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Adaptive Planning Standing the Test of Time: the Thames Estuary

21st September 2017

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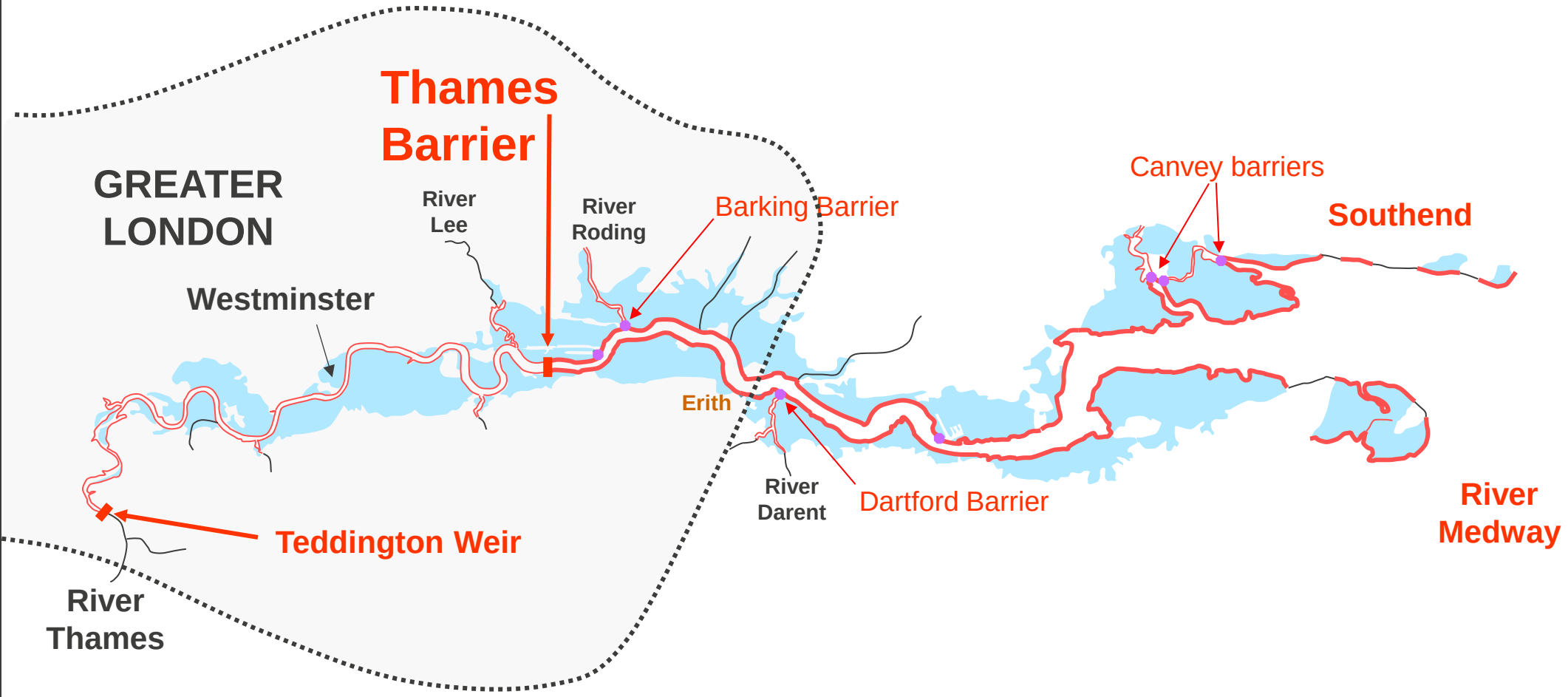
The Thames estuary

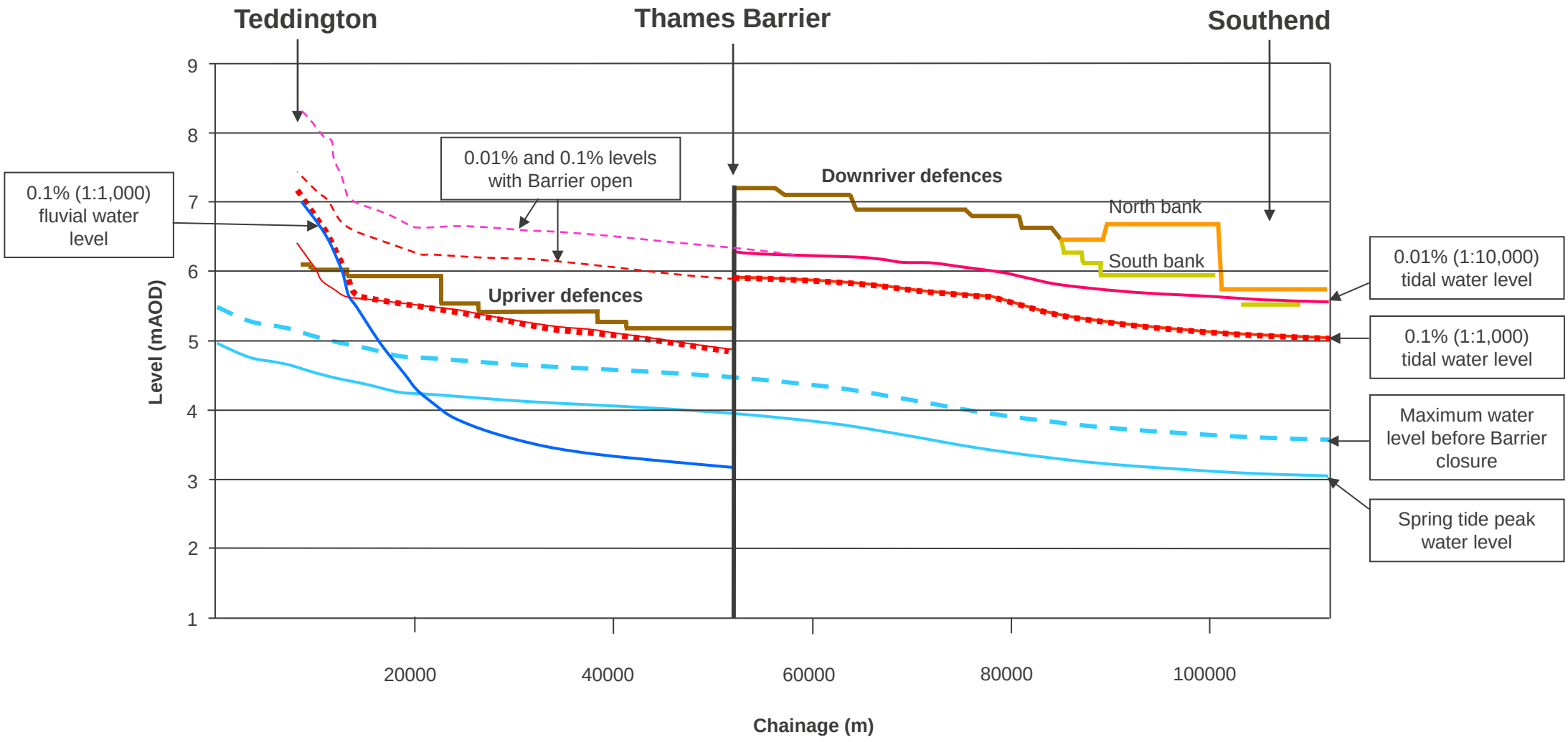


Primary defences

Secondary defences

Length of estuary: About 100km
Length of defences: About 350km
Number of properties in floodplains: About 540,000

Red dotted line represents present day 0.1% (1 in 1000-year) water surface profile



Thames Tidal Defences

Traditional response to floods in the Thames

Tidal defences including the Barrier:

Designed in 1970s for sea level rise to the 2030s

(picture courtesy: Rachel Hill, Environment Agency)

The Thames Estuary 2100 Plan (published in 2012)

A plan for flood management in the estuary taking account of long-term change:

- Climate change
- Deterioration of defences
- New development

The future is uncertain: an adaptive approach is needed

Approach to adaptation

Identify hazards and dependencies between hazards

Assess flood hazards in order of priority:

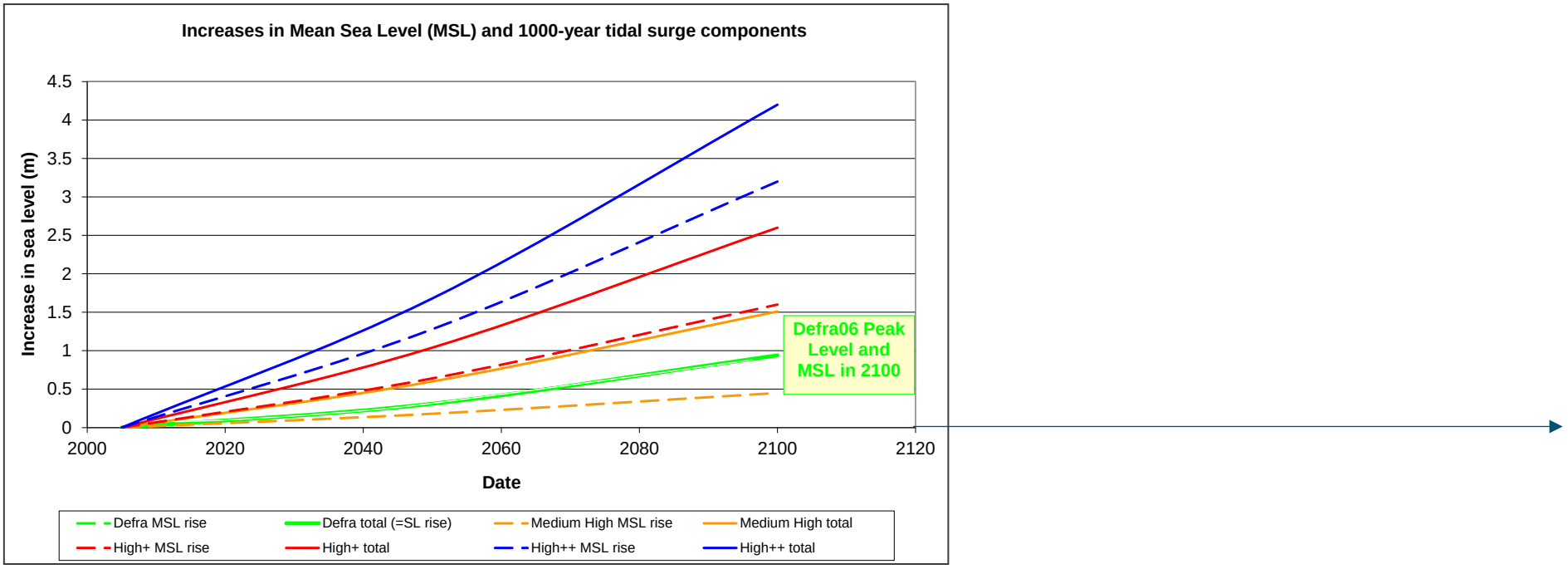
- Tidal flooding (the major risk) and fluvial flooding on the Thames
- Tidal and fluvial flooding on tributaries of the Thames
- Surface water flooding
- Groundwater flooding

Focus of presentation is on tidal flooding and climate change

Climate change adaptation:

- Extreme scenarios for long-term adaptation requirements (> 200 years)
- Government guidance for detailed options (for appraisal) (up to 100 years)

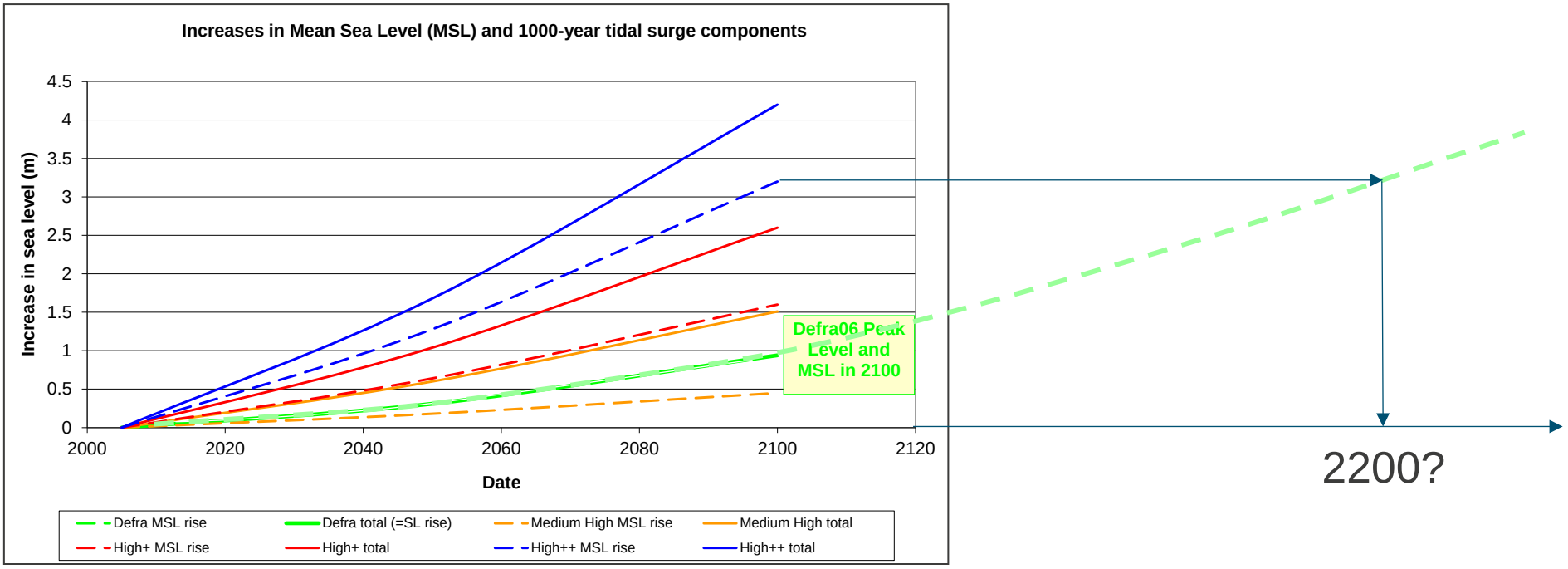
Climate change scenarios: sea level rise



Range of **Mean Sea Level** rise by 2100: 0.5 m to 3.2 m

Range of **Peak Surge Tide Level** rise by 2100: 0.5 m to 4.2 m

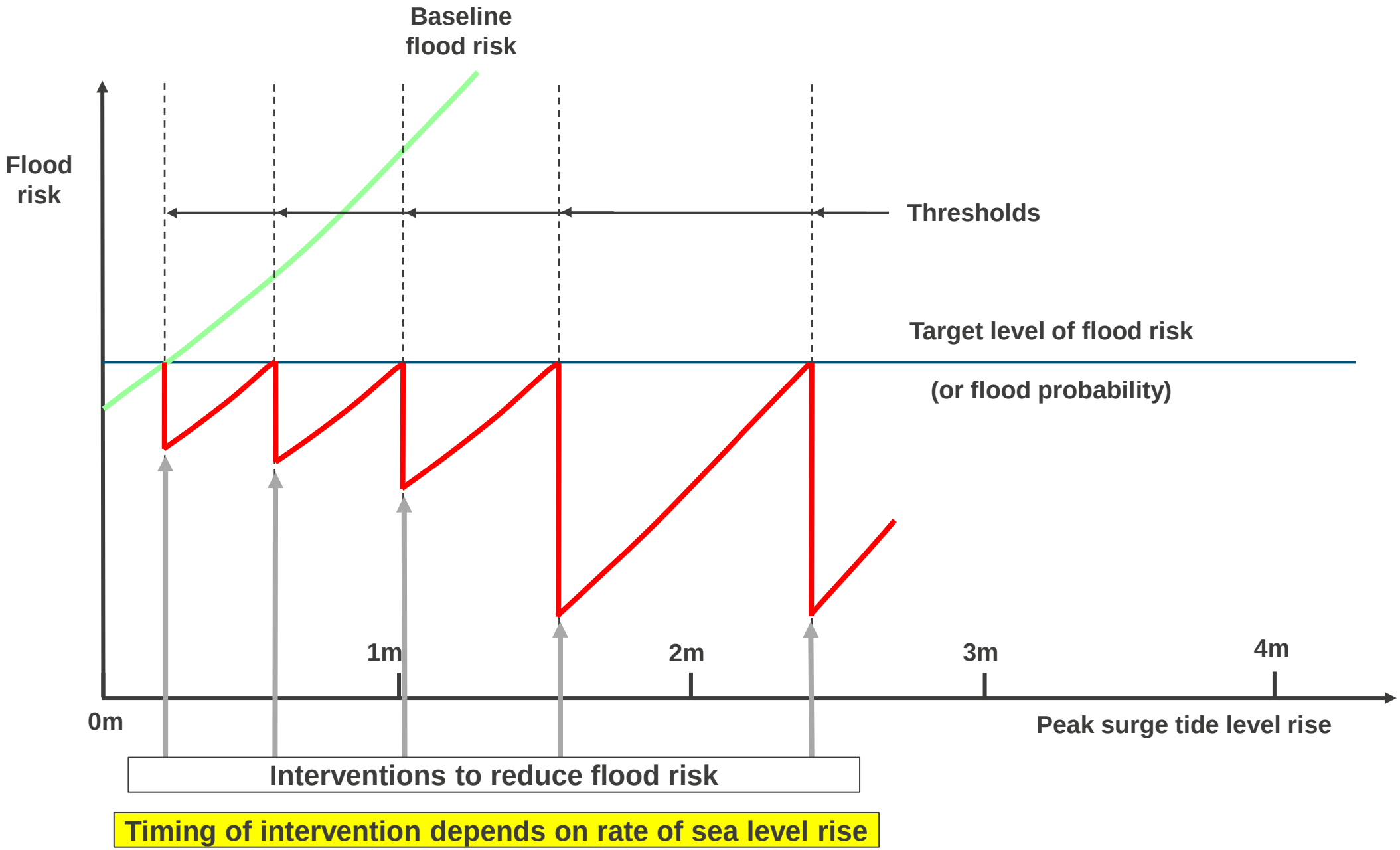
Climate change scenarios: sea level rise



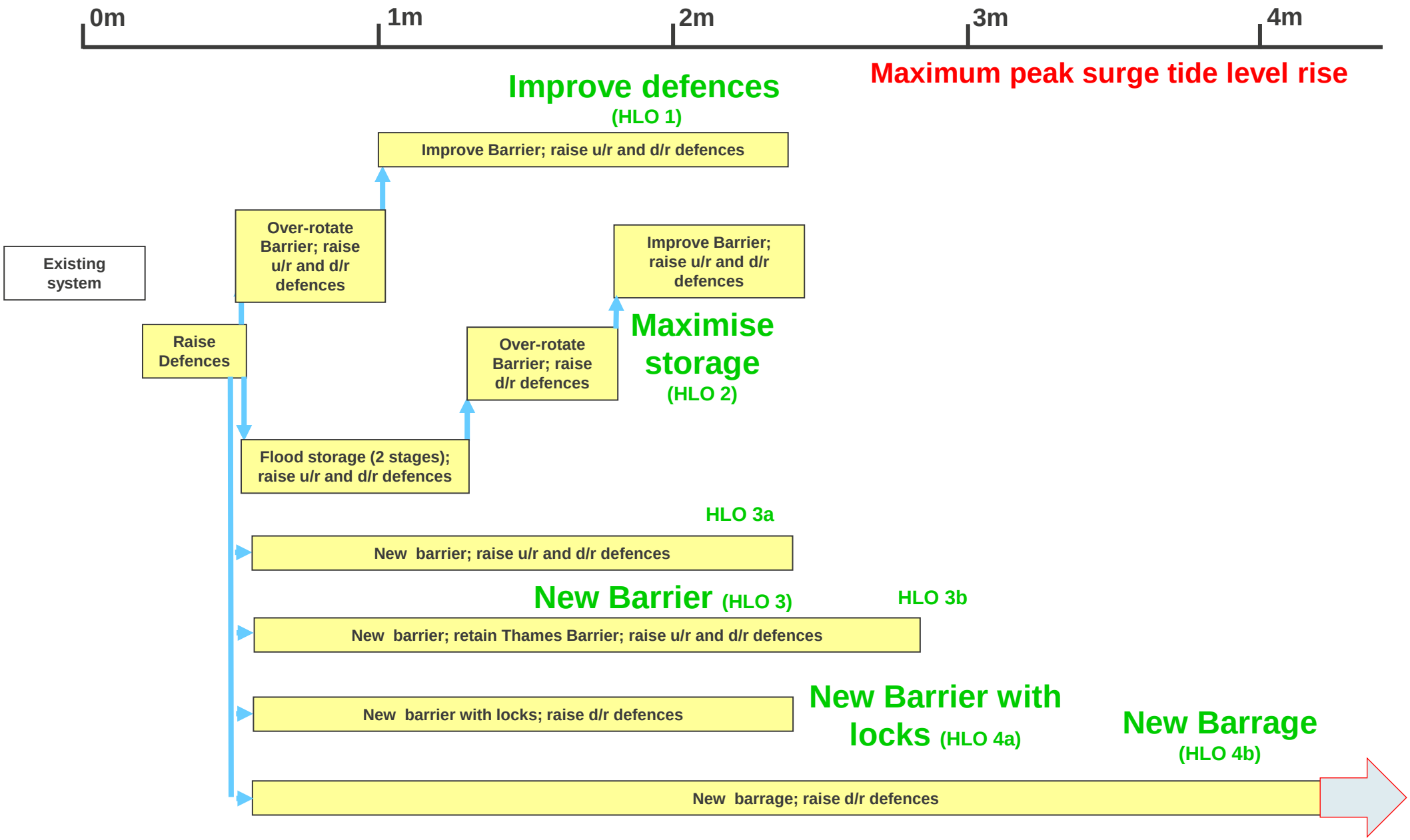
Even if the worst case scenario does not happen by 2100, it is likely to happen eventually

Infrastructure (including future upgrades or replacements) must cope with these scenarios

The concept: An adaptive option for flood management



High Level Options for sea level rise



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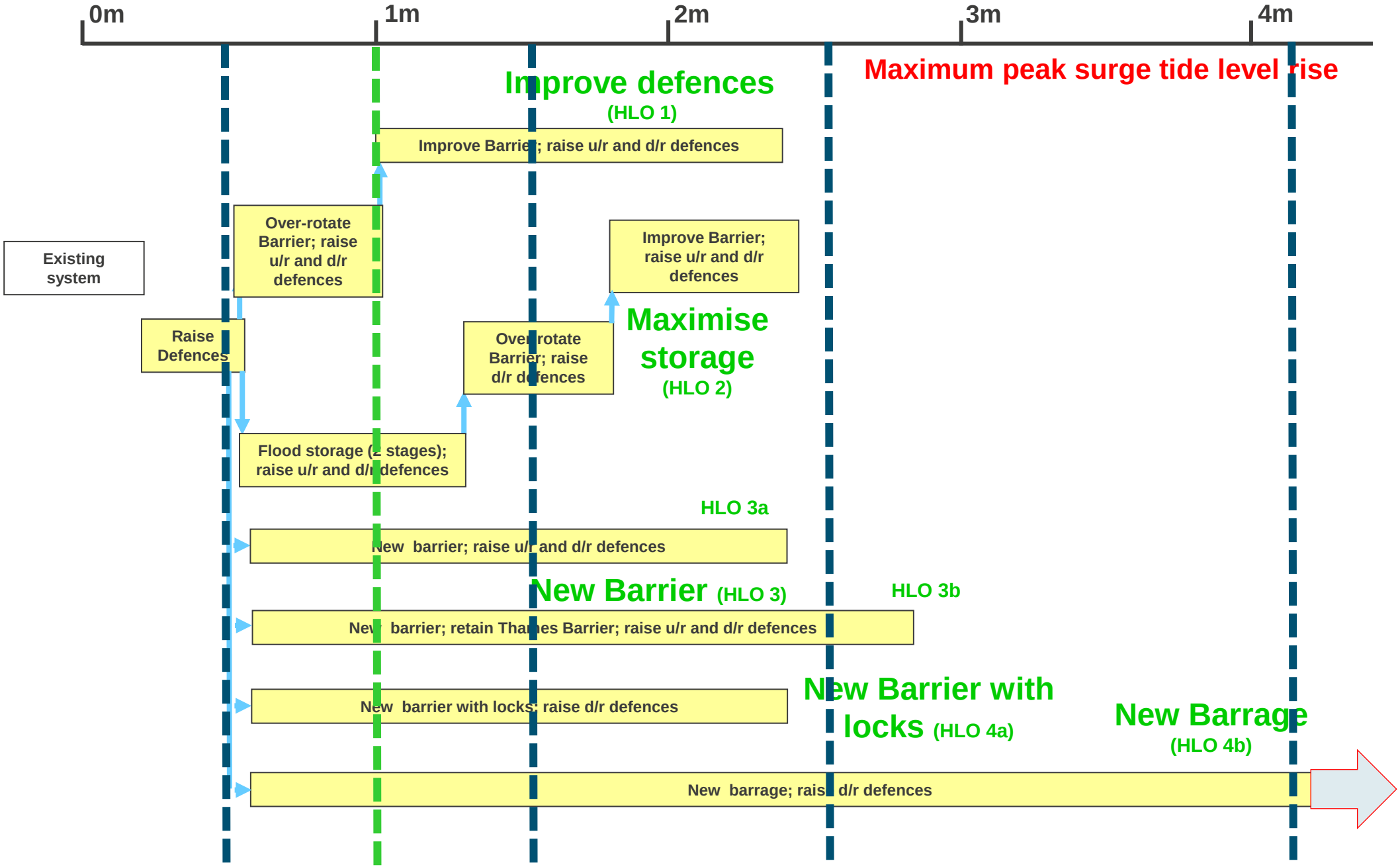
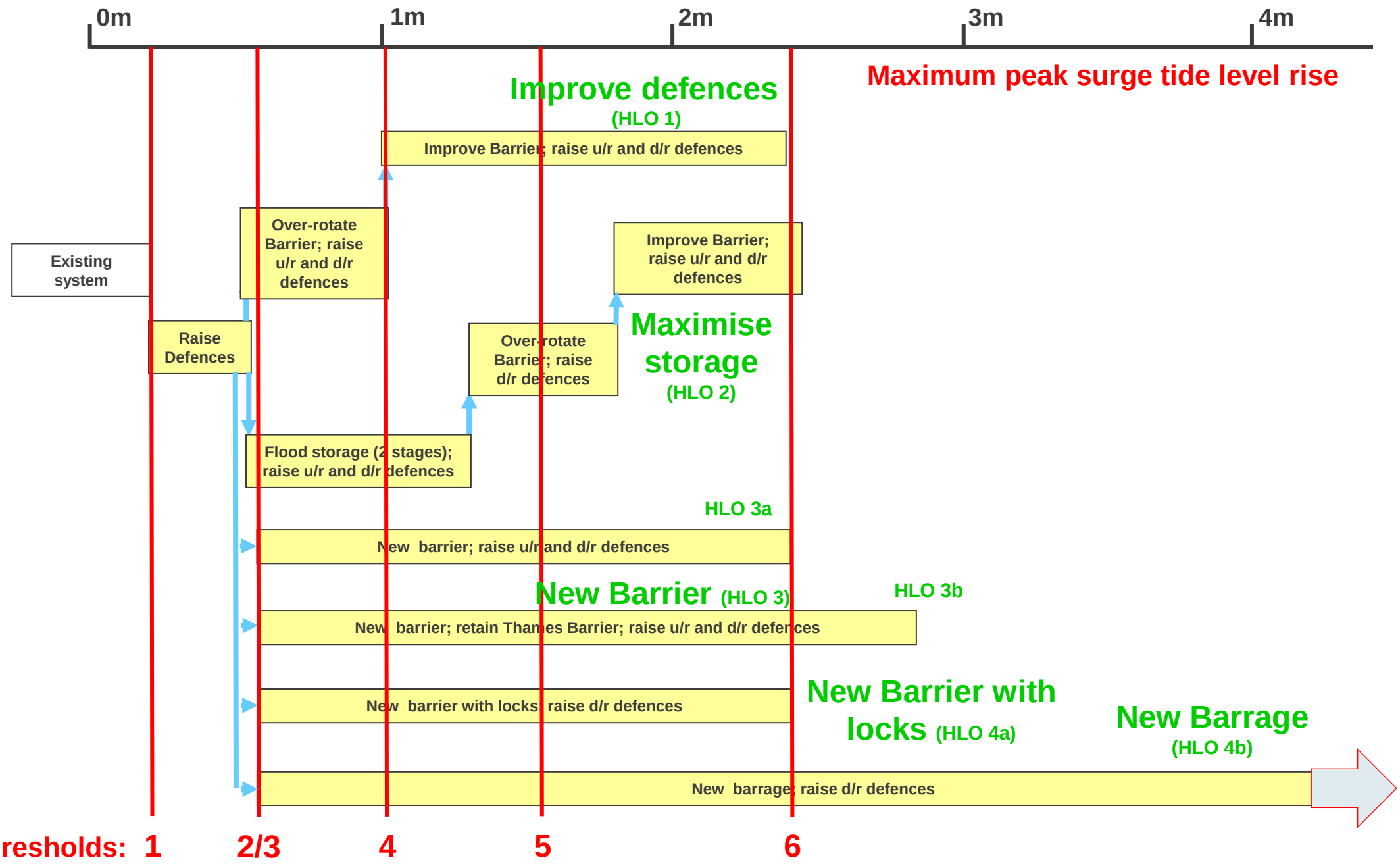
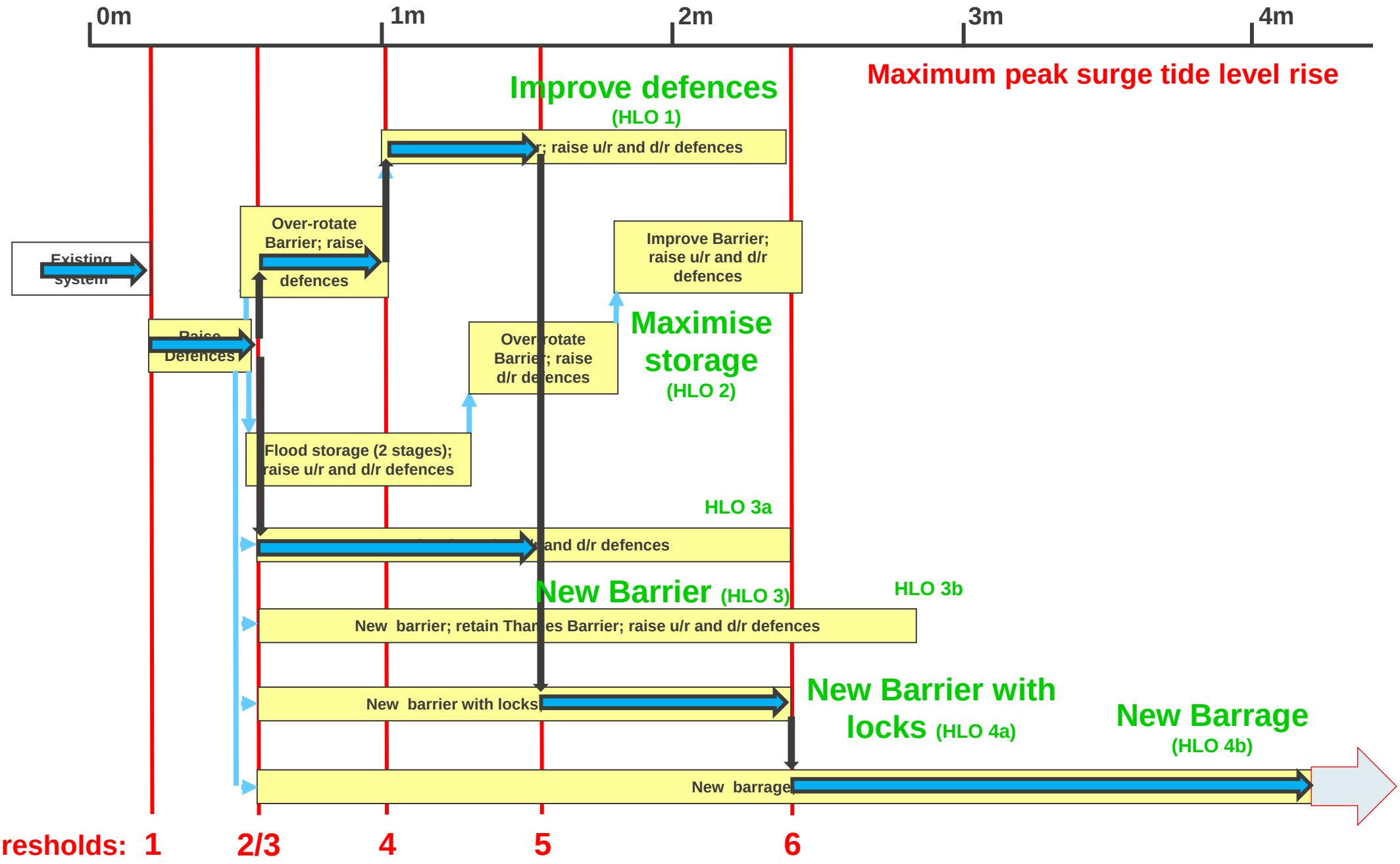


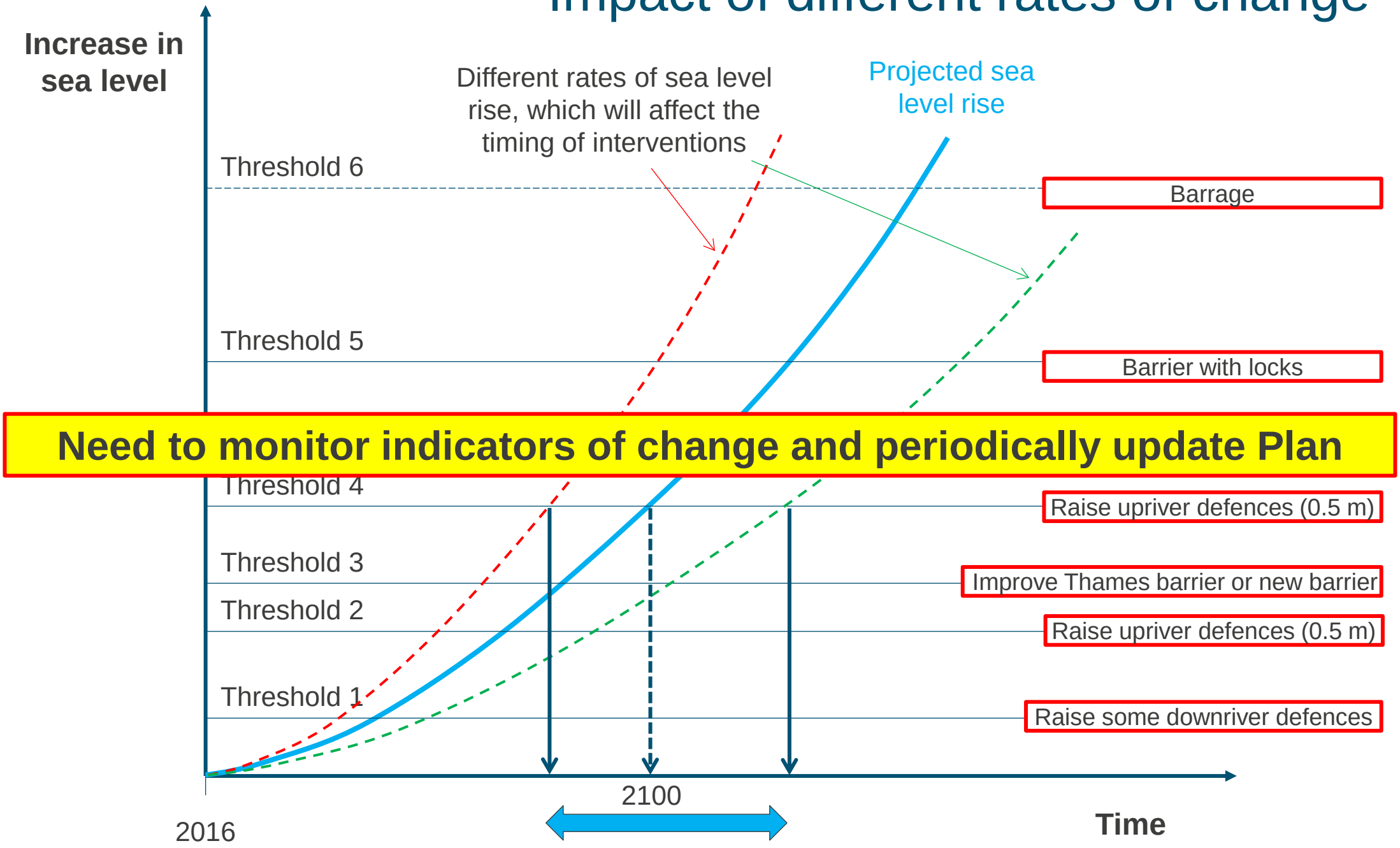
Thresholds for sea level rise



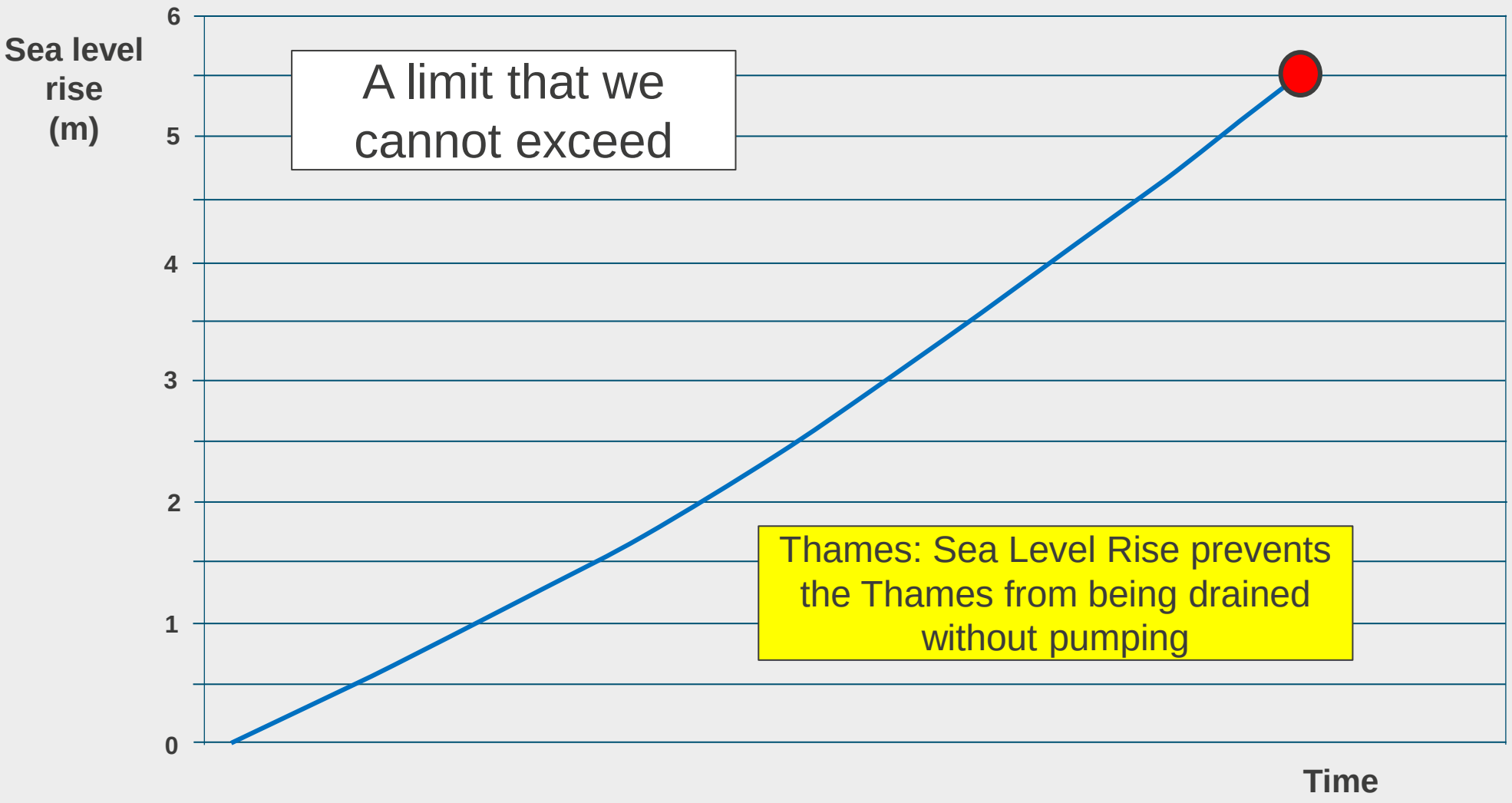
The preferred option for sea level rise



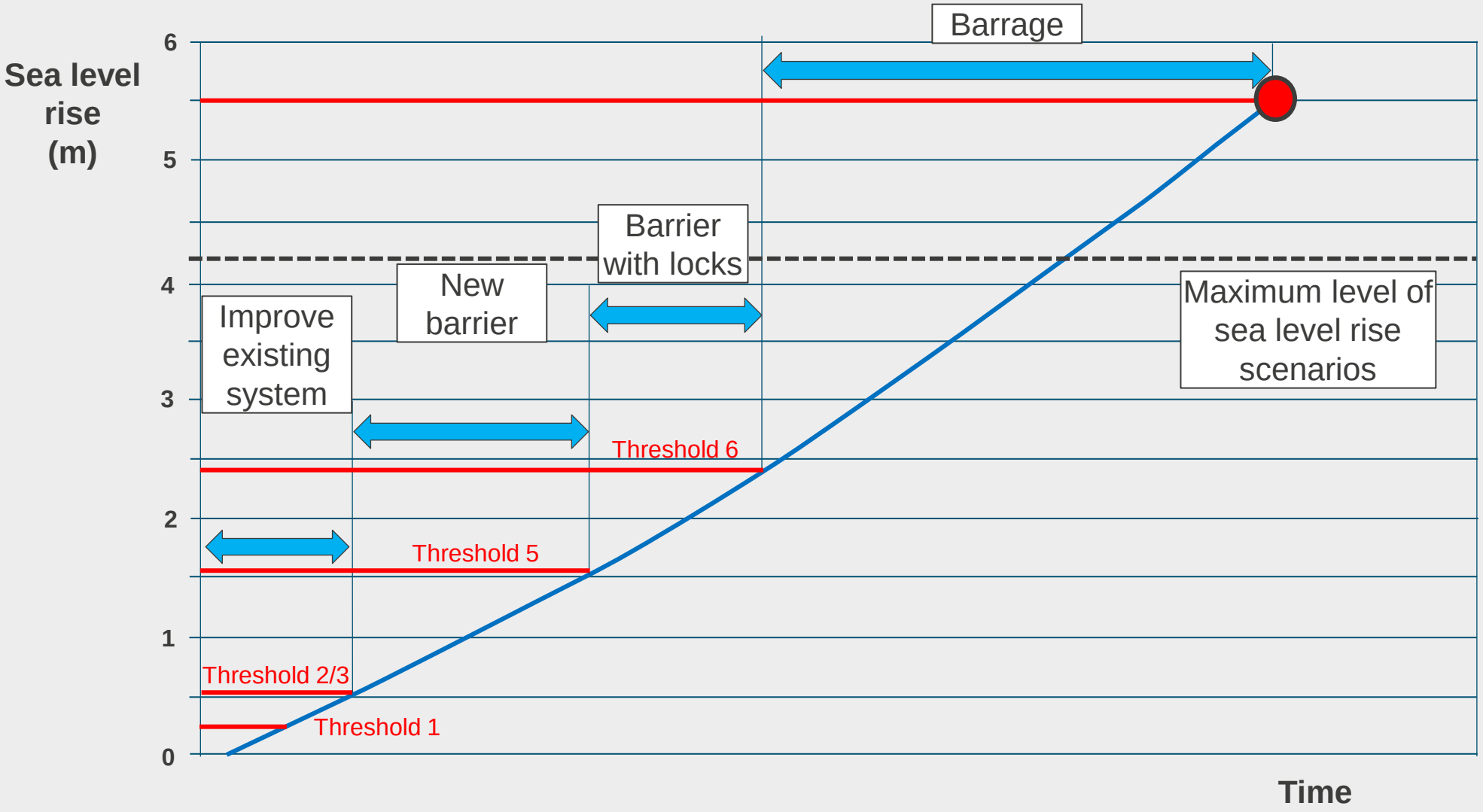
Impact of different rates of change



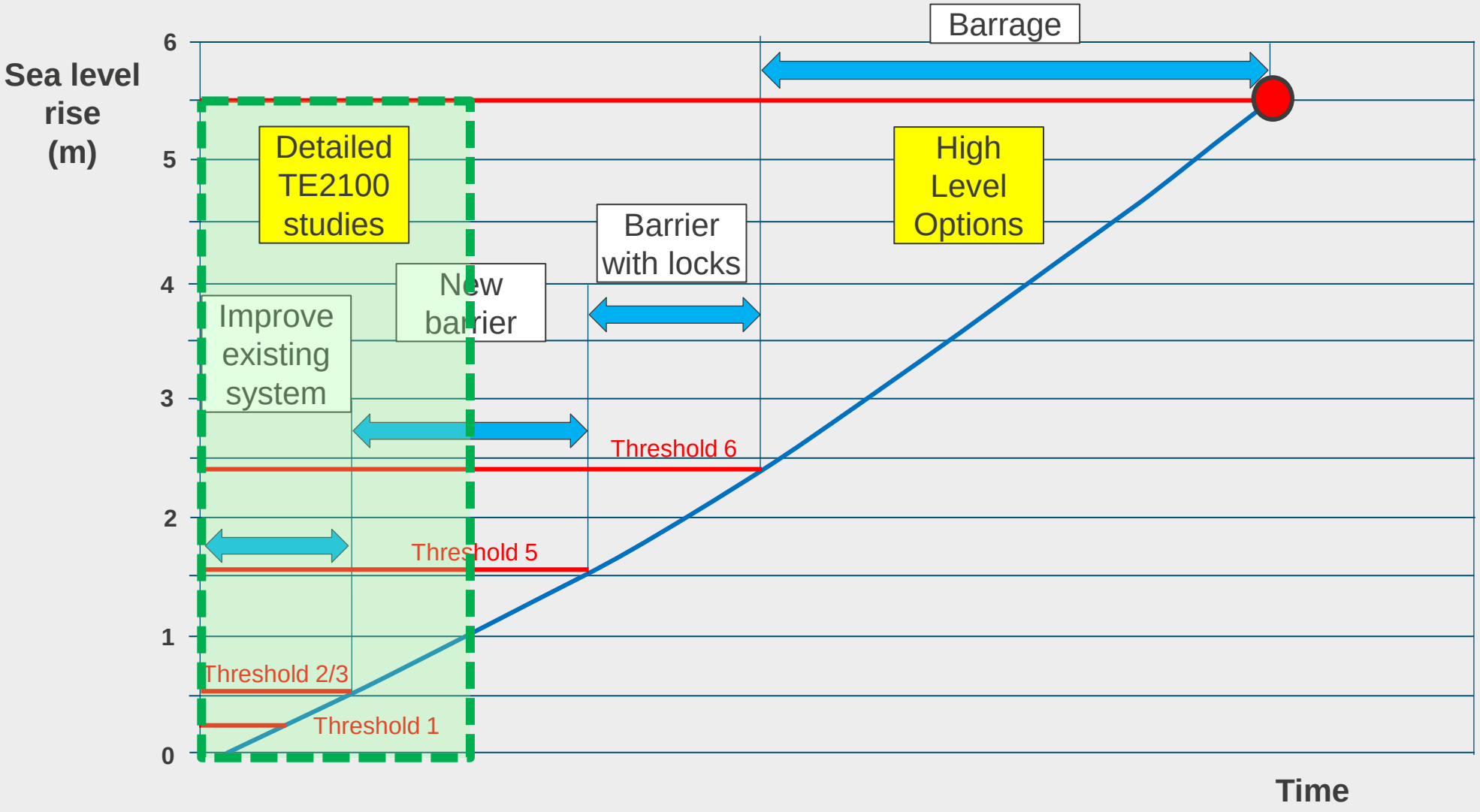
Limit of adaptation



Sequence of changes to the Thames Barrier



Detailed studies



Other factors

Condition of defences and deterioration

New development

Habitat creation

Change in thresholds (e.g. increase in standard)

Potential for achieving multi-objectives (working with partners)

The Plan is being implemented by ‘TEAM2100’ with a mandate for the first ten years

If we had to do it again……

Availability of land: need to guarantee that land will be available when needed

Riverside landscape strategy: need agreements with city authorities as part of the Plan

Other projects and programmes: take opportunities for closer integration (including flooding from other sources)

Integration of data into national and regional datasets

Christchurch: addition of earthquake and tsunami

Earthquake linked to land instability

Need to estimate likelihood and magnitude

Link to climate change?

Earthquake and tsunami damage flood management measures

Need to understand dependencies, e.g. earthquake and flood

Application of concept in other areas (e.g. water)

Main hazards and dependencies between them

- (Also consider development scenarios…)

Plausible extreme hazard scenarios

How can we manage the risks?

Outline designs of interventions: what are the limits?

Options (sequences of interventions), appraisal and selection

Implications for planning and engineering

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Thank you

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