Adapting a Closed Landfill for a Changing Climate

From Portfolio-Wide Risk to Site-Specific Action

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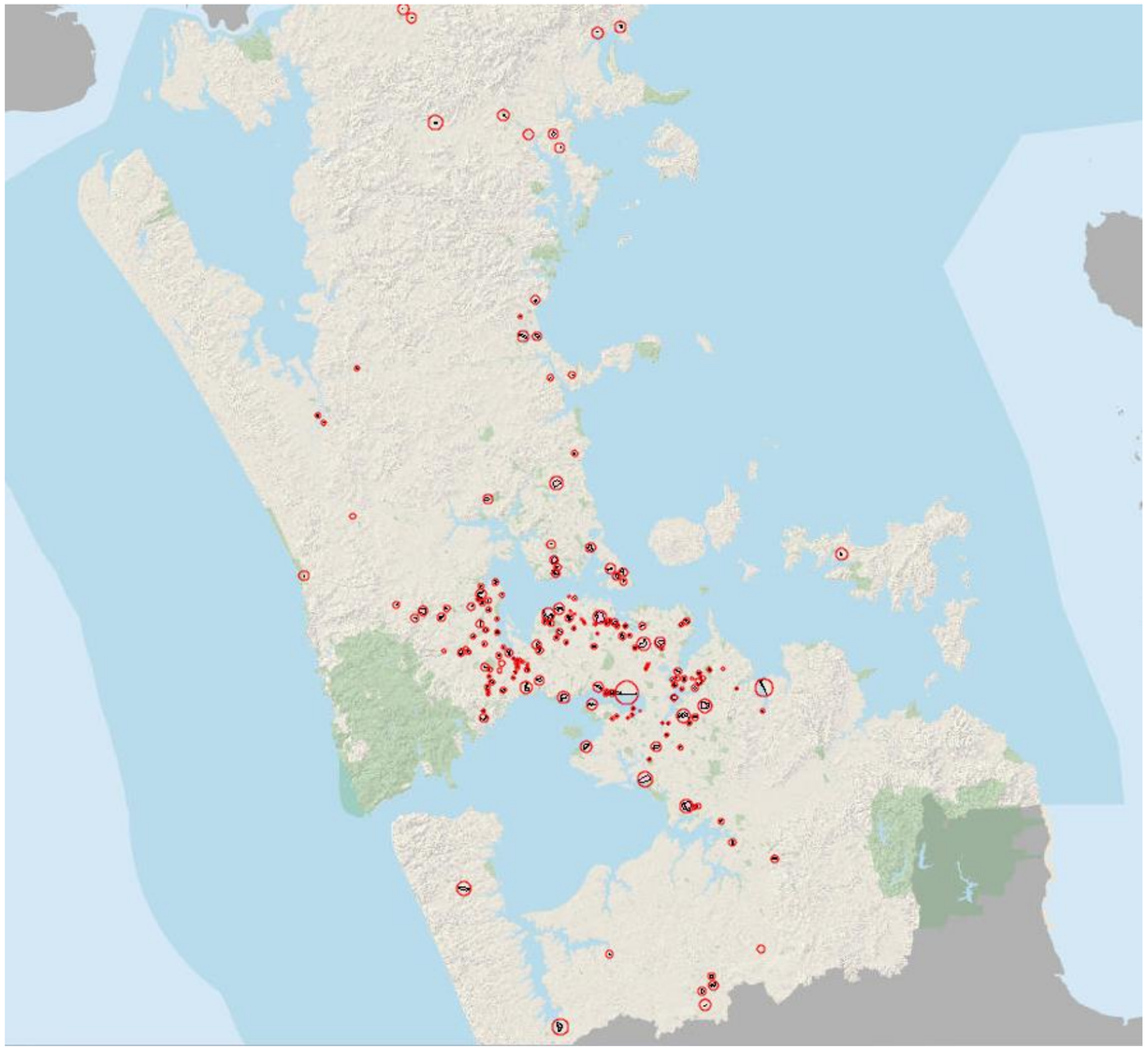
Presentation Overview

1. Auckland Council Closed Landfill Portfolio
2. Why Climate Change Matters for Closed Landfills
3. Portfolio-Wide Climate Risk Screening
4. What the Results Told Us (and What They Didn’t)
5. Site-Specific Assessments and Key Lessons Learnt
6. From Understanding Risk to Targeted Investment
7. Decision-Making: Act Now vs Monitor and Adapt
8. Wrap Up: Managing Risk with Confidence


Seaside Park

Auckland Council Closed Landfills



- Approx 200 landfills across the Auckland Region
- Wide spectrum of fill types – from municipal solid waste to cleanfill, and everything in between.
- Spread across coastal, floodplain and urban environments
- 110km span (north-south, straight line distance) or in Auckland terms >3 hours in traffic.
- 48 high priority sites

Why We Care: Climate Change & Closed Landfills

- Closed landfills are legacy assets in locations chosen under very different assumptions
- Climate change increases the likelihood that existing weaknesses are exposed
- Failure can extend well beyond the landfill boundary – into communities, coastlines and infrastructure.

Climate change amplifies existing landfill risks <u>and</u> introduces new ones

What We Saw in 2023 (Cyclone Gabrielle)

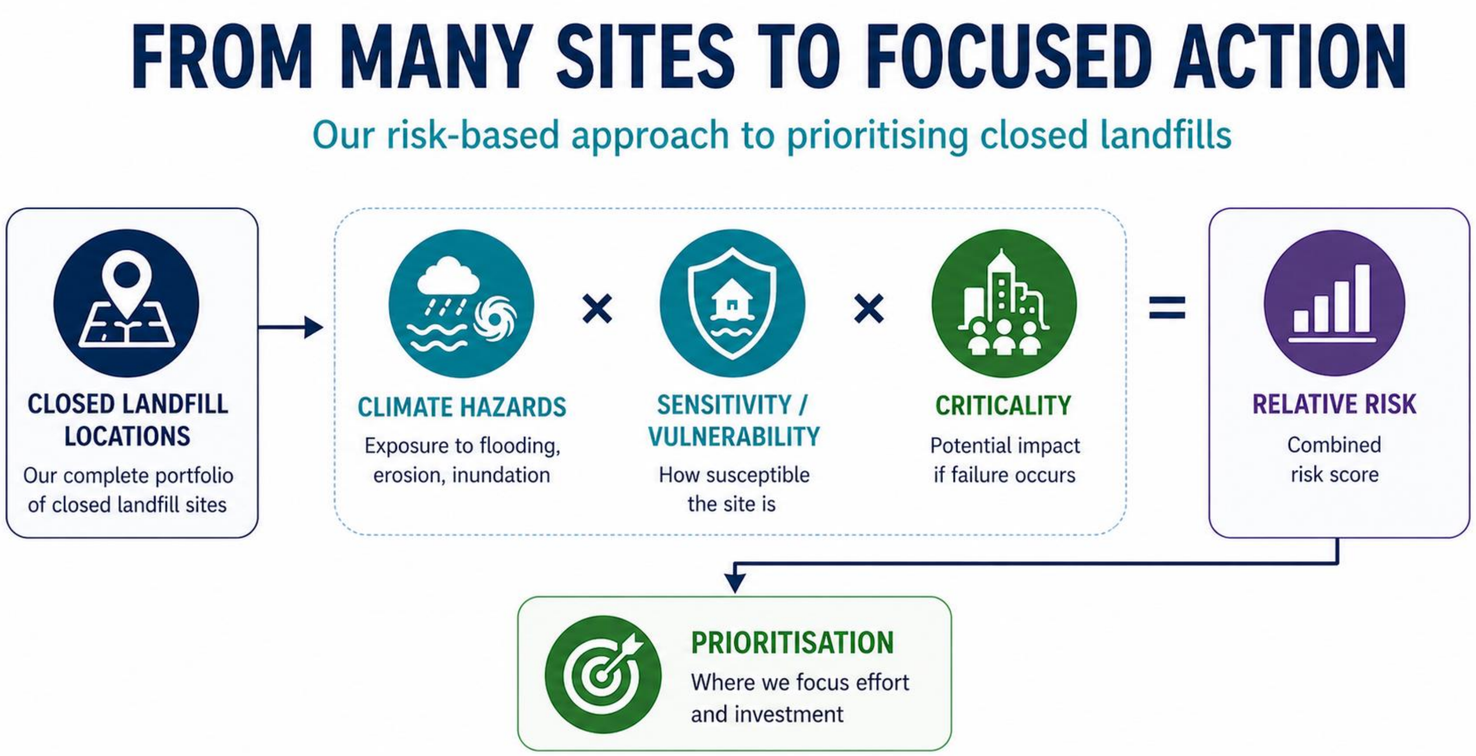
Exposed Refuse

Slips

Ponding

What we saw was manageable — but it left very little room for error. And across a portfolio this large, that makes understanding where the risk really sits critical.

Portfolio Wide Risk Assessment



- Based on the National Closed Landfill Risk Assessment Tool developed by Tonkin + Taylor with Ministry for the Environment (MfE)
- Designed as a screening tool, not a design solution
- A transparent, consistent, evidence-based view of where potential risk exists.

Houston, We Have a Portfolio Problem!

Summary: Not Ideal

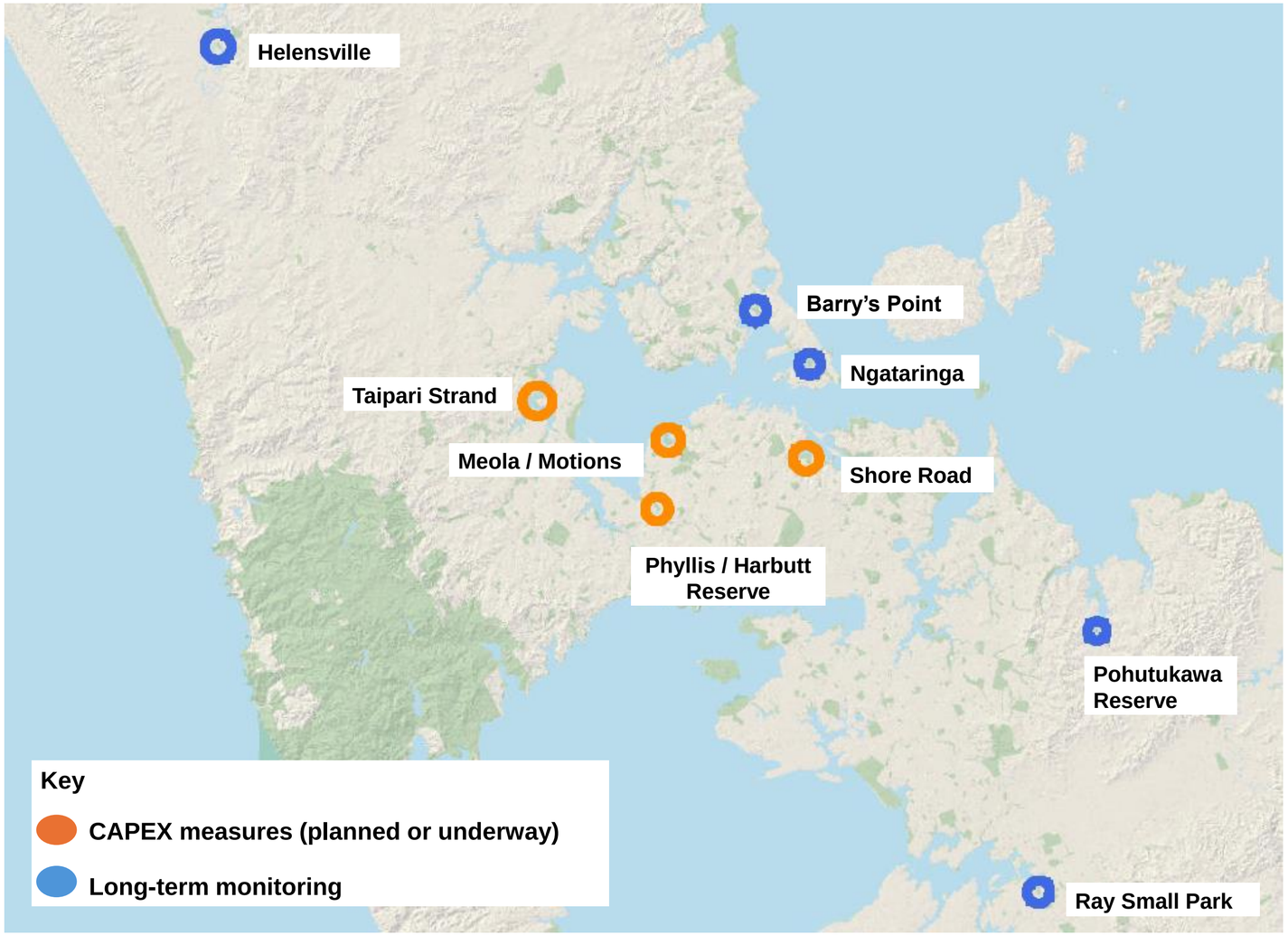
Table 4.5: Summary of the number of sites in each risk category – present day

Hazard	Total potentially exposed	Risk				
		Insignificant (1.0 - 1.9)	Low (2.0 – 2.9)	Moderate (3.0 - 3.9)	High (4.0 – 4.9)	Extreme (5.0 – 6.0)
Coastal boundary (erosion)	61 (33%)	116	6	18	19	24
Coastal inundation	80 (44%)	99	6	22	24	32
River scour	63 (34%)	114	6	14	12	37
Rainfall induced flooding	158 (86%)	25	0	46	42	70

- A large proportion of the portfolio is exposed to at least one climate hazard
- Rainfall-induced flooding is the dominant risk driver across sites
- Initial results flagged many sites as high risk — too many to address at once

The challenge wasn't identifying risk — it was deciding where to act first.

Site Specific Assessments – What We Did Next



- Selection of sites based on combined risk scores and site knowledge
- Short-term coastal erosion and inundation risk was often over-emphasised (low-energy environments, mangrove buffering)
- Only a small subset required remediation in the next ~20 years
- The tool was most powerful for long-term risk identification, not short-term action

The portfolio tool identifies potential risk — site-specific context determines significance

Key Lessons from Site-Specific Assessments

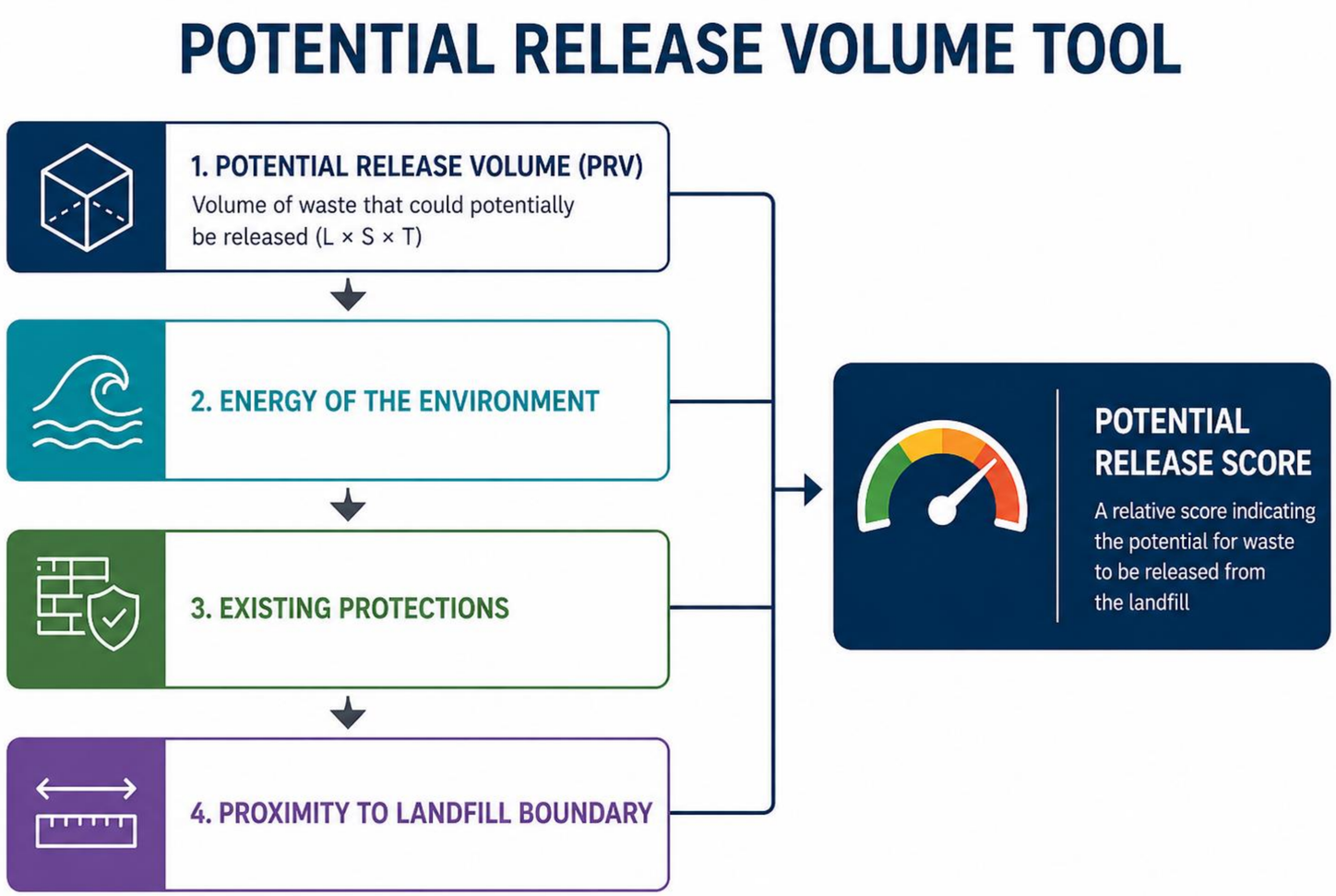
- Environmental energy was not accounted for
- Hazards were weighted equally
- Existing protections weren’t captured
- Waste proximity to the boundary matters
- Uncertainity drove conservatism

Site Context didn’t change whether hazards were present – it changed the likelihood that those hazards would actually impact the landfill

From Understanding Risk to Targeting Investment

From Where is the Risk? To Where should we actually spend money to change outcomes?

Adding a Decision-Focused Lens



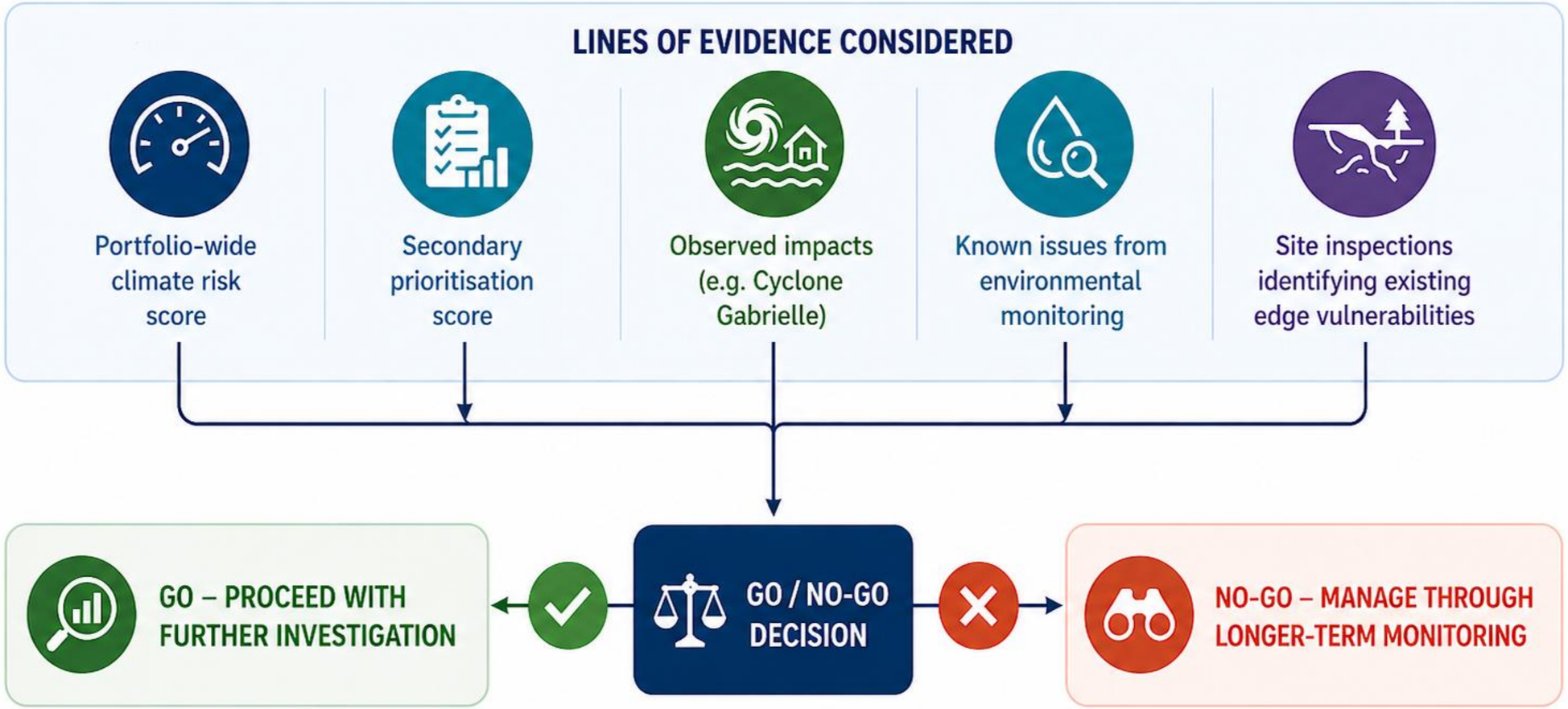
A deliberately simplified, comparative tool to focus investment on sites where release is most plausible without near-term intervention

DECISION-MAKING: BRINGING EVIDENCE TOGETHER

No single output used in isolation

The secondary prioritisation score is considered alongside multiple lines of evidence

From Prioritisation to Go / No-Go Decisions



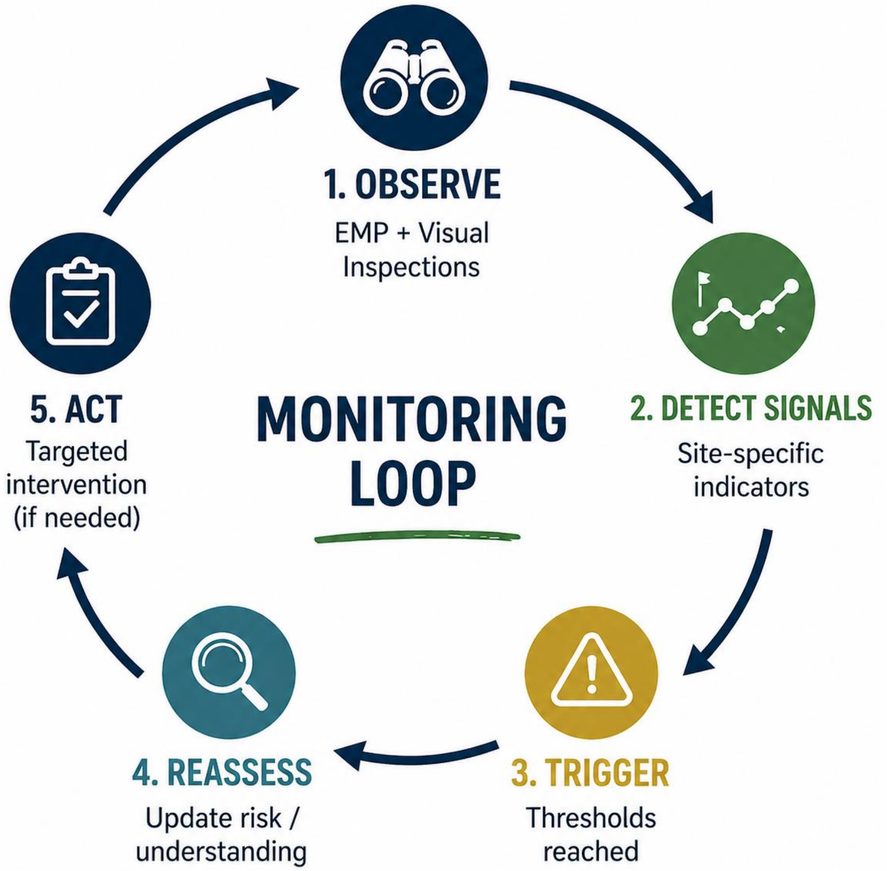
Managing Long-Term Risk Where Short-Term Action Isn’t Required

- **Not prioritised for remediation ≠ no risk:**
  Many sites have lower short-term likelihood but identifiable longer-term climate risk

- **Sites retained under active observation**

  Development of site-specific signals and triggers

- **Triggers prompt reassessment and escalation**
  Allowing intervention before risks translate into release



Low short-term risk sites are not ignored — they are actively monitored and ready to escalate.

Turns Out….. We Can Sleep at Night

This is Still Evolving (And That’s Okay!)

- Climate risk is real — but not uniform
- We understand it — and manage it proportionately
- Investment is targeted where it will change outcomes
- Long-term risks are actively monitored
- The approach will continue to evolve as new risks emerge

We’re acting where it matters now, and monitoring closely where risk may emerge