DC2O

DISCUSSION PAPER

Spreading the Bet

Portfolio thinking for property asset owners: what fund managers know about risk and return, and what it means for capital planning across an estate

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Executive summary

Ask a fund manager how they decide where to put the money and they will talk about the portfolio: the mandate, the risk budget, how the holdings move together, and the trade-off between return and risk across the whole book. Ask most organisations how they decide which buildings get capital this year and the honest answer is closer to a queue: the worst-looking roof, the loudest faculty, the plant room that failed last winter.

This paper argues that the discipline fund managers apply to a portfolio of investments, formalised by Harry Markowitz in 1952 and refined ever since, has direct and practical parallels in the management of a property portfolio. The international asset management standards already use the language of portfolios (ISO 2014; BSI 2008), and public sector policy expects agencies to extract maximum benefit from their asset portfolio (NSW Treasury 2019). What is usually missing is the analytical machinery to back the language up.

We draw out two lessons that matter most. First, **correlation is the hidden risk in an estate**: buildings of the same vintage, sharing the same systems, fail and fall due together, producing renewal peaks that no single-building plan reveals. Second, **an efficient frontier exists for capital programmes**: for any budget there is a set of programmes that deliver the most value for the least residual risk, and the common heuristics (worst-first, equal shares, squeaky wheel) usually sit well inside it.

We are equally clear about where the analogy breaks. You cannot sell the chemistry building on a Tuesday, service value is not priced by a market, and building risk is physical and lumpy rather than smoothly statistical. The recommendations at the end of the paper are designed with those limits in mind: write the mandate down, map the correlations, model whole programmes rather than ranking projects, provision for the risks you cannot diversify, and report to finance in portfolio terms.

1 The problem: funding buildings one at a time

Most organisations hold property as a collection of individual assets and fund it the same way. Capital requests arrive as building-by-building bids. Each is assessed on its own merits including condition, a compliance trigger, a business case from the occupying unit, and the bids are ranked and funded down the list until the money runs out. It looks orderly. It is, in fact, a stock-picker choosing shares one at a time on the strength of whichever broker shouted loudest and then being surprised that the portfolio as a whole does not behave.

The consequences are familiar to anyone who has sat through a capital planning round:

- **Funding follows visibility, not value.** The building the Vice-Chancellor walks past gets its facade done; the switchboard in a basement plant room waits.
- **Risk is assessed per building and never summed.** Each building's risk appears tolerable in isolation, while the estate's aggregate exposure to a single failure mode or a single regulatory change or a single decade of construction, goes unmeasured.

- **The backlog moves around rather than down.** Money spent on the worst assets buys down the most visible risk, while assets that are about to slip into a more expensive condition band are left to do exactly that.
- **Finance cannot see the trade-off.** Without a portfolio view, the conversation with the CFO is about how much, never about what each dollar buys in reduced risk or improved service.

In higher education, where much of DC2O's work sits, the pressure on this approach is rising. Universities Australia reports that sector capital expenditure fell from around $4.5 billion in 2019 to about $3.86 billion in 2024, with 22 universities showing weak liquidity (Universities Australia 2026). KordaMentha's 2025 review of the sector found university debt up 44 per cent since 2019 and identified twelve institutions as underinvesting in infrastructure (KordaMentha 2025). The maintenance backlog is not a new story either: Commonwealth data cited by the Innovative Research Universities group put the 2005 backlog at $1.5 billion, with thirteen universities carrying deferred maintenance above 3 per cent of asset replacement value (IRU 2008).

> **THE CORE ARGUMENT**
> When the capital pot shrinks, the cost of allocating it badly rises. A fund manager handed less money and the same obligations does not keep picking stocks one at a time, they tighten the portfolio discipline. Estates should do the same.

2 What fund managers know

2.1 Markowitz and the portfolio idea

Before 1952, investment advice was largely about finding good securities. Markowitz's contribution in *Portfolio Selection* was to show that an investor should judge the portfolio, not the holdings one by one (Markowitz 1952). The expected return of a portfolio is simply the weighted average of the returns of its parts. Its risk is not. Portfolio risk depends on how the holdings move in relation to each other (their covariance) and as long as assets are not perfectly correlated, combining them reduces risk without a matching sacrifice in expected return.

From this follows the **efficient frontier**: the set of portfolios that offer the highest expected return for each level of risk, or equivalently the lowest risk for each level of return. Any portfolio below the frontier is leaving something on the table. Markowitz's own illustration, from his 1959 book, makes the point about correlation plainly: sixty railway stocks are less diversified than the same number spread across railways, utilities, mining and manufacturing, because the railways rise and fall together (Markowitz 1959).

Sharpe (1964) added a distinction that will matter later in this paper. Some risk is specific to individual holdings and can be diversified away. Some is systematic, it affects the whole market at once, and no amount of spreading removes it. Investors are compensated for bearing systematic risk; they are not compensated for carrying specific risk they could have diversified.

2.2 The machinery around the theory

The theory is elegant, but what makes it work in practice is the governance apparatus that professional managers build around it:

- **A mandate** - an investment policy statement that sets objectives, constraints, time horizon and permissible asset classes.
- **A risk budget** - an explicit statement of how much risk the owner will accept, and where.
- **Asset allocation** - the deliberate split of capital across classes whose returns do not move together.
- **Concentration limits** - caps on exposure to any single holding, sector or issuer.
- **A benchmark** - something to measure performance against.
- **Rebalancing** - periodic return of the portfolio to its target allocation as values drift.
- **A liquidity buffer** - cash held to meet obligations without forced selling.

Notice what diversification is *not*. It is not putting a little into everything. An equally weighted portfolio is rarely efficient. Diversification is the deliberate combination of exposures whose risks offset each other, sized to the mandate. That distinction is the single most useful thing an estate manager can borrow from finance, and we return to it in Section 5.

3 Asset management already speaks the language

The good news is that the asset management profession adopted portfolio language a long time ago. The difficulty is that the language has run well ahead of the practice.

ISO 55000 defines an asset portfolio as the assets within the scope of the asset management system, and notes that organisations may choose to manage assets as groups (by type, system or portfolio) to achieve additional benefits (ISO 2014). The 2024 revision sharpened the definition of the Strategic Asset Management Plan so that it now aligns policy, objectives and strategies specifically for developing and managing the asset portfolio (ISO 2024; Assetivity n.d.). Commentary on the revised standard describes the purpose of asset management in terms any fund manager would recognise: maximising value over time while holding risk at an acceptable level (ANSI 2024).

PAS 55-1, the forerunner to the ISO series, went further. It described larger organisations as holding a diverse portfolio of asset systems, each contributing to the organisation's goals but presenting widely different investment opportunities, and it called for the optimal combination of life cycle activities to be applied across that portfolio according to criticality, condition, performance and the organisation's chosen risk profile (BSI 2008). Swap 'life cycle activities' for 'holdings' and 'chosen risk profile' for 'risk tolerance' and you have a passable summary of an investment mandate.

Australian public policy follows suit. The NSW Asset Management Policy, TPP19-07, frames a strong asset management framework as critical to extracting maximum benefit from the state's asset portfolio (NSW Treasury 2019). NSW Health's directive is more explicit still, describing effective asset management as an appropriate balance of cost, risk and performance at portfolio and asset levels (NSW Health 2022).

OBSERVATION

The standards are perfectly fluent in 'portfolio'. It is usually somewhere between the policy document and the budget spreadsheet that the portfolio quietly turns back into a list.

4 Mapping the analogy

Table 1 sets out how the core concepts of fund management translate to a property portfolio. Some carry across almost directly; others need adaptation, which we come to in Section 6.

Table 1. Fund management concepts and their property portfolio equivalents

Fund management	Property portfolio equivalent	What it looks like in practice
Mandate / investment policy	Organisational objectives and the SAMP	Strategic plan translated into levels of service by building function
Expected return	Contribution to objectives (service value)	Teaching and research capacity, student experience, compliance, carbon, revenue
Risk (variance)	Uncertainty of outcome	Failure, service disruption, cost overrun, compliance breach - measured across the estate, not per building
Correlation	Shared drivers of failure and renewal	Same construction era, same plant type, shared central plant, same regulatory trigger
Diversification	Spreading exposure and intervention timing	Staging renewals; mixing renew, refurbish, repurpose and dispose options
Efficient frontier	Best achievable programme for a given budget	Scenario modelling of whole capital programmes over 30–50 years
Risk budget / tolerance	Board-approved risk appetite	Explicit, tolerable condition and risk thresholds by asset criticality
Concentration limits	Caps on exposure	No single building or element group absorbing a set share of the forward programme without explicit approval
Rebalancing	Periodic re-allocation	Annual capital plan review against changed condition, objectives and use
Benchmark	Peer and target comparison	TEFMA benchmarks; agreed levels of service
Liquidity buffer	Contingency and reactive allowance	Ring-fenced provision for unplanned failure
Divestment	Disposal and consolidation	Exiting assets that add risk and cost but little service value

5 Two lessons that matter most

5.1 Correlation is the hidden risk in an estate

In a share portfolio, correlation is estimated from price history and is notoriously unstable. In a property portfolio it is largely written into the asset register, if anyone cares to read it. Buildings constructed in the same decade share materials, construction methods and

plant technologies. Their components reach the end of their service lives at around the same time. An estate built largely in one expansion era carries the property equivalent of sixty railway stocks.

Figure 1 shows the effect in a deliberately simple model. Two hypothetical campuses have the same floor area and the same total long-run renewal liability. One was built steadily between 1950 and 2020; the other was built mostly in a seven-year burst from 1968. The first produces a broadly even renewal demand. The second produces a peak more than three times its trough, and that peak arrives whether or not the budget has been prepared for it.

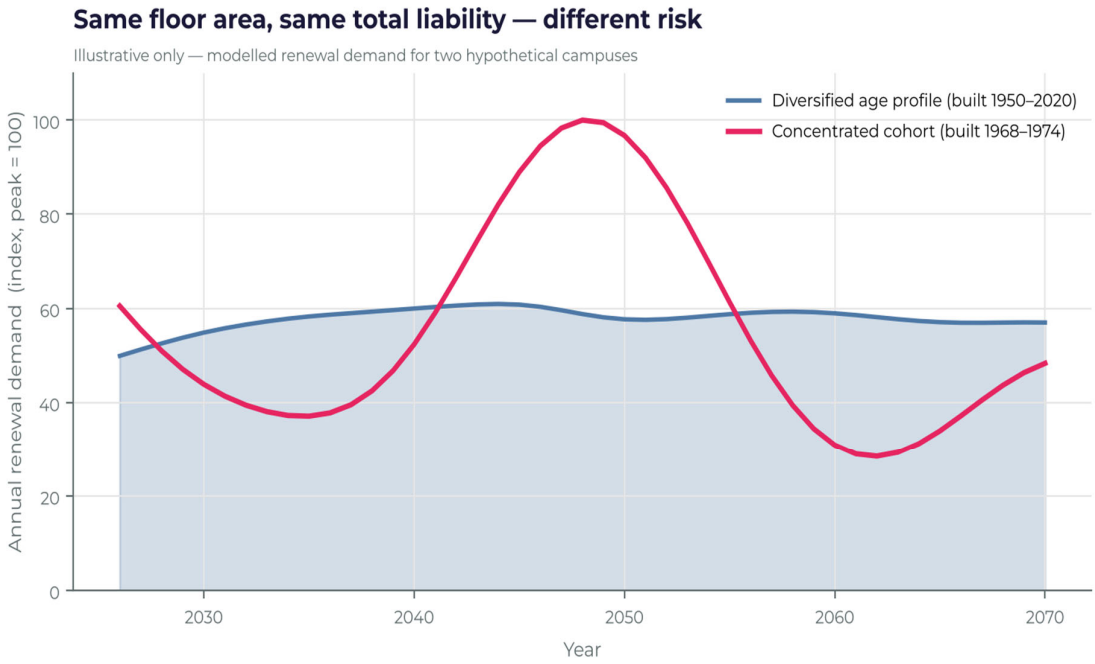


Figure 1. Modelled annual renewal demand for two hypothetical campuses with identical floor area and total liability. Illustrative only; component service lives and cohort assumptions are simplified.

Correlation in an estate also runs through shared systems and shared rules, not just shared birthdays. A portfolio that uses the same facade system across many buildings, the same chiller refrigerant across its plant, or the same generation of switchboards is exposed to a single event, such as a product failure, a regulatory phase-out, a change to the building code, landing on many assets at once. This is the estate's version of systematic risk. As Sharpe would remind us, it cannot be diversified away; it can only be anticipated, provisioned for and, where possible, deliberately staggered through the timing of renewal.

The practical implication is that renewal forecasting at building level, summed upwards, is not the same as a portfolio view. The portfolio view asks which components across the estate share a driver, how large the combined exposure is, and when it falls due. That question can only be answered with component-level data.

5.2 An efficient frontier exists for capital programmes

The second lesson is that, for any given budget, some capital programmes are simply better than others, because they deliver more service value and leave less residual risk, and the commonly used allocation rules rarely find them.

Figure 2 illustrates the point with a hypothetical estate of six buildings and thirty candidate projects, each with a cost, a risk reduction and a contribution to service objectives. Every dot is a programme that fits within a $10 million budget. The dark line traces the efficient frontier. Four allocation rules are marked:

- **Worst-first** funds the projects on the assets in the poorest condition. It buys down risk effectively but delivers little additional service value, because the worst assets are not always the most important ones.
- **Equal shares per building** - the political compromise, sometimes called peanut-butter budgeting, spreading the money evenly and landing in the middle of the cloud on both measures.
- **Squeaky wheel** follows whoever complains first and performs worst of all.
- **Portfolio-optimised** selects the *combination* of projects with the best overall balance of value and risk for the budget, and sits on or near the frontier.

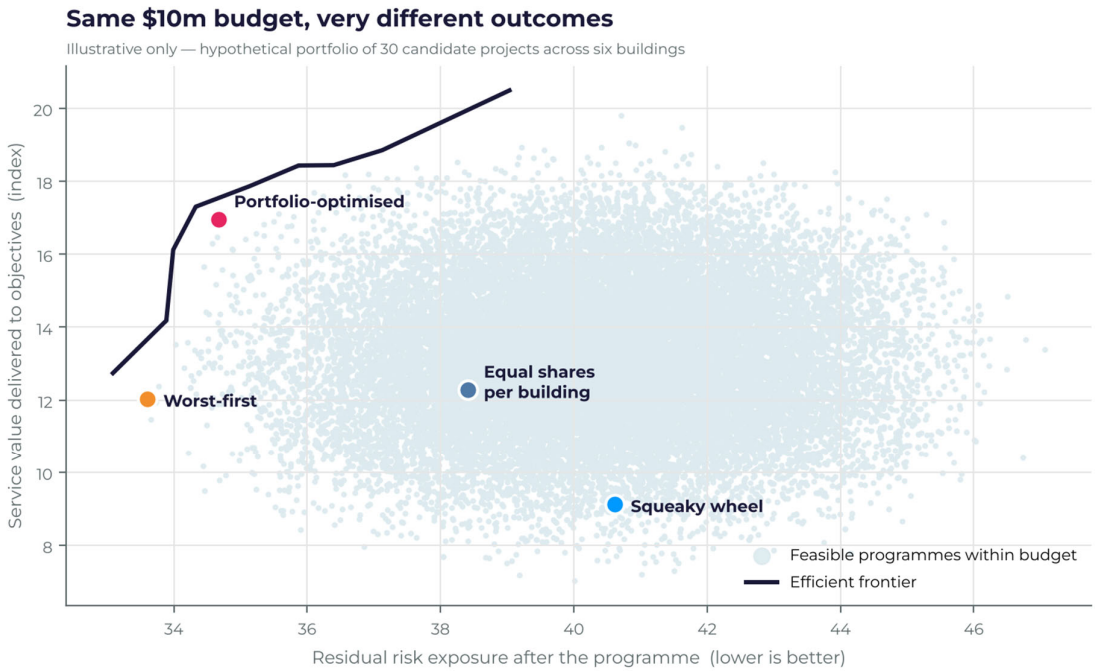


Figure 2. Residual risk and service value for 25,000 feasible programmes within a $10m budget, with four allocation rules marked. Illustrative only; hypothetical data.

None of this is a new discovery in asset management circles. Penny Burns, writing in AMQ International's practitioner newsletter, recalled the early debate over whether to fix the worst assets first or the best: those who chose worst-first found a handful of projects absorbed the whole budget, those who chose best-first watched the portfolio deteriorate anyway, and the real gains came from intervening just before an asset slipped into the next, more expensive condition band (Burns n.d.). That is a portfolio insight, not an asset-by-asset one. The European SALVO research programme built the same logic into a

structured process: recognising that an asset portfolio is large, diverse and full of unclear and competing priorities, then evaluating intervention options for value for money and assembling them into a programme with its total cost, risk, performance and resource implications (Woodhouse 2014). Research at the University of Cambridge's Institute for Manufacturing has similarly framed intervention planning as a portfolio problem, prioritising maintenance across asset fleets within budget and inter-asset dependencies (IfM n.d.).

There is one technical point worth labouring, because it is where many prioritisation tools go wrong. **Ranking projects and funding down the list is not the same as optimising the portfolio.** Projects interact. Two works in the same building may share a shutdown, access equipment or a decant; a renewal of central plant changes the risk on every building it serves; deferring one element may accelerate the failure of another. These interactions are the estate's covariance. A ranking treats each project as independent; a portfolio model does not.

6 Where the analogy breaks down

An analogy is only useful if you know where to stop leaning on it. Property is not a share portfolio, and five differences matter.

You cannot sell the chemistry building on a Tuesday. Shares are liquid; buildings are not, and most are bound to the organisation's mission for decades. Diversification in an estate therefore happens mainly across time and across intervention types (renew, refurbish, repurpose, consolidate, dispose) rather than by trading holdings. Divestment is a genuine tool, but a slow and political one.

Return is not priced by a market. A fund manager can read the return off a screen. An estate manager has to define it: what a building contributes to teaching, research, student experience, compliance, carbon targets or revenue. This is the hardest job in the whole exercise and the one most often skipped. Without an agreed definition of service value, the frontier in Figure 2 is fiction with good graphics.

Building risk is lumpy, not smooth. Markowitz measured risk as variance showing the spread of outcomes around an average. A failed main switchboard in a research building is not a modest dip below average; it is a step change with safety, reputational and financial consequences. Consequence-weighted risk, rather than statistical variance, is the better measure, and the tails matter more than the middle.

Correlations are more knowable , which is good news. Market correlations are estimated from noisy history and tend to rise just when diversification is needed most. Building ages, element types and service lives are, in principle, on record. An estate manager with a decent component-level register can see the correlation coming decades ahead. That is a genuine advantage over the fund manager, provided the data is any good.

Optimisation output deserves suspicion. Portfolio optimisation in finance has well-known weaknesses: small errors in the inputs produce large swings in the recommended allocation. The same applies to capital programme optimisation. The answer is not to abandon the method but to hold its outputs loosely, as ranges and scenarios rather than

single-point answers, and to test how sensitive the recommended programme is to the assumptions behind it.

> **KEY POINT**
> Borrow the discipline, not the formula. The value lies in thinking about the estate as a whole, making risk appetite explicit and modelling alternatives. It does not lie in pretending a building is a share.

7 Conclusions and recommendations

The parallel between fund management and property asset management is more than a figure of speech. Both are problems of allocating scarce capital across many holdings, under uncertainty, to achieve an owner's objectives. Both reward looking at the whole rather than the parts, and both punish concentration that nobody measured. The standards have accepted this for years; the practice in most capital planning rounds has not caught up.

We suggest seven practical steps.

1. **Write the mandate down.** Translate organisational objectives into levels of service by building function, and record an explicit risk appetite in the Strategic Asset Management Plan. If the board cannot say what it is trying to achieve and how much risk it will tolerate, no allocation method will rescue the programme.
2. **Map your correlations.** Profile the estate by construction era, element type and shared dependency such as central plant, facade systems, refrigerants, switchgear generations etc. at component level, not building level. Identify the cohorts that will fall due together.
3. **Model the frontier, not the wish list.** Compare whole capital programmes as scenarios over a 30–50 year horizon, rather than ranking individual projects. Show the board the trade-off between budget, residual risk and service value.
4. **Set concentration limits and rebalance annually.** Agree a threshold above which any single building or element group cannot take a larger share of the forward programme without explicit approval, and revisit the allocation each year as condition, use and objectives change.
5. **Provision for the risks you cannot diversify.** Systemic exposures such as regulatory change, product failure, a dominant construction cohort, should generate a call for reserves and deliberate staging of renewals, not hope.
6. **Report to finance in portfolio terms.** Present capital plans as risk-adjusted outcomes per dollar, in language a CFO or investment committee already uses. It changes the conversation from 'how much?' to 'what does each option buy?'.
7. **Hold the answers loosely.** Present forecasts as confidence ranges, test their sensitivity to key assumptions, and treat the optimised programme as the start of a conversation rather than the end of one.

At DC2O, this is the approach our work is built around: component-level lifecycle cost modelling drawing on a catalogue of more than 13,000 asset types, long-run horizons expressed as ranges, and transparent models that clients can interrogate and own. Our Farsight platform is designed to make the portfolio view - the correlations, the renewal peaks and the comparison of alternative programmes - visible to the people who have to make the decision.

Markowitz is often credited with the advice not to bet the ranch. For an estate the equivalent might be: do not let one decade's buildings decide the next three decades' budgets without at least noticing that they are about to.

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References

ANSI (2024) *ISO 55000:2024 — Asset Management Vocabulary & Principles*. American National Standards Institute blog. Available at: blog.ansi.org.

Assetivity (n.d.) *ISO 55000:2024 vs ISO 55000:2014 – A Comparison*. Available at: www.assetivity.com.au.

BSI (2008) *PAS 55-1:2008 Asset Management — Part 1: Specification for the optimized management of physical assets*. London: British Standards Institution.

Burns, P. (n.d.) 'Strategic Asset Management', *The Practical Asset Manager*, AMQ International. Salisbury, SA: AMQ International.

IfM (n.d.) *Management of Asset Fleets and Portfolios*. Institute for Manufacturing, University of Cambridge. Available at: www.ifm.eng.cam.ac.uk.

IRU (2008) *Funding the Full Cost of Research*. Innovative Research Universities Australia.

ISO (2014) *ISO 55000:2014 Asset management — Overview, principles and terminology*. Geneva: International Organization for Standardization.

ISO (2024) *ISO 55000:2024 Asset management — Vocabulary, overview and principles*. Geneva: International Organization for Standardization.

KordaMentha (2025) *Australia's Higher Education Sector Faces a Financial Reckoning* (Higher Education report, August 2025). Available at: kordamentha.com.

Markowitz, H. (1952) 'Portfolio Selection', *The Journal of Finance*, 7(1), pp. 77–91. doi:10.1111/j.1540-6261.1952.tb01525.x.

Markowitz, H. (1959) *Portfolio Selection: Efficient Diversification of Investments*. Cowles Foundation Monograph 16. New Haven: Yale University Press.

NSW Health (2022) *Asset Management*, Policy Directive PD2022_044. Sydney: NSW Ministry of Health.

NSW Treasury (2019) *TPP19-07 Asset Management Policy for the NSW Public Sector*. Sydney: NSW Treasury.

Sharpe, W.F. (1964) 'Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk', *The Journal of Finance*, 19(3), pp. 425–442.

TEFMA (2022) *2020 TEFMA Benchmark Insights Report*. Tertiary Education Facilities Management Association.

Universities Australia (2026) *Action Needed to Secure Universities' Future*. Media release, February 2026. Canberra: Universities Australia.

Woodhouse, J. (2014) *The SALVO Process: Strategic Assets Lifecycle Value Optimisation*. The Woodhouse Partnership. ISBN 978-0-9563934-7-0.