

Climate adaptation in waterfront urban regeneration

Kristen Webster
Head of Corporate Responsibility
28 November 2019



A photograph of two young girls sitting on a beach, eating ice cream. The image is overlaid with a semi-transparent blue filter. The girl on the left is wearing a white tank top and light-colored shorts, while the girl on the right is wearing a striped shirt and blue jeans. Both are wearing sunglasses and holding ice cream cones.

Our vision:

**Shaping spaces
for Aucklanders
to love**



What we do

Panuku Development Auckland helps to rejuvenate parts of our city to create spaces Aucklanders love by:

- developing and regenerating town centres and neighbourhoods
- shaping public spaces that are inspired by the essence of their community
- smart management of council's \$1 billion property portfolio
- acquiring assets to enhance or expand our portfolio
- releasing assets or land that are no longer needed.

Our neighbourhoods



Transform

Creating change through urban regeneration.

We lead the transformation of select parts of our region; working alongside others and using our custodianship of land and planning expertise.

Locations:

- **Wynyard Quarter**
- **Manukau**
- **Onewunga**



Shaping spaces for Aucklanders to love

Strategic Levers



Core Functions

Cross cutting themes

Showing Business Leadership

Quality Urban Design

Sustainability & Climate Change

Māori Outcomes

Residential Choices

Economic Development

Partnering & Engagement

Health, safety, wellbeing & risk



**PRIORITY
DEVELOPMENT
LOCATIONS**

Catalyse urban
regeneration



**PORTFOLIO
MANAGEMENT**

Strategically create
value from assets



Business Growth
Funding & pipeline



High Performing Team
Culture & capability – inspire, involve, enable, achieve



Wynyard Quarter

Clear aspirations from the outset



A BLUE-GREEN
WATERFRONT

A resilient place where integrated systems and innovative approaches are taken to enhance the marine and natural ecosystems, conserve natural resources, minimise environmental impacts, reduce waste, build sustainably and respond to climate change.

Sustainable Development Framework vision:

The leading location of sustainable urban transformation and renewal across Auckland and New Zealand

Objectives defined



Mitigation and adaptation to climate change is a key theme in the Framework's objectives, e.g.:

- Reduce greenhouse gas emissions and develop a low carbon precinct
- Increase resiliency of the built environment and natural environment and of the community
- Identify opportunities to restore and enhance environmental quality
- Manage travel demand and prioritise and promote sustainable transport modes.
- Design and develop the waterfront public land according to sustainable design principles



Requirements to consider climate adaptation in design – but primarily concerned with sea level rise and flood risk.

Designing for future climate - flooding/sea level rise/storm surge/extreme weather events

Developments will adopt resilient design principles and be adaptable to predicted climate effects including more severe and frequent weather events and predicted sea level rise and associated potential rise in water table. This will involve consideration of risk and resilience to both flooding and drought.

Design of residential and non-residential buildings will ensure the comfort of occupants in a future climate that may be warmer.

Developments will adopt a Low Impact Urban Design and Development (LIUDD) approach.

Designs for the public realm incorporate shade, shelter and green space.

Stormwater systems designed to accommodate extreme weather and flooding events.

Wynyard Quarter









Issues and learnings

- Requirements set – who will ensure they are met?
- Monitoring performance
- Selling the benefits
- Ensuring sustainable design features not an add-on
- Need a holistic approach
- Continually evolving space – need to update approach



Orehunga

**Panuku acquisition of Onehunga wharf –
goal to reconnect Onehunga with the Manukau Harbour**



Onehunga Wharf from the air (1960s)

2019 - a different approach

- A 'climate emergency'
- Greater understanding of issues and impacts – not all about sea level rise, although for this area that is the main issue.
- Auckland Council and NIWA research – Climate Change Projections and Impacts and Risk and Vulnerability Assessments
- Climate impacts, risk and resilience a key input – considered before design begins, not an add on.
- Reframing of our concepts of land use. It's not all or nothing; option of transitional uses.

Analysing impacts and risk

Two Representative Concentration Pathways (RCP)/Emissions Scenarios considered:

- RCP 4.5 – mid range emission reduction scenario
- RCP 8.5 – business as usual scenario

Two timeframes:

- 2031-2050 (2040) – Local Government planning horizon
- 2101-2120 (2110) – New asset lifespan

Key effects at Onehunga Wharf:

- Heatwaves - 1°C to 4°C increase in ambient temperatures
- Flooding/cyclones - Increased intensity of severe weather events (flooding/cyclones)
- Sea level rise - 0.6m to 0.9m increase in mean sea level/coastal storm inundation level

Key impacts

Temperature

- **Human health effects** - particularly higher risk vulnerable groups (outdoor workers, older adults, young children, those with pre-existing medical conditions) – currently 18 hot days ($>25^{\circ}\text{C}$)/yr increasing to 98days/yr (2110 RCP8.5)
- **Increased energy demand** for cooling
- **Increased water demand** (e.g. irrigation)

Extreme Weather

- **Increased rainfall intensity** leading to localised flooding and capacity issues in existing drainage infrastructure – higher tide levels will affect hydraulic capacity of underground stormwater networks
- **Higher extreme wind gusts** causing damage to buildings

Sea Level Rise and Coastal Storm Inundation

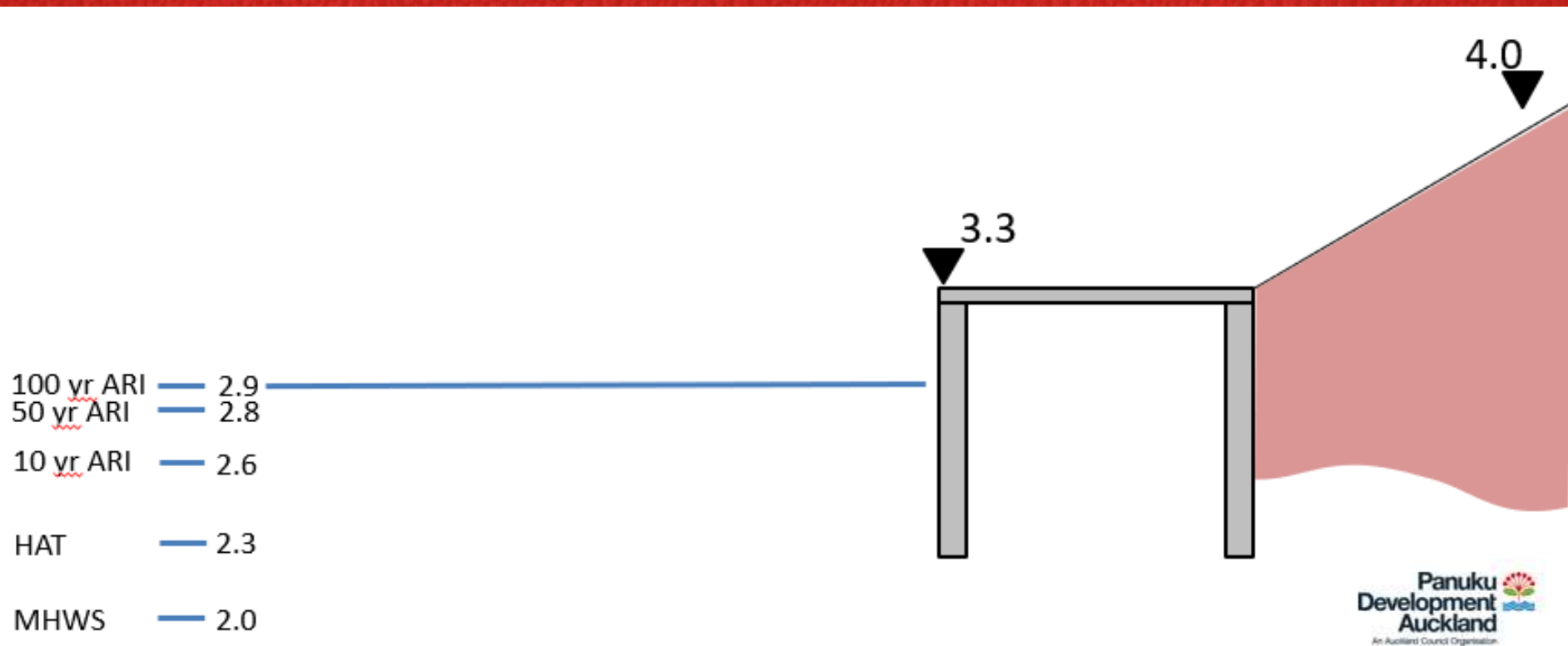
- **Building flooding** – Current floor levels $\sim 3.0\text{mRL}$ with MHWS projected to rise to 2.93mRL
- **Structural damage** to wharf – Increased wave energy and sea levels
- **Damage to infrastructure and utilities** – increase salt water intrusion to ground water - corrosion/subsidence
- **Flooded transport routes** – SH20 and Onehunga Harbour Rd inundated in 1% AEP

The future state?

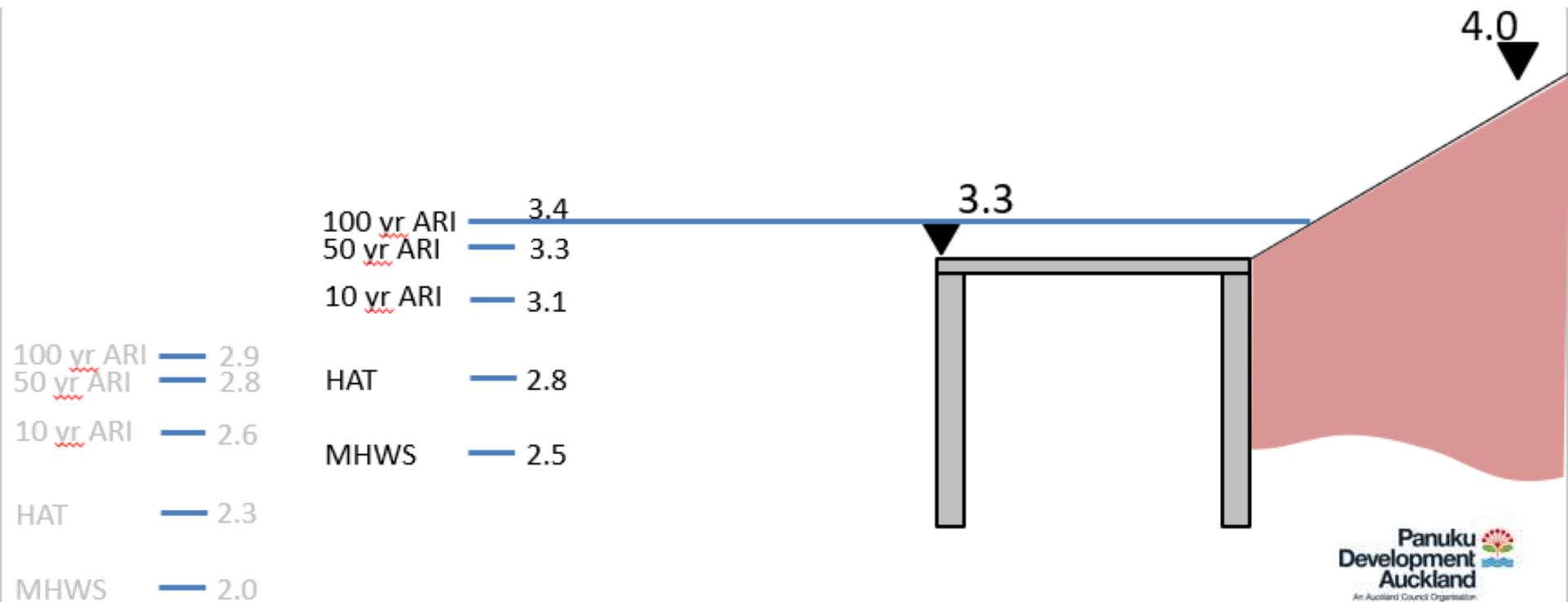
Auckland Council
inundation mapping –
100 ARI + 1.0m sea
level rise (RL3.9)



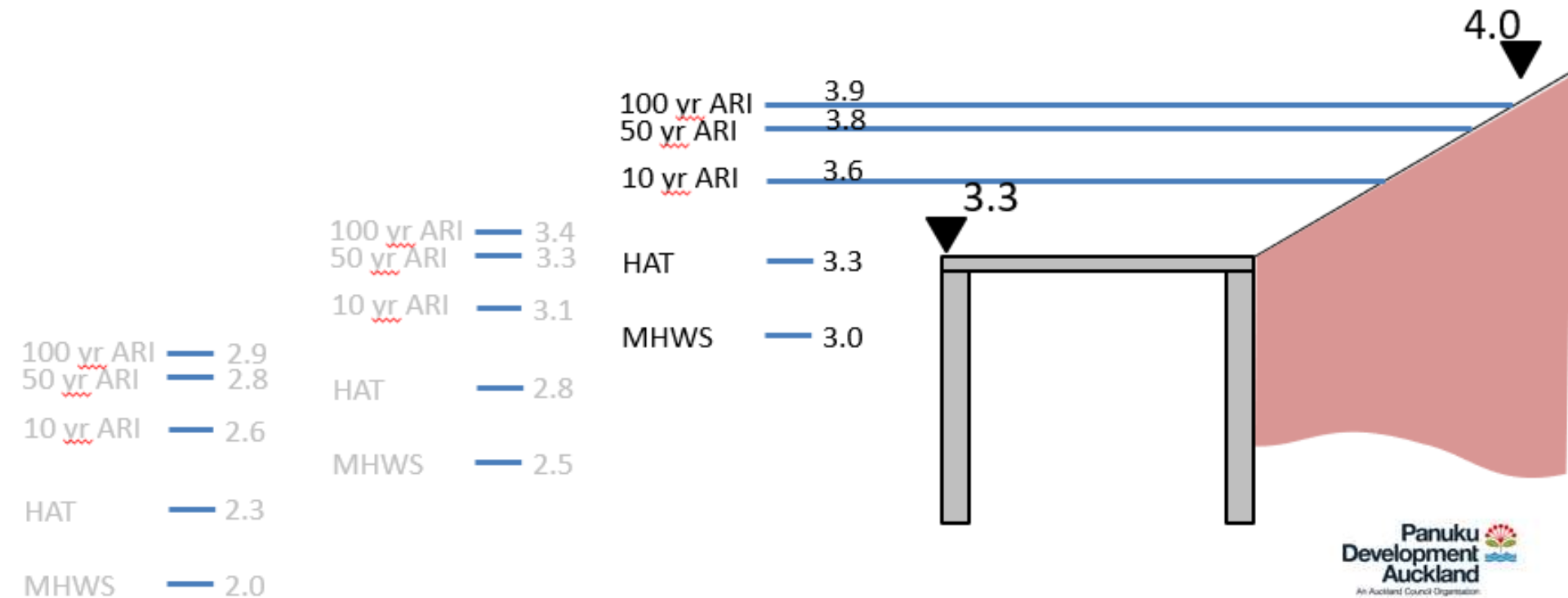
Existing water levels (not including wave effects)



50 years – 0.5m Sea Level Rise



100 years – 1.0m Sea Level Rise



Implications and options for redevelopment

Wharf area

- May not be practicable to raise wharf height
- Potentially a 50 – 70 year timeframe for use
- Look at alternatives:
 - Removable structures
 - Limited lease duration

Landward Reclamation:

- Raise ground out of inundation area
- Ensure appropriate access in extreme events

National Policy Direction

- NZCPS / AUPOIP - re-development must avoid increasing exposure / risk to coastal hazards

Constraints, but - also opportunities, technological and design solutions

- **Prioritise integration of blue-green infrastructure**
- **Maximise passive heating/cooling**
- **Plant species selection which reflects future climate**
- **Identify/design alternative access points not at risk of flooding**
- **Maximise use of light/pervious surfaces**
- **Rainwater capture and re-use**
- **Consider floodable infrastructure**

Wynyard Point

Our next opportunity
for climate resilient
development



Future opportunities



The New York Dryline,
Manhattan flood
resilient design.

Future opportunities

The New York Dryline, Manhattan flood resilient design.





Ngā mihi
Thank you