The Future of Warehouses:

Why your building needs to integrate with what's coming

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White Paper

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Introduction

The warehouse automation landscape has changed more in the past five years than in the previous 25. What worked for distribution operations a decade ago won't cut it today – and certainly won't prepare businesses for tomorrow's competitive pressures.

The properties that were once considered state-of-the-art are increasingly inadequate for modern automation requirements. The biggest reason is straightforward: automation systems have evolved far quicker than the buildings designed to house them. In many cases, the gap between what exists and what's needed is widening, rather than closing, creating both significant challenges and strategic opportunities.

When approaching lease renewals, facility expansions, or automation initiatives, getting the warehouse building specification right is something that is too often missed – that is, understanding the size needed now while aligning it with the business plan over the length of the lease. But here's where it gets complex: how do you determine what automation is needed today versus what might be required over the facility's lifetime as automation continues evolving rapidly.

The risk of making the warehouse too small – constraining business growth – or too big – creating leasing costs that strain resources during expansion – makes the alignment between infrastructure and business strategy critical before addressing technical requirements, costs, or implementation details.

This whitepaper explores how to align facility design with requirements of the future, ensuring your property and automation decisions support long-term success without limiting future possibilities.

The Changing Infrastructure Landscape

What's driving the need for change

Three forces are reshaping how warehouses must be designed and operated. E-commerce growth has compressed delivery expectations from weeks to days, often requiring same-day or next-day fulfilment capabilities that manual operations simply cannot sustain at scale. Labour shortages have made automation less of a luxury and more of a necessity for maintaining operational continuity. Meanwhile, the sophistication and the accessibility of automation technology has advanced dramatically, creating new possibilities but also imposing far more demanding infrastructure requirements.

Whether it's storage and retrieval systems towering overhead or Autonomous Mobile Robots scooting around their work stations, automation developments are more than technical upgrades, they require a reimagining of how space, people, and technology interact in modern operations.

Sean Ledbury, who has worked with major automation providers including Swisslog and Dematic before joining Prological, puts the scale of change in perspective:

> If you went back 25-30 years ago, warehouses were being designed and prioritised around manual labour. They had wider aisles, minimal vertical reach, typically low roof heights. It wasn't uncommon for a warehouse to be considered 'high' if it was 8-9 metres.
> Now, with automation and multi-level systems, we're capable of going to 50 metres in a single level for Automated Storage and Retrieval Systems or even higher when considering multi-level buildings. These systems provide far greater utilisation of the available footprint making them far more efficient.

Not just sophistication, accessibility of automation

A misconception in the market is that automation is reserved for large-scale operations with the resources to deploy advanced Automated Storage and Retrieval Systems or high-density pallet shuttles. While these remain valuable solutions for medium and enterprise-level organisations, the accessibility of automation has expanded significantly in recent years.

Small and mid-sized businesses are now able to access automation at an affordable scale. This shift is driven by a broader range of suppliers, rapid innovation at the entry level, and technologies such as Autonomous Mobile Robots (AMRs) that have lowered the barrier to entry. Automation is no longer defined solely by multi-million-dollar infrastructure investments; it can begin with more targeted and pragmatic solutions such as automated palletising, container loading aids or a single AGV supporting pallet put-away.

Modularised systems can be deployed quickly in smaller facilities – warehouses of 1,000–2,000 sqm, for instance – without requiring the footprint or capital of tier-one operations. This creates a genuine opportunity for smaller businesses to scale more effectively, improve throughput, and extend the useful life of existing facilities.

Why warehouses aren't matching modern automation requirements

This dramatic shift in vertical requirements is just one dimension of a much broader infrastructure transformation. Modern automated systems don't just allow more use of potential height – they require precision engineering across every aspect of facility design.

The problem extends beyond existing facilities. Developers continue building "spec" warehouses using traditional standards, typically constructing buildings with 10-12 metre roof/ridge heights and standard slab specifications. When the occupier later attempts to introduce automation into these facilities, they may discover incompatibilities that will make automation prohibitively expensive or entirely impossible. That's why it's vital to have a systematic approach to facility assessment that reveals these constraints early, before they become expensive surprises.

> Introducing automation systems into a spec building can be prohibitively expensive if the building's height or layout is unsuitable, reducing storage efficiency and limiting future growth. Floors may also need to be reinforced or the slab replaced to meet tighter tolerances, and these costs can quickly outweigh the benefits of automation, constraining the site's long-term potential.
>
> **- Sean Ledbury**

The retrofit reality

For businesses caught with unsuitable facilities, we consistently see the financial implications make a significant dent. Retrofitting existing warehouses to meet automation requirements typically adds 15-30% to project costs and extends implementation timelines by similar percentages. These figures don't capture the full impact – operational disruption, temporary capacity constraints, and the opportunity cost of delayed automation benefits compound the real expense.

Extended timelines mean longer transitions from old systems to new, during which productivity often suffers. You may need temporary facilities or workarounds that add unexpected expenses. The complexity of retrofitting often requires more sophisticated project management and specialised contractors, further inflating costs.

The alternative – relocating to a purpose-built facility – carries its own premium but often proves more cost-effective over the long term when all factors are considered. Every warehouse assessment is different, but it's important to analyse these trade-offs early in the process to prevent costly mistakes.

The Six Pillars of Automation-Ready Infrastructure

Modern automation systems impose requirements that extend far beyond traditional warehousing needs. Success depends on getting five critical infrastructure elements right from the beginning and understanding how these elements work together as an integrated system.

Pillar 1: Vertical capacity and structural precision

The most visible change in modern warehouse design is the dramatic increase in height possibilities. While traditional facilities operated effectively with 8-9 metre roof heights, contemporary multi-level automated storage and retrieval systems can utilise vertical space up to 50 metres.

This vertical expansion demands precision that wasn't previously required. Automated systems operate with aisle tolerances measured in millimetres rather than centimetres. Floor flatness becomes critical because robotic systems require precise navigation paths and must accommodate equipment weights that far exceed traditional racking systems.

Modern automation equipment generates different stress patterns than manual operations. Automated storage systems create concentrated loads at specific points, while robotic picking systems require floors that remain stable under constant, precise movement patterns.

If you are evaluating existing facilities, structural assessment should examine not just current load capacity but the precision requirements of planned automation systems. A facility that handles static storage loads adequately may prove unsuitable for dynamic robotic operations.

This assessment requires specialist expertise that understands both structural engineering and automation requirements – a combination that's essential for avoiding mistakes.

Pillar 2: Power infrastructure

Some automation systems – such as automated storage and retrieval systems, conveyors, or large-scale sortation equipment – can be particularly power-hungry, and their mission-critical nature means standard grid connections often prove inadequate. Australian businesses have seen electricity costs rise dramatically, making energy efficiency and renewable energy capabilities crucial. Facilities designed without integrated energy management capabilities face ongoing operational cost disadvantages that compound over time.

Future warehouses will require integrated energy systems including solar installations, battery storage, and potentially micro-grid capabilities to manage increasingly complex power demands. The investment in energy infrastructure often pays for itself through reduced operating costs, while also providing the reliability that modern automation systems require.

Electric vehicle charging infrastructure represents another emerging requirement that demands strategic planning today. Even those without immediate EV requirements should prepare electrical capacity for future needs, as retrofitting power infrastructure costs significantly more than designing it correctly from the beginning.

Hydrogen fuel cells and other emerging technologies may become standard within the next decade. While specific requirements remain uncertain, designing flexibility into energy systems allows facilities to adapt as these technologies mature.

Pillar 3: Advanced connectivity

Automated systems require high-speed, reliable data communication that provides comprehensive coverage within buildings and seamless integration with external networks.

This digital infrastructure supports real-time inventory management, predictive maintenance systems, and the sophisticated software platforms that orchestrate modern automated operations. The connectivity requirements extend beyond basic internet access to encompass internal networks capable of handling massive data flows from sensors, robotics, and monitoring systems.

Future-proofing connectivity infrastructure requires anticipating exponential growth in data requirements. As artificial intelligence and machine learning become more prevalent in warehouse operations, the volume of data processing will increase dramatically. Facilities must be designed to accommodate not just current needs but the data-intensive requirements of emerging technologies.

Pillar 4: Environmental controls

Modern automated systems have different climate requirements. Robotics typically struggle in high dust, high humidity, and high temperature environments, necessitating climate-controlled facilities that maintain optimal operating conditions for both equipment and stored goods.

The environmental control requirements vary significantly depending on the type of automation. Some automated equipment generates heat that must be managed through enhanced HVAC systems, while others require specific humidity ranges.

Environmental controls also play a crucial role in attracting and retaining staff. No one wants to work in a dusty sweatbox. When staff are hard to retain, warehouses need to be comfortable places to work.

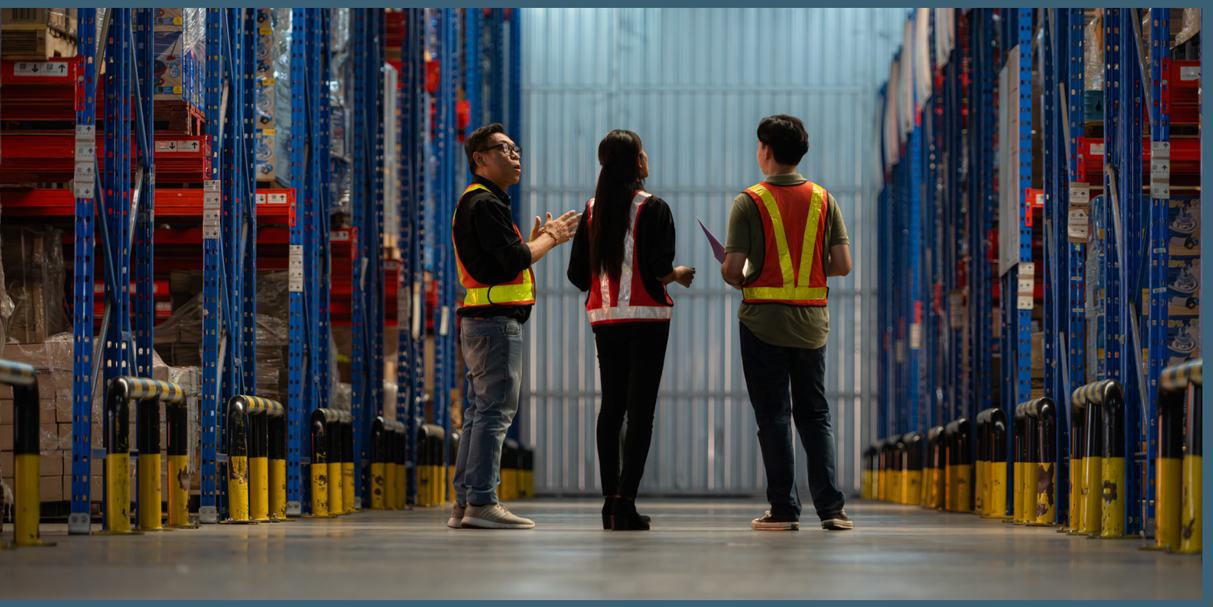
Pillar 5: Strategic location and access

Modern facilities need seamless access to highways and intermodal hubs. The increased size of automated facilities typically pushes them further from city centres, making transport connectivity critical for operational efficiency.

“Connectivity to road, rail, and air transport – which was previously a bonus – is now infrastructure that’s almost as important as the building itself,” explains Sean.

The investment in automation systems makes relocation far more complex and expensive, so site selection must account for long-term requirements.

Location decisions require balancing multiple factors such as proximity to customers, access to labour markets, transportation infrastructure, and future expansion possibilities.



Pillar 6: People are at the centre of automation

Automation may reduce the volume of manual work in warehouses, but people remain one of your biggest challenges. Designing facilities that integrate automation effectively must therefore account for how workers interact with both the technology and the building itself. Labour availability is one of the industry’s most pressing problems, making workplace quality and ergonomics critical.

The transformation seen in office environments over recent decades is now reaching warehouse design. Climate control, natural lighting, ergonomic workstations, and flexible work areas are becoming competitive necessities rather than luxuries.

Modern design principles increasingly shift manual and semi-manual tasks into more controlled, comfortable environments. For example, rather than picking stock in a hot or dusty warehouse, operators can work from air-conditioned office-style environments where goods are brought to them by automation. Technologies such as height-adjustable platforms ensure staff always work at an ergonomic level tailored to their individual needs, reducing strain and fatigue.

If you look after your people, they will look after you. Employees are more likely to remain engaged in environments that are well lit, climate-controlled, and designed with their comfort in mind. Automation should therefore be viewed not only as a driver of efficiency but also as a tool to elevate the quality of working conditions.

> “The person you’re trying to hire can choose between your 1980s-style warehouse or Amazon’s climate-controlled facility with ergonomic workstations and natural lighting – it’s not a difficult choice for them.”

How to Be Confident in Your Decisions

The transition toward automation-ready warehouses requires more than infrastructure investment – it demands strategic thinking about how automation integrates with broader business objectives.

You need to address the full spectrum of challenges you face: organisational alignment, operational integration, and business process optimisation to ensure smooth transitions to automation solutions. Don't just evaluate equipment – examine how automation integrates with your entire operation to maximise benefits and minimise disruption.

Acquire deep knowledge of emerging automation technologies, combined with experience across major automation providers, to avoid costly mismatches between equipment capabilities and operational requirements. Every facility and operation is unique, requiring the customised automation strategies to align with your current needs and future growth plans.

This is how to create confidence in your transformation journey:

The reality check assessment

The first step in any automation infrastructure project should be what Sean Ledbury calls a "reality check". This comprehensive assessment uncovers all limitations of existing facilities before any implementation planning begins.

"Customers often start with great enthusiasm about fixing all their current problems, only to discover months down the track that the building height is insufficient, floors can't bear the loads, or there isn't adequate power infrastructure", Sean explains.

The reality check methodology examines each of the five infrastructure pillars against planned automation requirements. This assessment must be brutally honest about current capabilities and limitations. Wishful thinking at this stage leads to expensive surprises later in the process.

Key elements of an effective reality check include structural engineering assessments, power capacity analysis, connectivity infrastructure evaluation, and environmental systems review. The assessment should also examine less obvious factors such as site access for large equipment installation and maintenance, regulatory compliance requirements, and potential expansion constraints.

Comprehensive impact analysis

Following the initial assessment, a detailed impact analysis evaluates available technologies and potential solutions. This analysis explores whether limitations can be overcome through equipment modifications, building infrastructure changes, or alternative automation approaches.

The impact analysis process might reveal that partial automation provides better returns than comprehensive systems in constrained facilities. Alternatively, it might demonstrate that fundamental building modifications would cost more than relocating to a purpose-built facility.

This stage requires close collaboration between automation specialists, facility engineers, and financial analysts. The goal is to identify all viable options with realistic cost and timeline projections before making strategic decisions.

Financial modelling and ROI calculations

The financial analysis must extend beyond simple cost comparisons to examine long-term operational implications. Retrofitting automation into existing buildings projects typically costs 15-30% more than in purpose-built facilities, but the analysis must also consider operational efficiency differences, energy costs, maintenance requirements, and flexibility for future expansion.

The modelling should examine multiple scenarios with different assumptions about business growth, technology evolution, and operational requirements. Sensitivity analysis helps identify which factors most significantly impact project returns and where additional planning attention should focus.

"Ideally we would prefer to design the building around the automation rather than trying to shoehorn automation into an existing building that it was not designed for", Sean notes. However, budget constraints are a reality for most businesses, making thorough financial analysis essential for optimal decision-making.

Risk assessment and mitigation

Every automation infrastructure project carries significant risks that must be identified and managed proactively. Technical risks include equipment compatibility issues, integration challenges, and performance shortfalls. Financial risks encompass cost overruns, timeline delays, and market changes that affect project returns.

Operational risks often prove most challenging to manage. Automation implementations can disrupt existing operations, require extensive staff retraining, and create temporary productivity losses during transition periods. The risk assessment must identify potential disruption points and develop mitigation strategies.

The analysis should also consider external risks such as regulatory changes, technology obsolescence, and market shifts that could affect automation requirements over the facility's operational lifetime.

Flexibility for emerging technologies

The most effective future-proofing strategy involves designing flexibility into facility systems rather than trying to predict specific future requirements. Modular electrical systems, adaptable floor layouts, and scalable data infrastructure allow facilities to evolve as new technologies emerge.

Facilities that can adapt to changing requirements without major reconstruction maintain competitive advantages over rigid designs that become obsolete.

Implementation Roadmap

Regardless of the facility, successfully implementing automation requires careful planning, realistic timelines, and systematic execution. It takes decades of experience to spot all the warning signs, and clear planning to keep your project on track.

Project planning and timelines

Simple network reviews and facility assessments typically require 12 weeks from start to finish, assuming good data quality and availability. Complex projects involving multiple facilities or extensive automation integration may require 16-20 weeks or longer.

These timelines assume quality data and clear decision-making processes. Poor data quality, unclear requirements, or extended approval processes can double project timelines and significantly increase costs.

The planning phase should establish clear milestones, decision points, and success criteria before implementation begins. By investing in planning from the beginning, you prevent costly changes and delays during execution.

Stakeholder alignment and communication

Automation infrastructure projects affect multiple departments and require coordination across technical, operational, and financial stakeholders. Early alignment on objectives, constraints, and success criteria prevents conflicts and delays later in the process.

Regular communication throughout the project lifecycle keeps stakeholders informed and engaged while providing opportunities to address concerns before they become problems. The communication plan should include progress updates, milestone reviews, and change management processes.

Vendor selection and management

Choosing the right automation partners can make the difference between project success and costly failure. The vendor selection process should evaluate not just technical capabilities but also project management experience, financial stability, ability to locally service and maintain the solution long term and cultural fit with your organisation.

Vendor reference checks with previous customers provide valuable insights into project timeline management, problem-solving capabilities, and post-implementation support quality. You need a vendor that is willing to commit to more than automation, you need their time and best people.

Contract terms should clearly define responsibilities, performance standards, and change management processes. Automation projects often encounter unexpected challenges that require scope modifications, making flexible but clear contractual frameworks essential.

Risk management and contingency planning

The biggest implementation risk is actually maintaining operational continuity during facility transitions or major infrastructure upgrades. Contingency planning should address potential disruptions and identify alternative approaches when primary plans go wrong.

People and transition management often receive inadequate attention during implementation planning but frequently determine project success. Staff members moving from familiar processes to new systems require time, training, and support to become fully productive in a new environment.

Budget contingencies should account for both technical challenges and transition costs. Successful projects typically reserve 10-15% of project budgets for unexpected requirements and timeline adjustments.

Conclusion

As vacancy rates begin to rise again across the country, tenants are beginning to evaluate whether supposedly prime industrial spaces can actually deliver the operational capabilities their businesses require. Tenant expectations are growing because of what modern warehouse operations truly need to stay competitive.

Businesses have more negotiating power than in previous industrial real estate cycles. This tenant's market creates opportunities for you to secure properties that support your operational requirements rather than accepting compromises.

For organisations approaching facility decisions, the choice is straightforward: invest in automation-ready infrastructure that supports long-term growth, or accept the constraints and costs that come with retrofitting unsuitable facilities. The businesses that act decisively today will reap the rewards.

Engaging Prological early in your automation planning process ensures that infrastructure decisions support your long-term operational success. Our systematic methodology identifies opportunities and constraints before they become expensive problems, positioning your business for sustainable competitive advantage in an increasingly automated industry.

About Prological

Established in 2010, Prological Consulting specialises in supply chain strategy, warehouse design, and automation consulting. With expertise across automation and warehouse design, Prological delivers individualised, innovative, commercially viable and operationally sustainable outcomes for clients across Australia and internationally.

Prological's team combines deep technical knowledge with practical business experience, having completed projects across multiple industry sectors and automation technologies. The company's approach addresses organisational, operational, and business process improvements to ensure successful transitions to optimised warehouse and automation solutions.

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