

Marinus Link Stage 1B Revenue Proposal

Updated Independent Review of
Marinus Link Stage 2
Expenditure July 2025 to June
2030

Marinus Link

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Acronyms

Acronym	Description
AACEI	Association Advancement Cost Engineering International
AER	Australian Energy Regulator
BOW	Balance of Work
CB	Cable Supply, Installation & Commissioning Package (incl. LHDD)
CCW	Converter Civil Works and Installation
CDCS	Converter Station Design, Supply & Installation
CDSE	Converter Equipment Design, Supply & Commissioning
DAB	Dispute Avoidance Board
D&A	Design and Approvals
ECI	Early Contractor Involvement
EES	Environmental Effects Statement
EIA	Environmental Impact Assessment
EPC	Engineer Procure Construct
FO	Fiber Optic
FTE	Full Time Equivalent
GFA	Gross Floor Area
GHG	Greenhouse Gas
GIS	Gas Insulated Switchgear
GPS	Generator Performance Study
HDD	Horizontal Directional Drilling
HE	Hitachi Energy
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ISP	Integrated System Plan
ITC	Incentivised Target Cost Scheme
ITP	Inspection and Test Plan
LCC	Land Cable Civils
LDV	Leonardo Da Vinci (Cable Installation Vessel)
LHDD	Landfall Horizontal Directional Drilling
LNTP	Limited Notice to Proceed
MLPL	Marinus Link Pty Ltd
NEM	National Energy Market
OEI	Offshore Electricity Infrastructure Act

PEC	Project Energy Connect
PPL	Prysmian Powerlink S.r.l
PQ	Pre-qualification
PSA	Planning Scheme Amendment
TBH	Tracey Brunstrom & Hammond
T&I	Transport and Installation
TCD	Transmission Cost Database
TDR	Time Domain Reflectometry
TJB	Transition Joint Bay
TNSP	Transmission Network Service Provider
TOV	Temporary Overvoltage
TR	Thermal Resistivity
UXO	Unexploded Ordinance
VSC	Voltage Source Converter

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Executive Summary

Aurecon was engaged to provide Marinus Link Proprietary Limited (MLPL) with an independent assessment of the prudence and efficiency of the expenditure estimates that it is seeking to put forward to the AER as part of its Stage 1B Revenue Proposal from July 2025 to June 2030 (FY30).

This report is a revised assessment from Aurecon's assessment in November 2024, which was submitted to the AER. The AER's Initial Draft Decision accepted MLPL's forecast cost for the cable and converter packages, which was the principal focus of the AER's review of MLPL's original Revenue Proposal. In this report, Aurecon has reproduced its assessment from November 2024 in relation to the cable and converter packages and noted minor variations in these contracts since November. The remainder of this report focuses on MLPL's updated Balance of Works, support activities, and risk allowance cost estimates.

Marinus Link will be delivered through five major capital works and delivery scopes which are outlined below:

Table 1-1 MLPL Expenditure Items and Status

Scope Item	Description
Converter Design and Equipment Supply (CDSE)	- As part of the project's scope, MLPL has separated out converter stations (equipment) – which convert alternating current into direct current or vice versa – into one capital works contract. - MLPL has undergone a competitive procurement process and has an executed contract with Hitachi Energy to deliver this scope of work.
Cable System Design, Supply and Installation (CB)	- The design, supply and installation of submarine and land cables has been separated out from civil works into a single contract which MLPL took to market. - The scope of the contract also includes landfall horizontal directional drilling. - MLPL has signed an executed contract for this item with Prysmian Powerlink S.r.l.
Balance of Works – Land Cable Civil Works & Converter Civil Works and Installation	- Civil works for both Land Cables and Converter Stations are to be tendered within a single "Balance of Works" package (ongoing). - MLPL is currently in the process of finalising its preferred contractor which will be contracted under an incentivised target cost (ITC) scheme. An early contractor involvement process (ECI) proceeded to inform the structure of the BOW package and better understand constructability and risk areas for the project. - As the tender process for this package is ongoing, MLPL's forecast reflects a Class 2 estimate provided by one of the contractors which has been market tested via the tender process. The estimate reflects 20 weeks of collaboration between the Contractor, OEMs, MLPL, and external advisors of MLPL such as the Owner's Estimator. The estimate has been verified by MLPL's Owner's Estimator.
Supporting Activities	MLPL, with the support of its external expert advisor E3 Advisory, has put forward an estimate of the expenditure it will be required to incur relating to various activities such as land and easement acquisition, stakeholder engagement, technical designs, procurement, delivery partner costs, program management, corporate business costs, and others.
Risk	- Major infrastructure is subject to various risks which can be inherent or contingent in nature. Costs may also relate to prolongation of the project. Risk allowances are included in major infrastructure project budgets to accommodate for these risks materialising. - MLPL, with the support of its external expert advisor E3 Advisory, has put forward a risk allowance for these risks.

In the table below, we summarise our findings for each of the scope elements included within our review.

Table 1-2 Key Findings

Expenditure Item	Real June 23 \$m Cumulative to FY30	Key Takeaways
Converter Design and Equipment Supply	773.2	■ The scope of work, procurement process, and price outcome for the CDSE package appears reasonable in the context of the current market environment. Risks where identified have been contracted out or managed wherever possible under the EPC structure, with reasonable deviations accepted by MLPL as necessary. ■ The Hitachi tender offer is based on standard OEM specification with limited room for deviation and is expected to comply with the scope and technical specifications with some exceptions. These exceptions appear to be well understood by all parties and are being managed to ensure that there are no scope gaps in the overall project delivery. ■ Despite current supply chain challenges and limited market players in the HVDC sector, MLPL's procurement process was competitive and efficient. The receipt and evaluation of more than one detailed proposal aligns with industry expectations, showcasing a prudent approach under current market conditions. ■ The negotiated cost for the CDSE package aligns with interconnector project benchmarks but is higher than offshore generation project references. No recent interconnector projects in Australia were considered due to the absence of comparable local references. Whilst there are limited Australian references, we note that we would expect the cost to be higher in Australia than international benchmarks due to local technical requirements and market dynamics. The project's lower capacity at 750MVA also impacts economies of scale, contributing to the cost differences.
Cable System Design, Supply and Installation	918.9	■ The scope of work, procurement process, and price outcome for the CB package appears reasonable in the context of the current market environment. Risks where identified have been contracted out or managed wherever possible under the EPC structure, with reasonable deviations accepted by MLPL as necessary. ■ The cable supply contract meets the Owner's Requirements, adhering to appropriate design standards and management plans. ■ The contracts adopt a conservative approach in areas such as cable sizing, thermal backfill, and depth of LHDDs to minimise unforeseen cost escalations. This approach may limit potential cost savings but reduces the risk of substantial future expenses. ■ The chosen delivery package split aligns with industry norms and aims to gauge market interest, balancing complexity with strategic benefits. This approach and procurement process was considered competitive and efficient by Aurecon given the market constraints. ■ Including the HDD scope in the contract, despite its complexity, helps mitigate significant project risks, such as vessel standby costs. This approach was crucial for securing project bankability and satisfying financiers' concerns. ■ Total design supply and installation costs for the offshore and onshore cable system were also benchmarked against four similar projects and the MLPL cost can be seen as at the lower end in terms of cost per km. However, it is marginally higher on a cost per km basis than Reference Project 4 which is the most comparable benchmark being a 320 kV system and having the closest total cable length. ■ The price received is reflective of a competitive market process in a region which offers less opportunity for suppliers, relative to the European

Expenditure Item	Real June 23 \$m Cumulative to FY30	Key Takeaways
		market. As such, MLPL has limited market power, and we would not expect a more competitive outcome given the current climate.
Balance of Works	945.8	Land Cable Civil Component - MLPL has put forward a market tested Class 2 cost estimate (tested via tender process) as the basis for its expenditure submission to the AER, based on one of its contractor responses. - Aurecon considers that the design assumptions and the implied expenditure put forward by MLPL with respect to the scope of civil works and the estimation method for quantities are reasonable in this context. The approach taken by the Contractor to specify trenching requirements and joint bays (the largest capital expenditure items) is consistent with expectation. - Opportunities to reduce pavement depth may exist once project delivery commences and the contractor attends site, provided that vehicle mass assessments and geotechnical data support this (i.e. the area is not overly flood-prone). We understand that some geotechnical investigation is still ongoing. [REDACTED] Converter Station Civils - MLPL has put forward a Class 2 cost estimate as the basis for its expenditure submission to the AER. - The Scope put forward by MLPL's Contractor is aligned to Australian standards and has been developed to meet the requirements of Hitachi (as the CDCS package must accommodate the requirements of the CDSE). - The basis of design documents have articulated the requirements for bulk earthworks, site access, the various structures of the converter stations, transformer areas, site services, and reinstatement and remediation where applicable. The design decisions and approach taken by the Contractor appear reasonable. - Key differences between the two sites include the ground conditions at Heybridge (where contamination of the land exists) and softer soil conditions at Hazelbrook, which lead to additional excavation requirements. - In some instances, further study and design progression would be beneficial, but the gaps identified are reasonable at the 70% design stage for a Class 2 estimate. Procurement Process and Cost - Overall, Aurecon is satisfied that the Class 2 estimate put forward by MLPL is reasonable and is of the view that the procurement process has been efficient given the current market conditions. - MLPL has engaged extensively with the market on contract structuring, packaging of scope items, and the treatment of risk. - MLPL has sought external advice from Currie & Brown throughout the tender process to support the evaluation of BOW package from the potential contractors. Currie & Brown's scope has included key tasks such as:

Expenditure Item	Real June 23 \$m Cumulative to FY30	Key Takeaways
		– Validate that the respondent's Target Outturn Cost has been developed in an appropriate manner. – Validate and confirm that the construction methodology, unit rates, and quantities of items within the Cost Plan are consistent with the scope of work specified. – Review the cost composition of direct and indirect costs for each respondent on a first principles basis and based on market estimates. ■ In Aurecon's view, the scope of the Owner's Estimator is extensive and likely to provide assurance that the cost estimate put forward is suitable for use as a Class 2 estimate and unlikely to deviate substantially. ■ MLPL has undertaken several rounds of value engineering over a 20-week period which has included collaboration with Currie & Brown, the BOW contractors, Prysman, Hitachi, and MLPL's team.
Supporting Activities	524.0	■ In Aurecon's view, MLPL's proposed expenditure and scope for support activities (exclude sustainability initiatives, insurance and hedging which were not assessed) is likely to be reasonable. ■ Aurecon is satisfied that the scope of the activities reviewed, which includes land and easement acquisition, landowner and stakeholder engagement, environmental impact assessments, procurement, program management, technical studies, and broader corporate costs are well defined and necessary. ■ The costs associated with these supporting works are based on varying approaches, including bottom-up labour estimates, judgements from MLPL's experience, input from external advisors, historical costs and quotes from the market. ■ MLPL has a higher FTE headcount compared to peer projects such as HumeLink, but this is likely a function of several corporate/administrative staff at peers being spread across multiple projects (lower FTE allocation or being treated as indirect costs), or due to differences in delivery structure. This point is quite important, as it makes benchmarking support activities of MLPL relative to peer projects or TNSPs challenging on a like for like basis. This is somewhat expected for a single project TNSP. ■ Aurecon is satisfied that the use of a delivery partner is likely to be beneficial to MLPL as Jacobs is providing specialised expertise that may not be readily available, there is a degree of risk transfer from MLPL, a delivery partner provides flexibility in mobilisation and demobilisation, and recruitment risk is reduced. ■ In some areas, Aurecon was not able to fully assess the reasonableness of costs (e.g. external legal support), or did not review their basis in detail due to limited materiality. For a small number of activities, Aurecon did not review their basis in detail due to limited materiality and did not fully assess the reasonableness of these costs.
Risk	363.0	■ Overall, the process undertaken appears robust. The E3 Risk report comprehensively outlines the scope, AER compliance requirements and structuring of the assessment given the contract packaging and pricing approach. Residual risk requirements and principles are clearly stated and appear to align with regulatory guidance and best practice. The risks that were considered in the QRA are clearly set out and detailed. ■ E3 has outlined in its risk report how MLPL has sought to manage each of the risks considered and how residual risk remains. E3 has also outlined precedents where these risks have materialised in major infrastructure delivery.

Expenditure Item	Real June 23 \$m Cumulative to FY30	Key Takeaways
		■ Aurecon has reviewed the monetary values and probabilities assumed in E3's analysis. We believe that they are reasonable. ■ With respect to the aggregate contingency allowance, Aurecon notes that the current estimate implies circa 10% of capex which is consistent with benchmarks Aurecon has observed for subsea HVDC projects and recent AER determinations (for HumeLink).
Total (excluding Interest During Construction & Financing Fees)	3,524.9	■ Overall, Aurecon is satisfied that the expenditure that MLPL is seeking to recover reflects a prudent and efficient scope for the delivery of the project. ■ Aurecon has reviewed the various work packages across the project and benchmarked costs on a top-down basis and bottom-up basis where possible. ■ For the Supporting Costs and Balance of Works package where costs are not formally "contracted," we note that the approach taken by MLPL is reasonable. ■ The design for the BOW package has not yet been finalised and therefore some limited design optimisation opportunities could exist provided that geotechnical investigations and mass calculations support this. Equally, there are further studies that could impact cost such as landslide assessments and cable pulling risk as identified by the Contractor. ■ The use of an Owner's Estimator provides Aurecon further confidence that the figures have been tested and are not likely to deviate substantially. ■ Aurecon is satisfied with the aggregate risk allowance allocated to the project. Interface risks have been well considered and the allowance allocated is within benchmark range. The approach to risk estimation is well considered given the complexity of the project.

1 Introduction

This section specifies the project's background, purpose of the report, Marinus Link's project status, Aurecon's scope of work and independent review limitations.

1.1.1 Background

Marinus Link is a significant national infrastructure project that should deliver considerable benefits to electricity consumers by reducing wholesale electricity prices. The project includes the construction of approximately 255 kilometres of undersea High Voltage Direct Current (HVDC) cable and roughly 90 kilometres of underground HVDC cable in Victoria. It also includes converter stations in both Tasmania and Victoria.

The total interconnection capacity will reach 1500 MW, facilitated by two 750 MW cables (circuits). The first cable is expected to be commissioned in 2030, while the second cable is not expected to be required before 2034. The timing of the second cable will be kept under review, including through the Australian Energy Market Operator's (AEMO's) national planning role.



Figure 1-1 Marinus Link

Marinus Link is part of a larger project, which is referred to as Project Marinus, which will be developed and owned by different entities:

- Marinus Link will be owned and operated by Marinus Link Pty Ltd (MLPL).
- The Northwest Transmission Development component of Project Marinus will be owned and operated by TasNetworks.

Marinus Link aims to address Australia's need for affordable and reliable electricity as coal-fired generation plants retire. By leveraging Tasmania's existing hydro capacity, wind resources, and energy storage capability, Marinus Link will provide the National Electricity Market (NEM) with low-cost, on-demand, and clean energy.

1.1.2 Marinus Link Project Status

In accordance with the Australian Energy Regulator's (AER) Commencement and Process Paper, as amended in March 2024:

- Marinus Link's Revenue Proposal Part 1A (Early Works) covered its early works expenditure period from 1 July 2021 to 31 December 2024.
- The scope of MLPL's Revenue Proposal – Part 1B (Construction costs) is limited to the works required to deliver the first cable and the necessary works in readiness for the second cable.
- MLPL's first regulatory period will apply from 1 July 2025 to 30 June 2030.
- The second cable will be treated as a Contingent Project, which may be triggered during MLPL's first regulatory control period.

Figure 1-2 below shows the timelines for the revenue determinations for Stage 1, which comprises Part A (Early Works), Part B (Construction Costs) and Stage 2. It also shows the proposed duration of the first and second regulatory periods, with the latter provided for information only.

Marinus Link previously submitted a revenue proposal to the AER in November 2024 for consideration with contracted costs for cable supply and installation, and for converter design and supply of equipment. This report includes an updated assessment from Aurecon with revised costs for the remaining packages (Balance of Works, Risk and Supporting Costs).

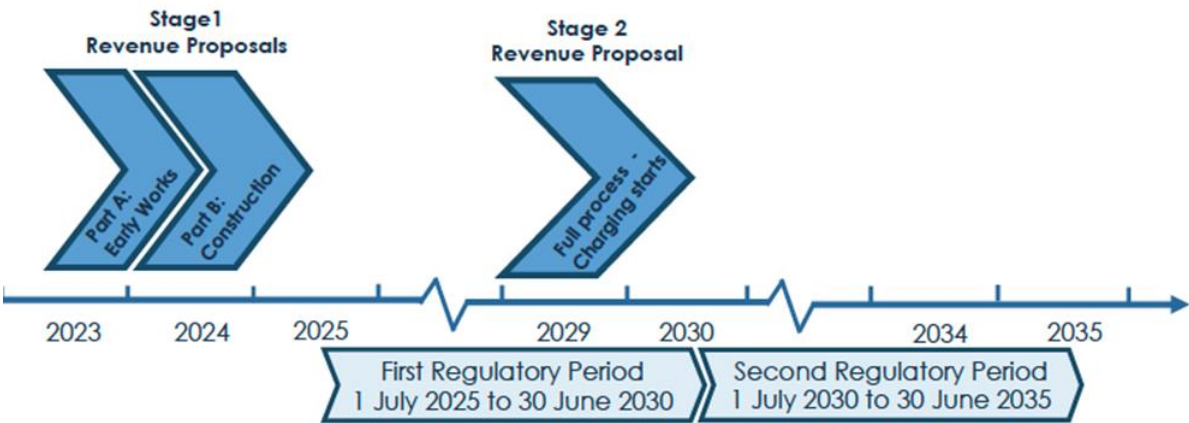


Figure 1-2 Marinus Link Regulatory Process

1.1.3 Delivery Package and Procurement Overview

The Marinus Link project will be delivered primarily through three major capital works packages:

- Cable supply and installation (CB);
- Converter design and supply of equipment (CDSE); and
- Balance of works packages – Converter design and construct and land cable civils.

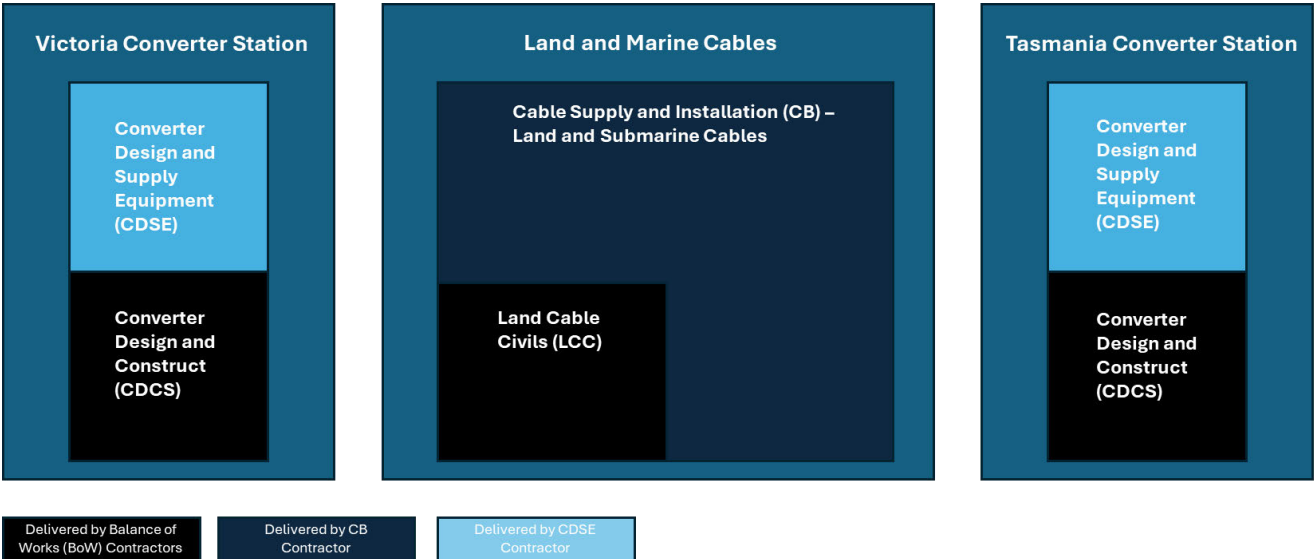


Figure 1-3 Marinus Link Delivery Packages

The delivery of the project in these three packages is based on extensive feedback that MLPL has received to ensure that its procurement approach and delivery strategy is best in class, given several unique challenges due to the project’s isolated location in Australia:

- A limited number of international suppliers exist with the required skills and experience to meet MLPL’s requirements. They may also have limited experience in the Asia Pacific region.

- Marinus Link is located remotely from manufacturing bases, headquarters and engineering offices, creating logistical challenges for prospective service providers.
- Cable laying vessels will likely need to be relocated from the Northern Hemisphere, which is time sensitive and costly, given the high demand for their services in Europe and North America.
- Prospective service providers are less likely to have relationships with local contractors, which introduces additional risks and uncertainties compared to competing projects located in more familiar markets.
- Suppliers for HVDC projects are likely to have greater market power than MLPL, given that there is a larger demand for HVDC projects in Europe relative to the Asia Pacific/Oceania region where Australia is located (see Figure 1-4 below). This implies that suppliers and manufacturers are less willing to negotiate on key risk positions.

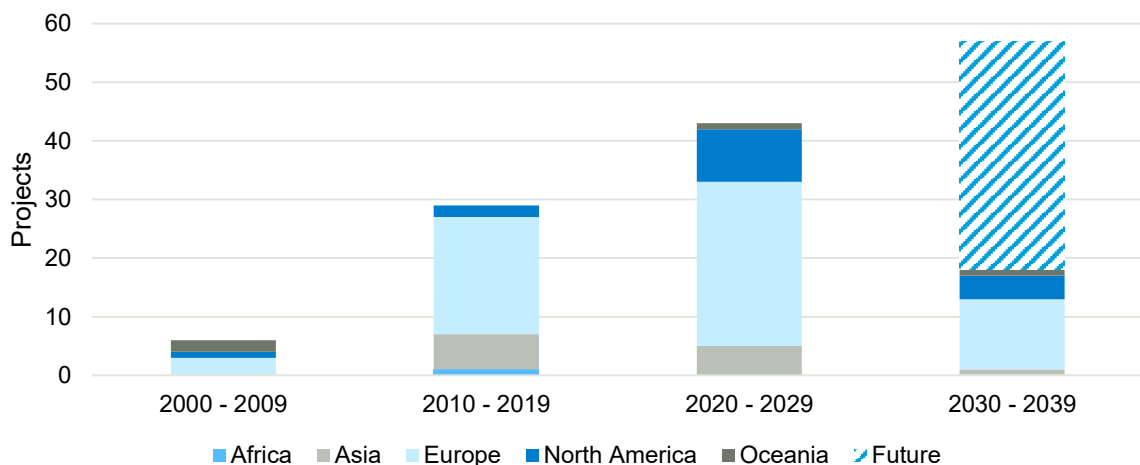


Figure 1-4 Market Outlook for Converter Stations (sourced MLPL)

MLPL has sought to manage these risks by seeking expert advice on its procurement and delivery strategy, specifically on aspects such as (but not limited to):

- Packaging capital works for efficiency.
- Optimal number of parties within each procurement process and their respective market power against each package.
- Suitability of various contracting models when considering package specific risks and their alignment to supplier's expectations.
- Ensuring that technical requirements in RFQs are aligned to the majority of the tenderer's capabilities and expectations as far as reasonably practicable.
- Ensuring that incentive and risk sharing arrangements are balanced.
- Provisioning for risk that could arise from interface risks.

Aurecon has reviewed MLPL's explanatory notes across each of its various delivery packages, which articulate its procurement approach as a result of the above analysis (noting that not all information has been reviewed due to commercial sensitivity). Aurecon has also relied on discussions with MLPL.

MLPL has also engaged with the AER to provide background on the challenges faced by the project and MLPL's decision making process.

MLPL has also engaged extensively with its Consumer Advisory Panel from 2022 where possible, to receive feedback on procurement decisions which are likely to involve price-risk trade-offs, which will be of particular interest to consumers.

The Consumer Advisory Panel received encouragement from MLPL to also procure an independent procurement advisor to facilitate their input into MLPL's procurement approach to ensure it was balanced. The Panel subsequently appointed Tate Consulting Services, who has provided input into MLPL's procurement approach on behalf of the Panel since 2023.

As part of MLPL's Stage 1B submission to the AER, we note that tender outcomes have been confirmed for the CB and CDSE contractors. The balance of works packages is still pending at the time of drafting this report but is expected to be finalised in July 2025.

Purpose of this report

The purpose of this report is to:

- Provide an independent assessment of the real expenditure (June 2023) from 1 July 2025 to 30 June 2030 for Stage 1 Part B (Construction Works) of Marinus Link.
- Evaluate the likely prudence and efficiency of the forecasts based on the Expenditure Forecasting Methodology used in Stage 1 Part B.
- Determine whether the costs and forecasts outlined in Stage 1 Part B are likely to be prudent and efficient, and whether they are essential to meet project timelines, reduce final project costs, and/or minimise schedule and cost risks.

1.1.4 Limitations

- The scope of Aurecon's work relates to Marinus Link which encompasses the scope of converter sites, the required infrastructure between the sites in Hazelwood in Victoria and Heybridge in Tasmania, and not "Project Marinus" which includes broader transmission infrastructure within Tasmania.
- Given the time constraint placed on Aurecon in undertaking this review, we have focused our review on the material cost items within Marinus Link's expenditure model and Stage 1B proposal to the AER. For costs related to capital works, this generally means costs in excess of \$10m. For those related to labour or services costs, this relates to those greater than \$1m or so.
- The scope of this assessment only spans one circuit of 750MW within the overall project. Civil works for both circuits however are included within the scope of our review.
- This report, prepared by Aurecon for MLPL, is intended solely for the use and reliance of MLPL for the agreed-upon purpose stated in Section 1.1.2 of this report.
- Aurecon explicitly disclaims any responsibility to any other party arising from this report. Implied warranties and conditions are also excluded to the extent permitted by law.
- Aurecon's services in preparing this report were limited to the scope limitations stated within the report.
- The opinions, conclusions, and recommendations in this report are based on the conditions and information reviewed at the time of its preparation. Aurecon is not obligated to update the report to account for subsequent events or changes.
- The opinions, conclusions, and recommendations in this report are based on assumptions made by Aurecon as outlined in the report. Aurecon disclaims any liability that may arise from the incorrect assumptions.
- Although Aurecon has made assertions on the scope of activities Marinus Link has sought to undertake, Aurecon has not in all instances cited or verified every output produced by MLPL, or provided judgement on the quality or completeness of all documents referenced.
- Aurecon has not verified the integrity of any calculations or inputs to the expenditure estimates provided to us by MLPL and assumes information provided is accurate unless otherwise stated or observed.

2 Independent Verification Process

Aurecon has provided an independent verification of the capital works put forward by Marinus Link by utilising a range of verification approaches such as:

- Engaging with MLPL to understand how the scope of work has been developed, testing the resourcing and procurement strategy and timeframes for implementation.
- Reliance on tender documentation – Aurecon has reviewed documents provided by MLPL which provide the basis for pricing via a competitive process.
- Benchmarking – Aurecon has benchmarked expenditure cost elements based on publicly available project benchmarks, our project experience, and databases such as AEMO's Transmission Cost Database.
- Assessing whether costs proposed are prudent and would be incurred by other Transmission Network Service Providers (TNSP) in similar circumstances.
- Evaluating whether internal or service providers costs are complete and represent an efficient team structure and position rate.
- Reviewing timeframes developed by MLPL to deliver on its work programs.
- Verification of unit rates and underlying assumptions where costs have been provided by third parties.

3 MLPL Stage 1B Expenditure Cost and Methodology Summary

This section summarises the total expenditure MLPL is seeking to recover as part of this revenue proposal and the methodology Aurecon understands has been applied to derive actual and forecast projections. Aurecon's summary is outlined below.

Table 3-1 Total Expenditure Cost

Expenditure Item	Real June 2023 \$m Cumulative to FY30	MLPL Methodology
Converter Design and Equipment Supply	773.2	- MLPL has worked with its technical advisors and internal SMEs to develop a technical specification for this work package. - MLPL issued this technical specification to contractors and undertook both a long-listing and short-listing process as a part of its EPC procurement process. - MLPL received responses from three parties, then evaluated the competitiveness of their financial offer, technical alignment to the specification, and risk profile. - The proposed cost reflects market pricing from the tender process.
Cable System Design, Supply and Installation	918.9	- MLPL has worked with its technical advisors and internal SMEs to develop a technical specification for this work package. - MLPL issued this technical specification to contractors and undertook both a long-listing and short-listing process as a part of its EPC procurement process. - MLPL received responses from two parties, then evaluated the competitiveness of their financial offer, technical alignment to the specification, and risk profile. - The scope includes Landfall Horizontal Directional Drilling (LHDD). - The cost put forward reflects market pricing from the tender process.
Balance of Works – Land Cable Civil Works & Converter Civil Works and Installation	945.8	- MLPL is currently in the process of finalising the tender for the BOW package. - The current cost estimate put forward by MLPL reflects the week 20 offer from one of the two prospective contractors and is a Class 2 estimate. MLPL has been collaborating with the contractor, OEMs (Prysmian, Hitachi), and external advisors such as Currie & Brown to refine and develop the Class 2 cost estimate that has been put forward. - The scope, construction methodology, pricing, risk, and interfaces have been tested over the past 20 weeks as the design and cost estimate has been developed. - The cost estimate has been tested independently and validated through a review of market prices and first principles-based assessments by Currie & Brown (MLPL's Owner's Estimator).

Expenditure Item	Real June 2023 \$m Cumulative to FY30	MLPL Methodology
Supporting Activities	524.0	■ MLPL has put forward a bottom-up cost estimate for supporting activities, which includes activities such as land and easement acquisition, engineering and technical support, system studies, environmental impact assessments, and corporate support costs, among others. The bottom-up estimate has also been subject to top down reviews by MLPL's executive team. ■ Land and easement acquisition costs have been derived from expert input from MLPL's advisors, in accordance with State legislation with respect to land acquisition where applicable. ■ MLPL has also prepared bottom-up cost estimates for engineering and technical support and system studies which it will require for implementation of the project. ■ MLPL has developed a bottom-up cost estimate for its management costs (owners' costs). This includes the cost of technical staff, corporate staff, indirect costs, and on-costs of labour. ■ The majority of costs have been cross-checked against benchmarks where possible or reviewed by the appropriate internal SMEs. ■ External advice from E3 has been utilised to validate the costs developed.
Risk Allowance	363.0	■ MLPL has utilised the services of E3 to develop a P50 quantitative risk assessment. ■ E3 has put forward a P50 estimate which has been tested for compliance against the AER's requirements. ■ The P50 estimate is indicative of the most material risks to the project which has been developed by MLPL and its advisors across the project's development. ■ E3 has also tested the scope of risk inclusions and exclusions in the context of the project's delivery structure (e.g. an ITC scheme for the BOW package).
Total	3,524.9	

*Totals may not sum due to rounding

In the sections below Aurecon provides further detail on the components which have formed the basis of MLPL's projections and our view on the reasonableness and prudence of these costs.

4 Contracted Cables and Converter Construction Costs

This section summarises Aurecon's review of the activities MLPL has undertaken as part of its Stage 1B submission to the AER for its prudency and efficiency.

This section focusses on elements which are currently contracted by MLPL, namely:

- Converter Design and Equipment Supply (CDSE).
- Cable system design, supply and installation (CB).

4.1 Converter Design and Equipment Supply

This section assesses Converter Design and Equipment supply.

Objectives and scope

Table 4-1 below summarises the objectives and scope of Converter Design and Equipment Supply.

Table 4-1 Objectives and scope of Converter Design and Equipment Supply

Objectives	Scope
■ Contractually agree the expenditure required for contractors to deliver major capital works. ■ Ensure that the tender responses and technical specifications put forward are reasonable and meet MLPL's requirements. ■ Ensure risk is adequately considered or priced into contracts by MLPL and its contractors. ■ Secure contractors to deliver major capital works packages for the design and supply of converter station equipment. ■ Develop a suitable procurement and delivery approach which generates value for money. ■ Ensure project risks are well defined and managed.	■ Procure and install key Converter Station equipment, which is designed to fit MLPL's technical specifications, specifically: – VSC Converters; – Interface Transformers; – Converter Cooling System; – Converter Reactors and Smoothing Reactors; – AC Filters; – DC and AC Voltage and Current Measuring Devices; – AC Circuit Breakers; – DC and AC Disconnectors and Earth Switches; and – Others.

4.1.1 Expenditure Summary

MLPL executed a contract with Hitachi Energy (HE) on 1st May 2024, for the design, supply and commissioning of HVDC equipment for the two converter stations located in Victoria and Tasmania. A Limited Notice to Proceed (LNTP) was issued to HE on August 14, 2024.

The executed contract is a lump sum and as such detailed expenditure breakdowns per activity or sub-package were not provided by HE. While this increases the difficulty to benchmark sub-package costs, it is not unusual for contractors to offer lump sums and provide rates for additional work generally higher than rates used to build the lump sum budget.

Table 4-2 below summarises the costs provisioned by MLPL for the CDSE package in the cost model provided (Marinus Link, 2024). For the purpose of this assessment, prices presented in the signed contract

were de-escalated, presented in real June 2023 terms and converted into AUD following the exchange rates provisioned in MLPL's hedging contract.

Table 4-2 Summary of Supply Costs – Real June 2023 (CDSE)

Cost Element (\$ Real) to FY30	Total (\$m)
Converter Equipment Design, Supply & Commissioning	693.0
Subtotal cost	693.0
Additional Allowances including storage costs, labour adjustment and transformer adjustments	80.2
Total cost^[1]	773.2

^[1] Subtotals and totals may not sum due to rounding.

4.1.2 Scope and Specification Assessment

The table below summarises our review of the scope of work and key terms referenced in the executed CDSE contract and our views on the appropriateness of technical assumptions.

Table 4-3 Scope Provisions & Appropriateness (CDSE)

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Fitness for Purpose of MLPL Specifications	■ MLPL has included a Converter Station Technical Specification (MLPL, 2023) on which the executed contract is based. This Technical Specification includes detailed requirements for all major converter station equipment and systems including: – VSC Converters. – Interface Transformers. – Converter Cooling System. – Converter Reactors and Smoothing Reactors. – AC Filters. – DC and AC Voltage and Current Measuring Devices. – AC Circuit Breakers. – DC and AC Disconnectors and Earth Switches. – Surge Arresters. – Insulators, Bushings, Connectors and Buswork. – Control and Protection System. – SCADA System. – AC and DC auxiliary power systems including transformers, switchgear, switchboards, backup UPS and diesel generator. – Lightning protection and earthing. ■ In addition to the equipment and systems technical specifications, the MLPL Technical Specification (MLPL, 2023) includes detailed performance requirements for the Converter Station.	■ Aurecon has reviewed the technical specifications and performance requirements provided by MLPL for the major converter station equipment and systems and is of the opinion that these: – Are well aligned with typical industry practice for similar projects. – Include sufficient detail for the Contractor to provide a solution that is aligned with the intent of the Technical Specification.

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Hitachi Tender Design	■ The HVDC technology being provided is multi-level VSC technology using a newer version of Hitachi's proven VSC technology that is presently in operation in many projects around the world. ■ Hitachi's proposed solution includes a Grid forming solution on both sides of the HVDC system which will benefit both the AusNet and TasNetworks Grids. It is understood that simultaneous operation of Grid forming capabilities on both sides of the HVDC system has not yet been implemented in practice. ■ The Interface Transformers proposed are Hitachi transformers. ■ The HV Control and Protection system is a proprietary Hitachi system known as MACH3 which is a proven system currently in operation across many Hitachi HVDC VSC control systems. Typical HV protection functions are included for the converter, DC poles, transformers, filters and busses. ■ Hitachi has indicated that their proposed converter design will have lower losses than required by the contract and meet the availability and reliability performance requirements.	■ Hitachi is contractually obligated to meet all Owner Requirements with some deviations as noted and discussed towards the end of this table. Aurecon is of the opinion that these Owner Requirements are aligned with typical industry practice for similar HVDC Converter Stations. The details of the Hitachi proposed solution have a high level of maturity for this stage of the project but are lacking in some areas (for example, detailed control and protection drawings). Hitachi has a proven record delivering HVDC technology and it is understood that most of the equipment and systems will be based on Hitachi's standard design. Consequently, Aurecon expects that Hitachi can deliver a solution that meets the Owner Requirements (Aurecon was not provided with any model specifications to cross check this but has believed this to likely be the case from our experience). ■ The Owner Requirements include scope for the Contractor to develop any new technologies that may be required for the project and Aurecon is of the opinion that this includes any necessary development of any new HVDC technology being proposed, including the control technology for the grid-forming converter capabilities which Hitachi has done on previous projects - but not on both converter sides simultaneously. It is recommended that a comprehensive new technology validation process be implemented as part of this project and that this new technology risk be quantified in project allowances ■ Specifications are in accordance with MLPL tech spec, Hitachi has a standard OEM specification with limited room for deviation.
Scope of Work: Converter Station Design	■ Design all HVDC equipment, systems and sub-systems required for the Stage 1 Converter Stations, including the auxiliary supply system. ■ Complete all necessary electrical studies required to allow for safe and reliable construction and operation of the Stage 1 Converter Station. Hitachi has provided a detailed assessment of the studies that are within their scope of supply in document (Hitachi Energy, 2024).	■ Aurecon is of the opinion that the design scope is aligned with typical industry practice for similar HVDC Converter Stations and meets the requirements of the MLPL technical specifications. ■ Aurecon is of the opinion that the approach to the electrical studies as outlined in the Study Assessment report (Hitachi Energy, 2024) is aligned with typical industry practice for similar HVDC projects.

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Scope of Work: Converter Station Equipment Supply	■ Manufacture and/or procure all HVDC equipment, systems and sub-systems required for the Stage 1 Converter Stations, including the auxiliary supply system. ■ Transport and supply all HVDC equipment, systems and sub-systems required for the Stage 1 Converter Stations, including the auxiliary supply system to the Converter Station sites. ■ Installation of the Interface transformers and the converter valves for the Stage 1 Converter Stations.	■ Aurecon is of the opinion that the manufacturing and procurement scope is aligned with typical industry practice for similar HVDC Converter Stations and meets the requirements of the MLPL technical specifications. ■ Aurecon is of the opinion that the installation scope being limited to the Interface transformers and converter valves is aligned with typical industry practice for similar HVDC Converter Stations adopting a similar contracting strategy.
Scope of Work: Converter Station Testing and Commissioning	■ Test and commission all HVDC equipment, systems and sub-systems required for the Stage 1 Converter Stations, including the auxiliary supply system.	■ Aurecon is of the opinion that the testing and commissioning scope is aligned with typical industry practice for similar HVDC Converter Stations and meets the requirements of the MLPL technical specifications.

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Key Interfaces	■ The scope of the executed contract is fairly typical of similar HVDC equipment design and supply contracts for other projects undertaken recently around the world with the key interfaces being: – Interface between CDSE and CDCS Contractors. – Interface between CDSE and AusNet / TasNetworks / AEMO. – Interface between CDSE and Cable Contractor. ■ The design of the 500 kV overhead connection between the interface transformers and the new 500 kV switchyard appears likely to require an outage to install the second 500 kV connection for Stage 2, which may require an update to the layout.	■ Aurecon is of the opinion that the Division of Responsibility between the CDSE and CDCS contractor is aligned with typical industry practice for similar HVDC Converter Stations adopting a similar contracting strategy. ■ Aurecon is of the opinion that challenges related to the scope split between the CDSE and CDCS Contractor are unavoidable aspects of the adopted contracting strategy but can be properly managed to deliver a successful project. Examples of these challenges include: – LV auxiliary system design and supplied by CDSE but the cables and cable trays connecting all the equipment are designed and supplied by CDCS. – Electrical equipment support structures designed and supplied by CDSE, but foundations are designed and supplied by CDCS. – The interdependency of design and delivery of different Contractors' scope means that parties are reliant on each other to progress certain scope items. This requires careful management of schedule risk. ■ The risk to project delivery due to interfaces not being properly managed are significant. Aurecon is of the opinion that this risk has been appropriately captured in the project allowances via development of a risk and contingency report. ■ Aurecon is of the opinion that any layout changes required to facilitate integration of Stage 2 without requiring an outage of Stage 1 can be incorporated during detailed design with limited cost impact.

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Key Exemptions	■ Notable exceptions to the scope include: – The 500 kV switchyard extension required to connect to the existing Hazelwood 500 kV switchyard. It is understood that this project component is not within the scope of this funding request. – The 220 kV AC switching station required to connect to the existing TasNetworks 220 kV system. It is understood that this project component is not within the scope of this funding request. ■ There do not appear to be any costs associated with Stage 2 Converter Station incorporated into Stage 1 aside from reasonable scope items that would be common to both sites including: – Main access road and gates. – Provision of sufficient space within the site for Stage 2 to be constructed using the Stage 1 access roads. – Provision of administrative rooms in Stage 1 that may also end up being used for Stage 2. – Preliminary layout design of Stage 2. – Audible noise report for Stage 2. – Power system studies to demonstrate Stage 2 is feasible assuming the same design as Stage 1.	■ Aurecon is of the opinion that the exceptions to the scope are well understood by all parties and are being managed to ensure that there are no scope gaps in the overall project delivery. ■ Aurecon is of the opinion that the costs associated with Stage 2 Converter Station that are incorporated into the Stage 1 scope are limited to what is necessary for the Stage 1 scope delivery, while leaving sufficient provision for Stage 2 to be delivered at a later stage.
Key Deviations to Owner's Requirements	■ Several technical deviations to the Owner Requirements have been identified in the executed contract that may lead to change orders. These include the following: – Protection control and monitoring system functionality including integration with AEMO/TNSP requirements. – Cable fault locator requirements (online capabilities).	■ Aurecon was not able to confirm from the information provided if these deviations are presently resolved, or if the resolution of these deviations may lead to change orders and price increases which should be captured in the project allowances. ■ The scope of these items appears reasonable otherwise and is part of typical coordination.
Availability and Reliability Guarantees	■ Undertake all activities required to demonstrate compliance with the performance requirements, including Availability and Reliability Guarantees.	■ Aurecon is of the opinion that the Availability and Reliability Guarantees, and calculation methods are well detailed in the executed contract and are in line with industry standards.

4.1.3 Procurement and Delivery

The table below summarises the procurement process adopted to secure the CDSE contract and our views on its appropriateness.

Table 4-4 Adopted Procurement Strategy (CDSE)

Category	Adopted Strategy	Aurecon's view on the appropriateness of the adopted strategy
Package Split	- MLPL initiated a procurement process focused on Tier 1 HVDC equipment suppliers. - Five responses were received in the pre-qualification invitation from parties including ABB Power Grids Sweden (Hitachi), UK Grid Solutions, NARI Technology, Siemens Energy and Toshiba International. - Three parties were prequalified for the design and supply of HVDC equipment packaged (denoted as "CDSE"). - The design and construct station package (denoted as "CDCS") is not part of the CDSE package.	- Aurecon is of the opinion that the adopted package split reflects industry expectations. - Aurecon is of the opinion that the interface risk between CDCS and CDSE contractors has been appropriately captured in the project allowances via development of a risk and contingency report.
Competitiveness of the process	- MLPL advised tenderers of the revised project program and intention to focus on Stage 1. - MLPL allowed a bid preparation time of 6 months reflecting the high maturity of lumpsum proposals expected from contractors. Initial proposals were received in July 2023 while a revision of the scope was communicated in October 2023. The preferred supplier status was disclosed to the selected bidder in December 2023 as a result of extensive negotiations. A LNTP was then issued in August 2024.	- Aurecon is of the opinion that the limited number of proposals reflect the current supply chain challenges in the HVDC market and is pleased to note that more than one detailed proposal was received and evaluated. - In consideration of the limited number of market players and strong demand in the sector, Aurecon is satisfied that MLPL's procurement process for this scope was as competitive and efficient as possible, and therefore prudent and efficient.
Contract Price Adjustments	- Aurecon assessed the exposure of the Project to cost fluctuations post contract award. The contract executed with Hitachi provisions that payments will be made in SEK, EUR, USD and AUD. In order to mitigate the risk of foreign exchange fluctuations identified by MLPL, a hedging contract is provisioned as a project cost. - The executed contract provisions for positive and negative adjustments associated with commodity price fluctuations. In order to mitigate the risk of commodity price fluctuations identified by MLPL, a hedging contract is provisioned as a Project cost.	- While this exposes the project to substantial fluctuations, this risk was identified and quantified in the project budget via a hedging cost provision. - Hedging is currently in place for foreign exchange up to the Notice to Proceed milestone. Hedging for foreign exchange and relevant commodity fluctuations post NTP will be entered into at NTP. - Aurecon is also pleased to note that negative adjustments are permitted, offering a benefit-sharing mechanism to the Project should global raw material prices decline as currently forecasted and likely optimising the cost of the hedging contract.

4.1.4 Forecast Expenditure and Benchmarking

HVDC equipment supply costs are linearly related to voltage with an intercept. An increase in voltage usually results in a large increase in cost per MW. As such, references relying on 320 kV were prioritised for this assessment. Further, key European HVDC suppliers tend to offer different prices as they offer varying technologies.

Table 4-5 below presents a summary of normalised CDSE benchmarks against anonymised sources. Though all costs are presented in \$real June 2023, references were obtained between 2018 and 2024 and as such capture the evolving nature of the HVDC market. Aurecon is of the opinion that the cost negotiated for the CDSE package is within the range of that of an interconnector project and relatively higher than other reference offshore generation projects. No reference project in Australia was used due to a lack of recent interconnector projects. While the local premium on the supply of equipment remains limited, local requirements impacting technical specifications justify the differences between reference projects. The limited economies of scale associated with the project capacity affects the cost.

Table 4-5 Summary of Normalised Benchmarks – Real \$ June 2023 (CDSE)

Ref.	Project Type	Capacity (MW)	Voltage (kV)	Reference Year	Total ^[1] (\$m/MW)
R1	Subsea interconnector	1,400	525	2020	0.49
R2	Subsea interconnector	1,400	525	2023	0.41
R3	Subsea interconnector	1,400	525	2021	0.44
R4	Subsea interconnector	700	320	2026	0.66
MLPL	Subsea Interconnector	750	320	2023	0.52
R5	Offshore generation project	1,050	320	2018	0.33
R6	Offshore generation project	1,200	320	2018	0.30
R7	Offshore generation project	1,200	320	2021	0.33
R8	Offshore generation project	400	150	2021	0.22
R9	Offshore generation project	800	320	2021	0.23
R10	Offshore generation project	1,200	320	2021	0.20
R11	Offshore generation project	1,200	320	2022	0.27
R12	Offshore generation project	1,000	320	2022	0.38
R13	Offshore generation project	1,000	320	2022	0.48
R14	Offshore generation project	1,000	320	2022	0.59
R15	Offshore generation project	1,200	320	2024	0.36

^[1] Cost per MW per converter station.

4.1.5 Conclusion

Scope

The scope and technical specifications for the converter station design and supply are reasonable and aligned with typical industry practice for similar HVDC converter stations adopting a similar contracting strategy.

The Hitachi tender offer is based on standard OEM specification with limited room for deviation and is expected to comply with the scope and technical specifications with some exceptions. These exceptions appear to be well understood by all parties and are being managed to ensure that there are no scope gaps in the overall project delivery.

Challenges related to the scope split between the various contractors involved in the converter station delivery are unavoidable aspects of the adopted contracting strategy but can be properly managed to deliver a successful project.

The costs associated with Stage 2 Converter Station that are incorporated into the Stage 1 scope are limited to what is necessary for the Stage 1 scope delivery while leaving sufficient provision for Stage 2 to be delivered at a later stage.

Price Risk

There are risks of price increases due to:

- Presently unresolved deviations between the Hitachi offer and the MLPL scope/technical specifications.
- Interface risk.
- Technology risk.

Suitability on procurement process

Despite current supply chain challenges and limited market players in the HVDC sector, MLPL's procurement process was reasonably competitive and efficient. The receipt and evaluation of more than one detailed proposal aligns with industry expectations, showcasing a prudent approach under current market conditions.

Aurecon confirms that the executed contract's base scope will be protected from foreign exchange and commodity price fluctuations. Additionally, the inclusion of a benefit-sharing mechanism for potential global raw material price declines is recognised as a cost-optimising strategy that supports financial stability for the project.

Benchmarking

The negotiated cost for the CDSE package aligns with interconnector project benchmarks but is higher than offshore generation project references. No recent interconnector projects in Australia were considered due to the absence of comparable local references. Whilst there are limited Australian references, we note that we would expect the cost to be higher in Australia relative to international benchmarks due to local technical requirements and market dynamics. The project's lower capacity at 750MVA also impacts economies of scale, contributing to the cost differences.

The cost related to the MLPL CDSE package could increase, considering that the \$773m figure for MLPL accounts for 2023 real cost up to June 2030 only and excludes any final risk costs, making benchmarking challenging, as benchmarks are based on total completed project actual costs. However, we note that MLPL has undergone a competitive procurement process and engaged extensively with the market. The current price fits within benchmarks and reflects a prudent process.

Concluding comments

The scope of work, procurement process, and price outcome for the CDSE package appears reasonable in Aurecon's view and in the context of the current market environment. Risks have been contracted out or considered wherever possible under the EPC structure, with reasonable deviations accepted by MLPL.

4.2 Cable System Design, Supply, and Installation

This section assesses Cable System Design, Supply, and Installation.

Objectives and scope

Table 4-6 summarises the objectives and scope of Cable System Design, Supply and Installation.

Table 4-6 Objectives of Cable System Design, Supply and Installation

Objectives	Scope
- Contractually agree the expenditure required for contractors to deliver major capital works. - Ensure that the tender responses and technical specifications put forward are reasonable and meet MLPL's requirements. - Ensure risk is adequately considered or priced into contracts by MLPL and its contractors. - To develop a suitable procurement and delivery approach which generates value for money. - Ensure project risks are well defined and managed. - Minimise interface risks between landfall HDD and the Submarine Cable scope.	To secure contractors to deliver major capital works packages for Cable System Design, Supply and Installation, including landfall HDD.

4.2.1 Expenditure Summary

MLPL executed a contract with Prysmian Powerlink S.r.l (PPL) on 1 August 2024, for the design, supply and installation of the Stage 1 power cable, covering the onshore and offshore portion of the Project, along with the LHDD to accommodate the Stage 1 and Stage 2 power cables.

The executed contract is a lump sum and as such detailed breakdown per activity were not provided by PPL (Aurecon was not provided an executed contract from PPL to review otherwise).

Table 4-7 below summarises the costs provisioned by MLPL. For the purpose of the assessment, prices presented in the signed contract were de-escalated, presented in \$real June 2023 terms and converted into AUD following the exchange rates provisioned in MLPL's hedging contract.

Table 4-7 Summary of Supply Costs – \$ Real June 2023 (CB)

Cost Element (\$ Real) to FY30	Total (\$m)
Cable System Design, Supply and Installation Work (Contract)	779.0
LHDD Design, Supply and Installation Work (Subcontract)	132.3
Additional Allowances (Cost Adjustments for Metals, Fuels, HDPE, Submarine Cable Sizing)	7.6
Total cost⁽¹⁾	918.9

⁽¹⁾ Subtotals and totals may not sum due to rounding.

4.2.2 Scope and Specification Assessment

A summary of the Marinus Link cable system is as follows: two point-to-point symmetrical monopoles that adopt voltage source converter modular multilevel converter technology between the State of Tasmania, Australia and the State of Victoria, Australia. Where each interconnector is operated at 750 MW continuous capacity and a nominal voltage of ± 320 kV. A point-to-point symmetrical monopole system requires two cables (positive and return) meaning the full 1,500 MW capacity requires four cables. The executed Cable Supply contract covers the supply of Stage 1 only i.e. a single symmetrical monopole system comprising of two cables.

Table 4-8 below summarises our review of the scope of work and key terms referenced in the executed cable contract and our views on the appropriateness of technical assumptions.

Table 4-8 Scope Provisions & Appropriateness (CB)

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Tender Design: Land Cable	- Options for the onshore cable section are specified with Aluminum (Al) or Copper (Cu) conductors with cross-sectional area 2,000 mm², 2,500 mm² or 3,000 mm² with cross-linked polyethylene insulation technology. The onshore cable length is approximately 90 km through Gippsland in Victoria between end terminations in the Hazelwood Converter Stations and the transition joint located in Waratah Bay. - Land cable rating calculation reports. Schedule 6 outlines assumed thermal resistivity (TR) values (TR = 3, 1.4, 1.2, 1.0 K.m/W). - Design of earthing system, fibre optical telecommunication cables, cable monitoring systems, cable fault locating equipment, other necessary fittings and accessories, back-up materials, spare parts, terminations, joints, joint bays, link boxes and all related auxiliary equipment. - Design interfaces with the LCC, CDCS and CDSE contractors including the following specific items: - Review LCC contractor's designs covering construction, as-built data, installation method statements for cable installation, including the cable termination civils and structures. - Design requirements for laydown areas and access / haul roads to the joint bays to be constructed by the LCC Contractor. Inspection of these items prior to LCC installation activities.	- Overall, the design requirements outlined in the Owners Requirements are appropriately addressed by the executed contract. Appropriate design standards are specified, and design documents outlined in the LNTP Work. - LCC design interface with cable supply contract is outlined in 'the interface register (MarinusLink) which captures PPL's responsibility for LCC handover works and other parties' milestones (including LCC). - The cable supply contract makes allowance for provision of final TR values to replace assumed TR values (stated to the left). When these are provided by MLPL, if a portion of the cable section requires a larger conductor or the LCC works required is increased) this could trigger a variation that is presently not included in the observed agreement. - Again, in discussion around the interface with the LCC works, section 4.2 point (c) (iv) of the Owners Requirements outlines use of a 50°C isotherm to design the thermally stable backfill for the 90 km onshore cable section in Victoria. The critical temperature for soil drying of 50°C is defined originally in UK National Grid Technical Specification 2.05 as a temperature increase from ambient (i.e. for the UK 50°C isotherm means 35°C temperature rise above 15°C ambient). 50°C is an industry standard value used for these calculations, and it is reasonable that MLPL has requested this be assumed at this stage of the design process. At the detailed design stage samples from ground investigation should be used to determine the local critical temperature and used to design the LCC works. - It is understood that PPL's proposal for the land cable system is a single conductor material and size for the entire 90 km route (see clarification comment in cell CB2.NF1.3.7 (pdf page 175 of the Tender Evaluation Report). A 3500mm² Al

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
	■ The onshore cable design offered by PPL states a maximum allowable conductor temperature of 80 degrees and a maximum allowable temperature rise across the insulation of 20 degrees. Both PPL and MLPL acknowledge that this cable system does not yet have a valid PQ test and as such its capability is unproven. The last occasion this cable system had a valid PQ test was over 5 years ago, and the insulation material specification varied significantly meaning the maximum allowable conductor temperature was 70 degrees. ■ It is understood that PPL were due to be providing PQ for almost the same cable type that is being specified for the MLPL onshore cable section (320 kV, 3500 mm², Aluminum conductor, Borealis LS4258DCS insulation and max conductor temperature of 80°C) commencing Q1 2024 in the Delft factory. The only difference being that the MLPL cable is specified with a lower electrical stress at the cable installation screen.	conductor cable. Defining a cable of this size across the full 90 km route is conservative given that some regions are likely to have TR low enough to allow for a reduced conductor CSA. This should be further considered by MLPL in terms of cost implications, however, given the lumpsum nature of this contract, this is a conservative approach to pricing and potentially reduces cost risk. ■ In Aurecon's experience, it is uncommon for a contract to be in place whilst PQ has yet to be provided for the cable being commissioned. It is common for the type testing (which is typically more project specific) to be conducted post contract execution. ■ PPL provides reasonable evidence of their confidence that the PQ will be successful, given the existing similar cable PQ'd in the last 5 years. The residual risk to MLPL is that the PQ for the cable they are specifying (which was planned for Q1 2024 for a different project) is not completed by Q2 2026 for prototype production and/or that the cable design post PQ varies significantly from the one issued to the other contractors as part of the LNTP works in Q4 2024. ■ Given the need to secure the contract within reasonable timescales and the evidence provided by PPL regarding existing and in progress PQs for the cable system, the risks described above are manageable in our view.
Tender Design: Submarine Cable	■ Options for the submarine cable section are specified with Al conductors with cross-sectional area 2,100 mm² or 2,500 mm², cross-linked polyethylene insulation technology and either single or double wire armour layer. The submarine cable length is approximately 255 km across the Bass Strait between end terminations in the Heybridge Converter Station in Tasmania and a transition joint in Waratah Bay located approximately 200m inland from the sand dunes in Victoria. ■ Submarine cable rating calculation reports. Schedule 6 outlines assumed TR values (TR = 1.4, 1.2, 1.0 K.m/W). ■ The offshore cable design offered by PPL states a maximum allowable conductor temperature of 80 deg. C and a maximum allowable temperature rise across the insulation of 20 deg. C. Both PPL and MLPL acknowledge that this cable system does not yet have a valid PQ test and as such its capability is unproven. ■ It is understood that PPL were due to be providing PQ for a similar cable type to that being specified for the MLPL offshore cable section	■ As with the land cable system, the executed cable contract allows for revision of the seabed TR values and therefore the possibility of updated conductor cross-sectional areas. ■ MLPL should also be aware of possible confusion caused by the inconsistency between Schedule 5, point 25A and Schedule 6 'Assumptions at contract date' which state different seabed TR values. ■ However, the overall design requirements outlined in the Owners' Requirements are appropriately addressed by the executed cable supply contract. Appropriate design standards are specified, and management plans and design documents outlined in the LNTP Work. ■ It is understood that PPLs proposal for the offshore cable system is a single conductor material and size for the entire 255 km route (see clarification comment in cell CB2.NF1.3.1 (pdf page 175) of the cable tender evaluation report). A 2100 mm² Al conductor cable. There may have been possible cost reductions available to the project by allowing for a tapered cable design between the seabed and LHDDs, if more detailed design data had been available prior to the contract execution

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
	(400 kV, 2500 mm², Aluminum conductor, Borealis LE0550DC insulation and max conductor temperature of 80°C) which is ongoing at present in the Arco Felice factory. Note that the ongoing PQ and previously completed PQ are for higher voltage and higher electrical stress at the insulation screen than the 320 kV MLPL system. ■ Design of earthing system, fibre optical telecommunication cables, cable monitoring systems, cable fault locating equipment, other necessary fittings and accessories, back-up materials, pulling stock kit, armour clamp, rigid repair joint, transition joint, spare parts, and all related auxiliary equipment.	stage. However, the existing approach is likely to be conservative in terms of pricing, which is likely to reduce the risk of further cost increases. – Report 1C update: increased depth of cover at both landfall HDDs has resulted in the cable design increasing from 2,100 mm² to 2,500 mm². Document 'Memo re offshore cable size (current)' describes this impact including the CAPEX increase of ~€3M for cable supply. – Alternative solutions such as reducing the HDD depth or introducing a cable joint between landfall and seabed sections are discussed and ruled out by PPL, Jacobs and MLPL. – There are risks that are discussed including the potential for cable overloading in short transient high current events. This must either be studied in more detail or monitored during operation (or both). – Some latent risks remain that might cause cost increases: cost increases for handling, transportation and installation of the larger cable section. ■ Through this review process MLPL confirmed that PPL have not developed a factory joint for the cable system being specified for the project meaning that a tapered design would have to be facilitated via field joints. This type of jointing operation has a high risk associated with it and is a common cause of cable failure. Therefore, the existing approach effectively avoids this risk. ■ It is not common for a contract to be in place whilst PQ has yet to be provided for the cable being commissioned, it is common for the type testing (which is typically more project specific) to be conducted post contract execution. ■ PPL provide reasonable evidence of their confidence that the PQ will be successful, given the existing similar cable PQ'd in the last 2 years. The ongoing PQ is for a 400 kV cable system with higher electrical stress at the insulation screen than is planned for the MLPL cable system. It is not uncommon for cables with lower electrical stress across the insulation screen to be considered as being covered by the PQ of the similar cable with higher stress. ■ The remaining risk to MLPL is that the PQ for the cable they are specifying (which was planned for Q1 2024 for a different project) is not completed by Q2 2026 for prototype production and/or that the cable design post PQ varies significantly from the one issued to the other contractors as part of the LNTP works in Q4 2024.

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Tender Design: Fibre Optic Cable	■ MLPL's Owners Requirements outline high-level requirements for a standalone Fibre Optic (FO) cable system in seabed and on land comprising 96 single mode fibres to allow for the following: – Communication between Converter Stations (6 nos fibres). – The protection of electrical and cable monitoring systems (number of fibres to be determined by PPL) including the capability to support: ■ Distributed Temperature Sensing (DTS), Distributed Acoustic Sensing (DAS) and Distributed Vibration Sensing (DVS). – For commercial telecommunication purposes (remaining fibres).	■ Overall design requirements outlined in the Owners' Requirements are appropriately addressed by the executed cable supply contract. Appropriate design standards are specified, and preliminary datasheets provided for the design of the FO cable system. The requirements are flexible as to whether the FO cable will be standalone or integrated within the cable system for the submarine portion of the route. It is expected that this decision can be appropriately managed at the detailed stage.
Tender Design: Landfall HDD (LHDD)	■ Design of the LHDD falls within the scope of the executed cable supply contract. ■ PPLs scope includes the LHDD survey and design, which is captured via a subcontract with Spiecapag. ■ PPL will manage the subcontractor's scope taking on risks associated with schedule and quality for the LHDD via their contract with Spiecapag. ■ The LHDD scope includes Stage 1 and Stage 2 and includes allowance for six LHDDs at each landfall (Tasmania and Victoria). One LHDD per Marinus Link cable and one spare.	■ The specification of a spare LHDD bore could be considered as conservative. However, given the nationally significant Project CAPEX associated with the LHDDs and the lack of final geotechnical and nearshore site data it is felt that this assumption is reasonable. ■ Section 3.5 (a) (1) of the executed cable contract outlines a 10m depth of cover for the LHDDs, but it is not clear from the Appendices and Annexes of the Owners Requirements how this depth has been calculated, and the executed cable contract allows for an increase in price if this value increases. LHDDs with depths greater than 10m are common for the type of geology present at both landfall locations. – Report 1C update: following further design the LHDD contractor has increased the depths at landfall to 28m and 25m in Victoria and Tasmania. – Despite this increase in the technical specification of the HDD design (increased depth of cover) the present cost model indicates a very minimal increase in costs. ■ Section 2.2C (a) of the executed cable contract outlines LHDD base penetration rates and that if the future geotechnical data received lead to slower penetration rates than planned, compensation can be claimed at a rate of \$ (equipment) + \$ (PM). We are of the opinion that the base rate is reasonable for the rock type specified, however those are not conservative and reduced rates are possible. ■ Program for LHDD installation is approximately 30 days per bore (12 bores in total), each of these durations would only need to increase by to increase Project CAPEX by

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
		■ Risk assessment of associated costs for this package are included within E3 Advisory's reports. Risk associated with increased thermal properties and reduced bore penetration rates are specifically accounted for in the cost model with likely impacts of \$2m and \$4.4m. ■ The mitigation for the thermal properties risk is associated with altering the cable or HDD design. Recent changes to the HDD depth have resulted in specifying the largest cable PPL will manufacturer for the landfall. As such, this mitigation is no longer available to the project if further adverse conditions are found at the site. ■ We are of the opinion that, although wrapping the LHDD scope into the cable supply scope reduces risk for the project, it does not completely avoid risk.
Scope of Work: Cable System Testing and Supply	■ PPL's cable contract scope includes supply, installation and commissioning of the Stage 1 offshore power cable. Supply and installation instructions of the Stage 1 onshore power cable and supply and installation of the LHDDs to accommodate the Stage 1 and Stage 2 power cables. ■ At contract execution there are no valid prequalification tests for the offered cable system. Land cable PQ is planned for start in Q1 2024 in the Delft factory (Netherlands), which is the same factory the land cable system was previously PQ'd in 2017. Submarine cable PQ is ongoing at the Arco Felice factory (Italy) for 525 kV and 400 kV systems using the same semiconductive and insulation materials. The completion date for both PQ tests is unknown. ■ PPL provision for Inspection and Test Plan including Type Testing, Routine and Sample Tests, Site Acceptance Tests.	■ The testing and supply package is broadly in line with industry standards. ■ Installing LHDDs for Stage 2 is logical in terms of reducing future mobilisation costs. However, should Stage 2 not proceed or incur substantial delays, the impact on the economics of the project remains significant. ■ The Owner's Requirements are not clear on whether or not Transition Joint Bays (TJBs) and onshore cables are required at the Tasmania landfall at the approach to the Heybridge Converter Station. If the Stage 1 cable system does require a TJB in Tasmania the impact on Project CAPEX could be greater than \$5m. ■ There is a risk that PQ tests are delayed for both cable systems. The existing programme would suggest acceptable PQ results are required prior to Q1 2026 in order to avoid a delay to the overall schedule. It is understood that PPL accepts responsibility should PPL cause delay to Contractor Interface Milestones.
Scope of Work: Submarine Cable T&I	■ The Leonardo Da Vinci (LDV) is a suitable vessel for cable laying but is more costly for transport relative to benchmarks. We understand that this decision has been made to minimise schedule delays between transport and laying, which could have high contractual penalties. ■ The LDV has been identified as the proposed cable installation vessel for surface laying of the subsea segment of the cables. According to the installation document, Submarine Power Cable - Cable Trenching Systems and Reasonable Endeavours, Doc: RSC-1-41-CB2, Rev 02, the SeaRex trencher will be employed for pre-lay trenching in soils that are not suitable for jetting, estimated to comprise approximately 5% of	■ The LDV is specified within the contract as the transport and cable laying vessel. In Aurecon's view, the vessel is suitable for cable laying but may be at a higher cost relative to other vessel types for transportation. ■ Furthermore, through this review process MLPL confirmed that they challenged PPLs' assumption for using the LDV for cable transportation. In response, PPL confirmed use of the LDV to reduce the number of loading and un-loading operations for the cable system and to maintain use of PPLs own vessel instead of a third party's. MLPL were reasonable to challenge the use of the LDV for these tasks however, the risks highlighted by PPL which are mitigated through use of the

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
	the cable route. Additionally, a high-powered jetting ROV (similar to the Q Trencher series), is planned for post-lay burial along the entire route, while a controlled flow excavator (CFE) equipped with mass flow and jetting capabilities will be used for the burial protection of the offshore omega cable joint.	LDV are reasonable. This is especially accurate regarding the reduction of onboarding activities. As such, Aurecon is of the opinion that the method is prudent. ■ In contrast to the loading duration for the HVDC cable, the fibre optic cable loadout, particularly if trans-pooling is involved, seems to be scheduled with aggressive durations and lacks a clear buffer for potential adverse developments, such as the breakdown of cable handling equipment. ■ Based on the detailed schedule for Stage 1, in conjunction with technical particulars from the method statement and provided documentation, several observations have been made that are worth noting: – Potential scheduling conflict is noted between the post-lay burial jetting first pass (CB2 Campaign 1) and the free lay of the 85 km cable (CB2 Campaign 2), as both activities are scheduled to start on the same date. – In general, assumptions for vessel speed are found to be conservative and likely to be overestimating the durations specified in the schedule for transit duration between Naples and Nordenham, pre-lay trenching activities and application of the absolute minimum advance rate for the full sections of chain cutter. This should reduce the risk allowance cost for these activities. – In Aurecon's view, there appear to be both scheduling assumptions which are optimistic, and assumptions which are conservative, which on balance are reasonable overall.
Scope of Work: Commissioning	■ PPL provided indicative ITPs for the submarine cable, land cable and both cable systems accessories including: – Conductor and insulation resistance measurements. – Visual Inspection on earthing connections. – Perform circuit resistance measurement after installation completion. – Screen continuity test. – DC high voltage test. – Time domain reflectometry (TDR) measurements. – OTDR test on integrated fibre optical cable.	■ The quality and appropriateness of the tests prior to commissioning is reasonable given the stage of the project. ■ Some residual risk remains with the ongoing PQ tests for both cable systems: – This is lower for the onshore cable system where MLPL are aware that PPL is providing PQ for the same cable type that is being specified the MLPL cable section (320 kV, 3500 mm², Aluminum conductor, Borealis LS4258DCS insulation and max conductor temperature of 80°C) commencing Q1 2024 in the Delft factory. – The risk is higher for the offshore cable system where the ongoing PQ from PPL is for a similar but not the same cable type (400 kV, 2500 mm², Aluminum conductor, Borealis LE0550DC insulation and max conductor temperature of 80°C) which is ongoing at present in the Arco Felice factory. Note that the ongoing PQ and previously completed PQ are for higher voltage and higher

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
		electrical stress at the insulation screen than the 320 kV MLPL system. This goes some way to reducing the ongoing PQs.
Relied-upon Information	■ PPLs executed cable contract includes Relied Upon Information predominantly pertaining to environmental and ambient conditions in the offshore portion of cable route as follows: – Ordtek UXO Desktop Study set out in Annexure EPC-4C1-8-CB to the Technical Specifications. – In-Service subsea infrastructure Report (existing & planned), Out-of-Service subsea infrastructure Report set out in Annexure EPC-4C1-9-CB to the Technical Specifications. – LCC Handover Works Information. – Fugro Geophysical Survey Integrated Report dated 2020 set out in Annexure EPC-4C1-4-CB to the Technical Specifications including relevant annexes comprising charts 156491-064-DRN-0001 to 53. – MMA Factual Report set out in Annexure EPC- 4C1-10-CB to the Technical Specifications. – The GIS layer Boulders.lpk. – “Waratah Bay Geophysical Survey Results Report”, and all corresponding annexes, including charts, and boulder picking. – Maritime Archaeological Desktop Assessment September 2021 (Cosmos) set out in Annexure EPC-4C1-5-CB to the Technical Specifications.	■ The quality and appropriateness of the information relied upon is reasonable given the stage of the project where much of the system design is to be completed at the detailed design stage. ■ Overall, it is felt that the Owners Requirements document and Interface Management documents provide some further detail regarding the electrical design of the system. Little else in this regard is provided in terms of electrical design in the relied upon information.
Key Interfaces	■ PPL's scope has significant interfaces which are typical of similar HVDC cable equipment design and supply contracts for other projects undertaken recently around the world: – Converter Design and Supply Equipment (CDSE) contractor. – Converter Design and Construct Station (CDCS) contractor. – (as yet undefined) Land Cable Civils (LCC) contractor.	■ The challenges related to the scope split between the cable contract CDSE, CDCS and as yet undefined LCC contractor are unavoidable aspects of the adopted contracting strategy but can be properly managed. ■ At present the key interface risk is with the LCC works which are less well defined in the existing Interface Register (see second comment in 'Tender Design: Land Cable').
Key Exemptions	■ PPL excludes all onshore civil works from their scope.	■ This exclusion is reasonable and reflects common practice for this type of project.

Subpackage	Description of main provisions	Aurecon's view on the appropriateness of the scope
Key Deviations to Owner's Requirements	- PPL accepts no responsibility for design of the interface stating that MLPL is to coordinate. PPL offer no indemnities regarding review of other Contractor Documents. - PPL states they have no requirement to complete Transmission System Tests and Trial Operation to achieve Taking Over.	Aurecon is of the opinion that these deviations are presently partially resolved. The interface requirements and Owners Requirements documents outline the overarching responsibilities, but a more detailed risk report should be developed to adequately capture and allow for any potential price increases associated with changing testing and commissioning activities.
Availability and Reliability Guarantees	- PPLs executed cable contract includes provision of guaranteed response times (Section 24) with respect to Defect notified to the Contractor before the end of the last Defects Notification Period or Serial Defect notified to the Contractor before the end of the last Serial Defects Notification Period. - Schedule 5 (a) (20) outlines Contractor Document 'Reliability, availability and maintainability analysis'. There are no guarantees provisioned within the executed cable contract.	Aurecon is of the opinion that reliability, availability and maintainability is not well outlined in the executed cable contract. This is not unreasonable given the stage of design and it is reasonable that the 'Reliability, availability and maintainability analysis' is included within the Schedule 5 (a) Late Notice to Proceed work.

4.2.3 Procurement and Delivery

The table below summarises the procurement process adopted to secure the Cable Supply, installation and LHDD contract.

Table 4-9 Adopted Procurement Strategy (CB)

Category	Adopted Strategy	Aurecon's view on the appropriateness of the adopted strategy
Package Split	MLPL initiated a procurement process focused on Tier 1 subsea power cable contractors, leading to the pre-qualification of 4 bidders for the supply and installation of the Stage 1 power cable with associated nearshore civil work for both stages (denoted as "CB1") and/or supply and installation of the Stage 2 HVDC cable (CB2). As a result of the limited appetite for civil work from pre-qualified manufacturers, MLPL received two quotations for CB2 via the tender process and a third proposal outside the tender process.	Aurecon is of the opinion that the adopted package split reflects industry expectations, while enabling them to test the market's appetite for a scope including civil work.
Competitiveness of the process	The re-evaluation of the Project led to the postponement of the Stage 1 cable programme and pause of the Stage 2 cable scope. Proposals submitted for CB2 were therefore considered for the Stage 1 power cable with the inclusion of the LHDD scope as a mitigation to the key interface	This risk-based decision from MLPL demonstrates a rational understanding of project risks despite increasing the complexity of contract negotiations.

Category	Adopted Strategy	Aurecon's view on the appropriateness of the adopted strategy
	risk, in the original Project programme, identified between the subsea installation and nearshore civil work. MLPL highlighted that Project shareholders trusted this risk would be best managed by the contractor and as such decided to include the LHDD scope in CB2. The adopted contracting strategy reduces interfaces between the subsea cable installation scope contingent to the availability of a limited supply of installation vessels and nearshore civil work required to be completed for the installation to start. Financing risk was also flagged as a justification to include the LHDD scope in CB2. Proposals were received in May 2023 while the LHDD scope was transferred onto CB2 during the first semester of 2024 and the contract was executed in August 2024. MLPL chose to not disclose any preferred supplier status to the awarded bidder to ensure competition is maintained until contract signature. The adopted timeline provided ample time for MLPL to negotiate the original and amended scopes and ensure the proposed solution is optimal for the Project.	In consideration of the limited number of market players and strong demand in the sector, Aurecon is satisfied that MLPL's procurement process for this scope was as competitive as possible and therefore prudent and efficient.
Contract Price Adjustments	- International contractors and equipment suppliers often pass through foreign exchange and partially commodity fluctuation risks to project owners. - Considering the hedging contract, limited cost variations on the cable supply and installation scope are expected as a result of the lump sum nature of the contract, relying on detailed technical assumptions and industry-standard commercial terms. The quoted price for the LHDD contract comprises of a variable share representing 17% of the total cost as a result of provisions for marine support subcontracted by PPL. - Aurecon assessed the exposure of the Project to cost fluctuations post contract award due to foreign exchange fluctuations. The contract executed with PPL provisions that payments will be made in both EUR and AUD. To mitigate the risk of foreign exchange fluctuations identified by MLPL, a hedging contract is provisioned as a Project cost. While the hedge is expected to be entered into once NTPs are provided, Aurecon reviewed the envisaged terms of the hedging contract and found them generally in alignment with the Project's exposure.	- The contract executed with PPL includes an adjustment provision that is commonly seen in industry. While this exposes the project to substantial fluctuations, this risk was identified and quantified in the Project budget via a hedging cost provision. - Hedging is currently in place for foreign exchange up to the Notice to Proceed milestone. Hedging for foreign exchange and relevant commodity fluctuations post NTP will be entered into at NTP. - Aurecon is also pleased to note that negative adjustments are permitted, offering a benefit-sharing mechanism to the Project should global raw material prices decline as currently forecasted and offering an upside to the Project CAPEX.

Category	Adopted Strategy	Aurecon's view on the appropriateness of the adopted strategy
Additional Scope	■ PPL approached six LHDD subcontractors and pre-selected proposals were shared with MLPL in a semi-transparent process expected considering the targeted lumpsum contracting strategy. ■ Further to extensive negotiations, the awarded subsea power contractor agreed to include the LHDD scope under the main contract subject to a mark-up of [REDACTED] on the selected subcontractor's price and provision for insurance and other contracting costs. The mark-up remains lower than quoted by another contractor. ■ MLPL highlighted that the offered mark-up mitigated the market risk during the tender process, interface and quality risks during execution. ■ The contract with PPL is based on a fixed price for 84% of the scope thereby transferring potential cost increase within the limits of the contract to the contractor. Bankability risk flagged by the Project's financier was also listed as a justification to accept the proposed mark-up.	■ Aurecon is of the opinion that the proposed markup is above market standards in Australia of 10-15% but reflects the challenging market conditions for HVDC projects in Australia. However, the outcome of this contracting strategy eliminates a key interface risk thereby reducing the Project contingency. That is, the risk of having the cable vessel on standby due to any delay and incurring a daily cost of [REDACTED] is mitigated if MLPL were to directly procure the completion of LHDD with another party. ■ While a cost-benefit analysis to justify [REDACTED] was not performed by MLPL, we understand that the decision was justified based on a qualitative risk assessment of the impacts of interface risks materialising on this item if the activity was undertaken by another party. ■ In Aurecon's view, Prysmian's procurement process (of which MLPL had limited visibility) appears to be reasonable, with a long list of six parties invited to respond. Of this list, two responded with Prysmian selecting the most cost optimal response [REDACTED] ■ Cable suppliers, including PPL, seldom take on the responsibility of civil work, including HDDs, in their main supply and installation contract. As such, MLPL highlighted the complexity of negotiations with PPL to include the HDD scope, which lead to a [REDACTED] that anticipated for subcontracts. ■ We are of the opinion that the approach is sound and greatly mitigates one of the key project risks. This risk was of key concern to MLPL's financiers, and ensuring the scope was undertaken by Prysmian was determined to be key to bankability.

4.2.4 Forecast Expenditure and Benchmarking

Aurecon compared contract costs with international benchmarks to assess the relevance of cost input assumed in the global market. **The contract executed with PPL is based on a lump sum and as such, limited visibility was provided on cost breakdown.** Based on the information available and criticality of each component, our benchmarking focuses on cable supply cost per km and the LHDD scope.

Reference projects were selected based on Aurecon's experience providing expertise to interconnector and offshore electricity generation projects globally. Key details were provided as a justification of the relevance of each reference. However, due to confidentiality restrictions Aurecon is unable to provide further details on these projects.

As such, land and subsea cable costs provisioned by MLPL in alignment with the contract with PPL were compared with the following reference projects and summarised in Table 4-10.

- Project: Australia, 2030 COD (denoted as "MLPL").
- Project A: Aurecon's Partner, OWC's internal cable system supply cost tool (denoted as "Ref. A").
- Project B: USA, 200 km, 2028 COD (denoted as "Ref. B").

We note that rates used for benchmarking below are provided by PPL to calculate adjustments and are not directly reflective of rates used to build the lump sum. Therefore, these rates are expected to be higher than base rates, but sufficient to provide an indication on supply rates assumed in the base scope of the contract.

Table 4-10 below indicates that the Project's unit rates (with an expected markup) for cable supply align reasonably with our international and internal benchmarks. *Aurecon is therefore satisfied that the provisioned cost is reflective of market expectations.*

As discussed in Section 4.2.2 the exact specification of cable sizes for the offshore and onshore cable sections are not clear in the executed contract. However, the tender evaluation report prepared by MLPL highlights that PPL suggest using the 2100 mm² Al conductor cable for the full portion of the offshore route and the 3500 mm² Al conductor cable for the full portion of the onshore route. Using the unit costs provided below this accounts for an approximately 23% of the total contract price from PPL. This is lower than is typical in our experience but not surprising given the higher CAPEX associated with the T&I (use of LDV) and landfall HDD scope.

Table 4-10 Cable Supply Benchmarking – Real \$ June 2023

Component	Unit	MLPL (Marked up)	Ref. A ^[1]	Ref. B ^[1]
Al 2500 mm ² XLPE +/- 320 kV HVDC land cable	\$/m	584	423	-
Cu 2500 mm ² XLPE +/- 320 kV HVDC land cable	\$/m	986	960	-
Al 3500 mm ² XLPE +/- 320 kV HVDC land cable	\$/m	613	504	-
Al 2100 mm ² XLPE +/- 320 kV HVDC submarine cable, single wire armour	\$/m	571	440	475

^[1] Benchmarks converted in AUD and are presented in Real \$2023.

Table 4-11 below provides a further benchmark of the total design supply and installation cost of the MLPL cable system against reference projects.

Table 4-11 Overall Benchmarking – Real \$ June 2023

URef.	Characteristics	Location	Target COD	Total (\$m) ^[1]	Total (\$m/km) ^[1]
MLPL	2x cables (symmetrical monopole) of 345 km (750 MW, 320 kV)	Australia	2030	786.6	2.3
R1 ^[1]	2x cables (rigid bi-pole) of 623 km (1400 MW, 525 kV)	Germany - Norway	2020	1,793.4	2.9
R2 ^[1]	2x cables (rigid bi-pole) of 720 km (1400 MW, 525 kV)	UK - Norway	2021	1,815.9	2.5
R3 ^[1]	2x cables (rigid bi-pole) of 760 km (1400 MW, 525 kV)	UK - Denmark	2023	1,721.3	2.3
R4 ^[1]	2x cables (symmetrical monopole) of 575 km (700 MW, 320 kV)	Ireland - France	2026	1,215.9	2.1

^[1] Final costs are not publicly disclosed. This estimate relies on the market assumption that subsea and onshore cables represent approximately 55% of the total CAPEX of 2.0 EURb (3.3 AUDb).

The LHDD contract was benchmarked against comparable projects denoted as “Ref. C”, “Ref. D” and “Ref. E”. Table 4-12 below reveals that the cost provisioned for the LHDD, excluding PPL’s mark-up and provisional allowances, is comparable to our references in comparable markets. The cost per bore remains lower than our benchmarks due to the higher economies of scale achieved in MLPL. We note however that soil conditions could impact cost and would need to be considered when undertaking any benchmarking.

Table 4-12 LHDD Benchmarking – Real \$ June 2023

Ref.	Characteristics	Location	Target COD	Total (\$m) ^[1]	Total (\$m/bore) ^[1]
████	████████████████████ ████████████████████	████	████	████	████
████	████████████████████ ████████████████████	████	████	████	████
Ref. C	Six LHDD bores (three per landfall)	USA	2028	100.9	16.8
Ref. D	Two LHDD bores	Europe	2030	24.8	12.4
Ref. E	Six LHDD bores (three per landfall)	Europe	2030	48.0	8.0

^[1] Benchmarks converted in AUD and are presented in Real \$2023.

4.2.5 Conclusion

Scope reasonableness

Aurecon makes the following conclusions on the reasonableness of the specified scope:

- **Design Compliance and Standards** – The cable supply contract meets the Owner’s Requirements, adhering to appropriate design standards and management plans. There are provisions for revising technical parameters (e.g., TR values) as needed, but this may impact costs if revisions increase LCC work.
- **Interface and Risk Management** – A material project risk lies in the undefined interface between the cable supply contract and LCC works. While the contracts include responsibilities for interface milestones, the risk management of these interdependencies remains unclear and needs attention. It is expected that MLPL will seek to resolve these as the BOW tender is progressed.

- **Approach to Cable Sizing** – The contracts adopt a conservative approach in areas such as cable sizing, thermal backfill, and depth of LHDDs to minimise unforeseen cost escalations. The cable sizes have been determined so as to leverage the larger cable size into lower civil costs by reducing the amount of thermally stable backfill required. Common industry practice has been followed in order to develop this strategy, and it is reasonable given the stage of design.
- **Schedule and Resource Risks** – The project schedule has aggressive (short) timelines, for cable loadouts and LHDD installations). These factors could lead to CAPEX increases associated with extended drilling operations but the duration between planned LHDD construction completion and cable installation is reasonably large and should mitigate significant programme variations if the drilling operations are extended.
- **Potential Project Impacts and Vessel Use** – The choice of vessels (e.g., Leonardo Da Vinci) is deemed prudent to minimise delays and reduce risks associated with additional cable storage and load-out operations. It is possible that PPLs specification of the LDV comes at a higher cost than a typical transport vessel, but this would be difficult to confidently quantify. The lack of clarity on certain components, like TJBs in Tasmania and PQ test timing, may impact the project's CAPEX and schedule if not properly managed.

Suitability on procurement process

Aurecon makes the following conclusions on the reasonableness of the procurement process:

- **Strategic Contracting Approach** – The chosen package split aligns with industry norms and aims to gauge market interest, balancing complexity with strategic benefits. This approach was deemed competitive and efficient given the market constraints.
- **Risk Management and Contingency Planning** – The decisions made reflect an understanding of project risks and includes common adjustment provisions to mitigate fluctuations. Identified risks were quantified and incorporated into the project's contingency planning, ensuring financial preparedness.
- **Mitigation of Key Project Risks** – Including the HDD scope in the contract, despite its complexity, helps mitigate significant project risks, such as vessel standby costs. This approach was crucial for securing project bankability and satisfying financiers' concerns.
- **Cost and Pricing Considerations** – [REDACTED]
[REDACTED]
[REDACTED] Prysmian however did proceed with the lowest cost offer it received and the implied cost per bore appeared to sit within the benchmark.
- **Procurement Process and Justification** – The procurement process by MLPL and Prysmian, although challenging and involving limited participants, was seen as prudent. The [REDACTED] markup was supported by a qualitative risk assessment and deemed necessary to secure reliable scope execution.

Benchmarking

Aurecon makes the following conclusions on benchmarking of project costs:

- Cable unit costs are benchmarked against internal 'bottom-up' cost estimation tools and similar reference projects. PPL's cable unit costs are found to be less than 30% higher than benchmarks for the Aluminium conductor cables and comparable to copper conductor cables. The proportion of the executed contract price associated with the cable supply is thought to be reasonably efficient from a cost perspective.
- Total design supply and installation costs for the offshore and onshore cable system were also benchmarked against four similar projects and the MLPL cost can be seen to be at the lower end in terms of the \$m/km metric.
- The MLPL cost is shown to be lower than projects with 525 kV cable systems which we would expect to be more expensive. However, it is slightly higher than Reference Project 4 which is the most comparable benchmark being a 320 kV system and being closest in terms of total length.
- We note that MLPL has worked extensively to ensure a competitive procurement process was undertaken and there are few comparable benchmarks in Australia for a project of this scale. The price received is reflective of a competitive market process in a region which offers less opportunity for

suppliers relative to the European market. As such, MLPL has limited market power, and we would not expect a more competitive outcome given the current climate.

- LHDD costs are benchmarked showing that the cost provisioned for the LHDD, excluding PPL's mark-up and provisional allowances, is comparable to our references in comparable markets. The cost per bore remains lower than our benchmarks due to the higher economies of scale achieved by MLPL.

Concluding comments

The scope of work, procurement process, and price outcome for the CB package appears reasonable in Aurecon's view and in the context of the current market environment. Risks have been contracted out or managed wherever possible under the EPC structure, with reasonable deviations accepted by MLPL.

The risk assessment for the CB package is shown to be thorough and identifies specific technical as well as broader interface risks likely to occur. The cost estimations in the cost model are developed based on P50 (AER and non-AER), P90 and P95 occurrence.

The P50 AER allowance looks to be low compared to the 'most likely' costs developed by E3 Advisory in Aurecon's view for this project.

5 Balance of Works

This section summarises Aurecon’s review of the activities MLPL has undertaken as part of its Stage 1B submission to the AER with respect to the proposed Balance of Works package.

5.1 Methodology

The two key elements of the Balance of Works (BOW) Package include:

- Land cable civil works (LCC); and
- Converter civil works and installation (CDCS).

Of importance in this Section is that the tender process for the BOW package was not yet final at the time of Aurecon’s assessment. Therefore, the process Aurecon has taken is as follows:

- Review MLPL’s procurement and delivery strategy and the likelihood of it delivering an efficient outcome.
- Assess the scope of work and basis of design put forward by MLPL, which we understand reflects one of the two prospective parties “Week 20” assessment on the scope and likely cost of the BOW package.
- Review whether the indicative capital expenditure provided by MLPL is likely to be reasonable and commensurate with the scope of work being put forward.
- We understand that the capex estimate put forward is considered to be a Class 2 estimate.
- Aurecon’s scope was to assess the reasonableness of the Class 2 estimate that has been put forward.

The guidance provided by AACEL with respect to Class 2 cost estimates is outlined below. Notably, engineering and design is between 10-40% in terms of definition, and cost estimation accuracy is expected to fall within a -15% to + 20% accuracy range. We expect that not all engineering and design risks will be explicitly addressed at the Class 2 stage, but allowances should be made to accommodate for future design changes to manage or mitigate these risks.

Table 5-1 AACEL Cost Estimation Classification Matrix

ESTIMATE CLASS	Primary Characteristic	Secondary Characteristic			
	LEVEL OF PROJECT DEFINITION Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes: [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.
[b] If the range index value of “1” represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

5.2 Land Cable Civil Works

This section evaluates the scope of work proposed by MLPL for land cable civil works for its prudence and reasonableness.

Objectives and Scope

Table 5-2 below summarises the scope of each of the expenditure categories assessed in this Section.

Table 5-2 Objectives and Scope of Land Cable Civil Works

Objectives	Scope
■ Develop and submit a Class 2 estimate for the purposes of a regulatory approval to the AER. ■ Identify direct and indirect costs for land cable civil works for the project, including the inclusion of the second cable. ■ Assess whether the scope put forward by the Contractor is reasonable. ■ Assess whether the technical requirements put forward by MLPL, which the contractor must comply with, is reasonable.	■ Site and Corridor Access Tracks. ■ Trenching. ■ Ducting and Cable Joint installation. ■ Drilling. ■ Traffic Management. ■ Environmental Impact Management. ■ Site Reinstatement. ■ Utilities.

5.2.1 Scope and Specification Assessment

Of relevance to this expenditure assessment is that Marinus Link will be delivered in two 750MW stages, namely Stage 1 and Stage 2. The majority of the expenditure categories within this report primarily focus on costs related to Stage 1. For land cable civil works, MLPL is seeking to recover its costs for Stage 1 & 2 as part of its Stage 1B submission. Each stage of works will require a circuit, where each circuit contains two conduits for power cables and one conduit for fibre-optic cables.

In terms of construction staging, all civil work—including trenching, trenchless methods, conduit installation, joint bay construction, site access tracks, and site establishment work, will be carried out in parallel.

Suitability of Key Engineering and Design Assumptions

Table 5-3 Land Cable Civils Design and Engineering Key Assumptions

Item	Owners and Contractor's Assumptions	Reasonableness of Assumption for Class 2 Estimate
Site Preparation and Clearance	The Contractor will be required to undertake various site preparation and clearance activities to deliver the project. These are anticipated to include: ■ Clearance of existing vegetation and plantation as required from the corridor. ■ Soil and water management (e.g. temporary drainage such as swales, or bunding on upstream sides of the corridor to reduce load on sedimentation ponds). ■ Allowances have also been made for the removal of trees, soil striping and removal of fencing and temporary crossings over creeks. ■ Activities related to building condition inspections, site and ground monitoring, and pre and post construction land condition assessment reports.	■ The activities proposed by MLPL's contractor appear reasonable and necessary. ■ The activities will support the Contractor meeting MLPL's owners project requirements, in addition to ensuring they environmental requirements.
Fencing	Fencing ensures site security, entry control, and boundaries are clearly marked and managed between the project site and other areas. Marinus Link in its LCC Technical Specifications has outlined that the contractor must develop fencing and security gates to: ■ Provide clear delineation of the working corridor. ■ Ensure that during construction a lockable gate is installed to prevent access to the work site and private property.	■ The scope of work appears reasonable and aligned to State construction requirements and Australian Standards. ■ Fencing will be applied across the project corridor which is reasonable and consistent with expectations. ■ We understand that the fencing material could be a combination of timber posts and star pickets. This appears reasonable in our view. Timber posts may be a preference of landowners which would be a valid reason for their use.

Item	Owners and Contractor's Assumptions	Reasonableness of Assumption for Class 2 Estimate
	■ Stockproof fencing must be installed in areas of grazing or cropping or as agreed with the appropriate Landholder. ■ Where site access roads to the Construction Site directly connect to major public roads and where practicable, the Contractor must have a lockable access gate installed that allows for 25m of space for a low loader vehicle length back from the road verge to facilitate the opening of the gates without causing traffic disruption. Any access that does not accommodate this must have the gates opened prior to the arrival of long vehicles to prevent traffic risks. ■ Deep excavations must be delineated and signed as per Safe Work Australia Excavation Work code of practice. ■ Fencing must be in accordance with AS 1725. ■ The Contractor has proposed the use of timber posts for fencing.	■ Fencing for construction areas (e.g. Joint Bays) is also included and is sensible for inclusion. ■ The use of gates for controlled access, to mark boundaries between properties, and for laydown areas is reasonable. ■ Fences and gates will be removed once installation activities are complete, with disturbed areas reinstated. ■ The contractor notes that this approach will maintain safety for workers, livestock, wildlife and the surrounding environment.
Access Tracks	Access tracks are required for contractors to reach the construction site and move along the project corridor. Various access track specifications have been proposed as below: ■ Construction Access Track – Utilises existing subgrade material once topsoil is stripped as the access surface. A track width of 5m is specified and 2% minimum crossfall. This method is reliant on material conditions being suitable at the time of year (e.g. not wet / excessive moisture). ■ HDD Access Tracks – Utilised at all locations with HDD. Typical pavement thickness of 250mm and minimum crossfall of 4% with a gravel finish. This will accommodate a vehicle weight of 18 tonne. ■ Light Construction Roads – To be used for access to joint bays where cable winching is required. A vehicle weight of 18 tonnes has been specified with a pavement thickness of 350mm. The road will be 6m wide. Prysmian has informed the road requirement specifications according to the contractor. ■ Heavy Construction Roads – Designed for vehicles which may be required to transport cable drums, with a minimum crossfall of 4% and pavement thickness of 450mm. The road will be 5.5m wide. Prysmian has informed the road requirement specifications according to the contractor.	■ The Contractor has clearly specified the scope assumptions for the use of various access tracks. ■ The use of heavy haulage roads with 450mm of crushed rock has been suggested in potential flood areas where soil conditions may be soft, and as necessitated where the transport of cable drums is required. ■ In Aurecon's view, this level of depth is conservative but suitable where geotechnical study has shown that the area is flood prone which necessitates this (as flooded areas will require larger time to dry and to mitigate further deterioration of road surfaces and generate safety concerns). Aurecon understands that the Gippsland region is subject to flood risk and this design choice may be warranted. ■ It is understood that the Contractor may in the future consider opportunities to reduce pavement depth in areas where this is not necessary as further geotechnical study is undertaken (80% completed at present) or as the design progresses (beyond 60%). ■ Similarly, for light construction roads, Aurecon's view is that pavement depth could be optimised in areas where the geotechnical condition allows for this.

Item	Owners and Contractor's Assumptions	Reasonableness of Assumption for Class 2 Estimate
	The Contractor notes that 45km of Heavy Access Tracks, 9km of Light Access Tracks, and 32km of Construction Haul Roads will be required based on their interpretation of geotechnical data. Class 3 crushed rock and clay subgrade is being assumed across all roads.	- The contractor has proposed the use of heavy construction roads for elevated areas. Aurecon would suggest that it be considered if the scope can be optimised with "pavement stabilisation methods" rather than increasing pavement depth as the design progresses. - The scope of HDD and construction access tracks appear reasonable in Aurecon's view for a Class 2 estimate.
Trench, Conduit and Backfill Construction	- Trenching will commence following the topsoil strip, with works proceeding in accordance with permit approvals, survey set out, and service proving. - Trenching plant will be selected based on ground conditions and thermal zone requirements and will include a combination of tracked excavators fitted with trenching buckets, v-buckets, or rock breakers as required. Where conditions permit, trenching buckets will be used to reduce spoil generation and improve efficiency. This method is only viable where ground conditions support - The Contractor has interpreted data provided by Prysmian to develop trench dimensions and burial depths based on the various thermal resistivity values encountered along the corridor (ranging from 0.0 to 3.0). Thermal resistivity values across the corridor have been informed by geotechnical assessments across the alignment of the project. - The contractor identified that the TR along the majority of the corridor would be under 2.0 based on geotechnical studies and that the risk of encountering rock would be limited to certain chainages (Section 33,800 to 34,200 and Section 40,700 to 45,500).	- Thermal Resistivity requirements and input from Prysmian will drive the scope of trenching activities required. The approach taken by the Contractor to assess TR values along the corridor and select trenches in line with Prysmian's requirements is reasonable. - The Contractor has also specified that based on ground conditions, various methods of trenching may be required (e.g. conventional earth moving, rippers, rock breakers, etc.). This is consistent with what would be expected along the corridor. - The Contractor has specified the proportion of the route/chainage where rock may be encountered which could require more specialised machinery (rock breakers/ pneumatic breakers). They have also noted that this is only an estimate, and rock could also be encountered elsewhere. - In Aurecon's view, there will be instances of rock being encountered elsewhere along the corridor and it is reasonable for the Contractor to advise on this risk.
Cable Joint Bays and Link Pits	- Cable joint bays and link pits are designed to link and provide access to sections of cable. Joint Bay dimensions have been specified by the cable manufacturer Prysmian which need to be adhered to. - The distance between joint bays is approximately 1km. - Similar to the Trenching assessment above, excavation costs are linked to the ground condition and geotechnical studies assessed which classified ground conditions.	- Joint bays are being driven by requirements from the cable manufacturer Prysmian. The Contractor has followed these requirements which is prudent. - Concrete foundations will form the base of the joint bay. Concrete is suitable in our view assuming a limited depth and offers a more stable foundation relative to alternatives such as gravel. - In terms of assessing the degree of trenching required for Joint Bays, we note that the Contractor has reviewed TR requirements and ground condition to inform their view on the type of excavation necessary (similar

Item	Owners and Contractor's Assumptions	Reasonableness of Assumption for Class 2 Estimate
	- Reinforced concrete has been allowed for constructing the Cable Joint Bays and Link Pits. - Scope has been allocated for backfilling the joint pit prior to handing it over to the cable's contractor. - Link pits have been determined as necessary for every 5th joint based on the concept design developed. Overall, this implies 17 link pits per circuit. - The Contractor has also considered the overall footprint for constructing joint bays, which includes laydown areas, temporary access roads, and other supporting areas. Multiple layouts have been put forward to Prysmian for consideration. - Laydown areas have been specified at 75m by 45m or 100m x 26m to accommodate turn radius specifications from vehicle movements. - Grading of the land has also been allowed to ensure a maximum 2% cross-fall.	to the method proposed for trenching where conventional earthmoving, rippers or pneumatic breakers may be used depending on ground condition). This is a reasonable approach. - The Contractor has proposed alternative joint bay layouts to facilitate vehicle turnaround movements in some instances. It is suggested that these are tested with any bushfire management requirements for compliance. - Overall, the scope appears reasonable in Aurecon's view.
Trenchless Construction –	- Trenchless construction relates to works where subsurface construction work is undertaken with few or no continuous trenches. - Ground conditions have also been specified within Geotechnical reports to define where HDD may be required. - The Contractor was provided a reference design which outlined where HDD was likely to be required. The Contractor assessed instances where it could use open trenching rather than HDD as proposed in the reference design and made updates as required. HDD sections were moved in some instances and also added in other cases with justification for any new inclusions (waterways, heavy vegetation). - Up to 5.3km of HDD has been assessed as being required across the chainage for the project by the Contractor.	- In Aurecon's view, the approach taken by the Contractor for determining HDD chainage is reasonable. The Contractor reviewed the reference design set (which has been informed by Geotechnical requirements and Owner's requirements) and made additions and removals where they felt trenching may be possible, or where waterways were identified. - The Contractor has flagged that additional information provided by Prysmian on pulling forces did not take into account the vertical alignment of cables. This seems to imply that additional scope may be required for cable pulling that was not previously considered. - The Contractor has identified 11 sections where additional cable support will be required via cable pushers based on this analysis. - The approach taken by the contractor appears reasonable overall. It is suggested that the BOW contractor (once confirmed) confirms with Prysmian the pulling forces and tests this additional scope requirement for cable pushers.
Fibre Optic Terminal Station	MLPL notes that the contractor is responsible for design, supply and implementing a FO Terminal Station and all utilities needed to operate the	The scope of work appears reasonable from Aurecon's review.

Item	Owners and Contractor's Assumptions	Reasonableness of Assumption for Class 2 Estimate
	FO communication cable system, including all buildings needed to comply with the performance requirements as per Owner's requirements EPC-4C1-0-CB1 Technical Specification_Rev F.	Aurecon was not able to assess whether drainage and backup generators have been included in the scope per the Owner's requirements EPC-4C1-0-CB1 Technical Specification_Rev F (Pages 73-75). This could further increase costs if included.
Reinstatement	- The LCC Technical Specification produced by MLPL notes that: - The reinstatement of the work area must be structured ensuring that land is returned as quickly as practical to the original use while at the same time, allowing for cable installation (e.g. cable pulling, hauling activities and jointing) to be undertaken at a future date. The Contractor must undertake reinstatement of the trenched Work areas wherever possible and remove access roads which are surplus to the Works at all stages. - Contaminated material must not be reused and is disposed of in accordance with prevailing environmental procedures and requirements. - Any surplus soils not used to backfill excavations must be removed from Site and transported to appropriately approved and licensed waste transfer sites unless permission has been obtained from the local Landholders and Authorities to place the material locally. - All working areas must be restored to their original condition, including any services or supplies that were removed or displaced during the Work. - Areas that fall under Property Management Plans must be reinstated by the Contractor in accordance with its obligations and according to the details within the document that are agreed with the Landholder. - All surfaces including (but not limited to) footpaths, roads, lawns, garden beds, parks etc., must be reinstated with appropriate material to a standard as good as or better than existing before the commencement of the Work. - Final resurfacing must not be carried out until compaction testing of the backfill has been carried out and the Owner is satisfied that the condition of the backfill is suitable. Permission to proceed with final resurfacing will not relieve the Contractor of its maintenance responsibilities.	- The reinstatement scope put forward by MLPL appears to be consistent with State and Commonwealth requirements and are reasonable. - The Contractor has commented that they will: - Reinstate fencing across a portion of the corridor. - Remove temporary gating. - Respread topsoil. - Replant hedges. - Remove stockproof fencing along the corridor. - Dispose of HDD laydown materials. - Reinstate any land associated with public roads. - Provide temporary creek crossings whilst works are undertaken.

Item	Owners and Contractor's Assumptions	Reasonableness of Assumption for Class 2 Estimate
	– Open trenches across driveways must be backfilled, compacted and have signage installed at the close of works on a daily basis. – The Contractor is responsible for reinstatement of the Work area, or any area affected by the Work to the initial condition or agreed requirement of various Authorities. – The Contractor must maintain and leave the Site in good condition. On completion of the Work on Site, the Contractor must remove all plant, surplus materials, construction debris and construction buildings and leave the Site clean and tidy to the Owner's satisfaction. – Backfilling and reinstatement in roadways must be carried out in accordance with NATSPEC 1152 using the quality assurance guidelines within or in accordance with other Authority requirements.	
Inclusion of civils for both cables	■ Marinus Link has included the civil works for both cables across various scope areas, including trenching, joint bays, link bits and utility protection. ■ MLPL has conducted a net present value (NPV) assessment in November 2024 which demonstrated savings for delivery of the second cable's civil component. The NPV assessment showed that the benefits could range from \$44.5m to as high as \$200m. At that time, the NPV assessment showed that the benefits could range from \$44.5m to as high as \$200m. This analysis has now been updated to reflect the latest available information, which shows that the case for proceeding with the enabling works has strengthened.	■ In Aurecon's view, this decision is likely prudent, because MLPL could benefit from efficiencies of having civil works delivered via one balance of works contractor (as demonstrated via the NPV assessment). ■ In Aurecon's experience, this is a common method for achieving efficiencies (e.g. Powering Sydney's Future adopted a similar approach). ■ By having this individual party deliver the scope, it is likely to reduce mobilisation costs (as contractors do not need to return to the same project site and can deliver materials and equipment only once) and also receive a more competitive tender outcome. ■ Aurecon also notes that by undertaking the civil works once, there may be less disruption to the public in Stage 2 from vehicles utilising access tracks and traffic management along public roads.

5.3 Converter Civil Works and Installation

This section assesses Converter Civil Works and Installation.

Objectives and Scope

Table 5-4 summarises the objectives and scope of Converter Civil Works and Installation.

Table 5-4 Objectives of Converter Civil Works and Installation

Objectives	Scope
■ To secure contractors to deliver major capital works packages for Cable System Design, Supply and Installation, including landfall HDD. ■ To develop a suitable procurement and delivery approach which generates value for money. ■ Ensure project risks are well defined and managed. ■ Minimise interface risks between landfall HDD and the Submarine Cable scope.	■ Contractually agree the expenditure required for contractors to deliver major capital works. ■ Ensure that the tender responses and technical specifications put forward are reasonable and meet MLPL's requirements. ■ Ensure risk is adequately considered or priced into contracts by MLPL and its contractors.

5.3.1 Scope and Specification Assessment

The evaluation covers the TOC of Converter Station installation works for Marinus Project Stage 1. According to Cost Plan of document [REDACTED], CDCS scope includes the following activities:

- The design and construction of CDCS sites including civil works and mechanical systems.
- The design, supply and installation of AC yard switchgear equipment.
- The installation and construction of supplied good and auxiliary systems for convertor station.

Two (2) separable portions have been developed for the CDCS scope of the permanent works: Separable Portion 1 (SP1) in Tasmania (Heybridge) and Separable Portion 2 (SP2) in Victoria (Hazelwood).

Table 5-5 below summarises our review of the scope of work for the CDCS package, and our views on the appropriateness of technical assumptions. The breakdown of the CDCS actual packages reflect the direct costs as proposed in the Cost Plan and exclude the following:

- The indirect costs (e.g. project management, corporate profits, etc).
- The optional scopes (Civil Works of the Heybridge Switching Station, HVDC study replica, Climate Controlled Storage Heybridge and Hazelwood). After a meeting with the MLPL, it was clarified the Switching Station at Heybridge (sitting on Tas Network land) is under Tas Network's decision to be built up by MLPL or another contractor.
- The provisional sums on scopes for the Gas Suppression System for Tasmania and Victoria (that potentially can be excluded from the TOC if proved not to be required) and Gippsland watermain relocation for Hazelwood site and the costs of Professional Indemnity Insurance > 12 years.

Table 5-5 Scope Provisions & Appropriateness (CDCS Direct costs)

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
Bulk Earthworks	Hazelwood Converter Station: ■ The proposed Hazelwood converter station site is located within the LaTrobe City Council district, south of Morwell, directly west adjoining to Tramway Road. The site and surrounding areas are typically classified as farmland. ■ Bulk earthwork requirements have been modelled using 3D Software to consider site specific constraints. The topography within the site is relatively flat with a high point gently grading away in all directions. The site will be graded to ensure that surface water is directed away from buildings and into the drainage network. ■ Hazelwood balances cut and fill volumes to maximise the re-use of site-won material and limit the import of select fill. Surface grading has been modelled with a general fall from the southeast to northwest corner of the site. The degree of cut and fill is greatly influenced by the AusNet switching yards which is existing, and its future requirements. ■ Stormwater requirements are designed to meet 100-yr ARI storm events and various other standards. ■ Allowance had been made for replacement of unsuitable subgrade to 5% of the subgrade area which is ~4,700 m2. ■ Ground investigations are not complete, and some further design work (related to settlement tolerance) requires repetition per Hitachi's request. This may affect the platform level. ■ In-situ cut material is deemed unsuitable to be used as fill material (high propensity for erosion soils). Allowance had been made for replacement of unsuitable subgrade to 5% of the subgrade area.	■ For a Class 2 estimate, the level of detail for ground investigations is overall satisfactory for both sites. ■ The scope of bulk earthworks has been derived from geotechnical investigation outcomes and detail some flood risk within the area. ■ Technical specifications for site development with respect to civils and grading are suitable. ■ Allowances made for the replacement and stabilisation of unsuitable subgrades are reasonable based on the ground conditions. ■ Heybridge is a more challenging site due to the presence of potential geohazards (landslides), substructure obstructions, and contamination of the land due to historical use of the site. ■ At Heybridge, closer inspection of potential landslide risks to the south could be undertaken. This could impact the scope and impact productivity. ■ Contamination of the land at Heybridge seems to be well identified for this stage of the project.	■ RFO-1B-3-BOW_BOW Design Report – Heybridge CDCS & Hazelwood CDCS ■ ITC-0-AB-BOW Part B Technical Requirements

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
	- No information in the geotechnical report indicates the presence of bedrock and contaminated materials, thus no allowance has been made for excavation, treatment, handling or disposal of rock and contaminated materials. - Ground investigations are not complete, and some works (related to settlement tolerance of 25mm) are required to inform the design as per Hitachi's request. - Localised flooding can be expected based on the site conditions. Heybridge: - Bulk earthwork requirements have been modelled using 3D Software to consider site specific constraints. - The overall site must be relatively flat to ensure that there is no significant level difference across buildings and that equipment can be installed level. The site will be graded to ensure that surface water is directed away from buildings and into the drainage network. Kerbs and drainage have been specified to meet VicRoad standards. Allowance for subgrade lime stabilisation had been allowed for 5% of the subgrade area which is ~3,125 m2. - The site was used historically for industrial purposes and has a high risk of soil contamination. Allowance has been made for screening, excavation and disposal of ~6 m3 of asbestos contaminated material to Heybridge Landfill ~19,000 m3 of uncontrolled fill had been assumed to be used as fill material ~4,000 m3 of uncontrolled fill material had been assumed to be disposed off-site to Dulverton Landfill. - Stormwater requirements are designed to meet 100-yr ARI storm events and various other standards. - A retaining wall is located within the northwest of the site, adjacent to the Bass Hwy, to ensure that works remains within the MLPL property boundary. The wall is required to be 105m in length with a maximum height of approximately 1.6m. The form of wall has been proposed to be a post and panel construction. - Landslides on the wider area are identified and require an additional inspection. No remarkable flooding risk is expected.		

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
	Other Comments: The two Converter Stations primarily differ in their underground soil conditions, hence the approach of civil founding. Heybridge (TAS) is located on a former Tioxide plant, with a legacy of existing foundations and some pockets of contamination, whereas Hazelwood (VIC) is located on a softer farmland which requires more leveling volume.		
Access Tracks	- The Contractor notes that pavement designs will be specified in line with Austroad design guidelines (2024) and Vicroads COP (2017). - Specific roads may be required which include transformer delivery roads, light access roads, heavy access roads, and general site benching. - The Contractor has made assumptions in the absence of detailed information (e.g. crane mass specifications, transformer delivery methodology, vehicle lengths). - Assumptions include vehicle masses for each of the roads (40 tonnes for light roads, 270 tonnes for heavy), largest vehicle length for each road (19m on light access roads and 101m on heavy), and design life (50 years).	- Technical Specifications for Civils Site Development are adequate for access tracks. References have been made to appropriate Australian and transport authority standards. - Assumptions for a Class 2 estimate appear reasonable.	- RFO-1B-3-BOW_BOW Design Report – Heybridge CDCS & Hazelwood CDCS - ITC-0-AB-BOW Part B Technical Requirements
Converter Buildings, including DC Hall, AC Halls & Switchyard, Valve Hall, and Reactor Hall	General: - The Contractor has specified design life, importance level, and various structural and civil design parameters to demonstrate compliance with Australian Standards for Steel (AS/NZS 4680, AS 2312.1/2), Concrete (AS3600), Earthquake Loading, Wind Loading, and others. - BCA advice has been provided to ensure compliance with the design. Building Foundations: - Foundation and slab designs are based on the geotechnical Basis of Design report that includes safe bearing design parameters as well as foundation settlement analysis for the critical structures. - Building foundations typically include two forms of construction: - Raft slabs with integrated internal and edge beams.	- Technical Specifications for Buildings and Structures are well defined in the Basis of Design and extensively described in six (6) sections, referencing applicable standards, load and design criteria and expected design outcomes with clearly stated assumptions and limitations. - The design specification is aligned to Australian standards and the project requirements. Overall, the assumptions appear reasonable. - The design is considered sufficiently advanced for the and towards the upper limit of Class 2 (70%). Design interfaces are high level but suitable at this stage of the design where some inputs are pending from Hitachi. - There is strong alignment between the PSDR, and the cost plan proposed by the MLPL Contractor.	- RFO-1B-3-BOW_BOW Design Report – Heybridge CDCS & Hazelwood CDCS - ITC-0-AB-BOW Part B Technical Requirements

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
	– Slab on ground construction with separated pad foundations or footing beams. ■ The HV buildings include separate pad foundations and slab on ground construction. This approach allows the steel frame, roof and cladding to be completed first and the floor slabs then constructed within a controlled protected environment. Slab construction consists of conventionally reinforced slab on ground construction. ■ Floor slabs have been designed for dead weight and live loads imposed by equipment and activities for each room, as well as earthquake loads from the equipment. The thickness has adopted a minimum thickness based on the expected equipment anchoring requirements. ■ Slab designs for the Converter Building and AC Halls have included a conventional reinforced slab construction as well as a fibre reinforced slab construction. ■ Concrete of N40 is assumed for these structures and Grade D500N for deformed and Grade R250N for plain bars. Building Structural Steel: ■ The Contractor notes that framed structural steel industrial buildings typically consist of a braced portal frame building with conventional Universal Beams, Welded Beams and Universal Columns forming the majority of the framing. ■ This construction has been adopted in lieu of fabricated trusses due to the reduction in fabrication costs. A truss has been adopted for the AC Hall due to the large spans not able to be managed with conventional Welded Beams. ■ Rafter and column restraint conditions are provided via a combination of hot rolled sections connecting directly into the building bracing system as well as conventional bracing systems such as purlin and fly-bracing. ■ Vertical and horizontal bracing bays and diaphragm are included to control building sway deflections under wind loads, seismic and crane operations. Building deflections (lateral sway and vertical rafter deflections) are heavily controlled, both for the operation of the cranes and to ensure airtight construction where required.	■ The basis of estimate is clearly documented with assumptions, limitations and methodologies.	

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
	- A comprehensive assessment has been conducted to establish the purlin and girt schedule for all structures. Other Items: - All items will be clad with non-combustible metal faced insulating panels. The panels will be specified to meet air tightness and EMF requirements. - The Internal Wall systems are tailored to meet fire separation demands prescribed by the NCC. - Roof cladding for all buildings to be a spanning rigid insulation sandwich panel to join both sides and non-combustible. All roofs will shed water outside of the building envelope. - Floors will generally be concrete for all HV halls, ancillary buildings, and technical rooms.		
Transformer Area	Hazelwood & Heybridge: The transformer compound construction will include: - Raft slab construction and reinforced concrete bund walls designed in accordance with AS 3735 Concrete Structures for Retaining Liquids. - Fire walls on three sides of each compound. - Transformer Plinth to match bund walls and sized to allow jacking of transformers. - Two walls within plinth for transformer installation via skating (if required). - The structural design and construction requirements for the banded transformer compound include containment of transformer oil spills and drainage to oil water separator, protection against fire, foundation support to limit settlements, oil spill from the transformer drain to an Oil Water separator, with fire and rainwater then discharged to stormwater. - The bund capacity for each transformer has been sized for 110% of the oil volume from one transformer plus deluge water.	- For the Transformer area, specific requirements are driven by Hitachi, and we understand that the BOW Contractor is required to conform with this scope. - The Contractor has demonstrated compliance with suitable Australian Standards and made sensible decisions with respect to the bunding of the Transformer area and allowing for some contingency in oil volumes. - The approach and scope appear sensible.	- RFO-1B-3-BOW_BOW Design Report – Heybridge CDCS & Hazelwood CDCS - ITC-0-AB-BOW Part B Technical Requirements

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
	■ Drainage of bund (rain and fire deluge water) via flame trap sump to oil containment tank and then separator. ■ The bund footprint has increased to ensure that oil spill from the transformer remains within the compound (in accordance with AS1940 Storage and Handling of Flammable and Combustible Liquids).		
Services	■ The design has allowed for various services on the site and across the various buildings including: – HVAC systems, fire protection systems, electrical systems (switchboards, generators, etc.), waste systems, stormwater management, communication systems, building management systems, control systems, and various other services. ■ The Contractor notes that their design has sought to be generally compliant with Hitachi's Civil Design Instruction (GEN-PRC-000008) and the Balance of Works technical requirements. ■ The Basis of Design Document specifies specific performance criteria (which are driven by Hitachi) with respect to maximum temperatures, minimum temperatures, humidity levels, and required redundancy of services. ■ Services have otherwise been driven by Australian Standards and NCC codes (e.g. with respect to fire protection or water & drainage requirements, heated water systems, domestic potable and non-potable water systems). ■ The contractor has outlined the basis for the sizing of various services within the Basis of Design reports for each site.	■ Various infrastructure services and systems have been included in the scope and are required for operation. These will service the various halls and buildings across the Converter Stations. ■ The Basis of Design documents clearly specify various parameters including, operational minimum and maximum design temperatures, humidity levels, flow rates, storage volumes & duration, pipework sizing, etc. for the various halls. ■ These design standards are largely driven by Hitachi's operational requirements for the Converter Station and the relevant Australian standards. ■ It was not within Aurecon's scope to validate whether all infrastructure is sized adequately but we are satisfied with the commentary provided by the Contractor on how they have sized various services infrastructure to comply with Hitachi's and Australian requirements for the Project.	■ RFO-1B-3-BOW_BOW Design Report – Heybridge CDCS & Hazelwood CDCS ■ ITC-0-AB-BOW Part B Technical Requirements
Reinstatement and Remediation	■ The MLPL Owner's project requirements specify the need to meet reinstatement requirements which include: – Any areas of the CDCS Sites which do not contain the CDCS Permanent Works must be suitably landscaped and revegetated. This may include, but is not limited to: ■ Areas adjacent to the converter fence line and areas adjacent to access roads.	■ The Contractor has described the need to import topsoil, carry out Hydro-mulching, supply and install Jute Matting, and conduct landscaping. ■ Further technical definition of remediation and reinstatement would be beneficial to provide certainty on the volume of the works. ■ Aurecon was not able to assess the exact volumes of soil and land which need to be reinstated but notes that the	■ RFO-1B-3-BOW_BOW Design Report – Heybridge CDCS & Hazelwood CDCS ■ ITC-0-AB-BOW Part B Technical Requirements

Item	Owners and Contractor's Scope Assumptions	Reasonableness of Assumption for Class 2 Estimates	Source Documents
	– Landscaping and revegetation must be assessed for but not limited to its risk to bushfire, site clearance and any other considerations. – The Contractor must ensure that contaminated material is not reused and is disposed of in accordance with prevailing Environmental procedures and requirements. – The Contractor must reinstate any haul routes as agreed with the relevant road Authority. ■ Asbestos and contaminated land is an issue on the Heybridge site, but further investigation is needed to confirm the magnitude of the required works. An allowance has been included for this within the scope of activities for the site.	activities described by the contractor are consistent with expectations. ■ The need for remediation at the Heybridge site is valid based on preliminary site investigations to date.	

5.4 Balance of Work Forecast Expenditure and Benchmarking

The table below summarises the approach taken by MLPL's Contractor in the Class 2 estimate. It should be emphasised that the estimate provided to MLPL by the Contractor is highly detailed. It was not within Aurecon's scope to validate each calculation, and all the quantities specified. Aurecon has focused on assessing the reasonableness of the estimates by reviewing the more material unit rate assumptions and providing a general view of the consistency between pricing and the scope assumptions where possible.

In some cases, totals in the "Basis of Estimation and Unit Rates" column may not perfectly align with the \$m Real June 2023 total which is reflective of the capital value sought to be recovered during the revenue proposal period. This is primarily because of Aurecon rounding values upward from source files reviewed and differences in the project period in some cases. Aurecon also notes that some of our analysis in the "Basis of Estimation and Unit Rates" column was based on costs that were provided in nominal terms from the Contractor's Cost Plan. In some cases, we have assumed the same proportion of total cost for the real values within the MLPL capex model that was reviewed by Aurecon (e.g. if the item is 20% of the total nominal cost it represents 20% of the total real cost).

Table 5-6 Balance of Works Expenditure Assessment Land Cable Civils

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
Tasmania CDCS Direct Costs			
Bulk Earthworks, Access Tracks, Roads & Paving	\$████	■ Bulk earthworks (\$████) scope includes: – Cut to fill (uncontaminated / other than rock material): ~7,000 m3. – Cut to fill (uncontrolled fill material): ~19,000 m3. – Cut to dispose (uncontrolled fill material): ~4,000 m3. – Cut to dispose (rock material): ~700 m3. – Supply, spread, level and compact imported fill material: ~81,000 m3. – Subgrade preparation: ~62,000 m2. – Supply and install geogrid: ~70,000 m2. ■ Access Tracks, Roads & Paving (\$████) scope includes: – Heavy haul road which includes base course layer, concrete pavement finish. – Light haul road which includes subbase layer, base course layer and sprayed seal and prime finish.	■ Bulk earthworks quantities: The overall quantities seem reasonable and appear to be aligned with the design stage assumptions. Due to the steep terrain on the southwestern side and the uncertainty of the slope stability, some additional earthworks may be required beyond what has been allocated. Additionally, rocky soil quantities in the south area may require some further allowances considering that there has been limited ground investigation in some areas, and there could be a risk of encountering shallower bedrock. ■ Bulk earthworks rates: Most unit rates appear to be within benchmark range. However, the rate of \$████ was applied in some cases, which appears to be at the higher range of benchmarks for the productivity proposed (50 m3/shift). We understand that these rates have been market tested by the Owner's Engineer. ■ Access roads: Quantities and rates are reasonable with material costs at the higher end of benchmarks, but

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		- Access tracks which include site benching, subbase layer, basecourse layer and gravel finish, kerbs and channels, wheel stops, bollards, and guideposts. - Key costs and unit rates include, but are not limited to: - Site preparation and clearance: approx. \$[REDACTED] - Bulk excavations - Cut to fill - uncontaminated material - other than rock material: ~\$[REDACTED] - Cut to dispose - rock material: ~\$[REDACTED] - Imported fill (supply, labor, equipment): ~\$[REDACTED] - Geogrid: approx. \$[REDACTED] - Access Tracks, Roads & Paving/Heavy Haul Road/Heavy Haul Road: approx. \$[REDACTED]. - Access Tracks, Roads & Paving/ Light Haul Road: \$[REDACTED]. - Access Track: approx. \$[REDACTED] - Subbase course, \$[REDACTED] base course and site benching \$[REDACTED] - Finish course: \$[REDACTED]	compatible with the class of crushed rock specified to be used in each case. - It is not clear if the bulking factor for vehicles has been considered for quantities referenced in mass units (t) For a class 2 estimate this is reasonable, but we note that this could increase cost if not considered. - The sum of this group of works represents ~9% of the total CDCS direct costs for Tasmania, which is reasonable.
AC, DC, Reactor and Valve Halls	\$[REDACTED]	- The scope includes foundations, footings, slabs, buildings, mechanical HVAC, fire systems, electrical systems, communication systems for each major area on the converter station: AC, DC, Reactor and Valve Hall. This is consistent with the basis of design. - Key assumptions include: - Concrete is assumed to be free issued to subcontractors and included in each cost group. - Reinforcement materials are assumed to be free issued to subcontractors and included in each cost group. - No blast walls for DC Hall are included. - No civil work is included for AC Switching Station. - Key unit rates include:	- From industry benchmarks, concrete rates of N40 supply are slightly lower than benchmarks of a range of \$[REDACTED] - In some cases, installation costs appeared to be above the benchmark range (e.g. column block out of \$[REDACTED] for N25 installation of 0.39m3). Aurecon understands that the unit rates are market tested and therefore likely to be reflective of market conditions and is therefore satisfied. - Most hall costs are allocated to FIM, mechanical and electrical services and external walls, windows, and doors. This is consistent with Aurecon's previous project experience.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– N40 concrete supply \$[REDACTED] and installation >\$[REDACTED] – Reinforcement rebar supply \$[REDACTED] and installation \$[REDACTED]. ■ Key costs have been itemised and include but are not limited to: – AC Hall ~\$[REDACTED]: Substructures ~10%, steel frame ~11%, roof ~14.5%, external walls & windows ~18% m, wall and floor finishes of the building ~10%, mechanical services ~9%, fire services ~3%, electrical services ~7.5%, and installation of free issued materials (HV equipment) ~14.1%. – DC Hall ~\$[REDACTED]: Substructures ~10%, steel frame ~11% (\$[REDACTED] t), roof ~9%, external walls & windows, doors ~13%, wall and floor finishes of the building ~14%, mechanical services ~9%, fire services ~3%, electrical services ~\$5%, communication services ~\$2%, transportation services ~2%, and installation of free issued materials (HV equipment) ~21%. – Reactor Hall ~\$[REDACTED]: Substructures ~7%, steel frame ~13% (\$[REDACTED]), roof ~10%, external walls & windows ~20%, floor and wall finishes ~19%, mechanical services ~15%, fire services ~4%, electrical services ~5%, communication services ~1%, and installation of free issued materials (HV equipment) ~7%. – Valve Hall ~\$[REDACTED]: Substructures ~6%, steel frame ~13% (\$[REDACTED]), roof ~10%, external walls & windows ~15%, wall and floor finishes, internal screens, fitments ~20%, mechanical services ~9%, fire services ~3%, electrical services ~5%, communication services ~3%, transportation services ~2%, installation of free issued materials (HV equipment) ~14%.	■ The sum of this group of works represents ~40% of the total CDCS directs costs for Tasmania, which is reasonable.
Services, Relay, MVS, Telcom & Storage Buildings	\$[REDACTED]	■ This scope includes foundations, footings, slabs, buildings, mechanical HVAC, fire systems, electrical systems, communication systems for the services, relay, MVS building – tertiary winding and DNO supply, telecom and storage buildings. This is consistent with the basis of design. ■ Key assumptions are: – Concrete assumed to be free issued to subcontractors and included in each cost group. – Reinforcement materials assumed to be free issued to subcontractors and included in each cost group. ■ Key unit rates include:	■ The scope is well defined, and the breakdown of direct costs is refined for a class 2 estimate. ■ Commentary on key unit rates for this group of buildings aligns with that provided for the HV halls (AC/DC Halls described above). ■ Benchmarking of these components against peer projects we would anticipate a cost of circa \$[REDACTED] per MW. ■ For Services, Relay, MVS and Telecommunications building the major costs are allocated to FIM, Mechanical and Electrical services and External walls, windows, doors. For Storage building, the external, internal and fitment indicate

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– N40 concrete supply \$[REDACTED] and installation >\$[REDACTED] – Reinforcement rebar supply \$[REDACTED] and installation \$[REDACTED]. ■ Key costs have been itemised and include but are not limited to: – Services Building \$[REDACTED]: Substructures ~2%, steel frame ~4% (\$[REDACTED]), upper floors ~5%, staircases ~1%, roof ~3%, external walls & windows ~6%, wall and floor finishes and internal walls & screens and fitments ~9%, hydraulic services ~1%, mechanical services ~23%, electrical services ~23%, fire services ~4%, communication services ~6%, transportation services ~1%, installation of free issued materials (equipment) ~12%. – Relay Building \$[REDACTED]: Substructures ~2%, steel frame ~2% (\$[REDACTED]), roof ~2%, external walls & windows ~5%, wall and floor finishes ~1%, mechanical services ~9%, fire services ~10%, electrical services ~37%, communication services ~6%, and installation of free issued materials (equipment) ~27%. – MVS – tertiary winding \$[REDACTED]: Substructures ~3%, steel frame ~1% (\$[REDACTED]), roof ~3%, external walls & windows ~6%, wall and floor finishes ~2%, mechanical services ~15%, fire services ~24%, electrical services ~32%, and communication services ~13%. – MVS – DNO Supply \$[REDACTED]: Substructures ~4%, steel frame ~2% (\$[REDACTED]), roof ~2%, external walls & windows ~6%, wall and floor finishes ~2%, mechanical services ~14%, fire services ~20%, electrical services ~41%, and communication services ~8%. – Telecom Building \$[REDACTED]: Substructures ~4%, steel frame ~1% (\$[REDACTED]), roof ~6%, external walls & windows ~13%, wall and floor finishes ~2%, mechanical services ~20%, fire services ~20%, electrical services ~24%, and communication services ~8%. – Storage Building \$[REDACTED]: Substructures ~7%, steel frame ~4% (\$[REDACTED]), roof ~14%, external walls & windows ~13%, wall and floor finishes and fitments ~18%, hydraulic services ~3%, mechanical services ~23%, fire services ~7%, electrical services ~9%, and communication services ~4%.	the higher costs. These are considered reasonable based on previous projects experience. ■ The sum of this group of works represents ~32% of the total CDCS direct costs for Tasmania, which is reasonable based on Aurecon's previous experience.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
Diesel & Water Assets	\$█	- The scope includes foundations, footings, slabs, mechanical, fire systems, electrical systems and communication systems for the diesel and water services below. - Key assumptions are: - Concrete assumed to be free issued to subcontractors included in each cost group. - Reinforcement materials assumed to be free issued to subcontractors included in each cost group. - Key unit rates include: - N40 concrete supply \$█ and installation >\$█ - Reinforcement rebar supply \$█ and installation \$█. Diesel Generator \$█: External structure ~7%, mechanical services ~11%, electrical services ~74%, and communication services ~11%. Diesel Oil Tank \$█: External structure ~10% and fuel installations ~90%. Water Tank \$█: Hydraulic services 100%. Deluge System \$█: External structure ~6% and fire protection services ~94%. Valve Cooler Bank \$█: External structure ~8%, mechanical services ~3%, electrical services ~86%, and communication services ~5%.	- The scope is well defined, and the breakdown of direct costs is refined for a Class 2 estimate. - Aurecon was not able to benchmark valve cooler banks but understands the unit rates have been market tested. - The aggregate costs for each item appear reasonable. - The sum of this group of works represents ~3% of the total CDCS direct costs for Tasmania, which is reasonable for this scope.
Transformer Area	\$█	- This scope includes foundations, footings, slabs, hydraulics and fire systems, electrical systems, and communication systems. - Key assumptions are: - Concrete assumed to be free issued to subcontractors and included in each cost group - Reinforcement materials assumed to be free issued to subcontractors included in each cost group - Key unit rates include: - N40 concrete supply \$█ and installation >\$█.	- From Aurecon's benchmarking against reference projects, the expected cost for this item ranges from \$█. The benchmark range is large and varies depending on ground conditions. The benchmark range is large and varies depending on ground conditions. For 750 MW of capacity a cost of \$█ would be reasonable. We are satisfied that the project cost is therefore reasonable. - The sum of this group of works represents ~4% of the total CDCS direct costs for Tasmania, which is reasonable for this type of activity. Moreover, the implied cost per MW appears reasonable.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Reinforcement rebar supply \$██████ and installation \$██████ – All substructures (formwork, rebar, N40 concrete supply and installation): approx. \$██████. – Concrete frame (formwork, rebar, N40 concrete supply and installation): approx. \$██████ – External walls (precast panels supply and installation): approx. \$██████. – Oil/water separator: approx. \$██████. – Fire services: approx. \$██████ – Electrical services: approx. \$██████ – Communication services: approx. \$██████. – Installation of free Issued Materials (FIM): approx. \$██████	
Other External Site Services	\$██████	■ The scope includes retaining walls (post and panel retaining wall, Soil nail and shotcrete retaining wall), supply and installation of stormwater pipes, stormwater pits rock beaching, headwalls, and subsoil drainage. ■ Key assumptions are: – Stormwater pipes and pits are assumed to be free issued to subcontractors. – Stormwater pipes and pits – Spoil from trenching and pit installation for Heybridge 90% assumed to be clean fill and 10% contaminated; assumed to be disposed to Dulverton landfill. ■ Key rates include: – External fencing (fencing material supply and installation, retaining wall – soil nail and shotcrete, retaining wall – post and panel with piling): approx. \$██████. – Gates (supply and installation): approx. \$██████. – Stormwater – (site & external, trench excavation and backfill): approx. \$██████ – Sewer: approx. \$██████	■ The rates of \$██████ provided for retaining walls on piles, are at the higher end of benchmark costs, but have been market tested. ■ We note that further investigation is required in the southern section of the Heybridge site which could impact retaining wall costs. ■ Drainage system costs are aligned to the flooding risk referenced and the topography of the area. ■ Lighting and power costs appear at the higher end of the benchmark range but have been market tested. ■ The total cost for this group of works represents ~11% of the total CDCS directs costs for Tasmania, which appears reasonable against Aurecon's benchmarks.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		- Water services – (site & external): approx. \$[REDACTED] - Fire protection: approx. \$[REDACTED] - Lighting & power – (site & external): approx. \$[REDACTED] - Communications – (site & external): approx. \$[REDACTED] - Lighting protection system: approx. \$[REDACTED]	
Remediation and Site Reinstatement	\$[REDACTED]	- The scope includes: - The Site Reinstatement activities (\$[REDACTED]) include supply of imported topsoil, placement and spread of imported topsoil, hydromulching, supply and install of jute matting, and other activities such as landscaping. - The Site Remediation (\$[REDACTED]) includes excavation, removal, transport and disposal of uncontrolled fill material, asbestos, treatment, respread, and compaction works. - Key rates include: - Screening vegetation: approx. \$[REDACTED] - Disturbed areas reinstatement: approx. \$[REDACTED] - Vegetation replanting with Hydromulching and jute matting: approx. \$[REDACTED] - Site remediation – excavation, removal, transport and disposal: approx. \$[REDACTED] - Site remediation – asbestos screening, excavation and disposal (6m3): approx. \$[REDACTED] - Site remediation – excavation, treatment, respread and compaction (uncontrolled fill material): approx. \$[REDACTED]	- Reinstatement costs are reasonable when considering the limited space available for screening. - Aurecon was not able to benchmark the reasonableness of the cost for site remediation as this is a relatively bespoke requirement and would vary project by project. Overall, Aurecon understands that the contamination at the site is reasonably well documented and known and are satisfied that the cost itself is likely to be necessary. - The sum of this group of works represents ~1% of the total CDCS direct costs for Tasmania, which is reasonable in our view.
CDCS Tas Direct Costs	\$[REDACTED]		
Tasmania CDCS Indirect Costs			
CDCS Tasmania Indirect Costs	\$[REDACTED]	Indirect cost allowances were made for site management, engineering & design, mechanical plant and equipment, safety & environmental protection, controls, site establishment and temporary site services.	\$[REDACTED] of the indirect cost accounts for approximately 22% of total construction costs. Given that the Contractor is a Tier 1 contractor, 22% is considered reasonable.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		- The largest cost elements included: - Site management & staff: \$██████ - Engineering design & labour: \$██████ - General mechanical plant & equipment: \$██████.	- Tier 1 contractor indirect costs typically range between 18% to 25%. - Aurecon notes that the market is currently favoring the Contractor, meaning a higher end of the range is more likely in the current market environment.
Victoria CDCS Direct Costs			
Bulk Earthworks, Access Tracks, Roads & Paving	\$██████	Bulk earthworks (\$██████) scope includes: - Cut to dispose: ~37,000 m3. - Supply, spread, level and compact imported fill material: ~17,000 m3. - Subgrade preparation: ~94,000 m2. Access Tracks, Roads & Paving (\$██████) scope includes: - Heavy haul road which includes base course layer, concrete pavement finish. - Light haul road which includes subbase layer, base course layer and sprayed seal and prime finish. - Access tracks which include site benching, subbase layer, basecourse layer and gravel finish, kerbs and channels, wheel stops, bollards, guideposts. - The Contractor has allowed for ~4,700 m2 for subgrade preparation. - Quarry materials, stormwater pipes and pits, concrete, and reinforcement assumed to be free issued to subcontractors. The cost of materials supply is included (class 2 crushed rock, N40 concrete, SL82 mesh). - Rates were based on a productivity of 100 m3/hr (cut other than rock), 40 m3/hr (spread, level, compact and cut other than rock), 50 m3/shift (cut rock), 30 m3/hr (spread, level, compact imported material, 500 m2/hr (subgrade preparation), 80 m3/hr (cut uncontrolled fill material), and 25 to 30 m3/hr (Spread, level and compact, site benching, concrete and asphalt pavement, subbase and base course materials). - Key costs and unit rates include, but are not limited to: - Site preparation and clearance: approx. \$██████	Bulk earthworks quantities: Overall, the quantities seem consistent with the design assumptions. No reuse of material is assumed which is sensible based on the soft soil characteristics. - Rocky soil and contamination of the land has been identified and is justified based on the ground condition data. However, it is noted that the subgrade preparation allowances could increase based on the soft soil identified and the need to limit settlements. Bulk earthworks rates: Overall, the unit rates are sensible based on the productivity referenced. Access roads: Quantities and rates are reasonable with material costs at the higher end of benchmark range, but compatible with the class of crushed rock to be used at each case. - It is unclear if the bulking factor has been considered in quantities referenced in mass units (tonnes). For a Class 2 estimate this may not have been considered but should be considered as the design progresses as it may impact cost. - The sum of this group of works represents ~7.5 % of the total CDCS direct costs for Victoria, which is reasonable.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Cut to fill - uncontaminated material - other than rock material: ~\$[REDACTED] – Imported fill (supply, labor, equipment): ~\$[REDACTED] – Unsuitable subgrade (cut, cart, dispose, crushed rock supply, spread, level and compact crushed rock): ~\$[REDACTED] – Access Tracks, Roads & Paving/Heavy Haul Road ~\$[REDACTED] (base course \$[REDACTED], concrete pavement \$[REDACTED] with materials supply). – Access Tracks, Roads & Paving/ Tramway Upgrade: ~\$[REDACTED]. – Access Tracks, Roads & Paving/ Light Haul Road: ~\$[REDACTED] – Access Track: ~\$[REDACTED] – Subbase course ~\$[REDACTED], base course and site benching. ~\$[REDACTED] – Finish course: ~\$[REDACTED]	
AC, DC, Reactor and Valve Halls	\$[REDACTED]	■ The scope includes foundations, footings, slabs, buildings, mechanical HVAC-fire systems, electrical systems, communication systems for each major area on the converter station: AC, DC, reactor and valve hall. ■ Key assumptions are: – Concrete is assumed to be free issued to subcontractors and included in each cost group. – Reinforcement materials are assumed to be free issued to subcontractors and included in each cost group. – No blast walls for DC Hall are included. ■ Key unit rates include: – N40 concrete supply \$[REDACTED] and installation >\$[REDACTED] – Reinforcement rebar supply \$[REDACTED] and installation \$[REDACTED] ■ Key costs have been itemized and include but are not limited to: – AC Hall \$[REDACTED]: Substructures ~33% and installation of free issued materials (HV equipment) ~67%.	■ From industry benchmarks, concrete rates of N40 supply are slightly lower than the benchmark range of \$[REDACTED] ■ In some cases, installation costs appeared to be above the benchmark range (e.g. column block out of \$[REDACTED] for N25 installation of 0.39m3). Aurecon understands that the unit rates are market tested and therefore likely to be reflective of market conditions and is therefore satisfied. ■ Most hall costs are allocated to FIM, mechanical and electrical services and external walls, windows, and doors. This is consistent with Aurecon's previous project experience. ■ The sum of this group of works represents ~40% of the total CDCS directs costs for Victoria, which is reasonable for this type of activity.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– DC Hall \$: Substructures ~11%, steel frame ~13% (\$), roof ~9%, external walls & windows ~12%, wall and floor finishes of the building and special equipment ~17%, mechanical services ~9%, fire services ~3%, electrical services ~4%, communication services ~1%, and installation of free issued materials (HV equipment) ~21%. – Reactor Hall \$: Substructures ~7%, steel frame ~15% (\$), roof ~10%, external walls & windows ~19%, floor and wall finishes ~18%, mechanical services ~15%, fire services ~4%, electrical services ~5%, communication services ~1%, and installation of free issued materials (HV equipment) ~6%. – Valve Hall \$: Substructures ~7%, steel frame ~15% (\$), roof ~10%, external walls & windows ~14%, wall and floor finishes, internal screens, fitments ~19%, mechanical services ~9%, fire services ~3%, electrical services ~3%, communication services ~3%, transportation services ~2%, and installation of free issued materials (HV equipment) ~14%.	
Services, Relay, MVS, Telecom & Storage Buildings	\$	■ The scope includes Foundations, footings, slabs, Buildings, Mechanical HVAC- Fire systems -Electrical systems -Communication systems for the Services, Relay, MVS Building – tertiary winding and DNO supply, Telecom and Storage Buildings. ■ Key assumptions are: – Concrete assumed to be free issued to subcontractors and included in each cost group. – Reinforcement materials assumed to be free issued to subcontractors and included in each cost group. ■ Key costs have been itemized and include but are not limited to: – Services Building \$: Substructures ~3%, steel frame ~6% (\$), upper floors ~7%, staircases ~1%, roof ~4%, external walls & windows ~7%, wall and floor finishes and Internal walls & screens and fitments ~11% m, hydraulic services ~1%, mechanical services ~23%, electrical services ~11%, fire services ~6%, communication services ~8%, transportation services ~0.4%, Installation of free issued materials (equipment) ~13%.	■ Commentary on key unit rates applies to this item, as for the HV Halls. ■ For Services, Relay, MVS and Telecommunications buildings the major costs are allocated to FIM, mechanical and electrical services and external walls, windows, and doors. This appears reasonable based on Aurecon's project experience. ■ Storage building costs also appear reasonable based on the specification put forward and composition of costs. ■ The sum of this group of works represents ~31% of the total CDCS directs costs for Victoria, which is reasonable.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Relay Building \$: Substructures ~2%, steel frame ~3% (\$), roof ~3%, external walls & windows ~7%, wall and floor finishes ~2%, mechanical services ~11%, fire services ~12%, electrical services ~14%, communication services ~7%, and installation of free issued materials (equipment) ~40%. – MVS – tertiary winding \$: Substructures ~4%, steel frame ~2% (\$), roof ~2%, external walls & windows ~8%, wall and floor finishes ~2%, mechanical services ~18%, fire services ~24%, electrical services ~25%, communication services ~15%. – MVS – DNO Supply \$: Substructures ~7%, steel frame ~2% (\$), roof ~3%, external walls & windows ~9%, wall and floor finishes ~1%, mechanical services ~17%, fire services ~20%, electrical services ~33%, communication services ~9%. – Telecom Building \$: Substructures ~6%, steel frame ~3% (\$), roof ~8%, external walls & windows ~13%, wall and floor finishes and fitments ~4%, mechanical services ~21%, fire services ~19%, electrical services ~17%, communication services ~9%. – Storage Building \$: Substructures ~8%, steel frame ~5% (\$), roof ~14%, external walls & windows ~13%, wall and floor finishes and fitments ~10%, mechanical services ~24%, hydraulic services ~3%, fire services ~8%, electrical services ~12%, communication services ~3%.	
Diesel & Water Assets	\$	■ The scope includes foundations, footings, slabs, mechanical, fire systems, electrical systems and communication systems for the diesel and water services below. ■ Key assumptions are: – Concrete is assumed to be free issued to subcontractors and included in each cost group. – Reinforcement materials are assumed to be free issued to subcontractors and included in each cost group. ■ Key unit rates include: – N40 concrete supply \$ and installation >\$	■ The scope is well defined, and the breakdown of direct costs is refined for a class 2 estimate. ■ Aurecon was not able to benchmark valve cooler banks but understands the unit rates have been market tested. ■ The aggregate costs for each item appear reasonable. ■ The sum up of this group of works represents ~3% of the total CDCS directs costs for Victoria, which is reasonable for this type of activities.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Reinforcement rebar supply \$[REDACTED] and installation \$[REDACTED]. ■ Key costs have been itemised and include but are not limited to: – Diesel Generator \$[REDACTED]: External structure ~7%, mechanical services ~13%, electrical services ~72%, communication services ~10%. – Diesel Oil Tank \$[REDACTED]: External structure ~7% and fuel installations ~93%. – Water Tank \$[REDACTED]: External structure ~3%, hydraulic services ~97%. – Deluge System \$[REDACTED]: External structure ~8%, fire protection services ~92%. – Valve Cooler Bank \$[REDACTED]: External structure ~7%, Mechanical services ~93%.	
Transformer Area	\$[REDACTED]	■ The scope includes foundations, footings, slabs, hydraulics and fire systems, electrical systems and communication systems. ■ Key assumptions are: – Concrete is assumed to be free issued to subcontractors and included in each cost group. – Reinforcement materials are assumed to be free issued to subcontractors and included in each cost group. ■ Key rates include: – N40 concrete supply \$[REDACTED] and installation >\$[REDACTED] – Reinforcement rebar supply \$[REDACTED] and installation \$[REDACTED] – All substructures (formwork, rebar, N40 concrete supply and installation): approx. \$[REDACTED] – Concrete frame (formwork, rebar, N40 concrete supply and installation): approx. \$[REDACTED]. – External walls (precast panels supply and installation): approx. \$[REDACTED] – Oil/water separator: approx. \$[REDACTED] – Fire Services: approx. \$[REDACTED]	■ From Aurecon's benchmarking against reference projects, the expected cost for this item ranges from \$[REDACTED] to \$[REDACTED]. The benchmark range is large and varies depending on ground conditions. For 750 MW of capacity a cost of \$[REDACTED] would be reasonable. Aurecon is satisfied that the project cost is therefore reasonable. ■ The sum of this group of works represents ~5% of the total CDCS direct costs for Tasmania, which is reasonable for this type of activity. Moreover, the implied cost per MW appears reasonable.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Electrical Services: approx. \$[REDACTED]. – Communication services: approx. \$[REDACTED] – Installation of Free Issued Materials (FIM): approx. \$[REDACTED]	
Other External Site Services	\$[REDACTED]	■ The scope includes: The supply and installation of stormwater pipes, stormwater pits rock beaching, headwalls, and subsoil drainage. ■ Key assumptions are: – Stormwater pipes and pits are assumed to be free issued to subcontractors. – Services: Pricing based on market pricing allocated through procurement vetting and adjudication, Procurement has received back priced from the market and will be using contractor pricing for majority of works. – Spares allowance. ■ Key unit rates include: – External fencing (fencing material supply and installation): approx. \$[REDACTED] – Gates (supply and installation): approx. \$[REDACTED] – Stormwater (Site & External, trench excavation and backfill): approx. \$[REDACTED] – Sewer: approx. \$[REDACTED] – Water services (Site & External): approx. \$[REDACTED] – Fire Protection: approx. \$[REDACTED] – Lighting & Power (Site & External): approx. \$[REDACTED] – Communications (Site & External): approx. \$[REDACTED] – Lighting Protection System: approx. \$[REDACTED].	■ The sum of this group of works represents ~13% of the total CDCS directs costs for Tasmania, which is reasonable against Aurecon's existing benchmarks. ■ Drainage system costs are within Aurecon's benchmark cost range and suitable when considering the level of local flooding and topography (high elevation, lack of catchments). ■ Lighting and power cost are at the upper end of our benchmark cost range, but we understand these items have been market tested.
Remediation and Site Reinstatement	\$[REDACTED]	■ The scope of work for reinstatement includes: – Screening Vegetation: approx. \$[REDACTED] – Topsoil reinstatement: approx. \$[REDACTED]	■ Reinstatement costs are expected to be higher in Victoria than Tasmania due to the high elevation of the converter station platform and the need for visual impact screening.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		Hydro-mulching and jute matting: approx. \$[REDACTED]	The sum of this group of works represents ~2% of the total CDCS direct costs for Tasmania, which is reasonable.
CDCS Victoria Direct Costs	[REDACTED]		
Victoria CDCS Indirect Costs			
CDCS Victoria Indirect Costs	\$[REDACTED]	- Within the indirect costs allowances were made for Site Management, Engineering & Design, Mechanical Plant and Equipment, Safety & Environmental Protection, Controls, Site Establishment and Temporary Site Services. - The largest cost elements were: - Site Management & Staff: \$[REDACTED] - Engineering design & labour: \$[REDACTED] - and General mechanical plant & equipment: \$[REDACTED]	\$[REDACTED] of indirect cost accounts for approximately 26% of total construction costs. - Given that the Contractor is a Tier 1 contractor, 65% is reasonable but on the higher side of the benchmark range. - Tier 1 contractor indirect costs typically range between 18% to 25%. - We note that the market is currently favoring the Contractor, so a higher end of the range is more likely in the current environment.
Land Cable Civil Direct Costs			
Site Preparation and Clearance	\$[REDACTED]	- The Contractor has allowed for various clearing and grubbing activities. This includes light, moderate, and heavy clearing of land. - Allowances have also been made for removal of trees, soil stripping, soil and water management, removal of fencing and temporary crossings over creeks. - The core pricing assumptions include (but are not limited to): - Clearing and grubbing at \$[REDACTED] - Disposal of Vegetation at \$[REDACTED] - Removal of large trees at \$[REDACTED]	- Clearing and grubbing rate can be reasonable depending on the terrain and condition of existing site. \$[REDACTED] is reasonable for a flat terrain and clearing of existing vegetation. \$[REDACTED] is reasonable for a challenging ground profile and clearing existing bush land. - On a high level, disposal of vegetation is reasonable. - On a high level, removal of large trees can be reasonable.
Fencing & Gates	\$[REDACTED]	- The contractor has included allowances for Perimeter fencing and stockproof fencing along the project's corridor. These include but are not limited to: 2.4m temporary fencing panels (material unspecified) at \$[REDACTED] 3.5m weldmesh security perimeter fencing at \$[REDACTED]	- Temporary fencing estimate falls within reasonable range. - On a high level and considering absence of drawings, \$[REDACTED] for 3.52m weldmesh security could potentially leaning on the higher end however, not unreasonable if ground condition is challenging.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Star picket fencing with mesh and wire at 1.2m height at \$ [REDACTED] – Access gates at 3.25m high and 6.0m wide at \$ [REDACTED]	■ Similarly, the star picket fencing rate might be high given the simplicity of construction methodology. However, it may be valid in the event of hilly or rough terrain, if rock is encountered, or based on ground conditions. ■ Unit rates for access gates seem reasonable considering motor and remote-control capability is assumed.
Access Tracks	\$ [REDACTED]	■ The cost buildup for access tracks was itemised into Heavy Construction Access Roads (including HDD), Light Access Roads, Drainage and the Corridor Access Track. ■ Key unit rates include, but are not limited to: – Earthwork Cut to Fill at \$ [REDACTED] – Earthwork Fill at \$ [REDACTED] – Supply of fill material at \$ [REDACTED] – Class 3 Crushed Rock at \$ [REDACTED] – Drainage at \$ [REDACTED]	■ The materials specified appear consistent with the scope which outlines the use of Class 3 Crushed Rock for various access tracks (with the volume/depth varying to meet different ground conditions/vehicle requirements). ■ Earthwork cut to fill unit rate is reasonable for large area of excavation to reduced level. ■ Supply and installation of crushed rock unit rate is approximately \$ [REDACTED] and is reasonable.
Trench, Conduits and Backfill	\$ [REDACTED]	■ The cost inclusions within Trenching, Conduits and Backfill include excavation costs based on varying trench requirements (driven by TR requirements), bedding placement, thermal sand supply, and other items such as disposal of materials and minor items. ■ Excavation specifications range from 1.0 to 1.5m burial depth with a width of 0.8 to 0.9m to a depth of 1.5 to 2.0m with a width as high as 2.0m. The range of costs between the scope of trenching is as low as \$ [REDACTED] to as high as \$ [REDACTED] depending on the depth and width of the trench required. ■ Bedding has been estimated at \$ [REDACTED] ■ Thermal backfill has been estimated at \$ [REDACTED] for trenches where it is required. ■ Thermal sand has been priced at \$ [REDACTED] where it is required.	■ Trenching specifications appear to be consistent with the TR specification put forward in the scope of work. – That is, the Contractor assumes the majority of trenching (54%) needs to meet a TR requirement of 2, which could mean that trenches need a burial depth from the top of the conduit of between 1 to 2m, and a width ranging from 800 to 900m wide. The remainder of trenching implies that 34% of the corridor requires a TR less than 2, and greater than 3 at 12%. – Aurecon was advised by the Owner's estimator that the unit rates included allowances for pneumatic breakers and ripping where required. ■ Excavation and bedding unit rates are reasonable. ■ Supply and backfill thermal sand is approximately \$ [REDACTED] [REDACTED] Rate is leaning towards the higher end. Supply and

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
			backfilling of thermal sand range between \$ [REDACTED] and [REDACTED]
Cable Joint Bays	\$ [REDACTED]	- The cost inclusions for Joint Bays include earthworks such as cutting, filling, and the supply of fill material. - Earthwork Cutting and Filling at \$ [REDACTED] (respectively). - Supply of Fill material at \$ [REDACTED]. - Crushed rock at \$ [REDACTED] - Subgrade preparation at \$ [REDACTED] - Allowances are also included for the substructure of the joint bay. - Excavation at \$ [REDACTED] - Backfilling of the joint bay at \$ [REDACTED] - Smaller allowances for backfill sand supply and disposing of surplus materials (\$ [REDACTED] and [REDACTED]).	- Earthwork unit rates for joint bays are reasonable. - Substructure of the joint bay: - Excavation for the joint bay slab is categorised under detail excavation and backfilling. Although detail excavation can generally be higher than standard excavation, rate is nevertheless fine provided construction involved, 250mm thick concrete slab. It is also assumed the slab to be constructed on levelled ground. - Assume backfill joint bay is including supply of material.
Cable Joint Bay Pits	\$ [REDACTED]	Includes cost allowances for earthworks, and supply and installation of pre-cast pits	
Trenchless Construction	\$ [REDACTED]	- The cost inclusions for trenchless construction include the drilling and encasement costs per linear metre and allowances for testing, grouting, and entry & exit pads. - Trenchless construction has been priced at \$ [REDACTED] per linear metre. - Unit rates for the Launch and Receiver areas include (but are not limited to): - Earthwork Cut to Fill at \$ [REDACTED] - Crushed rock at \$ [REDACTED]	- Trenchless construction unit rate is reasonable on a high level of assessment. - Unit rates for the Launch and Receiver are reasonable.
FO Terminal Station	\$ [REDACTED]	- The Terminal Station includes allowances for the: - Substructure. - Columns. - Roof.	The aggregate cost for the FO Terminal Station appears reasonable based on the composition of items included.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
		– Walls and Windows. – Doors. – Finishes and fittings. – Services (Fire, Mechanical, Electrical, Gas Water).	
Reinstatement	\$█	■ The key cost drivers of reinstatement include reinstatement of existing fences, respreading of topsoil, removal of stockproof fencing, disposal of construction access track materials, disposal of HDD laydown materials, temporary creek crossings, and reinstatement of public roads as required. ■ Key pricing assumptions include: – Reinstatement of Fencing at \$█ along a portion of the corridor. – Removal of stockproof fencing at \$█ along the entire corridor. – Respreading of Topsoil at \$█. – Disposal of HDD Laydown area Materials at \$█. – Reinstatement of public roads at \$█	■ Disposal and removal costs appear reasonable. ■ The Contractor could consider whether there is any optimisation between reinstatement of fencing and removal of fencing. ■ Assuming minor rehabilitation for public roads, the cost appears reasonable.
Total LCC Direct Costs	\$█		
Land Cable Civil Indirect Costs			
LCC Indirect Costs	\$█	■ Indirect costs for LCC included allowances for site management & staff, site establishment, site services, safety & environmental protection, control & protection of existing services, engineering and design of general mechanical plant & equipment, and other minor items. ■ The largest cost elements were: – Site Management & Staff - \$█ – Safety and Environmental Protection - \$█ – General mechanical plant & equipment - \$█ – Engineering design & labour - \$█	■ \$█ of indirect cost accounts for approximately 25% of total construction costs. ■ Given that the Contractor is a Tier 1 contractor, 25% is reasonable but on the higher side of the benchmark range. ■ Tier 1 contractor indirect costs typically range between 18% - 25%. ■ We note that the market is currently favoring the Contractor, so a higher end of the range is more likely in the current environment.
Summary of Direct and Indirect Costs			

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
CDCS Tasmania	\$████		
CDCS Victoria	\$████		
LCC	\$████		
Project Management Services			
Contractor Project Management Services	\$████	- Includes an overall allowance for \$████ for Project Management. - An additional allowance of \$████ for insurance, bonds, guarantees & warranties. - Costs for facilities and shared services at \$████. - Other costs related to travel, accommodation, and general expense.	- Project Management allowances appear to be roughly 8% of the base direct & indirect construction costs on aggregate. This is marginally below the benchmark of 10%. - Additional allowances for shared services appear reasonable. - Aurecon is not able to validate the reasonableness of insurance, bonds, and warranties.
Provisional Sums			
CDCS Tas Provisional Sums	\$████	Includes allowances for suppression valve hall works, professional indemnity insurance, and steel standard uplifts.	- The Contractor has included an allowance for scope requirements from Hitachi that are subject to discussion. These relate primarily to fire protection systems and structural steel requirements for structures. - The Contractor is assessing with Hitachi whether Australian standards are adequate, or if they need to conform with Hitachi's requirements which are closer to European standards. - In Aurecon's view, the inclusion of these costs is reasonable. We understand that both contractors in the procurement process have considered these scope items as risks and contingent on Hitachi's requirements. As they do not have full control of this cost, we believe it is reasonable to allow it to be included in full. From Aurecon's experience of HVDC projects, the BOW contractor is typically expected to conform and be flexible to the CDSE OEM's requirements.

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
CDSCS Vic Provisional Sums	\$█	Includes allowances for suppression valve hall works, professional indemnity insurance, and watermain relocation.	- The Contractor has included an allowance for scope requirements from Hitachi that are subject to discussion. These relate primarily to fire protection systems and water main relocation. - As noted above, compliance with Hitachi's requirements is likely to be necessary for the BOW contractor and outside of their control. - With respect to the watermain, we understand that an aged watermain is within the site's construction area and may need to be relocated. This cost inclusion is reasonable.
LCC Provisional Sums	\$█	Includes an allowance for professional indemnity insurance.	The inclusion of PI insurance for the works is reasonable in our view.
Corporate Overheads and Profits			
CDCS Tas	\$█	A lumpsum cost has been allocated to allow for profit and recovery of corporate overheads for the contractor across these items.	- Corporate overheads and profits allowed for contractors sit at about 11% of construction costs for LCC. This is similar for the CDSCS packages as well. - Given that the Contractor is a Tier 1 contractor we feel the allowances are adequate and fit within benchmark ranges from 10% - 15% of construction costs.
CDCS Vic	\$█		
LCC	\$█		
Project Management Services	\$█		
Risk and Contingency			
CDCS Tas	\$█	- Aurecon understands that the Contractor undertook a QRA to develop their risk and contingency assessment. - MLPL and their Owner's Estimator also supported in this assessment to test allocation of risk given the ITC structure.	- The contingency applied for the CDSCS elements is approximately 5% of direct and indirect costs. This appears reasonable. For LCC, this is approximately 10%. - The higher allocation for LCC is reasonable in our view given that the scope of risk is likely to be higher. - The allowance for risk on project management services is less than 1% of direct and indirect costs and is reasonable.
CDCS Vic	\$█		
LCC	\$█		
Project Management Services	\$█		
TOC Adjustments			

Item	\$m Real June 2023	Basis of estimation and unit rates	Aurecon view on reasonableness of class 2 estimate
Target Outturn Cost Adjustments	\$█	■ The TOC adjustments are based on a review from MLPL's Owner's Estimator to ensure that the cost estimate is on a like for like basis with the evaluation that is ongoing as part of the procurement process. ■ Several conformance adjustments were made to ensure certain aspects of the tendered submission align with the project scope / requirements: – Allowance to achieve Cable Drum delivery requirements of 2%. Prysmian has specified a grade requirement of 2% across the corridor and the BOW contractor has not conformed with this in all cases. – MLPL Technical Review Conformance – MLPL has assessed several compliance risks and conformance issues from the BOW contractor. Costs have been allowed with the support of the Owners' estimator to account for the resolution of these items. – LCC Earthworks requirements – Thermal backfill requirements were assessed by MLPL's Owner's Estimator as being inadequate and at risk due to insufficient geotechnical data. An incremental allowance was included for this. – Commercial Deed Adjustments – The Owner's estimator included an adjustment to account for the front loading of commercial negotiation costs. – Exclusions as noted in the Basis of Estimate Report from the Contractor which the Owner's estimator felt were required. – An adjustment to correct for incorrect escalation and indirect assumptions – The Owner's Estimator made adjustments were escalation rates of circa 1.5% were identified to be too low, and indirect costs (such as PM allowances) were deemed to be low.	■ Aurecon was not able to directly reconcile the adjustments within the cost model provided by MLPL to the scope items described. However, Aurecon engaged with MLPL's Owner's Estimator to understand the drivers of the cost adjustments. ■ Based on the description which was provided by Currie & Brown for each of the adjustments, we believe it is reasonable for MLPL to include the specified adjustments to ensure that the target outturn cost specified conforms with the project's requirements.
Pre-Agreed Variations			
Variations	\$█	■ A minor variation has been allowed to conduct a HVDC replica study.	■ The cost for the study appears reasonable.
Total Expenditure			
Total	\$945.8		

Top-down Benchmarking

With respect to assessing benchmark costs for land cable civils at the aggregate level, it is challenging to do so in Australia for high voltage cables in Aurecon's view. This is because there are limited project benchmarks, and civil costs may be packaged differently across various capital works packages (e.g. included in substations, converters).

Moreover, the cost for civils cannot be as readily benchmarked on a project or package basis because geotechnical conditions can heavily impact the cost comparison. That is, thermal resistivity, the volume of rock encountered, and prevalence of moisture / flooded areas can greatly drive the cost of civil works.

Whilst cost databases such as the AEMO TCD provide some views on this, in Aurecon's view it is not suitable for use as a comparison. Projects such as Powering Sydney's future are also not suitable as they reflect a metro environment rather than regional.

5.5 Procurement and Delivery

Procurement Strategy and Process

Marinus Link since the Project's inception sought to take a market and risk-based approach to its project delivery strategy. MLPL undertook a well-structured process which:

- Identified and analysed possible contract models.
- Selected contract models that would be suitable for a short-list of packaging options.
- Aligned across delivery options and the process which could identify those that would be suitable.
- Developed a set of criteria to undertake scoring of each option. This considered:
 - Ability to manage interface risk.
 - Commercial risk.
 - Stakeholder management – e.g., Approvals, change management, ease of communication.
 - Market preferences – e.g. views from the market on managing risk and constraints.
 - Likely cost.
 - Administration of contract.
 - Deliverability.
 - Flexibility.
 - Sustainability and social licence.

Marinus Link conducted market sounding with 13 potential contractors from August to September 2023 to gain feedback on the attractiveness of the Land Cable Civils and CDCS scope, preferred methods for procurement and delivery, and management of risk.

Feedback from the process indicated that a combined contract for both packages into one “head contract” for a balance of works scope could be suitable with Tier 1 contractors. In Aurecon's view, this would be sensible in terms of reducing points of interface between various contractors and from MLPL's perspective for contract administration.

The market also seemed to indicate that there was a preference to move away from traditional EPC style contracts and showed a preference for the Incentivised Target Cost structure. This is consistent with what Aurecon has observed in the market where contractors are seeking to get involved in the design & engineer process earlier and develop a regime for sharing risk and rewards. Moreover, contractors are seeking to avoid taking on high levels of risk (e.g. contamination or geotechnical risk) and may choose to add in a risk premium into EPC contracts where risk areas have not been assessed in detail. In Aurecon's view, the ITC approach is sensible in this context and when considering the significant scale of transmission infrastructure that will be delivered over the next decade where contractor availability is likely to be a constraint (and therefore contractors can be more selective on the terms of engagement).

In February 2024 MLPL commenced its Pre-Qualification process for the Balance of Works package which was based on an Incentivised Target Cost scheme for the Balance of Works items. MLPL had a preference for a combined package but allowed parties to submit only for individual components as well (e.g. LCC only rather than CDCS).

MLPL received 9 responses, with only three of these responses indicating a capability and willingness to undertake both the CDCS and LCC scope as part of one contract/package. MLPL received zero interest from the market for a standalone CDCS package. Three parties were then pre-qualified for the BOW tender process, which included CPB-UGL, Samsung-DTI, and [REDACTED]

The pre-qualified contractors were invited to support MLPL in the scoping / design of the BOW package under an ECI approach with a reimbursable scheme for their efforts put forward. This is consistent with market feedback in MLPL's market engagement in 2023.

MLPL will work with the pre-qualified contractors to develop an Incentivised Target Cost (also called a Target Outturn Cost in some cases) which will be the costs which are identified to be reimbursable. There may be other costs passed through to MLPL such as corporate overheads. Separate to this, various pain-share/gain-share and performance reward mechanisms will be embedded within the contract to incentivise performance.

View on Procurement Process

At the time of drafting this report, the ITC procurement process was still in progress, and MLPL has not selected a preferred contractor from the two parties it received a response from (CPB-UGL and Samsung-DTI). [REDACTED] did not respond to the tender with the required returnable schedules.

Whilst the procurement process is ongoing, Aurecon is satisfied that the procurement process undertaken by MLPL is likely to be consistent with the requirements of the market, has considered the optimal methods for managing risk for the project, and has been delivered efficiently.

In terms of the use of an ITC scheme, this was clearly a market preference, and Aurecon is aware of two other major transmission projects being delivered under this scheme at present (HumeLink and another project Aurecon is confidentially supporting). Moreover, in Aurecon's view, market power is currently favouring the contractor market at present given the significant scale of transmission infrastructure being delivered across the country in the timeframe that the Marinus Link is being delivered.

Whilst the tender process is still ongoing, MLPL has undertaken steps to ensure that costs are optimised throughout the collaborative tender process with the two parties through several methods:

- MLPL has undertaken several stages of value engineering with contractors to optimise the design and the scope of the project to ensure it is fit for purpose over a 20-week period thus far. Aurecon was provided documentation to substantiate MLPL's position that the estimated cost for the BOW package has reduced over the period in which the Target Outturn Cost has been developed.
- MLPL has established working groups which include staff, external advisors, OEMs for cables and converters (Prysmian and Hitachi) and the BOW contractors to work through scope optimisation and refine costs as the design has progressed.
- Most importantly, MLPL has sought external advice from Currie & Brown throughout the tender process to support the evaluation of BOW package from the potential contractors. Currie & Brown's scope has been to:
 - Validate that the respondent's Target Outturn Cost has been developed in an appropriate manner.
 - Validate and confirm that the construction methodology, unit rates, and quantities of items within the Cost Plan are consistent with the scope of work specified.
 - Support value engineering processes and innovation opportunities.
 - Review the cost composition of direct and indirect costs for each respondent on a first principles basis and based on market estimates.
 - Review risk allowances and provisional sums put forward by the contractor.
 - Reconcile deviations and differences between the two contractors and generate "normalised" costs so that they can be compared and assessed against MLPL's requirements where deviations are identified.
 - Provide MLPL a view on the Value for Money that each contractor is offering.

In Aurecon's view, the scope of the Owner's Estimator is extensive and likely to provide assurance that the cost estimate put forward is suitable for use as a Class 2 estimate and unlikely to deviate substantially.

5.6 Conclusion

Land Cable Civils

The scope put forward by MLPL in its owner's technical specification appears reasonable and consistent with the Project's requirements. The scope of services put forward by the Contractor conforms to this specification and Aurecon is satisfied that it is reasonable as a Class 2 estimate.

Trenching and joint bays are the largest scope elements within the package and the approach taken by the Contractor is sensible. In limited instances, design assumptions could be optimised for access tracks provided that further study supports this (such as with access tracks). Aurecon also felt that in other instances that residual design risks exist for cable pulling for HDD as flagged by the Contractor. These residual items are likely to come out in a balance.

The scope of trenching has been informed by thermal resistivity requirements (consistent with Prysmian's requirements) and based on geotechnical conditions which may impact the method of excavation required (e.g. conventional earth moving, rippers, pneumatic breakers). It was not within Aurecon's scope to validate the Contractor's position in the form of excavation based on ground condition data, but we note that the approach they have taken (using pneumatic breakers for rocks and geotechnical data to inform the method) is consistent with what we would expect. As mentioned above, the approach taken for trenching and joint bays is reasonable in our view.

The Contractor has proposed conservative assumptions in some instances with respect to pavement depth for access tracks. This may be warranted based on the Contractor's position that the Gippsland region is highly flood prone and if vehicle mass calculations validate this. It is suggested that MLPL confirms that the Contractor requires this depth in all instances along the corridor to manage flooded area risk and movements for cable drums. In Aurecon's view, there could potentially be some scope for optimisation on this item as the design progresses and as the remaining geotechnical study is completed to confirm this.

With respect to HDD, the Contractor has flagged some risk items which may require support to pull cable in line with Prysmian's requirements. The contractor has included some allowances to address this risk, but further investigation could be beneficial to confirm the extent of this risk. Moreover, it is suggested that Prysmian confirm there is no impact to cable volumes as a result of this risk.

Aurecon is satisfied that the remaining scope items being undertaken are reasonable and consistent with the scope of the land cable civils scope.

Converter Station Civils

The Scope put forward by MLPL's Contractor is aligned to Australian standards and has been developed to meet the requirements of Hitachi (as the CDCS package must accommodate the requirements of the CDSE).

The basis of design documents has articulated the requirements for bulk earthworks, site access, the various structures of the converter stations, transformer areas, site services, and reinstatement and remediation where applicable. The design decisions and approach taken by the Contractor appears reasonable.

Key differences between the two sites include the ground conditions at Heybridge (where contamination of the land exists) and softer soil conditions at Hazelbrook which leads to additional excavation requirements.

In some instances, further study and design progression would be beneficial, but the gaps identified are reasonable at the 70% design stage for a Class 2 estimate.

Procurement and Resultant Expenditure

MLPL has undertaken extensive market sounding on the preferred structure for the BOW package. MLPL received 9 responses, with only three of these responses indicating a capability and willingness to undertake both the CDCS and LCC scope as part of one contract/package. MLPL received zero interest from the market for a standalone CDCS package.

Three parties were then pre-qualified for the BOW tender process, which included CPB-UGL, Samsung-DTI, and [REDACTED]. CPB-UGL and Samsung-DTI proceeded to the second stage and have been engaging with MLPL to date to develop a TOC as part of the ongoing evaluation process.

Whilst the tender process is still ongoing, MLPL has undertaken steps to ensure that costs are optimised throughout the collaborative tender process with the two parties through several methods:

- MLPL has undertaken several stages of value engineering with contractors to optimise the design and the scope of the project to ensure it is fit for purpose over a 20-week period thus far. Aurecon was provided documentation to substantiate MLPL's position that the estimated cost for the BOW package has reduced over the period in which the Target Outturn Cost has been developed.
- MLPL has established working groups which include staff, external advisors, OEMs for cables and converters (Prysmian and Hitachi) and the BOW contractors to work through scope optimisation and refine costs as the design has progressed.
- Most importantly, MLPL has sought external advice from Currie & Brown throughout the tender process to support the evaluation of BOW package from the potential contractors. Currie & Brown's scope has been extensive as outlined earlier. In Aurecon's view, the scope of the Owner's Estimator is extensive and likely to provide assurance that the cost estimate put forward is suitable for use as a Class 2 estimate and unlikely to deviate substantially.
- In instances where costs were identified by Aurecon as being above our internal benchmarks, we note that as part of the tender process Currie & Brown and the Contractors actively engaged with the market to receive up to date pricing, which could be a more recent reflection of the market.

Overall, Aurecon is satisfied that the Class 2 estimate put forward by MLPL is reasonable and is of the view that the procurement process has been efficient given the current market conditions.

6 Supporting Activities

This section assesses the reasonableness of the activities and their underlying expenditure for Supporting Activities.

Objectives and Scope

This category includes expenditure relating to:¹

- Land and easement acquisition.
- Project delivery services.
- Environmental impact monitoring.
- Insurance.
- Hedging (financial).
- Stakeholder engagement.
- Community benefits programs.
- Biodiversity offsets.

Table 6-1 below summarises the objectives of Marinus Link's Stage 1B Supporting Activities and the activities it has undertaken in line with those objectives. We note that the table is not exhaustive.

Table 6-1 Objectives and Scope of Supporting Activities

Objectives	Scope
■ To build and maintain community support for the project. ■ To ensure that land access is obtained in accordance with the easement agreements. ■ To resolve access issues to avoid delays to the project schedule and the associated cost impacts. ■ Ensure that MLPL and its contractors comply with the planning and environmental approvals. ■ Ensure that MLPL complies with the reporting requirements for each of the relevant planning authorities. ■ To ensure that the project is commissioned on time in accordance with the agreed design specifications and achieves the planned transfer capability between Victoria and Tasmania. ■ To ensure that MLPL's procurement approach is consistent with industry best practice to provide confidence that MLPL's costs are prudent and efficient. ■ To ensure the project is delivered on time and to budget in accordance with the project plans for the benefit of electricity consumers. ■ To ensure that the project is supported by appropriately sized corporate functions, systems and processes to promote the timely and efficient delivery of the project.	■ Continue to engage with affected landholders and community stakeholders, including Traditional Owners, to understand and address their concerns during the project's construction phase. ■ Manage the land access agreements, including payments to landholders. ■ Liaise with landholders and contractors to ensure access requirements are communicated appropriately. ■ Provide guidance to contractors regarding MLPL's planning and environmental obligations in accordance with the relevant Commonwealth and State regulations. ■ Engage with contractors to ensure that reporting requirements are understood and actioned in accordance with MLPL's obligations. ■ To work with our contractors and delivery partner to ensure that acceptance testing is conducted in accordance with best practice, having regard to the specific challenges arising in relation to Marinus Link. ■ To work with our contractors and delivery partners to ensure that MLPL is ready to operate and maintain the facility through effective training and preparation of asset management plans.

¹ Insurance, hedging, biodiversity and community benefits schemes are not within Aurecon's scope

Objectives	Scope
■ To determine MLPL's insurance coverage for the construction phase of the project, having regard to MLPL's risks and the requirements of financiers in relation to insurance coverage. ■ To minimise the total cost of meeting biodiversity obligations on behalf of electricity consumers.	■ To maintain a best practice procurement policy. ■ Deliver MLPL's corporate and management activities, which include engineering design, risk management, controls. Interface management, governance, business establishment, finance, human resources, legal and regulatory support. ■ Understand the risk allocation between MLPL and its service providers to develop a view on the required level of insurance coverage. ■ Identify the lowest cost option to redress the residual biodiversity impact in accordance with our compliance obligations.

6.1 Expenditure Summary

MLPL's expenditure as part of its Stage 1B submission for Supporting Activities is below in Table 6-2. Aurecon's review of associated expenditure in this section is from July 2025 to June 2030, as per our scope. Certain expenditure elements are not in the scope of Aurecon's review and are marked in red.

Table 6-2 Summary of Pre-Construction Expenditure – \$m real June 2023

Cost Element (\$m real June 2023) to FY30	Total
Landowner and Community Engagement	27.8
Land and Easement Acquisition	40.5
Environmental Impact Assessments	20.6
Technical Design and Specifications	51.7
Procurement Strategy and Execution	7.9
Program and Project Management	149.6
Corporate Costs	156.4
Insurance and Biodiversity (Out of Aurecon's Scope)	69.6
Total cost (\$m)	524.0

*Totals may not sum due to rounding.

6.2 Scope and Specification Assessment

This section assesses the reasonableness and prudence of the activities proposed by MLPL.

6.2.1 Landowner and Community Engagement

Table 6-3 below provides Aurecon's assessment on the prudence of the activities proposed by MLPL for Landowner and Community Engagement.

Table 6-3 Landowner and Community Engagement

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	Includes full-time equivalent (FTE) roles for: ■ Head of Community and Social Impact; ■ Community Engagement Leads (For TAS and VIC respectively); ■ Social Impact Lead; and ■ First Peoples Engagement Advisor. These roles are required for MLPL's ongoing engagement with the community with respect to project impacted communities, engagement with Government planning authorities, and for the land acquisition process.	In Aurecon's view, the positions put forward are aligned with what we have observed for Major transmission infrastructure, and major infrastructure projects more generally. The roles specified are consistent with what the engagement needs of MLPL are likely to be (noting there may be some changes as the project progresses). Further analysis is provided in Section 6.4.
Service Provider Costs	Allowances have been included by MLPL for Communications and Engagement Program Costs, which include allowances for venue hire, printing, design, advertising, catering, among other expenses.	Aurecon believes these expenses are likely necessary to obtain the desired outreach and increase engagement with MLPL's programs. These appear to be reasonable corporate activities which would be incurred by a TNSP for engagement in various networks and training initiatives for MLPL.
	Communications and Engagement Corporate Expenses (partnerships, memberships, sponsorships, conferences, training, forums etc.).	
	Strategic Stakeholder Engagement advisory.	
Integrated Delivery Model	An allowance has been provided for Cultural Heritage Specialists from MLPL's Integrated Delivery Partner Jacobs.	In Aurecon's view this item is reasonable as this is a specialised field of expertise across multiple State and Commonwealth jurisdictions.
Materials Costs and Other Payments	Community Benefits Sharing Scheme.	This item was not within the scope of Aurecon's review.
	Infrastructure sustainability rating and Infrastructure Sustainability Council (ISC) membership costs for the MCC phase.	Aurecon understands MLPL conducted a CBA which informed the view that receiving an ISC rating would be justified.
	Corporate Partnerships, Training, Memberships, Venue Hire and associated engagement costs.	MLPL will be required to partner with various industries and community stakeholders to ensure adequate engagement and the successful delivery of any community programs. These appear to be reasonable items in our view.
Other Comments		Landowner and Community engagement is a core part of MLPL's delivery strategy to ensure that the project is capable of meeting the needs of the NEM whilst balancing community interests wherever possible. It is important to note that the breadth of MLPL's community engagement spans: Local stakeholders, Landholders, Traditional Owners, Gippsland Stakeholder Liaison Group, Key Commonwealth, State and local councils with respect to land use and environmental

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
		approvals/compliance, energy market participants, education and service providers, consumers, and other project impacted parties.

6.2.2 Land and Easement Acquisition

Table 6-4 below provides Aurecon's assessment on the prudence of the activities proposed by MLPL for Land and Easement Acquisition.

Table 6-4 Land and Easement Acquisition

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	Includes full-time equivalent (FTE) roles for: - Landowner Access Manager. - Land Agents (3x for VIC). - Land Access Paralegal. - Land Access Specialist.	The internal allocation of roles is necessary for MLPL to ensure adequate engagement with landowners where easements are required.
Service Provider Costs	Includes services for community counselling, easement valuation and negotiation matters, and land access matters where specialist knowledge is required to resolve challenges.	MLPL at times will require external specialist advice to adequately value land and engage with the community. These items are reasonable and prudent.
Materials and Other Payments	Marinus Link has included allowances for easement compensation and disturbance costs. Marinus Link requires access to parcels of land and easements to deliver the project across its preferred route. We understand this is approximately 102 parcels of land. MLPL has developed the "Project Marinus Land Access and Easement Compensation Framework and Working Principles" which contemplates five stages for acquiring these parcels of land/easements:² - Stage 1 – Land access licence negotiations. - Stage 2 – Compensation calculation. - Stage 3 – Options agreements and upfront deposit payments. - Stage 4 – Exercise of easement options. - Stage 5 – Asset installation easement registration payment of easement compensation. The scopes of Stages 1 to 3 were primarily covered within the MLPL Stage 1A Early Works submission to the AER. These	Stage 4 of the Land and Easement activities secures the legal rights to use (or access) the required land, allowing the project to transition smoothly from planning to execution. Stage 5 is essential for the physical installation of transmission infrastructure, formalizing the easement through registration, and ensuring fair compensation to landowners. Together, these stages provide the legal, operational, and financial foundation necessary for the project's completion and long-term viability. As outlined in Aurecon's Stage 1A Assessment, the compensation calculations account for State land valuation and acquisition policies, the market value of land, economic losses, and include allowances for professional expenses. In Aurecon's view, the activities involved in Stages 4 & 5 are prudent and necessary for the timely development of the project.

² LEA01

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
	covered activities related to negotiating initial land access for surveys and valuation, developing market values of land and options agreements, and payment of initial deposits on land to landowners. This Stage 1B expenditure submission focuses on the residual cost of activities during Stages 4 & 5. That is, the payment of the outstanding balance of payments on easement / land acquisition agreements to then begin asset installation.	

6.2.3 Environmental Impact Assessments

Table 6-5 provides Aurecon's assessment on the prudence of activities proposed by MLPL for Environmental Impact Assessments. The early works stage of MLPL's Stage 1A submission focused on field surveys, and technical reporting required for planning and environmental approvals. For Stage 1B, the focus has shifted towards achieving compliance with its obligations across the Commonwealth, Tasmanian, and Victorian jurisdictions.

Table 6-5 Environmental Impact Assessments

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	MLPL has included internal labour costs for positions which include: ■ Environment Officer. ■ Sustainability Coordinator. ■ Head of Environment. ■ Project Manager. Aurecon understands that the scope of these roles will span ensuring MLPL is meeting its obligations with respect to reporting on sustainability targets, improving the organisations sustainability, monitoring environmental impacts of the project, assessing compliance of management systems to legislated requirements, among other tasks.	From Aurecon's review of the positions put forward by MLPL, in our view, they are likely to be consistent with those we have observed at peer TNSPs and required for major infrastructure projects. Further analysis is provided in Section 6.4.
Service Provider Costs	The Environmental Impact Assessment (EIA) support activities during the construction stage include: ■ Independent Environmental Auditor (consultant). ■ Project compliance obligations. ■ EPR implementation. ■ Ad-hoc EP specialist activities (consultant). ■ Environment and Heritage Advisory.	In the Project's construction phase, the scope of EIA supporting activities is to ensure MLPL can achieve compliance with relevant obligations. MLPL is working with its environmental advisors (such as Tetra Tech Coffey) to ensure that those obligations are fully understood and reflected in their plans and work practices. Given the complex compliance landscape, where environmental responsibilities and obligations apply at the Commonwealth, State and local government levels, we

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
		consider the scope of these supporting activities necessary.
Integrated Delivery Model	MLPL has sought to engage Jacobs as its Integrated Delivery Partner. Jacobs will support MLPL with resources that span: ■ Site HSE Inspectors (x2). ■ Environment and Sustainability Manager. ■ Environment Officer. ■ Sustainability Officer (x2).	MLPL has sought to engage a delivery partner to support the delivery of its environmental impact assessments and compliance obligations. This is a valid approach to ensuring that specialised expertise can be secured for the project, particularly where internal capability may not be adequate. These costs are reasonable in our view.
Materials and Other Payments	MLPL has included within its scope of activities tasks for ensuring its environmental performance requirements are implemented, administration of EIS/EES approvals and storage of documentation.	These tasks are reasonable in Aurecon's view and required for delivery of MLPL's EIS/EES.
Other Comments		MLPL's Explanatory Notes have articulated how it is required to prepare various Environmental Impact Assessments, Environmental Effects Statements, Development Applications, Planning Scheme Amendments, and Cultural Heritage Management Plans to meet its environmental compliance obligations. MLPL must ensure that its contractors are compliant with these plans across the construction period to ensure it is meeting its commitments at the Commonwealth, State and local government level.

6.2.4 Technical Design and Specifications

Table 6-6 provides Aurecon's assessment of the prudence of MLPL's Technical Design and Specifications activities.

Table 6-6 Technical Design and Specifications

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	This includes several roles which include: ■ Power System Integration Manager. ■ Principal Power System Engineer. ■ Senior Power System Engineer. ■ Power Systems Engineer. ■ Power Systems Engineer (Consultant). ■ Asset & BIM Coordinator. ■ Technical Assurance Engineer.	From Aurecon's review of the positions put forward by MLPL, in our view, they are likely to be consistent with those we have observed at peer TNSPs and required for major infrastructure projects. Operationally, MLPL will need expertise on how it will operate as part of the NEM and with various parties such as AusNet and TasNetworks. MLPL will need its own technical staff who are capable of assessing and analysing the technical specifications for cables,

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
		converters, and civil works. Expertise will also be required on how to interface these major infrastructure components. Asset Management, Commissioning, and Information systems are also all prudent and necessary functions. Further analysis is provided in Section 6.4.
Service Provider Costs	MLPL has included the costs of an Owner's Engineer (OE) for their Engineering Design & Technical Services. The following resources may be required by OE during the construction stage (July 2025 to December 2030, although costs only considered to June 2030 for this submission): ■ BIM Coordinator. ■ Converter Engineer. ■ Cable Engineer. ■ Converter Civil Engineer. ■ Cable Civil Engineer. ■ Discipline Specific Consulting Support (x2). ■ IDP Implementation and Mobilisation Services. ■ Horizontal Directional Drilling Supervision. ■ Route Mapping and GIS Services. ■ Offshore Owner's Representative.	An owner's engineer is crucial for a large power transmission project, offering technical expertise, overseeing execution, managing risks, ensuring quality, ensuring regulatory compliance, and coordinating communication among stakeholders. Their role is essential in protecting the owner's interests. An owner's engineer helps provide input to MLPL on the delivery of works of their principal contractors (e.g. Hitachi, Prysmian), can provide advice on keeping the project on schedule, and ensuring its successful and compliant completion. The positions specified are necessary for evaluation of the core infrastructure elements and contracts of Marinus Link (e.g. HVDC cables, converter equipment, balance of works).

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
	Marinus Link has engaged with contractors and external advisors to ensure it receives support, and completes technical studies and verification across the following areas: ■ SPS Negotiation. ■ AEMO Agreement and System Study Costs. ■ TasNetworks Agreement and System Study Costs. ■ Connection System Support Costs. ■ O&M Support Costs. ■ Transmission System Test Support Costs. ■ Technical Assurance Reviews.	Aurecon assessed the prudence of the technical studies required by MLPL in its Stage 1A submission to the AER. However, several remaining studies exist which require funding. These primarily include system studies with AEMO, TasNetworks and allowances for the use of external advisors. MLPL is following joint planning processes as set out in the NER for TNSP interfaces into the NEM. As a result of this, system studies and potentially joint planning activities are required to conduct a deep and robust analysis of the integration impact into the network to ensure that system stability is maintained after connection, which is far beyond the traditional scope of GPS studies and network impact studies. MLPL will cover at a minimum, frequency control, fault ride-through, transient stability, voltage stability, TOV, and other studies. Aurecon considers these activities to be necessary and key for Marinus Link's efficient operation in the NEM. Other activities relate to witnessing contracts and milestones such as Connection System Support, O&M Support, and Assurance reviews and are also all considered reasonable activities.
	MLPL has included allowances for Factory System Tests (FST) and Factory Acceptance Testing (FAT) travelling costs and labour costs.	It is prudent for MLPL to appoint external consultants to witness factory system tests and confirm equipment has been manufactured to specification.
Integrated Delivery Model	Marinus link has engaged Jacobs as an Integrated Delivery Partner (IDP) to support MLPL. Key roles include: ■ Head of Engineering. ■ Power Systems Engineer. ■ Technical Interface Manager. ■ BIM specialist. ■ Engineering Services Lead.	The roles to be performed by the IDP have been selected to best leverage their capability and experience, supplementing the MLPL team where efficient.
Materials Costs and Other Payments	This item includes a range of technical and compliance-related items necessary to support delivery and operation. These include: ■ Testing and commissioning. ■ Monitoring and control. ■ Logistics. ■ Telecoms redundancy. ■ Regulatory compliance.	Aurecon was not fully clear on the scope of all items (e.g. logistics) but understands that testing, monitoring control and regulatory compliance will be necessary.

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
	Consulting support.	

6.2.5 Procurement Strategy and Execution

Table 6-7 below provides Aurecon's assessment of the prudence of activities proposed by MLPL for its Procurement Strategy and Execution.

Table 6-7 Procurement Strategy and Execution

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	This includes various roles which include: - Senior Procurement & Contracts Manager. - Procurement Manager. - Procurement & Contracts Coordinator. - IDP Contract Manager. - Contract Assurance Advisor. - Procurement Specialist.	Aurecon has reviewed the positions specified for Procurement Strategy and Execution against those we would expect for a peer TNSP, or for a greenfield major infrastructure project. Overall, we note that the positions specified by MLPL appear reasonable, and relate to prudent functions required for MLPL as a new TNSP which include: - Managing and delivering major infrastructure contracts, including its civil works, cables, and converters. - Engagement with market participants, such as AEMO, AusNet, TasNetworks, AER, and other bodies. - Driving commercial strategy and direction. - Assessing interface risks between various infrastructure packages. - Delivery partner management. Further analysis is provided in Section 6.4.
Service Provider Costs	This item includes an allowance for specialist commercial and procurement advisory services to support the internal MLPL team in relation to procurement strategy and execution support activities where required.	Marinus Link has received commercial advisory services from several of its advisors on the structuring of its cables, converters, and balance of works procurement and contract negotiation processes. Aurecon believes these activities to be prudent to ensure that MLPL undertakes these activities with its commercial interests in mind and to best negotiate with market participants in tender responses, manage variations and disputes, and address other performance related issues.

6.2.6 Program and Project Management

Table 6-8 below provides Aurecon's assessment on the prudence of activities proposed by MLPL for Program and Project Management.

Table 6-8 Program and Project Management

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	Up to 44 roles have been put forward to support MLPL's Program and Project Management Function across all major workstreams. These roles cover a broad mix of strategic leadership, delivery oversight,	Aurecon has reviewed the positions specified for Program and Project Management against those we would expect for a peer TNSP, or for a greenfield major infrastructure project. We have also considered this in the context of whether MLPL has outsourced functions via a delivery partner.

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
	technical coordination, and support functions. Key positions include: ■ Leadership and Governance. ■ Delivery and Package Management. ■ Site and Interface Management. ■ Project Controls and Support. ■ Engineering and Technical Oversight. Positions span from early-career professionals through to senior leadership.	Overall, we note that the positions specified by MLPL appear reasonable, and relate to prudent functions required for major HVDC infrastructure: ■ Managing and delivering major infrastructure, including its civil works, cables, and converters. ■ Ensuring construction activities are conducted safely and in accordance with the appropriate management systems. ■ Ensuring project sites are supervised. ■ Documenting construction work progress and flagging risk across various delivery packages. ■ Ensuring costs are appropriately estimated. ■ Ensuring that activities are undertaken to the required standard for various milestones. Further analysis is also provided in Section 6.4.
Service Provider Costs	Service provider costs cover specialist support for contract management, legal advice, procurement, project governance, and workforce health and safety. Key inclusions are: ■ Dispute Avoidance Board (DAB) Costs. ■ Commercial and Legal Services. ■ Project Delivery Support. ■ Training, Safety and Wellbeing.	The activities included in this item are considered prudent, reflecting a risk-based approach to supplementing internal capability with targeted external expertise. MLPL intends to develop a DAB agreement with its three major capital works delivery partners to establish an internal mechanism for resolving issues that may, or are likely to, occur. Aurecon considers that establishing a Dispute Avoidance Board enables early resolution of potential conflicts, minimising costly delays and litigation. It promotes open communication, provides expert guidance, and preserves positive relationships between parties. This proactive approach ensures smoother project delivery, safeguarding timelines, quality, and reducing overall risks. Independent estimation advice and quantitative risk advice will be necessary for MLPL in determining an appropriate risk allowance for the project and developing target costs for the future BOW package, in addition to checking costs of any deviations put forward by delivery partners or in contractual disputes.
Integrated Delivery Model	Up to 34 IDP roles have been put forward for MLPL's Program and Project Management Function. These roles include, but are not limited to: ■ Cables package and project managers, both subsea and onshore by region. ■ Converters package and project managers. ■ Health and safety.	Aurecon has reviewed the positions specified against those we would expect for a peer TNSP, or for a greenfield major infrastructure project. We have also considered this in the context of whether MLPL has outsourced functions via a delivery partner. Overall, we note that the positions specified by MLPL appear reasonable and relate to prudent functions required for major HVDC infrastructure: Managing and delivering major infrastructure, including its civil works, cables, and converters. Ensuring construction activities are conducted safely and in accordance with the appropriate management systems. ■ Ensuring project sites are supervised.

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
	- Construction supervision and safety. - Site Managers. - Schedulers. - Quantity Surveyors. - Risk Controllers. - Document Controllers. Positions across functions include a range of early career to senior level roles.	- Documenting construction work progress and flagging risk across various delivery packages. - Ensuring costs are appropriately estimated. - Ensuring that activities are undertaken to the required standard for various milestones.
Materials and Other Payments	Includes essential materials, equipment, and services to support project management functions across delivery sites. Key inclusions are: - Site infrastructure. - Vehicles. - Digital tools. - Monitoring and safety equipment. - Contract services and labour support.	Aurecon considers these activities necessary to address and manage the issues arising from project interface, project control and contract management, and minimise the risk and cost consequences of delays.

6.2.7 Corporate Costs and Support

Table 6-9 below provides Aurecon's assessment on the reasonableness of MLPL's Corporate Cost and Support activities.

Table 6-9 Corporate Costs and Insurance

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Internal Labour Costs	Labour costs span 60 corporate support positions which cover functions such as: - Safety. - Digital. - Finance and Accounting. - Legal. - People and Culture. - Liaison (e.g. with CEFC and other stakeholders). - Executive Management (e.g. the CEO and board). - Branding. Positions across functions include a range of early career to senior level roles.	From Aurecon's review, the positions specified by MLPL are typical for a large corporate organisation and appear reasonable. We note that given that the Marinus Link is a single project, relative to peer TNSPs such as Transgrid who have multiple projects, these costs can only be allocated to the individual MLPL project (whereas Transgrid could allocate similar costs across its existing asset base and greenfield projects). That is, we would expect the scope of MLPL's activities/costs allocated to this project to be higher than an operating peer TNSP. Further analysis is also provided in Section 6.4.

Scope Area	Marinus Link Requirement and Specification	Aurecon's comments on prudence of activity
Service Provider Costs	MLPL is seeking to recover a series of supplier costs which will be necessary for its business-as-usual operations. These functions include: ■ External support for tax and accounting (e.g. compliance, fringe benefits, and other reporting). ■ Internal and external audit support as required. ■ Support in developing responses to AER Regulatory Information Notices. ■ Support in developing its regulatory strategy and future proposals which will be submitted to the AER. ■ Finance advisor costs.	From Aurecon's review of the activities put forward, they appear reasonable for a corporate business and necessary for day-to-day operations. These functions are all necessary for a corporate entity and regulated NSP. Support will be required for ongoing regulatory submissions and in the decision-making process for the Final Investment Decision (FID). The scope of activities in our view would be comparable for a peer TNSP.
Materials and Other Payments	This item covers a broad range of corporate systems, services, and operational needs to support the ongoing functioning of MLPL's corporate functions. Key inclusions are: ■ Licensing, Regulatory and Statutory Costs. ■ Office Facilities, Leases, and Fit outs. ■ Workforce Support and Operations. ■ Digital Systems, Software, and Tools.	From Aurecon's review of the activities put forward, they appear reasonable for a corporate business and necessary for day-to-day operations. The scope of activities in our view would be comparable for a peer TNSP.
Administrative Costs	MLPL has included administrative activities within the scope of its submission. These costs apply to all employees of MLPL (i.e. all internal labour). These include: ■ Local travel. ■ Domestic travel. ■ Other miscellaneous administrative costs.	In Aurecon's view, the administrative activities put forward by MLPL appear reasonable and consistent with what a peer TNSP may be expected to undertake. With respect to travel, our understanding is that costs relate to a range of business functions, with most of the forecast expenditure linked to Corporate Affairs, the CEO's office, and Construction and Delivery. We have reviewed the estimated rates for key cost items such as hotel accommodation, per diems, and domestic flights, and consider them to be prudent. These unit rates are applied to relevant FTEs across functions to derive the total travel estimate.

6.3 Forecast Expenditure and Benchmarking

This section comments on the reasonableness of MLPL's forecast expenditure. **Given the scope of Aurecon's review, we have focused on elements of more than \$1m in capex over the regulatory period** (Items may be bundled within scope areas where the total value exceeds this materiality limit, but individual components were not assessed).

6.3.1 Landowner and Community Engagement

Table 6-10 below provides Aurecon's assessment of the reasonableness of expenditure proposed for Landowner and Community Engagement.

Table 6-10 Landowner and Community Engagement Expenditure

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour Costs	Includes the labour costs and on-costs for MLPL staff supporting the Landowner and Community Engagement function.	3.6	Includes allowances for 5 FTE roles. Aurecon understands that MLPL has determined annual wages for positions based on benchmarking from E3. Wages include on-costs (20%) over and above stated wages, such as leave allowances and payroll taxes which are further described in Section 6.4.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. We also assessed the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position. Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable. Further analysis is provided in Section 6.4.
Service Provider Costs	Strategic Stakeholder Engagement Advisory	0.3	Aurecon understands the budgets have been set by MLPL's engagement managers based on their industry experience.	Based on Aurecon's review, the expenditure estimates put forward appear reasonable.
	Cultural Community Partnerships	2.4		
	Reconciliation Action Plan, Cultural Heritage, and Sentiment Tracking & Research	0.7		

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Estimate	Aurecon comments on prudence and reasonableness of costs
Integrated Delivery Partner	Cultural Heritage Specialist	1.8	Aurecon understands this estimate is based on FTE requirements within the IDP head contract and competitively tendered rates provided by Jacobs.	Aurecon understands that the engaged IDP proponent was initially selected as part of a competitive process with the option to extend their contract for an IDP role. Aurecon understands MLPL has undertaken a direct negotiation process to validate competitiveness / pricing and engage the IDP, supporting the view that the forecast IDP costs are commensurate with the market and prudent.
Materials costs and other payments	Community Benefits Sharing Scheme	15.6	These items were not within the scope of Aurecon's review.	These items were not within the scope of Aurecon's review.
	Communications Programs Costs	0.7		
	IS Rating and ISC membership costs for the MCC phase. Other Grants and Sponsorships	2.6		
Total Expenditure		27.8		

6.3.2 Land and Easement Acquisition

Table 6-11 below provides Aurecon's assessment of the reasonableness of MLPL's Land and Easement Acquisition expenditure.

Table 6-11 Land and Easement Acquisition Expenditure

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour	Labour costs and indirect	4.0	This includes the positions of the Landowner relations officers who are required to engage with the public (understood to be up to 5 FTEs). Aurecon found that MLPL's annual salaries are in line with the market benchmarked rates.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. In addition to this we assessed the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position.

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
				Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable.
Service Provider Costs	Easement Valuation, Land Access Consultation, Community Counselling	■	Aurecon understands this covers the annual costs for external support with land access, easement valuation and negotiation, and counselling. Aurecon understands this is based on expert advice provided by Acumentis.	Aurecon has reviewed easement acquisition forecasts provided by Acumentis and understands that the cost forecasts involved are reasonable and prudent.
Materials costs and Other Payments	Easement compensation Easement Negotiation Temporary Occupancy Payments Disturbance from Construction	■ ■ ■ ■	Land and Easement acquisition costs comprise two elements, Easement compensation and easement temporary occupancy and disturbance. Easement Compensation: The compensation calculation in accordance with the relevant section of the Victorian Land Acquisition and Compensation Act 1986 is based on \$■ for Crown easement areas, \$■ for plantation easement areas and, individual calculations for private easement areas. The total allowance for professional fees is estimated assuming \$■ being paid per affected landholder (in a total of 105) as per MLPL's land easement and acquisition strategy. This amount includes legal, valuation, and accounting fees. The negotiation allowance further considers the project timelines, community acceptance, social licence and commercial impacts anticipated from negative public sentiment. ■ ■ Failure to acquire land in the required timeframes	The expenditure estimates have been developed by MLPL's land and easement acquisition advisor Acumentis. Aurecon notes that the forecast costs provided by Acumentis have considered on-site valuation findings, recent real estate transactions, market rates, State Government compensation acts, current options/easement agreements, professional fees, and disturbance costs. ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
	Easement Option and Acquisition Payments	■	could delay project implementation and lead to penalties under MLPL’s contracting structures. ³ Easement Temporary Occupancy and disturbance as part of construction: Acumentis, MLPL’s land acquisition adviser has also provided a view on costs required to be issued to landowners for disturbance within easement areas and adjoining land. Our understanding is that they have assessed economic losses of landowners and made an allowance for this.	With respect to disturbance costs, Acumentis, MLPL’s advisor, assessed benchmarks for land value reductions and assessed the volume of land impacted across. MLPL notes that its Advisor has determined the value of land diminution from court precedents and market research. We believe this approach to be reasonable.
	Fees and other payments	■		Overall, we consider the total expenditure for land and easements proposed to be reasonable.

³ ML Easement Compensation 27th August Report

⁴ Ibid

6.3.3 Environmental Impact Assessments

Table 6-12 below provides Aurecon's assessment of the reasonableness of MLPL's expenditure forecast for Environmental Impact Assessments.

Table 6-12 Environmental Impact Assessment Expenditure

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour Costs	Labour costs for MLPL staff supporting this function and on-costs.	1.4	Includes allowances for the following roles: - Environment Officer. - Sustainability Coordinator. - Head of Environment. - Project Manager for Environment. Aurecon understands that MLPL has determined annual wages for positions based on benchmarking from E3. Wages include on-costs (20%) over and above stated wages, such as leave allowances and payroll taxes which are further described in Section 6.4.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. In addition to this we benchmarked the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position. Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable. Further analysis is provided in Section 6.4.
Service Provider Costs	Audits, planning and performance	■	Estimates reflect the costs for external environmental specialists, including independent environmental auditor consultant and other environmental specialists, to support compliance and activities, including preparing impact assessments and planning documents.	The audit, planning and performance costs represent a number of smaller cost items valued at less than \$1m in capex and are below Aurecon's materiality limit. Due to the small size of these cost items, Aurecon has bundled together these cost items. In relation to Environmental and Heritage cost forecasts, from Aurecon's review the expenditure put forward appears reasonable against the scope of activities specified. Labour rates specified also appear reasonable.
	Environmental and Heritage	■		
Integrated Delivery Partner	HSE Inspectors	3.8	IDP expenditure includes allowances for 6 FTE roles giving external support for environmental management during delivery.	Aurecon understands that the engaged IDP proponent was initially selected as part of a competitive process with the option to extend their contract for an IDP role. Aurecon understands that MLPL has undertaken a direct negotiation process to validate competitiveness / pricing

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
	Environment and sustainability Management	4.8	Estimates reflect the level of support typically required for major infrastructure projects and are consistent with peer TNSP practices.	and engage the IDP, supporting the view that the forecast IDP costs are commensurate with the market and prudent. Additionally, Aurecon has reviewed a small sample of fee rates and found them to be reasonable.
	Sustainability Officers	2.2		
Materials and Other Payments	EIS/EES Approvals and Performance	0.5	Includes forecast costs for implementing environmental performance requirements and fees associated with obtaining EIS/EES approvals. Aurecon notes estimates are informed by known regulatory obligations and experience from comparable infrastructure projects.	These costs are necessary to comply with Commonwealth and State approvals. Approval fees are set by regulators and are considered prudent. Overall, the expenditure is considered prudent and reasonable given the projects scale and compliance obligations.
Total Expenditure		20.6		

6.3.4 Technical Design and Specifications

Table 6-13 below provides Aurecon's assessment on the reasonableness of MLPL's proposed expenditure for Technical Design and Specifications.

Table 6-13 Technical Design and Specifications

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour Costs	Includes labour costs for required positions and on-costs.	7.0	Includes allowances for the following roles: ■ Power System Integration Manager. ■ Power Systems Engineering (Senior and mid-level roles). ■ Asset and BIM Coordinator. Aurecon understands that MLPL has determined annual wages for positions based on benchmarking from Mercer.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. In addition to this we benchmarked the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position. Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable. Further analysis is provided in Section 6.4.

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
			Wages include on-costs (20%) over and above stated wages, such as leave allowances and payroll taxes which are further described in Section 6.4.	
Service Provider Costs	Specialist Technical and Advisory Support	■	This cost area includes forecast costs for technical advisory services such as connection agreement support, AEMO/TasNetworks system studies, design assurance reviews, and Operations and Maintenance set-up.	The forecasted expenditure is considered prudent given the technical complexity of the project and MLPL's role as an intending TNSP. External support is required to deliver system studies, connection agreements, technical assurance, and O&M planning—functions critical to ensuring MLPL can meet its obligations and operate independently. The higher level of effort compared to peer TNSPs reflects the bespoke nature of the connection process and the extensive consultation required with AEMO, AusNet, TasNetworks, CDSE contractors, BassLink, and other stakeholders. Aurecon understands that expenditure has been informed by benchmarking against internal labour costs and historical engagements. In the absence of market quotes, this approach is reasonable. Given the HVDC-specific challenges and limited precedent in Australia, the cost is assessed to be prudent and appropriate for a project of this scale.
	Connection Agreement and System Study Costs	■	The Specialist Technical and Advisory Support performance costs represent a number of smaller cost items valued at less than \$1m in capex and are below Aurecon's materiality limit.	
	Technical assurance review	■	Connection Agreement and System Study costs include the Victorian and Tasmanian System Study costs valued at \$4.3m each in addition to connection agreement support cost of \$0.6m.	
	Operations and Maintenance Set-up	■	Consulting Engineers and Support Consultants include costs for 7 consultant roles, which include Engineering and discipline specific support roles.	
	Consulting Engineers and Support Consultants	■	Aurecon understands these estimates reflect expected scope, supplier input, and previous experience with similar projects.	
Integrated Delivery Model	Engineering and Technical Leadership	5.4	IDP expenditure includes allowances for 5 FTE roles providing engineering and technical leadership across design development, interface management, BIM coordination, and system engineering. The engineering and technical leadership costs include costs related to the following roles:	Aurecon understands that the IDP expenditure reflects the level of effort required to undertake complex system studies and provide technical oversight during delivery. Aurecon understands that the engaged IDP proponent was initially selected as part of a competitive process with the option to extend their contract for an IDP role. Aurecon understands that MLPL has undertaken a direct

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
	Specialist Technical Roles	4.1	- Head of Engineering. - Engineering Services Lead. - Technical Interface Manager. The specialist technical roles include costs related to the following roles: - Power Systems Engineer. - BMI Specialist. Estimates align with the resourcing needs across the project delivery.	negotiation process to validate competitiveness / pricing and engage the IDP, supporting the view that the forecast IDP costs are commensurate with the market and prudent. These studies go beyond typical GPS assessments, covering a broad range of system stability considerations necessary for NEM integration. Based on our experience, this scope of work requires a greater level of support than would typically be expected for a peer TNSP, due to MLPL's status as an intending TNSP and the bespoke nature of the connection process. On this basis, we consider the level of expenditure to be reasonable and consistent with the technical requirements of the project.
Materials Costs and Other Payments	System Testing, Monitoring, Compliance and Operational Readiness Costs	5.8	Forecast costs are informed by supplier input, statutory pricing, and benchmarked allowances. Testing-related costs include travel and labour. AIS, metering, and tracking costs reflect standard subscription and equipment rates. Regulatory and telecom-related items are based on indicative pricing and known obligations.	The expenditure is considered prudent and reasonable given the technical and compliance functions it supports. FAT/FST witnessing ensures delivery quality and equipment conformity. Several of the items relate to critical operational readiness and integration with the NEM. These costs are consistent with what is typically required for complex infrastructure and reflect efficient use of targeted external support.
Total Expenditure		51.7		

6.3.5 Procurement Strategy and Execution

Table 6-14 below provides Aurecon's assessment of the prudence of expenditure proposed by MLPL for its Procurement Strategy and Execution.

Table 6-14 Procurement Strategy and Execution Expenditure

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour Costs	Includes labour costs for required positions and on-costs.	5.5	Includes allowances for the following roles: ■ Senior Procurement & Contracts Manager. ■ Procurement Manager. ■ Procurement & Contracts Coordinator. ■ IDP Contract Manager. ■ Contract Assurance Advisor. ■ Procurement Specialist. Aurecon understands that MLPL has determined annual wages for positions based on benchmarking from Mercer. Wages include on-costs (20%) over and above stated wages, such as leave allowances and payroll taxes which are further described in Section 6.4.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. In addition to this we benchmarked the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position. Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable. Further analysis is provided in Section 6.4.
Service Provider Costs	Commercial and Procurement Advisory Services	2.5	This expenditure includes an allowance for procurement support and commercial advisory services to support the internal team.	Aurecon understands that MLPL has received commercial advisory services from several of its advisors on the structuring of its cables, converters, and balance of works procurement and contract negotiation processes. Aurecon believes these activities to be prudent to ensure that MLPL undertakes these activities with its commercial interests in mind and to best negotiate with market participants in tender responses, manage variations and disputes, and address other performance related issues
Total Expenditure		7.9		

6.3.6 Program and Project Management

Table 6-15 below provides Aurecon's assessment of the prudence of expenditure proposed by MLPL for its Program and Project Management.

Table 6-15 Program and Project Management

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour costs	Includes labour costs for required positions and on-costs.	40.6	Includes allowances for up to 44 roles with positions spanning from early-career professionals through to senior leadership. Aurecon notes that MLPL have sized their internal labour to provide effective oversight of the project to ensure that the project is delivered prudently and efficiently. Aurecon understands that MLPL has determined annual wages for positions based on benchmarking from Mercer. Wages include on-costs (20%) over and above stated wages, such as leave allowances and payroll taxes which are further described in Section 6.4.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. In addition to this we benchmarked the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position. Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable. Further analysis is provided in Section 6.4.
Service Provider Costs	DAB	■	For each of the various review areas and externally appointed advisors, MLPL has developed a bottom-up cost estimate which put forward hourly requirements and labour costs.	The basis of estimation from MLPL appears reasonable for the items assessed. Aurecon is not able to benchmark or comment on the reasonableness of the value for items such as defending contractor claims and proceedings. However, we note that these costs would be expected in major infrastructure delivery for a project of this scale (some degree of contractor dispute may be expected). Other Commercial, Legal and Governance Support, Program Delivery and Risk Oversight, and Training, Safety and Wellbeing costs represent a number of smaller cost items valued at less than \$1m in capex and are below Aurecon's materiality limit. Due to the small size of these cost items, Aurecon has bundled together these cost items.
	Defending Contractor Claims and Proceedings	■		
	Interface Agreements	■		
	Stage 2 preparatory works	■		
	Legal Advice for Major Contracts	■		
	Other Commercial, Legal and Governance Support	■		
	Program Delivery and Risk Oversight	■		
	Training, Safety and Wellbeing	■		
	Project Leadership and Oversight	13.9	The IDP expenditure is based on a resourcing schedule developed by MLPL in consultation with its delivery partner. It includes a mix of full-time equivalent (FTE) roles across	Aurecon understands that the engaged IDP proponent was initially selected as part of a competitive process with the option to extend their
	Site and Delivery Management	14.8		

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Integrated Delivery Model	Technical and Engineering Support	8.0	project leadership, site management, engineering, project controls, risk, and assurance.	contract for an IDP role. Aurecon understands that MLPL has undertaken a direct negotiation process to validate competitiveness / pricing and engage the IDP, supporting the view that the forecast IDP costs are commensurate with the market and prudent. The scope and rates put forward by Jacobs were tested against peer projects and the market.
	Project Controls and Commercial	15.3	The estimate reflects expected deployment across key delivery phases and draws on market-aligned labour rates, historical benchmarks, and the complexity of delivering major HVDC infrastructure. Roles have been scaled to align with project needs over time, including ramp-up and ramp-down periods, to ensure efficient use of external support.	
	Governance, Risk, and Assurance	12.5		
Materials and Other Payments	IDP Labour Expenses	6.6	This expenditure covers a range of operational and support-related items required to enable project management teams to safely and effectively deliver the project. Estimates are based on supplier quotes, internal benchmarking, and planning assumptions aligned with project scope.	Aurecon considers these costs necessary and prudent to address and manage the issues arising from project interface, project control and contract management, and minimise the risk and cost consequences of delays.
	Site utilities, project vehicles, digital tools, safety and monitoring equipment, and contract support services	8.0		
Total Expenditure		149.6		

6.3.7 Corporate Costs and Support

Table 6-16 below provides Aurecon's assessment of the prudence of expenditure proposed by MLPL for its Corporate Costs and Support.

Table 6-16 Corporate Costs and Support Expenditure

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
Internal Labour Costs	Internal labour and On-costs for Corporate Support positions.	64.6	Labour costs span 60 corporate support positions which cover functions such as: ■ Safety. ■ Digital. ■ Finance and Accounting. ■ Legal. ■ People and Culture. ■ Liaison (e.g. with CEFC and other stakeholders). ■ Executive Management (e.g. the CEO and board). ■ Branding. These positions span a range of junior to senior level positions as required for each function.	Aurecon undertook a reasonableness assessment of the positions specified for the scope of work. In addition to this we benchmarked the wages put forward for a sample of the population of positions at MLPL, in addition to the reasonableness of any on-costs for each position. Based on our benchmarking assessment, and the process taken by MLPL in seeking external advice on its labour rates, we feel the internal labour costs put forward by MLPL are likely to be reasonable. Further analysis is provided in Section 6.4, which notes how each of the functions within MLPL have been assessed against peer TNSPs and corporate entities for completeness and scope. Section 6.4 also expands on how benchmarking MLPL's FTE levels for this item may not be appropriate, as MLPL cannot spread these costs across multiple projects whereas other TNSPs, such as Trasgrid, can do so.
Service Provider Costs	Financial, Tax, and Treasury Services Governance, Legal, and Board Support Regulatory and Economic Advisory Strategy, Transformation, and Readiness	■■■ ■■■ ■■■ ■■■	The expenditure has been developed based on a combination of supplier quotes, existing contract rates, internal benchmarking, and planning assumptions aligned with project needs. Costs reflect expected engagement levels across key corporate functions, including finance, legal, governance, ICT, regulatory advisory, health and safety, and workforce readiness. MLPL has provisioned for supplier support in carrying out its internal audit, external audit, and tax and accounting support costs.	It is common for TNSPs to utilise external support in preparing Revenue Proposals over several years prior to their initial submission. The annualised costs for Revenue Propose development, and Regulatory Strategy Advice, and Corporate Strategy appear reasonable. Aurecon notes that the costs specified appear reasonable and are either based on historical costs or market prices where relevant. We note that MLPL could have higher costs compared to other TNSPs as all of its regulatory preparation costs have

Scope Area	Inclusions	Expenditure (\$m real June 2023)	Basis of Expenditure Estimate	Aurecon comments on prudence and reasonableness of costs
	ICT, Cybersecurity, and Data Systems	■	MLPL has based this on historical costs of external and internal audits which would occur per annum (4 internal audits).	been allocated to this project, rather than spread across multiple.
	HR and Recruitment	■	Tax and accounting activities cover historical efforts for reporting on tax, compliance, fringe benefits and other items.	
	Health, Safety and Wellbeing	■		
	Communications and Stakeholder Engagement	■		
Materials and Other Payments	Licensing, Regulatory and Statutory Costs	5.0	Costs have been derived from existing lease rates which are in place for the MLPL offices.	The costs appear reasonable based on Aurecon’s review and the basis of estimate put forward by MLPL is sensible.
	Office Facilities, Leases, and Fit outs	11.7	MLPL has developed an IT Costs Estimate model which tracks the existing licences, software, hardware, and support agreements which are in place to ensure various functions and activities can be undertaken as part of its business-as-usual operations.	Sponsorship costs appear reasonable based on MLPL’s historical costs and scope proposed.
	Workforce Support and Operations	5.7	MLPL has provided documentation which outlines its costs as they relate to licence fees and other statutory items	Aurecon understands these are driven by existing commercial agreements which are in place and being referred to within an integral IT Cost Model. Aurecon did not cite these agreements or the underlying expenditure model but believes the basis of estimation stated would be reasonable.
	Digital Systems, Software, and Tools	12.2		Aurecon reviewed documentation related to these items and is satisfied that the costs are prudent and efficient as they relate to statutory costs which have limited scope for optimisation.
Administrative Costs	Local Travel	4.5	Administrative costs include domestic interstate travel and local travel to site for all internal MLPL staff.	From Aurecon’s review, the basis of estimation and total expenditure put forward is reasonable. With respect to travel, we have reviewed the estimated rates for key cost items such as hotel accommodation, per diems, and domestic flights, and consider them to be prudent. These unit rates are applied to relevant FTEs across functions to derive the total travel estimate.
	Domestic Travel	8.7	Domestic and local travel has been estimated based on proven costs to date and will be governed by MLPL’s travel policies.	
	Other Administrative Costs	2.3		
Total Expenditure		156.4		

6.4 Labour Top-Down Review

Aurecon has assessed the internal labour costs for Marinus Link top down for reasonableness and prudence.

The scope of labour costs put forward by MLPL span delivery and corporate support. Aurecon notes that MLPL has utilised the services for Ernst & Young (EY) in 2023 and E3 more recently to undertake a high-level design of MLPL's corporate functions and provide a roadmap for the implementation of the corporate functions. MLPL's activities with respect to composition of its staff, business establishment costs, and software and processes have been guided by this specialist advice.⁵

These functions and their required software systems include, but are not limited to:

- Delivery procurement.
- Package delivery.
- Environmental planning and approvals.
- Land access and acquisitions.
- Asset management and engineering.
- Commercial.
- Customer and revenue.
- Project controls.
- Governance, risk and compliance.
- Safety.
- Financial administration and management.
- Legal.
- IT and systems.
- Corporate procurement.
- Human resources.

MLPL has also received external advice from E3 and other parties in scoping its internal functions along with the requirements for a delivery partner (Jacobs) to support the project.

Aurecon evaluated the scope of MLPL's functions against peer TNSPs. Note, the intent of this exercise is to assess whether scope of costs is prudent and likely to be incurred by other TNSPs when establishing a greenfield transmission line. Our findings indicate that the scope of roles within MLPL are reasonable based on a review of Marinus Link's Resource Model. We provide further detail below.

Table 6-17 Organisational Structure Benchmarking⁶

Benchmark TNSP Organisational Function	Marinus Link Organisational Equivalent	Comments
Commercial	Commercial.	The scope of this function is broadly comparable with respect to including contract managers, procurement managers, project administrators, and corporate governance roles.
Environmental and Approvals	Environmental planning and approvals.	The scope of this includes costs related to environmental planning, approvals, impact assessments, and management of external consultants. The roles listed by MLPL in its resources model – Manager Environment and Planning,

⁵ Aurecon engagement with MLPL for its Stage 1 A Expenditure Proposal

⁶ MLPL Capital Cost Estimate Model v 16_4, MLPL Owners Costs Only Labour 16.5, Humelink CPA Stage 2

Benchmark TNSP Organisational Function	Marinus Link Organisational Equivalent	Comments
		Environmental Specialist and Auditor, Project Manager, appear aligned in this aspect.
Community and Stakeholder	Landowner and Community Engagement.	Includes roles for engagement with local communities, media, indigenous engagement and marketing. The scope of this function is aligned with MLPL's resource model, although some functions within MLPL are covered in different areas (e.g. Easements and access are covered under land and easement acquisition for MLPL).
Land and Property	Land and Easement Acquisition.	The scope of roles included within this function include Land and Easement Acquisitions managers at MLPL and support agents.
Project Controls	Embedded within each function as required.	The scope of this function covers risk management, program monitoring, reporting, scheduling, corporate support and document control. For MLPL, these functions are incorporated within the various organisational functions as required.
Design and Construction	Technical Design and Specifications.	Marinus Link's design, construction and engineering functions which cover: ■ Engineering - converter stations, cables, ops & maintenance, among others. ■ Construction - Managers for cable works in Victoria, and the two converter stations in Heybridge and Hazelwood. Supported by supported by superintendents, and safety specialists as required. ■ Design - Some of the design costs incurred by HumeLink relate to professional advisory services for this function. MLPL has included these within the Construction Support category of this submission. The functions were found to be comparable in scope/ to peer TNSPs.
HSE	Program and Project Management.	Both MLPL and the benchmark have HSE business partners, administrators, and systems & reporting roles. This is true across the corporate and delivery functions.
Project Management	Program and Project Management. Corporate Support.	MLPL has specified roles for major capital works package managers (converters & cables), resource planners, schedulers, project directors, and other supporting roles as required. These overlap across functions (e.g the technical design and specifications or project controls functions noted earlier above). Corporate support, executive management, and audit costs are also included within the benchmark under Project Management. These roles cover costs associated with the board, external auditors, project offices, administrative staff, IT systems support staff. MLPL has included these roles under its Corporate Support roles.
Regulatory	Corporate Support.	Peers have included costs associated with developing regulatory submissions and engagement with the

Benchmark TNSP Organisational Function	Marinus Link Organisational Equivalent	Comments
		AER. MLPL has similarly included regulatory advisors within its revenue and pricing team.
Legal	Corporate Support.	MLPL would be expected to have an internal function that can provide legal advice as needed and manage external legal advisors. We understand these staff are included within the Corporate Support function.

Workforce FTE During Delivery Period

Figure 6-1 below illustrates the FTE profile of MLPL during the delivery stage of the project. There is a steady increase in FTEs from 137 in FY26 up to 160 by FY27, with the quantity of delivery staff slowly decreasing over time as the project reaches closer to its completion date. In our view, this is reasonable as there is likely to be an increasing level of involvement in supervision across all work packages and input necessary for interfacing across the three major delivery packages (cables, converters, civils), leading into testing and commissioning.

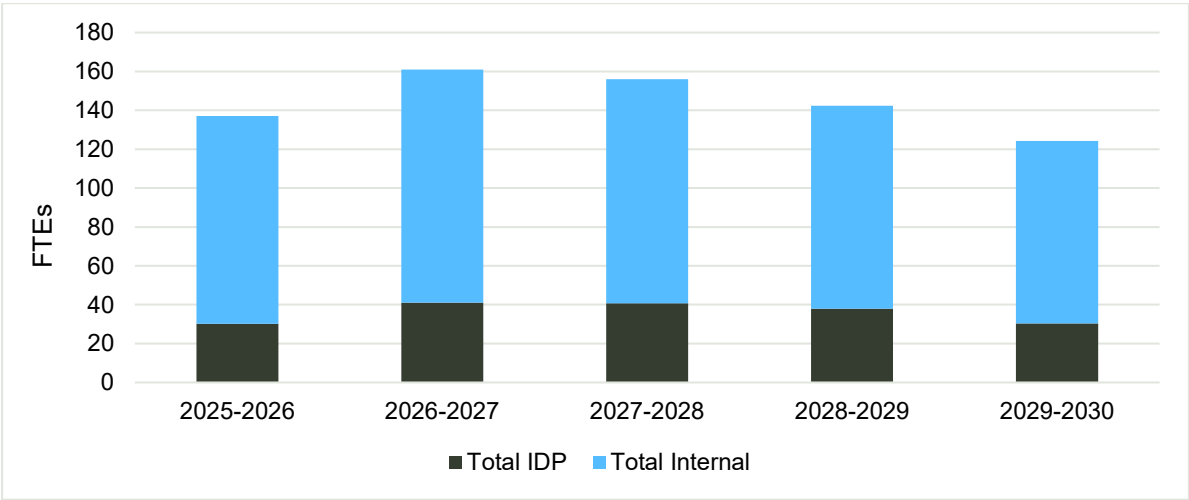


Figure 6-1 FTE Levels Corporate vs Delivery (Rounded)

Aurecon has not assessed the requirement for each individual position within MLPL’s resource model, however, we have conducted a high-level review on whether the positions appear necessary to support the overall delivery or corporate support function for MLPL. In our view, the positions and FTE levels appear reasonable. When compared to peer projects such as HumeLink, MLPL’s overall FTE count of approximately 160 appears slightly higher relative to HumeLink which averages circa 120. We suspect that Marinus Link may have higher corporate staff FTEs relative to peer TNSPs or DNSPs whose FTE allocation would be spread across multiple projects, whereas Marinus Link would reflect one project (i.e. costs for legal staff, the board, and executive management could be recovered or spread across various projects or might be treated as indirect costs). Moreover, Marinus Link would likely require more specialised expertise given that there have been few subsea HVDC projects delivered in Australia in recent years (whereas there are several overhead AC line projects being delivered).

Aurecon reviewed MLPL’s resourcing for roles which would be required for corporate support – which were developed with external advice – and believes them to appear reasonable. (Safety, People, Recruitment, Communications, Digital, Governance, Legal, Risk, Finance, Procurement, Executive Management).

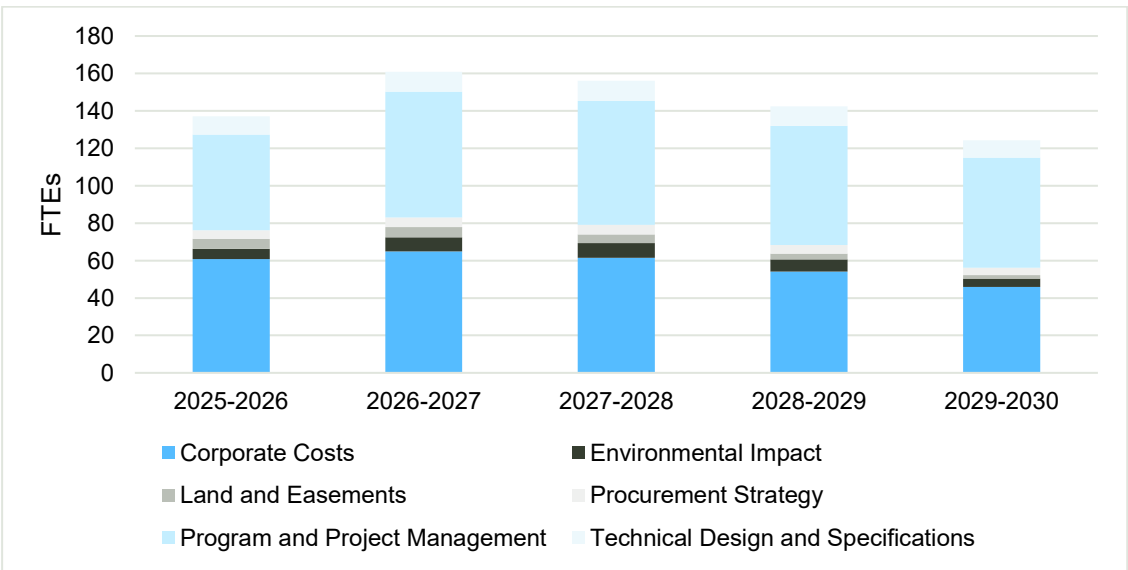


Figure 6-2 FTE by Function

When reviewing the delivery functions specifically (excluding Corporate Staff per the figure above), Aurecon notes that this peaks at around 96 FTE in FY27. This is comparable to the resourcing of PMO and Delivery functions estimated for the North Sea Link Project in Europe, which had a peak FTE level forecast at 94 and average during the delivery period of roughly 73.⁷ While the contracting strategy for converters and cables are similar to Marinus Link (EPC), there are still various factors which would make the resourcing requirements different between projects within Australia compared to those in Europe. These would include factors such as local HVDC technical expertise, degree of landowner and community engagement, the degree of approvals necessary.

MLPL has flagged to Aurecon that its FTE allocations have been estimated from inputs from its project delivery teams, the executive of each function, and external advice from E3. Aurecon note that the experience of MLPL Project Directors and Executive spans the commissioning of major capital programs and transmission lines across TNSPs and DNSPs across Australia and is credible. We believe that based on the information reviewed the allocation of FTEs for delivery roles appears reasonable

6.4.1 Forecast Expenditure and Benchmarking

To assess the reasonableness of the costs put forward, Aurecon's approach was to assess the direct labour costs put forward by MLPL for a sample of positions and any related on-costs. In our view, if the majority of costs in the sample of positions assessed appear to be in line with market, then it is likely that this may be true for the total figure put forward by MLPL.

Salary Benchmarking

The following table is a comparison of MLPL salary to local or national salaries for equivalent roles. The market annual salaries are sourced from a few sources:

- PageGroup salary guide 2023 to 2024.
- Hays salary guide 2023 to 2024.
- Aurecon's benchmarking of salaries based on market research and internal rates where comparable.

Table 6-18 Remuneration Benchmarking

MLPL / Delivery Partner (DP) Position	MLPL Annual Salary (inc. super)	Market Annual Salary range or average (inc. super unless stated)	Aurecon comments on Alignment against benchmarks
HVDC Lead Engineer			Within range of Senior/Lead Engineers in VIC/SA
Senior Cables Engineer			Within range of Senior/Lead Engineers in VIC/SA
Cables Project Manager			Comparable to Engineering Manager or Project Manager
Converters Project Manager			Comparable to Engineering Manager or Project Manager
Scheduling, Planning & Reporting Manager			Broadly within Benchmark
Scheduler - BoW (Contractor)			Broadly Within Junior Manager Salary Band - Aurecon
Project Manager - Cables onshore			Comparable to Engineering Manager or Project Manager

⁷ https://www.ofgem.gov.uk/sites/default/files/docs/2016/10/nsi_fpa_atkins_report_redacted.pdf

MLPL / Delivery Partner (DP) Position	MLPL Annual Salary (inc. super)	Market Annual Salary range or average (inc. super unless stated)	Aurecon comments on Alignment against benchmarks
Project Engineer			Comparable to Aurecon L5/L6 Engineer
Head of Enviro ()			Comparable to Director Level Position
Environment Officer			Appears higher than Benchmark
First Peoples Engagement Advisor			Within Benchmark
Graduate			Within Benchmark
Administrative Assistant			Appears higher than benchmark
Principal Power System Engineer			Within Benchmark Range for Senior Engineer
Analyst / Modeler			Appears within range for a Senior Financial Analyst
Implementation manager ()			Within Benchmark Range for Senior Staff
DP - Converters Director			
DP Senior Project Manager			
DP - Head of Engineering			
DP - Environment and Sustainability Manager			
DP - Project Finance and Commercial Manager			
DP - Project Manager - Hazelwood			

Generally, the annual salaries of the sample MLPL and Delivery Partner positions are in line with the market benchmarked rates.

. This may be a case of MLPL's / the Delivery Partner's job titles for certain band/grades being misaligned with the common titles of the same band/grade. It may also be due to the Marinus Link project needing more specialised or niche capabilities, which may push the salaries away from the typical market rates. We note that any benchmarking of wages is imperfect as role descriptions can vary across organisations, and at times, Tasmanian benchmarks were not always able to be fully captured.

MLPL also advised Aurecon that it has conducted its own benchmarking following the advice of Mercer and E3 Advisory.

With respect to the expenses put forward for roles for the Delivery Partner, it is worth noting that MLPL conducted a procurement process which selected Jacobs as providing the most competitive outcome. Specifically, Jacobs was selected based on an assessment of capability and capacity, partnership commitment, commercial certainty, and price. As we understand, other parties were engaged with earlier in the process, but MLPL proceeded with Jacobs based on its experience to date with the project as MLPL's key engineering service provider. In our view, this makes sense from a project continuity perspective.

The rate card proposed by Jacobs was also reviewed and this appeared to be in line with comparable rates Aurecon would observe within the market for engineering service providers for a project of this scale. This was also externally validated by E3 Advisory and MLPL staff.

We would also suspect that whilst insourcing of these roles could possibly generate a lower cost outcome to MLPL, this would expose the project to several risks including:

- Recruitment risk as several of the roles are highly specialised and would likely require a premium in the market to attract the correct candidates within the timeframes at the scale required. This could lead to delays in sourcing the workforce required to deliver the project (increasing cost further).
- Capability risk in that Jacobs would provide an integrated offering with pre-existing teams and experience globally that could support MLPL in delivering a HVDC project.
- Flexibility in being able to mobilise. Jacobs can mobilise and demobilise as required over the course of the project.
- MLPL would retain all delivery risk if roles were insourced. The IDP model will transfer some risks to the contractor.

On-costs Assessment

Marinus Link assumes 20% on-costs over and above the labour rates in their resource model. This is expected to cover expenses related to annual and service leave, payroll tax, and worker's compensation. The reported Labour on-cost breakdown and rates are elaborated in the table below.

Table 6-19 On-Costs Benchmarking from VNI West⁸

Labour on-cost rate			
Type	Rate (%)	Breakdown	Breakdown rate (%)
Employee under Award-Enterprise Agreement	20.3	Annual leave	8
		Long Service Leave	5.8
		Payroll Tax	5.5
		Worker's Compensation	1
Employee on individual employment contracts – Contracts Officers	20.3	Annual leave	8
		Long Service Leave	5.8
		Payroll Tax	5.5
		Worker's Compensation	1

⁸ <https://www.aer.gov.au/system/files/2024-02/Transgrid%20-%20VNI%20West%20CPA%20stage%201%20-%20A.3%20Labour%20%26%20Indirect%20Capex%20Forecast%20Methodology%20-%2031%20January%202024%20-%20Public.pdf>

The benchmarking exercise shows that Marinus Link's assumed labour on-cost rate of 20% is very closely aligned to TransGrid's 20.3% as shown above for VNI West (Victoria). Therefore, we consider MLPL's on-cost rate to be fair and aligned with the industry standard.

6.5 Conclusion

In Aurecon's view, MLPL's proposed expenditure and scope for support activities (excluding sustainability initiatives, insurance and hedging which were not assessed) is likely to be reasonable. We believe these activities are needed and prudent to support project delivery. The costs associated with these supporting works are based on varying approaches, including bottom-up labour estimates, judgements from MLPL's experience, historical costs and quotes from the market or external advisors.

With respect to Land Easement and Acquisition, Aurecon notes that MLPL engaged with Acumentis to undertake land and easement valuations, where the cost estimates were based on site inspections, desktop valuations, state land acquisition and compensation legislation, and other factors such as economic losses and disturbance to land. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

With respect to Technical Design and Specifications, in our view, the scope of activities put forward is likely prudent and is indicative of the nature of the project being a major HVDC project in Australia, which is a less mature market. As such, allowances for external support from an owner's engineer and the degree of technical study for system assessments is reasonable in our view.

The scope and costs of MLPL's organisational structure and internal labour costs has been established with support from external advisors such as EY and E3, and includes roles typically seen in peer TNSPs for greenfield transmission lines. Aurecon notes that these appeared reasonable at the activity level, and also at the corporate level for a TNSP delivering greenfield major infrastructure.

MLPL has a noticeably higher FTE headcount compared to peer projects such as HumeLink, but this is likely a function of several corporate/administrative staff at peers being spread across multiple projects (lower FTE allocation or being treated as indirect costs). When comparing the resourcing of delivery staff to a reference HVDC project in Europe we found MLPL's FTE level at its peak to be reasonable.

In Aurecon's view, the internal labour costs put forward for the project appear reasonable and reflect the complexity of program management and procurement needed to deliver a project of this scale.

In some areas, Aurecon did not fully assess the reasonableness of costs due to limited materiality.

7 Risk Allowance

Aurecon reviewed the P50 risk allowance developed by MLPL for the Stage 1B Expenditure Submission. In this Section we assess the:

- Methodology taken by MLPL in determining its risk allowance.
- Comment on its compliance with AER requirements and industry standards.
- Review the completeness of risks identified.
- Comment on the allowance relative to benchmarks.

7.1.1 Expenditure Summary

MLPL has put forward a risk allowance of \$363m based on a P50 quantitative risk assessment undertaken by its advisor E3.

Table 7-1 Summary of Pre-Construction Expenditure – \$m real June 2023

Cost Element (\$m real June 2023)	Total
Risk Allowance	363.0
Total cost (\$m)	363.0

*Totals may not sum due to rounding.

7.1.2 Assessment of Quantitative Risk Methodology and Compliance with AER Requirements

Marinus Link requested a desktop review of the Quantitative Risk Analysis (QRA) methodology completed by E3 Advisory for the project.

In Aurecon's view, the process undertaken by E3 Advisory appears to be logical, robust and appropriate for estimating the risk cost allowance. The key scope limitations and observations of the desktop review are detailed below.

Scope Limitations:

Our desktop review is subject to the following limitations:

- **Documentation:** Our desktop review is limited to examination of the PDF and excel files that were provided including:
 - MLPL Project Risk Register.
 - E3 Advisory Risk and Contingency Report.
- **Visibility of calculations and formulas:** It was not within Aurecon's scope to review the @risk calculation sheet and verify that the figures outlined in the risk register were translated accurately for the risk cost allowance calculation. Additionally, we did not observe or comment on the @risk functions and formulas used.
- **Risk Framework and Appetite:** E3 Advisory noted that the risk assessment was conducted in accordance with Marinus Link's project risk management framework but it was not within Aurecon's scope to validate this.

Key findings:

Overall, the process undertaken appears robust. The E3 Advisory Risk report comprehensively outlines the scope, AER compliance requirements and structuring of the assessment given the contract packaging and pricing approach. Residual risk requirements and principles are clearly stated and appear to align with

regulatory guidance and best practice. The risks that were considered in the QRA are clearly set out and detailed.

In terms of compliance with AER requirements E3 Advisory ensured for each risk item that:

- Risks could not be reasonably controlled by MLPL.
- Risk would not be managed by MLPL as part of business-as-usual operations.
- Risk was not symmetrical.
- Risk was not covered by contract terms.
- Risk was not covered by insurance or recoverable via a third party.
- Risk was not covered via a pass-through event.

MLPL and E3 Advisory undertook an iterative approach comprising a series of risk-focused workshops with key stakeholders. This is an effective way to identify discrete risk and objectively consider the impact of those risks.

The report outlines that the P50-value scenario has been tested against MLPL's risk appetite and reported in alignment with the projects risk exposure and AER guidance. The report does not specify other P-values or provide a confidence interval. It is common for projects to report other P-values (e.g. P10 and P90) to provide a holistic representation of risk exposure with reference to a confidence interval.

The risk register suggests that each risk is modelled using a BetaPERT distribution. A BetaPERT distribution may often favour the most likely outcome, reflecting a tendency for outcomes to cluster around it.

E3 Advisory has commented that the BetaPERT's smooth, bell-shaped curve provides a more realistic representation of uncertainty than simpler alternatives like the Triangular distribution, particularly when precise historical data is unavailable. Additionally, while E3 Advisory's overall risk assessment is conducted using a probabilistic Monte Carlo approach, the BetaPERT distribution has the advantage of supporting a formulaic approximation, enabling a reasonable single-point estimate to be calculated and reported for each risk, consistent with AER reporting expectations.

Aurecon is satisfied with the above reasoning for the use of the BetaPERT distribution and notes it is a commonly accepted approach in Industry.

E3 Advisory also conducted the risk assessment post variation to the CB and CDSE packages. This is reasonable in our view as these risks have already materialised.

7.1.3 Scope of Risks and Contracted Risks

E3 Advisory's report identifies multiple interface risks, such as scope gaps, misalignment between contractors, and delays in technical data sharing. Each risk is clearly described with its causes and consequences. This is appropriate given the varying contracting status and reliance between parties.

E3 Advisory has outlined in its risk report how MLPL has sought to manage each of the risks considered and how residual risk remains. E3 Advisory has also outlined precedents where these risks have materialised in major infrastructure delivery.

Aurecon has reviewed the monetary values and probabilities assumed in E3 Advisory's analysis. We believe broadly that they are reasonable. Some items such as technical scope risks related to the CB and CDSE package Aurecon felt were low. This primarily relates to the landfall HDD.

Whilst Aurecon has allocated risk items in our assessment below to specific packages, we note that in some cases they spanned multiple expenditure categories, but we have included them under the package we felt could be most impacted.

Aurecon notes that monetary values described in this chapter are in nominal terms and have been translated by MLPL into real terms for the purpose of the revenue proposal (and therefore totals described here may not perfectly align). Further details on the risks included (non-exhaustive) and "most likely" monetary values (prior to their P50 probability-based cost) are discussed below.

Converter Station and Cables Risk

The following key risks are identified by E3 Advisory with regard to the CDSE package (non-exhaustive):

- Loss of or damage to assets – Linked to fault, error, defects, damage or omissions in the design or construction of works by the contractor and/or MLPL. Most likely cost of \$122m has been assumed.
- Newly imposed / changes to requirements by AEMO – Implies that new or revised requirements / expectations made by AEMO impact the commissioning process and also delay the completion of transmission system tests and trials. This has been modelled to have a most likely cost of \$45m.
- Design changes not communicated between contractors – E3 Advisory explains that even with interface management plans and registers, there is a residual risk that some changes in standards and scheduling are not communicated. A most likely cost has been estimated at \$31m.
- Reliance on third parties (AEMO and TNSPs) – The project has a dependence on AEMO, TasNetworks, and AusNet to deliver critical studies. This is outside of MLPL's direct control but is essential for testing and commissioning during the regulatory period. Delays to these studies could impact regulatory requirements and project schedule. A most likely cost of \$20m has been assumed.
- Uncertainty regarding the future operations and maintenance contractor's requirements – The risk that although MLPL has engaged specialist input and has experienced staff, uncertainty remains regarding the requirements of the future asset manager, which requires a change in scope. A most likely cost of \$36m has been assumed.
- Changes to executed contract during BOW negotiations – There is still material risk that Hitachi and Prysmian may require redesign based on findings from the development of the BOW package. A most likely cost of \$26m has been assumed.

The following key risks are identified by E3 Advisory with regard to the CB package (non-exhaustive):

- The proposed burial depth of the HVDC does not satisfy insurer requirements. A 'most likely' cost impact of \$27m is attributed to this risk on the basis of 1x month of additional offshore cable works and 2x weeks of standby. This seems appropriate.
- New offshore Crossing and Proximity Agreements. A 'most likely' cost impact of \$14m is attributed to this risk on the basis of costs associated with the crossing design.
- Delay to securing license for offshore cable under the Offshore Electricity Infrastructure Act (OEI). This could lead to small delays in construction commencement and has a 'most likely' cost impact of \$7.8m attributed. This risk is appropriately given a low likelihood given that the project falls under national importance.
- Unforeseen environmental incident and/or unidentified assets on land. A 'most likely' cost impact of \$23m is attributed to these risks on the basis of costs associated with a 10% increase in offshore cable laying costs due to delays in productivity and a 1x month delay for the LCC contractor.
- Lack of availability of the specialist equipment, personal and resources (cable vessels, installation equipment and staff). A 'most likely' cost impact of \$16.9m is attributed to this risk on the basis of costs associated with 3x month delay in offshore operations.
- Lower penetration rate for the HDDs. A 'most likely' cost impact of \$4.4m is attributed to this risk on the basis of the rate being moderately slower than planned. This is an appropriate risk allowance given the uncertainty caused by the lack of detailed geo data for the landfall at the time of contract execution.
- Changes to thermal resistivity values provided after the execution of all contracts. A 'most likely' cost impact of \$2m is attributed to this risk on the basis of moderate variation occurs, requiring design or installation adjustments to meet rating requirements. It is not clear whether this risk allowance has been applied on top of the existing ~\$6.8m cost increase to the offshore cable supply caused by the variation in HDD depth. Furthermore, the design change to account for the deeper HDD depth means that the offshore and landfall cable cannot be increased in size any more (to account for changes in thermal properties) as such any mitigation to this section would require a change to the landfall design such as use of a steel duct instead of an HDPE duct (as discussed by PPL and MLPL in 'Memo re offshore cable size (current)').
 - In Aurecon's view this is likely to be a significantly larger cost impact than \$2m if it occurs and may have a greater probability than what has been assigned.

Key risks identified by E3 Advisory associated with the CB package total were approximately \$106.3m as a 'most likely' cost impact. The most recent cost model provided indicates \$100m in 'Contingent Risk' under P50 (AER) allowance.

Balance of Works and Other Risks

With respect to the Balance of Works and other items, E3 Advisory has considered items (including but not limited to):

- [REDACTED]
- Land Cable Civil Works incorrectly installed – The balance of work contractor may cause damage to the cable asset during installation due to quality control issues, misalignment, or accidental impact. This could imply rework or remediation is required, also leading to schedule delays and increasing project costs. The most likely cost impact is \$ [REDACTED]
- [REDACTED]
- [REDACTED]
- Skilled labour shortage – A skilled labour shortage in the Australian construction industry could create resourcing challenges. A most likely cost of \$24m could be incurred.
- Earthwork and topsoil reinstatement works – Additional fees for disposal or additional topsoil for the reinstatement of access tracks left by the BOW contractor for the cables' contractor and across private land. There is uncertainty in the portion of tracks that may need to be reinstated. A most likely cost of \$ [REDACTED] has been assumed.

7.1.4 Benchmarking

Aurecon has identified a set of benchmark projects which include subsea HVDC interconnectors which includes European projects and also a recent AER determination (e.g HumeLink) as reference points.

Table 7-2 Project Level Benchmarks

Project	Contingency as % of Capex
North Sea Link	12% of Capex ⁹
IFA2	10% of capex ¹⁰
Marinus Link	10% of Capex
Humelink	9.6% ¹¹
Celtic Interconnector	9% of Capex
Viking Link	9% of capex ¹²
NeuConnect	4% of Capex ¹³

⁹ [Decision on the Post Construction Review of the NSL Interconnector to Norway](#) pg 15 Ofgem FPA

¹⁰ [Decision on the Post Construction Review of the IFA2 interconnector to France](#) pg 11 Ofgem FPA
Position

¹¹ [AER - Determination - Transgrid HumeLink Stage 2 Contingent Project - August 2024](#)

¹² [Decision on the Final Project Assessment of the Viking Link interconnector to Denmark](#) pg 15

¹³ [Decision on the Final Project Assessment of the NeuConnect interconnector to Germany](#) pg 12
Ofgem FPA

Project	Contingency as % of Capex
GreenLink	3% of capex ¹⁴

Based on our review, the aggregate contingency put forward by MLPL falls comfortably within the range of benchmarks we have observed for HVDC projects internationally on a percentage of capital expenditure basis. The median of the reference projects identified had an aggregate risk allowance of 9%, with the average being 8.6%. NeuConnect and GreenLink were at the lower end of the range observed.

It should be noted though that when comparing to various international benchmarks several factors should be considered:

- Contracting methodology could impact the required risk allowances and be different across projects (e.g if most risks have been contracted out by the proponent, this may result in a different contingency to other projects where risks are being retained).
- There is likely a difference in experience and maturity of the HVDC market internationally, which could imply that in a less mature market such as Australia, a higher contingency would be justified.

¹⁴ [Decision on the Final Project Assessment of the Greenlink interconnector to Ireland](#) pg 12

7.1.5 Conclusion

Overall, the process undertaken appears robust. The E3 Advisory Risk report comprehensively outlines the scope, AER compliance requirements and structuring of the assessment given the contract packaging and pricing approach. Residual risk requirements and principles are clearly stated and appear to align with regulatory guidance and best practice. The risks that were considered in the QRA are clearly set out and detailed.

Aurecon has reviewed the monetary values and probabilities assumed in E3 Advisory's analysis and believe that they are reasonable. Some items such as technical scope risks related to the CB and CDSE package Aurecon felt were low. This primarily relates to the landfall HDD.

E3 Advisory has outlined in its risk report how MLPL has sought to manage each of the risks considered and how residual risk remains. E3 Advisory has also outlined precedents where these risks have materialised in major infrastructure delivery.

When benchmarking the contingency allowance MLPL falls comfortably within the range of benchmarks we have observed for HVDC projects internationally on a percentage of capital expenditure basis. The majority of the reference projects identified had an aggregate risk allowance ranging from 9% to 12% of capex with the project allowing for a 10% contingency.

Appendix A – Reference Projects

Aurecon assessed the Project's budgeted expenditures using a set of representative reference projects, drawing on both publicly available information and our industry experience. Given the global nature of HVDC equipment and subsea cable supply, interconnector projects presented in Table 7-3 below provide a suitable baseline for benchmarking overall project costs. Confidential offshore transmission projects were then utilised to refine the costs of individual packages.

Aurecon notes that the interconnector projects tend to require higher expenditures than offshore generation projects as a result of a lower appetite for commercial, contractual and technical risks.

Project specifications and references are provided in Table 7-3 below.

Table 7-3 Specifications of Reference Subsea Interconnector Projects

Ref.	Characteristics	Location	Project COD	Cable Supplier	HVDC Equipment Supplier
R1	1,400 MW, 525 kV - Offshore: 516 km; Onshore: 107 km	Germany - Norway	2020	Prysmian	Siemens Energy
R2	1,400 MW, 525 kV - Offshore: 560 km; Onshore: 160 km	UK - Norway	2021	Nexans	Hitachi Energy
R3	1,400 MW, 525 kV - Offshore: 625 km; Onshore: 135 km	UK - Denmark	2023	Prysmian	Siemens Energy
R4	700 MW, 320 kV - Offshore: 500 km; Onshore: 75 km	Ireland - France	2026	Prysmian	Siemens Energy

Overall Cost Benchmarks

Aurecon assessed the Project's budgeted expenditures using a set of representative reference projects, incorporating both publicly available data and Aurecon's industry expertise. Costs were normalised and anonymised in accordance with Aurecon's confidentiality requirements for the referenced projects.

We note that the project benchmarks are primarily European and reflects a different market environment with respect to procurement, transport and logistics costs, and market maturity. No reference project in Australia was used due to a lack of recent interconnector projects. While the local premium on the supply of equipment remains limited, local requirements impacting technical specifications would drive differences between reference projects. The limited economies of scale associated with MLPL's project capacity could also impact cost.

Normalised costs for subsea interconnector reference projects are provided in Table 7-4 below.

Table 7-4 Reference Subsea Interconnector Projects and Total Project Costs

Ref.	Publicly Disclosed CAPEX (original currency)	Total in COD ^[1] (converted in AUD)	Adjusted CAPEX in 2023 ^[2]
R1	1,800 €m (2020 price)	2,951 (2020 price)	3,416
R2	1,600 £m (2021 price)	3,137 (2021 price)	3,459
R3	2,000 €m (2023 price)	3,279 (2023 price)	3,279

Ref.	Publicly Disclosed CAPEX (original currency)	Total in COD\$ ^[1] (converted in AUD)	Adjusted CAPEX in 2023\$ ^[2]
R4	1,621 €m (2026 price)	2,657 (2026 price)	2,316

^[1] Total CAPEX disclosed by project owners converted into AUD using the following rates: AUD/GBP = 0.51, AUD/EUR = 0.61.

^[2] Total CAPEX disclosed by project owners converted into real 2023\$ based on the following inflation rates: 2020-2023 (5%), 2023-2026 (3%).

The typical package breakdown for subsea interconnector projects, as shown in Table 7-5, was defined to provide a rough order of magnitude for Project costs. While the accuracy of this breakdown is limited, it draws from data on completed and planned projects, helping to assess the relevance of cost inputs and the completeness of the scope of work.

Table 7-5 Typical Package Cost Split for International Subsea Interconnector Projects

Package	Typical Cost Split
Cable Design, Supply and Installation	45-60%
Converter Stations Equipment Design, Supply & Commissioning	14-20%
Converter Stations Civil Work	4-8%
Other costs	Residual balance

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