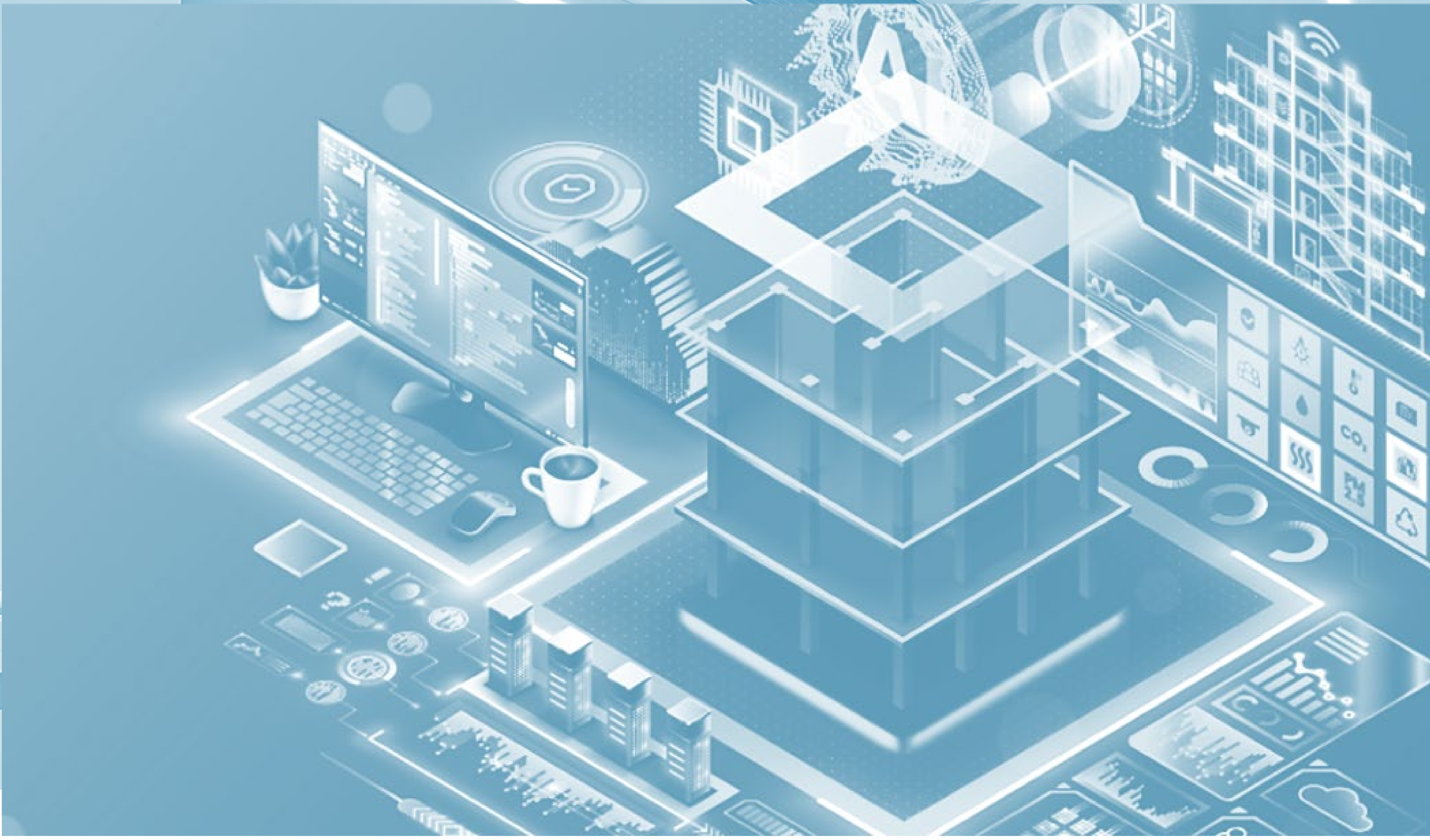


Australasian Health Infrastructure Alliance

AHIA BIM Return on Investment (ROI) Paper – Detailed Report

February 2026

Version **1**

australasian health infrastructure alliance

AusHFG
Australasian Health Facility Guidelines

Copyright and Disclaimer

Copyright

Australasian Health Facility Guidelines

Website: http://www.healthfacilityguidelines.com.au

Email: HI-AusHFGteam@health.nsw.gov.au

The AusHFG are an initiative of the Australasian Health Infrastructure Alliance (AHIA). AHIA membership is comprised of representatives from government health infrastructure planning and delivery entities in all jurisdictions in Australia and New Zealand.

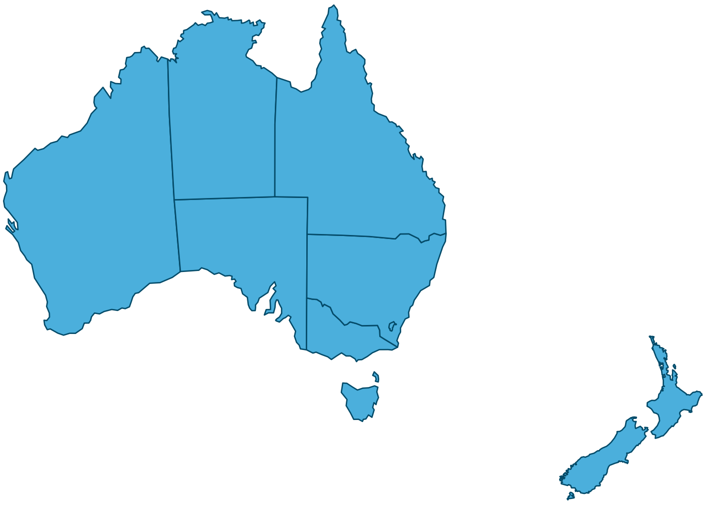
Disclaimer

AHIA gives no warranty or guarantee that the information in the AusHFG is correct, complete or otherwise suitable for use. AHIA shall not be liable for any loss howsoever caused whether due to negligence or otherwise arising from the use of or reliance on this information.

AHIA recommends that those seeking to rely on the information in the AusHFG obtain their own independent expert advice.

Cultural Acknowledgement and Terminology

The Australasian Health Facility Guidelines (AusHFG) are developed in collaboration with stakeholders across Australia and Aotearoa, New Zealand.



Acknowledgement of Country

We acknowledge the Aboriginal people and Torres Strait Islander People as traditional owners and continuing custodians of the land throughout Australia and the Torres Strait Islands.

We acknowledge their connection to land, sea, sky and community and pay respects to Elders past and present.

Acknowledgement of Te Tiriti o Waitangi

We acknowledge Māori as tāngata whenua in Aotearoa New Zealand.

Te Tiriti o Waitangi obligations have been considered when developing the AusHFG resources.

Terminology and Language in the AusHFG

Throughout the AusHFG resources, the term 'Indigenous Peoples' is used to refer to both the Aboriginal and Torres Strait Islander Peoples of Australia and Māori of Aotearoa, New Zealand. Where references to specific cultural requirements or examples are described, the terms 'Aboriginal and Torres Strait Islander Peoples' and 'Māori' are used specifically. The AusHFG respect the right of Indigenous Peoples to describe their own cultural identities which may include these or other terms, including particular sovereign peoples or traditional place names.

Contents

List of Tables

List of Figures

Acronyms

Acronym	Definition
AHIA	Australasian Health Infrastructure Alliance
AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
AusHFG	Australasian Health Facility Guidelines
BCA	Building Code of Australia – Volume 1 and Volume 2 of the NCC
BIM	Building Information Modelling
CCTV	Closed Circuit Television
CDE	Common Data Environment
DDA	Disability Discrimination Act
DE	Digital Engineering
DfMA	Design for Manufacture and Assembly
ESD	Environmentally Sustainable Development
FF&E	Furniture, Fittings and Equipment
FTE	Full Time Equivalent
HPU	Health Planning Unit
HVAC	Heating, Ventilation, and Air Conditioning
IoT	Internet of Things
IP&C	Infection Prevention and Control
ISO	International Standards Organization
LHD	Local Health District
MME	Major Medical Equipment
NCC	National Construction Code (Australia)
NZBC	New Zealand Building Code
PCG	Project Control Group
PUG	Project User Group
QUT	Queensland University of Technology
ROI	Return on Investment
SME	Subject Matter Expert
UQ	University of Queensland
VBIS	Virtual Buildings Information System
WHS	Workplace Health and Safety

1 How to read this report

This report has been divided into two separate documents to cater for different audiences.

Core Report

The Core Report is intended for an executive audience. It provides a concise summary of the investigation into BIM ROI and its findings, providing a succinct case for future BIM investment.

Detailed Report (this document)

The Detailed Paper is intended for a technical audience. It provides full details of the approach and methodology, assumptions and limitations, detailed analysis, findings and insights, case studies, recommendations, stakeholder engagement, references and supporting documents.

2 Introduction

2.1 What is BIM?

Building Information Modelling (BIM) is a collaborative and integrated approach to digital and data-driven infrastructure planning, delivery and operations. It encompasses governance, people, processes, technology, and data to enable more efficient and effective decision-making across the design, construction, and operational phases of infrastructure assets. This approach is supported by a suite of enabling technologies, including intelligent 3D modelling, computer-aided design (CAD), geographic information systems (GIS), Internet of Things (IoT), reality capture, and asset management systems, which work together to enhance data integrity, transparency, and collaboration across stakeholders. By emphasising these interconnected elements and focusing on connected, structured asset information, BIM aims to deliver higher-performing infrastructure, optimise resource utilisation, and achieve better long-term value and outcomes across the asset lifecycle.

2.2 Purpose of this Report

The purpose of this report is to provide a comprehensive analysis of the Return on Investment (ROI) for implementing BIM and Digital Engineering in healthcare infrastructure projects across Australia and New Zealand. The document aims to deliver evidence-based financial and operational metrics to guide policy and decision-making regarding BIM in healthcare.

The approach for this engagement centres around the linkage between:

- **BIM Uses** – the effective use of BIM across the health infrastructure lifecycle
- **BIM Benefits** – the value that effective use of BIM can provide for a health infrastructure authority
- **BIM Investments** – the business enablers that a health infrastructure authority needs to invest in so that they can realise BIM benefits.

By identifying, quantifying and mapping uses, benefits and investments, this ROI whitepaper will help health infrastructure authorities to prioritise where to spend their time and money in order achieve the greatest return on BIM investment.

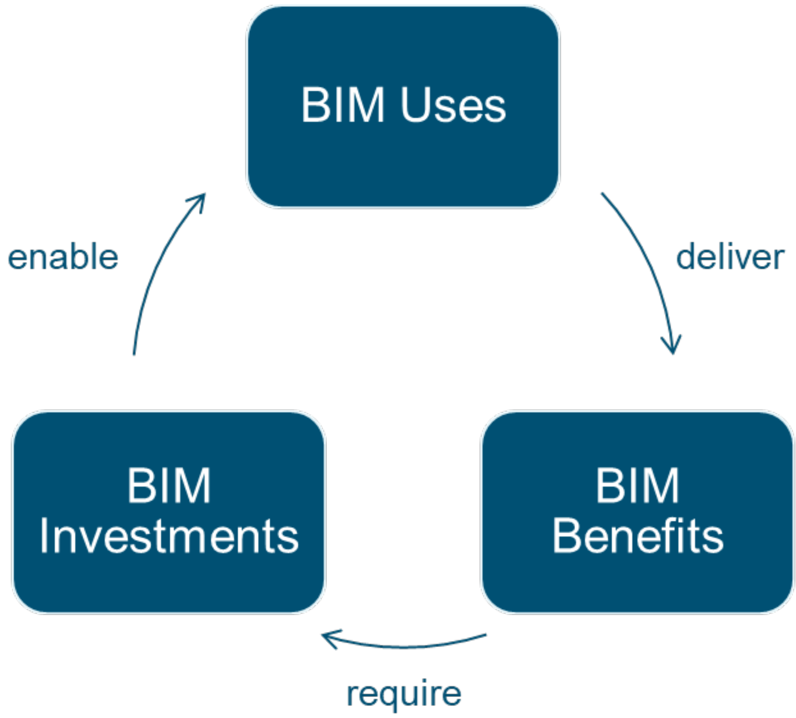


Figure 1: The linkage between BIM Uses, Benefits and Investments

2.3 Background and Context

The adoption and implementation of BIM in the delivery and operations of health infrastructure have increasingly become a topic of focus for public health jurisdictions. However, there is significant variation in the requirements for BIM deliverables across jurisdictions in Australia and New Zealand. While some regions have established guidelines or policies to support the integration of Digital Engineering (DE) into infrastructure projects, others remain less prescriptive in their approaches. Even in jurisdictions with formalised frameworks, challenges persist in defining the level of investment required for a comprehensive digital strategy that aligns with long-term asset management and operational goals.

Developing sustainable and effective BIM and DE initiatives extends beyond the adoption of 3D modelling technologies. Decision-makers within health jurisdictions are seeking clarity on the governance, capability, process, technology and data investments necessary to maximise the value of BIM. Furthermore, they need to understand what tangible benefits these investments can deliver in terms of cost, time efficiencies, and quality improvements across the lifecycle of health infrastructure assets.

While existing research highlights potential efficiencies through digital strategies, the quantification of BIM costs and benefits often lacks specificity. Most studies fail to provide detailed financial metrics, are seldom grounded in Australian contexts, and rarely focus on the unique requirements of health infrastructure. This lack of localised, sector-specific data makes it difficult for stakeholders to confidently assess the ROI for BIM initiatives.

This paper aims to fill those critical knowledge gaps by delivering actionable insights and robust financial metrics tailored to the healthcare infrastructure sector. By focusing on the specific needs and conditions of Australia and New Zealand, this study seeks to equip decision-makers with the evidence they need to advocate for broader BIM adoption. Ultimately, these insights will support optimised funding strategies and promote enhanced project performance through evidence-based practises, enabling jurisdictions to achieve more sustainable and effective outcomes in health infrastructure delivery and operations.

2.4 Objectives and Goals of the Study

Figure 2 summarises the objectives and goals of this study, and the key questions that this report seeks to answer.

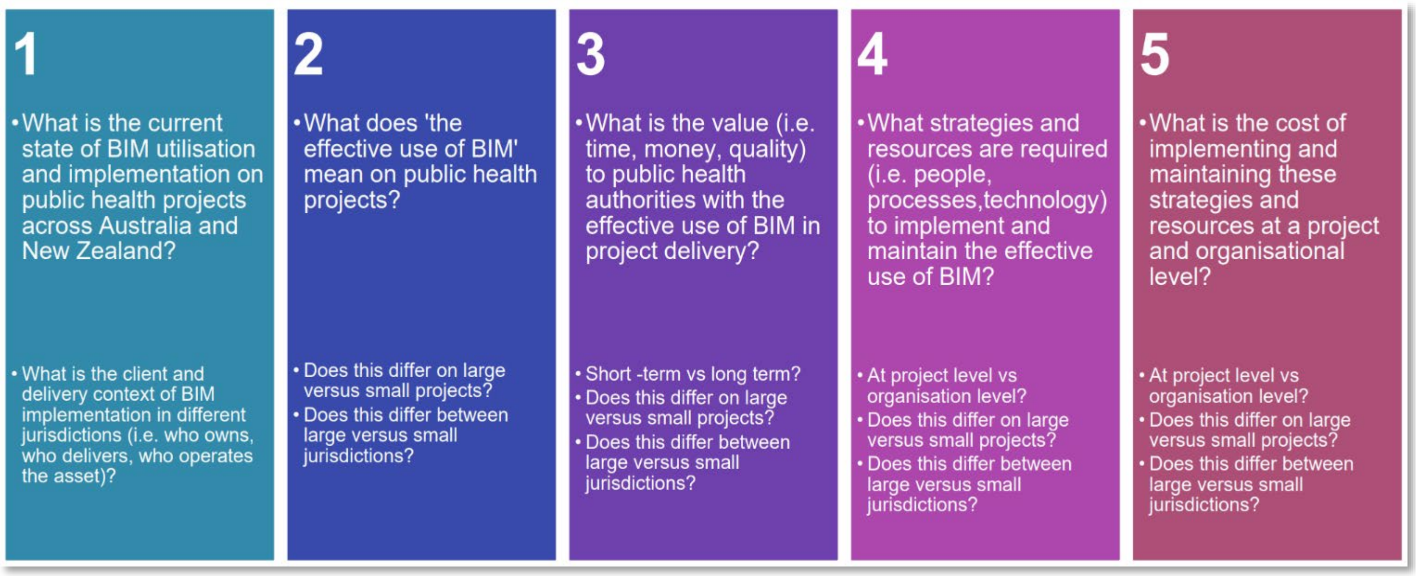


Figure 2: Objectives and Goals of this Study

3 Scope of Work

3.1 Project Overview

The BIM ROI paper examines the strategic investments required to enable BIM at an organisational level within Australian and New Zealand (NZ) health jurisdictions. It focuses on how these investments deliver financial benefits during infrastructure project delivery for the health jurisdiction by deploying BIM capabilities to achieve project delivery efficiencies and cost avoidance. The paper also considers broader, non-financial benefits across the entire asset lifecycle and health jurisdiction.

3.2 Methodology and Approach

This study broadly consists of two key parts:

- An assessment of the **current state of BIM adoption** in health infrastructure delivery and operations across Australian and NZ jurisdictions, and
- An analysis of the **financial ROI** from the use of BIM in health infrastructure projects – articulated through a set of hypothetical case studies.

3.2.1 Current State Assessment

For the current state assessment, key information was collected from each AHIA jurisdiction, including:

- Notes and comments regarding each jurisdiction's self-assessment of BIM maturity across the key areas of governance, people, processes, technology and data
- A summary of the key challenges facing each jurisdiction with regards to BIM adoption and implementation
- A summary of the main opportunities for BIM to improve outcomes in each phase of the asset lifecycle.

3.2.2 Case Studies & Financial ROI Analysis

Attempting to reliably quantify all BIM costs and benefits across health infrastructure projects is inherently problematic. Many BIM benefits are difficult to quantify, and there is still a distinct lack of reliable evidence regarding BIM benefits – not only in the health infrastructure sector, but across most of the construction industry.

Rather than attempting to provide a comprehensive quantification of all BIM costs and benefits, the financial ROI for this study focuses on representative costs and benefits for three hypothetical case studies:

- A "small project" – represented by a Community Health Hub – focusing on the basic BIM investments recommended for an organisation with limited BIM maturity.
- A "medium project" – represented by an Integrated Health Campus – focusing on the intermediate-level BIM investments recommended for an organisation seeking to build on its BIM foundations.
- A "large project" – represented by an Integrated Health and Research Centre – focusing on the advanced-level BIM investments that may be considered by an organisation with high levels of existing BIM maturity.

For each case study, the following have been identified:

- The type of BIM uses typical for a project of each type
- The typical investments or enablers needed to properly implement these BIM uses
- A set of quantifiable benefits that are likely to be realised by these investments.

A high-level estimate of the investment costs (at an organisational level) and the savings (at a project level) has been provided in order to calculate a representative ROI for each case study. Further details on the case study and financial ROI methodology are provided in Section 6.

3.3 Assumptions and Limitations

Table 1 outlines the key assumptions used throughout this study.

Table 1: BIM ROI Paper Assumptions

Assumption	Description
The cost of organisational BIM investments does not vary markedly between jurisdictions	For the purposes of this study, it is assumed that the costs for establishing and implementing BIM practices at an organisational level do not differ significantly between jurisdictions. For example, the cost of establishing BIM governance, or implementing an effective Common Data Environment are roughly the same for each organisation. It is acknowledged that there may be minor differences in the cost to implement BIM practices depending on the BIM maturity within the organisation (or within the jurisdiction more broadly), but for the purposes of the financial ROI analysis, it is assumed that these differences are relatively minor and do not make a material difference to overall ROI.
Costs for organisational BIM investments are order of magnitude estimates only	The cost estimates for organisational BIM investments have been based on an order of magnitude range drawn from previous projects and other industries. The mid-point of these ranges has been used for ROI calculations.
Benefits from other sectors are broadly applicable to health infrastructure	Whilst ROI calculations have been based on local, relevant figures from the health sector wherever possible, some of the evidence of quantifiable benefits from BIM implementation have been drawn from projects or examples from other industries. It is assumed that health infrastructure projects are able to achieve similar savings and benefits to those observed in other industries.
Benefit quantification for this study has been reduced to account for confidence levels	Each quantifiable benefit identified in this study has been assigned a confidence level. High confidence estimates have been reduced by a small amount to be conservative. Medium and low confidence estimates have been reduced further to reflect a conservative approach to benefits quantification.
Large projects are able to achieve a higher percentage benefit than small projects	It is generally assumed that the percentage benefit achievable from BIM on a large project is higher than on a small project (due to economies of scale and the ability to implement further value-added BIM uses on large, greenfield projects with more significant budgets. This variance has been accounted for in ROI calculations.
Conservative benefits estimates have been adopted for this study	Only those benefits which are deemed to have a large or medium impact for health infrastructure projects have been included in ROI calculations. Smaller quantifiable benefits have not been included, and the value of qualitative or downstream benefits is described but not quantified.
BIM benefits achieved are proportional to the organisational BIM maturity and BIM use proficiency levels.	Since the quantitative ROI calculation is concerned with the relationship between investment in organisational BIM maturity and the resulting dollar value benefit of project delivery savings, it is assumed that the % saving achieved on a project is proportional to the organisational maturity and BIM use proficiency in isolation from other project attributes.

Table *2* outlines the key limitations encountered in data gathering and analysis for this study.

Table 2: BIM ROI Paper Limitations

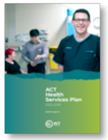
Limitation	Description
Lack of reliable evidence for quantifying BIM benefits	Despite drawing on relevant estimates for BIM benefits realisation from previous health infrastructure projects, other sectors and other parts of the world, the ability to accurately quantify benefits for the representative case studies will be limited to those benefits that have reliable metrics. Many of the BIM benefits that have been captured and identified still lack reliable metrics for quantification. This means that the ROI analysis for each of the case studies will be based on a relatively small subset of quantifiable benefits.
Limited detail in health infrastructure cost breakdowns	Cost breakdowns for typical health infrastructure projects were compiled to help support the ROI analysis for each case study. In cases where reliable cost estimates cannot be provided, broader assumptions or used proxy measures were made.
Limited information about the future pipeline of health infrastructure projects	The ROI analysis focuses on estimating the dollar benefits achievable on a typical healthcare project based on investments made at an organisational level. In order to provide better advice on the cumulative benefit achievable from BIM across a number of years – and the likely payback period – it would be useful to have data relating to the 5-year pipeline of projects for each jurisdiction. Key data would include (if available): jurisdiction, project size (small/med/large), indicative project cost, project type (e.g. extension/new build), expected date for completion

4 Current State of BIM in Healthcare

4.1 Policy and Framework Comparisons

Table 4 provides a summary of the BIM policies and frameworks across AHIA jurisdictions. It outlines the objectives, requirements, and alignment areas for each region's BIM policy. Key objectives include enabling decision-making, building capability, and promoting interoperability. Each region's framework aligns with state health infrastructure policies, defining roles, mandating standards, and supporting asset lifecycle management.

Table 3: BIM Policy & Frameworks

		State BIM Policy/Framework	State Policy/Framework Status			Health Infrastructure Policy/Framework	Health Policy/Framework Status
Northern Territory		NT Infrastructure Plan and Pipeline 2023	• Digital infrastructure key to growth. • BIM not mandated but aligned with strategy. • Infrastructure Audit highlights digital priorities.	• Focus on smart systems and data-driven planning. • BIM likely to emerge via digital transformation.		NT Health Strategic Plan 2023 - 2028	The NT plan does not explicitly mention BIM, but it reflects BIM-compatible goals such as data-informed service design, infrastructure planning, and technology use to bridge distances. The emphasis on culturally safe care, remote service delivery, and integrated systems suggests that BIM could play a future role in supporting these objectives, especially in asset management, facility planning, and digital coordination across vast regions.
Australian Capital Territory		ACT Government Infrastructure Design Requirements	• BIM part of ACT's Digital Engineering strategy. • Used for design, coordination, asset handover. • IFC format required for model outputs.	• BIM deliverables defined by project stage. • Integrated into procurement and construction.		ACT Health Services Plan 2022 - 2030	The ACT Health Services Plan integrates digital health and infrastructure planning as key enablers for future service delivery. While BIM is not explicitly named, the emphasis on digital health records, telehealth, and infrastructure master planning suggests that BIM principles—such as data integration, lifecycle asset management, and spatial planning—are embedded in the strategic approach. The plan's focus on role delineation, service levels, and forecasting hospital demand aligns with BIM's capacity to support evidence-based infrastructure decisions.
Western Australia		Dept Finance Architectural Services Brief	• BIM required for some government projects. • LOD 300 models used for documentation. • BIM Management Plan and IFC format needed.	• BIM used for coordination and tender sets. • Guidelines align with NATSPEC and CADD. • Case by case appraoch		Discussion Paper – Ensuring whole of asset life outcomes through the development of an integrated WMS	WA Health is rolling out a comprehensive BIM strategy as part of an Integrated Workplace Management System (IWMS), linking BIM with CMMS and finance systems for whole-of-life asset management. It aligns with national standards like IFC 2x3 or later and engages with the Australian Health Infrastructure Alliance (AHIA) to harmonise practices. BIM deliverables are embedded early in project briefs, starting with major projects such as the New Women and Babies Hospital. WA Health is defining OIR, PIR, and AIR to ensure consistent data handover and operational readiness.
Tasmania		Building Information Modelling (BIM) in Tasmania: foresight report(Industry White Paper)	• BIM capacity very low. • Small to medium size enterprise dominate AEC sector. • NBN offers digital edge.	• TBCITB key for training. • BIM seen as disruptive tech. • Education must target re-skilling.		Tasmania Healthcare Implementation Plan 2023 – 2025	Tasmania's plan shows strong alignment with BIM principles, particularly through its Digital Health Transformation Strategy and capital infrastructure masterplanning. The state is investing heavily in digital integration, telehealth, and hospital upgrades, all of which benefit from BIM-enabled workflows. The plan also includes workforce development, preventative health, and virtual care models, which can be supported by BIM through better planning, simulation, and data management.
South Australia		Department of Planning, Transport and Infrastructure (DPTI); Building Information Modelling Requirements	• BIM Capability Tier Levels 1-4 prequalification criteria. • DIT Building Projects EIR applies to projects over $5M. • Core BIM requirements for projects under $5M. • PIR and AIR included in the DIT Building Projects EIR.	• Mandatory for all projects >5M. • Pilot projects and Post construction reviews used for learning. • DCCIF BIM Industry subgroup to support the BIM industry and training. .		South Australia Health and Wellbeing Strategy 2020-2025	SA's Health and Wellbeing Strategy does not mention BIM directly it prioritises digital health technologies, predictive modelling, and integrated care systems, while developing a Digital and Information Strategy to improve data sharing and decision-making. SA Health mandates the Australasian Health Facility Guidelines (AHFG) for projects over $500,000, covering planning, engineering, infection control, and sustainability, alongside GreenStar Healthcare ratings and Victorian Health Design Guidelines.

		State BIM Policy/Framework	State Policy/Framework Objectives		State Health Infrastructure Policy/Framework	State or National Policy/Framework Alignment Areas
New South Wales		Digital Engineering Framework (Transport for NSW)	• Enable creation and management of digital assets for insights and decision-making. • Standardise DE deliverables using scalable templates and technical guidance. • Promote adoption of DE standards to improve project data and outcomes. • Support use of Common Data Environments (CDEs) and enterprise platforms. • Build DE capability through training and access to expert panels.		Health Infrastructure Standardised Project and Asset Information Requirements	• Define governance roles and execution plans for BIM. • Integrate asset management systems and 6D BIM. • Include audit processes to ensure data quality. • Support full asset lifecycle through structured digital deliverables. • Mandate BIM and centralised data environments for collaboration. • Use standard templates and schemas for consistency.
Victoria		Victorian Digital Asset Strategy (VDAS)	• Build Capability and Governance • Integrate Technology and Systems • Ensure Legal and Commercial Alignment • Facilitate Continuous Improvement • Enhance Asset Value and Management • Enable Whole-of-Life Asset Management • Establish a Consistent Digital Framework • Support Data-Driven Decision Making		Victorian Health Building Authority Digital Engineering Framework Project Information Requirements	• Follows VDAS lifecycle phases and asset model structure. • Uses ISO 19650 and BS EN 17412 standards. • Defines roles matching VDAS Champion and DE Project Champion. • Mandates use of CDEs for data sharing. • Includes audits and feedback loops. • Supports structured, scalable digital delivery.
Queensland		Digital Enablement for Queensland Infrastructure – Principles for BIM Implementation	• Enable Full Lifecycle Use of BIM • Build Public Sector Capability • Integrate BIM into Regulatory and Procurement Frameworks • Promote Consistency and Interoperability • BIM policy and the BIM framework are currently being significantly updated		QLD Health Project Information Requirements	• Supports full asset lifecycle via PIM to AIM transition. • Defines structured BIM deliverables across project stages. • Mandates (CDE) usage. • Establishes clear governance roles and responsibilities. • Tracks BIM benefits realisation and continuous improvement. • Integrates Safety in Design (SiD) • Enables quantity surveying directly from BIM. • Aligns BIM with operational planning and staging.
New Zealand		NZ BIM Handbook	• Promote BIM Across the Asset Lifecycle • Establish a Common Language and Framework • Improve Project Coordination and Outcomes • Support Asset Management and Operations • Define Clear Information Requirements • Enable Legal and Contractual Clarity • Align BIM with Procurement Models • Drive Capability and Continuous Improvement		Health New Zealand Te Whatu Ora BIM Framework	• Applies BIM across asset lifecycle, • Defines BIM roles and responsibilities • Requires project-specific BIM Execution Plans (BEPs). • Mandates use of a Common Data Environment (CDE). • Specifies model uses for asset lifecycle phases • Requires structured handover documentation (e.g. VBIS format). • Promotes collaboration through BIM meetings and compliance reviews.

4.2 Challenges and Barriers

Health infrastructure delivery authorities face a range of challenges when it comes to BIM adoption and implementation. Key challenges include limited BIM awareness, budget constraints, fragmented leadership, scalability issues, data capture burden, variation tracking, resistance in asset management, immature reporting tools, and cybersecurity risks. The challenges identified by health infrastructure deliver authorities emphasise the need for better understanding and integration of BIM throughout the project lifecycle.

Table 4: Challenges for BIM Adoption and Implementation

Plan	Design	Build	Operate & Maintain
• **Limited BIM Awareness and Buy-In -** Lack of understanding across key stakeholders about the long-term benefits of BIM results in resistance. This includes perceptions that BIM is an "extra" or "optional" task, rather than a core delivery tool. • **Budget Constraints and Cost Perception -** BIM is seen as a costly upfront investment due to expensive expertise and software. Also, less experienced project directors accept exorbitant variations from contractors. This creates pushbacks to allocating funding for BIM during the planning phase and labels it as a "nice-to-have" rather than a necessity. • **Fragmented Leadership and Governance -** Inconsistent adoption of governance frameworks and a lack of BIM leadership limit portfolio-level accountability. Disconnection between project team and operation team. Without strong governance, BIM's potential to add value throughout the project lifecycle is undermined. • **Lack of standardization** of digital information, which affects the consistency and reliability of data across different projects.	• **Industry Capability and Resistance to Change** - Consultants and contractors often lack the skills - or resist using BIM – to avoid increased data requirements, perceived complexity, and its capacity to expose project gaps and errors. They may rely on traditional methods to protect profit margins. • **Isolated or discipline-specific adoption of BIM** – Contractors often have the skills but utilize BIM in isolated disciplines realizing their own benefits, rather than as a collective team. BIM is most effective when fully integrated across a project, providing a connection between disciplines and stakeholders. • **Scalability Challenges** - Variance in project sizes and scopes makes it difficult to establish scalable BIM processes and determine clear return-on-investment benchmarks. • **Disagreement on Responsibilities** - Differing interpretations of who owns or is responsible for specific aspects of federated BIM models creates conflict within design teams, slowing implementation and coordination.	• **Data Capture Burden on Teams** - Increased demands for data collection and documentation lead to push back from consultants, contractors, and project teams who perceive this as extra workload. This often results in insufficient or delayed data entry. • **Variation Tracking and Manual Processes** - Workarounds like Excel and unmanaged email chains bypass formal BIM processes, leading to inconsistencies in quality assurance and tracking changes. • **Lack of Dedicated BIM Roles** - Without a dedicated BIM coordinator, the responsibility for managing models and data often falls to project leads who may deprioritize it in favor of cost or schedule pressures, reducing accountability. • **Value Engineering Risks** - Cost-cutting measures during the build phase can compromise BIM implementation, affecting data quality and alignment with long-term asset management needs.	• **Limited Asset Handover Integration** - Poor standardisation and fragmented handover workflows result in incomplete or delayed asset data delivery to operations teams. This undermines the potential to link BIM data with facilities management systems effectively. • **Resistance in Asset Management Sectors** - Facilities management teams, accustomed to manual methods like physical inspections and spreadsheets, show resistance to adopting BIM for operational purposes, limiting its use beyond design and construction phases. • **Immature Portfolio-Level Reporting and Tools** - A lack of consolidated portfolio-wide reporting and dashboarding reduces the visibility and utility of BIM at the operational level. • **Cybersecurity Risks in Integrated Systems** - Integrating BIM with operational building management systems raises cybersecurity concerns, adding a layer of hesitation in adopting comprehensive digital threads. Also, IT teams with legacy processes and mindset are not ready fully for cloud-based platforms, i.e. AI. • **BIM intelligence** within the AM FM space is negligible - resulting in limited utilisation of data post-handover.

• **Contractual Scope gaps** inadequate specifications of BIM and DE requirements in consultants and contractors' contract which leads to misalignment in terms of understanding o scope of services to deliver on the clients' needs.	• **Technology Fragmentation** - Tools such as dRofus, Revit, and other design software often lack seamless integration, resulting in inefficiencies and increased risk of errors during data transfers. • **Lack of dedicated BIM resource** in some jurisdictions, which affects the quality and consistency of BIM implementation. • **Misalignment of BIM guide and Brief** which results in lack of the validity of the models and standard.	• **Lack of standardisation approach** across different health agencies results in varying requirements and practices.	• **Limited application to operational decision-**making - BIM is rarely leveraged for operational decision making, maintenance planning, or asset renewal across portfolios due to limited integration with facilities and asset management systems (e.g., AIMS, CMMS), unclear ownership and accountability for ongoing BIM data maintenance, and insufficient digital capability within facilities and asset management teams.

4.3 Opportunities for BIM and Digital Engineering

AHIA jurisdictions identified the main opportunities that they see from broader BIM adoption and implementation. Table 6 summarises the opportunities that exist across the asset lifecycle and emphasizes the benefits that BIM can provide in terms of increasing delivery certainty, reducing risk, improving data accuracy, and facilitating better long-term asset management.

Table 5: Opportunities for BIM and Digital Engineering

Plan	Design	Build	Operate & Maintain
• **Standardised asset requirements** are defined early using BIM, reducing surprises later in the project. • **Reusable BIM strategies** eliminate the need to recreate BIM plans for each project. • **Scalable BIM specifications** (PIR/ AIRs) along with templated BIM/ DEMP templates. • **Standardised tender evaluation criteria** - Mapped to standardised specification, enabling like-for-like evaluation, even carried out by non-technical staff. • **Improved space utilisation** through alignment with the AusHFG. • **dRofus database** enables API integration for automated reporting during design. • **Templated and standardised data** in dRofus results in significant time savings. • **Structured BIM data** gives tenderers clarity on scope, deliverables, and asset expectations, reducing interpretation risk and improving accountability. • **Reality capture technologies** help contextualise tender documentation,	• **Automation and analysis tools** have become more effective when structured data is available. • **Mandatory BIM audits have revealed** missing data and clashes, preventing major issues even when ignored initially. • **Early BIM coordination** has prevented costly variations by catching service clashes and validating layouts against the AusHFG. • **Asset data alignment with procurement** before installation has reduced risks and improved delivery accuracy. • **Capturing relevant data during design and construction** phases ensures better downstream use and integration. • **Improved site staging and logistics management** through early digital planning. • **Reduced safety risks** due to better coordination and planning enabled by BIM. • **Seamless integration** of clean data into CMMS, finance, and procurement systems.	• **Structured digital asset registers** replace static O&M manuals, linking warranties, manuals, and service intervals directly to each asset. • **Faster access to information** LHDs can locate asset data in minutes instead of weeks. • **Seamless integration** with CMMS and procurement systems using clean, structured data. • **Real-time tracking** of assets and equipment, linked to rooms and systems. • **Digital capture of variations and replacements** which is giving visibility and status. • **Streamlined compliance checks** for fire safety, WHS, and infection control, reducing handover risks. • **Eliminates manual tracking** of repair and maintenance (R&M) schedules. • **Improved defect tracking and responsibility management** through digital workflows. • **Arcuate reflect of as-built condition at handover through models & drawings.**	• **Structured and trustworthy as-built information** enables better long-term asset management and reuse. • **Digital deliverables workflow** (e.g. ACC) replaced static paper submissions. • **Benchmarking potential** for future projects and guidelines, though quantification is still evolving. • **BIM data supports maintenance planning**, faster fault response, and lifecycle forecasting not yet fully implemented. • **Portfolio-wide asset tracking** (age, condition, renewal needs) is possible but currently inconsistent after handover to LHDs. • **Closing the data loop** would improve compliance, reduce duplication, and enable smarter asset management across NSW Health. • **CHS projects are beginning to produce BIM-format documentation**, though full governance is still pending. • **As-built drawings stored in models** ensure teams have holistic building information which is not isolated project outputs. • **BIM simplifies management of documents** like SLDs, schematics,

Plan	Design	Build	Operate & Maintain
enhancing contractor understanding of site conditions and logistics. • **Tender documents paired with models** enable faster and clearer comprehension of project requirements. • **Tender documents paired with models** enable faster and clearer comprehension of project requirements. • **Rapid asset lookup** reduces time from weeks to seconds, improving operational efficiency. • **Lifecycle planning** is improved, enabling proactive renewals and reducing "run to failure" scenarios.	• **Better pricing accuracy** due to improved understanding of space and design models. • **Client-owned Common Data Environment (CDE)** avoids contractor setup, saving full-time labour hours. • **Enhanced model coordination** leads to fewer clashes and better design outcomes. • **Reduced contingency allowances** due to more accurate early cost estimation. • **Faster design and coordination** due to availability of existing digital assets, aiding site logistics like crane and equipment movement. • **Integration of the AusHFG, advisory inputs, and kit-of-parts** into a single digital template streamlines design. • **Defined and Standardised** digital deliverables received at each project phase. • **Spatial benchmarking** to track variation of brief vs design areas throughout design development.	• **Use of VBIS standards** enables consistent digital asset categorisation and documentation. • **Supports operational readiness** by delivering structured, searchable, and reliable asset data from day one. • **Improved procurement workflows -** BIM and associated data can be utilised to verify quantities and scope for trade packages.	schedules, and asset IDs which are reducing duplication. • **System descriptions in O&M manuals** are improved when lifecycle data from multiple projects is merged. • **Smarter asset registers** can be created when modelling teams assign asset marks directly in the model. • **BIM workflows reduce handover pressure**, ensuring asset data is captured progressively. • **Operational readiness from day one**, empowering FM teams without delays or data gaps. • **Standardised O&M documentation** across projects using VBIS improves clarity and usability.

4.4 Risk Management

Building on the challenges and opportunities identified by AHIA stakeholders, the below table highlights typical risks associated with BIM adoption and offers potential mitigation measures to manage these risks effectively.

Figure 3 - Risks associated with BIM adoption

Risk Name	Risk Description	Likelihood	Impact	Mitigation Measures
Limited Stakeholder Buy-in	Lack of understanding or resistance from stakeholders to adopt BIM due to perceived complexity, costs, or lack of awareness of its benefits.	High	High	Conduct stakeholder engagement sessions; provide training programs to demonstrate BIM benefits and applications; establish regular communication channels.
Initial High Investment Costs	Perceived and actual upfront costs for software, training, and infrastructure leading to budget constraints and hesitation to invest in BIM.	High	High	Develop robust business cases showcasing ROI and financial benefits; seek cost-sharing solutions with partners and long-term funding strategies.
Fragmented Leadership and Governance	Inadequate or inconsistent standards, policies, and governance frameworks between stakeholders and jurisdictions hinder alignment and adoption consistency.	Medium	High	Develop a unified national BIM framework (aligned with ISO 19650); establish governance structures with clear roles, responsibilities, and accountability.
Technology Integration Challenges	Difficulty in integrating diverse BIM, CAD, GIS, and other platforms, leading to inefficiencies and data transfer errors.	Medium	High	Adopt standardised technology platforms and data schemas; prioritise interoperability between new and legacy systems; provide training programs for teams.
Inadequate BIM Training	Lack of skilled workforce to implement and operationalise BIM, hindering intended returns on investment and delaying maturity progression.	High	High	Establish national training and certification programs; promote ongoing professional development for staff; foster BIM Communities of Practise.

Risk Name	Risk Description	Likelihood	Impact	Mitigation Measures
Cybersecurity Risks	Integration of BIM with operational and asset management systems introduces potential vulnerabilities to cybersecurity threats.	Medium	High	Develop robust cybersecurity policies; adopt secure CDEs and actively involve IT teams in implementing and maintaining secure systems.
Data Quality Issues	Lack of standardisation of data capture and validation processes leading to inconsistencies and unreliable information for future asset management.	High	Medium	Implement standardised data governance frameworks; enforce data validation at key project milestones; provide training on data quality management.
Low Integration with Asset Management	Limited use of BIM data post-construction for facilities and asset management, reducing long-term operational benefits.	Medium	High	Define Asset Information Requirements (AIR) and Project Information Requirements (PIR); automate BIM data handover; align BIM implementation with CMMS and FM systems.
Resistance to Change	Cultural and attitudinal barriers to transitioning from traditional methods to technology-based workflows.	High	Medium	Foster a collaborative culture through workshops and training; highlight early success stories to build momentum; align BIM with organisational goals.
Lack of Organisational Resources	Insufficient internal resources to effectively manage BIM implementation and maintain long-term processes.	Medium	Medium	Advocate for dedicated BIM resources in team structure; secure initial and ongoing funding for BIM initiatives; leverage cross-jurisdictional cost sharing.
Inconsistent Adoption Across Jurisdictions	Variation in BIM maturity levels and frameworks creates confusion and inefficiencies in cross-jurisdictional projects or knowledge sharing.	Medium	High	Share templates, standards, and processes across jurisdictions; encourage cross-jurisdictional forums and knowledge-sharing initiatives under AHIA.

5 Value of the Effective Use of BIM

5.1 BIM Use Across the Asset Lifecycle

BIM is widely used across the asset lifecycle to support the effective planning, delivery, and operation of health infrastructure. By applying BIM at each stage, project teams can enhance processes such as site evaluation, design coordination, construction sequencing, and operational maintenance. The structured information generated during delivery phases can be seamlessly transitioned into asset information models (AIM), ensuring that critical data is available for ongoing facility management and operational optimisation.

Table 7 outlines the typical uses of BIM at various stages of the asset lifecycle, providing an overview of each use and its relevance at each stage of planning, design, construction, and operation. The table also outlines which uses would typically be adopted by an organisation at a basic level of BIM maturity, which would be added for an intermediate level organisation, and which more advanced uses might be implemented in the most mature health infrastructure delivery organisations.

Table 6: BIM Uses Across the Asset Lifecycle

Use Name	Use Description	Maturity Level	Plan	Design	Build	Operate & Maintain
Site Analysis	BIM and GIS are used to analyse spatial data, topography, and environmental factors to assess site suitability and optimise health facility locations.	Intermediate	✓	✓		
Master Planning	Integrated BIM and GIS tools are employed to develop comprehensive master plans incorporating spatial, demographic, and service delivery needs for health infrastructure.	Advanced	✓			
Concept Design Visualisation	Interactive visualisations generated in BIM allow stakeholders to explore conceptual health facility designs, improving decision-making and collaboration.	Basic	✓	✓		
Virtual Design Coordination	BIM enhances interdisciplinary design coordination, identifying and resolving clashes between architectural, structural, and MEP (mechanical, electrical, plumbing) systems.	Basic		✓	✓	
Detailed Design	BIM enables the creation of precise, data-rich 3D models to inform the development of detailed construction documentation and specifications.	Basic		✓		
Cost Estimation (5D BIM)	BIM integrates cost data with 3D models to perform detailed quantity take-offs and cost predictions for construction and lifecycle expenses.	Intermediate	✓	✓	✓	
Supply Chain Integration	BIM facilitates supply chain coordination by linking design models with procurement processes and prefabrication workflows.	Advanced		✓	✓	
Construction Sequencing (4D BIM)	BIM integrates time/schedule data with 3D models to enable simulation and optimisation of construction sequences, reducing on-site risks and delays.	Intermediate			✓	

Use Name	Use Description	Maturity Level	Plan	Design	Build	Operate & Maintain
360-degree Reality Capture	Laser scanning and photogrammetry (reality capture technologies) generate highly accurate as-built models for verifying construction quality and capturing deviations from design.	Intermediate	✓	✓	✓	✓
Asset Handover	A comprehensive digital twin or as-built BIM model is delivered to the operations team, including asset data, warranties, and maintenance schedules for efficient O&M.	Basic			✓	✓
Facility Management (6D BIM)	BIM integrates with facility management systems (FMS) to provide lifecycle data for monitoring, maintaining, and optimising health facility operations.	Advanced				✓
Emergency and Risk Planning	BIM allows scenario simulations (e.g., fire evacuation, pandemic response) for analysing risks and enhancing disaster preparedness plans in healthcare facilities.	Advanced	✓	✓		✓
Energy Performance Analysis	BIM tools are used to model and analyse energy consumption, optimising sustainable design in compliance with environmental goals and energy efficiency standards.	Advanced		✓		✓
Regulatory Compliance Checking	BIM automates compliance with health and building regulations, incorporating codes like BCA/NCC and leveraging standard templates.	Advanced		✓	✓	
Smart Building Integration	BIM enables integration with IoT systems for predictive maintenance, energy monitoring, and indoor environmental quality control in operational healthcare facilities.	Advanced				✓

5.2 BIM Investments and Enablers

As organisations seek to harness the full potential of BIM in delivering and operating health infrastructure, it is critical to identify and invest in the key enablers that drive successful adoption and integration. These enablers represent the foundational elements – spanning governance, people, processes, technology, and data – that must be enhanced for organisations to realise the efficiencies, collaboration, and lifecycle value that BIM offers. Each enabler plays a role in ensuring seamless implementation of BIM across all project phases, from planning and design to construction and ongoing operations.

This section highlights the strategic investments and organisational capabilities recommended to support BIM-enabled workflows effectively. Table 8 categorises these enablers based on their functional roles and maps their applicability across the lifecycle of health infrastructure projects. By investing in these critical enablers, organisations can establish the policies, skills, tools, and processes necessary to maximise BIM's value in delivering sustainable, high-performing health facilities.

Table 7: BIM Investments and Enablers

Enabler Name	Enabler Description	Category	Plan	Design	Build	Operate & Maintain
BIM Governance	Creating policies, standards, and governance frameworks to ensure clear processes and accountability for BIM adoption and management across all lifecycle phases, from planning to operations.	1. Governance	✓	✓	✓	✓
Government Leadership & Strategy	Advocating for government-led initiatives and strategies to mandate or encourage BIM adoption across infrastructure projects via policy frameworks, pilot projects, and sector capacity-building programs.	1. Governance	✓	✓	✓	✓
BIM Contract Requirements	Embedding BIM deliverables, roles, and performance goals into contractual agreements to align all parties (designers, contractors, asset managers) and drive compliance with BIM standards.	1. Governance	✓	✓	✓	✓
BIM Communications Framework	Developing structured communication plans to engage project stakeholders effectively, ensuring clarity around BIM deliverables, roles, and workflows.	2. People	✓	✓	✓	✓
BIM Maturity Assessments	Assessing an organisation’s or project team’s BIM capabilities and readiness using maturity frameworks (e.g., the BIM Maturity Matrix) to identify gaps and define improvement strategies.	2. People	✓	✓	✓	✓
BIM Training Programs	Developing continuous education and tailored workshops for staff on BIM technologies (e.g., Revit, Navisworks), processes, and standards while ensuring alignment with emerging digital engineering practises.	2. People	✓	✓	✓	✓
BIM Communities of Practise	Establishing communities of practise to facilitate knowledge sharing, industry collaboration, and innovation regarding advancements in BIM and DE technologies.	2. People	✓	✓	✓	✓
BIM Career Pathways	Embedding BIM into recruitment and career progression frameworks within organisations, emphasising roles such as BIM Coordinator, BIM Manager, and Digital Engineer.	2. People	✓	✓	✓	✓

Enabler Name	Enabler Description	Category	Plan	Design	Build	Operate & Maintain
Object Libraries & Design Reuse	Establishing processes and workflows to adopt standardised BIM object libraries (including AusHFG) and to reuse existing designs and BIM objects from previous health projects to accelerate project planning and delivery while minimising costs.	3. Processes	✓	✓	✓	
Design Coordination & Clash Detection	Implementing client-side tools and workflows (e.g., Navisworks, Solibri) for tracking and resolving design coordination issues and preventing clashes prior to construction, ensuring time and cost savings.	3. Processes		✓	✓	
Model-Based Scheduling (4D)	Integrating project schedules into 3D models using 4D BIM tools to enable construction sequencing simulation, resource allocation, and progress tracking.	3. Processes	✓	✓	✓	
Model-Based Quantity Take-offs & Cost Estimation (5D)	Implementing BIM tools to automate quantity take-offs and link cost data (5D BIM) to models for accurate construction and lifecycle cost estimates.	3. Processes	✓	✓	✓	✓
Offsite Construction / DfMA	Leveraging BIM to enable design for manufacture and assembly (DfMA), speeding up project delivery while improving safety and quality through prefabrication and modular construction techniques.	3. Processes		✓	✓	
Automated Handover of As-Built Data	Automating the handover of as-built models and asset data via CDEs, ensuring accurate and up-to-date digital twins for seamless integration into operational systems.	3. Processes			✓	✓
Common Data Environment (CDE)	Using a cloud-based collaborative platform (e.g. ACC, Aconex) to store, manage, share, and coordinate BIM, GIS, and project data in real time across all stakeholders and phases.	4. Technology	✓	✓	✓	✓
BIM Technology Platforms	Procuring and integrating essential BIM (e.g., Revit, dRofus), CAD (e.g., AutoCAD), GIS (e.g., ArcGIS), and Reality Capture (e.g., laser scanners) tools to produce and manage integrated digital models.	4. Technology	✓	✓	✓	✓

Enabler Name	Enabler Description	Category	Plan	Design	Build	Operate & Maintain
Project & Asset Data Standards	Establishing standardised metadata and classification structures for capturing, managing, and exchanging asset and project data (e.g., UniClass, ANZLIC) to ensure consistency across phases and enhance interoperability.	5. Data	✓	✓	✓	✓
BIM Performance Data Standards	Creating and adopting standardised formats for performance data (e.g., operational efficiency, energy usage, carbon output) to facilitate lifecycle assessments and sustainability reporting.	5. Data	✓	✓	✓	✓
Improved Analytics & Reporting	Leveraging analytics tools within BIM and DE platforms to enable real-time reporting of critical metrics (time, cost, energy, carbon) for better decision-making throughout the project lifecycle.	5. Data	✓	✓	✓	✓
Model-Based Carbon Accounting	Using BIM platforms to track and report a project's carbon footprint and embed sustainability reporting practises for meeting environmental and climate targets.	5. Data	✓	✓	✓	✓

5.3 BIM Benefits

The adoption of BIM offers measurable advantages across the lifecycle of health infrastructure projects. By integrating data, processes, and technologies, BIM facilitates improved efficiency, accuracy, and decision-making during planning, design, construction, and operations. These benefits are particularly relevant in health infrastructure, where projects must balance technical complexity, cost-efficiency, and long-term performance.

BIM undeniably delivers real value to projects, however many of its benefits remain underrepresented or unaccounted for in quantitative analyses. This underscores the need for broader recognition of BIM's holistic contributions beyond strictly measurable outcomes.

This section explores typical benefits that can be achieved on projects of differing type, size and complexity. Quantification of tangible financial benefits has been calculated where cost avoidance benefits can be reliably estimated in project delivery. Non-quantifiable benefits are also discussed but have not been incorporated into the hypothetical ROI calculations associated with each case study.

The quantifiable and non-quantifiable benefits of BIM in health infrastructure are described further below.

5.3.1 Quantifiable Benefits

Quantifiable benefits that have been considered for each of the hypothetical case studies in this study are summarized in Table 9. These benefits represent potential savings or cost avoidance compared to traditional delivery methods (not employing BIM). Further details on these benefits are provided in the supporting ROI calculations, including details on the evidence and sources used to derive savings estimates.

Table 8: Quantifiable benefits used in this study

Benefit Name	Benefit Description	Project cost item that savings apply to	Potential savings on cost item	Plan	Design	Build	Operate & Maintain
Reduce estimation effort through model-based quantity take offs	By using the BIM model to automatically calculate quantities, effort and time spent on manual estimations are reduced.	Quantity estimation costs	6-18%	✓	✓		
Reduce materials through model-based quantity take offs	Accurate quantity calculations through BIM minimise material waste and ensure optimal use of resources.	Materials contingency costs	6-12%		✓	✓	
Reduce program management overheads through improved delivery planning	Improved project planning and coordination enabled by BIM reduces the overall time and cost required for program management.	Program management costs	3-5%	✓	✓	✓	
Reduce changes & rework through more reliable and accessible data	Centralised and reliable data in a BIM model reduces the likelihood of errors, resulting in fewer changes and rework.	Cost of changes / rework / variations during construction	16-20%			✓	
Decreased cost of design labour	Automated tools and processes within BIM streamline design tasks, reducing the effort and cost of design labour.	Design labour costs	4-5%		✓		
Reduced construction time	Enhanced planning and precise execution enabled by BIM shorten the overall construction timeline.	Construction labour costs	6-7%			✓	

Benefit Name	Benefit Description	Project cost item that savings apply to	Potential savings on cost item	Plan	Design	Build	Operate & Maintain
Reduced construction & materials costs through offsite construction	Prefabrication facilitated by BIM reduces material wastage, construction costs, and on-site labour requirements.	Construction costs	4-7%			✓	
Reduced effort to prepare asset registers	BIM allows asset registers to be generated automatically, significantly decreasing the manual effort required.	Asset register preparation costs	52-63%			✓	
Reduced effort in clash detection	Advanced BIM features detect clashes early during design, reducing the manual effort needed to resolve conflicts.	Clash detection costs	81-90%		✓	✓	
Reduced effort to capture existing site conditions	Technologies like laser scanning integrated with BIM simplify the process of capturing and modelling existing site conditions.	Existing site conditions capture costs	25-70%		✓	✓	
Decreased cost of maintenance	Detailed asset data captured in the BIM model enables efficient long-term maintenance and lower upkeep costs.	Annual maintenance costs	9-10%				✓

5.3.2 Non-Quantifiable Benefits

The non-quantifiable benefits of BIM are many and varied. BIM provides a range of short-term benefits that provide savings, quality and safety improvements for project delivery, longer term benefits that enhance asset operations and maintenance, and indirect or downstream benefits to the broader industry and community.

Short Term Benefits for Project Delivery

Enhanced Stakeholder Engagement and Communication

In the early stages of health infrastructure projects, BIM delivers significant non-quantifiable benefits by transforming how stakeholders engage with the design and delivery process. The use of 3D and immersive visualizations allows clinicians, facility managers, and end-users to virtually explore proposed spaces, making complex designs accessible to those without technical backgrounds. This capability fosters a shared understanding of the project vision, enabling more informed and timely decision-making. As a result, misunderstandings are reduced, and the likelihood of costly design changes diminishes. The collaborative environment fostered by BIM - through co-location, regular review meetings, and shared digital platforms - breaks down traditional silos between designers, contractors, and clients, cultivating a culture of openness and shared responsibility.

Improved Change Management and Transparency

BIM also enhances change management and transparency during project delivery. It enables real-time tracking of design changes, documentation of the reasons behind them, and assessment of their impacts. This transparency reduces the potential for conflict and builds trust among project participants, which is especially important in complex, multidisciplinary health projects where requirements can evolve rapidly. The ability to visualize and communicate changes clearly ensures that all stakeholders remain aligned throughout the project.

Knowledge Transfer and Learning Culture

Another important short-term benefit is the encouragement of a learning culture within project teams. As digital tools and processes become central to project delivery, team members develop new skills and share knowledge, leading to a more capable and adaptable workforce. This upskilling, while difficult to quantify, has lasting value for both the organizations involved and the broader industry.

Enhanced Safety and Risk Management

BIM supports enhanced safety and risk management by enabling virtual safety simulations and scenario planning. Project teams can identify and mitigate risks before they occur on site, which is particularly critical in health environments where patient and staff safety is paramount. The ability to rehearse procedures and emergency scenarios virtually contributes to a safer construction environment.

Improved Quality and Reduced Rework

BIM leads to improved quality and reduced rework. Early and ongoing coordination using digital models helps to identify and resolve issues before construction begins, providing project teams and clients with greater confidence and peace of mind throughout the delivery process. The reduction in errors and rework not only streamlines project delivery but also supports smoother transitions into the operational phase.

Long Term Benefits for Asset Operations and Maintenance

Better Asset Information and Decision-Making

Over the long term, BIM delivers a range of direct non-quantifiable benefits during the operations and maintenance phase of health infrastructure assets. One of the most profound advantages is the provision of a single, reliable source of asset information. BIM enables the creation and maintenance of comprehensive digital records that support more informed, evidence-based decision-making throughout the asset’s lifecycle. This capability enhances the agility and confidence of asset managers, allowing them to plan maintenance, upgrades, and adaptations with greater precision and less uncertainty.

Enhanced Staff Experience and Retention

The digital transformation enabled by BIM also improves the experience and retention of facilities management staff. With easy access to accurate asset information, staff can perform their duties more efficiently and with less frustration, fostering a sense of professionalism and empowerment. This improvement in job satisfaction, while intangible, is particularly valuable in health settings where the quality of facility management can directly impact patient care and safety.

Improved Safety and Compliance

Safety and compliance are further strengthened through BIM's support for virtual training and briefings. Maintenance staff can rehearse procedures and emergency scenarios in a virtual environment, reducing on-site risks and supporting a culture of safety and regulatory compliance. The ability to simulate emergency scenarios or maintenance tasks virtually is a significant intangible benefit.

Resilience and Adaptability

Comprehensive digital models provided by BIM enhance the resilience and adaptability of health facilities. In times of crisis, such as a pandemic or a sudden change in service requirements, having up-to-date digital information allows organizations to respond quickly and effectively, ensuring continuity of care and service delivery.

Indirect Benefits for Industry and the Community

Improved Patient and Community Outcomes

Beyond the direct operational advantages, BIM implementation in health infrastructure projects yields significant indirect benefits for the broader community. Improved design and maintenance of health facilities, made possible by BIM, can lead to better patient experiences and outcomes. For example, well-designed spaces can support faster recovery, reduce the risk of infection, and improve wayfinding for patients and visitors. While these outcomes are difficult to measure directly, they are central to the mission of health infrastructure and contribute to the overall well-being of the community.

Social Value and Public Trust

BIM also fosters greater social value and public trust. The transparency and accountability enabled by digital information management enhance the reputation of health authorities and government agencies, building public confidence in the delivery and stewardship of public assets. This trust can, in turn, support future investment and community engagement.

Sustainability and Environmental Stewardship

Sustainability and environmental stewardship are further indirect benefits of BIM. The technology supports better environmental performance through energy modelling, lifecycle analysis, and the integration of sustainability considerations into design and operations. Over time, this fosters a culture of sustainability that extends beyond the facility itself to influence the broader community.

Economic and Industry Development

The widespread adoption of BIM in health projects drives digital transformation across the construction sector, supporting local industry capability, innovation, and competitiveness. This has long-term benefits for the broader economy and workforce, contributing to a more resilient and future-ready society.

6 Case Studies: Financial ROI Analysis

6.1 Case Study 1 (<$50M) – Community Health Hub

Figure 4: Community Hub Design Render

6.1.1 Project Snapshot

Project Name:	Community Health Hub
Project Location:	Inner Metropolitan Adelaide, SA
Project Value (TEI):	$48 Million (AUD)
Project Duration:	3 years
Project Type:	New brownfield construction
Project Delivery & Contracting Model:	Lump Sum, Construct only
Organisational BIM Maturity:	Basic

6.1.2 Project Description

This case study is focussed on a hypothetical community health hub project with a project value of less than $50 Million AUD. The Community Health Hub is a new-build, single-storey facility designed to deliver integrated primary care, allied health, and outpatient services to Adelaide's inner-north population. The project supports the South Australia (SA) Department of Health's strategic goals for decentralised care and preventative health, reducing demand on tertiary hospitals. The community health hub includes the following facilities.

- 12 general consultation rooms
- 4 allied health suites
- A minor procedures clinic
- Community meeting spaces
- Integrated telehealth infrastructure

Although delivered under a construct-only model, BIM was embedded throughout the design and construction phases to support coordination, quality assurance, and asset handover. The Department of Health, as both owner and operator, mandated BIM deliverables aligned with the Victorian Health Building Authority (VHBA) Digital Engineering Framework for Project Digital Engineering (DE) Level.

6.1.3 BIM Investment

This cases study assumes an existing **Basic** level of organisational BIM maturity for the hypothetical health infrastructure organisation. To elevate their BIM capability, the hypothetical health infrastructure organisation is implementing foundational enablers that support consistent, scalable, and lifecycle-oriented BIM practices across health infrastructure projects. BIM enablement initiatives were selected to develop the minimum required internal capability to support the foundational BIM uses and proficiency levels listed in Table 10 below.

Table 9: BIM Use Maturity

BIM Use	Proficiency Level
Concept Design Visualisation	Basic
Virtual Design Coordination	Basic
Detailed Design	Basic
Asset Handover	Basic

Enablement Initiatives were selected in alignment with organisation's recent BIM maturity assessment, which highlighted gaps in governance, technology integration, data standards, and workforce capability. BIM enablement initiatives and associated investment requirements are detailed in Table 11 below.

Table 10: BIM Enablement Investments

BIM Enablement Initiative	Enablement Description	Estimated Budget (AUD)
BIM Governance	Creating policies, standards, and governance frameworks to ensure clear processes and accountability for BIM adoption and management across all lifecycle phases, from planning to operations.	**$200,000**
BIM Contract Requirements	Embedding BIM deliverables, roles, and performance goals into contractual agreements to align all parties (designers, contractors, asset managers) and drive compliance with BIM standards.	**$150,000**
BIM Training Programs	Developing continuous education and tailored workshops for staff on BIM technologies (e.g., Revit, Navisworks), processes, and standards while ensuring alignment with emerging digital engineering practises.	**$75,000**
BIM Communities of Practise	Establishing communities of practise to facilitate knowledge sharing, industry collaboration, and innovation regarding advancements in BIM and DE technologies.	**$50,000**
Design Coordination & Clash Detection	Implementing client-side tools and workflows (e.g., Navisworks, Solibri) for tracking and resolving design coordination issues and preventing clashes prior to construction, ensuring time and cost savings.	**$600,000**
Automated Handover of As-Built Data	Automating the handover of as-built models and asset data via CDEs, ensuring accurate and up-to-date digital twins for seamless integration into operational systems.	**$600,000**
Common Data Environment (CDE)	Using a cloud-based collaborative platform (e.g. ACC, Aconex) to store, manage, share, and coordinate BIM, GIS, and project data in real time across all stakeholders and phases.	**$600,000**
BIM Technology Platforms	Procuring and integrating essential BIM (e.g., Revit, dRofus), CAD (e.g., AutoCAD), GIS (e.g., ArcGIS), and Reality Capture (e.g., laser scanners) tools to produce and manage integrated digital models.	**$2,000,000**
Project & Asset Data Standards	Establishing standardised metadata and classification structures for capturing, managing, and exchanging asset and project data (e.g., UniClass, ANZLIC) to ensure consistency across phases and enhance interoperability.	**$500,000**
Improved Analytics & Reporting	Leveraging analytics tools within BIM and DE platforms to enable real-time reporting of critical metrics (time, cost, energy, carbon) for better decision-making throughout the project lifecycle.	**$300,000**

6.1.4 BIM Uses & Benefits

The BIM capability improvement initiatives described in section 1.3 provide the minimum foundational requirements to enable the four key BIM uses listed in Table 10 and unlock a range of project delivery BIM benefits as shown in Table 12 below.

Table 11: BIM Use and Benefits

BIM Use	BIM Benefit Types															
	Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Concept Design Visualisation	1	1	3	1	3	1	0	0	1	0	0	1	0	0	1	5
Virtual Design Coordination	1	1	3	3	3	3	1	3	5	0	1	1	1	0	3	5
Detailed Design	1	3	3	3	3	3	1	3	3	0	1	1	1	0	3	5
Asset Handover	1	0	0	3	0	0	0	5	1	1	1	1	0	5	5	1

Legend	No Benefit	Low Benefit	Medium Benefit	High Benefit
	0	1	3	5

The four key BIM uses can be described as follows.

- **Concept Design Visualisation:** Enables interactive 3D representations of early design concepts, allowing stakeholders to explore spatial layouts, assess functionality, and provide feedback quickly - accelerating design review and approval.

- **Virtual Design Coordination:** Facilitates the integration of architectural, structural, and MEP models into a federated environment, enabling clash detection and resolution before construction begins - reducing rework and improving build efficiency.

- **Detailed Design:** Supports the creation of data-rich, discipline-specific models that inform construction documentation, specifications, and cost estimation - ensuring design accuracy and constructability.

- **Asset Handover:** Delivers structured digital models containing asset data, warranties, and maintenance schedules, enabling seamless transition to operations and integration with facility management systems.

Each BIM use contributes to BIM benefits in different ways and to different extents. For example, Implementing BIM for Concept Design Visualisation significantly improves the speed of design review and approval. This is represented in Table 12 with a score of 5 representing a 'High Benefit' contribution towards the 'Faster design review and approval' benefit type. Concept Design Visualisation does not contribute to the preparation of asset registers, which is represented in Table 12 with a score of 0.

Figure 5: Concept Design Visualisation Benefit Contributions

BIM Use	BIM Benefit Types																
	Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced rework due to clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Concept Design Visualisation	1	1	3	1	3	1	0	0	1	1	0	0	1	0	0	1	5

Conceptual design visualisation does not reduce effort for asset register preparation

Conceptual design visualisation contributes significantly to speed of design review and approval

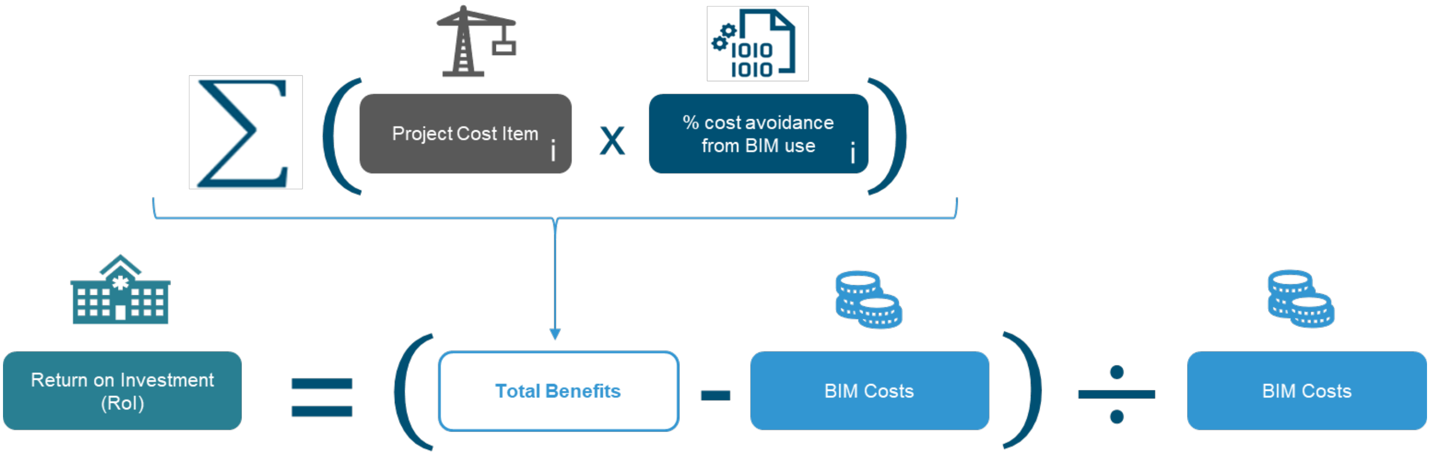
The above scoring can be understood intuitively by considering a scenario where a health infrastructure team is reviewing early-stage designs for the new Community Health Hub. Using BIM-enabled conceptual visualisations, the design team presents an interactive 3D model to stakeholders, including clinicians, facility managers, and community representatives. Instead of interpreting 2D drawings, stakeholders can virtually walk through the proposed spaces, immediately identifying layout issues such as poor patient flow or insufficient waiting areas. This leads to faster consensus, fewer design iterations, and quicker approvals.

At the conceptual design stage, the model is focused on spatial form and user experience, not on the detailed specification of mechanical systems, equipment IDs, or maintenance schedules. As a result, while the visualisation accelerates decision-making, it does not contribute to the structured asset data needed for creating asset registers, which are typically developed during detailed design and handover phases.

6.1.5 Return on Investment (ROI) Analysis

Calculation of quantifiable ROI is based on the below formula.

Figure 6: Return on Investment (ROI) Analysis Formula

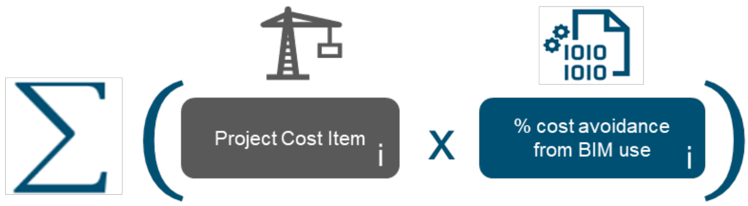


For the purposes of this case study analysis, project delivery benefits associated with BIM implementation are classified as either quantitative or qualitative.

Quantitative benefit types can be represented as the dollar value of cost saving achieved through the application of BIM to the Community Health Hub project delivery costs. The value of each quantitative benefit is calculated as the product of the individual project delivery cost items (quantity estimation, program management etc..) and benefit metrics which represent the percentage saving expected when applying BIM uses to each unique project delivery item.

A breakdown of the quantitative benefit calculation for the Community Health Hub project is illustrated in Figure 7 below.

Figure 7: Sum of quantitative benefit calculations



	Project Cost Item		% cost avoidance from BIM use	
Quantity estimation costs	$255,224	X	5.7%	Reduce estimation effort through model-based quantity take offs
Materials contingency costs	$2,517,310	X	5.6%	Reduce materials through model-based quantity take offs
Program management costs	$1,666,150	X	2.8%	Reduce program management overheads through improved delivery planning
Cost of changes / rework / variations during construction	$3,775,965	X	16.0%	Reduce changes & rework through more reliable and accessible data
Design labour costs	$6,191,015	X	4.0%	Decreased cost of design labour
Construction labour costs	$10,313,548	X	6.0%	Reduced construction time
Construction costs	$37,174,161	X	3.6%	Reduced construction & materials costs through offsite construction
Asset register preparation costs	$18,587	X	51.5%	Reduced effort to prepare asset registers
Clash detection costs	$419,552	X	81.4%	Reduced effort in clash detection
Existing site conditions capture costs	$37,174	X	25.3%	Reduced effort to capture existing site conditions

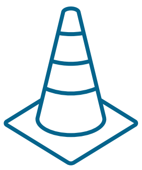
Based on the calculation in Figure 6 above, the total quantifiable benefit achieved by applying BIM to the Community Health Hub project delivery is below.

Total Benefits = **$3,490,000**

BIM benefits achieved for the Community Health Hub project which cannot be quantified to an equivalent dollar value, are described as follows.

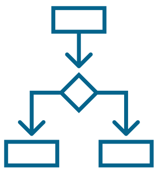
Enhanced Stakeholder Engagement and Communication

Located in a dense brownfields site in inner metropolitan Adelaide, the project impacted numerous stakeholders including local residents, community groups, and adjacent businesses. Applying BIM for concept design visualisation enabled immersive 3D walkthroughs of the proposed clinic and community spaces, allowing stakeholders to understand spatial layouts and service flows. This visual clarity helped facilitate early engagement, build consensus, and reduce resistance, especially critical in a community-sensitive environment where trust and transparency are essential.



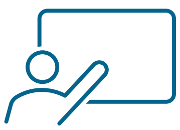
Improved Quality and Reduced Rework

BIM-enabled clash detection between architectural, structural, and building services reduced the likelihood of on-site errors. This proactive coordination was especially beneficial in the congested inner-city location, where construction delays would have had significant community and traffic impacts.



Better Asset Information and Decision-Making

BIM provided a structured digital record of all installed assets, including medical equipment and building systems, supporting evidence-based decision-making for maintenance and upgrades. This supports the objectives of the SA Health and Wellbeing Strategy which emphasises efficient, data-informed infrastructure planning and service delivery.



Improved Safety and Compliance

Maintenance teams could rehearse procedures virtually, such as servicing HVAC systems or responding to fire alarms, reducing on-site risks and improving compliance. This proactive training approach supports SA Health's commitment to safety and regulatory excellence.

Improved Patient and Community Outcomes

BIM-informed design enhanced spatial quality, accessibility, and infection control, contributing to better patient experiences and outcomes. Community meeting spaces were also optimised for engagement and health promotion, supporting the SA Health and Wellbeing Strategy's focus on preventative care and social inclusion.

Improved Project Delivery Confidence

Transparent BIM processes and data coupled with the demonstration of cost, schedule and risk benefits improved public confidence in SA Health's infrastructure delivery capability. This improved confidence supports future state investment into BIM capability and strengthens the relationship between government, SA Health Infrastructure and community stakeholders.

Economic and Industry Development

The project's BIM adoption contributed to digital capability growth in South Australia's construction and health infrastructure sectors. Local consultants and contractors gained experience with BIM workflows, enhancing competitiveness and supporting broader economic development. The project also served as a digital learning opportunity for SA Health staff many of whom were new to BIM workflows. Through collaborative model reviews and coordination sessions, teams developed digital literacy and shared best practices, contributing to long-term capability building for SA Health's infrastructure delivery personnel and across health sector delivery partners.

Quantitative BIM costs represent the dollar value of investment into organisational BIM capability required to realise the above BIM benefits and resulting project delivery cost savings. For the Community Health Hub project, the value of BIM Costs is derived as follows.

Figure 8: BIM Cost Calculation

BIM Enablement Cost ($) Investment in BIM capability to realise project cost avoidance benefits

Upfront Enablement Investment ($) Budgeted investment for upfront BIM Enablement initiatives to develop Health Infrastructure organisation BIM capability

BIM Implementation OPEX ($) Investment in additional dedicated BIM resources for the Health Infrastructure organisation project team.

BIM Project Overhead Premium ($) Premium on Total Project Costs attributable to implementation of BIM roles, processes and technology necessary to meet client BIM requirements.

BIM Costs = Upfront Enablement Investment + BIM Implementation OPEX + BIM Project Overhead Premium

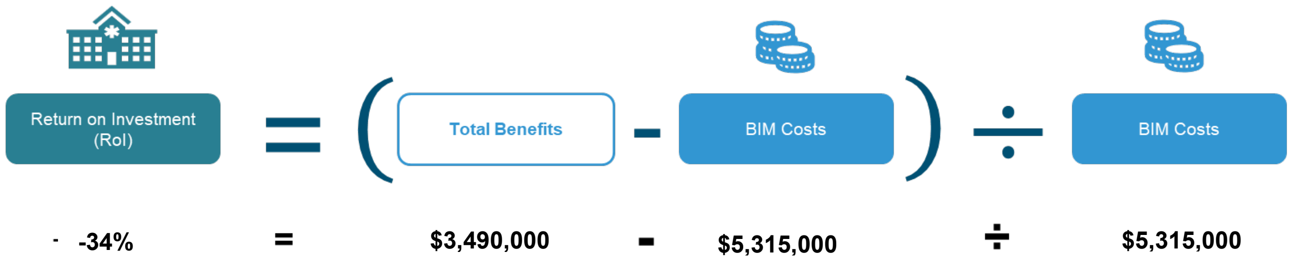
	Upfront Enablement Investment		BIM Implementation OPEX		BIM Project Overhead Premium
Total	**$5,075,000.00**	+	**$0.00**	+	**$240,000**
BIM Governance	$200,000		Considering the size of this project,it is assumed that additional Health Infrastructure side resources are not required		BIM project premium ius assumed to be 0.5% - 1.5% of total project value of the Community Health Hub.
BIM Contract Requirements	$150,000				
BIM Training Programs	$75,000				
BIM Communities of Practise	$50,000				
Design Coordination & Clash Detection	$600,000				
Automated Handover of As-Built Data	$600,000				
Common Data Environment (CDE)	$600,000				
BIM Technology Platforms	$2,000,000				
Project & Asset Data Standards	$500,000				
Improved Analytics & Reporting	$300,000				

Based on the calculation in Figure 7 above, the BIM cost associated with the Community Health Hub project delivery (including both the upfront enablement investment and the project-specific costs) is below.

BIM Costs = $5,315,000

ROI represents the net financial benefit achieved as a proportion of the initial investment into organisational BIM capability. A breakdown of the quantitative benefit calculation for the Community Health Hub project is illustrated in Figure 5 below.

Figure 9: ROI Calculation for a single small project

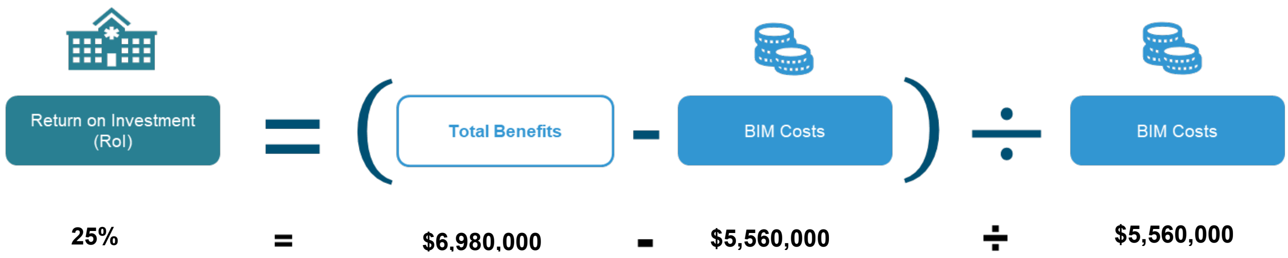


6.1.6 Conclusion

While the analysis of a single project indicates a negative return on investment (-34%) for the implementation of BIM, this outcome does not reflect the potential value of BIM across a broader portfolio of projects. When assessed over multiple projects, the cumulative efficiencies, process improvements, and cost savings begin to offset the initial investment.

Based on the current data, a positive return on investment is projected after completing 2 projects of equivalent size and scope to the Community Health Hub as shown below.

Figure 10: ROI Calculation for 2 small projects



6.2 Case Study 2 ($50M - $250M) – Integrated Health Campus

Figure 11: Integrated Health Campus Render

6.2.1 Project Snapshot

Project Name:	Integrated Health Campus
Project Location:	Outer Metropolitan Perth, WA
Project Value (TEI):	$155 Million (AUD)
Project Duration:	4 years
Project Type:	New brownfield construction
Project Delivery & Contracting Model:	Design and construct
Organisational BIM Maturity:	Intermediate

6.2.2 Project Description

This case study focuses on a hypothetical medium-value health infrastructure project with a total capital value of $155 million AUD and a duration of 4 years. The project involves the development of a multi-storey acute care facility designed to expand inpatient capacity, enhance emergency services, and integrate specialist outpatient clinics. Located within a metropolitan health precinct, the facility supports the health organisation's strategic goals for service integration, digital transformation, and long-term asset sustainability.

Key features of the facility include:

- 120 inpatient beds across medical, surgical, and rehabilitation wards
- A 24-hour emergency department with 20 treatment bays
- Specialist outpatient clinics including oncology, cardiology, and renal services
- Integrated imaging and diagnostics suite
- Central sterilisation and logistics unit
- Rooftop plant and helipad infrastructure

The project is delivered under a Design and Construct (D&C) model, with BIM mandated across all phases of design, construction, and handover. The health organisation, operating at an intermediate level of BIM maturity, has adopted BIM deliverables aligned with Digital Engineering (DE) Level 2 as defined by the Victorian Health Building Authority (VHBA) framework.

6.2.3 BIM Investment

This cases study assumes an existing **Intermediate** level of organisational BIM maturity for the hypothetical health infrastructure organisation. To elevate their BIM capability, the hypothetical health infrastructure organisation is implementing foundational enablers that support consistent, scalable, and lifecycle-oriented BIM practices across health infrastructure projects. BIM enablement initiatives were selected to develop the minimum required capability to support the BIM uses and proficiency levels listed in Table 13 below. These are additional to the BIM uses already established for a Basic level of BIM maturity.

Table 12: BIM Use Maturity

BIM Use	Proficiency Level
Concept Design Visualisation	Intermediate
Virtual Design Coordination	Intermediate
Detailed Design	Intermediate
Asset Handover	Intermediate
Site Analysis	Intermediate
Cost Estimation (5D BIM)	Intermediate
Construction Sequencing (4D BIM)	Intermediate
Reality Capture for As-Builts	Intermediate

Enablement Initiatives were selected in alignment with organisation's recent BIM maturity assessment, which highlighted gaps in model-based scheduling, estimation and object library standardisation. BIM enablement initiatives and associated investment requirements are detailed in Table 14 below.

Table 13: BIM Enablement Investments

BIM Enablement Initiative	Enablement Description	Estimated Budget (AUD)
BIM Governance	Creating policies, standards, and governance frameworks to ensure clear processes and accountability for BIM adoption and management across all lifecycle phases, from planning to operations.	**$400,000**
BIM Contract Requirements	Embedding BIM deliverables, roles, and performance goals into contractual agreements to align all parties (designers, contractors, asset managers) and drive compliance with BIM standards.	**$200,000**
BIM Maturity Assessments	Assessing an organisation's or project team's BIM capabilities and readiness using maturity frameworks (e.g., the BIM Maturity Matrix) to identify gaps and define improvement strategies.	**$100,000**
BIM Training Programs	Developing continuous education and tailored workshops for staff on BIM technologies (e.g., Revit, Navisworks), processes, and standards while ensuring alignment with emerging digital engineering practises.	**$100,000**
BIM Communities of Practise	Establishing communities of practise to facilitate knowledge sharing, industry collaboration, and innovation regarding advancements in BIM and DE technologies.	**$75,000**
Object Libraries & Design Reuse	Establishing processes and workflows to adopt standardised BIM object libraries (including the AusHFG) and to reuse existing designs and BIM objects from previous health projects to accelerate project planning and delivery while minimising costs.	**$750,000**
Design Coordination & Clash Detection	Implementing client-side tools and workflows (e.g., Navisworks, Solibri) for tracking and resolving design coordination issues and preventing clashes prior to construction, ensuring time and cost savings.	**$1,050,000**
Model-Based Scheduling (4D)	Integrating project schedules into 3D models using 4D BIM tools to enable construction sequencing simulation, resource allocation, and progress tracking.	**$550,000**
Model-Based Quantity Take-offs & Cost Estimation (5D)	Implementing BIM tools to automate quantity take-offs and link cost data (5D BIM) to models for accurate construction and lifecycle cost estimates.	**$750,000**
Automated Handover of As-Built Data	Automating the handover of as-built models and asset data via CDEs, ensuring accurate and up-to-date digital twins for seamless integration into operational systems.	**$1,050,000**
Common Data Environment (CDE)	Using a cloud-based collaborative platform (e.g. ACC, Aconex) to store, manage, share, and coordinate BIM, GIS, and project data in real time across all stakeholders and phases.	**$1,050,000**
BIM Technology Platforms	Procuring and integrating essential BIM (e.g., Revit, dRofus), CAD (e.g., AutoCAD), GIS (e.g., ArcGIS), and Reality Capture (e.g., laser scanners) tools to produce and manage integrated digital models.	**$3,000,000**
Project & Asset Data Standards	Establishing standardised metadata and classification structures for capturing, managing, and exchanging asset and project data (e.g., UniClass, ANZLIC) to ensure consistency across phases and enhance interoperability.	**$750,000**
BIM Performance Data Standards	Creating and adopting standardised formats for performance data (e.g., operational efficiency, energy usage, carbon output) to facilitate lifecycle assessments and sustainability reporting.	**$1,150,000**
Improved Analytics & Reporting	Leveraging analytics tools within BIM and DE platforms to enable real-time reporting of critical metrics (time, cost, energy, carbon) for better decision-making throughout the project lifecycle.	**$400,000**

6.2.4 BIM Uses & Benefits

The BIM capability improvement initiatives described in Table 14 provide the minimum foundational requirements to enable the eight key BIM uses listed in Table 13 and unlock a range of project delivery BIM benefits as shown in Table 15 below.

Table 14: BIM Use and Benefits

BIM Use	BIM Benefit Types															
	Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Site Analysis	0	0	3	1	1	1	0	0	0	5	1	1	0	0	1	1
Cost Estimation (5D BIM)	5	5	3	3	1	1	1	3	0	0	0	1	0	1	0	0
Construction Sequencing (4D BIM)	0	0	3	0	0	3	0	0	1	0	3	3	3	0	5	1
Reality Capture for As-Builts	0	0	0	1	0	0	0	5	0	5	1	0	0	1	3	0
Concept Design Visualisation	1	1	3	1	3	1	0	0	1	0	0	1	0	0	1	5
Virtual Design Coordination	1	1	3	3	3	3	1	3	5	0	1	1	1	0	3	5
Detailed Design	1	3	3	3	3	3	1	3	3	0	1	1	1	0	3	5
Asset Handover	1	0	0	3	0	0	0	5	1	1	1	1	0	5	5	1

Legend	No Benefit	Low Benefit	Medium Benefit	High Benefit
	0	1	3	5

The four additional BIM uses to achieve an intermediate maturity level are described as follows.

- **Site Analysis:** BIM and GIS are used to analyse spatial data, topography, and environmental factors to assess site suitability and optimise health facility locations.
- **Cost Estimation (5D BIM):** BIM integrates cost data with 3D models to perform detailed quantity take-offs and cost predictions for construction and lifecycle expenses.
- **Construction Sequencing (4D BIM):** BIM integrates time/schedule data with 3D models to enable simulation and optimisation of construction sequences, reducing on-site risks and delays.
- **Reality Capture for As-Builts:** Laser scanning and photogrammetry (reality capture technologies) generate highly accurate as-built models for verifying construction quality and capturing deviations from design.

Each BIM use contributes to BIM benefits in different ways and to different extents. For example, applying BIM to Cost Estimation (5D BIM) significantly reduces quantity estimation effort. This is represented in Table 15 with a score of 5 representing a 'High Benefit'. Applying BIM to Cost Estimation (5D BIM) does not contribute to improving construction safety, which is represented in Table 15 with a score of 0.

Figure 12: Cost Estimation (5D BIM) Benefit Contributions

BIM Use	BIM Benefit Types																
	Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced rework due to clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Cost Estimation (5D BIM)	5	5	3	3	1	1	1	3	0	0	0	0	1	0	1	0	0

Cost Estimation using 5D BIM contributes significantly to reducing estimation effort

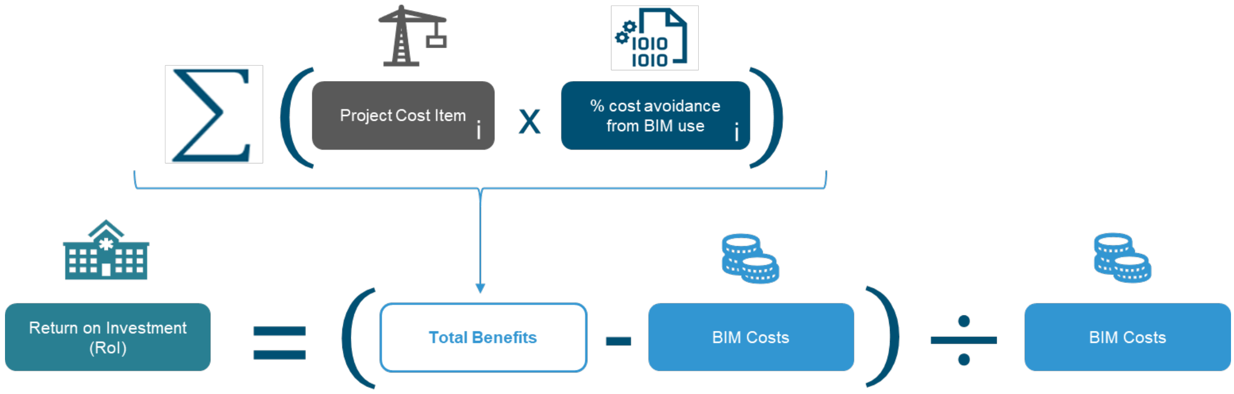
Cost Estimation using 5D BIM does not improve safety in construction

The organisation's intermediate BIM maturity enabled the implementation of more advanced BIM uses such as 5D cost estimation, 4D sequencing, and automated asset handover, supported by a Common Data Environment (CDE) and internal BIM governance structures. These capabilities were critical in managing the complexity of the project and ensuring alignment with long-term operational goals.

6.2.5 Return on Investment (ROI) Analysis

Calculation of quantifiable ROI is based on the below formula.

Figure 13: Return on Investment (ROI) Analysis Formula

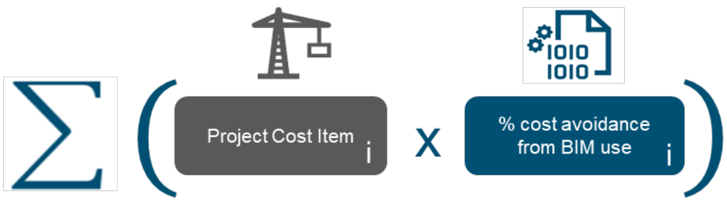


For the purposes of this cases study analysis, project delivery benefits associated with BIM implementation are classified as either quantitative or qualitative.

Quantitative benefit types can be represented as the dollar value of project cost avoidance achieved through the application of BIM to the Integrated Health Campus project delivery costs. The value of each quantitative benefit is calculated as the product of the individual project delivery cost items (quantity estimation, program management etc.) and benefit metrics which represent the percentage of cost avoidance expected when applying BIM uses to each unique project delivery item.

A breakdown of the quantitative benefit calculation for the Integrated Health Campus project is illustrated in Figure 14 below.

Figure 14: Sum of quantitative benefit calculations



	Project Cost Item		% cost avoidance from BIM use	
Quantity estimation costs	$360,499	x	15.9%	Reduce estimation effort through model-based quantity take offs
Materials contingency costs	$7,962,375	x	10.0%	Reduce materials through model-based quantity take offs
Program management costs	$2,696,636	x	3.1%	Reduce program management overheads through improved delivery planning
Cost of changes / rework / variations during construction	$11,943,563	x	17.8%	Reduce changes & rework through more reliable and accessible data
Design labour costs	$17,904,642	x	4.5%	Decreased cost of design labour
Construction labour costs	$32,650,019	x	6.7%	Reduced construction time
Construction costs	$117,681,590	x	3.8%	Reduced construction & materials costs through offsite construction
Asset register preparation costs	$58,841	x	57.3%	Reduced effort to prepare asset registers
Clash detection costs	$1,327,063	x	85.7%	Reduced effort in clash detection
Existing site conditions capture costs	$117,682	x	66.7%	Reduced effort to capture existing site conditions

Based on the calculation in Figure 13 above, the total quantifiable benefit achieved by applying BIM to the Integrated Health Campus project delivery is below.

Total Benefits = **$12,140,509.00**

BIM benefits achieved for the Integrated Health Campus project which cannot be quantified to an equivalent dollar value, are described as follows.

Enhanced Stakeholder Engagement and Communication

BIM visualisations enabled WA Health to engage clinicians, planners, and operational staff in validating layouts and workflows. This was particularly valuable for complex zones such as emergency departments (ED), imaging, and outpatient clinics. The immersive walkthroughs supported WA Health's clinical co-design principles and improved alignment between design intent and operational needs.

Improved Quality and Reduced Rework

BIM-supported clash detection and federated modelling reduced coordination errors across architectural, structural, and MEP systems. This was critical for integrating rooftop plant infrastructure and imaging suites, reducing rework and improving build efficiency.

Enhanced Staff Experience and Retention

Facilities management teams benefited from improved access to accurate asset data, reducing frustration and improving job satisfaction. This aligns with WA Health's goals for workforce sustainability and operational excellence.

Knowledge Transfer and Learning Culture

The project served as a digital learning opportunity for WA Health staff and delivery partners. BIM coordination sessions and model reviews fostered a culture of continuous improvement and digital literacy, contributing to long-term capability uplift.

Enhanced Safety and Risk Management

4D BIM sequencing and reality capture technologies enabled simulation of construction logistics and emergency access routes. These digital rehearsals improved site safety planning and supported compliance with WHS and infection control protocols.

Sustainability and Environmental Stewardship

BIM-supported energy modelling and lifecycle analysis enabled more sustainable design and operations, aligning with WA's environmental targets and climate resilience strategies.

Quantitative BIM costs represent the dollar value of investment into organisational BIM capability required to realise the above BIM benefits and resulting project delivery cost savings. For the Integrated Health Campus project, the value of BIM Costs is derived as follows.

Figure 15: BIM Cost Calculation

BIM Enablement Cost ($)	**Upfront Enablement Investment ($)**	**BIM Implementation OPEX ($)**	**BIM Project Overhead Premium ($)**
Investment in BIM capability to realise project cost avoidance benefits	Budgeted investment for upfront BIM Enablement initiatives to develop Health Infrastructure organisation BIM capability	Investment in additional dedicated BIM resources for the Health Infrastructure organisation project team.	Premium on Total Project Costs attributable implementation of BIM roles, processes and technology necessary to meet client BIM requirements.

BIM Costs = Upfront Enablement Investment + BIM Implementation OPEX + BIM Project Overhead Premium

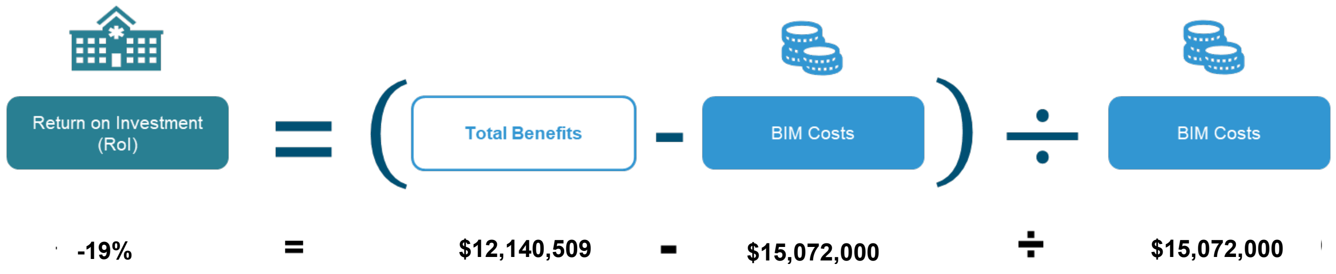
	Upfront Enablement Investment		BIM Implementation OPEX		BIM Project Overhead Premium
Total	**$11,375,000.00**	+	**$2,150,000**	+	**$1,547,000**
BIM Governance	$400,000		Considering the size of this project, it is assumed that an additional 3 FTE BIM resources are required on the Health Infrastructure project team to manage the project.		BIM project premium is assumed to be 0.5% - 1.5% of total project value of the Integrated Health Campus.
BIM Contract Requirements	$200,000				
BIM Maturity Assessments	$100,000				
BIM Training Programs	$100,000				
BIM Communities of Practise	$75,000				
Design Coordination & Clash Detection	$750,000				
Model-Based Scheduling (4D)	$1,050,000				
Model-Based Quantity Take-offs & Cost Estimation (5D)	$550,000				
Automated Handover of As-Built Data	$750,000				
Common Data Environment (CDE)	$1,050,000				
BIM Technology Platforms	$1,050,000				
Project & Asset Data Standards	$3,000,000				
BIM Performance Data Standards	$750,000				
Improved Analytics & Reporting	$1,150,000				
Standard Object Libraries	$400,000				

Based on the calculation in Figure 15 above, the BIM cost associated with the Integrated Health Campus project delivery is below.

BIM Costs = $15,072,000

Return on Investment represents the net financial benefit achieved as a proportion of the initial investment into organisational BIM capability. A breakdown of the quantitative benefit calculation for the Integrated Health Campus project is illustrated in Figure 16 below.

Figure 16: ROI Calculation for a single medium-sized project

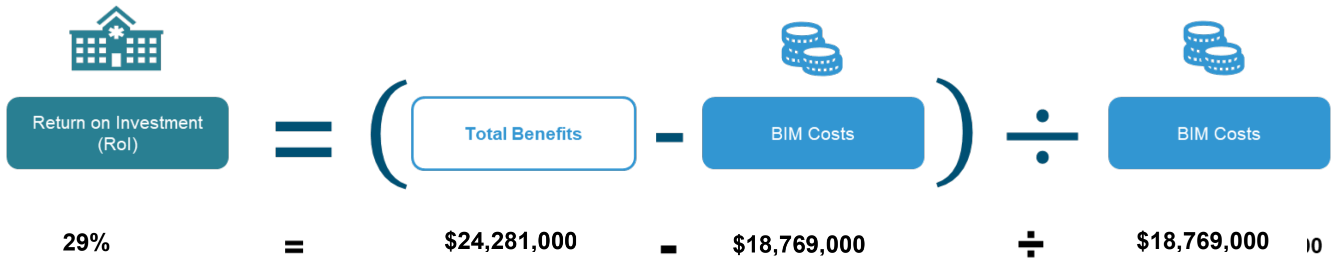


6.2.6 Conclusion

While the analysis of a single project indicates a negative return on investment (-19%) for the implementation of BIM, this outcome does not reflect the potential value of BIM across a broader portfolio of projects. When assessed over multiple projects, the cumulative efficiencies, process improvements, and cost savings begin to offset the initial investment.

Based on the current data, a positive return on investment is projected after completing 2 projects of equivalent size and scope to the Integrated Health Campus.

Figure 17: ROI Calculation for two medium-sized projects



6.3 Case Study 3 (>$250M) – Integrated Health and Research Centre

Figure 18: Integrated Health and Research Centre Render

6.3.1 Project Snapshot

Project Name:	Integrated Health and Research Centre
Project Location:	Inner Metropolitan Brisbane, QLD
Project Value (TEI):	$560 Million (AUD)
Project Duration:	5 years
Project Type:	New brownfield construction
Project Delivery & Contracting Model:	Managing Contractor
Organisational BIM Maturity:	Advanced

6.3.2 Project Description

This case study focuses on the Brisbane Centre for Integrated Health and Research, a flagship tertiary health infrastructure development located in Inner Metropolitan major health and education precinct in Brisbane, Queensland (QLD). With a total capital value of $560 million AUD and a duration of 5 years, the project represents a transformative investment in integrated care, clinical innovation, and digital health.

The facility is designed to deliver advanced acute and specialist services while co-locating research, education, and innovation hubs. It supports QLD Health's strategic goals for digitally enabled care, sustainability, and long-term asset performance. Key components of the development include:

- A 300-bed acute care hospital with ICU and surgical wards
- Specialist centres for oncology, neurosciences, and infectious diseases
- A surgical and procedural complex with 14 operating theatres
- Co-located research and education facilities in partnership with UQ and QUT
- Smart building systems and central energy plant
- Integrated transport access including rail, bus, and active travel links
- Full digital twin implementation for lifecycle asset management

Delivered under a Managing Contractor model, the project leverages the health organisation's advanced BIM maturity, enabling full lifecycle digital integration. BIM deliverables are aligned with Digital Engineering (DE) Level 3.

6.3.3 BIM Investment

This cases study assumes an existing **Advanced** level of organisational BIM maturity for the hypothetical health infrastructure organisation. To elevate their BIM capability, the hypothetical health infrastructure organisation is implementing foundational enablers that support consistent, scalable, and lifecycle-oriented BIM practices across health infrastructure projects. BIM enablement initiatives were selected to develop the minimum required internal capability to support the foundational BIM uses and proficiency levels listed in Table 16 below.

Table 15: BIM Use Maturity

BIM Use	Proficiency Level
Site Analysis	Advanced
Master Planning	Advanced
Concept Design Visualisation	Advanced
Virtual Design Coordination	Advanced
Detailed Design	Advanced
Cost Estimation (5D BIM)	Advanced
Supply Chain Integration	Advanced
Construction Sequencing (4D BIM)	Advanced
Reality Capture for As-Builts	Advanced
Asset Handover	Advanced
Facility Management (6D BIM)	Advanced
Emergency and Risk Planning	Advanced
Energy Performance Analysis	Advanced
Regulatory Compliance Checking	Advanced

BIM Use	Proficiency Level
Smart Building Integration	Advanced

Enablement initiatives were selected in alignment with organisation's recent BIM maturity assessment, which highlighted gaps in governance, technology integration, data standards, and workforce capability. BIM enablement initiatives and associated investment requirements are detailed in Table 17 below.

Table 16: BIM Enablement Investments

BIM Enablement Initiative	Enablement Description	Estimated Budget (AUD)
BIM Governance	Creating policies, standards, and governance frameworks to ensure clear processes and accountability for BIM adoption and management across all lifecycle phases, from planning to operations.	**$600,000**
Government Leadership & Strategy	Advocating for government-led initiatives and strategies to mandate or encourage BIM adoption across infrastructure projects via policy frameworks, pilot projects, and sector capacity-building programs.	**$200,000**
BIM Contract Requirements	Embedding BIM deliverables, roles, and performance goals into contractual agreements to align all parties (designers, contractors, asset managers) and drive compliance with BIM standards.	**$250,000**
BIM Communications Framework	Developing structured communication plans to engage project stakeholders effectively, ensuring clarity around BIM deliverables, roles, and workflows.	**$200,000**
BIM Maturity Assessments	Assessing an organisation's or project team's BIM capabilities and readiness using maturity frameworks (e.g., the BIM Maturity Matrix) to identify gaps and define improvement strategies.	**$125,000**
BIM Training Programs	Developing continuous education and tailored workshops for staff on BIM technologies (e.g., Revit, Navisworks), processes, and standards while ensuring alignment with emerging digital engineering practises.	**$125,000**
BIM Communities of Practise	Establishing communities of practise to facilitate knowledge sharing, industry collaboration, and innovation regarding advancements in BIM and DE technologies.	**$100,000**
BIM Career Pathways	Embedding BIM into recruitment and career progression frameworks within organisations, emphasising roles such as BIM Coordinator, BIM Manager, and Digital Engineer.	**$200,000**
Object Libraries & Design Reuse	Establishing processes and workflows to adopt standardised BIM object libraries (including AusHFG) and to reuse existing designs and BIM objects from previous health projects to accelerate project planning and delivery while minimising costs.	**$1,000,000**
Design Coordination & Clash Detection	Implementing client-side tools and workflows (e.g., Navisworks, Solibri) for tracking and resolving design coordination issues and preventing clashes prior to construction, ensuring time and cost savings.	**$1,500,000**
Model-Based Scheduling (4D)	Integrating project schedules into 3D models using 4D BIM tools to enable construction sequencing simulation, resource allocation, and progress tracking.	**$800,000**

BIM Enablement Initiative	Enablement Description	Estimated Budget (AUD)
Model-Based Quantity Take-offs & Cost Estimation (5D)	Implementing BIM tools to automate quantity take-offs and link cost data (5D BIM) to models for accurate construction and lifecycle cost estimates.	**$900,000**
Offsite Construction / DfMA	Leveraging BIM to enable design for manufacture and assembly (DfMA), speeding up project delivery while improving safety and quality through prefabrication and modular construction techniques.	**$3,000,000**
Automated Handover of As-Built Data	Automating the handover of as-built models and asset data via CDEs, ensuring accurate and up-to-date digital twins for seamless integration into operational systems.	**$1,500,000**
Common Data Environment (CDE)	Using a cloud-based collaborative platform (e.g. ACC, Aconex) to store, manage, share, and coordinate BIM, GIS, and project data in real time across all stakeholders and phases.	**$1,500,000**
BIM Technology Platforms	Procuring and integrating essential BIM (e.g., Revit, dRofus), CAD (e.g., AutoCAD), GIS (e.g., ArcGIS), and Reality Capture (e.g., laser scanners) tools to produce and manage integrated digital models.	**$4,000,000**
Project & Asset Data Standards	Establishing standardised metadata and classification structures for capturing, managing, and exchanging asset and project data (e.g., UniClass, ANZLIC) to ensure consistency across phases and enhance interoperability.	**$1,000,000**
BIM Performance Data Standards	Creating and adopting standardised formats for performance data (e.g., operational efficiency, energy usage, carbon output) to facilitate lifecycle assessments and sustainability reporting.	**$1,500,000**
Improved Analytics & Reporting	Leveraging analytics tools within BIM and DE platforms to enable real-time reporting of critical metrics (time, cost, energy, carbon) for better decision-making throughout the project lifecycle.	**$500,000**
Model-Based Carbon Accounting	Using BIM platforms to track and report a project's carbon footprint and embed sustainability reporting practises for meeting environmental and climate targets.	**$1,500,000**

6.3.4 BIM Uses & Benefits

The BIM capability improvement initiatives described in Table 17 provide the minimum foundational requirements to enable the 15 key BIM uses listed in Table 16 and unlock a range of project delivery BIM benefits as shown in Table 18 below.

Table 17: BIM Use and Benefits

BIM Use	BIM Benefit Types															
	Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Site Analysis	0	0	3	1	1	1	0	0	0	5	1	1	0	0	1	1
Master Planning	0	0	5	1	1	1	0	0	0	3	1	1	0	0	0	1
Concept Design Visualisation	1	1	3	1	3	1	0	0	1	0	0	1	0	0	1	5
Virtual Design Coordination	1	1	3	3	3	3	1	3	5	0	1	1	1	0	3	5
Detailed Design	1	3	3	3	3	3	1	3	3	0	1	1	1	0	3	5
Cost Estimation (5D BIM)	5	5	3	3	1	1	1	3	0	0	0	1	0	1	0	0
Supply Chain Integration	1	3	3	1	1	3	3	3	1	0	0	1	0	1	1	3
Construction Sequencing (4D BIM)	0	0	3	0	0	3	0	0	1	0	3	3	3	0	5	1
Reality Capture for As-Builts	0	0	0	1	0	0	0	5	0	5	1	0	0	1	3	0

BIM Use	BIM Benefit Types: Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Asset Handover	1	0	0	3	0	0	0	5	1	1	1	1	0	5	5	1
Facility Management (6D BIM)	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0
Emergency and Risk Planning	0	0	0	0	0	0	0	0	0	0	1	1	1	0	5	0
Energy Performance Analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0
Regulatory Compliance Checking	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3	5
Smart Building Integration	0	0	0	1	0	0	0	0	0	0	0	0	0	5	3	0

Legend	No Benefit	Low Benefit	Medium Benefit	High Benefit
	0	1	3	5

The 15 key BIM uses can be described as follows.

Use Name	Use Description
Site Analysis	BIM and GIS are used to analyse spatial data, topography, and environmental factors to assess site suitability and optimise health facility locations.
Master Planning	Integrated BIM and GIS tools are employed to develop comprehensive master plans incorporating spatial, demographic, and service delivery needs for health infrastructure.
Concept Design Visualisation	Interactive visualisations generated in BIM allow stakeholders to explore conceptual health facility designs, improving decision-making and collaboration.
Virtual Design Coordination	BIM enhances interdisciplinary design coordination, identifying and resolving clashes between architectural, structural, and MEP (mechanical, electrical, plumbing) systems.
Detailed Design	BIM enables the creation of precise, data-rich 3D models to inform the development of detailed construction documentation and specifications.
Cost Estimation (5D BIM)	BIM integrates cost data with 3D models to perform detailed quantity take-offs and cost predictions for construction and lifecycle expenses.
Supply Chain Integration	BIM facilitates supply chain coordination by linking design models with procurement processes and prefabrication workflows.
Construction Sequencing (4D BIM)	BIM integrates time/schedule data with 3D models to enable simulation and optimisation of construction sequences, reducing on-site risks and delays.
Reality Capture for As-Builts	Laser scanning and photogrammetry (reality capture technologies) generate highly accurate as-built models for verifying construction quality and capturing deviations from design.
Asset Handover	A comprehensive digital twin or as-built BIM model is delivered to the operations team, including asset data, warranties, and maintenance schedules for efficient O&M.
Facility Management (6D BIM)	BIM integrates with facility management systems (FMS) to provide lifecycle data for monitoring, maintaining, and optimising health facility operations.
Emergency and Risk Planning	BIM allows scenario simulations (e.g., fire evacuation, pandemic response) for analysing risks and enhancing disaster preparedness plans in healthcare facilities.
Energy Performance Analysis	BIM tools are used to model and analyse energy consumption, optimising sustainable design in compliance with environmental goals and energy efficiency standards.
Regulatory Compliance Checking	BIM automates compliance with health and building regulations, incorporating codes like BCA/NCC and leveraging standard templates.
Smart Building Integration	BIM enables integration with IoT systems for predictive maintenance, energy monitoring, and indoor environmental quality control in operational healthcare facilities.

Each BIM use contributes to BIM benefits in different ways and to different extents. For example, Implementing BIM for Facility Management (6D BIM) significantly reduces maintenance costs. This is represented in Table 18 with a score of 5 representing a 'High Benefit' contribution. Facility Management (6D BIM) does not contribute to reduced design labour costs, which is represented in Table 18 with a score of 0.

Figure 19: Facilities Management (6D BIM) Benefit Contributions

BIM Use	BIM Benefit Types																
	Reduce estimation effort through model-based quantity take offs	Reduce materials through model-based quantity take offs	Reduce program management overheads through improved delivery planning	Reduce changes & rework through more reliable and accessible data	Decreased cost of design labour	Reduced construction time	Reduced construction & materials costs through offsite construction	Reduced effort to prepare asset registers	Reduced effort in clash detection	Reduced rework due to clash detection	Reduced effort to capture existing site conditions	Improved safety in construction	Decreased risk contingency	Decreased insurance premiums	Decreased cost of maintenance	Better space management during construction and operations	Faster design review and approval
Facility Management (6D BIM)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0

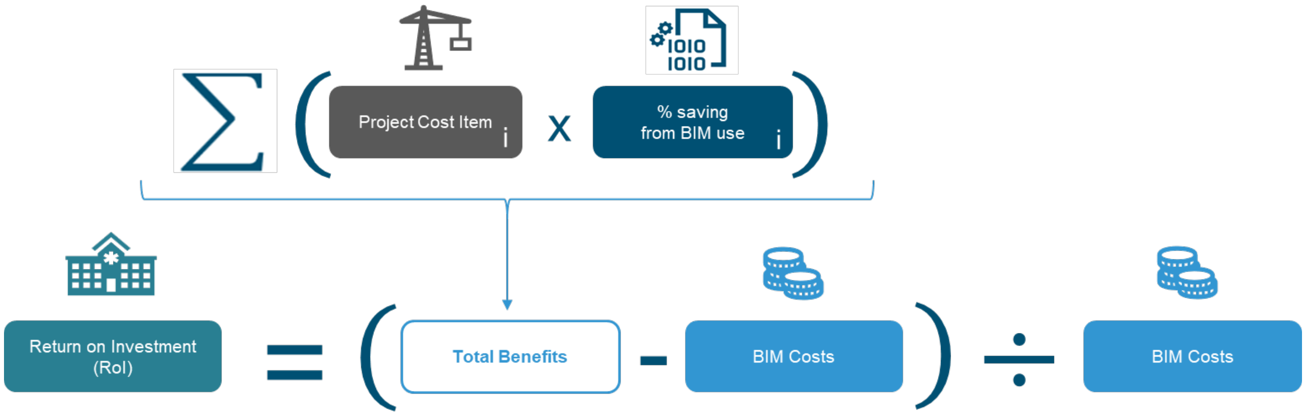
Facilities Management using 6D BIM does not reduce design labour cost

Facilities Management using 6D BIM contributes significantly to reducing maintenance cost

6.3.5 Return on Investment (ROI) Analysis

Calculation of quantifiable ROI is based on the below formula.

Figure 20: ROI Analysis Formula

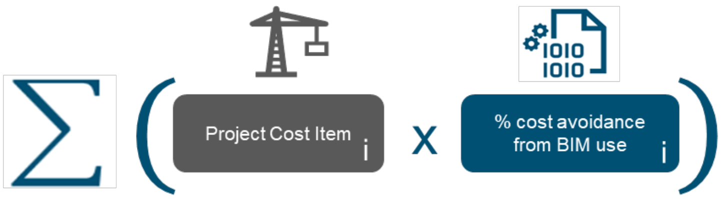


For the purposes of this cases study analysis, project delivery benefits associated with BIM implementation are classified as either quantitative or qualitative.

Quantitative benefit types can be represented as the dollar value of cost saving achieved through the application of BIM to the Integrated Health and Research Centre project delivery costs. The value of each quantitative benefit is calculated as the product of the individual project delivery cost items (quantity estimation, program management etc.) and benefit metrics which represent the percentage cost avoidance expected when applying BIM uses to each unique project delivery item.

A breakdown of the quantitative benefit calculation for the Integrated Health and Research Centre project is illustrated in Figure 21 below.

Figure 21: Sum of quantitative benefit calculations



Quantity estimation costs	$867,421	X	17.5%	Reduce estimation effort through model-based quantity take offs
Materials contingency costs	$28,872,354	X	12.0%	Reduce materials through model-based quantity take offs
Program management costs	$6,452,538	X	4.9%	Reduce program management overheads through improved delivery planning
Cost of changes / rework / variations during construction	$43,308,531	X	19.6%	Reduce changes & rework through more reliable and accessible data
Design labour costs	$62,461,842	X	4.9%	Decreased cost of design labour
Construction labour costs	$118,377,353	X	7.4%	Reduced construction time
Construction costs	$426,670,945	X	7.0%	Reduced construction & materials costs through offsite construction
Asset register preparation costs	$213,335	X	63.0%	Reduced effort to prepare asset registers
Clash detection costs	$4,812,059	X	90.0%	Reduced effort in clash detection
Existing site conditions capture costs	$426,671	X	70.0%	Reduced effort to capture existing site conditions

Based on the calculation in Figure 20 above, the total quantifiable benefit achieved by applying BIM to the Integrated Health and Research Centre project delivery is below.

Total Benefits = **$60,194,453.00**

BIM benefits achieved for the Integrated Health and Research Centre project which cannot be quantified to an equivalent dollar value, are described as follows.

Improved Change Management and Transparency

BIM facilitated real-time tracking of design changes and their impacts, improving coordination across multidisciplinary teams and reducing risk in high-spec areas like imaging and sterilisation.

Improved Quality and Reduced Rework

Advanced BIM uses such as 6D FM and smart building integration enabled early detection of design conflicts and improved coordination, reducing rework and improving delivery confidence.

Enhanced Staff Experience and Retention

Facilities teams benefited from intuitive access to asset data and virtual training tools, improving efficiency and job satisfaction in a complex operational environment.

Improved Safety and Compliance

BIM-supported virtual briefings and simulations enhanced compliance with WHS, IP&C, and emergency response protocols, supporting QLD Health's safety-first infrastructure strategy.

Resilience and Adaptability

BIM-enabled digital twins provided QLD Health with the flexibility to adapt to future service demands, research needs, and emergency scenarios, enhancing infrastructure resilience.

Sustainability and Environmental Stewardship

BIM-enabled carbon accounting and energy modelling supported QLD's climate targets and environmental stewardship commitments.

Economic and Industry Development

The project served as a flagship for BIM adoption in QLD's Health and research sectors, supporting local innovation, digital capability building, and cross-sector collaboration.

Quantitative BIM costs represent the dollar value of investment into organisational BIM capability required to realise the above BIM benefits and resulting project delivery cost savings. For the Integrated Health and Research Centre project, the value of BIM costs is derived as follows.

Figure 22: BIM Cost Calculation

BIM Enablement Cost ($) Investment in BIM capability development to realise financial benefits		**Upfront Enablement Investment ($)** Budgeted investment for upfront BIM Enablement initiatives to develop Health Infrastructure organisation BIM capability		**BIM Implementation OPEX ($)** Investment in additional dedicated BIM resources for the Health Infrastructure organisation project team.		**BIM Project Overhead Premium ($)** Premium on Total Project Costs attributable implementation of BIM roles, processes and technology necessary to meet client BIM requirements.
BIM Costs	=	Upfront Enablement Investment	+	BIM Implementation OPEX	+	BIM Project Overhead Premium

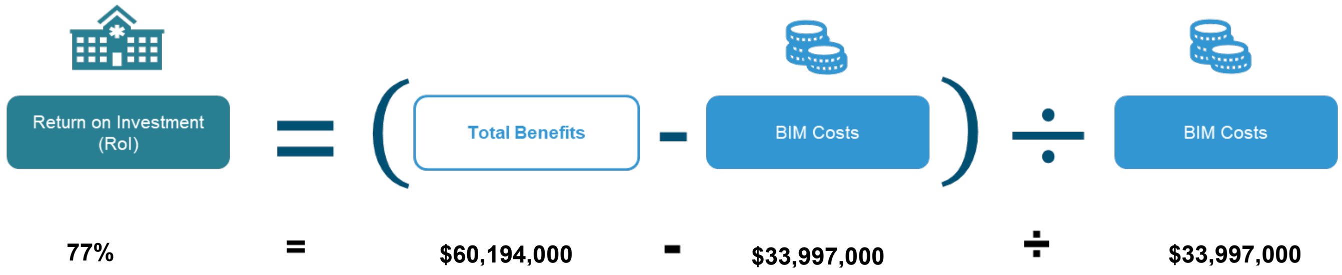
Total	**$20,500,000**	+	**$5,083,333**	+	**$8,413,800**
BIM Governance	$600,000		Considering the size of this project, it is assumed that an additional 5 FTE BIM resources are required on the Health Infrastructure project team to manage the project.		BIM project premium is assumed to be 0.5% - 1.5% of total project value.
Government Leadership & Strategy	$200,000				
BIM Contract Requirements	$250,000				
BIM Communications Framework	$200,000				
BIM Maturity Assessments	$125,000				
BIM Training Programs	$125,000				
BIM Communities of Practise	$100,000				
BIM Career Pathways	$200,000				
Design Reuse	$1,000,000				
Design Coordination & Clash Detection	$1,500,000				
Model-Based Scheduling (4D)	$800,000				
Model-Based Quantity Take-offs & Cost Estimation (5D)	$900,000				
Offsite Construction / DfMA	$3,000,000				
Automated Handover of As-Built Data	$1,500,000				
Common Data Environment (CDE)	$1,500,000				
BIM Technology Platforms	$4,000,000				
Project & Asset Data Standards	$1,000,000				
BIM Performance Data Standards	$1,500,000				
Improved Analytics & Reporting	$500,000				
Standard Object Libraries	$1,500,000				
Model-Based Carbon Accounting	$600,000				

Based on the calculation in Figure 22 above, the BIM cost associated with the Integrated Health and Research Centre project delivery is below.

BIM Costs = $33,997,000

ROI represents the net financial benefit achieved as a proportion of the initial investment into organisational BIM capability. A breakdown of the quantitative benefit calculation for the Integrated Health and Research Centre project is illustrated in Figure 23 below.

Figure 23: ROI Calculation for a single large project



6.3.6 Conclusion

The ROI analysis indicates that a 77% return on investment can be achieved through the implementation of BIM on the Brisbane Centre for Integrated Health and Research project. This strong return reflects the combined impact of advanced BIM uses, such as 4D construction sequencing, 5D cost estimation, digital twin development, and smart building integration enabled by the organisation's commitment to elevating its BIM maturity.

The scale and complexity of the $560 million project created significant economies of scale, allowing the upfront investment in BIM systems, governance, and capability development to be leveraged across a broad range of project activities. These efficiencies translated into measurable benefits, including improved design coordination, reduced rework, enhanced construction planning, and structured asset data that supports long-term facility management.

7 Findings and Insights

7.1 Case Study Comparisons

The below table Illustrates cost avoidance benefit for various project sizes where the existing organisational BIM maturity is assumed to be minimal.

Table 18: Organisational Level Cost Benefit

Case Study	Organisational BIM Maturity Uplift	Organisational Investment	Project level Investment	Cumulative BIM Benefit	ROI
Community Health Hub (<$50M) 	Zero - Basic	$5.1M	$244K	$3.5M	**-34%**
Integrated Health Campus ($50-250M) 	Zero - Intermediate	$11.4M	$3.7M	$12.1M	**-19%**
Integrated Health & Research Centre (>$250M) 	Zero - Advanced	$20.5M	$13.5M	$60.2M	**+77%**

The analysis of these three case studies highlights that the percentage of return varies significantly. Case Study 1 represents the lowest return on a single project and demonstrates the weakest economies of scale for the upfront organisational BIM investment. Case Study 2 shows improved economies of scale with a higher project value and leverages greater organisational BIM maturity to capture a larger proportion of the cost avoidance benefits. Case Study 3 achieves a positive return on a single project, where the initial investment is higher in absolute terms but smaller relative to the overall project value. When viewed from a portfolio perspective, payback is typically achieved after two to three projects, reinforcing the value of BIM enablement at scale.

7.2 Project Pipeline Analysis

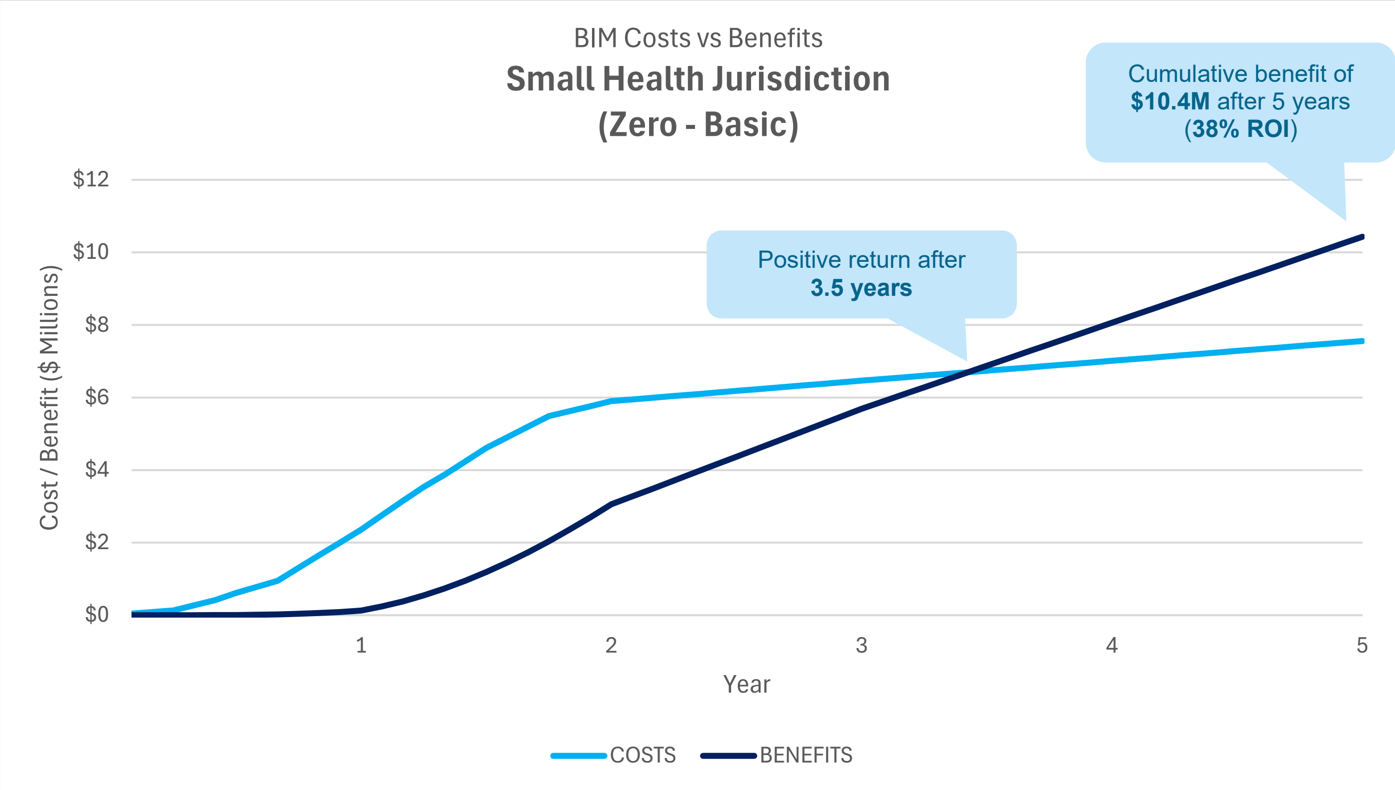
The financial ROI from BIM is strengthened when viewed in context of a longer-term project pipeline. As shown above, a positive return can be achieved across 1-2 health infrastructure projects (depending on project size and complexity) – most jurisdictions have multiple projects of varying size in their longer-term pipeline.

For the purpose of this analysis, the hypothetical ROI for each case study over a 5-year period was analysed, including consideration of the typical project pipelines for small, medium and large jurisdictions. The yield curves below illustrate forecast return on investment and payback-period for each of the hypothetical case studies. This analysis recognises that benefits will not start accruing immediately following a BIM maturity uplift investment, and as such assumes a 3-month delay before benefits begin to accrue, and a 12-month ramp-up period over which benefits gradually build up before they begin to be fully realised. This reflects the time required for capability building, process alignment, and technology adoption before measurable efficiencies and cost savings can materialise.

Project Pipeline Analysis – Case Study 1

The yield curve for Case Study 1 is shown in Figure 24. For Case Study 1, a smaller project pipeline is assumed, with a forecast 5-year capital delivery program of **$185M**[1]. The yield curve shows that a small health jurisdiction with a relatively small project pipeline can achieve a positive return on BIM investment after approximately **3.5 years**, and a cumulative benefit of **$10.4M** over 5 years. This represents a **38% ROI**. This scenario represents a health jurisdiction investing in BIM maturity uplift from zero to basic maturity to establish the foundational enablers required for consistent and scalable BIM application across project lifecycle phases.

Figure 24: 5-year ROI for Case Study 1

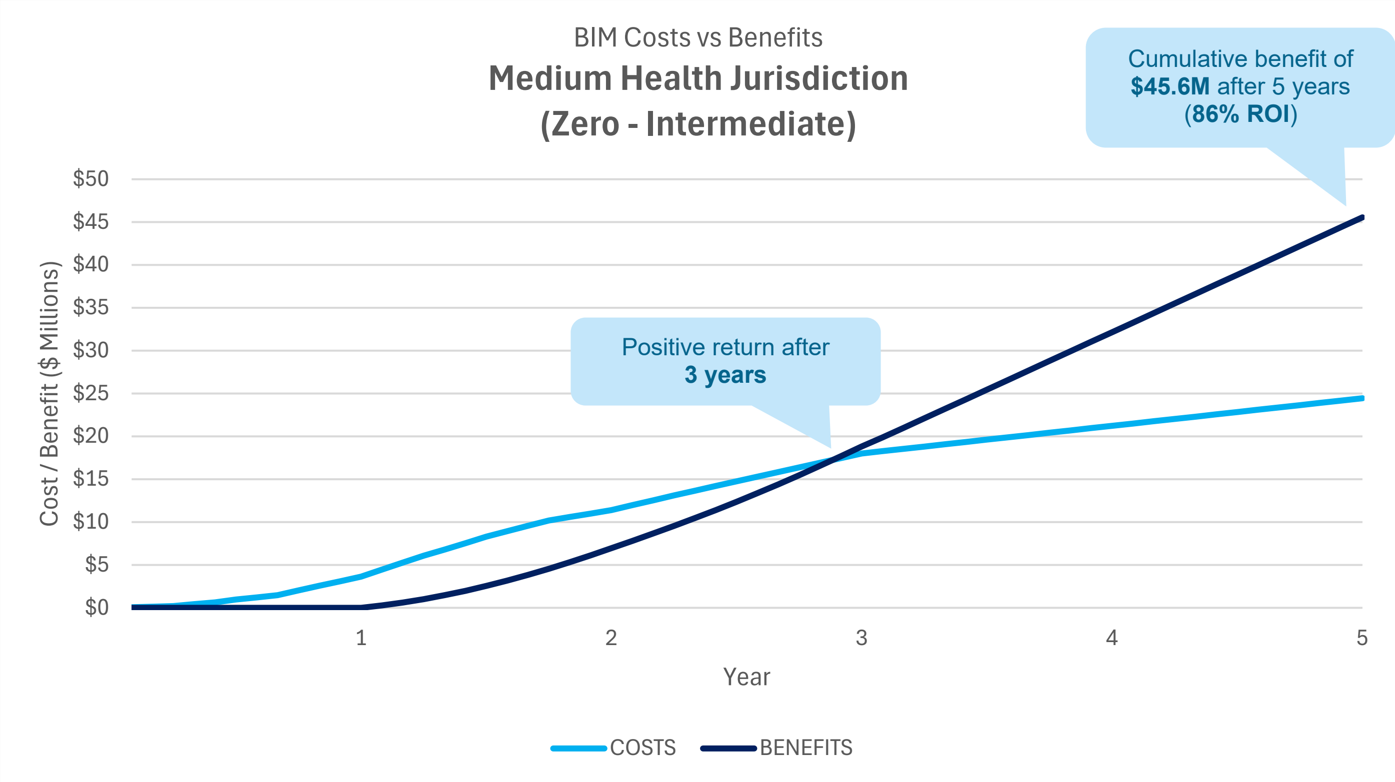


[1] *Please note that project pipeline figures do not include projects that are already in-flight, and only include projects yet to commence (upon which BIM benefits could be fully realised). Hypothetical project pipelines have been based on future project pipeline information provided by AHIA representatives.*

Project Pipeline Analysis – Case Study 2

The yield curve for Case Study 2 is shown in Figure 25. For Case Study 2, a medium project pipeline is assumed, with a forecast 5-year capital delivery program of **$675M**. The yield curve shows that a medium-sized health jurisdiction with a medium-sized project pipeline can achieve a positive return on BIM investment after approximately **3 years**, and a cumulative benefit of **$45.6M** over 5 years. This represents an **86% ROI**. This scenario represents a health jurisdiction investing in BIM maturity uplift from zero to intermediate maturity, positioning the organisation to go beyond foundational BIM capabilities to achieve greater efficiency gains and improved project delivery and operational outcomes.

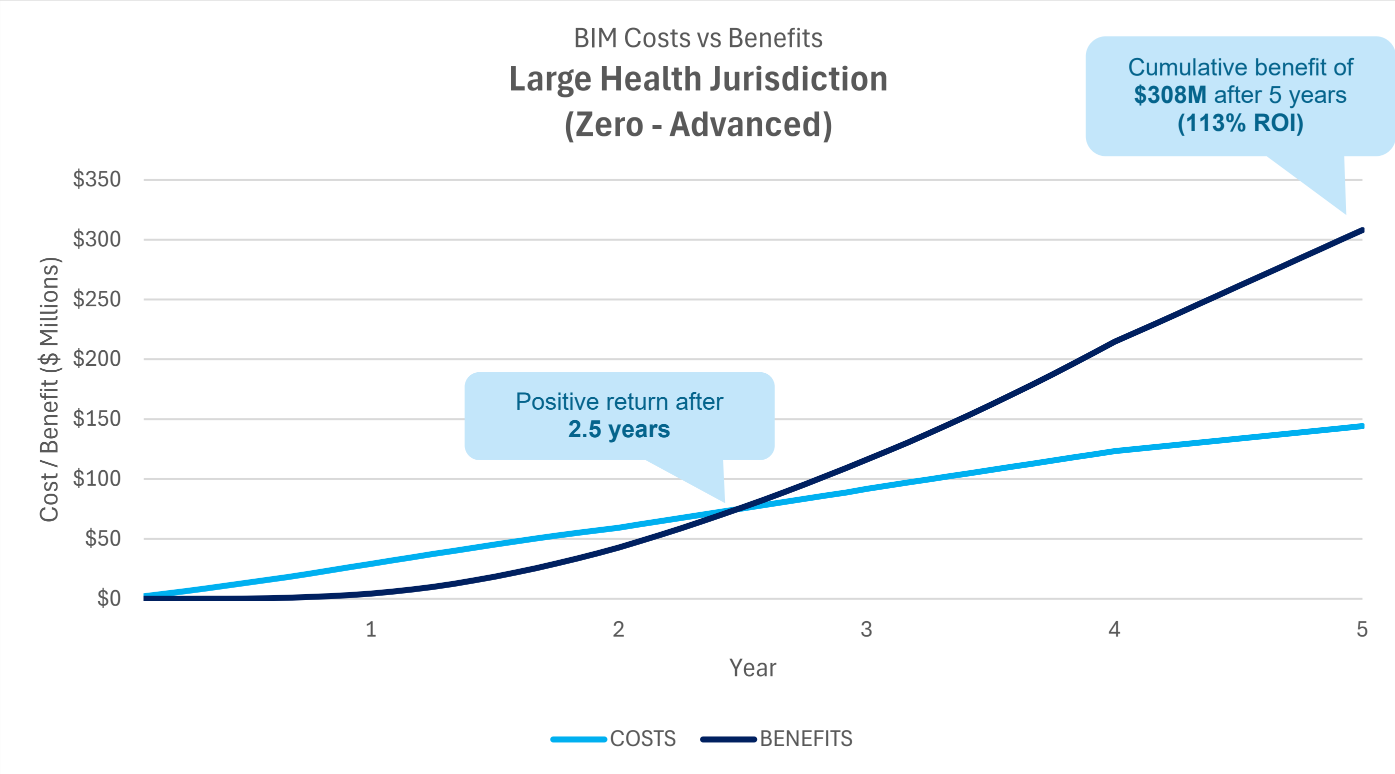
Figure 25: 5-year ROI for Case Study 2



Project Pipeline Analysis – Case Study 3

The yield curve for Case Study 3 is shown in Figure 26. For Case Study 3, a large project pipeline is assumed, with a forecast 5-year capital delivery program of **$6.15B**. The yield curve shows that a large health jurisdiction with a relatively significant project pipeline can achieve a positive return on BIM investment after approximately **2.5 years**, and a cumulative benefit of **$308M** over 5 years. This represents a **113% ROI**. This scenario represents a health jurisdiction investing in BIM maturity uplift from zero to advanced maturity to unlock maximum value from the use of BIM across a major capital delivery program.

Figure 26: 5-year ROI for Case Study 3



8 Conclusion and Key Takeaways

8.1 Investment Roadmap

The BIM Maturity Investment Roadmap outlines a series of BIM Enabling Initiatives designed to achieve basic, intermediate, and advanced levels of BIM maturity. The Roadmaps are a useful reference for health jurisdictions to plan the budgets, scheduling and resource requirements to enhance their BIM capabilities.

It should be noted that these estimated investments assume that an organisation is starting from a zero-base – this is not the case for all AHIA jurisdictions. Several AHIA jurisdictions have already made significant inroads on these investments, and so their level of investment would be far less than the figures shown above.

It should also be noted that a collaborative approach to share this investment – and to share frameworks, requirements, standards, tools and processes – has the potential to significantly reduce the investment required from each stakeholder.

8.1.1 Zero to Basic Roadmap

The Zero to Basic BIM Maturity Roadmap focuses on establishing the foundational enablers required for consistent and scalable BIM application across project lifecycle phases. Investments are focussed on core capabilities such as governance frameworks, standard processes, and essential technology infrastructure to support key use cases including Concept Design Visualization, Virtual Design Coordination, Detailed Design, and Asset Handover. By building these fundamentals, organizations create a stable platform for future maturity growth while ensuring immediate improvements in design quality, coordination efficiency, and data integrity.

Table 19: Zero to Basic Roadmap

Zero to Basic - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
BIM Governance	Creating policies, standards, and governance frameworks to ensure clear processes and accountability for BIM adoption and management across all lifecycle phases, from planning to operations.	Develop an organisational BIM Strategy and BIM Governance Framework aligned with ISO 19650. Define roles such as BIM Manager, Digital Engineering Lead, and Project BIM Coordinator. Establish a BIM Steering Committee to oversee implementation and continuous improvement. Conduct internal workshops to embed governance principles across departments.	1. Governance	6	$200,000	$600,000
BIM Contract Requirements	Embedding BIM deliverables, roles, and performance goals into contractual agreements to align all parties (designers, contractors, asset managers) and drive compliance with BIM standards.	Update standard contract templates to include detailed BIM requirements (aligned with ISO 19650). Include BIM compliance audits and performance metrics in contractor obligations. Develop a BIM Tender Evaluation Matrix to assess digital capability during procurement. Host industry briefings to communicate new contract expectations to suppliers.	1. Governance	11	$150,000	$250,000
BIM Training Programs	Developing continuous education and tailored workshops for staff on BIM technologies (e.g., Revit, Navisworks), processes, and standards while ensuring alignment with emerging digital engineering practises.	Arrange and facilitate formal BIM training for key organisational staff. Partner with industry bodies to enable 'on-the-job' BIM training and capability development. Create a BIM Knowledge Hub on the organisation's intranet with guides, templates, and FAQs.	2. People	15	$75,000	$125,000

Zero to Basic - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
BIM Communities of Practise	Establishing communities of practise to facilitate knowledge sharing, industry collaboration, and innovation regarding advancements in BIM and DE technologies.	Establish a cross-functional BIM working group with representatives from design, construction, operations, and IT. Host monthly forums to share lessons learned, troubleshoot issues, and showcase successful BIM applications. Create an internal BIM knowledge hub with templates, guides, and FAQs. Encourage participation in external networks such as buildingSMART Australasia.	2. People	4	$50,000	$100,000
Design Coordination & Clash Detection	Implementing client-side tools and workflows (e.g., Navisworks, Solibri) for tracking and resolving design coordination issues and preventing clashes prior to construction, ensuring time and cost savings.	Deploy tools such as Navisworks or Solibri for federated model coordination. Develop a clash detection protocol with thresholds, reporting formats, and resolution workflows. Train design teams on model federation and issue tracking. Pilot collaborative clash detection on a current capital works project to validate workflows and quantify benefits.	3. Processes	13	$600,000	$1,500,000
Automated Handover of As-Built Data	Automating the handover of as-built models and asset data via CDEs, ensuring accurate and up-to-date digital twins for seamless integration into operational systems.	Define as-built data requirements aligned with ISO 19650 and the AusHFG. Implement a handover checklist and model validation process. Use a Common Data Environment (CDE) to automate data packaging and transfer. Collaborate with FM teams to ensure data formats are compatible with asset management systems.	3. Processes	16	$600,000	$1,500,000
Common Data Environment (CDE)	Using a cloud-based collaborative platform (e.g. ACC, Aconex) to store, manage, share, and coordinate BIM, GIS, and project data in real time across all stakeholders and phases.	Procure and configure a CDE platform (e.g., Aconex, ACC, Trimble Connect). Define folder structures, access protocols, and version control policies. Train project teams on CDE usage for model sharing, issue tracking, and approvals. Pilot the CDE on a small capital works project to validate workflows. Integrate CDE with existing document management systems and asset databases.	4. Technology	12	$600,000	$1,500,000

Zero to Basic - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
BIM Technology Platforms	Procuring and integrating essential BIM (e.g., Revit, dRofus), CAD (e.g., AutoCAD), GIS (e.g., ArcGIS), and Reality Capture (e.g., laser scanners) tools to produce and manage integrated digital models.	Audit current technology usage and identify gaps in software capability. Procure licenses for core client-side BIM tools (e.g., Revit, Navisworks, dRofus). Consider investing in GIS and reality capture software platforms (for intermediate & advanced organisations). Develop a Technology Integration Plan to ensure interoperability between platforms. Provide training programs for internal staff and external consultants. Establish a Digital Sandbox for testing new tools and workflows before deployment. Configuration of technology for specific project	4. Technology	13	$2,000,000	$4,000,000
Project & Asset Data Standards	Establishing standardised metadata and classification structures for capturing, managing, and exchanging asset and project data (e.g., UniClass, ANZLIC) to ensure consistency across phases and enhance interoperability.	Develop BIM metadata standard. Develop EIR, PIR and AIR (including alignment with standards such as ISO 19650 & UniClass). Create standardised templates for room data sheets, equipment schedules and asset registers. Pilot the use of new data standards on small capital works projects to demonstrate application and benefits. Implement data validation tools and protocols during design and handover to ensure consistency and compliance with standards.	5. Data	15	$500,000	$1,000,000
Improved Analytics & Reporting	Leveraging analytics tools within BIM and DE platforms to enable real-time reporting of critical metrics (time, cost, energy, carbon) for better decision-making throughout the project lifecycle.	Integrate Power BI or similar platforms with BIM data sources for real-time dashboards. Define key performance indicators (KPIs) for design efficiency, construction progress, and asset readiness. Develop reporting templates for executive briefings and project reviews. Train staff in data visualisation and interpretation to support planning and operational decisions.	5. Data	8	$300,000	$500,000
				Total	**$5,075,500**	**$11,075,000**

8.1.2 Basic to Intermediate Roadmap

The Intermediate BIM Maturity roadmap builds on foundational capabilities to enable broader integration and collaboration across the project lifecycle. At this stage, investments focus on enhancing workflows and systems to support advanced coordination and data exchange, enabling use cases such as Integrated site analysis, Model-Based Quantity Take-Offs, Construction Sequencing, and Enhanced As-built Information Capture. These initiatives aim to improve efficiency, reduce rework, and strengthen interoperability between design, construction, and operations teams, positioning the organisation for greater efficiency gains and improved project delivery and operational outcomes.

Table 20: Basic to Intermediate Roadmap

Basic to Intermediate - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
BIM Maturity Assessments	Assessing an organisation's or project team's BIM capabilities and readiness using maturity frameworks (e.g., the BIM Maturity Matrix) to identify gaps and define improvement strategies.	Conduct a baseline BIM capability assessment using a recognised maturity matrix. Identify gaps across governance, people, process, technology, and data domains. Develop a staged improvement roadmap with short-, medium-, and long-term goals. Reassess maturity annually to track progress and recalibrate priorities.	2. People	3	$75,000	$125,000
Object Libraries & Design Reuse	Establishing processes and workflows to adopt standardised BIM object libraries (including AusHFG) and to reuse existing designs and BIM objects from previous health projects to accelerate project planning and delivery while minimising costs.	Formally adopt and embed AusHFG BIM object libraries and resources into organisational processes. Recommend adoption of the AusHFG in BIM delivery. Encourage reuse of design components during the early design phase of projects. Monitor reuse metrics including AusHFG adoption to quantify time and cost savings across projects.	3. Processes	12	$500,000	$1,000,000

Basic to Intermediate - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
Model-Based Scheduling (4D)	Integrating project schedules into 3D models using 4D BIM tools to enable construction sequencing simulation, resource allocation, and progress tracking.	Integrate project schedules with 3D models using 4D BIM tools (e.g., Synchro, Navisworks). Develop construction sequencing simulations to optimise site logistics. Train project teams in linking tasks to model elements for visual progress tracking. Use 4D outputs in stakeholder presentations to improve planning transparency.	3. Processes	12	$300,000	$800,000
Model-Based Quantity Take-offs & Cost Estimation (5D)	Implementing BIM tools to automate quantity take-offs and link cost data (5D BIM) to models for accurate construction and lifecycle cost estimates.	Implement BIM tools to automate quantity take-offs from design models. Link cost data to model elements for real-time budget forecasting. Validate model accuracy through cross-checks with traditional estimation methods. Use 5D outputs to support tender evaluations and value engineering decisions.	3. Processes	12	$600,000	$900,000
BIM Performance Data Standards	Creating and adopting standardised formats for performance data (e.g., operational efficiency, energy usage, carbon output) to facilitate lifecycle assessments and sustainability reporting.	Define standard formats for capturing performance metrics (e.g. energy, carbon). Align data structures with ISO 19650 and national sustainability frameworks. Integrate performance data into BIM models for lifecycle analysis. Use standardised reporting templates to support regulatory compliance.	5. Data	12	$800,000	$1,500,000
				Total	**$2,275,000**	**$4,325,000**

8.1.3 Intermediate to Advanced Roadmap

The Advanced BIM Maturity Roadmap focuses on achieving full lifecycle integration and data-driven decision-making across design, construction, and operations. Investments at this stage enable sophisticated capabilities such as Digital Twins, Predictive Analytics, Automated Compliance Checking, and Integrated Asset Performance Management. These initiatives leverage high-quality data and advanced technologies to optimize facility operations, enhance sustainability, and deliver continuous improvement. An advanced level of BIM maturity allows organisations to unlock maximum value from BIM, transforming it into a key strategic enabler for long-term portfolio performance and asset intelligence.

Table 21: Intermediate to Advanced

Intermediate to Advanced - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
Government Leadership & Strategy	Advocating for government-led initiatives and strategies to mandate or encourage BIM adoption across infrastructure projects via policy frameworks, pilot projects, and sector capacity-building programs.	Actively contribute to whole of government BIM strategy and policy initiatives. Establish inter-agency / cross-sector working groups to align BIM strategies and policies. Advocate for BIM adoption through relevant whole of government channels.	1. Governance	13	$100,000	$200,000
BIM Communications Framework	Developing structured communication plans to engage project stakeholders effectively, ensuring clarity around BIM deliverables, roles, and workflows.	Create a BIM communications plan outlining stakeholder engagement protocols. Develop standardised messaging and visual aids to explain BIM deliverables and roles. Conduct regular briefings with internal teams and external partners to ensure alignment. Establish feedback loops to refine communication strategies based on project outcomes.	2. People	13	$100,000	$200,000

Intermediate to Advanced - BIM Maturity Investment Roadmap						
Enabler Name	**Enabler Description**	**Enabler Activities**	**Category**	**Duration (Months)**	**Estimated Investment Low (AUD)**	**Estimated Investment High (AUD)**
BIM Career Pathways	Embedding BIM into recruitment and career progression frameworks within organisations, emphasising roles such as BIM Coordinator, BIM Manager, and Digital Engineer.	Define BIM-related roles and responsibilities within organisational HR frameworks. Create job descriptions for BIM Coordinator, BIM Manager, and Digital Engineer roles. Integrate BIM capability into performance reviews and career development plans. Partner with industry bodies to support certification and professional development.	2. People	13	$100,000	$200,000
Offsite Construction / DfMA	Leveraging BIM to enable design for manufacture and assembly (DfMA), speeding up project delivery while improving safety and quality through prefabrication and modular construction techniques.	Identify components suitable for prefabrication during early design stages. Collaborate with suppliers to align BIM models with manufacturing specifications. Use BIM to simulate assembly sequences and transport logistics. Track DfMA adoption rates and measure impact on delivery time and safety.	3. Processes	13	$2,000,000	$3,000,000
Model-Based Carbon Accounting	Using BIM platforms to track and report a project's carbon footprint and embed sustainability reporting practises for meeting environmental and climate targets.	Use BIM tools to calculate embodied and operational carbon across project stages. Integrate carbon data into design models for scenario analysis. Develop reporting templates aligned with climate targets and ESG frameworks. Pilot carbon accounting workflows on new builds to refine methodology.	5. Data	13	$800,000	$1,500,000
				Total	**$3,100,000**	**$5,100,000**

Health jurisdictions should consider the following factors when considering the appropriate level of investment into BIM maturity uplift.

1. Funds available for BIM investment

2. Deliverability of investment roadmap considering existing resource constraints. Dedicated BIM resourcing requirements for sustainment of BIM capability within health infrastructure organisations is estimated as follows.
    - Small Jurisdiction: 2-3 FTE
    - Medium Jurisdiction: 4-5 FTE
    - Large Jurisdiction: 6-8 FTE

3. Existing organisational BIM maturity

4. Forecast project pipeline value

The below Roadmap Gantt Chart provides a visual representation of the indicative timeframes and sequencing for BIM enablement initiatives across maturity stages. It illustrates how foundational activities progress into intermediate and advanced capabilities, ensuring a structured and scalable approach to implementation. By mapping initiatives over time, stakeholders can better understand dependencies, prioritise investments, and align resources to achieve targeted BIM maturity milestones efficiently.

Figure 27: Investment Roadmap (indicative timeframes only)

8.2 Funding Models

There are various approaches to secure the funding needed to properly implement BIM and realise its benefits. Health infrastructure program authorities can consider various funding models to meet these needs. Table 23 outlines a range of possible funding approaches, detailing their descriptions, implementation strategies, advantages, and potential challenges. These models, individually or in combination, can help authorities effectively support the adoption of BIM while addressing stakeholder expectations and budget constraints.

Table 22: Funding Models for BIM Investment

Funding Model	Description	Approach	Pros	Cons
State Budget Business Case Submissions	Preparing a robust business case to secure funding through state or territory government budgets.	Articulate BIM's benefits, such as cost control, asset management, and patient-centric outcomes, while aligning with digital transformation, sustainability, and broader government priorities. This approach should also include itemising costs associated with BIM/DE.	Comprehensive and well-justified cases can secure significant funding. Aligns BIM with public priorities.	Requires detailed analysis, long lead times, and alignment with broader government decision-making cycles.
Percentage Allocation from capital funds	Imposing a small surcharge or "levy" on individual health infrastructure projects to fund BIM capabilities.	Dedicate a percentage of each project budget to BIM-related initiatives such as training, governance, and technology systems, spreading the cost across projects.	Incremental and scalable funding; spreads costs across multiple projects.	Potential resistance from stakeholders if project costs increase, requiring careful communication.
Percentage Derived from Enterprise Cost	Allocating a fixed percentage of overall enterprise capital and operational expenditure to a dedicated BIM enablement fund	Setting aside a percentage of annual capital works budgets to finance initiatives such as technology platforms, data standards, training, and governance frameworks and embedding this percentage-based allocation into long-term financial planning.	Incremental and scalable funding; spreads costs across the enterprise.	Potential resistance from stakeholders lacking in BIM awareness, requiring careful communication.
Cost-Sharing Models with Industry	Collaborative funding model with private sector partners involved in the delivery of health infrastructure.	Partner with contractors, consultants, and technology providers to share costs, including financial contributions, in-kind support, or co-development programs that benefit both public and private entities.	Fosters innovation and broader adoption of BIM across stakeholders.	Requires careful negotiation to balance public and private interests; dependent on willingness to partner.
Cross-Jurisdictional Cost Sharing	Sharing the cost of developing BIM contracts, standards, processes, and technology platforms across different states, territories, or jurisdictions.	Foster collaboration between jurisdictions (e.g., VHBA and HINSW) to develop unified BIM standards and shared digital infrastructure, reducing duplication and benefiting from economies of scale.	Reduces duplication of effort and costs across jurisdictions; enhances interoperability and collaboration.	Requires complex inter-governmental agreements and alignment on standards, priorities, and timelines.

Funding Model	Description	Approach	Pros	Cons
Cross-Sectoral Cost Sharing	Collaborate with other government infrastructure sectors to share BIM development costs through harmonised standards and systems.	Work with education, transport, justice, or other government portfolios to co-fund BIM framework development, leveraging shared interests and cost efficiencies.	Reduces duplication of investments and enhances cross-sector consistency in BIM standards.	Requires inter-departmental coordination and alignment of sector priorities, which can be complex.
Value Capture Models	Reinvest part of the value created by BIM-enabled projects into further developing BIM capabilities.	Demonstrate realised savings or benefits from BIM (e.g., fewer overruns, better performance) and reinvest part of these tangible financial or societal gains into BIM innovation and implementation initiatives.	Creates a self-sustaining funding model tied directly to BIM outcomes.	Requires clear evidence of BIM's financial or societal benefits; success may be difficult to quantify.
Health-Sector Specific Funding Grants	Applying for grants or funding programs dedicated to digital transformation in health or other public service sectors.	Position BIM as a priority aligned with improved health service delivery and infrastructure sustainability and apply for competitive government or donor-based grants.	Opportunity to align BIM with health system goals and access additional funding sources.	Grants are highly competitive and may require extensive justification with measurable outcomes.
BIM Innovation Fund	Establish a dedicated fund involving government, industry, and academia to promote innovation and research in BIM.	Pool contributions to fund pilot projects, research and development, and incentivise BIM initiatives across stakeholders.	Promotes sustainable innovation ecosystems and attracts diverse expertise.	Requires consistent funding streams and long-term collaboration across multiple sectors.
Lifecycle-Based Funding Justification	Justify BIM investments based on its value throughout the operational lifecycle of infrastructure assets.	Highlight BIM's lifecycle benefits, such as maintenance cost reduction, accurate refurbishment planning, and efficient asset management, using case studies and quantified value propositions for long-term operational savings.	Positions BIM as integral to facility operations and long-term cost efficiencies.	Requires credible data on lifecycle benefits and a long-term view of funding.

9 Appendices

9.1 References and Supporting Documents

The following documents were provided by AHIA jurisdictions to support this investigation:

Jurisdiction	Supporting Document
General	2024-25 Report - State of Architectural Visualization
	ABAB-Digital-Twins-Position-Paper-Web-210118
	AIA BIM and Beyond Report 2021
	Australasian Health Facility Guidelines (AusHFG)
	Australian Institute of Health and Welfare (AIHW) – Health Expenditure Australia 2022-23
	NATSPEC SPECnotes 2020B April
	NATSPEC SPECnotes 2020C July
	NATSPEC SPECnotes 2020D October
	NATSPEC SPECnotes 2021B April
	Publications Index (Apr 20)
	Publications Index (Apr 21)
	Publications Index (Oct 20)
ACT	ACT BIM Implementation Plan
SA	BIM in SA and AusHFG Spatial Benchmarking Tool Integration (AHIA BIM Sub-Group)
	Building a Sustainable Future - The Role of Data in Green Construction
	DIT Building Projects Exchange Information Requirements (EIR) based on the NatSpec EIR Template.
	DOCS_AND_FILES-#14376206-v2-Building_Information_Modelling_Requirements__
	2025 BIM Sub Group Jurisdiction Summary – SA
NSW	Infrastructure NSW – NSW Infrastructure Digitalisation and Data Policy
	NSW - Health Infrastructure PAIR Guidelines_June 2022
	NSW - SPAIR Overview_June 2022
	NSW - SPAIR Part 0-2 Concept Design_June 2022
	NSW - SPAIR Part 3 Schematic Design_June 2022
	NSW - SPAIR Part 4 Design Development_June 2022
	NSW - SPAIR Part 5-7 Contract and Construction Administration_June 2022
	NSW - SPAIR Part 8 Commissioning and Handover_June 2022
	NSW - SPAIR Part 9-10 Post Occupancy Evaluation_June 2022
	NSW - HI BIM Execution Plan Template_June 2022
	2025 BIM Sub Group Jurisdiction Summary – NSW
NZ	NZ 2023 Digital Guidance Suite - The Value Case for Digital First
	NZ 2023 The New Zealand BIM Handbook ed4
	11. BIM Execution Plan - All Projects
	11. BIM Framework

Jurisdiction	Supporting Document
QLD	QLD Health BIM Execution Plan – Construction
	QLD Health BIM Execution Plan – Design
	QLD Health HHS Facilities Management Digital Project Involvement Plan v2.0
	QLD Health Project Information Requirements qh-gdl-374-9
	QldHealth_BIM_S4HANA_Socialisation
	QLD Health Asset Naming Standard
	2025 BIM Sub Group Jurisdiction Summary – QLD
VIC	VHBA Construction Digital Engineering Management Plan V1.0
	VHBA Design Digital Engineering Management Plan V1.0
	VHBA Project Information Requirements
	VHBA Asset Data Uploader Template V1.0
	VHBA Asset Equipment List V1.0
	VHBA Project Information Requirements
	Victorian Digital Asset Strategy
	Victorian Digital Asset Policy
	2025 BIM Sub Group Jurisdiction Summary – Victoria
NT	2025 BIM Sub Group Jurisdiction Summary – NT
TAS	2025 BIM Sub Group Jurisdiction Summary – Tasmania
WA	2025 BIM Sub Group Jurisdiction Summary – WA
	Discussion Paper on Asset Management and project handover in the digital world (final)

The following documents were reviewed or referenced during the course of this investigation:

References
Azhar, S., 2011, "Building Information Modeling (BIM): Trends, Benefits, Risks, and Challenges for the AEC Industry", Leadership and Management in Engineering, 11(3)
Bensalah, M., Elouadi, A., Mharzi, H., 2017, "Optimization of cost of a Tram through the Integration of BIM: A Theroetical Analysis", International Journal of Mechanical And Production Engineering, 5(11)
Bentley, 2013, "Bentley's LEAP Bridge Enterprise Saves Time in Analysis and Design of Prestressed Concrete Box Girder Bridges", <http://ftp2.bentley.com/dist/collateral/docs/newsletter/9414_GD_LEAP_Bridge_India_LTR-EN_0113-p.pdf>
Bentley, 2014, "Point Clouds and Scalable Terrain Models Support Network Rail's Great Western Rail Electrification Programme", <http://ftp2.bentley.com/dist/collateral/docs/point_clouds/DescartesV8iSS4_NetworkRail_0613_LTR_s.pdf>
BSI and buildingSMART, 2010, "Constructing the Business Case: Building Information Modelling", London: British Standards Institution
European Commission, 2021, "Calculating Costs and Benefits for the use of Building Information Modelling in Public Tenders - Methodology Handbook"
Giel, B. K. & Issa, R. R., 2013, "Return on Investment Analysis of Using Building Information Modeling in Construction", Journal of Computing in Civil Engineering, 27(5)
Kang, Y., O'Brien, W. J. & Mulva, S. P., 2013. "Value of IT: Indirect Impact of IT on Construction Project Performance via Best Practices", Automation in Construction, Volume 35
KPMG & ATKINS, 2021, "The value of Information Management in the construction and infrastructure sector", A report commissioned by the University of Cambridge's Centre for Digital Built Britain (CDBB)

References
Leite, F. et al., 2011, "Analysis of Modeling Effort and Impact of Different Levels of Detail in Building Information Models", Automation in Construction, 20(5)
Lu, W., Peng, Y., Shen, Q. & Li, H., 2013, "Generic Model for Measuring Benefits of BIM as a Learning Tool in Construction Tasks", Journal of Construction Engineering and Management, 139(2)
Manning, R., 2008, "Case Studies in BIM Implementation for Programming of Healthcare Facilities", The Pennsylvania State University
Pikas, E., Koskela, L., Sapountizis, S., Dave, B., Owen, R., 2011, "Overview of Building Information Modelling in Healthcare Projects", <https://www.researchgate.net/publication/277735729_Overview_of_building_information_modelling_in_healthcare_projects>
Sanchez, A., Hampson, K., Mohamed, S., 2015, "Perth Children's Hospital Case Study Report", Sustainable Build Environment National Research Centre
Suermann, P. C., 2009, "Evaluating the Impact of Building Information Modelling (BIM) on Construction - Doctoral Thesis", Gainesville: University of Florida
Thomas, S. R., Lee, S.-H., Spencer, J. D. & Tucker, R. L., 2004, "Impacts of Design Information Technology on Project Outcomes", Journal of Construction Engineering and Management, 130(4)
Widanage, C., Kim, K.P., 2024, "Integrating Design for Manufacture and Assembly (DfMA) with BIM for infrastructure", Automation in Construction, Volume 167