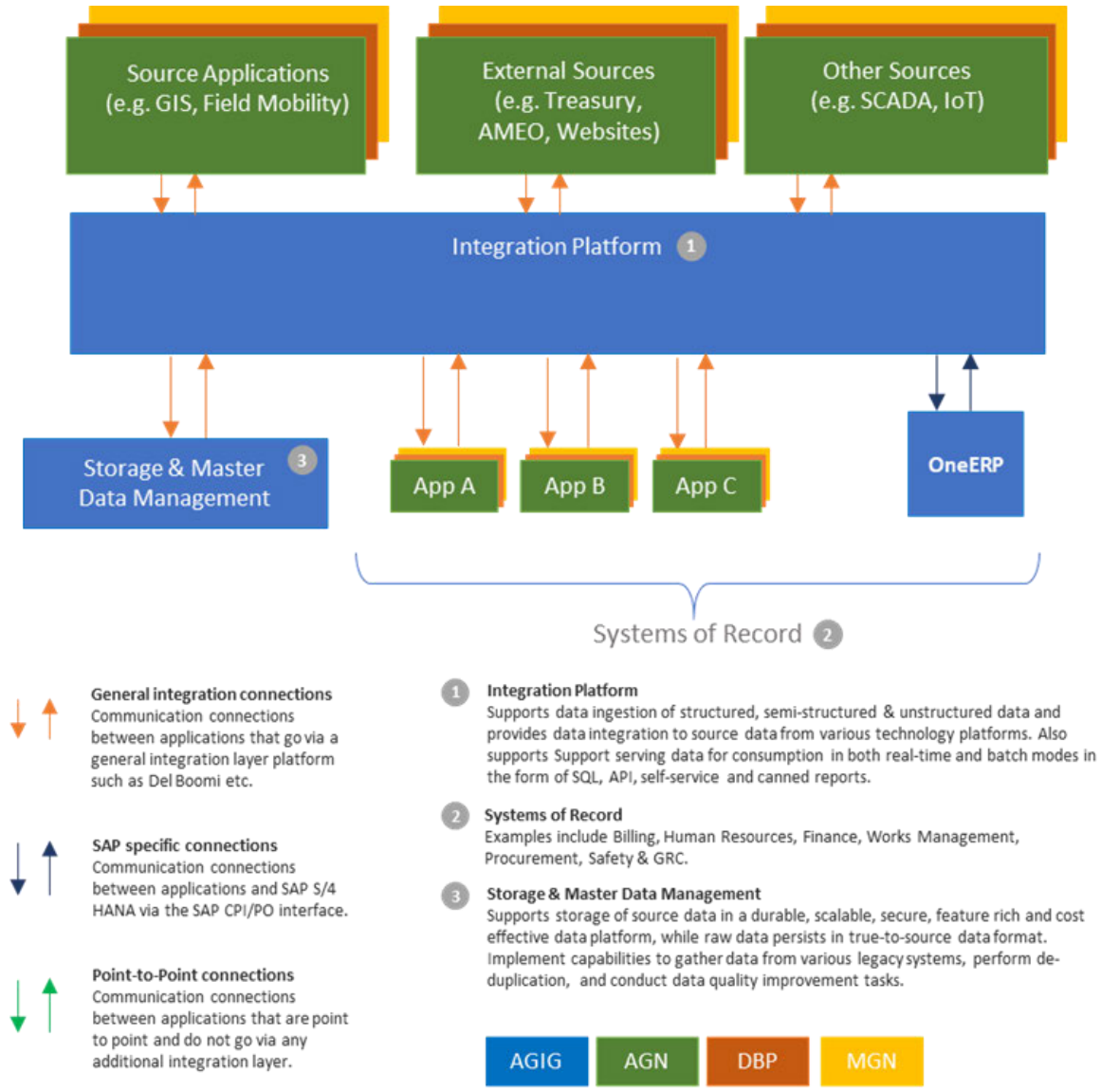
Figure 3 below illustrates communication between systems in the absence of an application integration platform. While it is still possible to integrate systems such as SAP across the businesses, the communication lines are complex, data exchange can be duplicated, and the connection framework is inefficient.

Figure 3: AGIG communication between systems in the absence of an application integration platform



Development of an application integration layer will alleviate these issues, as well as position the business to adapt to ongoing technological and business change. A simplified illustration of this is shown in Figure 4.

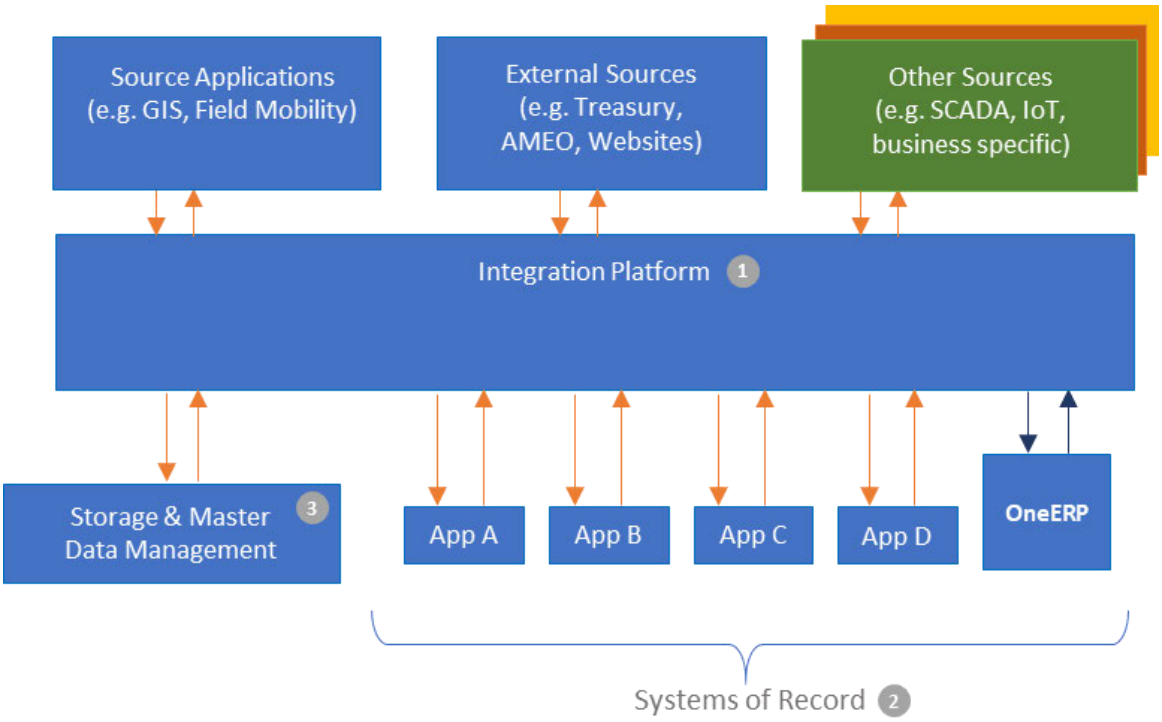
Figure 4: AGIG communication between systems with an application integration platform



An integration layer facilitates streamlined and automated communication between applications. An example of this is where Maximo and GIS integrate with SAP S/4HANA. An integration layer will facilitate streamlined and automated interactions between all three systems, where data is orchestrated based on standardised business rules, and does not require any manual intervention.

The modular and interoperable functionality also allows us to easily consolidate applications when required. For example, multiple instances of Maximo and GIS can be easily consolidated as applications can be plugged out and back in, in a modular way using the integration layer. This results in operational and cost efficiencies for the business. A simplified illustration of this is shown in Figure 5.

Figure 5: Illustration of applications communicating via an integration platform



This simplified technology landscape will also:

- provide the flexibility to safely defer replacement of legacy applications through the integration platform, if necessary, to reduce transition risks. In practice this means that by using an integration platform, interfaces between new and legacy applications can be created without needing to modify the legacy applications;
- optimise our licencing and operational costs, through consolidating and negotiating ongoing maintenance and support contracts with select strategic vendors; and
- develop standardised software development practices with the selected strategic vendors which, in turn, will reduce our cyber security risk profile and ensure mitigation efforts have the greatest chance of success[84].

Data architecture, reporting and governance capabilities

AGIG currently does not have a single source of truth for critical data. This is the result of the complex technology landscape, where DBP, AGN and Multinet each have duplicate applications and multiple integration approaches. Not having a single source of truth poses multiple risks to data integrity for regulatory, customer and business reporting.

The IT Enabling program will therefore deliver an enterprise data model (EDM) and associated data governance framework, which will apply to DBP, AGN and Multinet Gas. An EDM provides an integrated view of the data produced and consumed across an organisation. It establishes a single way to describe the information, independent of the technology the data is stored in and provides a way of describing the data and the data ownership, foundational to good data governance.

84 Toup E, 2017, *Platforms are increasingly key to cybersecurity,* August 2020, URL: https://inform.tmforum.org/features-and-analysis/2017/05/platforms-increasingly-key-cybersecurity/

Currently there is no view of the data model either at the individual entity or Group level. AGN, DBP and Multinet have previously operated using different processes on different platforms, which has resulted in siloed approaches to data definition, data redundancies, disparities, data quality issues and inconsistencies and duplicate data sets.

With no single source of truth and no overarching view of the available data and its relationships, maintaining regulatory and legislative compliance can be difficult and costly. Data must often be manually sourced, aggregated and reconciled for regulatory purposes. Due to inconsistencies between the data sources, discrepancies can arise on previously reported results. Therefore, any data reported incurs an additional review creating non-value add overhead, adding to the cost of compliance.

An EDM that describes the data across the organisation and that is utilised and enforced by One ERP will largely resolve this issue. Further support by way of an effective data governance framework will provide the oversight and authority over the use and maintenance of data and data sets.

The proposed EDM will integrate with One ERP and provide a sustained uplift in data management, content management and reporting capability. Data governance will be implemented and supported by data foundation capabilities including:

- data risk management – identification of regulatory, legislative and business drivers for data retention;
- metadata management – cataloguing and classifying data enabling informed data migration, archiving and storage needs; and
- data quality management - developing data standards and associated data quality metrics to enable data quality to be assessed, improved and monitored on an ongoing basis.

Introducing an EDM and implementing One ERP together greatly increases the analytics and insights that can be drawn from operational and corporate data. To leverage the benefits of these advances, we propose the implementation of a data warehouse. This will incorporate identification of useful data from various systems in addition to One ERP. It will also utilise extraction, transformation and loading tools to populate the data warehouse and leverage a business intelligence tool for developing reports.

A data warehouse will allow DBP to pull data from multiple systems and store it in a structured manner. The predefined relationships between the data sets (utilising the EDM) will allow information from solutions such as SAP, EAM and GIS to be collated to provide insights and comprehensive analytics as well as limited trending capability.

Coupled with DBP's and AGIG's need to uplift its data management capability, the approach to content management is also in need of uplift. There are presently no effective records management or content management solutions in place across AGIG. At DBP there is only limited records management for technical engineering documentation within a document management system called QDMS.

Currently, documentation is most frequently stored in personal directories or on drives on the network, not linked to records in which they belong. This ad-hoc approach creates risk and introduces inefficiencies as workers search for and collate all related content for a job. It inhibits an information management capability.

Implementing an enterprise content management (ECM) solution will, as a first step, create a system of record to manage traditional documents, with controls over retention and disposal schedules. It will bring all content together, boosting productivity and effective decision making

as DBP transitions to a culture of working with an ECM to manage documents, the need for a video repository content system for videos captured for asset maintenance, prevention and monitoring purposes or an engineering drawing management system that provides specific functionality, including redlining of drawings will be assessed.

An ECM brings together all the connected records of the organisation, providing information ready for decision making at our fingertips. We can drive operational efficiencies by our staff knowing where they need to look for information, allowing us to spend more time in analysis rather than sourcing and connecting the information.

In summary, the data architecture, reporting and governance work stream of the revised IT Enabling program will deliver the following benefits to DBP:

- data-driven decision making;
- fully traceable and documented evidence to respond to regulatory information requests;
- greater ability to coordinate and identify efficiencies in operations (e.g. asset maintenance);
- improved productivity and reduction in manual effort required to gather and collate data from disparate and siloed sources; and
- a consolidated technology platform for managing DBP's content, allowing for rigorous information management. We expect that a quality information management approach will streamline and therefore reduce cost and risk associated with audits.

1.3.3 Forecast expenditure

The forecast expenditure covered by this business case addendum is for the DBP cost component only. As discussed above, these initiatives are being rolled out as part of the One IT program, which will result in implemented of these systems at all AGIG businesses over the coming years.

The total capital cost of these initiatives across AGIG is $17.4 million. This cost is allocated between the three AGIG businesses using a combination of direct allocation based on the data migration requirements of each business, and an allocation based on revenue.

As shown in Table 2, DBP's allocation totals $5.6 million. This comprises a $1.1 million direct allocation calculated based on the DBP data and applications being migrated to the new integrated platform, and $4.5 million allocation of AGIG shared costs based on total revenue at each business.

Table 2: IT Enabling capex allocation to DBP ($'000)

Allocation	2021	2022	2023	2024	2025	Total
Total IT Enabling capex	8,911.8	5,676.1	806.8	1,863.1	93.1	17,350.9
Less AGN direct allocation	-	624.1	-	-	-	624.1
Less DBP direct allocation	1,122.5	-	-	-	-	1,122.5
Less Multinet direct allocation	-	-	806.8	1,863.1	93.1	2,763.0
AGIG shared costs	7,789.3	5,052.0	-	-	-	12,841.3
DBP allocation of AGIG shared costs (35%)	2,726.3	1,768.2	-	-	-	4,494.5
DBP allocation total (direct + shared)	**3,848.8**	**1,768.2**	-	-	-	**5,617.0**

Various options were considered for allocating the shared component between AGIG businesses. Our objective was to find a method that would provide an appropriate allocation under NGR 74, i.e. arrived at on a reasonable basis; and representing the best forecast or estimate possible in the circumstances.

One option considered was to allocate costs between businesses based on the number of customers. This a common practice AGIG uses to allocate costs between its gas distribution network businesses. However, applying this approach for allocating IT system costs between DBP and AGN would not produce an appropriate allocation, as the small number of large volume DBP transmission customers are incomparable to the large number of small volume distribution customers associated with AGN.

We also considered allocating costs based on total gas volumes, however the disparity between transmission and distribution pipelines again makes this an inappropriate basis for sharing costs.

Ultimately, we consider the most reasonable allocation methodology is to use revenue. These applications being developed cross a multitude of systems and processes across AGIG businesses.

Apportioning costs by revenue will result in an allocation that reasonably reflects the level value of the program to each business. This is consistent with standard industry practice, and will result in a cost allocation that is the best forecast or estimate possible in the circumstances and is therefore consistent with NGR 74.

Allocating costs by revenue result in 35% of costs being allocated to DBP.

Table 3: IT Enabling initiatives forecast shared capex allocation, $'000 June 2020

AGIG business	% allocation	Forecast shared capex
Total AGIG	100.0%	12,841.3
DBP	35.0%	4,494.5

Opex requirements

In information request EMCa16, EMCa queried why there was no recognition of additional opex costs associated with the new IT Enabling systems in the original business case (and by extension in the NPV). While we provided a response in EMCa16 as to why this was appropriate for the original business case, this has now been reviewed in light of the revised program scoping and development work completed since that time.

There will be an associated uplift in annual operating costs associated with the suite of IT Enabling software, as shown in Table 4.

Table 4: IT Enabling forecast annual operating costs, $'000 June 2020

Component	Total Forecast Opex	DBP Share of Forecast opex
Vendor licensing & support – AGIG shared costs	1,174.2	411.0
Vendor licensing & support – DBP specific	3.1	3.1
Total annual operating costs		**414.1**

1.3.4 Estimated benefits

The IT Enabling initiatives are required to enable us to fully leverage the benefits from the AGIG One IT Strategy, in particular our One ERP system.

It must be stressed that these benefits will be observed over time through completion of all of the IT Enabling initiatives included in this Addendum. As described earlier, the various programs of

work included under AGIG's One IT Strategy and Roadmap are fundamentally interconnected. This means that tangible benefit streams represent benefits achievable from the whole portfolio of work, and are unable to be attributed to individual components of the program.

Independent experts KPMG have provided a detailed assessment of forecast costs and expected benefits of the revised IT Enabling program. KPMG has applied its industry experience and knowledge of benefits achieved by similar IT enabling programs delivered at other infrastructure businesses. We have given regard to the ERA's concerns that the 'rule of thumb' benefits applied in our original business case may not translate to the management of a linear transmissions pipeline, and have taken measures to estimate how the IT enabling benefits would apply to DBP's specific business processes.

We have also taken on board EMCa's concerns that the original NPV provided in support of the standalone DBP IT Enabling program was based on preliminary estimates and that no sensitivity analysis was provided. As such, we have developed a revised NPV, using more robust cost estimates informed by a detailed scope, and an assessment of benefits based on their specific allocation in a transmission pipeline business.

To test the robustness of the NPV, we have conducted sensitivity analysis, which shows that the NPV remains positive at various less favourable scenarios, for example a combined 10% increase in costs and 30% decrease in benefits. Table 5 provides a summary of the NPV under our conservatively estimated scenario. Table 6 shows NPV outcomes under various sensitivities to changes in costs and benefits.

Table 5: IT Enabling 10 year NPV, $'000 June 2019

Component	NPV (10 years)
Total capex	5,547.6
Incremental opex	4,208.7
Total benefits	19,329.4
Hurdle rate (IRR)	13.8%
NPV	6,052.1

Table 6: IT Enabling Sensitivity analysis, $'000 June 2019

	Costs							
Benefits	-30%	-20%	-10%	0%	10%	20%	30%	40%
-30%	4,236	3,360	2,483	1,606	729	(147)	(1,024)	(1,901)
-20%	5,718	4,842	3,965	3,088	2,211	1,335	458	(419)
-10%	7,200	6,324	5,447	4,570	3,693	2,817	1,940	1,063
0%	8,682	7,806	6,929	6,052	5,175	4,299	3,422	2,545
10%	10,164	9,288	8,411	7,534	6,657	5,781	4,904	4,027
20%	11,646	10,770	9,893	9,016	8,139	7,262	6,386	5,509
30%	13,128	12,252	11,375	10,498	9,621	8,744	7,868	6,991
40%	14,610	13,734	12,857	11,980	11,103	10,226	9,350	8,473

The NPV analysis for the revised IT Enabling project, founded on more mature data and industry-specific analysis, is significantly more robust than the high level estimates developed for the original standalone project.

An overview of the benefits estimated for DBP used in the NPV, including how the benefits have been allocated is provided below.

- **Process benefits** – this benefit reflects the reduction in process time and cost that will be achieved from the IT Enabling work. It crosses a range of DBP's functions, including tax, treasury, accounts payable and receivable, accounting and budgeting, and procurement.
  The benefits included in the NPV analysis have been calculated by assuming a proportion of savings on the current calculated DBP costs of these functions. [redacted]

  Strategic sourcing benefit – this benefit represents the cost savings that will be achieved from leveraging strategic sourcing opportunities in order to optimise our licencing and operational costs. Having higher volume national contracts will allow us to negotiate improved contracts with a select number of vendors.
  The benefits included in the NPV have been calculated by assuming a proportion of savings on the current DBP annual costs of goods and services where there is potential for group procurement. Based on current procurement volumes at DBP, coupled with KPMG's experience of procurement savings achieved at other businesses, we conservatively estimate savings of 3%.

Allocation of benefits

As discussed above at section 1.3.3, shared costs have been allocated between AGIG businesses on the basis of total revenue. This reflects that the majority of staff will use these systems, and as such, is the most reasonable allocation methodology and will result in a cost allocation that is the best forecast or estimate possible in the circumstances, consistent with NGR 74.

We initially allocated benefits on a similar basis, under the assumption that allocating costs and benefits on the same basis would result in the best forecast under the circumstances. However, we found that allocating the benefits by revenue did not produce a reasonable outcome. This is because as a transmission business, the quantum of relevant goods and service procurement costs is significantly lower than the distribution businesses of AGN and Multinet Gas. Applying the revenue allocation basis would therefore overstate the level of benefits that DBP could expect to receive.

To challenge the robustness of the NPV analysis we felt it prudent to apply conservative estimates based on actual costs, therefore we calculated the benefits for DBP directly by applying the efficiency assumption to the historical and forecast costs and volumes of goods and services procured by DBP, as well as actual resourcing levels within our finance and procurement functions.

We submit that this benefits allocation approach arrives at a more reasonable and conservative estimate of benefits and therefore produces the best forecast available in the circumstances.

1.4 Summary

1.4.1 Estimating efficient costs

Table 7 summarises the total unescalated costs by cost type for the IT Enabling capital works program.

Table 4Table 8 shows the escalation to real dollars of December 2020, including labour cost escalation of 0.57% per annum.

Table 7: IT Enabling cost estimate, by cost category ($'000 June 2020)

($'000)	2021	2022	2023	2024	2025	Total
Internal labour	1,266.2	751.4	-	-	-	2,017.6
Contractors/ consultants	1,319.0	507.7	-	-	-	1,826.7
Materials & services	1,158.1	509.2	-	-	-	1,667.2
Travel & others	105.5	-	-	-	-	105.5
Total	**3,848.8**	**1,768.2**	**-**	**-**	**-**	**5,617.0**

Table 8: IT Enabling cost estimate, by cost category, ($'000 December 2020)

	2021	2022	2023	2024	2025	Total
Total unescalated ($ Jun 20)	3,848.8	1,768.2	-	-	-	5,617.0
Escalation	40.7	22.6	-	-	-	63.3
Total escalated ($ Dec 20)	**3,889.5**	**1,790.8**	**-**	**-**	**-**	**5,680.3**

Expenditure related to this project is based on:

- estimated market rates for external labour/approximate salary + on-costs for internal labour and estimated effort; and
- relevant licencing and other vendor development and support costs.

The overall program is made up of the following workstream activities, each of which has been costed separately to ensure costs related to a specific entity in the Group are fully allocated to that entity before the remainder are apportioned:

- design and install integration layer;
- connect DBP applications;
- connect AGN applications;
- connect Multinet Gas applications;
- create Enterprise Data Model and Governance framework;
- classify and catalogue data;
- implement an archived data store for each major entity within AGIG;
- implement a data warehouse across the Group;
- implement an information management framework and ECM system; and
- conduct a feasibility study and roadmap for data store and analytics reporting solution.

1.4.2 Consistency with the National Gas Rules

In developing these forecasts, we have had regard to Rule 79 and Rule 74 of the NGR. With regard to all projects, and as a prudent asset manager/network business, we give careful consideration to whether capex is conforming from a number of perspectives before committing to capital investment. Specifically:

Rule 79(1)

The proposed IT Enabling capex consistent with the requirements of Rule 79(1) of the National Gas Rules, specifically the capital expenditure is:

- **Prudent** – DBP's investment and operational decisions are based on timely, reliable and accurate information. Currently this information is widely dispersed, often uncontrolled and outside core systems (e.g. spreadsheets). The proposed customised IT Enabling initiatives are prudent as they will implement systems, processes and tools to enable decision making based on more accurate and timely information which will translate into cost efficiencies and therefore lower future prices than they otherwise would have been.

- **Efficient** – The forecast expenditure is based on estimates of similar projects, discussions with vendors and industry experts. A formal procurement process will be undertaken once the project is fully mapped, and will ensure efficient prices are offered based on a competitive tender process.

  Significant efficiencies are expected to result from the implementation of the Group-wide One IT Strategy and Roadmap which includes this business case as well as One ERP, IT Security and the rationalisation of sustaining applications. Together these highly interconnected projects will enable all group companies to benefit from shared services, standardised operating procedures and reporting and to leverage the skills and knowledge of staff across the Group. The opportunity to address issues identified across the group and to share the costs so each entity can benefit from the result whilst only funding a small proportion is an excellent one for the long-term benefit of our customers.

  The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with good and accepted industry practice** – The proposed projects align to 'Big Data' and 'Business Intelligence' style industry standard projects that look to normalise the organisations data and then exploit it.

  The design of an enterprise data architecture and the associated governance frameworks and systems represents better practice within our industry and in particular in relation to implementation of a new ERP. This business case supports achievement of the benefits to be realised from the One ERP project as well as providing efficient and co-ordinated data and/or information storage and reporting capability.

- **Achieves the lowest sustainable cost of delivering pipeline services** – The proposed initiatives will enable more informed decision making throughout the business, including being able to proactively offer new and more flexible services to our customers. It will reduce manual processing and costs and improve accuracy, which results in tangible cost savings in document collaboration and enterprise asset management.

Rule 79(2)

The proposed IT Enabling capex will implement systems and processes that enable decision making based on more accurate and timely information which will translate into cost efficiencies and therefore lower future prices than they otherwise would have been. It is also expected to deliver $1.9 million of tangible benefits per annum, with further intangible benefits in terms of improved safety, customer service, information management, data quality, asset integrity and reliability. Therefore this capex is consistent with NGR 79(2)(a).

Rule 74

The forecast costs are based on the latest market rate testing, and project options consider the requirements of our business (including focus areas where the most value can be derived). Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A – AGIG One IT Strategy 2019-2024

DBP23 IT Security

Project summary	
Project name	IT Security
Risk	High
Category	Capital expenditure (Capex)
Amendments to original business case	The original business case 'IT Security - DBP23', developed during Q3/Q4 of 2019, included forecast capex of $1.7 million to upgrade our IT architecture to achieve maturity indicator level (MIL) 3 within the AA5 period. We have considered recommendations made by the ERA and EMCa in the Draft Decision, along with emerging cyber security obligations and our broader IT deliverables, and have revised our approach. A reassessment of our Australian Energy Sector Cyber Security Framework (AESCSF) maturity conducted in July 2020, coupled with more stringent cyber security requirements by foreshadowed proposed amendments to the *Security of Critical Infrastructure Act 2018*, means we believe it is prudent to achieve MIL 3 as soon as reasonably practicable. Our intention therefore is still to achieve a cyber security uplift from MIL 1 to MIL 3, as originally planned. Since preparing the initial submission we have more clarity on our cyber security architecture requirements, have developed a more detailed scope, and have modified our proposal accordingly. In summary, we have: • conducted a detailed design of our IT architecture, informed by the reassessment of AGIG's maturity under the AESCSF; • reassessed our cyber security obligations in light of proposed amendments to the *Security of Critical Infrastructure Act 2018*, which we expect will require an uplift in cyber security for major infrastructure owners at least consistent with MIL 3; • assessed the risk associated with remaining at MIL 1 and having different cyber security architecture across each of the AGIG businesses; and • considered the extent to which upgrades to other applications proposed during the AA5 period will contribute to achieving MIL 3. As a result, we have developed a more detailed program of work targeted at the uplift required to address weaknesses identified in our July 2020 AESCSF assessment and meet the proposed amendments to the *Security of Critical Infrastructure Act 2018* obligations. This has allowed us to prepare more accurate forecasts than were available in Q3/Q4 2019. We have also taken the opportunity to incorporate the DBP standalone cyber security program into the AGIG-wide cyber security program, which is being delivered as part of AGIG's One IT Strategy. The AGIG-wide program offers DBP a more holistic and effective cyber security uplift than the original standalone program, and will provide greater security features and benefits to DBP at a comparable capex cost to that originally contemplated. The estimated capital cost of the revised, AGIG-wide 'Uplift Cyber Security Technology and Capabilities' program is $6.7 million. These costs will be allocated across the three AGIG business (Australian Gas Networks (South Australia and Victoria and Albury), DBP and Multinet Gas) based on revenue, consistent with the allocation of expected benefits accrued. As a result, DBP's forecast capex to uplift cyber security maturity during the AA5 period with the intention of achieving MIL 3 has been revised to $2.4 million.

Estimated cost

The total program costs have been developed by independent experts EY and are based on current market conditions and rates, with the capital cost estimate of the IT Security program allocated to DBP being $2.4 million, as shown in the table below.

$'000 June 2020	2021	2022	2023	2024	2025	Total AA5
Capex	1,271.6	453.6	465.5	164.5	-	2,355.2

The estimated total operating expenditure associated with the IT Security program allocated to DBP over the AA5 period is $2.8 million as shown in the table below.

$'000 June 2020	2021	2022	2023	2024	2025	Total AA5
Opex	5.6	546.0	692.0	806.1	764.1	2,813.7

Basis of cost estimates

All costs are presented in real unescalated dollars of June 2020 unless otherwise stated.

Consistency with NGR

This project complies with the following National Gas Rules (NGR):

NGR 79(1) – the proposed solution is consistent with that of a prudent and efficient operator, acting in line with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service.

NGR 79(2) – proposed capex is justifiable under NGR 79(2)(c) (i), (ii) and (iii), as it is necessary to maintain and improve the safety of services, maintain the integrity of services, and comply with regulatory obligations such as the *Security of Critical Infrastructure Act 2018* and Foreign Investment Review Board requirements.

NGR 74 – forecast costs are based on typical vendor market rates, historical labour rates, published license fees and standard implementation costs. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Project Approval	
Prepared by:	David Phillips, Security Architect Cameron Honey, Manager Technology Services
Reviewed by:	Kay Nolte, Head of Architecture & IT Strategy
Approved by:	Andrew Staniford, Chief Customer Officer

Other Relevant Documents

This addendum should be read in conjunction with:

- the original business case 'IT Security – DBP 23', which was provided to the ERA on 23 January 2020 as Attachment 8.5 to the Access Arrangement (AA5);
- EY Australian Energy Sector Cybersecurity Framework Compliance Review and Roadmap;
- Protecting Critical Infrastructure and Systems of National Significance Energy Sector – 20 August 2020 workshop slides; and
- Attachment 7.5 Response to Draft Decision on Opex.

1.1 Original business case

The original business case 'IT Security - DBP23', developed during Q3 and Q4 of 2019, proposed forecast capex during the AA5 period of $1.7 million (real unescalated dollars of June 2019) to upgrade DBP's IT architecture to be consistent with industry standards, regulatory requirements in relation to critical infrastructure security, and risk appetite.

The program comprised three initiatives to deliver an uplift in cyber resilience, data protection and technology governance and automation as follows:

- **Cyber resilience** – development of an approach that ensures all systems implemented for DBP are secure by design; establishment of a multi-audience approach to ensure the right messages reach the right people at the right frequency; extension of the DBP supply chain's capability to facilitate informed decisions about a supplier's potential cyber impact and enable them to work with relevant third parties during a cyber-crisis; fine tuning of DBP's business continuity approach; introduction of a threat intelligence capability; and implementation of a security incident and event management service;
- **Data protection and privacy** – identification of all information pools; definition of a classification policy and process that allocates responsibility to information owner; and design and implementation of a solution that enables the enforcement of the information classification policy; and
- **Technology governance and automation** – definition and establishment of appropriate network architectures and processes to enable the effective management of IT, internet of things and operational technology devices.

The forecast cost of each of these initiatives for AA5 was based, where possible, on a three-year average actual cost incurred by DBP during the AA4 period. Table shows forecast for AA5 and the comparison of costs incurred in AA4.

Table 1: Summary of AA5 forecast and AA4 actual capex by initiative ($'000 June 2019)

	2021	2022	2023	2024	2025	Total AA5	Total AA4
Cyber resilience	169.5	313.0	322.0	221.0	221.0	**1,246.5**	935.0
Technology governance and automation	32.0	64.0	33.0	-	-	**129.0**	-
Data protection and privacy	182.0	182.0	-	-	-	**364.0**	462.0
Total	**383.5**	**559.0**	**355.0**	**221.0**	**221.0**	**1,739.5**	**1,397.0**

1.2 ERA Draft Decision

In its Draft Decision, the ERA accepts that we need to continue to improve our cyber security maturity, but does not consider the proposed program was prudent, stating:

> *The ERA accepts that DBP needs to continue to improve its cybersecurity maturity, however, it is not satisfied that the capital expenditure proposed for the 'IT security' business case for AA5 would be undertaken by a prudent service provider. This view is based on technical advice that:*
>
> - *DBP has not provided sufficient support for the risk rating of 'High' it has concluded for cyber security risk on the DBNGP.*

- *DBP has proposed capital expenditure for IT software and hardware projects under multiple business cases in AA5, which like the projects proposed in the 'IT security' business case, all contribute to improving DBP's cyber security, and a large number of which appear to be 'business as usual' activities or closely related to work undertaken in AA4.*[85]

The ERA and its technical experts (EMCa) reviewed the IT Security work program, and determined that Option 3 from our original business case was the prudent option. Option 3 was for $1.5 million (real unescalated dollars of December 2019) to achieve maturity indicator level (MIL) 3 by 2026:

> *Technical advice that the cost of one of the alternative options considered by DBP in its options analysis for the business case but not pursued represents a reasonable amount that would be required by a prudent operator.*[335] *Under this alternative option DBP would attain a maturity level indicator of three in 2026. As stated at paragraph 539, DBP targets a maturity indicator level of three as measured by the Australian Energy Sector Cyber Security Framework.*[86]

1.3 Our response

We have considered recommendations made by the ERA and EMCa, along with recent and forthcoming changes in cyber security obligations, and have revised our approach. A number of significant changes since the development of the original business case have led us to review our IT Security program:

- **Reassessment under the AESCSF** – in July 2020, we engaged EY to undertake an independent AGIG-wide assessment of our maturity under the AESCSF. This found that DBP was at a maturity level of MIL 1 and highlighted a number of critical weaknesses in our cyber security policies, processes and protocols that could threaten safety, reliability and security of the operation of our pipeline;

- **Understanding the Security of Critical Infrastructure obligations** – we have considered the compliance risk associated with our cyber security obligations in light of proposed amendments to the *Security of Critical Infrastructure Act 2018*. We expect these mandatory obligations will require an uplift in cyber security for major infrastructure owners at least consistent with MIL 3 within a short timeframe;

- **Transitioning to a consistent cyber security framework** – we have considered the risk associated with DBP remaining at MIL 1, including in relation to the continued operation of different cyber security architecture across each of the AGIG businesses, but with increasing inter-dependence and inter-operations. We expect that cyber security vulnerabilities in any one part of the Group could put at risk the operation of many critical energy infrastructure assets across Australia;

- **Development of an AGIG-wide plan to address cyber security weaknesses** – following the reassessment of our security maturity, we worked with EY to develop a detailed program of works to address critical weaknesses. This remains in keeping with our original high level plan, but includes a more thorough assessment of the works required to ameliorate known issues, and bridge the gap to an industry-standard cyber security framework; and

[85] ERA Draft Decision, [742]
[86] ERA Draft Decision, [743]

- **Optimisation of the IT program of work** – we have considered the extent to which upgrades to other applications and other work programs proposed during the AA5 period will contribute to achieving MIL 3, and more generally the uplift of IT security for DBP. We have looked to optimise the program of work and achieve economies of scale and scope by incorporating the standalone DBP cyber security program into the AGIG-wide cyber security program being delivered as part of AGIG's One IT Strategy.

Each of these changes have helped us develop a more detailed project scope. Though we have modified our proposal, we believe it remains prudent to achieve MIL 3 as soon as reasonably practicable.

The new, Group-wide cyber security program is called 'Uplift Cyber Security Technology and Capabilities'. The three initiatives that comprised the DBP standalone program (see section 1.1) will be delivered as part of this broader program, as well as a number of complementary uplifts to our IT architecture. The AGIG-wide program offers DBP a more holistic and effective cyber security uplift than the original standalone program, and will provide greater security features and technological benefits to DBP at a comparable cost to that originally contemplated, albeit one year later. The Uplift Cyber Security Technology and Capabilities program is discussed in section 1.3.5.

The estimated capital cost of the Uplift Cyber Security Technology and Capabilities program over AA5 is $6.7 million. The estimated additional operating expenditure over the same period is $8.0 million. These costs will be allocated across the three AGIG business (Australian Gas Networks (South Australia and Victoria and Albury), DBP and Multinet Gas) based on proportion of total revenue.

As a result, DBP's forecast capex to uplift our cyber security maturity to MIL 3 has been revised from $1.7 million (real dollars June 2019) to $2.4 million (real dollars June 2020). We will also incur $2.8 million in opex over the period (real dollars June 2020).

Our proposed Uplift Cyber Security Technology and Capabilities program is commensurate with similar programs being undertaken by energy infrastructure businesses in Australia, which the Australian Energy Regulator and its technical consultants (EMCa) have accepted for inclusion in revenue allowances. For example, in the Draft Decision for CitiPower/Powercor, the AER included $19.4 million of capex, and $8.2 million of opex for "optimising the effectiveness of existing cyber security capabilities by increasing coverage".

We highlight that the continued operation of a gas transmission pipeline such as the DBNGP, on which Western Australia is dependent for its gas and electricity supply, has arguably a higher criticality than a highly meshed electricity distribution network. Cyber security arrangements for DBP should therefore be at least equivalent to those in place at other critical infrastructure businesses.

We expect to achieve the necessary uplift in cyber security as per the CitiPower/Powercor projects, albeit at a lower overall cost. EMCa's assessment of the prudence of CitiPower/Powercor's cyber security program is provided in section 7.4.6 of Powercor - Review of aspects of proposed expenditure.[87]

A discussion of each of the drivers for the change in our cyber security approach is provided in the following sections.

[87] Available at: https://www.aer.gov.au/system/files/EMCa%20-%20Final%20report%20to%20AER%20-%20Review%20of%20Powercor%27s%20Regulatory%20Proposal%202021-26%20-%20August%202020.pdf

1.3.1 Australian Energy Sector Cyber Security Framework (AESCSF)

The AESCSF is a cyber security framework tailored for the Australian energy sector. Its purpose is to enable stakeholders to assess, evaluate, prioritise, and improve their cyber security capability and maturity to protect the nation's critical infrastructure from virtual threats which could disrupt the safe, reliable and secure operation of the pipeline.

The AESCSF focuses on improving IT architecture; that is the processes, procedures and protocols that exist within an organisation to keep it virtually secure. By improving IT architecture, an organisation can identify and implement the necessary applications and infrastructure to achieve an overall uplift in cyber security.

The AESCSF is recognised in the energy industry as being an appropriate benchmark for cyber security arrangements. As highlighted by EMCa:

> *DBP's capability against the energy subsector cybersecurity capability maturity model (ES-CSM2) was assessed in 2018. It shows that DBP had significant gaps across the 78 ES-CSM2 domains to Maturity Indicator Level 3 (the highest level). The ES-CSM2 is the foundation of the Australian Energy Security Board's Australian Energy Sector Cyber Security Framework (AESCSF). It is an existing industry standard that has been adopted globally. On this basis it is an appropriate reference for DBP.*[88]

The framework leverages existing industry standards that have been adopted internationally, including the Electricity Subsector Cybersecurity Capability Maturity Model (ESC2M2) (version 1.1) (U.S. DOE, 2014) and National Institute of Standards and Technology (NIST) Cybersecurity Framework (NIST CSF) (version 1.1) (NIST, 2018), and is tailored for the Australian energy sector to align with existing Australian policy and guidelines, for example, the Australian Privacy Principles and ACSC Essential Eight Strategies to Mitigate Cyber Security Incidents.

The framework will continue to evolve to ensure it maintains its relevance to the evolving cyber security threat landscape and the challenges faced by the Australian energy sector, including in relation to proposed amendments to the *Security of Critical Infrastructure Act 2018*.

Our 2018 AESCSF assessment found we had significant gaps in our cyber security framework. This 2018 assessment helped inform our original business case. In July 2020, AGIG conducted a Group-wide assessment under AESCSF and found three critical risks:

1. a lack of IT and cybersecurity resources to support the cybersecurity uplift and business-as-usual activities;
2. businesses are performing cyber security activities in an ad-hoc fashion without an organisation-wide security framework to document and formalise those activities; and
3. over reliance on third parties and lack of third party risk management framework.

Based on this assessment, the Group currently only satisfies the requirements for MIL 1, with some MIL 2 practices partially or largely implemented and a number of MIL 3 practices partially implemented. MIL 3 is required to mitigate the risks presented by the prevalent cyber security threats currently in the energy sector. Within this Group-wide assessment, DBP's overall maturity rating is at MIL 1, with some activities at or approaching MIL 2.[89]

---

[88] EMCa Technical Review, p.109

[89] Note that under the AESCSF, all requirements of the next maturity level must be largely or fully complied with in order to achieve the next MIL rating. Where an organisation has only partially met MIL 2, it will retain a MIL 1 rating until all MIL 2 requirements are met.

1.3.2 Proposed amendments to the Security of Critical Infrastructure Act

On 6 August 2020, the Department of Home Affairs released *Australia's Cybersecurity Strategy 2020* and a consultation paper outlining the proposed amendments to the *Security of Critical Infrastructure Act 2018*[90], which will require businesses in critical infrastructure sectors such as ours to meet baseline security and resilience standards. These amendments are based on the following key findings:

- highly sophisticated nation states and state-sponsored actors continue to target governments and critical infrastructure providers;
- around 35% of incidents the ACSC responded to in the year to 30 June 2020 impacted critical infrastructure providers; and
- despite the Government's efforts to introduce reforms in 2018 to manage threats to its gas assets, "the threat environment is worsening".

While the proposed amendments to the *Security of Critical Infrastructure Act 2018* have not yet been defined in detail, strong indications suggest the amendments to the Act will place more stringent cyber security obligations on critical infrastructure owners than currently exist. We consider it is reasonable to expect obligations under the Act will be at least comparable with the AESCSF MIL 3 requirements, and will be enacted within the AA5 period.

In preparation for this, our cyber security program for the AA5 period has been designed and will be delivered with the following proposed obligations in mind:

- Reporting obligations to provide Government with greater visibility and understanding of who owns, controls and has access to our most critical assets. This requires the collection, storage and security aspects of:
    - ownership information – information on those entities that are in a position to directly or indirectly influence and/or control the asset (for example through ownership arrangements, voting and veto rights and the ability to make Board appointments);
    - operational information – information on the location of the asset, and outsourcing and contractual arrangements that are relevant to the operation of the asset; and
    - cyber security incident information – information on a cyber incident that impacts an asset's operations or functions.
- A positive security obligation – to build consistent security and risk management uplift across all critical infrastructure sectors. This is intended to set and enforce sector-specific standards and protections for critical infrastructure (including physical, cyber, personnel and supply chain security), and strengthen regulatory oversight.
- Enhanced cyber security obligations to strengthen the resilience of designated systems of national significance. This will include:
    - facilitating the Government's real-time threat picture, by participating in cyber security activities and providing situational awareness as requested; and

[90] The *Protecting Critical Infrastructure and Systems of National Significance Consultation Paper*, August 2020 is available here: https://www.homeaffairs.gov.au/reports-and-pubs/files/protecting-critical-infrastructure-systems-consultation-paper.pdf

- ensuring we are able to receive timely advice and assistance to address and respond to a cyber security attack.

We submit that the original DBP standalone cyber security program did not consider the above proposed obligations and would likely not have satisfied the requirements under the proposed amendments to the Act.

By incorporating DBP's cyber security uplift into the One IT program of work, we have the opportunity to ensure our plan will satisfy the likely outcomes of the Act and ensure the expenditure we incur is fit for purpose.

1.3.3 AGIG One IT Strategy

The One IT Strategy program is an AGIG-wide initiative, which seeks to bring all AGIG's network and pipeline businesses under a common IT system.

AGIG (comprising AGN, DBP and Multinet Gas) operates across multiple Australian jurisdictions, bringing together a wealth of expertise and experience that allows its various businesses to share knowledge, information, resources and costs. AGIG's scale and breadth of resources presents opportunity to deliver benefits for DBP's customers in Western Australia. Not least, it allows us to review and rationalise our IT systems and infrastructure across the group, moving to shared platforms where practicable.

In 2019, we developed the AGIG One IT Strategy and Roadmap (see Appendix A) rolling it out to the AGIG businesses in November that year. The strategy is designed to deliver stable and aligned IT management processes, architectures, procurement, cyber security and core technology platforms across the Group.

Our aim is to achieve economies of scale and scope, while keeping pace with technological advances. In the short term, this has required national coordination of applications renewals, replacement and upgrades. This initial coordination means there has been an increase in IT investment across all our businesses compared to historical levels. This is necessary to bring some of our legacy systems up to a reasonable standard, or to invest in the new systems that will replace the multitude of state-based technologies and cyber security arrangements. However, over the longer term we expect coordinating our IT investment into a national program will reduce the overall ongoing cost for our customers, and better support the provision of pipeline services at the lowest sustainable cost.

When AGIG came together in 2017, a review of existing IT systems across the Group found that each business was using a markedly different suite of IT systems and cyber security arrangements, with little or no commonality between key IT sustaining applications.

The different levels of cyber security was identified as a risk for the Group, and it was acknowledged that this will exponentially increase as the businesses' systems and processes become interdependent and inter-operational. This makes achieving a common uplift and bringing uniformity to IT architecture a critical part of AGIG's One IT Strategy.

The delivery of the Strategy in November 2019 prompted the AGIG-wide AESCSF review in July 2020, and in turn led to DBP's original standalone cyber security projects being rolled into the broader Uplift Cyber Security Technology and Capabilities program.

1.3.4 Revised risk assessment

In light of the July 2020 AESCSF assessment and the more stringent obligations under the *Security of Critical Infrastructure Act*, we conducted a revised risk assessment for our business.

The primary risk event associated with not investing in the proposed cyber security capability uplift initiatives as defined in the Uplift Cyber Security Technology and Capabilities program is the compromise of critical infrastructure assets owned and operated by DBP. A successful cyber attack perpetrated by malicious actors could result in the unavailability of our pipeline. This would result in significant reputational, operational and financial risks.

The risks posed to DBP are summarised below:

- *DBP* – inefficiencies and compromise of critical IT assets required for collation and aggregation of key data sets may result in a lack of compliance with legal and regulatory reporting obligations such as Foreign Investment Review Board requirements and the *Security of Critical Infrastructure Act 2018*.[91] As mentioned above, the current cyber threat landscape and the cyber security maturity landscape at DBP (and across AGIG) increases the likelihood of occurrence of the primary risk event (compromise of critical infrastructure assets) to 'occasional' and the impact to 'major'. This translates to a proportionate increase in likelihood and impact of compliance risk as breach of compliance can occur within a span of two years and could result in a material impact in terms of stringent fines and regulatory penalties as regulators increasingly prioritise cyber security obligations. Hence, the resultant risk is rated 'High'.

- *People* – compromise and failure of critical IT systems leveraged for remote operation and control of critical infrastructure assets within the operational technology (OT) environment may result in severe health and safety risks to on-site personnel. With the increase in cyber attacks on critical infrastructure assets across Australia and given the current cyber security maturity across AGIG, the likelihood of compromise of AGIG's assets (including the DBNGP) is plausible within a span of every two years. However, there are existing Operational Health and Safety controls, which will minimise the likelihood of occurrence of the risk from a health and safety standpoint to unlikely. This could have a severe impact on the physical and or mental wellbeing of the affected staff. Hence, the resultant risk is rated 'Moderate'.

- *Reputation* – any significant disruptions in the transmission of natural gas will have a severe impact on customer confidence. On the DBNGP we have contractual obligations to maintain 98% reliability (with penalties attached), as well an expectation from customers that this will be closer to 100% as is currently delivered. Furthermore, any breach of confidential customer data may have a cascading impact on DBP's reputation to manage personal information. As mentioned above, the likelihood of occurrence of a severe disruption to supply is occasional. The impact on DBP's reputation will be significant as there may be sustained adverse media articles and coverage in addition to deterioration in customer satisfaction. Hence, the resultant risk is rated 'Moderate'.

[91] Noting that the new requirements of the Act have not yet been defined, but are likely to result in a new compliance obligation during the AA5 period.

- *Supply* – with enhanced integration between OT and IT environments, there is an increased risk of successful cyber-attacks within IT systems translating into outages and compromise of key OT assets. This may result in the disruption of business operations for extended periods of time. A significant disruption to business operations through the compromise of DBP's critical infrastructure assets is plausible within a span of every two years. This results in a likelihood of 'occasional' as per our risk matrix. Furthermore, given the criticality of the DBNGP to Western Australia's domestic gas (and electricity) supply, an extended disruption could result in an unplanned loss of service to over 10,000 customers. This is classified as a major impact. Hence, the resultant risk is rated 'High'.

- *Loss* – non-compliance with the *Security of Critical Infrastructure Act 2018*, Notifiable Data Breach scheme or other reporting obligations pertaining to data management can result in financial penalties. There is also the risk of incurring additional financial losses as a result of an outage and interruption to supply resulting from a successful cyber security incident. As mentioned above, the likelihood of occurrence of a significant disruption to operations is occasional. Given the scale of operations for AGIG and the regulatory obligations it is subject to as a critical infrastructure services provider, this could result in a severe financial impact within the range of $2.5 million to $10 million. Hence, the resultant risk is rated 'Intermediate'.

The current risk rating is presented in Figure 6 and Table 2.

Figure 6: Risk rating – based on current cyber security MIL 1 environment

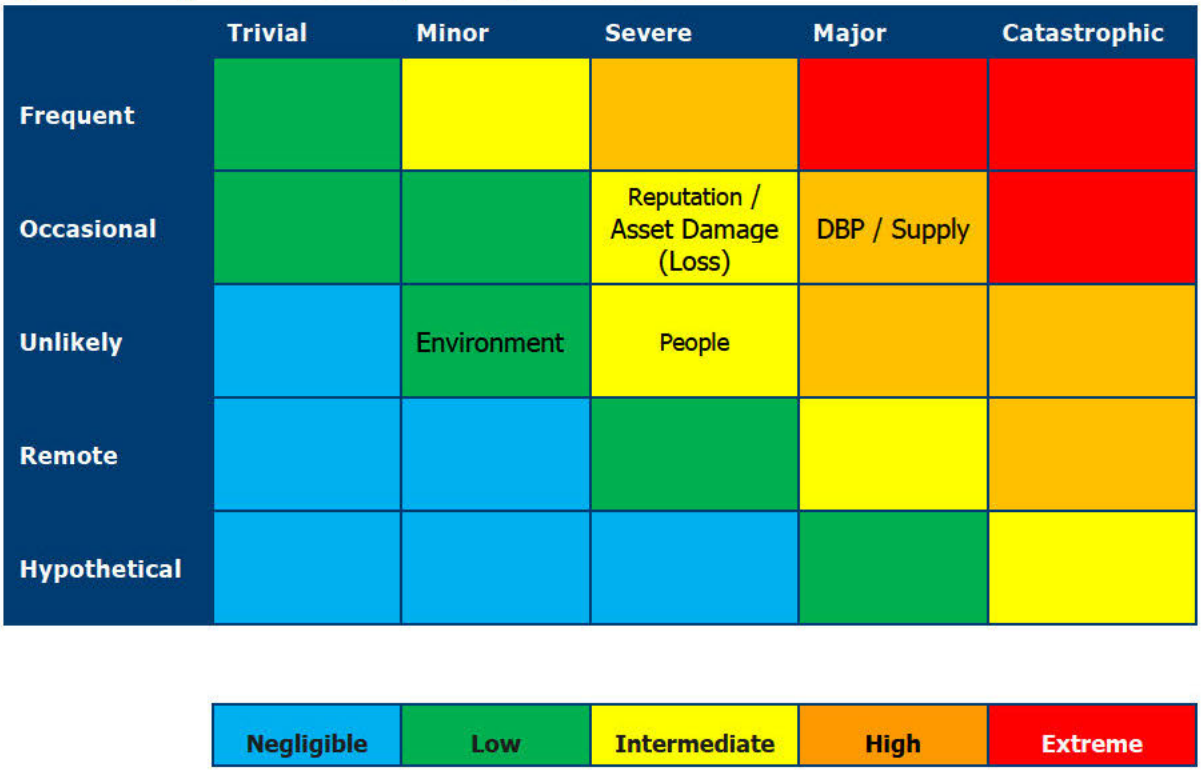


Table 2: Risk rating – based on current cyber security MIL 1 environment

Risk Area	Untreated
DBP	High
People	Intermediate
Environment	Low
Reputation/Outrage	Intermediate

Asset Damage (Loss)	Intermediate
Supply	High
Risk	**High**

We consider that the actions proposed in the Uplift Cyber Security Technology and Capabilities program will reduce our current 'High' risk rating to 'Low', as shown in Figure 7 and Table 3.

Figure 7: Risk rating – based on uplift to cyber security MIL 3 environment

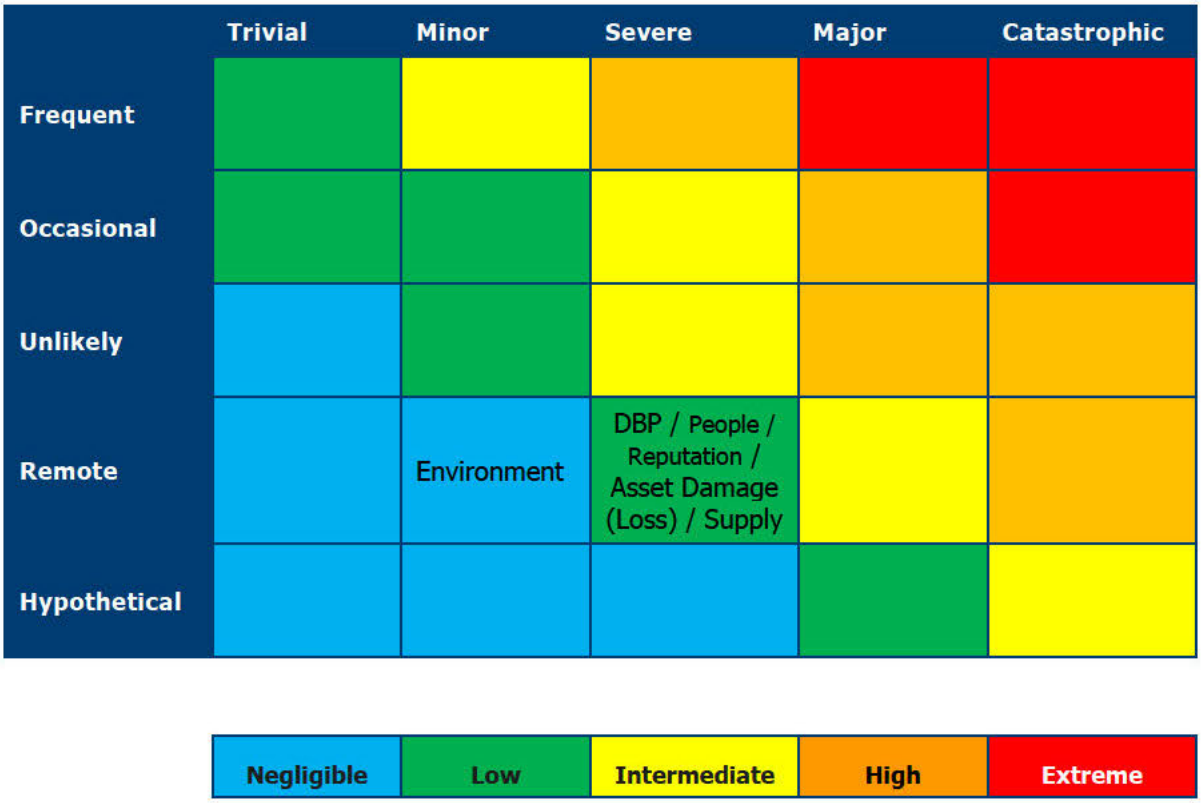


Table 3: Risk rating – based on uplift to cyber security MIL 3 environment

Risk Area	Untreated	Treated
DBP	High	Low
People	Intermediate	Low
Environment	Low	Negligible
Reputation/Outrage	Intermediate	Low
Asset Damage	Intermediate	Low
Supply	High	Low
Priority Rating	**High**	**Low**

The program will establish cyber security with mature processes to enable risk-based decision making, reporting for applicable regulatory obligations, and continuous monitoring of conformance with defined frameworks. It will also ensure that independent assurance over the design and operating effectiveness of security controls is sought through periodic audits and reviews.

Reducing the overall risk to low is consistent with our risk management framework. We therefore consider delivering the Uplift Cyber Security Technology and Capabilities program to be a prudent course of action.

1.3.5 Uplift Cyber Security Technology and Capabilities program

The Uplift Cyber Security Technology and Capabilities program is designed to raise AGIG's cyber security to MIL 3. Given the rate of change in the IT security landscape, we do not believe that the continued MIL 1 rating, or achievement of an uplift to MIL 2, is adequate to maintain the safety and integrity of services to our customers. Moreover, a MIL 1 rating it is not expected to allow us to meet the minimum mandatory security requirements required by the Australian Government (expected to be consistent with MIL 3 for gas transmission infrastructure).

AGIG engaged EY to identify current gaps in achieving full implementation of all MIL 2 and MIL 3 practices within its IT architecture, and design a prioritised remediation roadmap that is fit-for-purpose. This 'Security Roadmap' (see Appendix B) will allow AGIG to focus future effort on those areas of the business requiring uplift or improvement in cyber security as measured against the AESCSF, while simultaneously positioning itself to strategically align with the mandatory requirements of the Australian Government's proposed amendments to the *Security of Critical Infrastructure Act 2018*.

EY's key findings and recommendations are provided in Figure .

Figure 1: EY's key findings and recommendations in relation to AGIG's IT Security

Australian Government 2020 Strategy's "Actions by Businesses"	AGIG's Current Gaps	Proposed Roadmap Solutions
Improve baseline security for critical infrastructure	AGIG rates itself at MIL 1 which indicates that most baseline security practices have been implemented, but are only performed in an ad-hoc manner and lack the management characteristics that drive governance and continuous improvement.	▸ Reach MIL 3 by the end of 2025.
Uplift the cybersecurity of SMEs	AGIG's outsourced service providers are lacking the required skillset to continue to effectively protect AGIG from well-resourced and trained adversaries that conduct persistent intrusion campaigns targeting Australian critical infrastructure.	▸ Develop training for SMEs in respective cybersecurity domains. ▸ Enforce compliance with training requirements.
Provide secure products and services	AGIG's lack of visibility and accountability over its many organisational assets and reliance on outsourced service providers who do not consistently comply with AGIG's policies and procedures does not provide assurance that AGIG can secure its products and services.	▸ Develop a security framework that will include the development of a comprehensive asset register. ▸ Enforce compliance with AGIG's security framework across the organisation including external service providers.
Grow a skilled workforce	AGIG's IT function is currently under-resourced, comprising two FTEs responsible for the safe operation of AGIG's entire environment, and it is unable to continue to effectively develop and implement initiatives to improve AGIG's security posture.	▸ Onboard additional FTEs to support proposed uplift and BAU initiatives.
Take steps to block malicious activity at scale	AGIG's lack of an overarching SOC that facilitates an immediate and 24/7 response capability, reliance on outsourced service providers that do not share or aggregate risk, threat and vulnerability information, and a wide footprint means that AGIG may not be able to effectively detect and protect itself from malicious activity at scale.	▸ Establish an organisation-wide SOC that will monitor and respond to any anomalous or malicious activity.

The Security Roadmap has been developed as part of the One IT program and will be delivered across all AGIG businesses. We expect this program to cost $6.7 million in capex, and $8.0 million in opex between 2021 and 2025. The work program comprises the following **key** initiatives:

- **Workforce Management:** Onboard additional internal resources to support the establishment and operationalisation of roadmap initiatives and subsequent BAU activities.
- **Incident Management:** Establish and implement an organisational incident management framework to detect, analyse, and respond to cybersecurity events and build resilience.
- **Identity and Access Management:** Establish and implement a comprehensive identity and access management framework to control access to AGIG's assets and protect the IT and OT infrastructures.

- **Threat and Vulnerability Management:** Establish and implement an organisational threat and vulnerability program to detect, identify, analyse, manage and respond to threats and vulnerabilities.
- **Situational Awareness:** Develop a framework to manage situational awareness capabilities to form a Common Operating Picture.
- **Third Party Risk Management:** Establish and implement a third party risk management framework to manage the cybersecurity risks associated with services and assets that are dependent on external entities.

The costs of this program will be shared between each of the AGIG businesses, with costs allocated based on total revenue. AGIG considered other allocation methods, including throughput, customer numbers and number of users:

- Throughput and customer numbers were dismissed as inappropriate allocation methods for this expenditure due to the inherent differences in customer type and gas volumes between distribution networks and transmission pipelines.
- We looked at allocating costs based on the number of users (as applied for the One ERP project), however, in this instance we considered the breadth of the cyber security initiatives means it is difficult to identify which and how many specific people in each business will utilise and/or directly benefit from each component of the program. Allocating costs in this way is prohibitively complex and would not necessarily result in the most accurate allocation.

Given that the above obvious cost allocation methods were considered to result in an inappropriate allocation of costs between businesses, a more reasonable approach was required. Consistent with other situations where an obvious method has been deemed inappropriate, we have chosen to allocate based on the total revenue of each business. Revenue is a commonly used and understood cost driver and we consider that it will not result in an unreasonable allocation method for these costs.

This results in a 35% allocation to DBP, with the remaining allocation to AGN, and Multinet Gas.

The forecast capex cost to DBP over the next five years is shown in Table 4.

Table 4: DBP AA5 capex estimate, Uplift Cyber Security Technology and Capabilities, $'000 June 2020

IT architecture uplift	2021	2022	2023	2024	2025	Total
Risk Management	96.6	9.8	-	-	-	106.4
Asset, Change, and Configuration Management	-	27.0	118.0	-	-	144.9
Identity and Access Management	379.4	140.0	175.0	122.5	-	816.9
Threat and Vulnerability Management	106.1	-	-	-	-	106.1
Situational Awareness	57.1	-	-	-	-	57.1
Information Sharing and Communications	-	89.3	130.6	-	-	219.8
Event and Incident Response, Continuity of Operations	212.5	-	-	-	-	212.5
Supply Chain and External Dependencies Management	78.4	-	-	-	-	78.4
Security Resourcing (Workforce Management)	216.0	116.6	42.0	42.0	-	416.5

IT architecture uplift	2021	2022	2023	2024	2025	Total
Cyber Security Program Management	125.7	71.1	-	-	-	196.7
Total	**1,271.6**	**453.6**	**465.5**	**164.5**	**-**	**2,355.2**

We will also incur $2.8 million of opex over the AA5 period as shown in Table 5.

Table 5: DBP AA5 opex estimate, Uplift Cyber Security Technology and Capabilities, $'000 June 2020

IT architecture uplift	2021	2022	2023	2024	2025	Total
Risk Management	-	-	9.8	9.8	9.8	29.4
Asset, Change, and Configuration Management	-	-	-	9.8	9.8	19.6
Identity and Access Management	2.8	149.8	149.8	202.3	149.8	654.5
Threat and Vulnerability Management	-	58.8	58.8	58.8	58.8	235.2
Situational Awareness	-	9.8	9.8	9.8	9.8	39.2
Information Sharing and Communications	-	-	56.0	98.0	98.0	252.0
Event and Incident Response, Continuity of Operations	2.8	140.0	140.0	140.0	140.0	562.8
Supply Chain and External Dependencies Management	-	-	-	-	-	-
Security Resourcing (Workforce Management)	-	187.6	196.7	206.5	217.0	807.8
Cyber Security Program Management	-	-	71.1	71.1	71.1	213.2
Total	**5.6**	**546.0**	**692.0**	**806.1**	**764.1**	**2,813.7**

We have not included the additional $2.8 million in opex as a step change to our base-year IT forecast. As discussed in Attachment 7.5 Response to the Draft Decision on Opex, we have absorbed this increase in lieu of any top-down imposed productivity adjustment.

Advantages of delivering this work as part of One IT

Though the capex costs allocated to DBP during the AA5 period ($2.4 million) are higher than those originally estimated for the standalone DBP program ($1.7 million), there are advantages to our cyber security uplift being delivered as part of the broader Uplift Cyber Security Technology and Capabilities program.

First of all, the broader program is delivering additional IT architecture improvements, which will enable DBP to reduce the current risk associated with MIL 1 and ensure current and future legislative obligations are met. The original standalone DBP program did not consider the emerging security of critical infrastructure obligations and would likely not have satisfied the revised requirements of the Act. By incorporating DBP's cyber security uplift into the One IT program of work, we have the opportunity to ensure our plan will satisfy the likely outcomes of the Act and ensure the expenditure we incur is fit for purpose.

Transitioning the Group to a consistent cyber security framework is the only way of minimising the risk for the continued safe, reliable and secure operation of the DBNGP in the environment of the increasing inter-dependence and inter-operationality of our various businesses. We expect that cyber security vulnerabilities in any one part of the Group could put at risk the operation of many critical energy infrastructure assets across Australia.

In terms of additional architecture enhancements, the Uplift Cyber Security and Capability program will deliver consistent identity and access management processes across DBP and the other AGIG businesses, as well as provide enhanced situational awareness, and event and incident response procedures. Moreover, the broader program will deliver these additional architecture improvements at a relatively low incremental cost due to economies of scale and scope.

DBP will also benefit from ongoing efficiencies due to being part of a larger IT shared services platform. Having consistent cyber security arrangements across AGIG means ongoing IT maintenance and update costs can be shared with the other businesses. This should lead to lower forward-looking costs, through access to greater economies of scale, than would otherwise be incurred if DBP remained operating standalone operating platforms.

Cyber security driven by other IT projects

In its review of our initial proposal, EMCa commented:

> *a large number of the projects or aspects of the AA5 projects appear to be BAU activities or closely related to work undertaken in AA4 (e.g. 'Develop an approach that ensures all systems implemented by DBP are 'secure by design'…; 'Define appropriate network architectures and processes to enable the effective management of IT, IoT, and OT devices').*[92]

EMCa is correct in that the delivery of the various AA5 application upgrades will result in some security improvements simply due to DBP running the latest software versions. However, it is important to distinguish between the scope of this IT Security business case and the various other technology business cases (IT sustaining, IT enabling and IT infrastructure), and how they combine to achieve DBP's overall level of cyber security.

The MIL rating relates to the security of the IT framework. A MIL rating is the result of the IT security policies, procedures and protocols at an organisation. These are the key items that underpin the technology uplift required to achieve a certain level of cyber security.

The IT security business case proposes investment in DBP's IT framework only. The initiatives that comprise the Uplift Cyber Security Technology and Capabilities program will deliver the necessary processes/procedures/protocols which then define the how and when security upgrades and enhancements to its applications need to be implemented.

Think of the program as the blueprint for the various IT software and hardware components that should be rolled out to ensure cyber security. The IT sustaining, enabling and infrastructure investments are required to deliver the technology uplift in line with the IT framework. It is only when both the infrastructure uplift and technology uplift are aligned that an overall uplift in security will be achieved.

The various IT projects originally proposed in the AA5 proposal have been revisited and are also being delivered as part of the One IT Strategy. The IT sustaining, enabling and infrastructure investments proposed for AA5 have therefore been reassessed and re-scoped to ensure they align with the IT cyber security framework requirements.

This is potentially the greatest advantage of combining DBP's IT activities within the broader AGIG One IT Strategy. Whereas in the past DBP's IT planning has been admittedly reactive and in some cases ad-hoc, by rescoping and delivering our requirements as part of a proactive strategy, we can deliver IT investments in a more coordinated manner, sharing costs and seeking efficiencies across the Group.

[92] EMCa Technical Review, p.133

We therefore submit that while there is some overlap in cyber security activities between business cases, there is no overlap or double-count of expenditure within DBP, or the Group's forecasts.

1.4 Summary

1.4.1 Estimating the efficient costs

Table 6 shows the forecast capital costs of the full unallocated (AGIG) Uplift Cyber Security Technology and Capabilities program.

Table 6: Unallocated (AGIG) capex estimate, Uplift Cyber Security Technology and Capabilities, $'000 June 2020

Initiative	2021	2022	2023	2024	2025	Total
Risk Management	276.0	28.0	-	-	-	304.0
Asset, Change, and Configuration Management	-	77.0	337.0	-	-	414.0
Identity and Access Management	1,084.0	400.0	500.0	350.0	-	2,334.0
Threat and Vulnerability Management	303.0	-	-	-	-	303.0
Situational Awareness	163.0	-	-	-	-	163.0
Information Sharing and Communications	-	255.0	373.0	-	-	628.0
Event and Incident Response, Continuity of Operations	607.0	-	-	-	-	607.0
Supply Chain and External Dependencies Management	224.0	-	-	-	-	224.0
Security Resourcing (Workforce Management)	617.0	333.0	120.0	120.0	-	1,190.0
Cyber security Program Management	359.0	203.0	-	-	-	562.0
Total	**3,633.0**	**1,296.0**	**1,330.0**	**470.0**	**-**	**6,729.0**

Table 7 shows the forecast operating costs of the full unallocated (AGIG) Uplift Cyber Security Technology and Capabilities program.

Table 7: Unallocated opex estimate, Uplift Cyber Security Technology and Capabilities, $'000 June 2020

IT architecture uplift	2021	2022	2023	2024	2025	Total
Risk Management	-	-	28.0	28.0	28.0	84.0
Asset, Change, and Configuration Management	-	-	-	28.0	28.0	56.0
Identity and Access Management	8.0	428.0	428.0	578.0	428.0	1,870.0
Threat and Vulnerability Management	-	168.0	168.0	168.0	168.0	672.0
Situational Awareness	-	28.0	28.0	28.0	28.0	112.0
Information Sharing and Communications	-	-	160.0	280.0	280.0	720.0
Event and Incident Response, Continuity of Operations	8.0	400.0	400.0	400.0	400.0	1,608.0
Supply Chain and External Dependencies	-	-	-	-	-	-

IT architecture uplift	2021	2022	2023	2024	2025	Total
Management						
Security Resourcing (Workforce Management)	-	536.0	562.0	590.0	620.0	2,308.0
Cyber Security Program Management	-	-	203.0	203.0	203.0	609.0
Total	**16.0**	**1,560.0**	**1,977.0**	**2,303.0**	**2,183.0**	**8,039.0**

Table 8 shows the costs to be incurred by DBP during the AA5 period, a 35% allocation based on revenue. Table 9 summarises total AA5 capex on uplift cyber security technology and capabilities, including escalation to dollars of December 2020.

Table 8: DBP allocated Capex estimate, Uplift Cyber Security Technology and Capabilities, $'000 June 2020

DBP allocation	2021	2022	2023	2024	2025	Total
Capex	1,271.6	453.6	465.5	164.5	-	2,355.2
Opex	5.6	546.0	692.0	806.1	764.1	2,813.7
Total expenditure	**1,277.2**	**999.6**	**1,157.5**	**970.6**	**764.1**	**5,168.9**

Table 9: Uplift Cyber Security Technology and Capabilities, summary of AA5 capex

	2021	2022	2023	2024	2025	Total AA5
Total capex ($ Jun 20)	1,271.6	453.6	465.5	164.5	-	2,355.2
Escalation	13.5	5.8	7.0	2.8	-	29.1
Total capex ($ Dec 20)	**1,285.1**	**459.4**	**472.5**	**167.3**	**-**	**2,384.3**

Our program of work to be undertaken as the AGIG-wide Uplift Cyber Security Technology and Capabilities program is commensurate with the programs of other energy infrastructure businesses, considered prudent by EMCa and the AER. Moreover, it is expected to be delivered at a lower cost than the costs considered efficient by EMCa and the AER.

The unit rates used for all projects managed within this program of work include the internal labour, external labour and materials/other costs forecast. Where significant technological synergies exist between certain projects, costs have been shared across a project to avoid duplication of effort and cost.

Project estimates for the AGIG total costs, both capital and operating, have been developed by an independent expert (EY) in conjunction with AGIG subject matter experts. They are based on the latest market conditions and rates, and the specialist industry knowledge of EY. A mix of internal and external resources will be used for delivering the initiatives based on skillset requirements, and due consideration has been used to determine the requirements to implement the initiatives and transform our cyber security environment in a structured and prudent manner.

Delivery of the program will be subject to a competitive market tender process prior to project initiation. Works will be undertaken in line with our IT Project Management Policy and Delivery frameworks, and supported by our IT technical governance frameworks. We will endeavour to deliver the program for lower than forecast where practicable, and reallocate any savings to deliver our broader IT strategy accordingly.

1.4.2 Consistency with the National Gas Rules

In developing these forecasts, we have had regard to Rule 79 and Rule 74 of the NGR. With regard to all projects, and as a prudent asset manager/network business, we give careful consideration to whether capex is conforming from a number of perspectives before committing to capital investment.

NGR 79(1)

The proposed solution is prudent, efficient, consistent with accepted and good industry practice and will achieve the lowest sustainable cost of delivering pipeline services:

- **Prudent** – The expenditure is necessary in order to ensure availability of customer services, and fulfilment of regulatory expectations. In particular we have identified gaps in our approach to cyber security compared to the AESCSF which need to be addressed in order for us to appropriately manage cyber risk for our organisation. This expenditure is therefore of a nature that a prudent service provider would incur.
- **Efficient** – The implementation of the proposed cyber security capability uplift initiatives to achieve MIL 3 is the most practical and effective option. Given the present regulatory environment and increasing incidence of cyber-attacks, it is efficient to invest in sustainable cyber security capabilities proactively. Work will be carried out by internal staff and external contractors as skills demand requires. Any work carried out by external contractors will be based on competitively tendered rates as per the procurement process. The proposed expenditure is therefore of a nature that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed initiatives have been derived from the AESCSF and are aligned with accepted and good industry practice.
- **To achieve the lowest sustainable cost of delivering pipeline services** – The implementation of the proposed cyber security capability uplift initiatives to achieve MIL 3 is necessary to achieve the required risk reduction and maintain reliable customer service. Failure to do so would result in significant operational risks arising from uncontrolled incidents and breaches resulting in financial, reputational and regulatory implications. The project is therefore consistent with the objective of achieving the lowest sustainable cost of delivering services.

NGR 79(2)

Proposed capex is justifiable under NGR 79(2)(c) (i), (ii) and (iii), as it is necessary to maintain and improve the safety of services, maintain the integrity of services, and comply with regulatory obligations such as the Security of Critical Infrastructure and Foreign Investment Review Board requirements. The proposed capex program will deliver a significant reduction in the likelihood and impact on health and safety, compliance, operational, reputation & customer, and financial risks. Through this risk reduction, we will be able to provide reliable and sustained services to our customers in accordance with our obligations. Furthermore, we will be better placed to comply with cyber security regulatory obligations by providing accurate reporting through the enhanced security of systems and integrity of the underlying data.

NGR 74

The forecast costs are based on independent expert advice using typical vendor market rates, historical labour rates, published license fees and standard implementation costs. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A – AGIG One IT Strategy 2019-2024

Appendix B – Cyber Security 5 Year Roadmap