

# ASX Limited

Independent assessment of CHES  
Roadmap Program and CHES  
Roadmap Refresh

Second Six-Monthly Progress Report

20 June 2024

## PUBLIC REPORT DISCLAIMER

The findings contained in this Report dated 20 June 2024 are prepared by Ernst & Young at the request of ASX Limited solely for the purpose of providing an assessment of ASX's implementation of the CHES Roadmap and approach to updating the CHES Roadmap and is not appropriate for use for other purposes. This report is provided for information purposes only in order to provide details of the findings reported to the ASX Limited and should not be taken as providing specific advice on any issue, nor may this be relied upon by any party other than ASX Limited and ASX's regulators ASIC and the RBA. In carrying out our work and preparing this report Ernst & Young has worked solely on the instructions and information of ASX Limited and has not taken into account the interests or individual circumstances of any party other than ASX Limited and ASX's regulators ASIC and the RBA. Ernst & Young does not accept any responsibility for use of the information contained in this report and makes no guarantee nor accept any legal liability whatsoever arising from or connected to the accuracy, reliability, currency or completeness of any material contained herein. Ernst & Young expressly disclaims all liability for any costs, loss, damage, injury, or other consequence which may arise directly or indirectly from the use of, or reliance on, this Report.

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Full details of our assessments for ASX Roadmap initiatives relating to Security and some Operational and Continuity initiatives have not been included in this report due to commercial sensitivity.



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# 1. Executive Summary

## 1.1 Introduction

ASX is completing a program of work to sustain its current Clearing House Electronic Sub-register System (CHES) to ensure it remains operationally reliable until a new CHES replacement solution is implemented. This Program of work is known as the **CHES Roadmap**.

In October 2023, the Reserve Bank of Australia (RBA) issued its **Assessment of ASX Clearing and Settlement Facilities Report**. This report recommended ASX implements an annual process of updating the CHES Roadmap (**CHES Roadmap Refresh**). It also recommended ASX provides ASX boards and regulators with ongoing visibility of the CHES Roadmap, relevant risks, new initiatives, and measures to ensure continued compliance with the Financial Stability Standards (FSS), and to share the latest CHES Roadmap with the industry on an annual basis.

## 1.2 Our Scope

- A. **CHES Roadmap** - ASX engaged EY to conduct independent assessment activities over the implementation of the CHES Roadmap Program (also **the Program**) and produce six-monthly findings and recommendations reports. This Report is the second planned six-monthly report covering the period 1 November 2023 to 30 April 2024 (**Cycle 2**).
- B. **CHES Roadmap Refresh** - Our scope for this period includes an assessment of ASX's annual process for updating the CHES Roadmap and whether relevant matters outlined in RBA's Assessment of ASX Clearing and Settlement Facilities Report have been appropriately addressed.

## 1.3 Our Approach

Our activities included attending workshops with key stakeholders, and reviewing supporting artefacts, documentation, and evidence to assess:

- ▶ whether initiatives and deep dives completed by ASX in the reporting period are appropriate (adequately designed), executed (implemented as designed) and sustainable (continue to operate and address the CHES risk)
- ▶ the overall health of the Program (**Program health check**) including progress made and operating effectiveness of governance arrangements, and other program management practices supporting the execution of the Program
- ▶ the approach, outcomes and governance arrangements completed by ASX for its annual process for updating the CHES Roadmap (**CHES Roadmap Refresh**)

## 1.4 Our Conclusion

### CHES Roadmap

We found that ASX continues to operate appropriate governance and oversight arrangements for the CHES Roadmap. We found processes for ongoing monitoring and reporting are operating effectively, including status reporting, and the identification and treatment of risks.

ASX has satisfactorily addressed the recommendations from our Special Report Audit Report dated 31 May 2023 and First Progress Report dated 12 December 2023.

Our testing found that all initiatives tested in the period addressed our 'Appropriate' assessment criteria (9 of 9), and most of the initiatives tested addressed our 'Executed' assessment criteria (8 of 9) and 'Sustainability' criteria (7 of 10). Four initiatives which were partially addressed will be re-assessed in the next reporting period.

### CHES Roadmap Refresh

We found that ASX has addressed all matters specified by RBA. Specifically, ASX has designed and implemented an appropriate process for updating the CHES Roadmap annually (Roadmap Refresh) to include material upgrades and changes.

We found that ASX has conducted commensurate governance arrangements for the Roadmap Refresh to provide ASX Boards and regulators visibility of the CHES Roadmap, relevant risks, new initiatives, and measures to ensure continued compliance with the FSS.

### Overall Recommendations

We have three recommendations relating to the sustainability of Roadmap initiatives which, if implemented satisfactorily, should strengthen the embedment of controls to mitigate CHES risks.

## 1.5 Our Assessment Summary

The outcomes of our assessments and findings identified are summarised below.

### A. Independent assessment of the implementation of the CHES Roadmap Program

#### Assessment of the status and closure of CHES Roadmap initiatives

EY Assessment Cycle	Assessed as Appropriate	Assessed as Executed	Assessed as Sustainable
Cycle 1	9 of 9	9 of 9	N/A
Cycle 2	9 of 9	8 of 9 1 of 9 Partial	7 of 10 3 of 10 Partial
<b>Total to date</b>	<b>18 of 18</b>	<b>17 of 18</b> <b>1 of 18 Partial</b>	<b>7 of 10</b> <b>3 of 10 Partial</b>

Our assessment found that all initiatives except four fully addressed our assessment criteria.

Of the four partially addressed, one initiative partially addressed the 'Executed' assessment criteria and three initiatives partially addressed the 'Sustainable' assessment criteria. These initiatives will be re-assessed in the next reporting period.

We also assessed two business as usual (BAU) initiatives against our 'sustainability' criteria, and we did not identify any exceptions.

We have made two recommendations which relate to the partially addressed sustainability assessments, as follows:

1. We recommend ASX designs and implements controls for regularly monitoring third party performance against agreed service levels - refer to section 3.1.10 Initiative CC#13: New SCI MSA for VMS, HW, RDB Contract Agreement (Special Report Item O-5) for detailed recommendations.
2. We recommend ASX designs and implements processes to periodically review controls relating to two security initiatives.

**Assessment of the overall health of the Program (Program health-check)**

The following table summarises our Program health-check assessment results for this reporting period, across each of the assessed dimensions.

Program Dimension	Cycle 1 Assessment Rating	Cycle 2 Assessment Rating	Recommendation
1 Program Governance	●	●	None
2 Planning Management	●	●	None
3 Scope Management including Change Control	●	●	Refer to Section 3.3
4 Risk Management (Risks Assumptions Issues Dependencies)	●	●	None
5 Supplier / Third party Management	●	●	None
6 Quality Management	●	●	None
7 Confidence in Upcoming Initiatives	●	●	None

Our assessment found that ASX has continued to operate appropriate oversight and governance arrangements for the CHES Roadmap Program. The Program produces appropriate status and progress reporting for key stakeholders and actively monitors delivery and

delivered risks. Planning management is completed and periodically reviewed to manage resourcing contention and Program demands.

Following our Cycle 1 recommendation, the Program has implemented an improved scoping template for all new initiatives. ASX has not applied this to inflight initiatives. Consequently, clarity and specificity of scope definition remains areas for improvement, specifically for in-flight initiatives.

We have one recommendation in relation to the program health check, as follows:

3. **Scope management - We recommend ASX** adopts the scope template for in-flight initiatives, with particular focus on the business drivers, objectives, sustainability criteria (controls) and closure criteria (demonstrably delivered outcomes). The improved criteria should provide a clearer set of requirements to support initiative closure and quality attestations completed by Executive Owners.

**B. Assessment of ASX’s annual process for updating the CHES Roadmap (Roadmap Refresh)**

The following table provides a summary of our Roadmap Refresh assessment results against our assessment criteria.

Assessment Criteria	EY Assessment Rating
ASX’s CHES Roadmap Refresh and Roadmap Update Report has addressed relevant matters in relation to the support and maintenance of CHES	✓
The work undertaken by ASX supports the outcomes documented in the report	✓
ASX has conducted sufficient governance arrangements for the production of the CHES Roadmap Refresh and Roadmap Update Report	✓

We found that ASX has designed and implemented an appropriate process and governance arrangements for updating the CHES Roadmap

annually. Completion of the recent Roadmap Refresh has resulted in seven new initiatives being added to the Roadmap.

ASX plans to complete deep dives into Security, Third party Management and Business Continuity and Resilience as recommended in our Audit of ASX's Special Report on the support and maintenance of CHES (dated 31 May 2023). These deep dives are planned to be completed by August 2024, April 2025 and November 2025 respectively. Outcomes of the deep dives will inform the CHES risk assessment and Roadmap, including the addition of initiatives, if required.

### **Next Steps**

Our next Report is due in December 2024, and will include our assessment of:

- ▶ the progress of implementation of the CHES Roadmap in the associated reporting period,
- ▶ deep-dive assessment(s) performed by ASX on a specific topic related to a key risk area in the CHES risk profile,
- ▶ the sustainability of initiatives closed in previous reporting periods,
- ▶ the completion of any remediation actions from the assurance Program activities, including the recommendations from this Report.

We acknowledge ASX for its cooperation in undertaking our independent assessment activities to date.

## 2. Introduction

### 2.1 Background

On 28 April 2023, ASX Clear Pty Limited and ASX Settlement Pty (**CS Facility Licensees**) issued a special report on the support and maintenance of CHES (Special Report).

The Special Report outlined a Program of work (the CHES Roadmap) ASX intends to complete with the aim of ensuring CHES remains operationally reliable until the Go-Live of the CHES replacement system.

In October 2023, the Reserve Bank of Australia (RBA) issued its **Assessment of ASX Clearing and Settlement Facilities Report**. This report recommended ASX implements an annual process of updating the CHES Roadmap. The report also recommended ASX provides ASX boards and regulators with ongoing visibility of the CHES Roadmap, relevant risks, new initiatives, and measures to ensure continued compliance with the Financial Stability Standards (FSS), and to share the latest CHES Roadmap with the industry on an annual basis.

### 2.2 Scope

EY has been engaged by ASX to conduct independent assessment activities over the CHES Roadmap Program and CHES Roadmap Refresh Program and produce six-monthly findings and recommendations reports. This report is the second planned six-monthly report (**Cycle 2**).

The scope for this reporting period includes the following assessment activities:

A. Independent assessment of the implementation of the CHES Roadmap Program:

- ▶ An assessment of the status and closure of the initiatives included in the CHES Roadmap. Specifically, an assessment of the appropriateness and execution of nine CHES Roadmap initiatives completed by ASX within this reporting period (1 November 2023 to 30 April 2024), and a sustainability assessment for 10 initiatives.
- ▶ A review of a sample of BAU initiatives completed alongside the CHES Roadmap Program. These initiatives have been defined to contribute to the uplift of the current CHES control environment.
- ▶ A review of the progress of ASX's completion of deep-dive reviews on specific topics related to key risk areas in the CHES risk profile (including business continuity and resilience, security and third party management).
- ▶ A review of the overall health (health-check) of the CHES Roadmap Program, including implementation progress and an assessment of the proposed scope and objectives for any new initiatives ASX has added to CHES Roadmap.

B. Assessment of ASX's annual process for updating the CHES Roadmap (Roadmap Refresh):

This includes an assessment of ASX's approach to preparing the CHES Roadmap Refresh and Roadmap Update Report and whether the following relevant matters outlined in RBA's Assessment of ASX Clearing and Settlement Facilities Report have been appropriately addressed:

- ▶ By 30 June 2024, implement a robust annual process of updating the CHES Roadmap to ensure that all planned upgrades and material changes to the current CHES are incorporated,
- ▶ Provide ASX boards and the regulators with ongoing visibility of the CHES Roadmap, relevant risks, new deliverables and measures to ensure continued compliance with the FSS,
- ▶ Share the latest CHES Roadmap with the industry at least on an annual basis.

## 2.3 Approach

To complete our assessment, we performed the following activities:

1. **Documentation review:** Review and analysis of the CHES Roadmap Program and CHES Roadmap Refresh governance documentation. In addition, review and analysis of artefacts, inputs, deliverables and other documentation evidencing closure of initiatives completed by ASX in the reporting period. A list of documentation reviewed can be found in Appendix B.
2. **Independent Testing:** Independent testing of ASX artefacts, inputs and deliverables to determine the completeness and appropriateness of the activities performed by ASX. This includes reconciliations of ASX deliverables against EY standards and industry practices.
3. **Roadmap Initiative and Program Health-check Workshops:** Workshops were held with key ASX stakeholders to understand the actions taken by ASX to complete Program initiatives and manage the ongoing operation of the Program.

This includes Program delivery dimensions including planning, change management, risk management, quality management and third party management. Refer to Appendix A for a summary of workshops held.

4. **Stakeholder Interviews:** Interviews with stakeholders were held to understand the inputs, basis, approach and outcomes of the CHES Roadmap Refresh. Key stakeholders interviewed included ASX Group directors (in particular, the directors of the CS Facility Licensees and ASX Technology Board Committee), executives, program leads, and operational risk staff involved in the CHES Roadmap Refresh. Refer to Appendix A for a list of stakeholders interviewed.
5. **Observation of CHES Roadmap Program Meetings:** We attended ASX workshops and forums to understand the overall progress and updates to the CHES Roadmap Program including the CHES Roadmap Refresh. As part of our observation of these meetings, we considered the appropriateness of stakeholder attendees, the meeting input and outputs and the level of discussions and judgement exercised within these meetings. The forums and meetings attended included the Current CHES Delivery Leadership Meeting, the CHES Roadmap Program Strategic Guidance Group (SGG) and CHES Roadmap Refresh workshops.

We applied defined assessment criteria and ratings to reach our assessment outcomes, as follows:

### A. Assessment of the implementation of the CHES Roadmap Program

#### Assessment criteria and ratings for CHES Roadmap initiatives and deep-dive reviews

We assessed each initiative, including deep-dive reviews, in scope for the period of this Report against the following criteria:

- 1) **Appropriate: Has the initiative (and associated actions) been designed effectively to address the identified CHES risk?**

Yes  / No  / Partially Addressed 



2) **Executed: Has the initiative (and associated actions) been implemented as designed?**

Yes  / No  / Partially Addressed 

3) **Sustainable: Is the initiative (and associated actions) sustainable? As part of the completion of the initiative, has ASX designed and implemented measures (e.g. controls) to continue to address the identified CHESSE risks?**

Yes  / No  / Partially Addressed 




The assessment criteria described above determines if the initiative was fully, partially, or not appropriately addressed. Our determination of 'partially addressed' is based on professional judgement of the extent of completion of the initiative relative to the risk (e.g., subset of initiative actions not demonstrably completed, gaps or missing aspects of the initiative design and / or implementation to effectively mitigate the risk). Refer to section 3 for details of the findings and recommendations from our assessment per defined assessment criteria and to Appendix C for further details of the definitions of the assessment criteria.

**Assessment criteria and ratings for CHESSE Roadmap health-check**

Our health-check assessment criteria considered the operating effectiveness of the Program against relevant ASX delivery frameworks and/or policies, and industry practices.

We assessed the Program across the following Program delivery dimensions; governance, planning management, scope and change management, risk management, suppliers and third party management and quality management.

We applied the following assessment ratings to each of the Program dimensions:

Assessment Rating	Assessment Rating Description
	Established in terms of design and execution of design. Minimal opportunities identified to strengthen the design and/or execution of the Program dimension.
	Evolving in terms of design and/or execution of design. Moderate opportunities for consideration to strengthen the design and/or execution of Program dimension.
	Requires significant enhancement. Basic and/or significant opportunities required to strengthen the design and/or execution of Program dimension.
N/A	Not assessed

Refer to section 3 for details of the findings and recommendations per defined assessment criteria.

**B. Assessment of ASX's annual process for updating the CHESSE Roadmap (Roadmap Refresh)**

Our CHESSE Roadmap Refresh assessment criteria is designed to assess whether ASX's approach for the annual CHESSE Roadmap Refresh and Roadmap Update Report is appropriately designed and executed to address relevant matters outlined in the RBA's Assessment of ASX Clearing and Settlement Facilities Report.

Specifically, we assessed whether:

- 1) ASX's CHES Roadmap Refresh and Roadmap Update Report has addressed the relevant matters in relation to the support and maintenance of CHES (refer to section 2.2 further details),
- 2) The work undertaken by ASX supports the outcomes documented in the report, and
- 3) ASX has conducted sufficient governance arrangements for the production of the CHES Roadmap Refresh and Roadmap Update Report.

We determined whether each of the criteria was fully, partially, or not appropriately addressed.

Our determination of 'partially addressed' is based on professional judgement of the extent to which ASX demonstrably met the criteria.

## 2.4 Limitations

We draw attention to the limitations inherent in this report:

Our work was not performed in accordance with generally accepted auditing, review, or other assessment standards in Australia and accordingly does not express any form of assurance.

This report does not constitute legal opinion or advice. We have not conducted a review to detect fraud or illegal acts.

The work undertaken is substantially less in scope than an audit conducted in accordance with Australian Auditing Standards and consequently does not express an audit opinion.

Our work does not assume any responsibility for any third party products, Programs or services, their performance or compliance with ASX specifications or otherwise.

Our work did not intend to identify, address, or correct any errors or defects in ASX computer systems, other devices, or components thereof, whether or not due to imprecise or ambiguous entry, storage, interpretation, or processing or reporting of data. We are not responsible for any defect or problem arising out of or related to data processing in any systems in relation to CHES.

Due to the inherent limitations of any internal control structure, it is possible that fraud, error or non-compliance with laws and regulations may occur and not be detected. Further, the internal control structure, within which the control procedures operate, has not been reviewed in its entirety and, therefore, no opinion or view is expressed as to the effectiveness of the greater internal control structure. Our work is not designed to detect all weaknesses in control procedures as it is not performed continuously throughout the period and the tests performed on the control procedures are on a sample basis. Any projection of the evaluation of control procedures from our sustainability assessment in this reporting period is subject to change in future reporting periods. This is because changes in conditions may impact the extent to which these control procedures operate as intended.

The Security of Critical Infrastructure Act 2018 restricts the disclosure of information by ASX.

EY has not completed any evaluation procedure with regards to ASX's assessment of compliance with the Security of Critical Infrastructure Act 2018.

Full details of our assessments for ASX Roadmap initiatives relating to Security and some Operational and Continuity initiatives have not been included in this report due to commercial sensitivity.

## 2.5 Use and disclosure of our reports

We are providing specific advice only for this engagement and for no other purpose and we disclaim any responsibility for the use of our advice for a different purpose or in a different context.

If ASX plans to use this advice on another transaction or in another context, please let us know and provide us with all material information so that we can provide advice tailored to the appropriate circumstances.

Our Reports may be relied upon by ASX and ASX's regulators ASIC and the RBA for the purpose outlined in the SOWs dated 27 November 2023 and 14 March 2024.

We understand that ASIC and the RBA, and ASX may issue a media release and/or a public report referring to or publishing the content of our Reports and may make public or issue our Reports or a summary of the content of our Reports. We consent to ASIC and the RBA, and ASX publishing our Reports.

For the avoidance of doubt, no other party other than ASX, ASIC and the RBA may rely on the Reports. We disclaim all responsibility to any such other party for any loss or liability that the other party may suffer or incur arising from or relating to or in any way connected with the contents of our Reports, the provision of our Reports to the other party or the reliance upon our report by the other party.

### 3. CHES Roadmap Program Findings and Recommendations

Detailed below are the findings and recommendations for our assessments completed during this period. This includes our assessments of:

1. The appropriateness and execution of nine CHES Roadmap initiatives completed by ASX within this reporting period (1 November 2023 to 30 April 2024) and a sustainability assessment for 10 CHES Roadmap initiatives,
2. A sample of BAU initiatives completed alongside the CHES Roadmap Program, which have been defined to contribute to the uplift of the current CHES control environment,
3. Deep-dive reviews on specific topics, and
4. Overall health-check of the progress of implementation of the CHES Roadmap.

### 3.1 Assessment of CHES Roadmap initiatives

Detailed below are the findings and recommendations for our assessment of the CHES Roadmap initiatives in scope for the period of this Report. Our assessment of eight CHES Roadmap initiatives relating to Security and Operational and Continuity are not detailed in this report due to commercial sensitivity.

#	Initiative ID	CHES Roadmap Reference ID	Initiative Name	Appropriate	Executed	Sustainable
1	CC09_M17	O-16	HSM Go Live	✓	✓	✓
2	CC09_M18	O-11	Monitoring application - System Watchdog (application upgrades)	✓	✓	✓
3	CC#11a	O-3	CHES - capacity & performance improvements (test only)	✓	✓	N/A*
4	CC#40	O-2	Establish Enterprise 'Availability and Capacity Management Framework'	✓	●	N/A*
5	CC#55	C-4	CHES- Review backup and restore processes	✓	✓	N/A*
6	CC#56	C-5	CORE - Review the backup and restore processes	✓	✓	N/A*
7	CC#13	O-5	New SCI MSA for VMS, HW, RDB Contract Agreement	✓ (Cycle 1)	✓ (Cycle 1)	●
8	CC#39	O-1	Develop a new model for forecasting future trading growth	✓ (Cycle 1)	✓ (Cycle 2)	✓
9	CC09_M10	O-6	Front End Server Go Live (1st business day after implementation)	✓ (Cycle 1)	✓ (Cycle 1)	✓

Legend: Yes ✓ / No ✗ / Partially Addressed ●

*\*Sustainability not applicable for this initiative in this reporting period as the initiative is either a one-off activity performed by ASX or is yet to meet the minimum operating time threshold for testing (i.e. 3 months). For those pending the minimum operating time threshold, the initiative may be assessed on the sustainability criteria in the next reporting period. For the initiatives in-scope for this reporting period, we have determined that the sustainability criteria will be tested in the next reporting period based on the recent implementation of these initiatives.*

## Findings and Recommendations

### Initiatives Assessed for Appropriateness and Execution

#### 3.1.1 Initiative CC09\_M17: HSM Go Live (Special Report Item O-16)

##### Context

Hardware Security Module (HSM) devices are hardware devices that manage the generation, storage and processing (including encryption and decryption) of cryptographic keys to authenticate to systems and supporting infrastructure. The scope of this initiative was to upgrade the HSM devices from Luna devices to Payshield devices due a planned end of vendor support in March 2024. ASX uses Unicenter System Watchdog (known as 'System Watchdog'), to monitor the operational performance and availability of the Payshield devices. Additionally, ASX performs an annual review of all CHES-related assets (including infrastructure, hardware and supporting platforms) to identify aging assets (i.e. assets that are nearing end of life or may be nearing end of vendor support) and corresponding remediation actions (e.g. asset replacement, upgrade and/or extension of vendor support).

##### Procedures Performed

We inquired with ASX to understand the requirements of the HSM upgrade and reviewed supporting artefacts to confirm that the upgrade was completed successfully. This included a review of the implementation readiness document, testing results and decommission certificates of the Luna devices. We also reviewed the go-live meeting minutes to ensure the Go/No-Go decision for the implementation of the Payshield devices had been reviewed and approved by key stakeholders.

We reviewed screenshots from System Watchdog to evidence the ongoing monitoring of the Payshield devices and a sample alert that is received when a Payshield device is unavailable. We reviewed supporting artefacts to assess the design and coverage of the aged assets control for the new Payshield HSM devices.

##### Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design, execution, or sustainability of the initiative.

#### 3.1.2 Initiative CC#09\_M18: Monitoring application - System Watchdog (application upgrades) (Special Report Item O-11)

##### Context

ASX uses System Watchdog to monitor the operational performance of the CHES application and operating system (an OpenVMS platform). Events that are monitored through System Watchdog include, but are not limited to, network connectivity, batch job failures, CPU errors and memory errors. Due to a planned end of vendor support, the scope of the initiative was to upgrade the operating system and hardware components of System Watchdog. Other activities included in the scope of this initiative pertain to setting up System Watchdog at ASX's Secondary Data Centre and upgrading the operating system and hardware of HP Insight Remote Support (HPIRS), the tool that monitors the performance of the CHES and CORE hardware. ASX performs an annual review of all CHES-related assets (including infrastructure, hardware and supporting platforms) to identify aging assets (i.e. assets that are nearing end of life or may be nearing end of vendor support) and corresponding remediation actions (e.g. asset replacement, upgrade and/or extension of vendor support).

## Procedures Performed

To perform our assessment, we inquired with ASX and reviewed supporting artefacts to confirm that the activities were completed successfully per the implementation plan and that vendor support was in place. We also considered whether pre and post connection testing was conducted and reviewed the go-live meeting minutes to ensure the Go/No-Go decision had been reviewed and approved by key stakeholders. We made enquiries with ASX and reviewed supporting artefacts to assess the design and coverage of the aged assets review control.

## Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design, execution, or sustainability of the initiative.

### 3.1.3 Initiative CC#11a: CHES - capacity & performance improvements (test only) (Special Report Item O-3)

#### Context

The scope of this initiative was to conduct a stress test on the CHES application to address the following recommendations from the Reserve Bank of Australia's (RBA) Financial Stability Review (published in October 2023):

- ▶ Provide regulators with the details of capacity bottlenecks identified during breakpoint stress tests and,
- ▶ Test the effect on performance if daily trading volumes increase to 15 million, identify key bottlenecks and communicate the results to the ASX boards and the regulators.

## Procedures Performed

To perform our assessment, we inquired with ASX to understand the design, scope, approach, execution and results of the stress test of the CHES application. We reviewed key supporting artefacts including the stress test plan and the testing execution documents to determine that the stress test was conducted in line with the plan. We considered testing components including key assumptions, limitations and key data inputs. We reviewed the data that was used in the stress test and how ASX ensured the completeness of this data. We also reviewed the final stress test report and evidence of review from ASX Management.

## Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design or execution of the initiative.

### 3.1.4 Initiative CC#40: Establish Enterprise 'Availability and Capacity Management Framework' (Special Report Item O-2)

#### Context

The scope of this initiative was to define ASX's enterprise-wide availability and capacity management framework (based on COBIT principles) and embed this framework within CHES. The key deliverables of this initiative include the following:

- ▶ An availability and capacity management policy,
- ▶ A process document to support the availability and capacity management policy, and

- ▶ Evidence to demonstrate the embedment of the framework within CHES

### Procedures Performed

We reviewed ASX's enterprise availability and capacity management framework against the COBIT principles. We inquired with ASX to understand application of the enterprise frameworks to CHES.

### Findings

Our assessment found that ASX has developed an enterprise-wide availability and capacity management framework that is aligned to COBIT principles. This framework specifies the requirement for business requirement gathering activities and monitoring activities over defined service level agreements and key performance indicators. However, we noted at the time of our assessment, the enterprise-wide availability and capacity management framework had not been embedded for CHES.

Since our initial assessment, ASX has defined a new CHES Roadmap initiative (CC#40b - Embedding Capacity & Availability Framework to CHES) to complete this activity with a planned completion date by 30 July 2024. We expect this initiative will define and embed CHES-specific availability and capacity policies and processes, aligned to the new enterprise-level availability and capacity management framework. We expect to assess this initiative in Cycle 3.

## 3.1.5 Initiative CC#55: CHES - Review backup and restore processes (Special Report Item C-4)

### Context

The scope of this initiative required ASX to perform a review of the current CHES backup policy to align with the backup requirements per the RBA's Reserve Bank Information and Transfer System (RITS) standards (as of December 2022).

These standards outline requirements for RITS members, including ASX, to ensure the continuation of payment operations during adverse conditions to minimise disruption to other parties.

### Procedures Performed

To perform our assessment, we inquired with ASX to understand how the review of the CHES backup policy against the RITS Business Continuity and Security Standards was conducted. We reviewed ASX's reconciliation assessment documentation and noted ASX's identification of two amendments to the CHES backup policy:

1. The requirement to perform an annual restoration test of backups
2. The requirement for CHES online backups to be indelible and immutable. Note that this requirement has been addressed through another initiative which we have assessed. Our assessment is not detailed in this report due to commercial sensitivity.

We also reviewed supporting artefacts to confirm that ASX had updated the CHES backup policy and had performed the backup restoration test to comply with the updated policy. This included a review of the previous and current versions of the CHES backup policy, evidence of review and approvals from key stakeholders and evidence of the completion of the backup restoration test.



Further, we confirmed that ASX had also performed a review of the CHES backup policy against the December 2023 version of the RITS Standards and identified no further updates required to the CHES backup policy.

### Findings

We did not identify any exceptions in the appropriateness of the design or execution of the initiative.

### 3.1.6 Initiative CC#56: CORE - Review the backup and restore processes (Special Report Item C-5)

#### Context

The scope of this initiative required ASX to perform a review of the current CORE backup policy to align with the backup requirements per the RBA's Reserve Bank Information and Transfer System (RITS) standards (as of December 2022). These standards outline requirements for RITS members, including ASX, to ensure the continuation of payment operations during adverse conditions to minimise disruption to other parties.

#### Procedures Performed

We inquired with ASX to understand how the review of the CORE backup policy against the RITS Business Continuity and Security Standards was conducted. We reviewed ASX's reconciliation assessment documentation and noted ASX's identification of two amendments to the CHES backup policy:

1. The requirement to perform an annual restoration test of backups
2. The requirement for CORE online backups to be indelible and immutable.

Note that this requirement has been addressed through another initiative which we have assessed. Our assessment is not detailed in this report due to commercial sensitivity.

### Findings

Our assessment found that while the CORE back-up policy was updated, at the time of our initial assessment, ASX had not conducted nor planned to conduct the required back-up test due to a planned decommissioning of CORE in March 2025.

We acknowledge that, since our initial assessment, ASX has conducted the full backup and restoration test for CORE as of April 2024. We reviewed the supporting artefacts and did not identify any exceptions in the execution of this activity.

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design or execution of the initiative.

### Initiatives assessed for Sustainability

The following initiatives were assessed against our 'Appropriate' and 'Executed' assessment criteria in Cycle 1. In this reporting period, we have assessed these initiatives against the 'Sustainability' assessment criteria. Refer to the summary assessment tables in section 3.1 for details of the assessment outcomes from Cycle 1.

#### 3.1.7 Initiative CC#13: New SCI MSA for VMS, HW, RDB Contract Agreement (Special Report Item O-5)

##### Context

The CHES operating system, database and supporting hardware is managed and maintained by an external service provider, Software Concepts International (SCI). As per the Statement of Work (SOW) signed, SCI is required to provide ASX with monthly performance reports showing its performance against the agreed Service Levels.

##### Procedures Performed

We inquired with ASX to understand its process and controls for reviewing SCI's monthly performance reports. We also reviewed a sample of SCI's performance reports for the months of November 2023 and January 2024 against the service levels defined in the signed SOW.

##### Findings

We found that there is no formal control to monitor SCI's performance on a monthly basis. However, ASX stated that informal reviews of SCI's reports may be carried out by management and regular interaction with SCI in the business-as-usual environment would be used to manage performance issues should they arise. We found the SCI reports sampled did not include performance reporting for all agreed Service Levels.

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Since our initial assessment, ASX has established monthly meetings with SCI to discuss ongoing operations and has requested SCI to report against all agreed Service Levels in its monthly report.

##### Risk

The risk of not performing periodic reviews of the performance of an external service provider could result in the inability of ASX to appropriately monitor and validate SCI's performance against its contractual obligations and SLs.

##### Recommendation

We recommend that ASX formally defines and documents the monthly performance monitoring control to review the SCI performance reports. This includes defining control attributes, control owner, control frequency, and exceptions. As part of the design of the control, we recommend ASX to ensure all service levels defined in the SOW are reflected in the SCI performance reports.

#### 3.1.8 Initiative CC#39: Develop a new model for forecasting future trading growth (Special Report Item O-1)

##### Context

The scope of the initiative resulted in the development and deployment of a model in October 2023 that forecasts future trading growth processed by all Australian Market Operators (AMOs) for Clearing and Settlements. ASX has designed and implemented controls relating to the preparation (known as pre and post distribution activities), execution, ongoing maintenance and reporting of the future trade volume forecast and capacity model.

Due to the different control frequencies defined by ASX, our assessment is limited to the controls that have operated in the reporting period. Our assessment excludes controls that have a bi-annual frequency (i.e. controls relating to the maintenance of the trade volume forecast and capacity model) as the control is expected to be performed in September 2024.

### Procedures Performed

To perform our assessment, we reviewed the control design through a sample of one per control that has operated in the reporting period. Key supporting artefacts reviewed included emails to confirm ASX's review over the completeness and accuracy of the data inputs into the pre and post distribution activities. Additionally, we reviewed reconciliation analysis documentation and reporting artefacts to confirm the execution and reporting of the future trade volume forecast and capacity model.

### Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the sustainability measures performed by ASX.

## 3.1.9 Initiative CC09\_M10: Front End Server Go Live (1st business day after implementation) (Special Report Item O-6)

### Context

This initiative involved an upgrade of the CHES front-end server operating system and hardware to ensure continued performance and supportability of CHES.

ASX has defined the following activities to monitor the availability of the CHES front-end servers:

- ▶ Use of System Watchdog, an automated monitoring tool that monitors the operational performance and availability of CHES components, including the front-end operating system servers
- ▶ An annual review of all CHES-related assets (including infrastructure, hardware and supporting platforms) to identify aging assets (i.e. assets that are nearing end of life or may be nearing end of vendor support) and corresponding remediation actions.

### Procedures Performed

We inquired with ASX to understand the use of System Watchdog to monitor the CHES front-end servers. For a sample of monitored events (including server disk space, failure of automated processes), we reviewed the System Watchdog configuration and the corresponding alert notification. We also inquired with ASX to understand how the annual review for CHES-related assets is conducted, the data inputs used in the review and the key approvals required. We reviewed key data inputs and outputs of this annual review, including the Cormant extract, which details all CHES-related assets, the working paper used by ASX to identify aging assets and the CHES Aged Asset Roadmap. We also reviewed ASX's mechanism to monitor the progress of remediation actions through JIRA.

### Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design or execution of the sustainability measures performed by ASX.

## 3.2 Assessment of BAU initiatives

Detailed below are the findings and recommendations for our assessment of sampled BAU initiatives in scope for the period of this Report. These BAU initiatives were assessed against our 'Appropriate' and 'Executed' assessment criteria in Cycle 1. In this reporting period, we have assessed these initiatives against the 'Sustainability' assessment criteria.

#	Initiative ID	CHES Roadmap Reference ID	Initiative Name	Appropriate	Executed	Sustainable
1	CC#24	N/A - BAU initiative	CHES AIC increase	✓ (Cycle 1)	✓ (Cycle 1)	✓
2	CC#47	N/A - BAU initiative	Improve the Software Change Request (SCR) Process document for CHES	✓ (Cycle 1)	✓ (Cycle 1)	✓
3	CC#43	N/A - BAU initiative	CHES - Oracle to confirm RDB architecture roadmap in support of CHES	✓ (Cycle 1)	✓ (Cycle 1)	N/A - confirmed with ASX that this initiative is not applicable for our sustainability assessment due to the nature of the initiative and therefore not applicable for this report
4	CC#50	N/A - BAU initiative	Updating of documentation associated with CHES Application user rights	✓ (Cycle 1)	✓ (Cycle 1)	N/A - confirmed with ASX that this initiative is not applicable for our sustainability assessment due to the nature of the initiative and therefore not applicable for this report

Legend: Yes ✓ / No ✗ / Partially Addressed ●

## Findings and Recommendations

### 3.2.1 Initiative CC#24: CHES AIC increase (BAU Item)

#### Context

Access Identification Code (AIC) is a unique identifier assigned to a client (such as brokers), at the time of onboarding the client to CHES. The scope of the initiative resulted in an increase to the AIC limit from 400 to 600. ASX has defined configurations in CHES to automatically monitor the number of available AICs against the AIC limit.

#### Procedures Performed

We inquired with ASX to understand how the number of available AICs are monitored. We reviewed screenshots from the CHES production environment to confirm that CHES has been configured to monitor the number of available AICs against a defined threshold (i.e. 90% capacity). We also reviewed a sample of the daily automated email alerts sent to the CHES Application Support Team regarding the AIC availability status. We also found that should the AIC limit reach the capacity threshold, the CHES Application Team has a defined procedure to engage with the CHES Engineering Team to increase the AIC limit.

#### Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design or execution of the sustainability measures performed by ASX.

### 3.2.2 Initiative CC#47: Improve the Software Change Request (SCR) Process document for CHES (BAU Item)

#### Context

This initiative required ASX to update its Software Change Request (SCR) Process document for CHES to align with changes made to enterprise-wide policies and procedures relating to ASX's operating model. ASX has defined an annual review control over the completeness and appropriateness of the SCR Process document.

#### Procedures Performed

We inquired with ASX to understand how the annual review of the SCR Process document is conducted, including the identification and implementation of required changes and the key stakeholders involved in the review. We inspected the March 2024 sample of the annual SCR Process document review and noted sign-off from appropriate stakeholders were provided. We reviewed a sample of CHES software change requests, including testing and approval evidence which demonstrated the embedment of the SCR process into CHES. The evidence reviewed showed that four stage-gate approvals had been configured in CHES to ensure the appropriate sign-off of the change prior to deployment into the production environment.

#### Findings

Based on our assessment of the information provided by ASX, we did not identify any exceptions in the appropriateness of the design or execution of the sustainability measures performed by ASX.

### 3.3 Deep-dive reviews on specific topics

#### Context

Our 2023 Audit of ASX's Special Report recommended ASX should perform deep-dive reviews on specific topics related to key risk areas in the CHES risk profile including business continuity and resilience, security, and third party management.

The purpose of the deep-dive reviews is to assess current CHES risks and controls against common industry better practices and guidance provided by local regulatory requirements and international standards.

#### Market Management Scenario Fire Drill

##### Context

In February 2024 ASX developed a set of Market Management Guiding Principles designed to formalise ASX's existing tools and approaches, and to provide a paradigm for decision making in the event of an exceptionally high-volume trading day.

In April 2024 ASX conducted a 'Market Management Scenario Fire Drill' (**Fire Drill**). The purpose of the Fire Drill was to test ASX's management and internal decision-making process during an event of extreme trade volumes in the CHES operating environment based on ASX Market Management Principles (**the 'Principles'**).

##### Procedures Performed

We assessed the design of the Fire Drill to determine whether it aligned the objectives set by Management, provided coverage across impacted teams and considered a reasoned 'extreme' set of trading conditions to work against.

We also assessed documentation relating to the execution of the Fire Drill and considered whether the approach was followed, outputs and conclusions of the exercise were captured, and a clear set of recommendations established.

##### Findings

Our testing found that the scope and approach was appropriately designed in the context of testing the resilience of ASX's internal management and decision-making processes.

We found that the approach considered the end-to-end process of an extreme trade volume event, communication requirements to external stakeholders (i.e. participants, Approved Market Operators (AMOs) and regulators), and included the involvement of appropriate teams across the organisation (e.g. S&P Operations Team, S&P Technology Team, Legal and Clearing Risk Policy and Credit).

We found that the Fire Drill was conducted in line with the plan. The intra-day market scenarios (i.e. the ratcheting up of backlog times, processing rates etc) were executed in a manner that created natural decision-points and tested Management's understanding of the application of the Principles, how teams would be required to interact, as well as confirm external communication points.

Whilst the Fire Drill tested Management's understanding of the Principles and helped highlight what steps would be required, it was not designed to replicate or test the actual execution of the responses / activities required throughout the day. We see this Fire Drill as a foundation step in the broader scenario planning process/maturity journey. Post implementation of the Fire Drill recommendations (see below), logical next steps would include the extension of the scenario to cut across a further trading day and consideration to testing (executing) some of the operational steps in real-time, to identify any bottlenecks/key-person risk.

We found that the six action items identified by the Fire Drill were consistent with our understanding of the outcomes of the Fire Drill and partly highlighted the need to more formally document some of the processes/procedures (which were known across participants).

### **Security, Third Party Management and Business Continuity and Resilience**

The security, third party management and business continuity and resilience deep dives planned for completion by August 2024, April 2025 and November 2025, respectively. These dates are in line with our expectations for completion of the deep dives by December 2025. Outcomes of the deep dives will inform the CHES risk assessment and Roadmap, including the addition of initiatives, where required.

As at the time of this report, ASX has developed the scope for the security deep dive. We have reviewed this planned scope and our assessment findings have been reported to ASX and its regulators.

ASX has not formally scoped the deep dives into third party management and business continuity and resilience deep dives. We will review the scope documentation in future cycles once this has been defined.

When developing the scope of each deep dive, we expect ASX to incorporate practices aligned with relevant industry standards and Commonwealth obligations (such as the Security of Critical Infrastructure (SOCI) Act), and whilst ASX is not an APRA regulated entity, ASX should consider Capital Prudential Standard (CPS) 230 (Operational Risk Management). CPS 230 is designed to strengthen the management of operational risk, response to business disruptions and management of risks from service providers for all APRA-regulated entities.

CPS230 is broadly consistent with enhancements in business continuity, resilience and third-party risk management practices for Financial Market Infrastructure in other global jurisdictions.

### 3.4 Health-check of the CHES Roadmap Program

Detailed below are the findings and recommendations from our assessment of the overall health (**health-check**) of the CHES Roadmap Program during this period.

Program Dimension	Assessment Commentary	Cycle 1 Assessment Rating	Cycle 2 Assessment Rating
Program Governance	<p>Our assessment found that ASX has continued to operate an appropriate governance structure to oversee and manage CHES Roadmap Program.</p> <p>We attended established Program governance forums, including the fortnightly Current CHES Delivery Leadership meeting and the monthly Strategic Guidance Group (SGG) meeting. We also reviewed the papers and reports produced for these meetings. We observed that the overall status and progress of the Program is actively tracked and discussed within the governance forums. Attendees are provided with adequate reporting information and are actively engaged in discussions, providing appropriate challenge and direction as needed.</p> <p>The Program also leverages other existing ASX forums, including the Portfolio Business Review (PBR) and Portfolio Governance Group (PGG), to inform the wider business on relevant progress information.</p>	●	●
Planning Management	<p>Our assessment found that ASX has implemented and operated adequate planning management practises for the CHES Roadmap Program.</p> <p>We reviewed artefacts to confirm that the Program has considered appropriate factors when planning activities for the CHES roadmap (e.g., priority of initiatives based on delivered benefits and/or underlying CHES risks, and availability and capability of resources).</p> <p>We observed that significant Program planning activities and changes to the plan are discussed, ratified and/or agreed in relevant governance forums as required, such as the Strategic Guidance Group (SGG) and Current CHES Delivery Leadership meeting.</p> <p>Project Managers and Executive Owners are responsible for defining and managing detailed plans for their respective roadmap initiatives. Key milestone dates are captured within ASX’s management tracking and reporting system (Confluence) to enable consolidated planning at the Program level.</p>	●	●



Program Dimension	Assessment Commentary	Cycle 1 Assessment Rating	Cycle 2 Assessment Rating
	<p>We found that ASX has also continued to improve its planning capabilities. For example, it has recently developed and implemented a resourcing model to periodically assess the resourcing needs for Program. This resourcing model is reviewed by ASX monthly to identify resourcing needs across the Program and the wider Securities and Payment (S&amp;P) business, and actively manage resource contention.</p>		
<p>Scope Management including Change Control</p>	<p>Our assessment found that the Program’s scope management practices are evolving in terms of design and execution.</p> <p>Our Cycle 1 assessment recommended ASX uplifted its scoping documentation and guidance to help more effectively articulate the extent of the initiative’s coverage and establish clear measures for closure. We recommended the scope for each initiative should include an articulation of clear benefits and expected risk reduction, proposed outcomes (and associated deliverables), out-of-scope areas and closure criteria.</p> <p>The Program has taken steps to improve its scoping documentation. A scoping template (which includes high level guidance) has been designed and implemented for all new initiatives. The template requires initiative objectives, business drivers, scope, expected deliverables and closure criteria to be defined.</p> <p>ASX has not applied this scoping template for all inflight initiatives. Consequently, clarity and specificity of scope definition remains areas for improvement; specifically for in-flight initiatives where scope has not been retrospectively uplifted. Refer to Recommendations section below.</p>	<p>●</p>	<p>●</p>
<p>Program Risk Management (Risks, Assumptions, Issues and Dependencies)</p>	<p>Our assessment found that the Program continues to operate effective risk management practices to manage Program delivery and delivered risks.</p> <p>We observed, through attendance at monthly SGG and a sample of S&amp;P Delivery RAID review meetings (March 2024 and April 2024), that the Program’s RAID log is regularly reviewed, updated, and discussed. ASX management, including Program PMO and Roadmap initiative Project Managers, can (and do) appropriately escalate risks and issues via these forums for resolution. The fortnightly</p>	<p>●</p>	<p>●</p>

Program Dimension	Assessment Commentary	Cycle 1 Assessment Rating	Cycle 2 Assessment Rating
	<p>Current CHESS Delivery Leadership meeting also provides a forum for Program risks and issues to be discussed more frequently, as required.</p> <p>JIRA is ASX's enterprise-wide tool for recording and tracking RAID items. The Program PMO and Project Managers are responsible for updating this for CHESS Roadmap. Maintaining a single source of truth for RAID items via JIRA enables consistent reporting of Program risks at relevant governance forums. This was evidenced through our attendance at SGG and S&amp;P delivery RAID meetings, inspection of underlying artefacts such as SGG papers, and a review of a sample of JIRA entries. We also observed ASX takes periodic actions to validate RAID entries for completeness and accuracy, as required.</p>		
Supplier / Third party Management	<p>The CHESS Roadmap Program adheres to ASX's entity-wide vendor management framework and procurement policy. During this assessment period the Program engaged one 'critical' vendor to assist with the completion of Program deliverables.</p> <p>We inspected supporting artefacts evidencing that the Program managed the procurement and oversight of the vendor's services in line with ASX's entity-wide vendor management framework and procurement policy. We considered framework elements including vendor due diligence, service scoping requirements, legal and contract approvals, contract execution and contract governance arrangements.</p>	●	●
Quality Management	<p>Our assessment found that the Program's quality management practices are evolving in terms of design and execution.</p> <p>Our Cycle 1 assessment recommended ASX to apply a consistent and formal approval process across all initiatives to ensure that review and governance occurs by appropriate stakeholders and is evidenced. We recommended the establishment of a framework that outlines the necessary steps and criteria for approving deliverables and completing initiatives in a consistent manner.</p> <p>Following our Cycle 1 recommendations, ASX has enhanced its Quality Management process by defining and implementing a Program closure criteria matrix. This intends to ensure consistent review and governance steps occur for all initiatives.</p>	●	●

Program Dimension	Assessment Commentary	Cycle 1 Assessment Rating	Cycle 2 Assessment Rating
	<p>A collaborative PMO and Project Manager 'evidence completeness' review has also been introduced prior to Executive Owner (EO) sign-off. This intends to ensure all documentation needed to support EO sign-off has been saved to Confluence. Additionally, ASX has improved the EO self-attestation sign-off statement required for initiative closure. The attestation wording now includes more specificity on scope, completion, risks, and quality.</p>		
Confidence in Upcoming Initiatives	<p>Per ASX's internal reporting to SGG on 29 April 2024, there are four Program initiatives with a planned completion date by June 2024 and two Program Initiatives with a planned completion date by July 2024. Through observation of ASX's Program governance forums, we note that these initiatives remain on track for completion and have not identified any contradictory information that would impact the completion of these initiatives by the planned dates.</p> <p>Additionally, through observation of the fortnightly Current CHES Delivery Leadership meetings, we note that there are two Program initiatives that are currently tracking at risk. Our assessment has found that the Program continues to appropriately monitor the progress of these initiatives through these meetings, with relevant stakeholders actively engaged in discussions and action identified where required.</p>	●	●

## Recommendations

Our assessment identified one recommendation in relation to the overall health-check of the Program, as described below:



### Scope Management

**We recommend** ASX adopts the improved scope template and guidance for all in-flight initiatives, with mandatory requirements for the definition of business drivers, objectives, sustainability criteria (controls) and closure criteria (demonstrably delivered outcomes). This will help ensure clearer linkage between the initiative scope and the expected delivered outcomes which must be met upon initiative closure.


If applied to all initiatives, the improved scope and closure criteria definition should provide a clearer set of requirements for assessment by ASX during quality reviews and attestations completed by Executive Owners. Initiatives should not pass through these reviews unless the closure criteria has been evidenced.

## 4. CHES Roadmap Refresh Findings and Recommendations

Detailed below are the findings and recommendations from our assessment of ASX's CHES Roadmap Refresh and Roadmap Update Report produced during the period.

Assessment Criteria	Assessment Commentary	Assessment Rating
<p>ASX's CHES Roadmap Refresh and Roadmap Update Report has addressed relevant matters in relation to the support and maintenance of CHES</p>	<p><b>ASX's Process for updating the CHES Roadmap - design adequacy assessment</b></p> <p>ASX has developed a CHES Roadmap Report Process document which outlines the activities required to update the CHES Roadmap and produce the Roadmap Update report on an (at least) annual basis.</p> <p>We reviewed the process document and found that it defines appropriate activities for completion of the Roadmap Refresh and production of Report. These activities include performing a CHES risk assessment, identification, prioritisation, planning, implementation, and closure of CHES Roadmap initiatives, and accountability and governance arrangements for the refreshed Roadmap and Report. CHES initiatives are designed to address the current assessment of CHES risks and are categorised and monitored across five themes including security, reliability, resilience, integrity, and other.</p> <p>If implemented as designed, the process should ensure ASX addresses relevant matters in relation to the support and maintenance of CHES as part of its annual Roadmap Refresh.</p> <p><b>ASX's Process for updating the CHES Roadmap - implementation assessment</b></p> <p>We reviewed ASX's Roadmap Refresh Report (dated May 2024) and other artefacts evidencing the work completed by ASX for the Roadmap Refresh. We found that ASX has adequately addressed relevant matters in relation to the support and maintenance of CHES. We did not identify any significant exceptions in the process followed to complete the Roadmap Refresh and produce the report, compared to the process design.</p>	
<p>The work undertaken by ASX supports the outcomes</p>	<p><b>ASX's CHES Risk Profile Assessment</b></p> <p>We conducted stakeholder interviews, attended workshops and inspected related artefacts to understand ASX's process for refreshing the CHES risk profile.</p>	

Assessment Criteria	Assessment Commentary	Assessment Rating
documented in the report	<p>We compared ASX's CHES risk against EY's Process Risk and Controls (PRC) library to determine completeness of the identified CHES risks and controls. Our assessment did not identify significant gaps relating to the completeness of identified CHES risks.</p> <p>We also reviewed ASX's residual risk rating rationale and inputs relied on by ASX to support the residual risk ratings, such as status and impact of related issues, control effectiveness self-assessments, and the completion status of current Roadmap initiatives. We found that ASX had considered appropriate inputs in forming its residual risk rating assessments.</p> <p>We found that ASX has also considered relevant BAU activities in performing the CHES risk profile assessment. For example, matters reported to the S&amp;P Risk Working Group such as the outcomes of S&amp;P Line 1 Risk control testing for controls relevant to the identified CHES risks (including the status of remediation activities for gaps identified). For non-S&amp;P managed controls (e.g., enterprise-wide security controls) impacting CHES risk, the outcome of control testing activities as reported in the risk management tool (ERICA) was considered.</p> <p>ASX has scheduled three recommended deep dives into Security, Third party Management and Business Continuity and Resilience. The outcomes of the deep dives, once completed, will be used to update the CHES risk assessment and Roadmap, including the addition of new scope and/or initiatives, where required.</p> <p><b>Identification, planning and scoping of new CHES Roadmap Initiatives</b></p> <p>We conducted stakeholder interviews, attended workshops, and inspected related artefacts to understand ASX's process for identification and planning of new initiatives as part of the CHES Roadmap Refresh.</p> <p>We found that ASX assessed a 'backlog' list of S&amp;P work items against a set of prioritisation criteria based on 'business value' and 'ease of implementation' to determine if new initiatives should be included or excluded from the Roadmap. ASX mapped all Roadmap initiatives (including completed, in-flight, and new initiatives) against the identified CHES risks to illustrate Roadmap coverage relative to the risk. Where no initiatives were identified for medium and high rated risks, we found ASX had a reasonable basis for this (for example the residual risk rating was driven by other ASX systems, not CHES).</p>	

Assessment Criteria	Assessment Commentary	Assessment Rating
	<p>ASX identified 7 new initiatives for inclusion on the updated Roadmap. We reviewed the completed scoping templates for these initiatives and found that the scope, objectives, closure criteria and sustainability considerations were adequately designed and approved.</p> <p>Additionally, ASX has undertaken commensurate planning activities to support the Roadmap Refresh including scheduling, resourcing, and environment planning for the new initiatives. The outputs of this work have been socialised and agreed at appropriate governance forums including SGG.</p>	
<p>ASX has conducted sufficient governance arrangements for the production of the CHES Roadmap Refresh and Roadmap Update Report</p>	<p>We reviewed ASX's CHES Roadmap Report Process and found that ASX had defined commensurate governance arrangements for the CHES Roadmap Refresh and Roadmap Update Report.</p> <p>We attended SGG meetings for April and May 2024, and reviewed the associated papers and meeting minutes. We observed that SGG was provided with sufficient information relating to the Roadmap Refresh process, including the outcomes of the work undertaken and updates to the CHES Roadmap.</p> <p>We held interviews with a sample of executive stakeholders (i.e., Senior Management and Directors), including board members, to understand their views on CHES risks and the completeness and reliability of the CHES Roadmap Refresh and Roadmap Update Report.</p> <p>Lastly, we reviewed supporting artefacts and attestations completed by executive stakeholders in Atticus (ASX's enterprise-wide fact checking and verification software). We found that attestations were completed in line with the defined process.</p>	

## Appendix A Workshop and Interview Lists

### Appendix A1 CHES Roadmap Program

The table below outlines the workshops conducted with ASX stakeholders related to the CHES Roadmap Program.

Workshop Name	Attendees	Date of Workshop
Initiative Walkthrough Session (Initiative CC#24 & CC#47)	GM, Technology Infrastructure Software Engineering Manager, S&P, Technology	7 February 2024
Initiative Walkthrough Session (Initiatives CC09_M17)	Project Manager, S&P, Business Management & Planning Senior Manager, Technology CHES	8 February 2024
Initiative Walkthrough Session (Initiative CC#11a)	GM, Securities & Payments Technology Senior Project Manager, S&P, Business Management & Planning	9 February 2024
Initiative Walkthrough Session (Initiative CC#55, CC#56, CC#57 and CC#58)	Infrastructure Delivery Lead, Infrastructure GM, Technology Infrastructure	14 February 2024
Initiative Walkthrough Session (Initiative CC#13)	Head of Hosting Services, Infrastructure	14 February 2024
Initiative Walkthrough Session (Initiative CC#39)	Senior Project Manager, S&P, Business Management & Planning	15 February 2024
Initiative Walkthrough Session (Initiatives CC#40)	Senior Manager, Systems Integration & Critical Situations	16 February 2024
Initiative Walkthrough Session (Initiative CC#19)	Senior Project Manager, S&P, Business Management & Planning	21 February 2024
CHES Roadmap Program Workshop - Resource Management	GM, Business Management & Planning Senior Delivery Manager S&P	21 February 2024
CHES Roadmap Program Workshop - Program Governance and Planning	Program Manager, Equities, S&P	22 February 2024
CHES Roadmap Program Workshop - Risk Management and Upcoming Items	Program Manager, Equities, S&P	28 February 2024
CHES Roadmap Program Workshop - Scope and Quality Management	Program Manager, Equities, S&P	8 March 2024
Initiative Walkthrough Session (Initiative CC09_M10)	Senior Manager, Technology CHES GM, Securities & Payments Technology	13 March 2024
Initiative Walkthrough Session (Initiative CC09_M18)	Project Manager, S&P, Business Management & Planning Senior Manager, Technology CHES	3 April 2024



## Appendix A2 CHES Roadmap Refresh

The table below outlines the workshops and interview conducted or observed with ASX stakeholders related to the CHES Roadmap Refresh.

Workshop Topic	Attendees	Date of Workshop
Planning Workshop - FY25 Budget and Annual Business Planning	GM, Business Analysis & Delivery GM, Business Management & Planning GM, Equities GM, Securities & Payments Operations	GM, Securities & Payments Technology Head of Issuer Services Program Manager, Equities, S&P
Planning Workshop - S&P Resource Review	GM, Business Analysis & Delivery GM, Business Management & Planning	GM, Securities & Payments Technology Senior Delivery Manager S&P
Risk Workshop - CHES Risk Assessment	GM, Business Management & Planning Senior Manager, Risk & Compliance	
Governance and Planning Workshop - CHES Roadmap Update Workshop	GM, Business Analysis & Delivery GM, Business Management & Planning GM, Equities	GM, Securities & Payments Operations GM, Securities & Payments Technology Program Manager, Equities, S&P
CHES Roadmap Refresh Annual Process Deep Dive	GM, Business Analysis & Delivery GM, Business Management & Planning	Program Manager, Equities, S&P GM, Equities

Interviews with ASX Management	
Attendees	Date
GM, Business Management & Planning	8 April 2024
GM, Equities	9 April 2024
GM, Business Analysis & Delivery	10 April 2024

Interviews with ASX Executives	
Attendees	Date
Chief Information Officer	12 April 2024
Chief Information Security Officer	16 May 2024
Chief Risk Officer	1 May 2024
Group Executive, Securities & Payments	29 April 2024
Managing Director & CEO	2 May 2024

Interviews with ASX Directors	
Attendees	Date
Director of ASX Board, Independent Chairman	27 May 2024
Director, Chair of Technology Committee	27 May 2024
Director of ASX Clear Pty Limited, Director of ASX Settlement Pty Limited and Technology Committee member Director of ASX Clearing and Settlement Boards, Chair of ASX Clear Pty Limited and Chair of ASX Settlement Pty Limited	29 May 2024

## Appendix B Key Documents Reviewed

### Appendix B1 CHES Roadmap Program

Documents Reviewed					
#	Initiative ID	Document Name	#	Initiative ID	Document Name
1	CC09_M17	Confluence Page: CC09_M17_HSM: Go Live and Sign-Off Page	13	CC09_M18	Responses and evidence attached per the Confluence Page: CC#09_M18 Assurance Page
2	CC09_M17	Responses and evidence attached per the Confluence Page: CC09_M17_A1: Assurance Cycle #2	14	CC09_M18	Project Change Request (CR) - CR5 for Monitoring Upgrade v1.7.pdf
3	CC09_M17	Implementation Readiness Plan and Sign-Off documents	15	CC09_M18	Confluence page: MBR and PGG Outcomes
4	CC09_M17	Project Change Request - CR3 for HSM FINAL 1.1.pdf	16	CC09_M18	Confluence page: System Watchdog ASX270 Operating System and Migration to Emulation
5	CC09_M17	Testing for HSM Go Live (ChessHSMNFTInfrastructureTestSummaryResults.pdf)	17	CC09_M18	Confluence page: Implementation Readiness Plan and Approval
6	CC09_M17	Go - No-Go Meeting Minutes for HSM 2023 11 17.pdf	18	CC09_M18	Confluence page: CHES and Core Pre and Post Sanity Checking and CHES and Core Shakedown testing evidence
7	CC09_M17	Post Implementation Verification/Checkpoints (Confirmation email re HSM participants connected on go live date.msg)	19	CC09_M18	GO/No GO meeting minutes 10/11/2023.pdf
8	CC09_M17	Evidence of Destruction of old Luna devices (Destruction Certificate Chess Hardware ALC 17012024.pdf and Certificate of Destruction - ASX c-TIMG ED Pemulwuy SX255251.pdf)	20	CC09_M18	Sample of ServiceNow Change Ticket(s) including, not limited to, CHG0058842, CHG0060731, CHG0059501
9	CC09_M17	Testing defect evidence (RE TD0219_01; QA5; CHES Access not sending all messages.msg and Confluence Page: Defect Management Process)	21	CC#11a	Confluence Page: CC11a: Capacity & performance improvements (test only) and Sign-Off Page
10	CC09_M17, CC09_M18	Cormant - Infrastructure Asset Quarterly Report - Ad Hoc - 19-12-2023 - CHES Aged Assets - v21.xlsx	22	CC#11a	Responses and evidence attached per the Confluence Page: CC11a_A1: Assurance Cycle #2
11	CC09_M17, CC09_M18	CHES Aged Assets Roadmap Dec 2023 v1.2.pptx	23	CC#11a	Current_CHES_STRESS_TEST_REPORT_v24FINAL
12	CC09_M18	Confluence Page: CC09_M18_MonUpgrade: System Watchdog Operating System and Hardware Upgrade and Sign-Off Page	24	CC#11a	ACM_QET_RBT_Assessment_CHES_v1.docx

Documents Reviewed					
#	Initiative ID	Document Name	#	Initiative ID	Document Name
25	CC#11a	ASX_ACM_CHESS_STRESS_TEST_PLAN_DRAFT v1.5.docx	41	CC#56	Confluence page: CC#56: CORE - Review the backup and restore processes and Sign-Off Page
26	CC#11a	CAC-TestSummaryReport-08224-112-360.pdf	42	CC#56	Responses and evidence attached per the Confluence Page: CC56_A1: Assurance Cycle #2
27	CC#11a	20231115_Results_05- ASX CC#11 Stress Test Results.xlsx	43	CC#56	CORE Backup and Restore Processes.docx
28	CC#40	Confluence Page: CC40: Establish Enterprise 'Availability and Capacity Management Framework' and Sign-Off Page	44	CC#56	RE Current CHESS Item Closure Approval CC#56 CORE Review the backup and restore processes.msg
29	CC#40	Responses and evidence attached per the Confluence Page: Confluence Page: CC40_A1: Assurance Cycle #2	45	CC#56	ASX Confluence Core Backup Policy - Versions 19 and 22
30	CC#40	ASX ITSM Capacity Management Process and Policy.docx	46	CC#13	Responses and evidence attached per the Confluence Page: CC13_A1: Assurance Page #1, #2
31	CC#40	Capacity and Availability Framework_PRC Mapping.xlsx	47	CC#13	SCI - ASX MSA SOW 1 - OpenVMS Managed Services (Fully Executed) 30.05.23.pdf
32	CC#40	ITIL V4 Assessment_Execution Checklist for Banks_ASX CHESS Roadmap.xlsx	48	CC#13	Master Services Agreement: Software Concept Intl - MSA (Fully Executed) 30.05.2023.pdf
33	CC#40	ASX ITSM Availability Management Policy and Process.pdf	49	CC#13	SCI Monthly Report November 2023 and January 2024 Samples: ASXCHSPRD_2023-11-30.pdf and ASXCHSPRD_2024-1-31.pdf
34	CC#55	Confluence page: CC#55 CHESS- Review backup and restore processes and Sign-Off Page	50	CC#19	Responses and evidence attached per the Confluence Page: CC19_A1: Assurance Cycle #1, #2
35	CC#55	Responses and evidence attached per the Confluence Page: CC55_A1: Assurance Cycle #2	51	CC#19	Cisco ASA - AnyConnect clients - Aug242023.pdf
36	CC#55	CHESS Backup and Restore Processes.docx	52	CC#19	ASX_SAM-CACVPN_PROCESS_DRAFT_v0.3.docx
37	CC#55	RE Current CHESS Item Closure Approval CC#55 CHESS Review backup and restore process.msg	53	CC#19	Network Monitoring Connectivity Report.pdf
38	CC#55	ASX Confluence CHESS Backup Policy - Versions 48 and 58	54	CC#39	Responses and evidence attached per the Confluence Page: CC39_A1: Assurance Cycle #1, #2
39	CC#55	First annual restoration test (ServiceNow Ticket INC0085545 and CHG0056662) and test results (CHESS RESTORE POLICY TEST_9_8_2023.docx)	55	CC#39	ASX Trade Process Data (CORE CHESS) (QTR1 January and QTR1 February 2024)
40	CC#55, CC#56	RBA Business and Security Standards for RITS Members (December 2022 and December 2023) versions	56	CC#39	CHESS Process Data (CORE CHESS) (QTR1 January and QTR1 February 2024)

Documents Reviewed					
#	Initiative ID	Document Name	#	Initiative ID	Document Name
57	CC#39	February 2024 EMO AMO Reports	72	Health Check	Confluence Page - ASX Delivery Framework.pdf
58	CC#39	RE CURRENT CHESSE Trade Volume Forecast - December 2023 Data	73	Health Check	Confluence page - Program Governance - CC Delivery Leadership Meetings.pdf
59	CC#39	EOM AMO Reports - to CHESSE service Mgmt. Team (January and February 2024)	74	Health Check	Confluence page - Program Governance - CC SGG Meetings.pdf
60	CC#39	ASX_ACM_CHESSE_TVFCM_PPD_FINAL_v1.6.docx	75	Health Check	Confluence page - Risk Management - Jira Home Page.pdf
61	CC09_M10	Responses and evidence attached per the Confluence Page: CC#09_M10_A1: Assurance Cycle #1, #2	76	Health Check	Confluence page - Risk Management - S&P RAID Sessions.pdf
62	CC09_M10	System level ASX Monitoring for CHESSE PROD with AR Comments	77	Health Check	Confluence page - Scope Management - 5.1 Scope Definition and Management Guidelines.pdf
63	CC09_M10	Cormant - Infrastructure Asset Quarterly Report - Ad Hoc - 19-12-2023 - CHESSE Aged Assets - v21.xlsx	78	Health Check	Confluence page - Scope Management - CC#31.pdf
64	CC09_M10	CHESSE Aged Assets Roadmap Dec 2023 v1.2.pptx	79	Health Check	Confluence page - Planning Management - Resource Forecasting & Allocation.pdf
65	CC#24	Responses and evidence attached per the Confluence Page: CC24_A1: Assurance Cycle #1, #2	80	Health Check	Supplier Third Party - #20 ASX Vendor Management Framework v3.6.pdf
66	CC#24	Sustainability_Evidence_CC24.xlsx	81	Health Check	Supplier Third Party - ASX Procurement Policy.pdf
67	CC#47	Responses and evidence attached per the Confluence Page: CC47_A1: Assurance Cycle #1, #2	82	Health Check	Confluence page - Quality - CC Closure - sign-off statement.pdf
68	CC#47	Sustainability_Evidence_CC47.xlsx	83	Health Check	Confluence page - Quality - Closure Criteria Matrix - V.02.pdf
69	CC#47	CHESSE_RELEASE_PROCESS_V2.1.docx	84	Health Check	Confluence page - Quality - Working Page - CC Program Review & Closure.pdf
70	CC#47	Confluence page: CHESSE_RELEASE_PROCESS_V2.1 Approval	85	Health Check	Confluence page - Program Health Check Cycle 2.pdf
71	CC#47	ASAE 3402 Controls Report CHESSE_FY23 v0.8_Final_25July23.pdf			

## Appendix B2 CHES Roadmap Refresh

Documents List					
#	Document Name	#	Document Name	#	Document Name
1	2024_Apr_CHESS-SORA Update_22May24 DRAFT.docx	10	Confluence Page - 18. CC Roadmap Update CY24.pdf	19	ERICA extract - Controls Testing Results.xlsx
2	ASX CHES Roadmap Update Report of ASX Clear Pty Limited and ASX Settlement Pty Limited	11	Confluence Page - 18.1 Roadmap Update 2023 Framework/Approach.pdf	20	ERICA extract - S&P Risk Register Reports.pdf
3	CC - CHES Risks.xlsx	12	Confluence Page - 18.5 Scope & Benefits Uplift.pdf	21	ERM Framework.pdf
4	CC CY24 Roadmap Workshop Output (V1.4).pdf	13	Confluence Page - 2024-04-16 CHES Roadmap Update Workshop.pdf	22	FY24 CHES Roadmap Risk Mapping.docx
5	CC PROGRAM MASTERSHEET (V.11.6).xlsx	14	Confluence Page - CC Roadmap - Input Evidence (Fred).pdf	23	Minutes for the Securities and Payments Risk Working Group.pdf
6	CC#11b WP1-Capacity & Performance Improvements.pdf	15	Control Testing Framework.pdf	24	RE S&P Resourcing - PM allocation.msg
7	CHES Aged Asset Roadmap Dec 2023 v1.2.pptx	16	Current CHES Program 29Apr24 SGG (V1.0 - 26Apr24).pdf	25	Roadmap Refresh New Risks and Work-Items V.7.docx
8	CHES Risks Workshop.msg	17	Current CHES Roadmap Finalisation Workshop V1.0.pptx	26	SP Resourcing March 2024 FVDW Update.xlsx
9	CHES Roadmap Annual Development Process.pdf	18	December Risk Working Group.pptx		

## Appendix C Glossary of Terms and Acronyms

Glossary of Terms and Acronyms		
Acronym / Term	Definition	Explanation
Appropriate	The criterion by which the CHES Roadmap initiatives are assessed	This criterion evaluates the design of the initiative and whether the initiative (and associated actions) has been designed to mitigate the identified risk
APRA	The Australian Prudential Regulatory Authority	Australia's independent statutory authority that is responsible for promoting financial stability, competition, and efficiencies
Assessment of ASX's Clearing and Settlement Facilities Report	The Reserve Bank of Australia's (RBA) assessment	In October 2023, the RBA conducted its annual assessment of the ASX Clearing and Settlement (CS) facilities over the period over the period 1 July 2022 to 30 June 2023. The assessment pertained to the CS facilities' compliance with applicable Financial Stability Standards (FSS), as well as the CS facilities' general obligation to do all other things necessary to reduce systemic risk.
ASIC	The Australian Securities and Investments Commission	Australia's financial markets conduct regulator that is responsible for promoting fair and efficient financial systems
ASX	ASX Limited	ASX Limited is an Approved Market Operator
ASX Group	Australian Securities Exchange	
Atticus	ASX's enterprise fact-checking and verification software	
Audit of ASX's Special Report	EY's Audit report of ASX Special Report	ASIC's notice dated 14 December 2022 required ASX CS Facility Licensees to provide a Special Report into specified matters pursuant to section 823B of the Corporations Act 2001 and required EY to undertake an audit of the Special Report (Audit Report). In this context 'audit' means EY's audit of the special report specified by ASIC in the notice. EY's 'audit' involved a review of the CS Facility Licensees' basis and approach to preparing its Special Report (dated 28 April 2023) and our assessment of whether the Specified Matters required by ASIC had been appropriately addressed. Our work was not performed in accordance with generally accepted auditing, review, or other assurance standards in Australia and accordingly did not express any form of assurance. The work undertaken was substantially less in scope than an audit conducted in accordance with Australian Auditing Standards and consequently did not express an audit opinion.

Glossary of Terms and Acronyms		
Acronym / Term	Definition	Explanation
BAU	Business as Usual	These are BAU activities that will be managed via the BAU teams and governed through the S&P management system
CC ID	Current CHES ID	The unique identifier of each CHES Roadmap initiative
CHES	Clearing House Electronic Subregister System	The core system used by ASX to fulfil its CS obligations
COBIT	Control Objectives for Information and Related Technologies	An IT governance and management framework developed by the Information Systems Audit and Control Association (ISACA).
Confluence	ASX's enterprise knowledge repository system	
CORMANT	ASX's enterprise data center infrastructure management system	
CPS 230	Prudential Standard CPS 230	APRA Prudential Standard CPS 230 - Operational Risk Management
CPU	Central Processing Unit	The central processing unit that runs a machine's operating system and applications.
EO	Executive Owner	The individual responsible for the end-to-end delivery of the CHES Roadmap initiative. This includes direct involvement in the definition of scope, progress oversight, quality management oversight and review and approval of deliverables.
ERICA	ASX's enterprise risk management system	
Executed	The criterion by which the CHES Roadmap initiatives are assessed	This criterion evaluates the implementation of the initiative and whether the initiative (and associated actions) has been implemented as per the design.
EY PRC	EY's Process Risk and Controls library	EY's proprietary framework incorporating an IT process, risk and control library that considers regulatory, leading practices and internal requirements.
FSS	Financial Stability Standards	Standards developed by the RBA to ensure that licensed Clearing and Settlement (CS) facilities conduct operations in a way that is consistent with financial system stability
GM	General Manager	
JIRA	ASX's project management system	

Glossary of Terms and Acronyms		
Acronym / Term	Definition	Explanation
OpenVMS	Open Virtual Memory System	The server operating system of CHES, it is a multiprocessing and virtual memory-based operating system
PMO	Project Management Office	
RBA	Reserve Bank of Australia	
Reserve Bank Information and Transfer System (RITS) Standards	Reserve Bank Information and Transfer System (RITS) Standards	Standards developed by the RBA to ensure the continuation of payment operations during adverse conditions. These standards are designed to reduce disruption to other parties.
S&P	Securities and Payments	
SGG	Strategic Guidance Group	Committee responsible for the oversight of the of CHES Roadmap Program in terms of risks, outcomes, and alignment of Program to ASX's strategy
Sustainable	The criterion by which the CHES Roadmap initiatives are assessed	This criterion evaluates the operation of the initiative and the ability of the initiative (and associated actions) to continue to operate in a consistent manner



## Appendix D Release Notice

Ernst & Young ("EY") was engaged on the instructions of ASX Limited ("ASX", "Client" or "you") to conduct an assessment of the CS Facility Licensees' basis and approach to preparing the Special Report in accordance with the written notices pursuant to s823B(2) of the Corporations Act 2001 ("Project"), in accordance with the engagement agreement dated 27 November 2023 and 14 March 2024 including the General Terms and Conditions ("the Engagement Agreement").

The results of EY's work, including the assumptions and qualifications made in preparing the report, are set out in EY's report dated 20 June 2024 ("Report"). ASX and ASX's regulators ASIC and the RBA, should read the Report in its entirety including any disclaimers and attachments. A reference to the Report includes any part of the Report. No further work has been undertaken by EY since the date of the Report to update it.

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