

“The Delayed Implementation of the ASX CHESS Replacement Project”
Submission to the Parliamentary Joint Committee on Corporations and Financial Services
Inquiry into the activities of ASIC, the Takeovers Panel and the operation of the
Corporations legislation and related legislation”

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I Outline and Introduction

A. Outline

This submission highlights governance and regulatory issues arising from the delayed implementation of the Clearing House Electronic Sub-register System (“CHESS”) replacement project undertaken by the Australian Stock Exchange Limited (“ASX”) and its subsidiary companies (“the ASX Group”).¹

The submission is divided into 9 parts:

- Part I – Outline and introduction;
- Part II - Primary submission;
- Part III – Key findings;
- Part IV - History and context of CHESS replacement project;
- Part V - The governance framework;
- Part VI - Analysis of ASX corporate governance;
- Part VII - Analysis of CHESS replacement project governance;
- Part VIII - The regulatory framework & analysis; and
- Part IX - Summary of conclusions.

B. Introduction

Context of our submission

The ASX is responsible for operating Australia’s equity market, facilitating the buying and selling of 804 million shares worth \$3,168 trillion in 2022 alone.² The backbone of the market is the CHESS system, which manages transaction settlements and records changes

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¹ The ASX group of companies consists of the following companies: ASX Limited; ASX Securities Exchange Limited; ASX Clearing Corporation Limited; ASX Settlement Limited; ASX Compliance Pty Limited; ASX operations Pty Ltd; ASX Clear Pty Ltd; ASX Clear (Futures) Pty Ltd; ASX Settlement Pty Ltd; and Austraclear Limited. See further discussion in Part VI.C. below.

² Australian Securities & Investments Commission, “Equity market data”, *ASIC.gov.au* (website) <https://asic.gov.au/regulatory-resources/markets/market-structure/equity-market-data/>.

in share ownership. This submission analyses the ASX's failed project to replace the existing CHES system with a new system based on blockchain technology, a project which began in late 2017 before being abandoned in 2022. We draw attention to governance and regulatory issues that have come to light from these events.

By "governance", we focus on issues relating to who was in control of the CHES project, to assess how it was governed and whether that governance was in good order.³ We define corporate governance as:

"the framework of rules, relationships, systems and processes within and by which authority is exercised and controlled within corporations. It encompasses the mechanisms by which companies and those in control are held to account."⁴

By "regulation", we intend only to focus on the sustained and focused control exercised by the Australian Securities and Investment Commission ("ASIC") and the Reserve Bank of Australia ("RBA") as public agencies over the ASX's clearing and settlement facilities.⁵

Limitation on our findings

The CHES replacement project failure raises many questions about decisions, processes, monitoring and accountability within the ASX Group and the quality of regulatory oversight that may have contributed to the replacement project failure.

Our submission, while detailed, is necessarily limited by lack of access to ASX, ASIC and Reserve Bank internal documents and witnesses to the chain of events involved in the project failure. It may well be that our observations and findings would change if we had extended access to these additional documents and witnesses.

Our observations are based entirely on reading and analysis of publicly available documents, underpinned by corporate law principles⁶, and the laws regulating the ASX's clearing and settlement licences.⁷

Broader implications of this inquiry

Accountability questions are rightly asked in relation to the ASX CHES project failure for two reasons. First, it is an example of a costly technology project that went wrong inside a publicly listed corporation. It offers important insights for any organization, whether publicly or privately owned, undertaking significant technology transformation projects

³ John Farrar and Pamela Hanrahan, *Corporate Governance* (2017, Australia) [1.1]

⁴ Commonwealth of Australia, *The Failure of HIH Insurance Volume 1: A Corporate Collapse and its lessons* (April 2003) [xxxiv].

⁵ Robert Baldwin and Martin Cave, *Understanding Regulation: Theory; Strategy and Practice* (2nd ed, OUP, 2012) [2-3]. Except in passing, our submission does not discuss the role of the Council of Financial Regulators, the Treasury and/or APRA; or what impact decisions about market structure for clearing and settlement facilities made by these bodies may have had on the ASX's investment and project management decisions regarding the CHES replacement project.

⁶ See Part VB.

⁷ See Part VC.

now or in the future.⁸ Given high technology project failure rates, the CHES replacement is unlikely to be the last failed technology infrastructure project to fall under the accountability microscope.⁹

Secondly, the CHES replacement project was a technology project undertaken to replace the existing CHES system, an important piece of infrastructure critical to the proper functioning of the Australian financial system. When the CHES replacement project failure is considered alongside recurring problems affecting the operation of the current CHES system, the CHES replacement project failure raises real questions as to the circumstances under which the ASX Group should be permitted to continue to hold its C&S licences.

II Primary Submission

We submit that there are two areas of governance failure requiring further investigation by this Committee:

1. A failure of project governance by the ASX, specifically to properly manage and supervise the project to replace the CHES infrastructure with a system based on blockchain technology.
2. A failure of corporate governance by the ASX, specifically, a failure by the ASX board of directors and ASX executive management to sufficiently monitor and supervise its technology operations including the project to replace CHES.

We further submit that there are also important lessons to be learnt from the CHES replacement failure by the regulators of the ASX's Clearing and settlement licences ("**C&S licenses**"), ASIC and the Reserve Bank. We suggest that ASIC and the Reserve Bank needed to approach the task of monitoring the ASX's CHES replacement project from 2018 onwards with greater rigour. The regulators had been alerted by a KPMG Review in 2018 to systemic problems with technology governance and enterprise risk management within the ASX Group, problems that would have justified the imposition of conditions on the ASX's C&S licences from that time onward. Those conditions should have included an ongoing externally appointed assurance program in relation to ASX technology projects concerning or affecting C&S licences including the ASX's CHES replacement project.

III Key Findings Summary

A. Project management failures (Drawn from Part IV – History & Context)

Based on the public documents referenced in this submission, we submit that the CHES replacement program was poorly managed from its inception in late 2017 until it was abandoned in 2022. We conclude:

- The project was not properly formalised at the start: the ASX failed to clearly and properly identify the project's core objectives from the start of the project. It was not clear whether the replacement project was intended to be the mere replacement of the existing CHES system, replacing like-for-like, or whether it would provide new and additional services over and above those undertaken by the existing CHES system.

⁸ KPMG and Australian Institute of Project Management, *2021 AIPM and KPMG Project Management Survey* (4 November 2021) <https://kpmg.com/au/en/home/insights/2021/11/kpmg-aipm-project-management-survey-2021.html>.

⁹ The globally estimated failure rate of technology projects is 66%, see Standish Group, *Chaos Report 2020* (2020).

- The project specifications, project milestones and implementation timelines for the project kept changing with the result that the design of the replacement solution, DLT technology, was never completed despite the project moving into the “project execution” stage in 2020.
- The project management relationship between the ASX and its technology partner, Digital Asset LLC was unclear, with the two working groups often working in silos, at cross purposes without a shared universal understanding of the project.
- The project scalability requirements were never properly identified or tested before 2022 with the result that it was never clear whether the proposed DLT technology was a viable replacement for the existing CHES system.
- The project ran off the rails in 2020 but the problems did not become evident until 2022.

B. Corporate Governance Failures (Part VI)

Based on the public documents referenced in this Part, we submit that the ASX had a systemic problem with the governance of its technology projects, of which the CHES replacement project was but one recent example of the ASX’s technology governance failures. Another concerning technology project failure was the ASX Trade Refresh Project, the failure of which in November 2020 caused the ASIC and the Reserve Bank to request that conditions be placed on all three ASX licences including its C&S licences in November 2021.

ASX technology governance and risk management failings, illustrated by the ASX’s poor governance of the CHES replacement project, both impact and have bearing on its ongoing suitability to be the licenced operator of a major piece of public infrastructure essential to the stability of Australia’s financial system.

7 specific concerns we would highlight are:

- The quality and robustness of the ASX’s enterprise risk governance. The ASX itself admitted in 2018 that its risk management systems required major reform. Risk management and governance, particularly of technology risks, was found to be deficient in two regulatory reviews undertaken in 2018 and 2021.
- Deficiencies in the ASX’s three lines of defence risk management: the first line of defence, inside the C&S facilities, lacked sufficient capacities to fully discharge their risk detection obligations as the first line of defence, and the third line of defence, audit and assurance, lacked a comprehensive, end-to-end framework and clear guidelines to facilitate robust assurance and timely risk identification.¹⁰
- The pace of implementation of the 2018 recommended reforms: the reforms took 3 years to complete and there were still major issues with the identification, monitoring and mitigating of major technology project management risks being raised by the Reserve Bank in its Annual Assessments up to 2022 when the Reserve Bank concluded that despite all the improvements, the ASX’s risk management was still below the risk maturity levels of the ASX’s peers.

¹⁰ EY, Independent Expert Report – Independent assessment of ASX’s Assurance Program for the Implementation of the CHES Replacement Program (28 February 2022) [15].

- The quality of reporting of technology risk management issues up to the Executive Technology Operations and Security Committee and through them to the Board Audit and Risk committee until 2021, and the Board Technology Committee from 2021 onward: Prior to 2018, information was typically provided at a summarised level with the concern identified by the KPMG Review in 2018 that the board and executives were operating without sufficient information to make strategic or risk management decisions or to oversee delegated decision-making. Responses to the 2018 Governance Review had a perverse effect on board reporting, with directors in 2021 complaining that reports were too long and technical for board members to be able to distil their key issues. An inference to be drawn is that the board and executives before and post 2018 were operating without sufficient technical expertise or advice to effectively perform their technology governance oversight and management roles. The ASX CEO in 2018 publicly conceded that he did not fully understand the technology strategy that underpinned ASX operations.
- Robust oversight of technology projects by ASX Directors: Interviewed ASX directors admitted to the Reserve Bank in 2021 that they were not fully informed of the progress and status of the CHES replacement program. The question that arises is whether it was reasonable to expect board members to ask why they were not being kept up to date about the project. In turn, whether the information that they were being given was adequate or too complex and whether it was reasonable for them to rely on the persons providing that information. Further, whether the board should have sought the assistance of external experts to guide their monitoring and consequent decision-making. Certainly, there are questions to be answered about whether the ASX boards or the ASX executive group had a “risk champion” in their ranks when it came to the CHES replacement project and its management.
- Board skill set: Prior to 2022, no ASX director had any relevant skills, expertise or experience in digital transformation projects despite the ASX being a technology company with a full slate of such projects. The ASX Annual Reports from 2011-2022 reported high levels of IT and technology competencies on the board, but it is not clear what were the specific competencies being claimed and which directors possessed them.
- Risk governance resourcing: The 2018 and 2021 Governance Reviews conducted by the KPMG and the Reserve Bank respectively found there was limited sharing of risk information across relevant boards and committees within the ASX group. The ASX ran a “lean and mean” business structure, where no employees, premises or IT resources were provided to the C&S subsidiary companies. This structure was cost efficient but impeded the aggregated collection of risk information, led to inconsistencies in monitoring of risk across the organisation and limited the risk information provided to ASX executives and the board.

We also note that on 28 March 2023, ASIC notified the ASX that it had commenced an investigation into whether ASX Limited, ASX Clear Pty Ltd, ASX Settlement Pty Limited and or their directors and officers had breached the following obligations:

- the duty of care and diligence in *Corporations Act* s 180(1);

- the obligation to make continuous disclosure in accordance with the *ASX Listing Rules* in *Corporations Act* s 674 and s 674A;
- engaged in misleading or deceptive conduct in relation to a financial product or a financial service pursuant to *Corporations Act* s 1041H;
- engaged in misleading or deceptive conduct in relation to a financial service pursuant to in *ASIC s Act* s 12DA; and
- made false or misleading statements in connection with the supply or possible supply of financial services.¹¹

In relation to that investigation, we observe that:

- the critical time period for the purposes of the ASIC investigation is a small one, from 28 October 2020 to 28 March 2022. This is a much smaller period of time than our submission on the CHES replacement project would suggest is relevant;
- of critical relevance to their investigation will be finding sufficient evidence to determine whether it was reasonable for ASX boards to rely on reports provided on technology projects and associated risk issues by ASX executives. Under the investigation microscope should be the actions of the ASX's senior executives, specifically including the CRO and COO, both of whom chaired executive management committees dealing with C&S risks including technology risks; and
- the ASIC investigation is not apparently considering whether, in addition, to duty of care concerns, there are grounds for concern as to breaches by ASX directors and corporate officers of their duties of loyalty and good faith under *Corporation Act* ss 181-183. As this appears to be a live issue bearing on the length of time it took for the ASX to build the now failed CHES replacement using DLT technology, the Committee may wish to direct relevant questions to ASIC about this issue.¹²

C. Project Governance Failures (Part VII)

We submit that the CHES replacement project failure was exacerbated by poor project governance. 7 specific issues we would highlight are:

- The lack of clear understanding of the core objectives of the CHES project scope, delivery plan and its resourcing by the ASX and its technology partner, Digital Asset.
- The lack of project documentation and a record of program decisions taken or made during the life of the project as observed by Accenture in its October 2022 report.
- The lack of clear consensus or understanding at the top of the ASX as to the key milestones for the CHES replacement project.
- The lack of effective vendor governance by the ASX, in relation to the DLT design and build of the technology solution, of its technology partner, Digital Asset.

¹¹ ASX, "Chess Replacement Project – ASIC Investigation", *Letter to ASIC and to ASX Market Announcements Office* (29 March 2023) < <https://www.asx.com.au/about/media-centre>>.

¹² James Eyers, "Is another CHES advisory group already coming off the wheels?" *Australian Financial Review* (4 September 2023) < <https://www.afr.com/companies/financial-services/is-another-ches-advisory-group-already-coming-off-the-wheels-20230901-p5e1b3>>.

- Gaps in the ASX three lines of defence risk management for the CHES replacement project: both in the first line through insufficient resources being assigned to ensure project staff were able to perform risk management tasks assigned to them and in the third line, due to the absence of a robust end-to-end assurance program for the CHES replacement project prior to August 2021 as identified by EY.
- Lack of clear reporting lines for internal assurance projects and express guidelines for reporting risks identified in the process both within the ASX and from Digital Asset.
- There was no visible project risk champion sufficiently briefed and capable of bringing CHES project risk issues to the attention of ASX executives and the ASX board.

D. Regulatory issues (Part VIII)

We submit that there are also important lessons to be learnt from the CHES replacement failure by the regulators of the ASX's C&S licences, ASIC and the Reserve Bank.

We submit that the ASX CHES replacement project failure was an illustration of a systemic failure by the ASX to properly govern technology projects and manage its technology risks. A systemic failure made known to the Regulators by a KPMG report delivered in 2018.

Given the seriousness of the KPMG findings and the importance of CHES to the stability of the Australian financial system, the Reserve Bank and ASIC should also have:

- Required that the ASX institute a program of external assurance, rather than ASX internal audit, to confirm to the Reserve Bank and ASIC that the ASX had fully and effectively implemented the KPMG Review recommendations.
- Approached the task of monitoring the ASX's CHES replacement project from 2018 onwards with greater rigour.
- Required that the ASX institute a program of external assurance of new technology projects affecting ASX licences including the CHES replacement project, from their formal inception to determine whether their governance and risk management arrangements were periodically in accordance with Financial Stability Standards and other C&S licence obligations.
- Required an attestation from the ASX board that all controls, procedures and resources necessary to implement any remediation recommendations arising from the assurance programs had been put in place.
- Made these requirements ongoing conditions of the ASX C&S licences.

IV History and Context – the CHES Replacement Project

A. Project Management Framework

Context and history are needed to make sense of the issues discussed in this submission. Part IV is intended to provide both.¹³ From its very conception, ASX's CHES replacement was a serious, complex and high-octane project with many moving parts.¹⁴ To make sense of those parts, this submission uncritically adopts the internationally recognised framework

¹³ We acknowledge that questions of governance and regulation inevitably influence the issues we highlight and give weight to in this discussion.

¹⁴ ASX, *2022 Full-Year Results Presentation Speaking Notes* (18 August 2022) [17] <https://www.asx.com.au/about/media-centre>.

of project management known as the *PMBOK Guide – A Guide to the Project Management Body of Knowledge* to narrate the ASX CHES replacement story.¹⁵

According to the *PMBOK Guide*, there are 5 typical phases of a project life cycle: project initiation; project planning; project execution; project performance (monitoring) and project closure. Initiation, as the name suggests, references the earliest conceptual stages of a project, when an organisation defines the project very broadly in order to determine whether it is feasible, has business value and to secure support from key stakeholders.

Once the commitment is made, the next phase is planning, where the specific objectives, milestones and deliverables including a road map for delivery come into sharper focus. Project execution describes the stages involved in getting the project underway and making sure that it is able to carry out the anticipated work that it was developed to do. In the technology context, that encompasses both the building of that technology, its roll-out and the transition to its operation in a business as normal environment. This is followed by project performance, where monitoring is undertaken to ensure the project (technology) has met its objectives and requirements as to scope, cost and schedule. Project closure marks the end of the project.

B. Our assessment

We use the *PBMOK* framework to highlight the key events and activities that caused the CHES replacement project to fail. We conclude that there are three project management factors that contributed to the CHES replacement failure:

- Project conception failure: the ASX failed to properly identify the CHES replacement project's core objectives from the very start of the project. Was it merely to replace the existing CHES system with a like-for-like new system? Or was it to provide functionality that went well beyond the existing CHES system? To use that technology to expand the range of services that the ASX, as opposed to its stakeholders, could additionally provide in connection with their C&S facilities?
- Project specification and design failure: there were consistent, on-going alterations being made to the project's "day 1" design and functionality requirements with the result that the design stage of the project was never completed, despite the project moving to execution stage in 2020; and
- Project scalability risks were not properly identified and managed; with the result that it was never clear whether the proposed blockchain technology could in fact adequately replace the existing CHES system.

We conclude that the CHES project ran off the rails in 2020, even though a significant portion of its work was in the "project execution" phase. However, the true extent of the project's problems did not become evident until the Accenture review undertaken in mid-2022.¹⁶

¹⁵ Project Management Institute, *PMBOK Guide - A Guide to the Project Management Body of Knowledge* (7th ed, 2022).

¹⁶ Accenture, *ASX CHES Replacement Application Delivery Review* (November 2022), attachment to ASX, "ASX will reassess all aspects of the chess replacement project and derecognise capitalised software of \$245-255 million pre-tax in 1H23", *Letter to ASIC and ASX Market Announcements Office* (17 November 2022) <https://www.asx.com.au/about/media-centre>.

C. Project initiation – a grand scheme

The initiation phase for the ASX CHES replacement project arguably began in 2015, when the ASX informed the RBA of its plans to replace the existing CHES system with one potentially based on DLT¹⁷, and extended through to December 2017, when it formally announced the project to the market.¹⁸ Importantly, the CHES replacement was not originally conceived of as an idea on its own, but rather formed part of a larger ‘group-wide technology transformation project’.¹⁹

Very little was said publicly by the ASX about the project before 2016. ASX’s commitment to the project was clearly dependent on the current market structure for clearing Australian cash equities being maintained, following a government review announced in February 2015.²⁰ ASX wanted to remain the sole provider of those services for at least another 5 years.²¹ That decision, in effect, was made in June 2015 when a report by the Council of Financial Regulators supported a policy stance of openness to competition but acknowledged that until competition emerged, regulators would have to deal with the ASX as an ongoing monopoly.²² The Federal government endorsed these recommendations on 30 March 2016.²³

On February 22, 2016, the ASX appointed Digital Asset Holdings LLC as its CHES replacement technology partner.²⁴ Very little was publicly known about the terms of this partnership, the project management protocols put into place to manage the project and the oversight or vendor governance of the technology build that the ASX might have implemented once the project got underway. The Accenture review in 2022 found no evidence of such governance arrangements and very poor standards of project management owing to the two work teams, ASX and Digital Asset, working in silos with differing views as to what the project entailed.²⁵

The project was described by the ASX as covering all aspects of the ASX’s post-trade

¹⁷ RBA, *2014/2015 Assessment of ASX Clearing and Settlement Facilities* (September 2015) [1.3] <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2014-2015/>.

¹⁸ ASX, “ASX selects distributed ledger technology to replace CHES” *ASX Media Release* (7 December 2017) <https://www.asx.com.au/documents/asx-news/ASX-Selects-DLT-to-Replace-CHES-Media-Release-7December2017.pdf>.

¹⁹ RBA, *2014/2015 Assessment*, n 17 above, [1.3] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2014-2015/>>. See also, ASX, “ASX to invest in world class technology”, *ASX Media Release* (12 February 2015) < https://www.asx.com.au/documents/trading_services/Media_Release_12.02.2015.pdf>.

²⁰ Council of Financial Regulators, *Review of Competition in Clearing Australian Cash Equities Consultation Paper* (February 2015) < <https://www.cfr.gov.au/publications/consultations/2015/review-of-competition-in-clearing-australian-cash-equities/>>.

²¹ ASX, *Annual Report 2015* (2015) [12] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

²² Council of Financial Regulators, *Review of Competition in Clearing Australia’s Equities: Conclusions* (June 2015) [4-6] https://treasury.gov.au/sites/default/files/2019-03/C2015-007_CFR-ConclusionsPaper.pdf.

²³ ASIC, “Competition in cash equities clear and settlement: legislative reform”, *ASIC Website* (undated) < <https://asic.gov.au/for-finance-professionals/market-infrastructure-licensees/licensed-and-exempt-clearing-and-settlement-facilities/competition-in-cash-equities-clearing-and-settlement-legislative-reform/>>.

²⁴ ASX, “ASX selects Digital Asset to Develop Distributed Ledger Technology for the Australian Equity Market”, n 18 above.

²⁵ Accenture, n 16 above, discussed further in Parts VII and VIII below.

services. The accompanying release foreshadowed a period of 6-12 months during which they would work together on a prototype of the proposed DLT system to determine if the technology could work at the scale required for the Australian equity market.²⁶ Reserve Bank reporting from this period suggested that the development and viability test period was more likely to be 12-18 months in length but noted that the ASX was committed to making a final decision on viability by late 2017.²⁷

The ASX's early ambitions for the CHES replacement project were lofty. Asserting that it was possible to simply update the existing CHES system, Elmer Funke Kupper, the ASX's then CEO, stressed the benefits of doing more than mere replacement, of innovation over legacy. He stated "we should aim to re-engineer and simplify those processes to deliver significant benefits to the users of the market."²⁸ Innovation would apparently enable "the ASX and third parties to develop new services for intermediaries, end-investors and listed companies", thereby ensuring a more competitive marketplace across a broad range of services.²⁹

As a project management exercise, it was very "big bang" in approach³⁰, contemplating a technology feat on a scale that no other clearing and settlement exchange globally had been brave enough to implement.³¹ Australia was awash with blockchain trials at the time but industry experts opined that DLT technology was still stuck in the "proof of concept" starting blocks.³² Prudent precursors to a project of this magnitude might have included a benchmarking exercise against technology used by CHES like facilities overseas and consultation with ASX CHES stakeholders. It is not evident from public documents that the ASX undertook any such benchmarking exercise. While extensive stakeholder consultation was sought by the ASX, it appeared mainly to take place after the commitment

²⁶ ASX, "ASX selects Digital Asset to Develop Distributed Ledger Technology for the Australian Equity Market", n 18 above.

²⁷ RBA, *2015/2016 Assessment of ASX Clearing and Settlement Facilities* (September 2016) [1.3.3] <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2015-2016/pdf/report-2015-2016.pdf>

²⁸ ASX, n 18 above.

²⁹ Contrast the more modest claims in the ASX's annual reports for the same period, which spoke of a "potential solution" that "may eventually replace the existing CHES application": ASX, *ASX Limited Annual Report 2016*, (2016) [13, 27]. <https://www.asx.com.au/about/asx-shareholders/reports.html>.

³⁰ Evidence to Parliamentary Joint Committee on Corporations and Financial Services, Parliament of Australia, Canberra, 8 June 2023, 16 (Eric Saraniecki) < https://www.aph.gov.au/Parliamentary_Business/Hansard/Hansard_Display?bid=committees/commjnt/26947/&sid=0000>.

³¹ Tony Boyd, "ASX CEO leaves \$250m in unfinished business" *Australian Financial Review Online* (10 February 2022) <https://www.afr.com/chanticleer/asx-ceo-leaves-250m-in-unfinished-business-20220209-p59v7l>>. As to the risks and limitations of distributed ledger systems in connection with financial services, see also. Benedict Sheehy, "Re-thinking Securities Regulation: A comparative study of ASX, NYSE, and SGX." (2006) 2 *Corp. Governance L. Rev* 181; Annabel Simpson, Australian regulation of blockchain and distributed ledger technology in banking and finance (2018) 29 *Journal of Banking and Finance Law and Practice* 73; and Panisi, Buckley and Arner in "Blockchain and public companies- A revolution in share ownership transparency, proxy voting and corporate governance?" (2019) 2 *Stanford Journal of Blockchain Law & Policy* 189.

³² Nick Abrahams, "The reality of blockchain in Australia, lots of plans but waiting for big hit", *Australian Financial Review* (21 August 2017), < <https://www.afr.com/technology/the-reality-of-blockchain-in-australia-lots-of-plans-but-waiting-for-the-big-hit-20170816-gxx6C&S>>.

had been made to go with the DLT replacement.³³

D. From initiation to planning

The ASX's December 2017 confirmation of the DLT project announcement shifted the focus from feasibility to planning, at which time it might be expected that details of the project scope and scale, timelines, resourcing, risk management and cost issues would come into sharper focus. As will be seen in Part VIII of this submission, it is around this time that we contend that the ASX's regulators, the Reserve Bank and ASIC, should have insisted on the ASX initiating a specific program of assurance for the CHES replacement project.³⁴

In fairness, there were differing views offered on the status of the project being offered. The ASX's *Annual Report 2017*, published in August 2017, suggested that the replacement project was at an embryonic "potential replacement" stage. It stated that the ASX was building an enterprise-grade DLT system that would enable it to determine its suitability as a replacement for CHES, while at the same time seeking input from stakeholders as to what they wanted from the new system.³⁵ This view was also reflected in the 2017 Reserve Bank's *Assessment of ASX's CHES Facilities*, published in September 2017, wherein it described the ASX as "currently considering the use of a system using distributed ledger technology."³⁶

The ASX's public website on the CHES project was, however, more optimistic.³⁷ It reported that by the end of 2017, the ASX had completed its own analysis and assessment of the technology. This included comprehensive testing of the functions currently performed by CHES, comprehensive non-functional testing (scalability, security and performance requirements) for the replacement system; a broad industry engagement process on desired functionality and two 3rd party security reviews of the proposed DLT replacement.³⁸ The stakeholders involved in the engagement program from the period included members of the ASX Business Committee, the ASX ISO 20022 Technical Committee, industry working groups, and others.³⁹ The Reserve Bank also reported monthly workshops to discuss the replacement project between the ASX, Digital Asset, the RBA and ASIC.⁴⁰

On 27 April 2018, the ASX released a public consultation paper outlining the new and

³³ ASX, *Annual Report 2018*, (2018) [19], < <https://www.asx.com.au/about/asx-shareholders/reports.html> >.

³⁴ See Part VIII.

³⁵ ASX, *Annual Report 2017* (2017) [4, 19, 32, 34], < <https://www.asx.com.au/about/asx-shareholders/reports.html> >.

³⁶ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2017) [2, 23], < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2016-2017/pdf/report-2016-2017.pdf> >.

³⁷ ASX, "About CHES Replacement" (undated) [https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/about-ches-replacement.html#:~:text=The%20replacement%20of%20CHES%20provides,end%20investors\)%20and%20associated%20information.](https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/about-ches-replacement.html#:~:text=The%20replacement%20of%20CHES%20provides,end%20investors)%20and%20associated%20information.)

³⁸ See also ASX, "ASX selects distributed ledger technology to replace CHES" n 18 above.

³⁹ ASX, *Chess Replacement: New Scope and Implementation Plan* (April 2018) [4] <https://www.asx.com.au/documents/public-consultations/ches-replacement-new-scope-and-implementation-plan.pdf>.

⁴⁰ See for e.g. Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [Table 1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>,

planned features and a timetable for replacing CHESSE with the DLT solution.⁴¹ The consultation sought feedback on timing, testing and transition arrangements and 50 new business requirements added at stakeholders' requests.⁴² The Reserve Bank welcomed the stakeholder consultation process, noting that it brought together the technical and stakeholder elements of the project for the first time.⁴³ The technical work stream had been working on the DLT prototype, whilst the stakeholder work groups were helping to determine the proposed business requirements of the new system.

The April 2018 consultation document hinted at tensions between stakeholder requested business requirements and ASX delivery expectations, specifically as to whether they could be delivered on Day 1 of the CHESSE replacement commencing operation. The consultation document acknowledged a full roll-out of all the required features could not realistically be delivered on Day 1.⁴⁴ However, critically, the ASX left the door open for further, additional requirements to be requested by stakeholders. The ASX specifically invited stakeholders to advise them on any specific new business requirements that had not been captured to date and which required inclusion.⁴⁵ By flagging that further additions were possible, it could hardly be said that the key objectives of the plan, including scalability requirements, were finally determined. Equally, the business requirements being discussed were clear evidence that the CHESSE replacement project was developing over time into something far more than mere replacement of existing CHESSE technology.⁴⁶

Despite flagging the possibility of still adding further requirements to the project design, the consultation paper estimated that the CHESSE replacement would commence operation somewhere between Q4 2020 and Q1 2021.⁴⁷ That was a mere 2 years and three months away, yet the ASX was still in the throes of consulting on specificity requirements and virtually nothing was publicly known about how the work stream managing the building and testing of the DLT was handling this complex challenge.

The paper did foreshadow that timing was subject to change throughout the lifecycle of the project as the platform developed, following the consultation process and delivery planning. So it came as no surprise in September 2018, when the ASX modified the plan by pushing back Day 1 implementation of 7 scope items, bringing forward other items that previously were not planned for Day 1, delaying the commencement timetable (from Q4 2020 to March-April 2021) and providing an additional six months for more user development and testing, in its response to feedback received on the April 2018 ASX consultation paper.⁴⁸ The Day 1 changes were effectively an acknowledgment by the ASX that they were trying to do too much in too short of a time frame.⁴⁹

The ASX *Annual Report 2018*⁵⁰ spoke in terms of real project outputs, such as "proposed

⁴¹ ASX, Chess Replacement: New Scope and Implementation Plan, n 39 above.

⁴² Ibid.

⁴³ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) n 40 above [2.3.1].

⁴⁴ ASX, Chess Replacement: New Scope and Implementation Plan, n 39 above, [5].

⁴⁵ Ibid [7]

⁴⁶ ASX, Chess Replacement: New Scope and Implementation Plan, n 39 above, [7].

⁴⁷ Ibid [4].

⁴⁸ ASX, Chess Replacement: New Scope and Implementation Plan, n 39 above, [4].

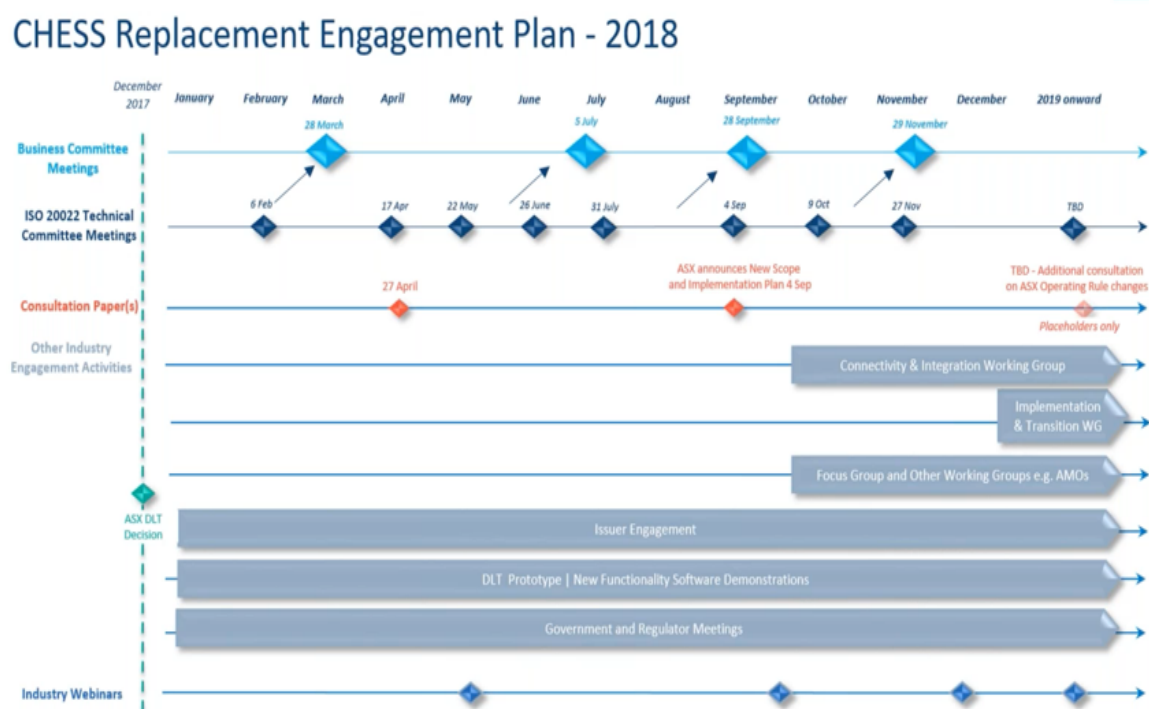
⁴⁹ ASX, *Chess Replacement: New Scope and Implementation Plan – Response to Consultation Feedback* (September 2018) [4]. <<https://www.asx.com.au/documents/public-consultations/response-to-chess-replacement-consultation-feedback.pdf>>.

⁵⁰ ASX, *Annual Report 2018*, (2018) [19], <<https://www.asx.com.au/about/asx-shareholders/reports.html>>.

Day 1 functionality” having now been published, with ‘Day 1 Scope’ coming within months. None of these claims aligned with the revised implementation plan in the CHES Response in September 2018.⁵¹ The Reserve Bank’s 2018 *Assessment of ASX Clearing and Settlement Facilities* summarized the ASX’s efforts over the previous year as continuing “its development work” on a project to replace CHES and “consulting on business requirements for the new system”.⁵²

By December 2018, the ASX reported to stakeholders that the internal build structure was going according to plan, with a properly identified day-1 scope and an April-March 2021 targeted go-live.⁵³ Figure 1 is a copy of the ASX’s CHES replacement engagement plan from this period.⁵⁴

Figure 1: Chess Replacement Engagement Plan



E. Project execution – building the system

Public details about the DLT system build, as opposed to the prototype used to assess the viability of the project, remained scant. Project milestones were not shared. The extent of any project assurance being undertaken by the ASX’s internal audit team was also unknown. It was not, for example, clear whether the build was in any way hampered as to scalability or timing delays by expanding stakeholder requirements. ASX also published monthly CHES project bulletins providing largely technical updates about specific aspects of the project, which were sent to stakeholders and intended users of the new CHES

⁵¹ Ibid [7].
⁵² Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [2.3.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>>.
⁵³ ASX, “Overview of Technical Documentation” *ASX Webinar Slides*, (12 December 2018). ASX, *Chess Replacement: New Scope and Implementation Plan*, n 48 above; Webinar recording: <https://attendee.gotowebinar.com/register/4997939350762985473>.
⁵⁴ Ibid.

system.⁵⁵ The newsletters conveyed the impression that a lot was happening within the project, but no signs of possible problems afoot were immediately obvious to a reader without specific DLT insights and expertise.

What is on the public record from this period supports the conclusion that the DLT technology was still in fact in development, with software code being “dropped” into a Customer Development Environment (CDE) set up by ASX from around April 2019 onwards⁵⁶ and Industry Test Environments (ITE) being opened from November 2019.⁵⁷ The CDE was set up to allow CHES customers to begin to interact and experiment with the new DLT system.⁵⁸ The accompanying press release declared that the establishment of the CDE was an important milestone for the project, which “is on-track to go-live with the new DLT-based system in March-April 2021.”⁵⁹

In August 2019, the ASX announced that specialist cloud and server software provider, VMware would be an additional partner in the CHES project, alongside the ASX and Digital Asset.⁶⁰ The press release spoke of VMware providing support and scale for the project, without indicating why that additional support was needed. However, then Deputy CEO of the ASX, Peter Hiom, said the appointment “confirms our belief in the potential of DLT as we remain on track to deliver the CHES replacement system in March-April 2021.” It is unclear how appropriate day 1 scope and functionality could be adequately identified at this point when critical vendors were being added to the project in a key part of the project execution phase. Vendors that the ASX asserted were “critical to the solution”⁶¹. Prudent project management would suggest such vendors should be identified and engaged during project initiation and planning, not in the middle of project execution.

ASX’s 2019 corporate announcements also described the project as “on track” to go live in March-April 2021.⁶² The ASX’s *2019 Annual Report* declared that the ASX had met all its

⁵⁵ See for e.g. ASX, “CHES Replacement Project Update”, *Program Newsletter* (July 2019), <https://www.asx.com.au/documents/CHES_Replacement_Project_Newsletter_July_2019.pdf>.

⁵⁶ ASX “Successful opening of Customer Development Environment for DLT testing”, *ASX Media Release* (7 May 2019) <https://www.asx.com.au/about/media-centre>. The ASX CHES replacement website indicates that a forerunner of this facility commenced in December 2018: see, ASX, “About CHES Replacement” *ASX Website* (undated), [https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/about-ches-replacement.html#:~:text=Guiding%20principles,end%20investors\)%20and%20associated%20information](https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/about-ches-replacement.html#:~:text=Guiding%20principles,end%20investors)%20and%20associated%20information).

⁵⁷ ASX, “About CHES Replacement” *ASX Website* (undated), [https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/about-ches-replacement.html#:~:text=Guiding%20principles,end%20investors\)%20and%20associated%20information](https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/about-ches-replacement.html#:~:text=Guiding%20principles,end%20investors)%20and%20associated%20information).

⁵⁸ ASX, ASX “Successful opening of Customer Development Environment for DLT testing”, n 56 above.

⁵⁹ *Ibid.*

⁶⁰ ASX, “ASX, Digital Asset and VMware join forces on DLT” *ASX Media Release* (26 August 2019) <https://www.asx.com.au/about/media-centre>.

⁶¹ Evidence to Parliamentary Joint Committee on Corporations and Financial Services, Parliament of Australia, Canberra, 8 June 2023, 25 (Dave Curran) <https://www.aph.gov.au/Parliamentary_Business/Hansard/Hansard_Display?bid=committees/commjnt/26947/&sid=0000>.

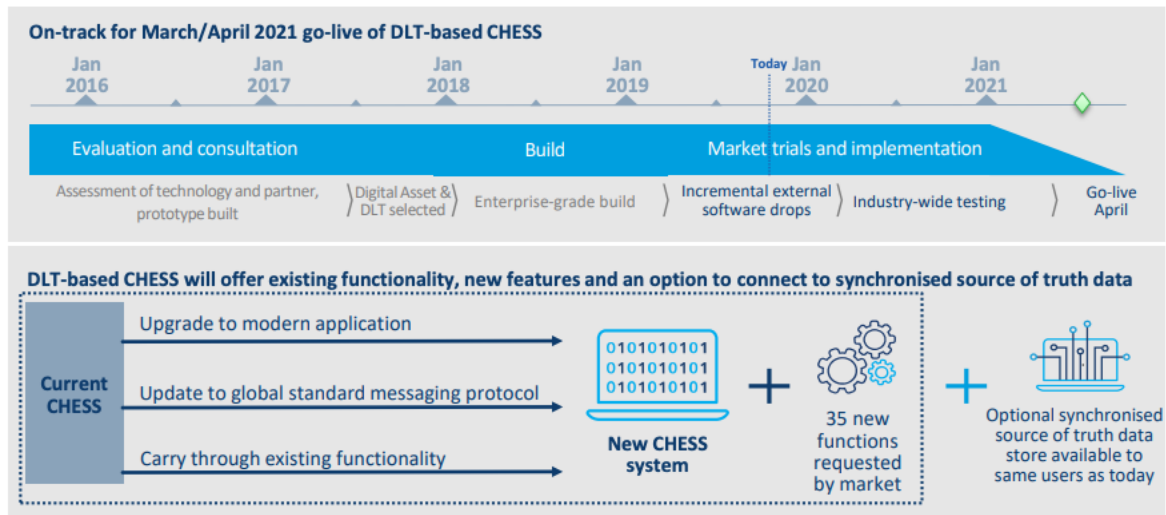
⁶² See for e.g. ASX, *2019 AGM Chairman and CEO Address* (24 September 2019) [9], <https://www.asx.com.au/about/media-centre>; ASX, “ASX participates in Digital Asset’s Fundraising”, *ASX Press Release* (12 December 2019), <https://www.asx.com.au/about/media-centre>.

“FY19 milestones” for the CHES replacement⁶³ before also confirming the project remained on track.⁶⁴ Where exactly “on track” was not particularly clear in these announcements but a special “Replacement of CHES” section in the Annual Report described the project as being “in the build and test phase”.⁶⁵ Figure 2 is a copy of the ASX’s project timeline taken from the ASX National Issuer Roadshow Oct/Nov 2019 – CHES Replacement update.⁶⁶

Figure 2 – ASX CHES Replacement Project Timeline - 2019

CHES Replacement - project timeline

An enhanced equities clearing & settlement system and new opportunities for the market



At the same time, criticism of the ASX’s handling of the project began to appear in the financial press. However, the chief criticisms were not about project viability or milestones but rather the potential misuse of the ASX’s market power in the scoping of the new DLT system. Stakeholders criticised the ASX’s lack of transparency particularly as concerned the business case for the replacement technology and mechanisms for handling conflicts of interest once implemented.⁶⁷ Most participants were also concerned about their own software upgrade costs for connecting to the new DLT system.⁶⁸ The ASX’s response was to encourage users to stop fretting and explore the “gargantuan” innovation opportunities

⁶³ The 2019 milestones appear to relate to the opening of the CDE: See ASX, 2019 *Annual Report* (September 2019) [23, 52], < <https://www.asx.com.au/documents/investor-relations/AnnualReport2019.pdf>>.

⁶⁴ ASX, 2019 *Annual Report* (September 2019), n 62, [5] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

⁶⁵ Ibid [12-13].

⁶⁶ ASX, *CHES Replacement update* (2019) [11], <<https://www2.asx.com.au/content/dam/asx/documents/unlinked-doC&S/ches-replacement-national-issuer-roadshow-oct-nov-2019.pdf>>.

⁶⁷ Tony Boyd, “ASX’s blockchain project gets nasty”, *Australian Financial Review* (18 March 2019), < <https://www.afr.com/chanticleer/asx-s-blockchain-project-gets-nasty-20190318-p5155s#:~:text=The%20report's%20conclusion%20said%3A%20%E2%80%9CThe,to%20issuer%20and%20investor%20outcomes.%E2%80%9D>>.

⁶⁸ Tony Boyd, “ASX weathers revolt over CHES”, *Australian Financial Review* (16 April 2019), < <https://www.afr.com/chanticleer/asx-weathers-revolt-over-ches-20190415-p51eed>>; Tony Boyd, “Alarm at ASX’s blockchain armageddon”, *Australian Financial Review* (22 October 2019), < <https://www.afr.com/chanticleer/alarm-at-asx-s-blockchain-armageddon-20191021-p532tc>>.

that would arise from having access to the new system.⁶⁹ A lobby group known as the CHES Replacement Stakeholder Group formed and responded to the ASX, claiming to have evidence based concerns that the primary beneficiary of the project was the ASX.⁷⁰ They accused the ASX of having far wider ambitions for the DLT technology than had been previously disclosed.⁷¹ The extent of the ASX's DLT innovation ambitions were certainly becoming more apparent in its result updates.⁷²

F. Covid Replan

2020 was a year of equity market shocks that would in time have huge ramifications for the CHES replacement project. While the *ASX 2019 Annual Report* foreshadowed that the major project milestone expected in July 2020 was industry-wide testing, initially for software developers and later for all users,⁷³ that milestone was largely downplayed by Covid-19 events including market outages in March and November 2020. In March 2020, the ASX announced it was replanning its CHES implementation plans.⁷⁴ Citing uncertainty created by the COVID-19 pandemic, user feedback on timing, more requested functionality changes, and the need for ASX to complete aspects of its own readiness, the ASX sought a revised project schedule that would move the go-live date from April 2021 to a later date.

The ASX's March press release cited three benefits of the delay:

1. the industry needed to focus on day-to-day operations in light of volatile market conditions;
2. users would have more time to become familiar with the new system in a production-like testing environment; and
3. the ASX could complete software development and testing.⁷⁵

While the ASX would seek consultations about a revised schedule, the ASX Deputy CEO Peter Hiom stressed:

“The ASX remains fully committed to CHES replacement. We continue to progress the project, including system development and testing, supporting back-office software developers, and assisting users in their readiness activities.”⁷⁶

⁶⁹ James Evers, “ASX rebuffs its blockchain critiC&S”, *Australian Financial Review* (22 May 2019) < <https://www.afr.com/companies/financial-services/asx-rebuffs-its-blockchain-critiC&S-20190522-p51q11>>.

⁷⁰ Aleks Vickovich and James Evers, “Open ASX blockchain to disrupters, say critiC&S”, *Australian Financial Review* (22 October 2019), < <https://www.afr.com/companies/financial-services/asx-blockchain-critiC&S-call-for-more-oversight-20191022-p532xz>>.

⁷¹ Paul Smith, “ASX ploughs another \$15m into blockchain provider” *Australian Financial Review* (12 December 2019), < <https://www.afr.com/technology/asx-ploughs-another-15m-into-blockchain-provider-20191212-p53j7c>>.

⁷² Dominic Stevens and Gillian Larkins, “ASX 2019 Full-Year Results” *ASX Presentation and Speaking Notes*, (15 August 2019) [9-10] < <https://www.asx.com.au/about/media-centre>> (2019).

⁷³ ASX, *2019 Annual Report* (September 2019) [25], < <https://www.asx.com.au/documents/investor-relations/AnnualReport2019.pdf>>.

⁷⁴ ASX, “ASX to consult on CHES replacement implementation timetable”, *ASX Press Release* (25 March 2020) < <https://www.asx.com.au/about/media-centre>>.

⁷⁵ Ibid.

⁷⁶ Ibid.

What the press release specifically did not mention was the pressure brought to bear by the Reserve Bank and ASIC. Both were concerned about the viability of the existing CHES system, which had been overwhelmed by record share trading volumes in March 2020. ASIC had been forced to step in and temporarily require trading firms to cut their order volumes by 25%.⁷⁷ The inability of the current CHES to cope in a time of crisis brought into sharp focus the CHES replacement system and the reality that the existing system was not due for replacement for at least two more years.⁷⁸

The ASX June 2020 CHES consultation paper sought industry views on its proposal to extend the project by 12 months, pushing the live target date from April 2021 to April 2022.⁷⁹ Specifically, it sought feedback as to whether CHES users could meet the revised implementation schedule. The ASX claimed to have undertaken a comprehensive replanning process, with an assessment of risks, issues, implications and assumptions. Those risks included: being able to meet the functional changes requested by users⁸⁰, ensuring that users had sufficient time to ensure their own software met functional and technical requirements of the DLT system⁸¹, and ensuring that the DLT could meet significantly increased performance requirements given the trade record volumes from March 2020.⁸² The ASX also admitted that its own work on the project had slowed due to Covid.

Early feedback on the Consultation Paper confirmed that industry users were supportive of the replan timelines,⁸³ but also revealed anger and suspicion amongst stakeholders that the CHES replacement project had become a lot bigger project than merely replacing ageing technology. For example, one stakeholder asserted that in the ASX's communication of the CHES replacement scope, what the "ASX was actually saying, 'With this new system we will be able to do all the things that the share registries do for you today.' That's a fundamentally different scope to the scope we thought it had."⁸⁴ Additionally, another stakeholder reported feedback from clients that the scope of the replacement project was not clear, whereby it would encompass "capabilities well beyond what replacing the current system would be" and "that could potentially encroach on the services we were

⁷⁷ ASIC, "ASIC takes steps to ensure equity market resiliency", *ASIC Media Release 20-062MR*, (16 March 2020) <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2020-releases/20-062mr-asic-takes-steps-to-ensure-equity-market-resiliency/>.

⁷⁸ Tony Boyd, "ASIC to reform share trading", *Australian Financial Review* (23 April 2020), <<https://www.afr.com/chanticleer/asic-to-reform-share-trading-20200422-p54m8z>>.

⁷⁹ ASX, *CHES Replacement: Revised Implementation Timetable Consultation Paper* (June 2020) [4] <[https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/stakeholder-engagement#:~:text=On%2028%20October%202020%2C%20ASX,live%20date%20as%20April%202023](https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/stakeholder-engagement#:~:text=On%2028%20October%202020%2C%20ASX,live%20date%20as%20April%202023>)> (2020 Revised Implementation Line).

⁸⁰ *Ibid* [1.1].

⁸¹ ASX, *CHES Replacement: Revised Implementation Timetable Consultation Paper*, n 79 above, [1.2].

⁸² *Ibid* [1.3-1.4].

⁸³ ASX, "Consultation closes on CHES replacement timetable", *ASX Media Release* (5 August 2020) <https://www.asx.com.au/about/media-centre> (2020).

⁸⁴ Evidence to Parliamentary Joint Committee on Corporations and Financial Services, Parliament of Australia, Canberra, 23 February 2023, 38 (Paul Conn) <https://www.aph.gov.au/Parliamentary_Business/Hansard/Hansard_Display?bid=committees/commjnt/26572/&sid=0000>.

providing.”⁸⁵ The ASX was seemingly taking advantage of its monopoly power to extend the scope of its platforms.⁸⁶

On 28 October 2020, the ASX announced that, following extensive industry and regulatory consultation and a comprehensive project review, the ASX would increase the scope of the CHES replacement project and reset the ‘go-live date’ to April 2023, meaning that the project implementation date was extended for a further two, rather than one, years.⁸⁷ CEO Dominic Stevens commented:

“ASX has listened to the industry, regulators and its technology partners throughout this project. It is clear that COVID-19 continues to impact the whole industry, including ASX, and this has evolved what our stakeholders want from the CHES replacement system. In parallel, ASX has considered how we can reduce delivery risk, enhance the customer experience and continuously improve project execution. Consequently, we have increased the scope of the project and extended the timeline. The result is a program that provides a significantly enhanced CHES replacement solution on Day 1.”

In hindsight, these comments significantly downplayed the enormous task that the ASX was facing. What was being announced here was not just an extension of time for building the planned DLT system, but a significant overhaul of its functionality and scalability specifications, at a time when the build of the originally conceived DLT had yet to be completed.

The extent of that overhaul was not at all clear because the ASX never publicly explained the scope of additional work required, either as to additional functionality requested by users and stakeholders or as to scalability by reference to the number of trades that the enhanced DLT system was expected to manage.

In relation to scalability, Table 1 summarises ASIC data on average daily trading volumes between 2016 and 2020.⁸⁸ The key period of concern that the ASX was referring to in its consultation statements was Q1, 2020, where average daily trades rose to almost 3m per day. To be clear, there was never any question that the DLT system would be expected to cover average daily trades⁸⁹, but equally there was no public discussion of what additional volume the enhanced DLT system would reasonably be expected to accommodate. In its 2020

⁸⁵ Evidence to Parliamentary Joint Committee on Corporations and Financial Services, Parliament of Australia, Canberra, 23 February 2023, 39 (Rhett Tregunna) <https://www.aph.gov.au/Parliamentary_Business/Hansard/Hansard_Display?bid=committees/commjnt/26572/&sid=0000>.

⁸⁶ Sarah Thompson, Anthony Macdonald and Tim Boyd, “Governance institute takes aim at ASX’s CHES replacement project” *Australian Financial Review* (30 July 2023), <https://www.afr.com/street-talk/governance-institute-takes-aim-at-asx-s-chess-replacement-project-20200730-p55gt6>.

⁸⁷ ASX, “After extensive industry consultation and a comprehensive project review, ASX increases the scope of CHES replacement and resets the go-live date to April 2023 ASX has confirmed the new go-live date for the CHES replacement”, *ASX Press Release* (28 October 2020) <https://www.asx.com.au/about/media-centre> (2020).

⁸⁸ Peaking trading volumes were likely much higher than average trading volumes. See ASIC, *Equity Market Data*, (2016-2020) <https://asic.gov.au/regulatory-resources/markets/market-structure/equity-market-data/>.

⁸⁹ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) [2.1.2] <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>>.

Assessment of the ASX's Clearing and Settlement Facilities, the Reserve Bank noted that the ASX planned for the new system to be able to process *15 million trades per day* at Day 1 launch, a multiple of 5 times the exceptional average in Q 1, 2020.⁹⁰ The same Assessment later stated that the ASX was in fact targeting the new system to have a 100% capacity above the peak daily volume of the existing CHES system.⁹¹ It is in taking account of these targets, known and the subject of discussions between the ASX and its regulators, that the enormity of the proposed upgrade becomes clear.

Table 1 – Daily Trading Averages

Year	Quarter	Trades
2016	Q1	1,265,509
2016	Q2	1,289,869
2016	Q3	1,289,115
2016	Q4	1,352,597
2017	Q1	1,385,296
2017	Q2	1,560,201
2017	Q3	1,546,197
2017	Q4	1,588,769
2018	Q1	1,654,369
2018	Q2	1,574,518
2018	Q3	1,671,277
2018	Q4	1,814,579
2019	Q1	1,995,613
2019	Q2	2,126,026
2019	Q3	2,238,229
2019	Q4	2,077,305
2020	Q1	2,826,129
2020	Q2	2,210,328
2020	Q3	1,962,967.5

⁹⁰ Reserve Bank, *Assessment of Clearing and Settlement Facilities* (September 2020) [4] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2019-2020/>>;

⁹¹ *Ibid* [29-30].

2020	Q4	1,915,982
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However, the ASX did not see this as a problem. As the ASX's Dominic Stevens observed:

“The functional scope, capacity, scalability and testing of the CHES replacement system now being developed is greater. It captures the increased requirements of ASX and the industry and lowers the risk in delivering them. It is also consistent with ASX addressing the expectations of the regulatory agencies that CHES be replaced as soon as it can be achieved safely and that the new system meets the market's needs.”⁹²

G. Back to Project Design Again (2021)

New project timelines for the CHES replacement were included in the ASX's 2021 half-year results presentation.⁹³ The ASX reported that the project build phase was extended until 1 July 2021, during which time additional customer driven design and scope changes were to be made and “scale and scope” requirements added to the project specifications to enable increased volume activity. Testing, accreditation and customer readiness was planned for 1 July 2021 to 1 July 2022, with an additional 8 months set aside for extra testing, before going live in April 2023.⁹⁴

A further consultation paper was issued on 18 February 2021, seeking stakeholder input on the proposed changes to the design of the DLT to enable the CHES replacement system to be scaled to much higher volume levels and the need to ensure the post-trading capacity of the new system would not constrain trading activity.⁹⁵ The ASX's response was published on 30 June 2021.⁹⁶ It documented user and stakeholder support for the required changes but also acknowledged that the changes would present a timing implementation risk at this stage in the project.⁹⁷ The design and build phase of the project was therefore pushed out until August 2021 to accommodate the changes, but no other key project milestones were said to be affected.⁹⁸ The remaining changes to the CHES project specifications, said to have been published on 30 June 2021, were not disclosed to the general public.⁹⁹

Corporate statements about the CHES replacement project remained upbeat in outlook. The Chairman's letter in the ASX's 2021 Annual Report declared that good progress had been made in 2021 with the project moving from the “build and design phase” to the

⁹² ASX, “After extensive industry consultation and a comprehensive project review, ASX increases the scope of CHES replacement and resets the go-live date to April 2023 ASX has confirmed the new go-live date for the CHES replacement”, n 87 above.

⁹³ ASX, *Half Year Results Presentation Slides* (10 February 2021) [14], <https://www.asx.com.au/about/media-centre> (2021).

⁹⁴ Ibid.

⁹⁵ ASX, *CHES Replacement: Proposed changes to netting and settlement workflow - Consultation Paper* (February 2021) <<https://www.asx.com.au/about/regulation/public-consultations>>.

⁹⁶ ASX, *CHES Replacement: Confirmed changes to netting and settlement workflow - Response to consultation feedback* (June 2021), <https://www.asx.com.au/about/regulation/public-consultations>.

⁹⁷ Ibid [3].

⁹⁸ Ibid [5].

⁹⁹ ASX, “CHES Replacement Project Update”, *ASX Program Newsletter* (June 2021), <https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/ches-replacement-resources/stakeholder-communications>.

“testing and delivery” phase and the project was on track to ‘go live’ in April 2023.¹⁰⁰ While the reasonableness of these statements is hard to assess without knowledge of the replanned project specifications, the Reserve Bank’s 2021 Assessment of the ASX Chess Facility provided some specificity, reporting that ASIC and the Reserve Bank expected the new system to at least meet the requirements of the current system.¹⁰¹ The capacity of the current CHES system was upgraded during 2021 to support 10 million trades per day to mitigate against the risk of processing delays such as those that occurred in March 2020 when equity trade volumes reached 7 million trades per day.¹⁰² The ASX advised the Reserve Bank that the replacement DLT functionality would exceed these minimum requirements.

H. Project Abandoned

The ASX’s CHES replacement project did not survive the seismic events of 2022. The year began with ASX executives spruiking the many achievements of the project and their strong commitment to the project’s timelines.¹⁰³ Behind the scenes, the story was less optimistic, forcing the ASX in March 2022 to foreshadow “a strong likelihood of delay” to the April 2023 go-live date.¹⁰⁴ The cited reasons were a delay in the delivery of application software for the replacement system, which allowed insufficient time for the ASX and CHES users to complete their testing and readiness activities before April 2023. On 11 May 2022, the ASX confirmed that April 2023 was no longer a viable date, declining to offer a revised one without further planning and input from stakeholders.¹⁰⁵

The possibility that there was a problem beyond mere delay did not become publicly evident until 3 August 2022, at which point it emerged that ASIC and the Reserve Bank had been working behind the scenes in response to the May announcement.¹⁰⁶ Expressing disappointment in the delay, the regulators insisted that it was time for an independent review of ASX’s and Digital Asset’s (DA) work to date on the CHES Replacement and the work needed to complete the project. Accenture was appointed to conduct that review. The ASX’s own press release from the same day advised that it did not expect the go-live date for the CHES replacement would now be before late 2024.¹⁰⁷

¹⁰⁰ ASX, *ASX Limited Annual Report 2020* (August 2020) [5], <https://www.asx.com.au/about/asx-shareholders/reports.html> (2020). See also ASX, *ASX Limited 2021 Annual General Meeting Chairman and CEO Addresses* (29 September 2021), <https://www.asx.com.au/about/media-centre>.

¹⁰¹ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) [2.1.2] [<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>]. For discussion of other functionality requirements, see also [2.1.3].

¹⁰² Ibid [2.1.1]

¹⁰³ Dominic Stevens and Gilligan Larkins, *2022 ASX Limited Half-Year Results - Presentation and Speaking Notes* (10 February 2022) <https://www.asx.com.au/about/media-centre>.

¹⁰⁴ ASX, “Chess Replacement Project: Changes to Project Schedule – March 2022”, *ASX Press Release* (27 March 2022) <https://www.asx.com.au/about/media-centre>.

¹⁰⁵ ASX, *Letter to ASIC and ASX Market Announcements Office* (11 May 2022), <https://www.asx.com.au/about/media-centre>.

¹⁰⁶ ASIC, “Delay to the ASX CHES Replacement Project and Independent Review”, *ASIC Media Release (22-204MR)* (3 August 2022) < <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2022-releases/22-204mr-delay-to-the-asx-chess-replacement-project-and-independent-review#!page=2&type=media%20releases&search=ASX>>.

¹⁰⁷ ASX, *Letter to ASIC and ASX Market Announcements Office* (3 August 2022) <<https://www.asx.com.au/about/media-centre>>.

The barest of details of the problems afoot were provided to the market at the time of the ASX's full year results reporting.¹⁰⁸ The speaking notes accompanying the presentation slides noted:

“We have identified that more development is needed in parts of the application to meet the market’s scalability and resiliency requirements.

While we don’t yet have a timeline for completion, we have given guidance that, based on the information we currently have, we don’t expect that the go-live could be before late 2024.

Given the delay and the criticality of a safe go-live, we have commissioned an independent review of the application by Accenture.

The aim is to investigate specific areas in the application that are presenting challenges, to consider possible solutions and to provide input on the timeline for implementation. We will provide further updates in due course.”¹⁰⁹

The ASX’s senior officers appeared to be at a loss to explain what had gone wrong and what were the possible solutions. They emphasized the progress that had been made on the project to date, that the distributed ledger technology was operational and industry users were interacting with it in an industry test environment. Clearly, scalability, an issue of increasing importance according to Reserve Bank Assessment Reports since 2020, was a major issue. However, the *ASX Annual Report 2022* also did not present this as a fatal flaw, noting that work on the project was continuing and offering the rationale that all change involves risk and ASX initiatives seemingly always attracted headlines.¹¹⁰

Accenture delivered its report on the CHES project in October 2022.¹¹¹ The report found significant gaps and deficiencies in ASX’s program delivery capabilities and significant challenges in the technology design. Four underlying drivers were said to be “contributing to the challenges in the current solution design.”¹¹² 45 recommendations were developed, focusing on rethinking the solution design and architecture for the CHES replacement application.¹¹³

On 17 November 2022, the ASX announced an indefinite project pause, promising to undertake a reassessment of all aspects of the project following the Accenture review.¹¹⁴ \$250m would be written off in light of the solution uncertainty. With those few simple words, the DLT solution for the CHES replacement was assigned to the dust bin. The 5 year, much

¹⁰⁸ ASX, *2022 Full-Year Results Presentation Slides* (18 August 2022) [17] <https://www.asx.com.au/about/media-centre>.

¹⁰⁹ ASX, *2022 Full-Year Results Presentation Speaking Notes* (18 August 2022) [17] <https://www.asx.com.au/about/media-centre>.

¹¹⁰ ASX, *ASX Limited 2022 Annual Report* (21 August 2022) [9], <https://www.asx.com.au/about/media-centre>. See also, ASX, *AGM Address by Chair, Managing Director and CEO* (27 September 2020), <<https://www.asx.com.au/about/media-centre>>.

¹¹¹ Accenture, n 16 above.

¹¹² *Ibid* [1.3].

¹¹³ *Ibid* [1.2].

¹¹⁴ ASX, “ASX will reassess all aspects of the chess replacement project and derecognise capitalised software of \$245-255 million pre-tax in 1H23”, *Letter to ASIC and ASX Market Announcements Office* (17 November 2022) <https://www.asx.com.au/about/media-centre>.

vaunted CHES replacement project was over and now the blame game would begin.

I. Our analysis & conclusions

Based on the public documents we have read and cited in Part IV, we submit that the CHES replacement program was poorly managed from its inception in late 2017 until it was abandoned in 2022. We conclude:

- The project was not properly formalised at the start: the ASX failed to clearly and properly identify the project's core objectives from the start of the project. It was not clear whether the replacement project was intended to be the mere replacement of the existing CHES system, replacing like-for-like, or whether it would provide new and additional services over and above those undertaken by the existing CHES system.
- The project specifications, project milestones and implementation timelines for the project kept changing with the result that the design of the replacement solution, DLT technology, was never completed despite the project moving into the "project execution" stage in 2020.
- The project management relationship between the ASX and its technology partner, Digital Asset LLC was unclear, with the two working groups often working in silos and at cross purposes without a shared universal understanding of the project.
- The project scalability requirements were never properly identified or tested with the result that it was never clear whether the proposed DLT technology was a viable replacement for the existing CHES system.
- The project ran off the rails in 2020 but the problems did not become evident until 2022.

V The Governance Framework

A. Types of Governance

This submission concerns itself with the question of what is good governance for a publicly listed company operating a critical piece of public technology infrastructure (CHES) and undertaking a project to replace that technology with a new system based on blockchain technology (the replacement project). The answer to that question, first requires an awareness of the laws and associated regulations, guidelines and policies that underpin and direct the governance of the entities involved, here the ASX Group¹¹⁵, and of its CHES replacement project. They are briefly considered here, before turning to analyse the corporate governance of the ASX Group (Section VI) and the project governance of the CHES replacement project (Section VII) more specifically.

B. Corporate governance and its regulation

The expression "corporate governance" has its genesis in the Cadbury Report¹¹⁶, more recently expounded by Justice Owen as being 'the framework of rules, relationships, systems, and processes within and by which authority is exercised and controlled in

¹¹⁵ See above n 1 and further discussion in Part VI.C.

¹¹⁶ Sir Adrian Cadbury, *Report of the Committee on the Financial Aspects of Corporate Governance* (Gee & Co, London, 1992) [2.5]. Robert Tricker is also cited as the "father" of corporate governance. See Robert Tricker, *Corporate Governance, Principles, Policies and Practices* (4th ed, OUP, 2019).

corporations".¹¹⁷ It includes the practices by which that exercise and control of authority is in fact effected. This definition is currently accepted by the ASX in its own Corporate Governance Principles and Recommendations, considered shortly.¹¹⁸ Corporate governance is not found exclusively in legislation, but includes consideration of a company's constitution or applicable replaceable rules, case law, institutional and industry codes of conduct and ethics.¹¹⁹

The *Corporations Act 2001* (Cth) contains laws with respect to the registration, formation, constitution, internal and external governance, capital, fund raising and external administration of corporations. Specifically relevant to corporate governance, both the *Corporations Act* and case law sets standards of behaviour expected of company directors and senior officers. The current discussion considers only those obligations arising under the *Corporations Act*. Part 2D.1 of the *Corporations Act* imposes duties on directors and officers of corporations, which are enforceable by ASIC. The duties are of two broad kinds: the duty of care and diligence under s 180(1)¹²⁰; and the duties of loyalty and good faith under ss 181-183. There is a significant body of literature concerning the operation of these duties.¹²¹ A range of defences are available to directors and officers who breach their statutory duties, including, but not limited, to the business judgment rule¹²²; reliance on information provided by others¹²³; and decisions made by reliable and competent delegates.¹²⁴ Listed entities, their directors and officers also have continuous disclosure obligations regarding materially price sensitive information that they must disclose to their equities market.¹²⁵

Listed entities must also conform to certain standards and structures of corporate management and composition known as the ASX's *Listing Rules*, which are enforceable against listed entities and their associates under the *Corporations Act*.¹²⁶ Two ASX Listing Rules are immediately relevant to the current discussion: the requirement that listed entities disclose their corporate governance practices to the market¹²⁷; and the additional requirements relating to continuous disclosure. In relation to corporate governance practices, listed entities are expected annually to produce a corporate governance

¹¹⁷ HIH Royal Commission, *The Failure of HIH Insurance*, Commonwealth of Australia, Canberra, 2003, Vol 1, [6.1]. See also Commonwealth of Australia, *Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry – Final Report*, (Canberra, 2019) Volume 1, [334-335].

¹¹⁸ ASX Corporate Governance Council, *Corporate Governance Principles and Recommendations* (4th edition, February 2019) < <https://www.asx.com.au/documents/asx-compliance/cgc-principles-and-recommendations-fourth-edn.pdf>).

¹¹⁹ John Farrar and Pamela Hanrahan, *Corporate Governance*, n 3 above, [4].

¹²⁰ Including the sub-component of the duty to prevent insolvent trading (*Corporations Act* s 588G), not discussed here.

¹²¹ See for e.g. Ian Ramsay, *Company Directors, Principles of Law and Corporate Governance* (2nd ed, Lexis Nexis, 2023); Robert Austin & Ian Ramsay, *Ford, Austin and Ramsay's Principles of Corporations Law* (LexisNexis Butterworths, 2018) [Chapters 8 and 9]; Rosemary Langford, *Directors' Duties: Principles and Application* (Federation, 2014).

¹²² *Corporations Act 2001* (Cth) s 180(2).

¹²³ *Corporations Act 2001* (Cth) s 189.

¹²⁴ *Corporations Act 2001* (Cth) s 190.

¹²⁵ *Corporations Act 2001* (Cth) ss 674-678.

¹²⁶ *Corporations Act 2001* (Cth) s 793C & 1101B.

¹²⁷ ASX, *ASX Listing Rules* (1 December 2019) [4.7.3, 4.7.4, 4.10.3, 12.7 and 12.8], < <https://www.asx.com.au/about/regulation/rules-guidance-notes-and-waivers/asx-listing-rules-guidance-notes-and-waivers>>.

statement, which discloses the extent to which it follows the recommendations set by the ASX Corporate Governance Council.¹²⁸ In relation to continuous disclosure practices, listed entities must comply with specific rules relating to what is market sensitive information and the prohibition against creating a false market.¹²⁹

The ASX Corporate Governance Council, through the *Corporate Governance Principles and Recommendations* (“CGPR”)²⁶, stipulates additional responsibilities of boards such as monitoring the effectiveness of the company’s governance, overseeing management’s implementation of the company’s strategic objectives and its performance generally, setting the risk appetite within which the board expects management to operate and ensuring that the company has in place an appropriate risk management framework to identify, monitor and manage its risks. Compliance with these rules is not mandatory, but rather on a “comply or explain” basis.¹³⁰ However, the effect of the *ASX Listing Rules* is to require disclosure by listing entities of the extent of their compliance with the *ASX CGPR* principles and recommendations.

A company’s constitution also contains governance rules such as directors’ powers, delegation, and proceedings for the internal governance of the organisation.¹³¹ According to section 140(1) of the *Corporations Act*, the constitution acts as a contract between the company and each member, between the company and each director and company secretary, and between a member and each other member.

C. CHESSE governance and its regulation

Licensing of financial markets, including clearing and settlement facilities are regulated by Part 7.2 of the *Corporations Act*. A licensee’s fundamental obligations are as follows:

- comply with all relevant financial stability standards imposed by the Reserve Bank¹³² and do all things necessary to reduce systemic risk;
- to the extent that it is reasonably practical to do so, to do all things necessary to provide the facility services in a fair and effective way;
- to comply with all conditions on the licence;
- to have adequate arrangements for supervising the facility including arrangements for handling conflicts and enforcing compliance with the facility’s operating rules; and
- to have sufficient resources (financial, technological, and human) to operate the

¹²⁸ Ibid [4.7.3].

¹²⁹ ASX, *ASX Listing Rules* (5 June 2021) [3.1, 3.1A and 3.1B], < <https://www.asx.com.au/about/regulation/rules-guidance-notes-and-waivers/asx-listing-rules-guidance-notes-and-waivers>>. See also, ASIC, “Handling corporate information”, *ASIC.gov.au* (Accessed 1 September 2023) < [¹³⁰ Dimity Kingsford-Smith, “Governing the Corporation: the role of ‘soft regulation’ \(2012\) 3 *University of New South Wales Law Journal* 378.](https://asic.gov.au/regulatory-resources/corporate-governance/handling-corporate-information/#:~:text=Continuous%20disclosure&text=Listed%20companies%20must%20disclose%20material,rules%20of%20the%20relevant%20market.>.</p></div><div data-bbox=)

¹³¹ ASX, *Constitution of ASX Limited* (5 October 2012) < <https://www.asx.com.au/about/corporate-governance>>.

¹³² As determined by the Reserve Bank pursuant to *Corporations Act* s 827D.

facility properly and for the required supervisory arrangements to be provided.¹³³

Attached to these obligations is an additional requirement that the licensee notify ASIC as soon as practicable if it becomes aware that these obligations have been breached.¹³⁴ Similarly, it must notify the Reserve Bank if it becomes aware that there has been a breach of any standards imposed by the Reserve Bank or it becomes aware that it has breached its obligation to reduce systemic risk.¹³⁵ A C&S facility licensee must provide an annual report to ASIC on the extent to which the licensee has complied with its statutory obligations.¹³⁶

Both ASIC and the Reserve Bank are empowered to undertake assessments of a C&S facility licensee.¹³⁷ ASIC assessments focus on how well the C&S licensee has complied with its obligations under *Corporations Act Part 7.3*, whilst the Reserve Bank assessment focuses on how well the licensee is complying with its obligation to reduce systemic risk. Reserve Bank assessments are done on an annual basis and are publicly available from the Reserve Bank website.¹³⁸ ASIC assessments are likewise done annually, but are not always available for public access.¹³⁹

ASIC assessments are conducted in accordance with standards and recommendations promulgated by international regulatory bodies, the International Organisation of Securities Commissions (“**IOESCO**”) and the Committee on Payment and Settlement Systems (“**CPSS**”).¹⁴⁰ ASIC chiefly concerns itself with monitoring compliance with the legislative provisions imposed on clearing and settlement facilities, apart from financial stability, and the governance arrangements of facility licensees.¹⁴¹ In relation to governance, CPSS–IOSCO Principles for financial market infrastructure provide, inter alia, financial market infrastructure should have governance arrangements that are clear and transparent, promote the safety and efficiency of the financial market infrastructure, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.¹⁴²

The Reserve Bank assessment is chiefly concerned with how well the clearing and settlement facility licensee is complying with the Financial Stability Standards and doing all other things

¹³³ *Corporations Act* s 821A(aa)-(d).

¹³⁴ *Corporations Act* s 821B(1).

¹³⁵ *Corporations Act* s 821BA(1).

¹³⁶ *Corporations Act* s 821E.

¹³⁷ *Corporations Act* s 823 (ASIC) and *Corporations Act* s 823CA (Reserve Bank).

¹³⁸ *Corporations Act* s 823CA(IA). See also Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2022), <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2021-2022/>>.

¹³⁹ *Corporations Act* s 823C(2). See ASIC, “Licensed market and clearing and settlement facility assessment reports”, www.ASIC.gov.au (accessed 1 September 2023) <<https://asic.gov.au/regulatory-resources/markets/market-structure/licensed-market-and-clearing-and-settlement-facility-assessment-reports/#asx>>. The most recent ASX clearing and settlement facility assessment report was published by ASIC was in 2018.

¹⁴⁰ ASIC, Regulatory Guide 211, Clearing and Settlement Facilities: Australian and Overseas Operators (December 2012) [211.114].

¹⁴¹ Reserve Bank of Australia, “Memorandum of Understanding”, *Media Release 2002-08* (20 March 2002) <<https://www.rba.gov.au/media-releases/2002/mr-02-08.html>>.

¹⁴² *Ibid*, Appendix 2, Principle 2.

necessary to reduce systemic risk.¹⁴³ The object of these standards are to ensure that licensees identify and properly control risks associated with their operations in order to promote the overall stability of the Australian Financial system.¹⁴⁴ There are 21 standards, which, inter alia, impose standards expected for legal compliance, governance, risk management including credit, liquidity, general business risk, custody and investment, and operational risks.¹⁴⁵

D. ASX Code of Practice

The ASX Cash Equities Clearing and Settlement Code of Practice (“**ASX Code of Practice**”) is an acknowledgment by the ASX that it is the sole licensee and custodian of Australia’s clearing and settlement infrastructure used in the Australian equities market.¹⁴⁶ It comprises a series of commitments made by the ASX in relation to the operation of its clearing and settlement facilities including: to proper customer and stakeholder engagement; to transparent and non-discriminatory pricing of and access to services to all users; and to protection of confidential information. The Code was drafted as a means of give effect to regulatory expectations published by the Council of Financial Regulators for the conduct of clearing and settlement services in Australia in September 2017.¹⁴⁷

The 2017 Regulatory Expectations provide a framework for ASX’s conduct in operating its cash equities clearing and settlement services while it remains the sole provider of these services. They relate to key user governance, pricing and access matters.

E Returning to the Governance Framework.

Each of these requirements now discussed, whether imposed by law, the ASX Corporate Governance Council, the ASX itself, ASIC and/or the Reserve Bank, serve to underpin and inform the governance of Australian clearing and settlement facility licensees. They are both relevant to the corporate governance of the ASX group of companies and, as will be seen, to

¹⁴³ Reserve Bank of Australia, *The Reserve Bank’s Approach to Supervision and Assessing Clearing and Settlement Facility Licences* (21 July 2019, updated 25 February 2021) < [¹⁴⁴ Reserve Bank of Australia, *Financial Stability Standards for Central Counterparties* \(December 2012\) \[Introduction - Objectives\] \(December 2012\) < \[>\]\(https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/standards/central-counterparties/2012/introduction-standards.html\).](https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/standards/approach-to-supervising-and-assessing-C&Sf-licensees.html#:~:text=The%20Bank%20will%20typically%20conduct,full%20set%20of%20PFMI%20Principles.>.</p>
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¹⁴⁵ Reserve Bank of Australia, *Financial Stability Standards for Central Counterparties* (December 2012) <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/standards/central-counterparties/2012/>.

¹⁴⁶ ASX, *ASX Cash Equities Clearing and Settlement Code of Practice* (July 2023) [2] < [¹⁴⁷ Council of Financial Regulators, *Regulatory Expectations for Conduct in Operating Cash Equity Clearing and Settlement Services in Australia – A Policy Statement by the Council of Financial Regulators* \(September 2017\) < \[>\]\(https://www.cfr.gov.au/publications/policy-statements-and-other-reports/2016/regulatory-expectations-policy-statement/pdf/policy-statement.pdf\).](https://www.asx.com.au/about/regulation/clearing-and-settlement-of-cash-equities-in-australia/code-of-practice#:~:text=ASX's%20core%20commitments%20include%20providing,of%20cash%20equity%20C&S%20services.>.</p>
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the governance of major projects that the ASX undertakes as part of the operations of its C&S licences.

VI – Analysis of ASX Corporate Governance

A. Key period of assessment

In this section, we rely on ASX Limited Annual Reports and reports published by the Reserve Bank and ASIC to describe and analyse key corporate governance structures and practices by the ASX group of companies during the 5-year period that encompassed the CHES replacement project. Having detailed what we found, we draw together and offer a number of critical observations about ASX corporate governance at the end of this Part.

The insights here also inform the discussion of project governance which follows in Part VII. The limitations attending this exercise were noted at the start of this submission.¹⁴⁸ As our discussion is limited to an examination of public documents, we cannot comment on the human interactions involved in the events, save where they are recorded in public documents.

B. ASX Clearing and Settlement Facilities

Throughout the 5-year period, the ASX operated four clearing and settlement facilities (“C&S”), known as ASX Clear, ASX Clear (Futures), ASX Settlement and Austraclear.¹⁴⁹

ASX Clear and ASX Clear Futures provide counterparty services for ASX quoted cash equities, debt products and warrants and equity derivatives traded on the ASX markets.¹⁵⁰ ASX Clear (Futures) provided the same service for futures and options traded on the ASX 24 market.

ASX settlement provided final settlement services for transactions on the ASX market and others trading platforms. Austraclear provides settlement and deposit services for debt securities, derivatives traded on the ASX 24 market and for margin payments in ASX Clear and ASX Clear Futures.

Each of the required licences for these facilities are held by proprietary companies bearing the same name as the facilities. The ASX Clear C&S licence was held by ASX Clear Pty Ltd. The ASX Clear (Future) C&S licence was held by ASX Clear (Future) Pty Ltd. The ASX Settlements C&S licence was held by ASX Settlements Pty Ltd and Austraclear’s C&S licence was held by Austraclear Pty Ltd.

C. ASX Group Structure during the period

Figure 3 depicts the ASX group structure as it existed in 2017. ASX Limited was and remains the ultimate parent company of the four clearing and settlement facilities just described. The four proprietary companies which hold the ASX’s C&S licences are subsidiaries of two holding companies, ASX Clearing Corporation Limited and ASX Settlement Corporation Limited, who in turn, are subsidiaries of the parent, ASX Limited. ASX Limited is the licenced operator of the ASX market. The Australian Securities Exchange Limited, also a subsidiary of the ASX Limited, is the licenced operator of the ASX 24 futures market.

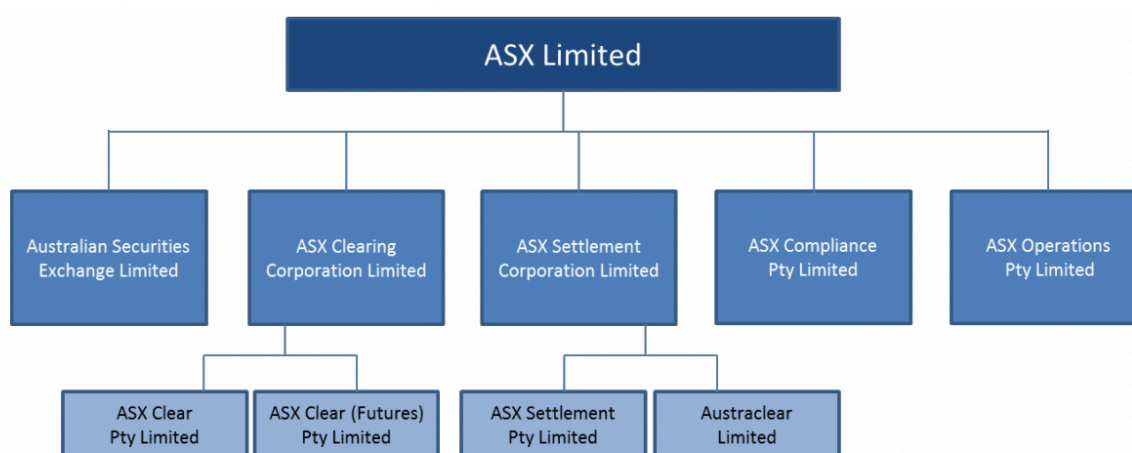
¹⁴⁸ See Part IB above.

¹⁴⁹ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2017) [Appendix B, B.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2016-2017/>>.

¹⁵⁰ And on Chi-X Australia Pty Ltd markets.

While the licences are held by subsidiary companies, the ASX has always adopted a “group-wide” approach to managing the business operations of the various entities including the C & S facilities.¹⁵¹ None of the ASX C&S facilities had any employees, premises or IT facilities.¹⁵² ASX Compliance Pty Ltd and ASX Operations Pty Ltd in Figure 3 provided compliance and operational resources to the whole group in 2017. In 2018, the ASX Compliance Pty Ltd was removed from the corporate group, presumably having been collapsed into and become part of ASX Operations Pty Ltd.¹⁵³ Figure 4 depicts the ASX group structure as it has existed since 2018.

Figure 3: ASX Group Structure (2017)¹⁵⁴.

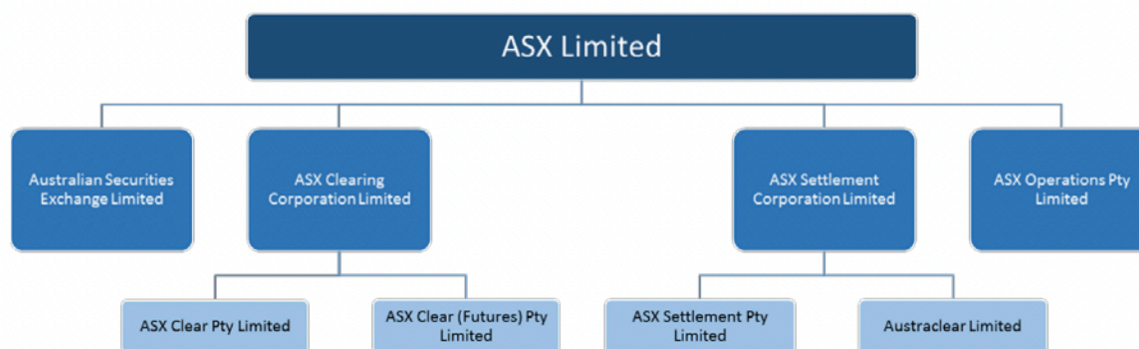


¹⁵¹ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2017), [Appendix B, B.1]; Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018), [Appendix B, B.1]; Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2019), [Appendix B, B.1]; Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2020), [Appendix B, B.1]; Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) [Appendix B, B.1]; and Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2022) [Appendix B, B.1], <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/>.

¹⁵² Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2021), [4.1.1].

¹⁵³ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [Appendix B, B.1].

¹⁵⁴ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2017) [Appendix B, B.1].

Figure 4: ASX Group Structure (2018-2022)¹⁵⁵.

D. Corporate Governance

The essential structures and processes by which the ASX Group was governed from 2017 to 2022 are reported in the Corporate Governance Statement forming part of the ASX Limited Annual Reports.¹⁵⁶ ASX Limited is listed on the ASX market and is responsible for overseeing control, monitoring and reporting mechanisms through the group. While the four subsidiary companies holding C&S licences have boards of directors and are subject to their own governance arrangements¹⁵⁷, their involvement in the CHES replacement project was likely limited as their main function was to provide oversight of the clearing and settlement operations, for which they reported to the ASX Limited Board.¹⁵⁸ ASX Limited made and resourced the critical corporate governance decisions that affected the whole group including the CHES replacement project pursuant to a Group Support Agreement between all the companies in the group.¹⁵⁹

Produced in accordance with the *ASX Listing Rules*¹⁶⁰ and reporting how the ASX's approach to corporate governance aligns with the *ASX CGPR*¹⁶¹, the Corporate Governance statement provides an annual profile of the directors of ASX Limited, the role of the ASX Board and board committees, the role and responsibilities of management, how the ASX makes timely and balanced disclosures, respects the rights of security holders, recognises and manages risk and remunerates its executive and non-executive remuneration. In the following discussion, we focus on a subset of these issues that we consider are most relevant to the CHES replacement project collapse.

¹⁵⁵ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2017) [Appendix B, B.1],

¹⁵⁶ See ASX, *ASX Limited Annual Report 2017* (August 2017) [8-12]; ASX, *ASX Limited Annual Report 2018* (August 2018) [28-38]; ASX, *ASX Limited Annual Report 2019* (August 2019) [36-47]; ASX, *ASX Limited Annual Report 2020* (August 2020) [32-45]; ASX, *ASX Limited Annual Report 2021* (August 2021) [30-42]; and ASX, *ASX Limited Annual Report 2022* (August 2022) [32-45] <<https://www.asx.com.au/about/asx-shareholders/reports.html>>.

¹⁵⁷ ASX, *C&S Board Charter* (February 2018) <https://www.asx.com.au/documents/about/C&S-Board-Charter.pdf>.

¹⁵⁸ ASX, *ASX Limited Board Charter* (15 February 2023). Earlier versions not publicly available.

¹⁵⁹ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2021), [4.1.1].

¹⁶⁰ See Part V.B above.

¹⁶¹ *Ibid.*

E. Management and Oversight of Group

The 2017 Corporate Governance provides basic details of the division of functions between the ASX Limited board of directors and ASX management. Similar statements can be found in the ASX Annual Reports from 2018-2022.¹⁶²

The role of the ASX board of directors' functions was said to be as follows:

- To take responsibility for performance of the ASX Group, enhancing and protecting the reputation of the ASX, and communicating with shareholders;
- to approve corporate strategy, annual budgets and financial plans, major corporate initiatives and the performance of the CEO;
- to oversee the conduct of the ASX Group consistent with its licence obligations and public policy objectives, financial performance, management effectiveness, ASX culture, processes for identifying, controlling, monitoring and reporting significant risks facing the ASX and executive succession plans.¹⁶³

F. Board of Directors (2017-2022)

Table 3 lists the members of the Board of Directors of ASX Limited from 2017 to 2022, based on information in ASX Limited Annual Reports from that period.¹⁶⁴ Typically, the board consisted of the board chair, the ASX Managing Director/CEO and 8-9 non-executive directors. The appointments were said to be consistent with the ASX Board policy on independence¹⁶⁵, the ASX Board Charter¹⁶⁶ and the ASX *GGPR* guidelines on independent directors.¹⁶⁷ Board membership was largely stable during the period, with only a few directors departing and new directors joining. The Reserve Bank expressed reservations about lengthy director tenure at the ASX in its 2021 review of ASX governance arrangements and encouraged the ASX to come up with a board tenure policy that provided for a more structured and progressive board renewal program.¹⁶⁸

¹⁶² ASX, ASX Limited Annual Report 2018 (August 2018) [31]; ASX, ASX Limited Annual Report 2019 (August 2019) [40]; ASX, ASX Limited Annual Report 2020 (August 2020) [37]; ASX, ASX Limited Annual Report 2021 (August 2021) [34]; and ASX, ASX Limited Annual Report 2017 (August 2022) [36]. See also, ASX, ASX Board Charter (15 February 2023) <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁶³ See ASX, *ASX Limited Annual Report 2017* (August 2017) [8] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁶⁴ See ASX, *ASX Limited Annual Report 2017* (August 2017) [8-12]; ASX, *ASX Limited Annual Report 2018* (August 2018) [28-38]; ASX, *ASX Limited Annual Report 2019* (August 2019) [36-47]; ASX, *ASX Limited Annual Report 2020* (August 2020) [32-45]; ASX, *ASX Limited Annual Report 2021* (August 2021) [30-42]; and ASX, *ASX Limited Annual Report 2022* (August 2022) [32-45] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁶⁵ ASX, *ASX Limited Board Policy and Guideline to Relationships Affecting Independent Status* (accessed 1 September 2023) < <https://www.asx.com.au/documents/about/ASXL-guidelines-affecting-independent-status.pdf>>.

¹⁶⁶ ASX, *ASX Board Charter*, n 162 above, [25-26].

¹⁶⁷ See Part V.B. above.

¹⁶⁸ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) [4.1.8] <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>.

Table 3 - Directors of ASX Limited (2017-2022)

	2017	2018	2019	2020	2021	2022
Chair	Rick Holliday-Smith	Rick Holliday-Smith	Rick Holliday-Smith	Rick Holliday-Smith	Damian Roche	Damian Roche
MD, CEO & Executive Director	Dominic Stevens	Dominic Stevens	Dominic Stevens	Dominic Stevens	Dominic Stevens	Helen Lofthouse
Non-Executive Directors	Yasmin Allen	Yasmin Allen	Yasmin Allen	Yasmin Allen	Yasmin Allen	Yasmin Allen
	Melinda Conrad	Melinda Conrad	Melinda Conrad	Melinda Conrad	Melinda Conrad	Melinda Conrad
	Dr Ken Henry	Dr Ken Henry	Dr Ken Henry	Dr Ken Henry	Dr Ken Henry AC	Dr Ken Henry AC
	Peter Marriott	Peter Marriott	Peter Marriott	Peter Marriott	Peter Marriott	Peter Marriott
	Robert Priestley	Heather Ridout	Peter Nash	Peter Nash	Peter Nash	Peter Nash
	Heather Ridout	Damian Roche	Heather Ridout	Heather Ridout	Heather Ridout AO	Heather Ridout AO
	Damian Roche	Peter Warne	Damian Roche	Damian Roche	Robert Woods	Robert Woods
	Peter Warne		Peter Warne	Peter Warne		Dr Heather Smith
				Robert Woods		David Curran

G. Board Skill Set

A board skills matrix was said to guide the nomination of directors, with the appointed board members considered to individually and collectively possess the appropriate level of skills, expertise and experience.¹⁶⁹ Figure 3 is a copy of the skills matrix taken from the ASX Limited 2017 report. Notably, despite the previous assertion, the only director whose biography made specific mention of IT and technology experience was Peter Marriott, referencing his pre-1997 career as a partner at KPMG.¹⁷⁰

Figure 3 - Board skills matrix 2017

Category	Explanation
Executive leadership	Successful career as a CEO or senior executive.
Strategy	Define strategic objectives, constructively question business plans and implement strategy.
Financial acumen	Accounting and reporting, corporate finance and internal controls, including assessing quality of financial controls.
Risk and compliance	Forward-looking, able to identify the key risks to the organisation and monitor effectiveness of risk management frameworks and practices.
Public policy	Public and regulatory policy, including impact on markets and corporations.
Information/technology/digital	Use and governance of critical information technology infrastructure, digital disruption and information monetisation.
Business development	Commercial and business experience, including development of product, service or customer management strategies, and innovation.
People and change management	Overseeing and assessing senior management, remuneration frameworks, strategic human resource management and organisational change.
Corporate governance	Knowledge, experience and commitment to the highest standards of governance.
International exchange experience	International financial markets or exchange groups, including post-trade services and relationships with financial market participants.
Financial services experience	Broking, funds management, superannuation and/or investment banking activities.

¹⁶⁹ ASX, ASX Limited Annual Report 2017 (2017) [7] <<https://www.asx.com.au/about/asx-shareholders/reports.html>>.

¹⁷⁰ Ibid [6].

While the director biographies remained largely the same from 2018 onwards, the ASX Annual Reports from 2018-2021 profiled the number, but not the identity, of the board members with the prescribed board matrix skills.¹⁷¹ Table 4 summarises that data. Notably, the data suggests that the ASX believed that they had technology skills, experience and/or expertise during this period on the board.

Table 4 - Number of Directors with ASX Board Matrix Skills 2018-2021

Skill	2018 (Board = 10)	2019 (Board = 9)	2020 (Board = 10)	2021 (Board = 8)
Executive leadership	8	9	10	8
Strategy	8	9	10	8
Financial acumen	7	8	10	8
Risk and compliance	8	9	10	8
Public policy	3	4	8	6
Information technology digital ¹⁷²	6	7	7	5
Business development & customer management	7	8	9	7
People & change management	7	8	9	7
Corporate governance	7	8	10	8
International exchange experience ¹⁷³	2	2		
Financial services experience	6		9	7

The assessment basis for the board matrix changed in 2022. Instead of merely listing the number of directors with the requisite experience or expertise, the matrix now purported to assess the overall “strength” of particular skills. The criteria was depicted along a horizontal axis with “low” at one end, “very strong” at the other end and “strong” in the middle.¹⁷⁴ Interestingly, in the year that the CHES project was abandoned, the data and technology strengths of the board were said to be slightly more than “strong” and risk management was half-way between “strong” and “very strong”.

¹⁷¹ ASX, ASX Limited Annual Report 2018 (August 2018) [33]; ASX, ASX Limited Annual Report See 2019 (August 2019) [42]; ASX, ASX Limited Annual Report 2020 (August 2020) [40]; and ASX, ASX Limited Annual Report 2021 (August 2021) [36] <<https://www.asx.com.au/about/asx-shareholders/reports.html>>

¹⁷² “Information technology digital” was changed to “Technology and data” in 2020: see ASX, ASX Limited Annual Report 2020 (August 2020) [40] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁷³ “International exchange experience” was removed as a skill from the Board Skills Matrix in 2020. See ASX, ASX Limited Annual Report 2020 (August 2020) [40] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁷⁴ ASX, ASX Limited Annual Report 2022 (August 2022) [41] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

H. Board Committees

To assist the ASX Board to discharge its duties, three committees were established: audit and risk, nominations and remuneration. Table 5 lists the committees and their membership between 2017 and 2022 based on information contained in the ASX Annual Reports for this period.

Of chief interest in this submission is the work of the audit and risk committee. The ASX Annual Report for 2017 stated that the role and responsibilities of that committee included oversight of the integrity of the ASX's financial reports, the adequacy of its reporting processes, systems of risk management, internal control and legal compliance; the ASX's framework for identifying and managing cyber risk; and internal and external audit oversight and review.¹⁷⁵ As will be seen, risk management was a critical issue behind the CHES replacement project and therefore issues pertaining to the project should have been before this committee from time to time from 2017 until 2022.

A new committee, known as the technology committee was established in 2022.¹⁷⁶ The charter of that committee required it to oversee technology, data and cyber security challenges, projects and risks.¹⁷⁷ The Committee Chair, David Curran, a newly appointed non-executive director was the first ASX director to have significant experience with leading digital transformation since the CHES replacement project began. Once established, oversight of technology risks shifted from the Audit and Risk Committee to the Technology Committee.

¹⁷⁵ ASX, *ASX Limited Annual Report 2017* (August 2017) [10]. The Audit and Risk Committee Charter from the period is not publicly available.

¹⁷⁶ Established on 6 May 2022. See ASX, *ASX Limited Annual Report 2022* (August 2022) [38 (footnote 1)] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁷⁷ ASX, *Technology Committee Charter* (6 May 2022) <https://www.asx.com.au/about/corporate-governance>.

Table 5 - Membership of Board Committees 2017-2022

	2017	2018	2019	2020	2021	2022
Audit & Risk Committee	Peter Marriott (C) Yasmin Allen Ken Henry Rick Holliday-Smith (from 17 August 2016) Dominic Stevens (up to 1 August 2016) A J Harkness (ending 29 September 2017)	Peter Marriott (C) Yasmin Allen Ken Henry Rick Holliday-Smith Peter Warne	Peter Marriott (C) Yasmin Allen Ken Henry Rick Holliday-Smith Peter Warne	Peter Marriott (C) Yasmin Allen Ken Henry Rick Holliday-Smith Peter Nash Peter Warne Rob Woods	Peter Marriott/ Peter Nash (C) Yasmin Allen Ken Henry Damian Roche Peter Marriott Peter Nash Rob Woods	Peter Nash (C) Yasmin Allen Ken Henry Peter Marriott Damian Roche Rob Woods
Nomination Committee	Rick Holliday-Smith (C) Heather Ridout Peter Warne	Rick Holliday-Smith (C) Heather Ridout Peter Warne	Rick Holliday-Smith (C) Heather Ridout Peter Warne	Rick Holliday-Smith (C) Heather Ridout Peter Warne Melinda Conrad Ken Henry	Damian Roche (C) Melinda Conrad Ken Henry Heather Ridout	Damian Roche (C) Melinda Conrad Ken Henry Heather Ridout
Remuneration Committee	Heather Ridout (C) Rick Holliday-Smith Peter Warne	Heather Ridout (C) Rick Holliday-Smith Peter Warne	Heather Ridout (C) Rick Holliday-Smith Peter Warne	Heather Ridout (C) Rick Holliday-Smith Peter Warne Melinda Conrad	Damian Roche (C) Heather Ridout Melinda Conrad	Heather Ridout (C) Melinda Conrad Damian Roche
Technology Committee						David Curran Yasmin Allen Carolyn Colley Melina Conrad Peter Nash

I. Day-to-day management of ASX Business

The day-to-day management of the ASX group was delegated by the board to the Managing Director or CEO consistent with the ASX Constitution.¹⁷⁸ The CEO took responsibility for the operational and business management of the group, supported by an executive committee of senior executives including the Deputy CEO, the Chief Financial Officer, the Chief Operations Officer, the Chief Risk Officer and the Group General Counsel.

Table 6 lists the persons holding those positions at the ASX Limited from 2017-2022, based on information from the ASX Annual Reports published over this period. The ASX CHES replacement project for most of the 2017-2022 period apparently fell within the remit of the ASX Chief Operating Officer, Tim Hogben. Although the ASX announcements about the CHES replacement project typically were made by Peter Hiom, the then Deputy CEO.

At the start of the CHES project in 2017, the group was divided into nine business units: Office of the CEO; Risk; Operations; Technology; Business Development; ASX Compliance; Office of General Counsel and Company Secretary; Regulatory Policy and Regulatory Assurance; Finance and Human Resources.¹⁷⁹ This structure remained more or less the same until a governance and risk management review in 2021 led ASX to provide more extensive governance and risk functions within the subsidiary companies.¹⁸⁰

¹⁷⁸ ASX, *ASX Limited Constitution* (5 October 2012) [15.1] <https://www.asx.com.au/about/corporate-governance>.

¹⁷⁹ Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2017) [Appendix B, B.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2016-2017/>>.

¹⁸⁰ See Part VI.K below.

Table 6 ASX Senior Executive Group (2017-2022)

Year	2017	2018	2019	2020	2021	2022
MD & CEO	Dominic Stevens	Dominic Stevens	Dominic Stevens	Dominic Stevens (CEO only)	Dominic Stevens (CEO only)	Dominic Stevens/ Helen Lofthouse (01.07.2022)
Deputy CEO	Peter Hoim	Peter Hoim	Peter Hiom	Peter Hiom	Peter Hiom (ending 01.07.2021)	Andrew Tobin
CFO	R Aziz	R Aziz (ending 31.10.2018)	G L Larkins	G L Larkins	G L Larkins	G L Larkins
COO	Tim Hogben	Tim Hogben	Tim Hogben	Tim Hogben	Tim Hogben (ending July 2021) ¹⁸¹	Unclear from public documents.
CRO	A J Bardwell/ Hamish Treleaven (01.03.2017)	Hamish Treleaven	Hamish Treleaven	Hamish Treleaven	Hamish Treleaven	Hamish Treleaven
Group General Counsel	A J Harkness (ending 29.09.2017)	Daniel Moran	Daniel Moran	Daniel Moran	Daniel Moran	Daniel Moran

J. Risk Management

The ASX Annual Report 2017 documents ASX risk governance as it existed at the start of the CHES replacement project period.¹⁸² The ASX Board had responsibility for overseeing systems of risk management throughout the group. The Audit and Risk Committee assisted in that process, reporting to the ASX Board. The Committee required regular reports from the Chief Risk Officer on enterprise risk and the Chief Operating Officer on operational, technology and cyber security risks.

Enterprise risk management (ERM) is a firm-wide risk management strategy to identify and prepare for hazards with a company's finances, operations, and objectives.¹⁸³ Operating risks are the risk of loss resulting from inadequate or failed internal processes, people and systems

¹⁸¹ Executive responsibility for CHES was taken up by Dan Chesterman, then ASX Chief Information Officer ("CIO"), who was appointed both Group Executive for Technology and Data and CIO from July 2021. See n 295 and accompanying text.

¹⁸² ASX, ASX Limited Annual Report 2017 (August 2017) [11-12].

¹⁸³ Adam Hayes, "What Is Enterprise Risk Management (ERM)?" *Investopedia* (7 September 2022) <<https://www.investopedia.com/terms/e/enterprise-risk-management.asp>>.

or from external events.¹⁸⁴ In relation to enterprise risk, the Chief Risk Officer chaired the Enterprise Risk Management Committee. This was a management committee with responsibility for oversight and implementation of the ASX's enterprise risk management framework consistent with the ASX's board directives.¹⁸⁵

However, there was no similar role for the Chief Operating Officer in relation to operational, technology and cyber risks according to the 2017 ASX Annual Report. It seems likely that the CHES replacement project, being technology, fell within the COO's portfolio of responsibilities.¹⁸⁶ Responsibility for risk management of the existing clearing and settlements facilities was undertaken by the ASX subsidiary companies holding the ASX's C&S licences. They were required to report directly to the ASX Audit and Risk Committee.¹⁸⁷

In addition to reporting to the audit and risk committee, the board also required an annual statement from the ASX CEO and Chief Risk Officer that the ASX risk management and internal control systems were operating effectively for material business risks. External assessments of the risk management framework were also to be periodically undertaken.¹⁸⁸

K. Technology Governance Review (2018)

The ASX's governance, operational risk practices¹⁸⁹ and control mechanisms were the subject of two regulatory reviews during the period of the CHES replacement project. The more comprehensive of the two was the independent review conducted by KPMG in 2018.¹⁹⁰ That review was instigated by the ASX, at the request of the Reserve Bank and ASIC, following a series of operational disruptions to both ASX trading and C&S facilities during 2016 and 2017. The object of the review was to identify gaps in ASX technology governance and risk management processes and practices and recommend how they should be addressed. The report made 36 such recommendations.¹⁹¹ The focus on technology governance, as opposed to broader corporate governance, reflected the reality that the technology underpinned all of ASX's trading and C&S facilities. The documented operational disruptions in the report were caused by technology disruptions.

Despite observing that the ASX's arrangements for managing operational and technological risks had served the Australian market well historically, KPMG identified significant gaps or

¹⁸⁴ See Basel Committee on Banking Supervision, *Principles for the Sound Management of Operational Risk* (31 March 2021) <<https://www.bis.org/bcbs/publ/d515.htm>>.

¹⁸⁵ ASX, ASX Limited Annual Report 2017 (August 2017) [12]. <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁸⁶ Ibid.

¹⁸⁷ ASX, ASX Limited Annual Report 2017 (August 2017) [12]. <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁸⁸ Ibid.

¹⁸⁹ Operational risks means the risk of loss resulting from inadequate or failed internal processes people and systems or from external events. See Basel Committee on Banking Supervision, *Principles for the Sound Management of Operational Risk* (31 March 2021) <<https://www.bis.org/bcbs/publ/d515.htm>>.

¹⁹⁰ ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [3.1-3.3] <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>>.

¹⁹¹ Ibid [3.1].

deficiencies where arrangements did not match international recognised technology governance benchmarks and risk management standards.¹⁹² They included:

- The ASX had not kept pace with the changing role of enterprise risk management across the industry and needed to develop a more detailed risk appetite statement.
- There was a lack of evidence of formal consideration of risk in the ASX's strategy setting and performance management processes.
- The ASX's three lines of defence model for risk management, as well as the risk management and compliance functions for operation and technology, had been under resourced and lacked clarity as to roles and responsibilities across the organisation.
- The ASX's IT strategy was focused on individual projects, rather than an overarching vision of its core IT functions, the business objectives they were designed to address and the capability needed to meet those objectives.
- The ASX lacked a "true end-to-end view" of its IT architecture. The ASX needed to define a technology strategy and road map and clarify the role of enterprise architecture within strategic planning.
- Information given to the ASX executive and board on the governance of technology and operational risk issues was typically provided at a summarised level with the concern that the board and executives were operating without sufficient information to make strategic or risk management decisions or to oversee delegated decision-making.
- There was limited sharing of risk information across relevant boards and committees within the ASX group. The ASX instead relied on common membership across these forums.
- Limitations were also noted in the ASX's systems to measure and monitor operational risk. These limitations impeded the aggregated collection of risk information, led to inconsistencies in monitoring of risk across the organisation and limited the risk information provided to executives and the board. In turn, this limited the ASX's ability to generate strategic insights and key risk indicators for more effective risk management.
- There was heavy reliance on individual experts within the ASX, which had the potential to impede effective response to incidents, efficient IT operations and change management. There was an inconsistent approach to the documentation of processes, procedures and controls. The ASX was encouraged to establish a formal technology risk and controls register with the intention of improving information management and reducing key person risk.

¹⁹² ASIC, *Report 592 – Review of ASX's Group's technology governance and operational risk management standards* (September 2018) [Observation 8] <<https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-592-review-of-asx-group-s-technology-governance-and-operational-risk-management-standards/>>.

- The ASX had a tendency to manage projects and operations within silos, which limited the ability to manage its resources effectively. This was compounded by a lack of clarity regarding the division of responsibilities in the IT area.¹⁹³

On any objective assessment, these were damning findings for a public company whose technology powers Australia's equity, debt and futures markets.¹⁹⁴ Technology, that the then ASX CEO, Dominic Stevens, somewhat underwhelmingly admitted he needed to better understand.¹⁹⁵ For the purposes of our submission, we contend that these findings revealed that the 2016 and 2017 outages giving rise to the KPMG review were underpinned by a more systemic problem, namely, an ASX group wide failure of effective technology governance and risk management. Importantly, for present purposes, these problems were apparently evident as the CHES replacement project was starting. Problems that cast immediate questions about the ASX's ability and preparedness to effectively manage and govern the CHES replacement project from the very start.

To be clear, the KPMG Review did not specifically discuss the CHES replacement project. Yet, their findings invite equal examination about the activities and decisions of the then ASX Board and its senior management regarding the CHES replacement project including:

- Was there specific discussion of governance and risk management arrangements to be put in place for the CHES replacement, in the light of the KPMG findings?
- If these were already in place, was there any discussion, identification and remediation of gaps in the governance and management of the CHES replacement project in the light of the KPMG findings?
- To what extent did the KPMG report serve as a warning to either the ASX Board or its senior executives of the need to review the CHES replacement project and kick start an assurance program?
- Was there any sense of "chronic unease" at the ASX Board and Senior executive levels in relation to operational risks attaching to the ASX CHES replacement project?¹⁹⁶
- Did the project have an operational risk champion and was that champion reporting to the senior level of the organisation including the ASX Board?
- What was the division of risk and responsibilities within the ASX concerning the CHES replacement project? What were the reporting lines and did they extend adequately to the Board's audit and risk committee?

Importantly, the ASX supported the KPMG review and its recommendations, indicating that they were already aware of problems with their enterprise risk management system and

¹⁹³ ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [3.2] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>

¹⁹⁴ ASX, *ASX Annual Report 2018* (August 2018) [6] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

¹⁹⁵ ASX, "ASX FY18 Financial Results", *Managing Director and Deputy CEO Speaking Notes* (16 August 2018) < <https://www.asx.com.au/about/media-centre>>.

¹⁹⁶ Notions of "chronic unease" in the effective management of risk, and operational risk in particular, are considered essential to drive effective risk culture in many industries. See Commonwealth of Australia, *Prudential Inquiry into the Commonwealth Bank of Australia* (April 2018) [4, 10, 17, 83, 85] < https://www.apra.gov.au/sites/default/files/CBA-Prudential-Inquiry_Final-Report_30042018.pdf>.

were putting in place a three-year program to address those issues, entitled the “Building Stronger Foundations” program.¹⁹⁷ As part of that response, the ASX refreshed its senior executive team and appointed a Chief Operating Officer, Tim Hogben, for the first time, to provide a more holistic view of operations and technology within the ASX.¹⁹⁸ They also announced that they were updating their 3 lines of defence risk model¹⁹⁹, but noted it would take time to implement.²⁰⁰

The ASX also restructured its management committees.²⁰¹ In addition to the already existing executive committee, three new executive-level committees were established to support decisions related to the risk management of the ASX’s C&S facilities:

- The risk committee - responsible for advising the CRO on risk management decisions in the exercise of his delegated authority from the CEO;
- The regulatory committee - responsible for ASX policies relating to the conduct in operations of its licence entities;
- The technology, operations and security committee - responsible for advising the chief operations officer (“COO”) on the oversight of the ASX’s technology, operations and security strategies and the investments which supported those strategies. A sub-group within this committee, the portfolio governance group, would provide oversight of significant projects within the ASX Group.²⁰²

One of the positives of these changes was to bring technology and operations together into the one business unit²⁰³, but details of the committee’s new oversight responsibilities and

¹⁹⁷ ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [3.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>. The ASX advised both regulators that a significant component of this work would be completed by the end of 2018. See for e.g. ASIC, *Report 592 – Review of ASX’s Group’s technology governance and operational risk management standards* (September 2018) [Observation 14] <<https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-592-review-of-asx-group-s-technology-governance-and-operational-risk-management-standards/>> .

¹⁹⁸ Ibid [2.4.1].

¹⁹⁹ Institute of Internal Auditors, *The IIA’s Three Lines Model – An update of the three lines of defence* (July 2020) < <https://www.theiia.org/globalassets/documents/resources/the-iias-three-lines-model-an-update-of-the-three-lines-of-defense-july-2020/three-lines-model-updated-english.pdf>>. 1st line of defence is the specific risk functions performed by operational management and staff. The 2nd line of defence is a dedicated risk management and compliance function. 3rd line of defence is internal and external audit. See ASIC, *Report 592 – Review of ASX’s Group’s technology governance and operational risk management standards* (September 2018) [Observation 31] <https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-592-review-of-asx-group-s-technology-governance-and-operational-risk-management-standards/>. See also, ASX, *ASX Limited Annual Report 2018* (September 2018) [20].

²⁰⁰ ASX, *ASX Annual Report 2018* (August 2018) [7], <https://www.asx.com.au/about/asx-shareholders/reports.html>.

²⁰¹ The other recommended groups were a risk quantification working group, a default management and recovering steering group and a participant incident response group. See ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [Appendix B, B.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>>.

²⁰² Ibid [2.4.2].

²⁰³ Ibid [8].

reporting lines within the ASX were scant at that time.²⁰⁴ ASIC's review of the same period provided some further details, which included:

- Developing a robust and effective 'tone from the top' approach to operational and technological risk management activities that was enterprise-wide and meaningful resourcing and accountabilities;
- Making strategic investments in foundation, enterprise-wide capabilities to ensure that staff, internal systems and data support the board and senior management to readily identify risks, draw connections between business areas and make informed strategic decisions;
- An enterprise technology strategy and enterprise architecture to support the delivery of new technology solutions including a robust program to routinely monitor and evaluate existing core technology systems and assets; and
- A mature defence against risk management failure where accountabilities and responsibilities are clear and understood.²⁰⁵

Assessments by the Reserve Bank from 2019 to 2020 indicated that the ASX substantively completed the changes required to address the KPMG recommendations by 2020, with internal audits assessing how well they had been implemented.²⁰⁶ KPMG was consulted on "foundational" elements of the internal audit, but details of their involvement are scarce and do not appear to have been shared with the Reserve Bank and ASIC.²⁰⁷

Given the systemic nature of the concerns raised by KPMG and the full slate of technology projects that the ASX had on its agenda, a more prudent course by the regulators might have been to place conditions on ASX's licences requiring external assurance of the plan's implementation and future technology projects affecting the operation of C&S licence facilities for a specified period. However, while they did not do this, the Reserve Bank continued to raise concerns about aspects of the ASX's broader operational risk management, with shortcomings in the CHES replacement project becoming one of them in 2020.²⁰⁸

L. Governance and Risk Management Review (2021)

The second governance and risk review of the ASX occurring during the CHES replacement project period was undertaken by the Reserve Bank, this time in the wake of the ASX market

²⁰⁴ See discussion of risk in ASX, *ASX Limited Annual Report 2018* (August 2018) [20-21] <<https://www.asx.com.au/about/asx-shareholders/reports.html>>.

²⁰⁵ ASIC, *Report 592 – Review of ASX's Group's technology governance and operational risk management standards* (September 2018) [Observation 16] <<https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-592-review-of-asx-group-s-technology-governance-and-operational-risk-management-standards/>>.

²⁰⁶ RBA, *Assessment of ASX Clearing Facilities* (September 2020) [Table 1, 3.2 and 3.2.2.] <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2019-2020//>>>.

²⁰⁷ Ibid [3.2].

²⁰⁸ RBA, *Assessment of ASX Clearing Facilities* (September 2020) [Table 1] <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2018-2019/>>>; RBA, *Assessment of ASX Clearing Facilities* (September 2021) [Executive Summary, Table 3] <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>>>; and RBA, *Assessment of ASX Clearing Facilities* (September 2022) [Executive Summary].

turmoil and the March 2020 outages.²⁰⁹ Three key themes were raised in the review: the risks attaching to the ASX's 'whole of group' governance and management model used by the ASX to manage the C&S facilities within the group; the quality of oversight from the ASX boards of ongoing technology projects; and the ASX's framework for the management of risks.²¹⁰ For the purposes of our submission, the findings of this review provide further evidence of technology governance and risk management concerns. This time they concerned the current CHES technology and occurred during a critical time in the project lifecycle of the CHES replacement project.

Group wide structure

For the first time during the critical 5-year period under analysis (2017-2022), the Reserve Bank raised substantive questions about the risks and benefits of the group-wide operational structure for the governance of the C&S facilities within the group.²¹¹ C&S facilities had no employees, premises or IT resources, from which the Bank's view pointed to two high level risks. First, the risk that the business, operations and obligations of the C&S facilities did not receive sufficient attention in decisions about the day-to-day operations of the broader group. Second, that conflicts of interest arising between specific entities within the group were not being appropriately identified and managed.²¹² The Reserve Bank recommended that the governance of the C&S facilities be significantly strengthened to address these concerns.²¹³ This would include, inter alia, a requirement that C&S boards should complete a self-assessment of their own compliance with Financial Stability Standards and appoint identifiable executives with clear lines of responsibility and accountability to the C&S Boards for all parts of the C&S facility operations.

It was apparent that the Reserve Bank no longer considered that the ASX long standing governance framework, concentrated on the board of ASX Limited, was sufficient to satisfy governance standards for the subsidiary ASX companies with licenced C&S facilities under the Financial Stability Standards. There seems little doubt that a driving factor behind the Reserve Bank's change of attitude was the ASX system outages in 2020 and the firm belief that they were caused by technology failings²¹⁴; failings that appeared also to simultaneously reflect poor operational risk management practices by the ASX of the current CHES system and raised questions about the capacity and implementation plan for the CHES replacement project.

Board oversight

These high-profile technology and operational failures raised further concerns about ASX governance and the quality of board supervision of ASX technology projects. The CHES

²⁰⁹ Part IV.F. above.

²¹⁰ RBA, *Assessment of ASX Clearing Facilities* (September 2021) [4.1.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>>.

²¹¹ Ibid.

²¹² Ibid.

²¹³ RBA, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) [Governance Recommendations 1-10, 17, pages 41-43, 45-47,52-53] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>>.

²¹⁴ Ibid [2.2.1-2.1.2].

replacement project was specifically mentioned. The Reserve Bank review interviewed ‘many’ ASX directors and observed:

“It is clear from our interviews with directors that they were periods during 2019 and/or 2020 when the ASX boards were not fully informed of the progress and status of the chess replacement program. It is important that the ASX boards carefully consider any changes to their policies, processes and approach that may be required to avoid a similar scenario in future”.²¹⁵

In hindsight, this observation is a critical reflection of the dire state of technology governance likely on all ASX boards during 2021. As objective observers, it is hard to understand how the ASX board did not act more pro-actively in response to this Review, for example, by forcing an immediate board refresh of all ASX Boards. Instead, the ASX proposed to establish a technology project implementation board committee to have oversight of technology projects.

The Reserve Bank’s Review endorsed the proposal, observing that a more intensive board oversight in this area was required because “project implementation has proven to be a critical and ongoing risk for ASX”.²¹⁶ However, it also noted that the establishment of such a committee did not of itself discharge the responsibility of directors to develop and maintain their understanding of all aspects of the C&S facilities’ risk and businesses.²¹⁷ A specific recommendation was that the ASX also strengthen their oversight of technology project implementation by exploring ways to provide its boards with skills, experience and networks relevant to large technology project implementation.²¹⁸

The quality of ASX reporting to ASX boards and to the Reserve Bank was also raised. ASX directors, consultants and even the Reserve Bank itself made observations about the tendency of the ASX executives to provide feedback reports that were both lengthy and excessively technical in detail, making it difficult to engage on the key issues.²¹⁹ Combined with obvious gaps in essential technology project implementation skills on AS Boards, it is hard to see how reports of technical complexity could have been actively, robustly and effectively challenged by the ASX boards at this critical time. There was no project implementation risk champion anywhere in public sight.

Risk Management Framework

The 2021 review also purported to undertake a review of the ASX’s risk management framework to ensure there was an integrated and comprehensive review of its C&S risks. However, the review was “light touch” in approach, apparently awaiting the findings of a bi-annual review of the ASX’s enterprise risk management framework due later in 2021.²²⁰ The

²¹⁵ RBA, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) n 213 above, [4.1.6].

²¹⁶ *Ibid* [4.1.7].

²¹⁷ *Ibid*.

²¹⁸ RBA, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) n 213 above [Governance Recommendations 11 & 12].

²¹⁹ *Ibid* [4.1.6].

²²⁰ *Ibid* [4.2.1].

2021 review provided a largely uncritical update of ASX C&S risk governance following the completion of the “Building Stronger Foundations” discussed earlier.²²¹

The 2021 review recorded that:

- The ASX’s overarching approach to risk management including clearing and settlement risks was set out in its enterprise risk management framework.
- The ERMF is reviewed every two years with a review scheduled for September 2021.
- ASX’s governance structure distributes oversight of risk management between the ASX board, the Audit and Risk Committee, the Boards of the C&S Facilities and the ASX’s three executive level committees. These were the risk committee, the regulatory committee and the technology, operations and security committee (“**TOSC**”).
- TOSC was responsible for oversight of the ASX’s technology, operations and security strategies, with a sub-group, known as the Portfolio Governance Group, providing oversight of significant projects within the group.
- Internal forums also brought together experts from across the ASX group for the purpose of overseeing risk management. These included the Technology Risk Working Group, who were responsible for the management of technology risks and reporting their findings to TOSC.²²²
- The ASX continues to employ a version of the three lines of defence model.
- Risk identification is considered through a prism of seven key categories including strategic, operational, technology, counterparty, financial, regulatory and legal, and reputation risks. The ASX’s tolerance for each category is determined according to the Board’s Risk Appetite Statement. Tolerance for technology risk was said to be “very low”.
- The ERM system included an internal audit and compliance function, by which the ASX captures risk, compliance and audit data to facilitate consistent reporting and management of risks.²²³

These risk governance structures were consistent with what was expected for a sound risk management framework that managed legal, credit, liquidity, operational and other risks of C&S facilities.²²⁴ What they did not reveal, however, was their actual effectiveness in managing and mitigating technology risks, including the CHES replacement project risks. The possibility of real differences between documented risk governance practices and actual risk governance practices was a major cause of the Enron corporate governance scandal.²²⁵

M. Project Collapse

²²¹ Only one minor recommendation was made. See RBA, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) n 213 above [4.2.1-4.2.5].

²²² RBA, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) n 213 above, [Appendix B, B.1].

²²³ *Ibid* [4.2.1-4.2.4].

²²⁴ *Ibid* [4.2].

²²⁵ Robert Rosen, “Risk management and Corporate Governance: the Case of Enron” (2002) 35 *Connecticut Law Review* 1157.

The ASX announced a significant delay in the delivery of the CHES replacement project in May 2022. By November 2022, the project was abandoned in its planned DLT form. The Reserve Bank's 2022 Assessment of the ASX's Clearing and Settlement Facility found that the ASX had only "partially observed" compliance with Financial Stability Standards".²²⁶ The key developments considered in that assessment included:

- The CHES replacement system: specifically, concerns as to whether the new system was being built to meet required specifications and what impact the delays to the go-live date would have on vendor-related risks; and
- Weaknesses in ASX's risk management framework identified in its bi-annual review: in particular, the gaps in the effectiveness of the 1st and 2nd lines of risk defence.
- Governance failings: As at 30 June, 2022, the ASX had addressed 11 of the 17 recommendations in the Reserve Bank's 2021 review, but had not demonstrated the "expected sense of urgency" to progress the remaining 6 recommendations.²²⁷

The Reserve Bank appeared to be losing confidence in the ASX's governance of its C&S facilities. The Bank did acknowledge that the ASX had a comprehensive enterprise risk management framework, had made good progress in implementing risk managements systems and enhanced its risk reporting, but it critically observed:

"Despite this progress, the operating effectiveness of ASX's risk management framework remains behind the maturity levels of its peers in the Australian financial services industry."²²⁸

The ASX was asked to present plans to the Reserve Bank, as to how it planned to strengthen its three lines of defence model, by 31 December 2022. However, the priority surrounding these plans were derailed by the ASX's announcement in May 2022 that it was again suspending the CHES replacement project and the events that then followed, leading to the abandonment of the project altogether.

N. Our conclusions as to corporate governance failings during 2017-2022

Based on the public documents we discuss in Part VI, we submit that the ASX had a systemic problem with the governance of its technology projects, of which the CHES replacement project was but one recent example. Another concerning technology project failure was the ASX Trade Refresh Project, the failure of which in November 2020 caused the ASIC and the Reserve Bank to request that conditions be placed on all three ASX licences including its C&S licences in November 2021.

ASX technology governance and risk management failings, illustrated by the ASX's poor governance of the CHES replacement project, both impact and have bearing on its ongoing suitability to be the licenced operator of a major piece of public infrastructure essential to the stability of Australia's financial system.

7 specific concerns we would highlight are:

²²⁶ RBA, *Assessment of ASX Clearing Facilities* (September 2022), [Executive summary, key findings, pages 1-2] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2021-2022/pdf/report-2021-2022.pdf>>.

²²⁷ Ibid [2.1].

²²⁸ Ibid [2.2].

- The quality and robustness of the ASX’s enterprise risk governance. The ASX itself admitted in 2018 that its risk management systems required major reform. Risk management and governance, particularly of technology risks, was found to be deficient in two regulatory reviews undertaken in 2018 and 2021.
- Deficiencies in the ASX’s three lines of defence risk management: the first line of defence, inside the C&S facilities, lacked sufficient capacities to fully discharge their risk detection obligations as the first line of defence, and the third line of defence, audit and assurance, lacked a comprehensive, end-to-end framework and clear guidelines to facilitate robust assurance and timely risk identification.²²⁹
- The pace of implementation of the 2018 recommended reforms: the reforms took 3 years to complete and there were still major issues with the identification, monitoring and mitigating of major technology project management risks being raised by the Reserve Bank in its Annual Assessments up to 2022 when the Reserve Bank concluded that despite all the improvements, the ASX’s risk management was still below the risk maturity levels of the ASX’s peers.
- The quality of reporting of technology risk management issues up to the Executive Technology Operations and Security Committee and through them to the Board Audit and Risk committee until 2021, and the Board Technology Committee from 2021 onward: Prior to 2018, information was typically provided at a summarised level with the concern identified by the KPMG Review in 2018 that the board and executives were operating without sufficient information to make strategic or risk management decisions or to oversee delegated decision-making. Responses to the 2018 Governance Review had a perverse effect on board reporting, with directors in 2021 complaining that reports were too long and technical for board members to be able to distil their key issues. An inference to be drawn is that the board and executives before and post 2018 were operating without sufficient technical expertise or advice to effectively perform their technology governance oversight and management roles. The ASX CEO in 2018 publicly conceded that he did not fully understand the technology strategy that underpinned ASX operations.
- Robust oversight of technology projects by ASX Directors: Interviewed ASX directors admitted to the Reserve Bank in 2021 that they were not fully informed of the progress and status of the CHES replacement program. The question that arises is whether it was reasonable to expect board members to ask why they were not being kept up to date about the project. In turn, whether the information that they were being given was adequate or too complex and whether it was reasonable for them to rely on the persons providing that information. Further, whether the board should have sought the assistance of external experts to guide their monitoring and consequent decision-making. Certainly, there are questions to be answered about whether the ASX boards or the ASX executive group had a “risk champion” in their ranks when it came to the CHES replacement project and its management.

²²⁹ EY, Independent Expert Report – Independent assessment of ASX’s Assurance Program for the Implementation of the CHES Replacement Program (28 February 2022) [15].

- Board skill set: Prior to 2022, no ASX director had any relevant skills, expertise or experience in digital transformation projects despite the ASX being a technology company with a full slate of such projects. The ASX Annual Reports from 2011-2022 reported high levels of IT and technology competencies on the board, but it is not clear what were the specific competencies being claimed and which directors possessed them.
- Risk governance resourcing: The 2018 and 2021 Governance Reviews conducted by the KPMG and the Reserve Bank respectively found there was limited sharing of risk information across relevant boards and committees within the ASX group. The ASX ran a “lean and mean” business structure, where no employees, premises or IT resources were provided to the C&S subsidiary companies. This structure was cost efficient but impeded the aggregated collection of risk information, led to inconsistencies in monitoring of risk across the organisation and limited the risk information provided to ASX executives and the board.

We also note that on 28 March 2023, ASIC notified the ASX that it had commenced an investigation into whether ASX Limited, ASX Clear Pty Ltd, ASX Settlement Pty Limited and their directors and officers had breached the following obligations:

- The duty of care and diligence in *Corporations Act* s 180(1);
- The obligation to make continuous disclosure in accordance with the *ASX Listing Rules* in *Corporations Act* s 674 and s 674A;
- Engaged in misleading or deceptive conduct in relation to a financial product or a financial service pursuant to *Corporations Act* s 1041H;
- Engaged in misleading or deceptive conduct in relation to a financial service pursuant to in *ASIC s Act* s 12DA;
- Made false or misleading statements in connection with the supply or possible supply of financial services.²³⁰

In relation to that investigation, we observe that:

- the critical time period for the purposes of the ASIC investigation is a small one, from 28 October 2020 to 28 March 2022. This is a much smaller period of time than our submission of the CHESS replacement project would suggest is relevant;
- of critical relevance to their investigation will be finding sufficient evidence to determine whether it was reasonable for ASX boards to rely on reports provided on technology projects and associated risk issues by ASX executives. Under the investigation microscope should be the actions of the ASX’s senior executives, specifically including the CRO and COO, both of whom chaired executive managing committees dealing with C&S risks including technology risks; and
- the ASIC investigation is not apparently considering whether, in addition, to duty of care concerns, there are grounds for concern as to breaches by ASX directors and corporate officers of their duties of loyalty and good faith under *Corporation Act* ss 181-183. As this appears to be a live issue bearing on the length of time it took for the

²³⁰ ASX, “Chess Replacement Project – ASIC Investigation”, *Letter to ASIC and to ASX Market Announcements Office* (29 March 2023) < <https://www.asx.com.au/about/media-centre>>.

ASX to build the now failed CHES replacement using DLT technology, the Committee may wish to direct relevant questions to ASIC about this issue.²³¹

VII Analysis of CHES Replacement Project Governance (2018-2022)

A. Project Management Failures

Part IV identified three project management failures critical to understanding why the CHES replacement project failed.²³² Part VI highlighted a range of technology governance failings that go some way to explaining why problems with the CHES replacement project persisted despite the oversight role given to executive and board committees as part of the ASX Group corporate governance arrangements.

In this Part, we drill down from the general to the specific, namely the governance and risk management of the CHES replacement project that did in fact occur. In undertaking this analysis, we admit to being somewhat tentative in our analysis due to the lack of access to ASX internal project management documents. We are only able to reconstruct the events and circumstances of the CHES project governance from public documents, particularly the Accenture Report published late in 2022.

B. Early project governance

The ASX began discussing the idea of using DLT technology as a replacement for its existing CHES system in 2015.²³³ By the time of its formal announcement, the CHES replacement project became known as “Phase 2” of a larger technology transformation project.²³⁴ Surprisingly, for a company highly reliant on technology platforms, ASX did not have a formal technology strategy or governance plan at the time of that announcement.²³⁵

How was such an ambitious, large-scale project to be managed and governed? A thumbnail explanation can be found in the Reserve Bank’s 2014/15 Assessment of the ASX’s Clearing and Settlement Facilities.²³⁶ It explains that technology transformation projects were overseen by two ASX executive and board level committees. Oversight of the management of strategic and operational risks associated with the execution of transformation projects was given to the executive-level Enterprise Risk Management Committee and in turn monitored by the ASX Board Audit and Risk Committee. Internal and external audit provided review of key elements of the projects. The Reserve Bank anticipated that this system of oversight would also apply to the CHES replacement project.²³⁷

While this explanation anticipated executive and board oversight of technology projects, it did not drill down into the governance of specific technology projects. In fairness, the project

²³¹ James Evers, “Is another CHES advisory group already coming off the wheels?” *Australian Financial Review* (4 September 2023) < <https://www.afr.com/companies/financial-services/is-another-ches-advisory-group-already-coming-off-the-wheels-20230901-p5e1b3>>.

²³² See Part IV.I above.

²³³ ASX, *Annual Report 2015* (August 2015) [9] < <https://www.asx.com.au/about/asx-shareholders/reports.html>>.

²³⁴ ASX, “ASX selects distributed ledger technology to replace CHES”, *ASX Media Release*, (7 December 2017) < <https://www.asx.com.au/documents/investor-relations/ASX-selects-distributed-ledger-technology-to-replace-CHES.pdf>.

²³⁵ A key governance failing identified by the KPMG review in 2018. See Part VI above.

²³⁶ ASX, *Annual Report 2015* (August 2015) [3] < <https://www.asx.com.au/about/asx-shareholders/reports.html>>.

²³⁷ Reserve Bank, 2014/2015 Assessment of ASX Clearing and Settlement Facilities, n 19 above, [3.5.6].

was little more than an idea at this stage, with the ASX initially focussed on finding a technology partner with which to develop the project.

That said, there is evidence to suggest that the ASX Limited board itself did have early engagement with the CHES replacement project. The ASX announced it was investing \$24.5 million in its CHES technology partner, Digital Asset Holdings LLC.²³⁸ ASX became a minority shareholder in Digital Asset. This investment including the acquisition of a warrant that gave ASX the right to appoint a director to the DAH Board and to purchase further equity.²³⁹ We presume that that share purchase required the ASX Limited Board's approval.

On issues of oversight, the ASX Remuneration Reports from 2018 to 2020 record that the board, most likely the members of the Board remuneration committee, considered the progress on development of the DLT as part of its remuneration assessment for senior executives.²⁴⁰ Meeting CHES replacement project milestones formed one part of the remuneration assessment criteria. However, no details were provided in remuneration reports as to how that determination was made, nor of the specific milestones being assessed.

C. Stakeholder and regulatory engagement

Following the appointment of Digital Asset as technology partner²⁴¹, there were many ASX public announcements from 2017 to 2020 regarding the CHES project that concerned stakeholder and regulatory engagement.

Stakeholder Consultations on CHES

The ASX has produced a summary of its stakeholder consultations and stakeholder responses on the CHES project from 2016 to 2022.²⁴² This reporting included a number of key insights:

- In 2016, ASX issued a consultation paper that proposed a largely like-for-like replacement system for existing CHES. Feedback from clearing and settlement participant stakeholders evidenced that they did not broadly support a like-for-like replacement system. The clearing and settlement participants expressed a desire for CHES replacement to deliver service enhancements and business process efficiencies.
- In 2017, ASX held a series of industry working groups, including custodians, brokers, clearing and settlement participants, industry associations and Australia's three largest share registries, to identify the business requirements that stakeholders thought should be considered for CHES replacement and their relative prioritization.

²³⁸ ASX, "ASX selects Digital Asset to develop distributed ledger technology for the Australian Equity Market, *ASX Media Release* (22 January 2016) < <https://www.asx.com.au/about/media-centre>>.

²³⁹ Evidence to Parliamentary Joint Committee on Corporations and Financial Services, Parliament of Australia, Canberra, 8 June 2023, Answer to questions on notice, [20] <https://www.aph.gov.au/Parliamentary_Business/Committees/Joint/Corporations_and_Financial_Services/OversightofASIC/-/media/EDB3A52071D344C49198CD81C8376D60.ashx>.

²⁴⁰ ASX, *ASX Limited Annual Report 2018* (August 2018) [44]; ASX, *ASX Limited Annual Report 2019* (August 2019) [52]; ASX, *ASX Limited Annual Report 2020* (August 2020) [51] <<https://www.asx.com.au/about/asx-shareholders/reports.html>>.

²⁴¹ Announced on 22 January 2016. See n 18 above.

²⁴² ASX, *CHES replacement: Summary of Stakeholder Engagement as at 28 February 2023* (28 February 2023) < <https://www.asx.com.au/markets/clearing-and-settlement-services/ches-replacement/stakeholder-engagement>>.

- In April 2018, ASX asked industry stakeholders if there were any other business requirements they wanted considered for CHES replacement that were not already captured by the industry working groups held in 2017.
- In September 2018, ASX confirmed the Day 1 scope for CHES replacement based on industry feedback received through the consultation processes undertaken in 2017-2018.
- Further public consultations on changes to scope, capacity and time implementation took place from 2019 to 2022.

Stakeholder consultation of this kind was a requirement of ASX corporate governance, needed to ensure compliance with the Financial Stability Standards regulating its C&S licences. As stakeholder engagement evolved, so did the technicality of their discussions. The ASX split engagement into two reference points: business requirements; and technical issues, establishing for that purpose the ASX Business Committee, and three technical committees or working groups for specific stakeholder input on the project.²⁴³

What was apparent from the 2018 consultation was that stakeholders were expressing doubts as to the planned scope of the DLT replacement and the timelines for its implementation. The ASX responded by offering further consultation and ultimately extending the project's timelines. However, what these consultations do not show is the awareness and extent of oversight given to these responses by Senior Executive Committee and/or the ASX Board.

Regulatory Consultations

The Reserve Bank reported that it attended monthly updates on the DLT project through dedicated "regulator workshops involving the ASX, Digital Asset Holdings, the ASX's technology partner, and other regulators."²⁴⁴ The agenda for these workshops was said to include discussion of the ASX's prioritisation decisions, resourcing challenges and interdependencies with day-to-day and business-as-usual processes and change management issues.²⁴⁵ However, no minutes of those meetings are publicly available from which it is possible to identify who attended the meetings on behalf of the ASX and the degree of oversight given to the issues discussed at the meetings by senior ASX staff and through them, the ASX boards. The Reserve Bank's Annual Assessments of the ASX's C&S facilities do provide some details of CHES project decisions made over the period of the project, but not the identities of individuals who were involved in assisting the Reserve Bank to prepare their reports.

D. Project governance in Hindsight

Only in February 2022 did the full state of the CHES project governance arrangements come into public view in the first of three Independent Expert Reports prepared by EY.²⁴⁶ EY was asked to assess whether the existing assurance program for the CHES replacement project

²⁴³ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2019) [2.4.1]. Three main technical groups were set up: the Technical Committee, a Connectivity and Intergration Working Group and the Implementation and Transition Working Group.

²⁴⁴ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities 2015/2016* (September 2016 [3.5.7] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2015-2016/>>.

²⁴⁵ Ibid.

²⁴⁶ EY, n 10 above.

was fit for purpose in consequence of ASIC imposing conditions on the ASX C&S facility licences in November 2021.²⁴⁷ ASIC also asked EY to provide an opinion with respect to the adequacy of the ASX's governance framework for assurance testing and the design adequacy of the CHES Replacement Go-Live decision framework.²⁴⁸

CHES Replacement Project Objectives

According to the EY's first report, the CHES replacement program since 2017 had four key objectives:

- to replace the CHES system which is based on ageing technology;
- to adopt international messaging standards and enable the retirement of proprietary CHES messaging;
- to comply with regulatory expectations to be capable of implementing settlement services that are multi-CCP compatible; and
- to develop and enable new business services in relation to clearing and settlement made possible by a flexible and secure system design using contemporary technology providing DLT optionality.²⁴⁹

We would contend that the objectives were never entirely clear nor fixed at any point in time during the CHES replacement project but kept changing and evolved over the length of the CHES replacement project in response to already detailed concerns raised by stakeholders, the regulators and, somewhat contentiously, we acknowledge, the ASX itself.

CHES Project milestones

EY noted that the CHES replacement project had three key milestones in the project plan:

- ITE 1 (industry test environment 1): Being a release of the new DLT platform and chess application to industry ahead of the go-live milestone. ITE 1 enabled software providers to perform functional and non-functional testing and to complete any developments they had been implementing;
- ITE 2 (industry test environment 2): Being the second stage release of the new DLT platform and application for CHES users to complete user testing and develop their operational readiness; and
- Go-Live: being the expected go live date for the CHES replacement project.²⁵⁰

As was the case with the CHES project specifications, we would contend that the key project milestones kept shifting and lacked this degree of particularity until late into the CHES replacement project period. Project milestones were mentioned in ASX Annual Reports, usually as part of Remuneration Reports for senior ASX executives, but not in terms that

²⁴⁷ One of those conditions required the ASX to appoint an independent expert to assess whether the ASX's assurance program for the CHES replacement was fit for purpose, to identify any shortfalls and report regularly to ASIC. EY was chosen as the independent expert for this process: see n 305 below and accompanying text.

²⁴⁸ EY, n 10 above, [6].

²⁴⁹ Ibid [2.1, page 4].

²⁵⁰ Ibid.

referenced ITE 1, ITE2, and Go-Live dates. More common, less informative expressions such as “Delivery of CHES replacement program milestones” were preferred.²⁵¹

CHES Project assurance

According to EY, the ASX had a CHES replacement project assurance program with two purposes. One purpose was to assist the project to meet its objective of successfully replacing the existing CHES system with a system based on DLT that met the ASX functional and non-functional requirements. The second purpose was to provide confidence to internal and external stakeholders relating to the functional and non-functional aspects of the replacement system and decision-making for key milestones.²⁵²

The assurance program was the responsibility of the ASX chief risk officer but its delivery was said to be across “a number of assurance providers depending on the subject matter of each topic including independent experts and ASX internal audit”. An assurance programme workstream, within the CHES replacement project, was said to track reviews planned and undertaken as part of the CHES assurance programme and reported periodically to the Executive steering group, the Board Audit and Risk Committee and to the C&S Facility Boards.²⁵³

Project risk issues were said to be periodically extracted and presented through the Executive Steering Committee to the monthly board meetings and quarterly Board Audit and Risk Committee meetings.²⁵⁴ Specific risks were also supposed to be tracked in the ASX enterprise and risk management system.²⁵⁵

The EY report provides much needed particulars of the CHES project’s assurance program and the reporting lines that extended from that program up to the ASX executive and ASX boards. An immediate observation is that project risk issues were not apparently reported to the Executive TOSC (Technology, operations and security committee) who had oversight responsibility for technology issues. As one of the key themes of the ASX CHES replacement project is a failure of technology governance and risk management, this apparent oversight stands out as a key oversight failure by the ASX.

Governance of CHES Assurance program

ASX CHES replacement assurance was said to require comprehensive review coverage of four aspects of the CHES replacement project: project governance; technical solution and design; operational processes and controls; and industry readiness and implementation.²⁵⁶ It is unclear how long the assurance program had been in existence, but EY noted it was only formalised in August 2021 and was “by design, forward looking”.²⁵⁷

This comment reinforces our concern that no end-to-end formal assurance program with the capability and systematic approach required to assure a project of the scale and complexity

²⁵¹ See for e.g. ASX, *ASX Limited Annual Report 2020* [51] <https://www.asx.com.au/about/asx-shareholders/reports.html>.

²⁵² EY, n 10 above [4-5].

²⁵³ *Ibid* [5].

²⁵⁴ EY, n 10 above, [14].

²⁵⁵ *Ibid* [14].

²⁵⁶ EY, n 10 above, [9-10].

²⁵⁷ *Ibid* [10].

of the CHES replacement program formally existed before August 2021.²⁵⁸ It is critical to appreciate what that means for ASX CHES replacement governance as well as its enterprise risk management strategy. Throughout the CHES period, ASX claimed to adopt a three lines of defence risk model, the third line of which was audit. Whatever assurance was undertaken prior to August 2021 lacked a formal framework and clear guidelines as to how it would be executed.²⁵⁹ Monthly meetings served that de-facto role, held between the ASX CRO and other replacement project staff including the Project Sponsor, the End-to-End Delivery Lead, the Programme Owner, the general manager, and the head of regulatory affairs, to discuss assurance activities and adjustments to the assurance program.²⁶⁰ EY determined that the governance and change management processes for the CHES project assurance program needed to be strengthened.²⁶¹ EY recommended that the ASX needed to formalise a proper framework of governance and maintain its assurance program with clear guidelines as to:

- roles and responsibilities in relation to all assurance programme activities;
- how the assurance programme was maintained including processes for approvals, meetings and expected outcomes;
- timelines to trigger the planning activities of assurance reviews;
- expectations around reporting and escalation of progress and outcomes to executive and board level committees;
- expectations around issue closure including monitoring of remedial actions taken and periodic reporting of their status; and
- requirements to assist the independence of assurance providers.

EY's other findings

The EY review did not find any significant “high level gaps” in the design of the assurance program or the timetable for the program itself, but acknowledged there were deficiencies in the governance of the assurance program as now raised and raised concerns about the program’s scope. In particular, EY noted that the assurance program, as it was presently constructed, could not demonstrate whether and how key risk areas were getting the right level of attention within planned reviews.²⁶² Critically, in relation to program readiness, EY was only able to conduct a desktop review of the program because of delays in delivering elements of the CHES software. They found the project scope of the assurance plan for assessing milestone readiness to be limited and recommended it be expanded to ensure it included an assessment of key project objectives and their associated risks. EY also raised doubts about whether individual assessments were being brought together to provide a holistic view of the CHES replacement project’s readiness.²⁶³

The upshot of EY’s first review was that they found the ASX’s review system was on-paper fit for purpose, but had only existed in its present form since August 2021. EY recommended changes as to what the program covered, the nature and extent of assurance activities and

²⁵⁸ Ibid [1].

²⁵⁹ EY, n 10 above [15].

²⁶⁰ Ibid [14].

²⁶¹ Ibid [15].

²⁶² EY, n 10 above, [11-12].

²⁶³ Ibid [12].

strengthening of the governance program itself. Given past reviews conducted by KPMG and the Reserve Bank, this was hardly a ringing endorsement of the CHES project risk management and its project assurance practices prior to August 2021.

EY Second & Third Report

The second EY report provided an update on status of CHES replacement assurance activities, six months after the first review.²⁶⁴ EY reported that the assurance program continued to mature, was fit for purpose but needed to continue strengthening, to meet the rising volume and complexity of assurance activities ahead.²⁶⁵ Again, the focus of EY's recommendations was on the governance of the program and the risk assessment process that formed part of the assurance. The third EY report was limited by the ASX's decision in November 2022 to reassess its CHES replacement solution design and so did not add significantly to the earlier reports.²⁶⁶

While the EY reports revealed important insights into the ASX's CHES project risk governance practices and procedures, their assurance focus meant they could only go so far. Their deep dive was only into what the ASX was doing in relation to the project, but the ASX was building the DLT solution in partnership with technology experts, Digital Asset and VMWare. The management and governance of these critical relationships remained in the dark.

E. The Final Project Review - Accenture

In May 2022, the ASX announced an indefinite delay in the delivery of the CHES replacement project.²⁶⁷ In August 2022, at the request of the Reserve Bank and ASIC, the ASX appointed Accenture to conduct an independent review of the delivery partnership between ASX and Digital Asset across the delivery lifecycle of the CHES replacement, for the purpose of assessing the remaining work required to complete delivery of the project.²⁶⁸ The Accenture Review was delivered in three parts: a solution review of the DLT technology; a capability assessment; and a review of the revised draft delivery plan.²⁶⁹ The capability assessment was in effect an assessment of how the project had been managed to date. Significantly, what the review offered, that had until now been missing, was the first public insights into the relationship between ASX and Digital Asset that were pivotal to the CHES replacement project.

Accenture's assessment of the CHES replacement program is perhaps best encapsulated in this comment:

²⁶⁴ EY, Independent Expert Report – Independent assessment of ASX's Assurance Program for the Implementation of the CHES Replacement Program (30 June 2022).

²⁶⁵ Ibid [1].

²⁶⁶ EY, Independent Expert Report – Independent assessment of ASX's Assurance Program for the Implementation of the CHES Replacement Program (31 December 2022) [2-3].

²⁶⁷ ASX, "CHES replacement project update – confirmation of delay to April 2023 go-live", *Letter to ASIC and Market Announcements Office* (10 May 2022) < <https://www.asx.com.au/about/media-centre>.

²⁶⁸ ASX, "CHES replacement project update – delay to project schedule; ASX to commission independent review of new CHES application software", *Letter to ASIC and Market Announcements Office* (3 August 2022) < <https://www.asx.com.au/about/media-centre>.

²⁶⁹ Accenture, *ASX CHES Replacement Application Delivery Review* (November 2022), attachment to ASX, "ASX will reassess all aspects of the chess replacement project and derecognise capitalised software of \$245-255 million pre-tax in 1H23", *Letter to ASIC and ASX Market Announcements Office* (17 November 2022) <https://www.asx.com.au/about/media-centre>.

“The program lacks a holistic, agreed, single view of status with adequate traceability of resources and estimation to the draft delivery plan.”²⁷⁰

The design of the DLT solution was found to be the source of fundamental challenges facing the project on the issues of scalability, resilience and supportability.²⁷¹ At heart, Accenture assessed that the problems derived from the project’s “top down” design. The solution design was driven by the functionality of the current CHES system and requirements determined by ASX stakeholder consultation²⁷², and not by the capacity and requirements for adaption of the DLT technology itself.²⁷³ Functional and non-functional requirements of the DLT technology became misaligned as to definitional terms, granularity, quality, delivery time and scope.²⁷⁴ This gave rise to four core challenges in the solution design²⁷⁵, leading to Accenture’s recommendation that the ASX effectively abandon the DLT solution and explore new solution opportunities.²⁷⁶

On the issue of project capability, Accenture found the hybrid methodology, whereby the ASX was jointly managing the project with technology partner, Digital Asset, resulted in poor project management.²⁷⁷ Over time, management had become siloed, resulting in frictions between the two working teams and misaligned views between them as to their respective accountability for project outcomes.²⁷⁸ Deficiencies in executive rigour and vendor governance impeded various phases of the project.²⁷⁹ Material discrepancies were found between ASX and Digital Asset as to risk management practices.²⁸⁰

Finally, Accenture determined that the draft delivery plan was too high risk.²⁸¹ It was criticised as being based on high-level estimates, not supported by a detailed, “bottom up” plan and evidence, through testing, that interim milestones were being achieved and underlying root concerns were being addressed.

Although couched in technical language, the message from the Accenture Review could not have been clearer. The CHES replacement project was poorly conceived, poorly managed and poorly governed. There had been little or no effective vendor governance of Digital Asset’s work by the ASX during the lifecycle of the CHES replacement project.

O. Our conclusions as to project governance failings during 2017-2022

We submit that the public documents highlighted in Part VII raise real concerns about the quality of project governance that was at the heart of the CHES replacement project. Specific concerns we would highlight are:

²⁷⁰ Ibid [23].

²⁷¹ Accenture, n 16 above, [6-7].

²⁷² Accenture report uses expression “market consultation”.

²⁷³ Ibid [23].

²⁷⁴ Accenture, n 16 above, [7].

²⁷⁵ Ibid [5].

²⁷⁶ Accenture, n 16 above, [5].

²⁷⁷ Ibid [7,23].

²⁷⁸ Accenture, n 16 above, [7, 23-25].

²⁷⁹ Ibid [7,23].

²⁸⁰ Ibid.

²⁸¹ Ibid [8, 26].

- The lack of clear understanding of the core objectives of the CHES project scope, delivery plan and its resourcing by the ASX and its technology partner, Digital Asset.
- The lack of project documentation and a record of program decisions taken or made during the life of the project as observed by Accenture in its October 2022 report.
- The lack of clear consensus or understanding at the top of the ASX as to the key milestones for the CHES replacement project.
- The lack of effective vendor governance by the ASX, in relation to the DLT design and build of the technology solution, of its technology partner, Digital Asset.
- Gaps in the ASX three lines of defence risk management for the CHES project: both in the first line through insufficient resources being assigned to ensure project staff were able to perform risk management tasks assigned to them and in the third line, due to the absence of a robust end-to-end assurance program for the CHES replacement project prior to August 2021 as identified by EY.
- Lack of clear reporting lines for internal assurance projects and express guidelines for reporting risks identified in the process both within the ASX and from Digital Asset.
- There was no visible project risk champion sufficiently briefed and capable of bringing CHES project risk issues to the attention of ASX executives and the ASX board.

Part VIII – The Regulatory Framework & Analysis

A. The Key Regulators

As the laws governing the obligations of C&S licensees were discussed in Part V, the submission here focuses on the actions of the regulators over the period of the CHES replacement project in monitoring ASX's compliance with these obligations as the holder of C&S licences. Central to that monitoring role, the *Corporations Act* requires both ASIC and the Reserve Bank to conduct annual assessments of C&S licence holders.²⁸² The Reserve Bank assesses the licensee's compliance with Financial Stability Standards and the requirement to do all things necessary to reduce systemic risk.²⁸³ ASIC assesses broader compliance with licensee obligations under the *Corporations Act* and has the power to take enforcement action in the event of licensee non-compliance.²⁸⁴

Illustrations of both ASIC and the Reserve Bank engaging in the monitoring of the ASX current CHES arrangements and the ASX CHES replacement project appear throughout this submission. A consolidated summary of their major actions in relation to the ASX CHES project will shortly be offered, before turning to discuss some of these actions in further detail and then to consider the more difficult question of whether the regulators could and should have done more in the circumstances.

B. Key Events

²⁸² *Corporations Act 2001* (Cth) s 823C (ASIC) and s 823CA (Reserve Bank).

²⁸³ *Corporations Act 2001* (Cth) s 823CA in relation to compliance with obligations in s 821A(1)(aa). Section 821A(1)(aa) requires a C&S licence to comply with Financial Stability Standards in s 827D (s 821A(1)(aa)(i)) and do all things necessary to reduce systemic risk (s 821A(1)(aa)(ii)).

²⁸⁴ *Corporations Act 2001* (Cth) s 823C: obligations under *Corporations Act* Part 7.3 other than those arising under s 821A(1)(aa). As to ASIC's power to vary, suspend or cancel a licence, see ss 826A-826G.

There can be no doubt that both the Reserve Bank and ASIC performed monitoring functions in relation to the CHES replacement project over the period between late 2017, when the CHES replacement project formally began, and late 2022, when the project was abandoned in its current form. Their work is self-evident in the Reserve Bank's Annual Assessments of the ASX's Clearing and Settlement Facilities, which have been referenced many times in the submission. ASIC also completed annual assessments, although they were not as a rule made publicly available during the critical period in question.²⁸⁵ It also appears that ASIC was involved in and consulted with the Reserve Bank in relation to the drafting of the Reserve Bank's Annual Assessments. Based largely on the Reserve Bank's Assessments, Table 7 provides a summary of what we consider to be the key governance and regulatory events surrounding and/or involving the CHES replacement project.²⁸⁶

Table 7 - Key Events during the CHES project

Year	Event	Regulatory Response
2015	ASX announces considering CHES replacement project involving Blockchain technology	<ul style="list-style-type: none"> Noted in Reserve Bank's Assessment of ASX's Clearing and Settlement Facilities 2014/2015. Start of monthly CHES replacement workshops with ASX, range of regulators and service providers
2016	ASX announces Digital Asset Holdings LLC as its technology partner for the CHES replacement project.	Noted in Reserve Bank's Assessment of ASX's Clearing and Settlement Facilities 2016/2017.
2017	ASX formally announces CHES replacement project is going ahead blockchain technology	Noted in Reserve Bank's Assessment of ASX's Clearing and Settlement Facilities 2017/2018.
2018	<ul style="list-style-type: none"> Reserve Bank and ASIC requested ASX to commission an independent review of ASX technology governance and 	<ul style="list-style-type: none"> Independent report delivered to ASX & regulators by KPMG

²⁸⁵ For a list of ASIC reports on ASX CHES facilities assessment reports, see ASIC, "Clearing and Settlement Facilities", *ASIC.gov.au* (accessed 1 September 2023) < <https://asic.gov.au/regulatory-resources/regulatory-index/clearing-and-settlement-facilities/#reports-ASX>>. Only one report from the period 2017-2022 is publicly available. See ASIC, *Report 592 – Review of ASX's Group's technology governance and operational risk management standards* (September 2018) <https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-592-review-of-asx-group-s-technology-governance-and-operational-risk-management-standards/>.

²⁸⁶ We do not purport to suggest this represents all regulatory actions and responses taken by the Reserve Bank and ASIC. We acknowledge that the events selected for inclusion reflect our own subjective assessment of critical events and may invite debate by others as to their importance.

	<p>risk control framework following trade outages affecting ASX's C&S facilities in 2016 and 2017.</p> <ul style="list-style-type: none"> • Regular CHES replacement updates given by ASX 	<ul style="list-style-type: none"> • Reserve Bank supports ASX "building stronger foundations program" response – a 3yr program. • ASIC, in separate report, requires ASX to do further work "top down" approach to operating risks. • Reserve Bank Annual Assessment Report 2018 notes CHES replacement project updates.
2019	Regular CHES replacement project update given by ASX	Reserve Bank Annual Assessment Report 2019 notes CHES replacement project updates.
2020	CHES processing delays raise concerns about capacity of current CHES system, also viability and timing of replacement system.	<ul style="list-style-type: none"> • Annual assessment reports that ASX completed building stronger foundations program. • Late 2020: ASIC & Reserve Bank publish joint letter of expectations to ASX: <ul style="list-style-type: none"> • To implement new CHES system as soon as can be safely achieved. • To provide independent assurances that replacement is operationally resilient before moving to new system.
2021	More outages in late 2020 involving another ASX technology project known as ASX Trade Refresh. ASIC announces a review of the outage.	<ul style="list-style-type: none"> • ASIC places conditions on all ASX licences. Conditions include requirement for independent review of CHES replacement assurance. • Assurance reports from EY published in 2022. • Reserve Bank's 2021 Assessment of C&S facilities 2021 includes a review of ASX governance and risk management. 17 Recommendations made.
2022	ASX announces delay in Go-live date for CHES replacement	<ul style="list-style-type: none"> • Reserve Bank & ASIC request ASX commission an independent review of CHES replacement project.

		<ul style="list-style-type: none"> • Accenture carries out the review & recommends that ASX abandon its current CHESSE solution. • Reserve Bank & ASIC issue new statement of regulatory expectations requiring ASX to get CHESSE replacement project back on track.
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C. Some further observations about regulatory involvement in the CHESSE Replacement Time Period

While regulatory concerns about the ASX's broader technology governance and enterprise risk management systems were known since 2018²⁸⁷, it took until 2020 for regulators to begin to raise similar concerns in relation to the CHESSE replacement project. Two factors possibly explain why that was the case. First, mid 2020 loomed as a key project milestone, as the ASX proposed to make the new system available for testing by users and stakeholders from July 2020. The project had apparently finally graduated from the "design and build" stages, so that a more concrete assessment of its strengths and weaknesses was finally possible. Secondly, market volatility in March and November 2020 had raised questions about the capacity of the existing CHESSE infrastructure.²⁸⁸ This raised the stakes for regulatory supervision of its planned replacement.

On 1 October 2020, the Reserve Bank and ASIC issued a joint media release outlining their expectations for the CHESSE replacement system.²⁸⁹ They expected the ASX:

- to replace CHESSE as soon as this can be safely achieved;
- to take into account CHESSE user feedback from its recent consultations and revisions to the project implementation timeline;
- to achieve a significant uplift in intraday trade processing capacity and end-of-day processing performance in the new system'
- to demonstrate the readiness of the CHESSE replacement system; and
- to provide supporting independent assurances to the regulators before migrating to the new system.

These expectations echoed concerns raised about the governance of the CHESSE replacement project in the Reserve Bank's 2020 Assessment of the ASX's C&S facilities. Two specific concerns raised then were the capacity of the CHESSE replacement and delays in project implementation.

The issue of capacity arose from a discussion of the limitations of the current CHESSE replacement system. While the ASX reported to the Reserve Bank that it was able to improve capacity in the current system, the medium-term solution was the CHESSE replacement facility, expected "to be able to process 15 million trades per day at launch" with "capacity to increase

²⁸⁷ See Part VI.J above.

²⁸⁸ See Part IV. F above.

²⁸⁹ ASIC, "ASIC and RBA announce expectations for CHESSE replacement", *ASIC Media Release (20-229MR)* (1 October 2022), < <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2020-releases/20-229mr-asic-and-rba-announce-expectations-for-chess-replacement/>>.

in the future if needed”.²⁹⁰ For the first time since 2015, the ASX also offered additional “operational resilience” targets for the CHES replacement as follows:

“

- *Availability.* ASX’s target is for the new system to be available 99.95% of the time during operating hours. This exceeds the current CHES target of 99.8% availability;
- *Recovery.* ASX will require that the new system is recoverable (without data loss) within two hours where there has been a serious failure. ASX will target recovery from a single component failure within 5 minutes and recovery within 30 minutes of any interruption to batch settlement.
- *Performance and scalability.* ASX will target the new system to have a minimum of 100% capacity above the daily peak volume in CHES. The new system is designed so that ASX can both adjust the performance of the nodes used to process transactions and increase the number of nodes (i.e. It will be vertically and horizontally scalable, although there are limits to scalability in some processes such as netting).
- *Information security.* ASX will require that all messaging and node access channels between ASX and users are protected by strong authentication and encryption so that users only ever receive data they are entitled to receive.²⁹¹

“

In short, the ASX had finally given the Reserve Bank a set of benchmarks against which to assess the viability of the project. A set of benchmarks that good governance suggests the ASX CHES replacement project team, through the Executive Technology Projects and Oversight Committee, should themselves have been monitoring and reporting on to the ASX Board Audit and Risk Committee as detailed in Parts VI and VII. The Reserve Bank left the ASX with no discretion on the issue, commenting:

“The Bank expects ASX to demonstrate that the CHES replacement system is operationally resilient before going live. This will include ASX providing external assurance that the ‘non-functional’ business requirements outlined above have been met”.²⁹²

The ASX had already announced delays in the CHES replacement timeline, resulting in a revised launch plan for April 2023. Again, the underlying concern raised by the Reserve Bank was the risk of unnecessary delay and the consequent risks from continued reliance on the ailing existing CHES system. ASX advised the Reserve Bank that it had appointed consulting

²⁹⁰ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2020) [2.1.2] <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2019-2020/>>.

²⁹¹ *Ibid*, [3.3.1].

²⁹² *Ibid*.

firm, EY, to conduct an independent review of its revised plan and to provide assurance to the ASX board and to regulators that the process would address their expectations.²⁹³ EY in fact submitted three CHES reports in 2022, but a second major outage in November 2020 raised more issues for the CHES system and by extension, the CHES replacement project.

D. IBM Trade Refresh Review

The trade outage on 16 November 2020 occurred shortly after an upgrade of the ASX's equity trading platform, ASX Trade. The upgrade, known as the ASX Trade Refresh Project, was another technology project being undertaken by the ASX at the time. Following the outage, the Reserve Bank and ASIC required the ASX to initiate an independent review of the Trade Refresh Project.²⁹⁴ That review was undertaken by IBM Australia Limited ("IBM"). IBM found that while the ASX had met or exceeded leading industry practices in 58 out of 75 of the assessed capabilities, there were a number of key shortcomings with the project:

- the ASX trade system was "not ready to go live" even though formal implementation processes were completed and verified by multiple parties;
- there were gaps in the rigour applied to the project delivery risk and issue management process expected for a project of this nature;
- risk and issue management, project compliance to ASX practises, project requirements and the project test strategy/planning did not meet accepted industry practises; and
- it was not reasonable to expect the "test plan" used would meet the ASX's near zero appetite for service disruption.²⁹⁵

The Reserve Bank and ASIC informed the ASX that they expected it to apply the insights from the IBM review across the group to ensure existing projects, including the CHES replacement program, were managed and implemented properly. Arguably implicit in this request was a deeper concern that the ASX's 2020 outages were not one-off, ad hoc events experienced during extreme periods of volatility.

The ASX committed to addressing the report's recommendations,²⁹⁶ announcing a restructure of the ASX business into four units: markets, technology and data, securities and payments and listings. A new Executive leadership was established to mirror the business units. The long serving COO, Tim Hogben, was shifted to Securities and Payments and Dan

²⁹³ Ibid [3.3.1].

²⁹⁴ ASIC, "ASIC statement on ASX equity market outage" *ASIC Press Release (20-284MR)* (16 November 2022) <<https://asic.gov.au/about-asic/news-centre/find-a-media-release/2020-releases/20-284mr-asic-statement-on-asx-equity-market-outage#!page=3&type=media%20releases&search=ASX>>; ASIC, "Update on ASIC's review of November's ASX Trade outage", *ASIC Press Release (20-334MR)* (21 December 2020) <<https://asic.gov.au/about-asic/news-centre/find-a-media-release/2020-releases/20-334mr-update-on-asic-s-review-of-november-s-asx-trade-outage#!page=3&type=media%20releases&search=ASX>>.

²⁹⁵ ASIC, "Update on the independent expert review of November's ASX Trade outage", *ASIC Media Release (21-220MR)* (23 August 2021) <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2021-releases/21-220mr-update-on-the-independent-expert-review-of-november-s-asx-trade-outage/>. See also, IBM Australia Limited, *Executive Summary of IBM Independent Expert Review – Final Report* (June 2021).

²⁹⁶ ASX, "Completion of independent review of the November 2020 equity market outage", *ASX Media Release* (23 August 2021) <<https://www.asx.com.au/about/media-centre>>.

Chesterman, then CIO, also became the group executive for Technology and Data. This included responsibility for the CHES project. On 23 May 2023, the CIO role and responsibility for the CHES replacement project was shifted to Tim Whiteley, described as a “highly skilled technology transformation executive”.²⁹⁷

On the application of the Review’s findings to the CHES replacement project, Dominic Stevens, then ASX CEO commented:

“ASX recognises that there is interest in how the findings in this report relate to the CHES replacement project. We will ensure that any relevant insights that have not already been built into the ches project are taken on board.”²⁹⁸

E. Regulatory Tension (2021)

The Reserve Bank’s 2021 Assessment of C&S facilities wasted no time in conveying three explicit regulatory expectations with respect to the CHES replacement project going forward:

- that ASX would replace CHES as soon as it could be safely achieved;
- the new system at a minimum was expected to meet the requirements of the current CHES system as to system availability, resilience, recoverability, performance and security; and
- ASX was expected to provide independent assurances to ASIC and the Reserve Bank to demonstrate the readiness of the CHES replacement system before migration took place.²⁹⁹

ASX was also expected to provide copies of independent 6 monthly assessments of the governance of the CHES replacement program undertaken by consulting firm, EY.³⁰⁰ As foreshadowed in the 2020 Reserve Bank Assessment, ASX had engaged EY to conduct these assessments to provide ongoing visibility as to how well the CHES replacement programme was functioning, as well as to review the revised CHES implementation plan to provide assurance on the 2020 replanning process to the ASX Board, ASIC and the Reserve Bank.³⁰¹ However, none of these assessments were forthcoming until 2022. Their key findings were discussed in Part VII as part of the CHES replacement project governance issues.

The Reserve Bank 2021 Assessment included a review of the ASX’s corporate governance and risk policies for the C&S facilities. As part of that process, the Bank interviewed ASX directors who admitted the ASX boards were not fully informed about the progress and status of the CHES replacement system during 2019 and 2020.³⁰² The Bank also stressed that more

²⁹⁷ ASX, “ASX appoints Tim Whiteley as Chief Information Officer”, *ASX Media Release* (23 May 2023) < <https://www.asx.com.au/about/media-centre>>.

²⁹⁸ ASX, “Completion of independent review of the November 2020 equity market outage”, n 294 above.

²⁹⁹ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2020) [3.3.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2019-2020/>>.

³⁰⁰ Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities 2021* (September 2021), [4.1.6] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2020-2021/>>.

³⁰¹ EY, above n 10.

³⁰² Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities 2021* (September 2021), [4.1.6, page 44]. See also Part VI.K discussion.

intensive board oversight was needed of ambitious technology upgrade programs such as ASX Trade Refresh and the CHES replacement projects. Oversight that required “skills, experience, understanding and personal networks that are relevant to large technology project implementation”.³⁰³ The ASX offered to establish a board technology project implementation committee, which the Reserve Bank supported.³⁰⁴

On 24 November 2021, the ASIC announced that it had concluded its investigation into the November 2020 Trade Refresh outage and was imposing additional licence conditions on all three licences held within the ASX Group.³⁰⁵ The additional conditions were directed at mitigating risks for all future ASX future technology upgrades, but with specific emphasis on the oversight of the CHES Replacement Program for the C&S licences.³⁰⁶ An independent expert was to be appointed to assess whether the ASX’s assurance program for the CHES replacement was fit for purpose, to identify any shortfalls and report regularly to ASIC. Prior to going live with the new CHES system, the ASX executive leadership group would provide attestations as to the implementation readiness of the CHES replacement and the ASX Board would provide attestations that the company had put in place all controls, procedures and resources necessary to implement remediation recommendations made by the independent expert. While ASIC’s press release indicated that these attestations were expected to specify individual executive accountability with “clear links to remuneration consequences”³⁰⁷, the licence conditions themselves did not expressly provide for that consequence.³⁰⁸ The ASX did not challenge the imposition of additional conditions on their licences.³⁰⁹

F. Final Days of the CHES replacement project

On 3 August 2022, the ASX announced it had appointed Accenture to conduct a review of the CHES replacement project.³¹⁰ ASIC and the Reserve Bank expressed their disappointment in

³⁰³ Ibid [4.1.7, page 48].

³⁰⁴ Ibid.

³⁰⁵ ASIC, “ASIC imposes additional licence conditions on ASX and issues expectations to improve market resilience”, *ASIC Media Release (21-313MR)* (24 November 2021) <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2021-releases/21-313mr-asic-imposes-additional-licence-conditions-on-asx-and-issues-expectations-to-improve-market-resilience#!page=2&type=media%20releases&search=ASX>.

³⁰⁶ Commonwealth of Australia, *Australian C&S Facility Licence (ASX Clear Pty Ltd) Additional Conditions Notice 2021 (No 1)* (24 November 2021) < <https://download.asic.gov.au/media/jb4d2hjo/20211124-asxc-instrumentsigned.pdf>>; Commonwealth of Australia, *Australian C&S Facility Licence (ASX Settlement Pty Ltd) Additional Conditions Notice 2021 (No 1)* (24 November 2021) < <https://download.asic.gov.au/media/qi4nxzru/20211124-asxs-instrumentsigned.pdf>>.

³⁰⁷ ASIC, “ASIC imposes additional licence conditions on ASX and issues expectations to improve market resilience”, *ASIC Media Release (21-313MR)* (24 November 2021) <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2021-releases/21-313mr-asic-imposes-additional-licence-conditions-on-asx-and-issues-expectations-to-improve-market-resilience/>.

³⁰⁸ Commonwealth of Australia, *Australian C&S Facility Licence (ASX Clear Pty Ltd) Additional Conditions Notice 2021 (No 1)* (24 November 2021) < <https://download.asic.gov.au/media/jb4d2hjo/20211124-asxc-instrumentsigned.pdf>>; Commonwealth of Australia, *Australian C&S Facility Licence (ASX Settlement Pty Ltd) Additional Conditions Notice 2021 (No 1)* (24 November 2021) < <https://download.asic.gov.au/media/qi4nxzru/20211124-asxs-instrumentsigned.pdf>>.

³⁰⁹ ASX, “ASIC investigation of ASX market outage concluded: licence conditions align with ASX’s program of improvement” *ASX Media Release* (24 November 2021) < <https://www.asx.com.au/about/media-centre>>.

³¹⁰ See Part VII.E above.

the events that lead to this review being required.³¹¹ The Accenture Report was delivered in October 2022. On 16 November 2022, the ASX published the report and announced that it was abandoning the CHES replacement project in its present form in the wake of its recommendations.³¹²

ASIC and the Reserve Bank immediately released a joint statement of expectations that the ASX was expected to support and maintain the existing CHES system and bring the replacement program back on track to ensure that the ASX's safe and reliable clearing and settlement infrastructure is fulfilled.³¹³ In December 2022 and again in February 2023, the ASX and ASIC demanded special reports on the current CHES system, how ASX planned to respond to the Accenture Report and the ASX's current portfolio of projects and project management framework for technology projects.³¹⁴ The reports were to be audited and timelines for their delivery were given. In March, the ASX was notified that the events surround the CHES replacement project during the period October 2020 to March 2022 were now the subject of an ASIC enforcement investigation.³¹⁵

G. Some reflections

Our final task is to comment on the actions taken by the Regulators in relation to the CHES replacement project. We offer observations on two aspects of the regulators' actions: The Reserve Bank Assessment Reports; and the use of Independent Expert Reports.

Reserve Bank Assessment of ASX C&S Facility Reports

In writing this submission, we examined in detail the Reserve Bank Assessment Reports for the ASX C&S facilities from 2015 to 2022. The reports are extensive, follow the same format from one year to the next, contain significant sections of the report that are largely repeated from one year to the next and appear to draw extensively from information provided by the ASX to the Reserve Bank.³¹⁶ It is in relation to the information drawn from ASX documents that we raise one issue for consideration. For the years 2017-2019, the Assessment Reports do little more than provide an update on the CHES replacement project's progress. The information given is very broad brush in description and similar language is used from one report to the next. We would query the source of these descriptions and ask whether they

³¹¹ ASIC, "Delay to the ASX CHES Replacement Project and Independent Review", *ASIC Media Release (22-204MR)* <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2022-releases/22-204mr-delay-to-the-asx-ches-replacement-project-and-independent-review/>.

³¹² ASX, "ASX will reassess all aspects of the chess replacement project and derecognise capitalised software of \$245-255 million pre-tax in 1H23", *Letter to ASIC and ASX Market Announcements Office* (17 November 2022) <https://www.asx.com.au/about/media-centre>.

³¹³ ASIC, "ASIC-RBA joint statement on ASX CHES replacement program", *ASIC Media Release (23-320MR)*, (17 October 2022) <<https://asic.gov.au/about-asic/news-centre/find-a-media-release/2022-releases/22-320mr-asic-rba-joint-statement-on-asx-ches-replacement-program#!page=1&search=ASX>>.

³¹⁴ ASIC, "ASIC – RBA further regulatory response regarding the ASX CHES replacement program" *ASIC Media Release (23-357 MR)* < <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2022-releases/22-357mr-asic-rba-further-regulatory-response-regarding-the-asx-ches-replacement-program#!page=1&search=ASX>>, ASIC, "Further ASIC regulatory response on CHES Replacement and ASX's program capabilities" *ASIC Media Release (23-035 MR)* < <https://asic.gov.au/about-asic/news-centre/find-a-media-release/2023-releases/23-035mr-further-asic-regulatory-response-on-ches-replacement-and-asx-s-program-capabilities#!page=1&search=ASX>>.

³¹⁵ ASX, "Chess Replacement Project – ASIC Investigation", *Letter to ASIC and to ASX Market Announcements Office* (29 March 2023) < <https://www.asx.com.au/about/media-centre>>.

³¹⁶ ASX is required to assist the Reserve Bank in this process: see *Corporations Act 2001* (Cth) s 821C(3).

were taken directly from ASX provided materials, without any real assessment of their accuracy or quality.

The Reserve Bank's commentary on the CHES replacement scheme increased in scope and intensity from the 2020 Assessment onwards, when the Reserve Bank first raised the need for external assurance as to whether the CHES replacement would meet the non-functional business requirements proposed by the ASX at the time.³¹⁷ By the time of the 2022 Assessment, the CHES replacement project was its own special topic and the subject of several specific recommendations as to governance, assurance, conflict of interest management and key operational risks.³¹⁸ Unfortunately, as we now know, these recommendations were too little and too late to rescue the CHES replacement project from the project failure it had already become.

What this issue raises for discussion is the nature of the regulatory relationship as it then existed between the Reserve Bank, ASIC and the ASX. We use that term, regulatory relationship, in its fullest sense³¹⁹, not limited or confined to legal obligations per se but also taking account of the way in which the relationship between the three parties reflexively operated over time. The Reserve Bank and ASIC were clearly the regulators, but the ASX was no archetypal regulated party. It was entrusted to manage a key piece of nationally important financial infrastructure and in that context, it was effectively the regulator of trading and settlement activities undertaken pursuant to its market and C&S licences. It provided detailed information to the Reserve Bank to enable the Bank to do its Assessments. It is apparent that the Reserve Bank relied on that information especially as it related to the CHES project up until 2020.

Questions arise as to whether there was a high degree of trust and professionalism involved in this regulatory circle (Reserve Bank, ASIC and the ASX) that may have encouraged the Reserve Bank and ASIC to accept ASX's representations at face value without criticism or challenge at least until 2020. They are questions which need to be answered by those involved in preparing the Reserve Bank Assessments.

Use of Independent Expert Reports

From 2020, the Reserve Bank and ASIC began to increasingly require the ASX to provide independent assurance reports on the CHES replacement project.³²⁰ The reports were delivered in 2022 and painted a bleak picture of the CHES project management, the suitability of the DLT design and its own program of assurance. Unfortunately, these reports were too late to bring about any significant change to the CHES replacement project. It is important to appreciate that the issues that these reports raised, while specific to the CHES replacement project, were not new or unique to the ASX.

Problems with the ASX's technology governance and risk management programs were known to the regulators since at least 2018. In 2018, KPMG provided a comprehensive review of the

³¹⁷ Reserve Bank, Assessment of ASX Clearing and Settlement Facilities (September 2020) [3.3.1, page 30].

³¹⁸ Reserve Bank, Assessment of ASX Clearing and Settlement Facilities (September 2022) [4.1-4.7].

³¹⁹ Keith Hawkins, Law as Last Resort – Prosecution Decision-Making in a Regulatory Agency (OUP, 2022) [206-243].

³²⁰ ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2020) [3.3.1]; ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2021) [2.2.2]; ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2022) [4.1.1] and see also "Final Days of the CHES Replacement Project" in Part VIII.F. above.

ASX's technology governance framework and risk management arrangements, finding significant gaps that surely should have served as a warning bell for the governance of all ASX technology projects. The KPMG report was not commenting about any specific technology project but rather the governance and risk management of all technology projects run by the ASX. An issue of real concern because the ASX's business, including its C&S operations, depended heavily on technology. In response, as previously noted, the ASX implemented its "Building Stronger Foundations" program,³²¹ to address these issues over three years.

The ASX reported and the Reserve Bank noted in its Assessments that the remedial program had been completed by 2020. Critically, at that time, there was no external review or assurance to confirm that was in fact the case and further that the new systems were effective in addressing the gaps identified by the KPMG review. The ASX claimed assurance had been provided by its own internal audits with reference to KPMG on "foundational elements"³²². Yet, audit is the third line of defence in the ASX's risk management framework and KPMG had raised serious questions about the ASX's risk governance. In the circumstances, the question to be asked is why an internal audit was ever deemed sufficient assurance of the ASX's risk governance.

No suspicion or doubt was apparently raised by the Reserve Bank or ASIC, as to the ASX internal verifications from 2018-2020. One other way in which that could have been done was to choose one of the ASX's technology projects, such as the CHES project, and require periodic assurance of its governance and risk management arrangements in accordance with the requirements of the Financial Stability Standards. This may not have prevented the project failure that was identified in 2022, but the extent of the problems may have become known earlier and forced a significant rethink of the regulatory oversight of ASX technology governance. A rethink that is clearly taking place right now.

H Our Conclusions as to Regulatory Oversight

Based on the documents examined in this submission, we contend that the ASX CHES replacement project failure was only one illustration of a systemic failure by the ASX to properly govern technology projects and manage technology risks. A systemic failure that was clearly made known to the Regulators by a KPMG report delivered in 2018.

Given the seriousness of the KPMG findings and the importance of CHES to the stability of the Australian financial system, the Reserve Bank and ASIC should also have:

- Required that the ASX institute a program of external assurance, rather than ASX internal audit, to confirm that ASX had fully and effectively implemented the KPMG 2018 recommendations.
- Required that the ASX institute a program of external assurance of new technology projects affecting or connected to licenced C&S facilities including the CHES replacement project from their formal inception to definitively determine whether

³²¹ ASX, Reserve Bank of Australia, *Assessment of ASX Clearing and Settlement Facilities* (September 2018) [3.1] < <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2017-2018/>. The ASX advised both regulators that a significant component of this work would be completed by the end of 2018. See for e.g. ASIC, *Report 592 – Review of ASX's Group's technology governance and operational risk management standards* (September 2018) [Observation 14] <<https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-592-review-of-asx-group-s-technology-governance-and-operational-risk-management-standards/>> .

³²² Reserve Bank, *Assessment of ASX Clearing and Settlement Facilities* (September 2020) [3.2].

their governance and risk management arrangements were in ongoing compliance with Financial Stability Standards and other legal obligations of C&S licence holders.

- Required an attestation from the ASX board that all controls, procedures and resources necessary to implement any remediation recommendations arising from the assurance programs had been put in place.
- Made these requirements ongoing conditions of the ASX C&S licences.

Part IX - Summary of conclusions

This submission addressed governance and regulatory issues arising from the ASX's failed project to replace the existing CHES system with a new system based on blockchain technology, a project which began in late 2017 before being abandoned in 2022.

We identified two areas of governance failure requiring further investigation by this Committee:

1. A failure of project governance by the ASX, specifically to properly manage and supervise the project to replace the CHES infrastructure with a system based on blockchain technology.
2. A failure of corporate governance by the ASX, specifically, a failure by the ASX board of directors and ASX executive management to sufficiently monitor and supervise its technology operations including the project to replace CHES.

Poor project management and governance in relation to the CHES replacement project was likely the product of poor planning, lack of sufficiently documented requirements, the apparent absence of effective supervision of the project and of a risk champion, capable of drawing together the common threads of work being done by ASX and Digital Asset, identifying the serious risk of project failure and drawing that risk to the ASX Executive and Board members' attention.

Poor corporate governance of the CHES replacement project reflects in some part a critical lack of senior executive and board experience and history in monitoring and providing oversight of large-scale technology transformation projects. ASX directors claimed not to be alerted to problems with the CHES replacement project problems in 2019 and 2020, although they could not avoid knowledge of system outages occurring in 2020. Whether the events of 2020 caused or should have caused a sensation of 'chronic unease' by senior management and the board as regards the CHES replacement project requires further investigation.

There are also lessons for the regulators in the CHES replacement project failure. Public documents suggest that the Reserve Bank and ASIC appear to have superficially monitored the CHES replacement project until 2020 and only then did they began to express concerns with the governance of the project. This, despite knowing, since at least since 2018, that there were significant problems with ASX's technology governance and risk management frameworks. They needed to perform the role of monitoring the ASX's C&S compliance with greater rigour at an earlier point in time.

The CHES replacement project abandonment in 2022 has cost the ASX approximately \$250m, but more significantly, it has increased the systemic risks for the Australian financial system from having to continue to rely on the ailing CHES system. Given this track record,

it would seem only appropriate that the regulators reconsider the circumstances under which the ASX should be allowed to continue to operate its C&S facilities going forward.

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