

LANDSCAPE POTENTIALS OF UNCERTAINTY

USING A LANDSCAPE APPROACH AND MULTIPLE BENEFITS TO FOSTER
INCREMENTAL COASTAL STRATEGIES AND FUNDING MODELS

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AARHUS SCHOOL OF ARCHITECTURE



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- 2 DENMARK AS THE CONTEXT
- 3 A LANDSCAPE STRATEGIC APPROACH
- 4 SUM UP / DISCUSSION

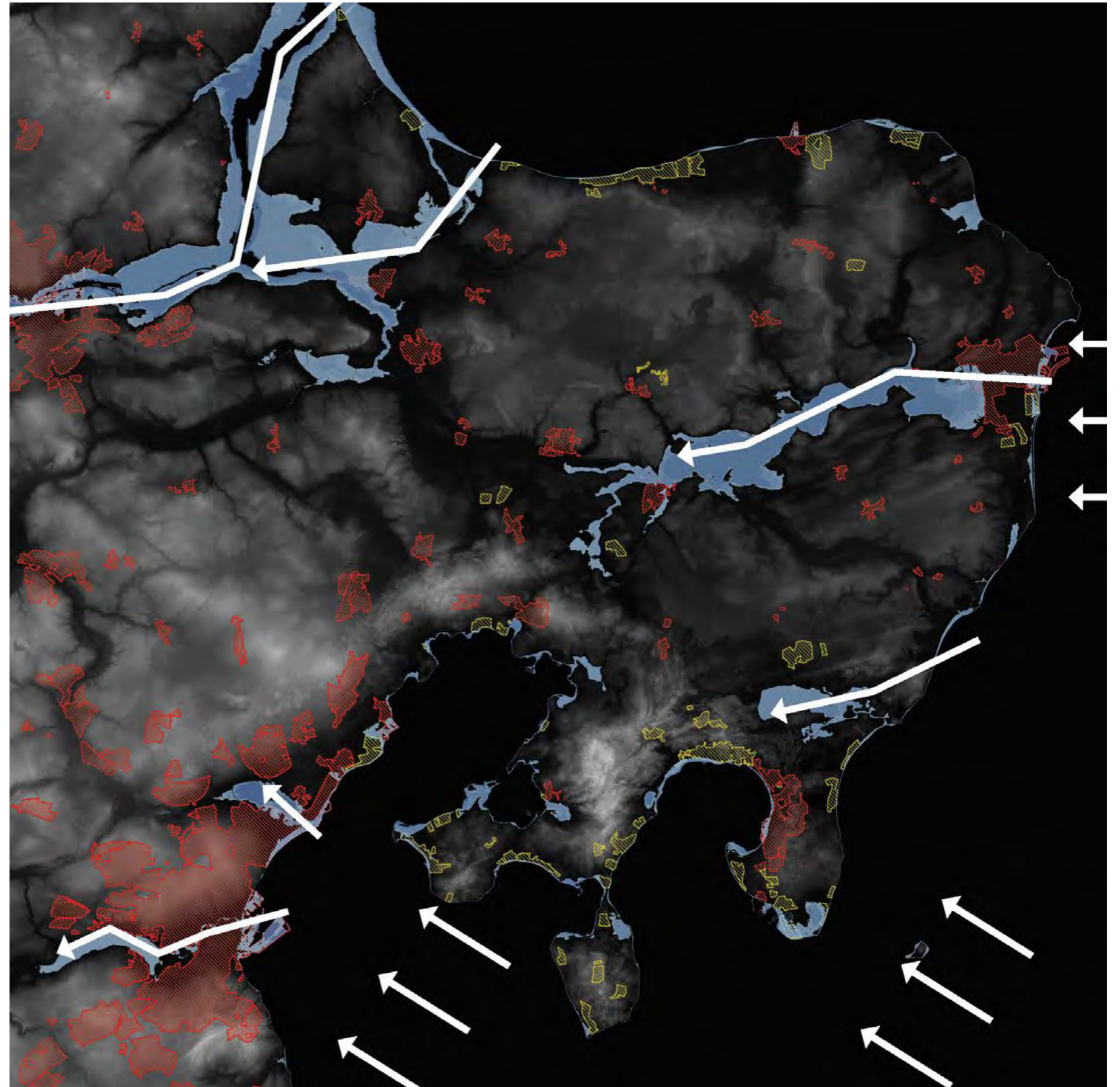
1 INTRODUCTION

TERRAIN AND SETTLEMENT PATTERNS

Reading of potentials in the city together with reading of the landscape structures (- terrain, soil, vegetation) can offer embedded potentials for value creation

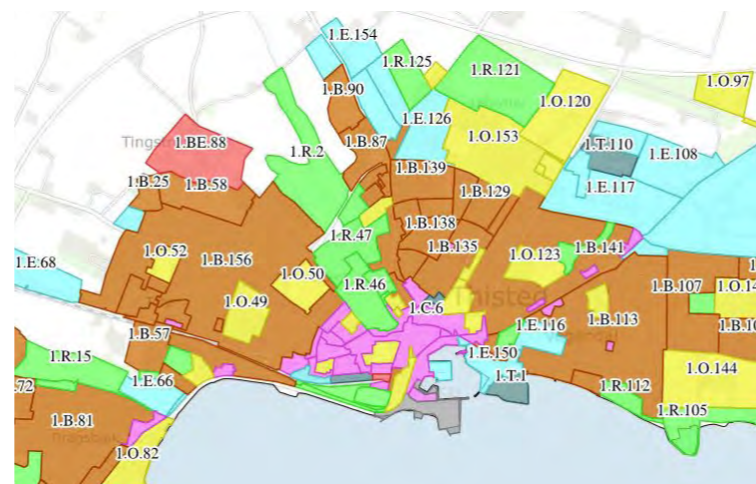
Uncertainty (climate change) takes long-term, strategic planning with incremental steps (flexibility, investments)

Context-based multiple benefits can form part of no-regret solutions that are meaningful to citizens, can create new business, supportive of alternative funding models



Source: Styrelsen for Data og Effektivisering (SDFE) 2019, PlanData.dk and MiljøGIS
Diagrammed with white by Wiberg

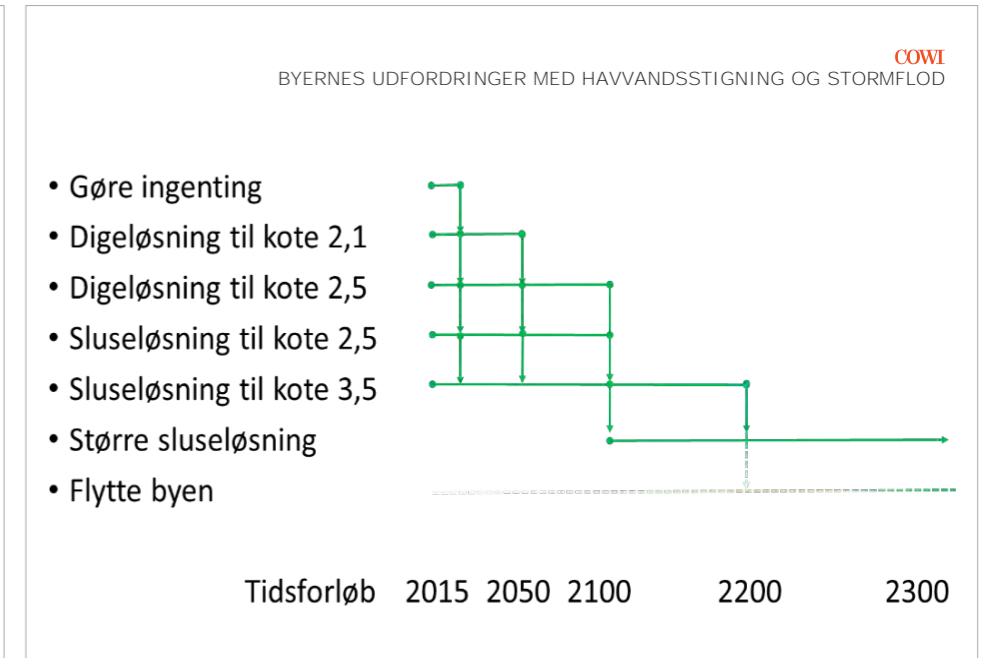
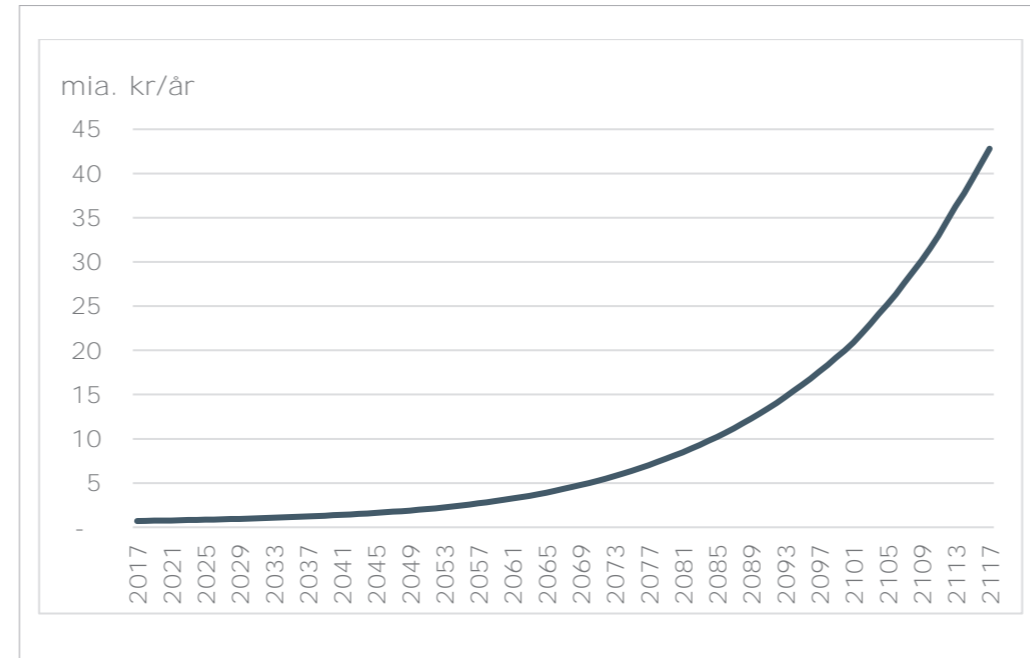
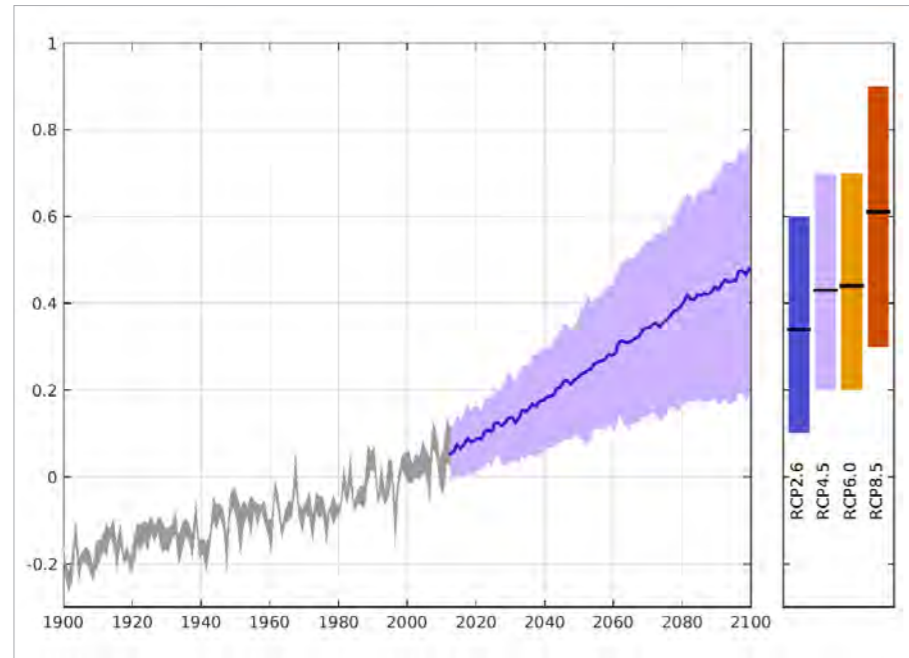
CORRELATION HISTORY'S WATER FLOOD AND URBAN DEVELOPMENT



Source: Styrelsen for Data og Effektivisering (SDFE) 2019, PlanData.dk and MiljøGIS
Diagrammed with white by Wiberg

2 DENMARK AS THE CONTEXT

TIME, EXPENSES, SOLUTIONS



Temaforside: Fremtidens vandstand
 Hvorfor havet stiger
 Globale ændringer
 Stormfloder i fremtidens klima
 Temaansvarlig Kristine Skovgaard Madsen og Torben Schmith
 Opdateret 5. juli 2018

<https://www.dmi.dk/hav-og-is/temaforside-fremtidens-vandstand/>
 accessed 2019.11.08

Realdania 2017
 Byernes udfordringer med havvandsstigning og
 stormflod, rapport af COWI, side 10

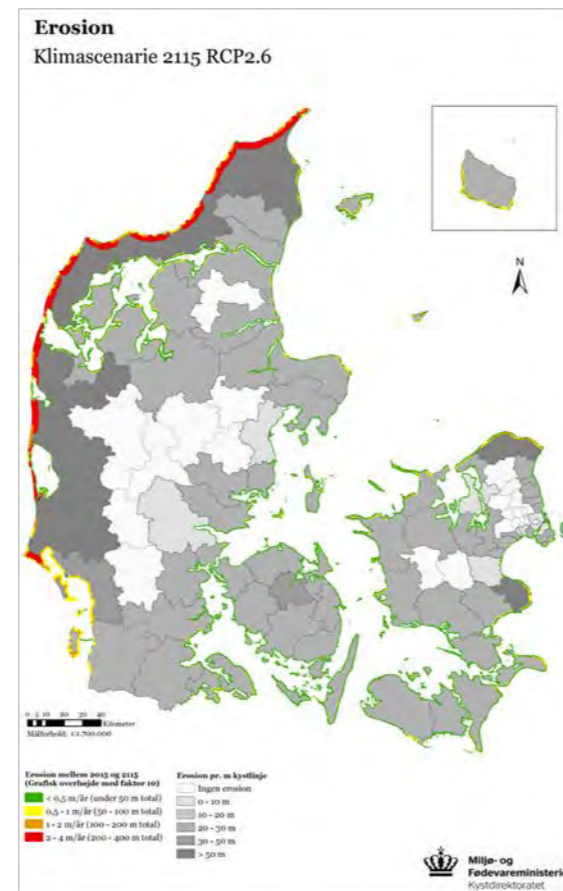
Realdania 2017
 Byernes udfordringer med havvandsstigning og
 stormflod, rapport af COWI, side 55:
 Figur 8-1 Eksempel på løsningsmuligheder for en konkret by.

COASTLINES AND VALUES



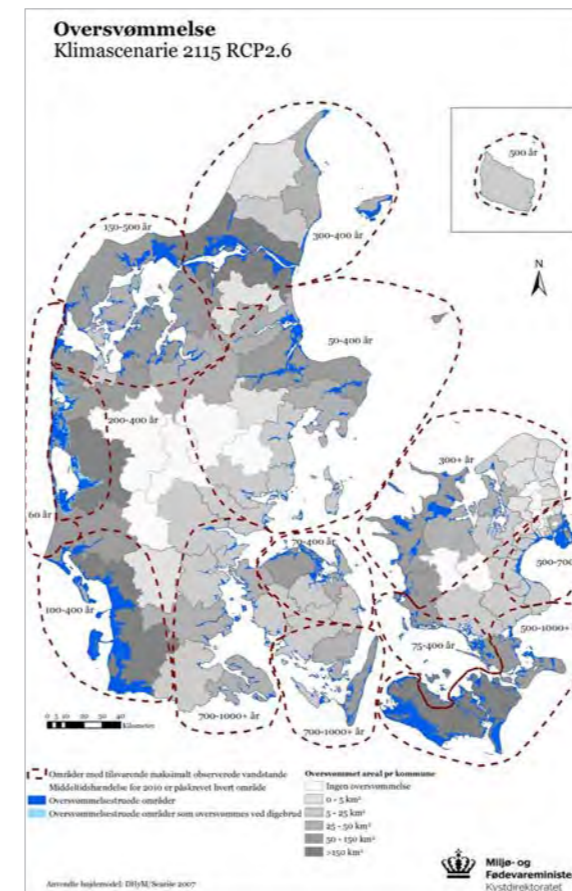
8.750 kms of shoreline
 10 largest cities are coastal cities
 70% of the 50 largest and half of the 100 largest cities/towns are coastal

“Udsigt til vand” baseline 2019 Byerne og det stigende havvand. Ole Fryd og Gertrud Jørgensen (red.) med bidrag fra Kristoffer Albris, Helle Tegner Anker og Vibe Thimgaard Knoop, Karsten Arnbjerg-Nielsen og Roland Löwe, Ole Fryd og Gertrud Jørgensen, Jesper Sølvner Schou, Marie Laurrup og Gustav Esmann Callesen, samt Katrina Wiberg og Tom Nielsen



The sea directly affects 77 out of the 98 Danish municipalities (erosion map, climate scenario 2115 RCP2.6)

Kystanalyse 2016, Miljø- og Fødevarerministeriet



Flood (map, climate scenario 2115 RCP2.6)

Kystanalyse 2016, Miljø- og Fødevarerministeriet



Map of biodiversity, coastal protection, wave exposure and property values

Coastal protection technologies in a Danish context, 2018 Faragò, M., Rasmussen, E. S., Fryd, O., Rønde Nielsen, E., & Arnbjerg-Nielsen, K. (2018). Vand i Byer. Publication date: September 2018. Document Version. Publisher's PDF, also known as Version of record. Downloaded from orbit.dtu.dk on: May 27, 2019

side 28 Fig. 7. Map of biodiversity, coastal protection, wave exposure and property values. The coastal towns and villages are marked with colours from red (highest property values) to orange (average property values) and green (lowest property values). Prepared by DHI for Danish Coastal Authority in 2012. Map by Eva Sara Rasmussen.

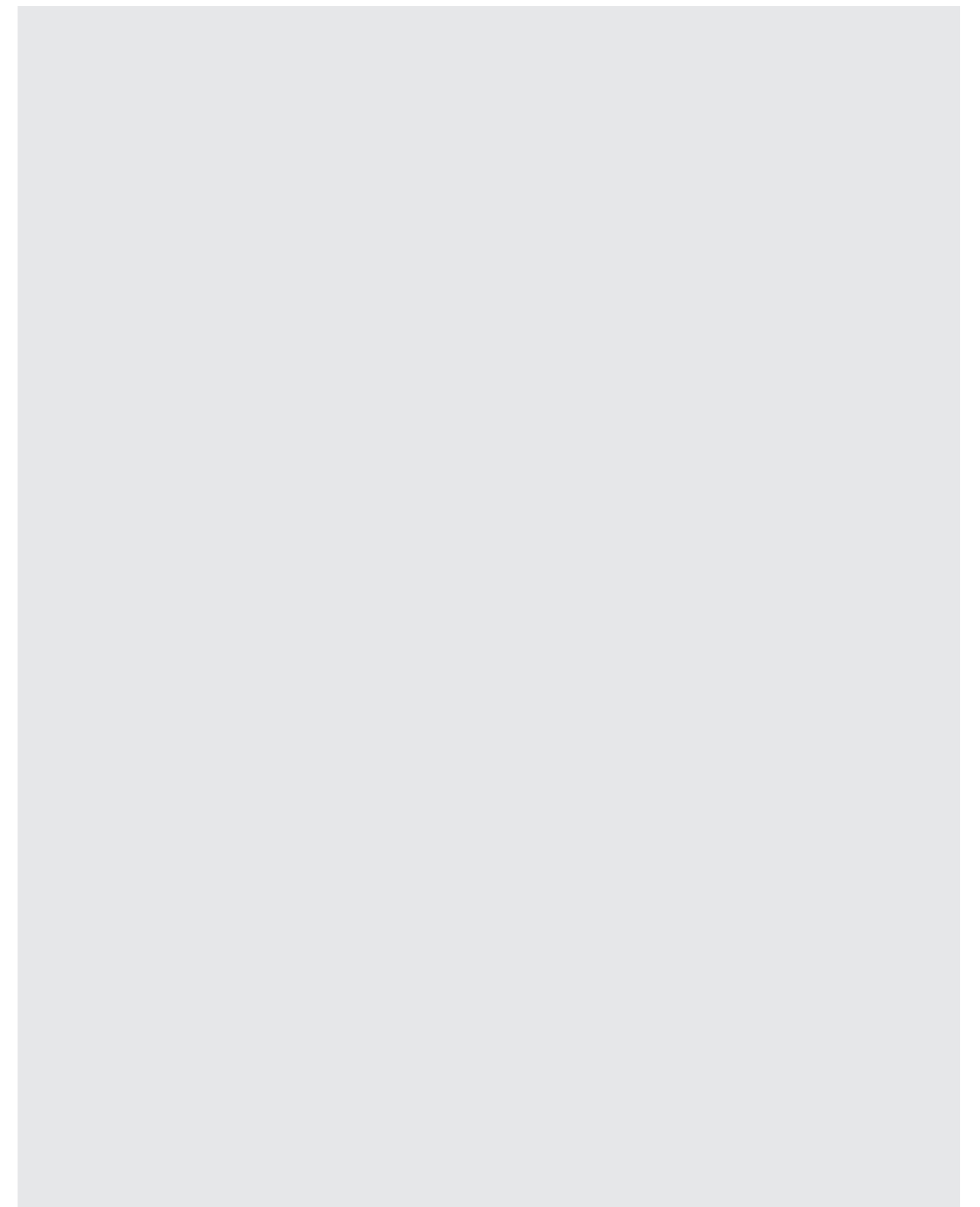
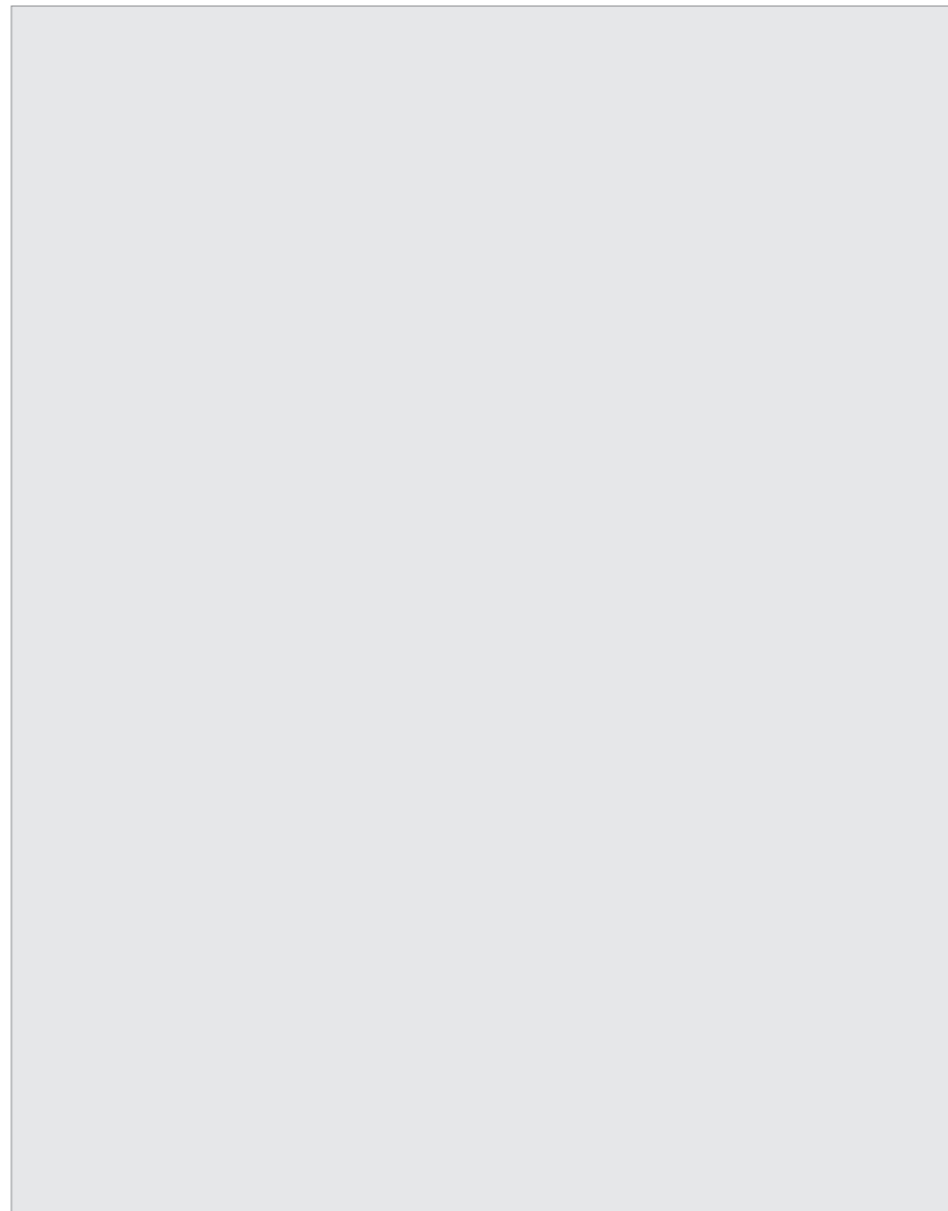
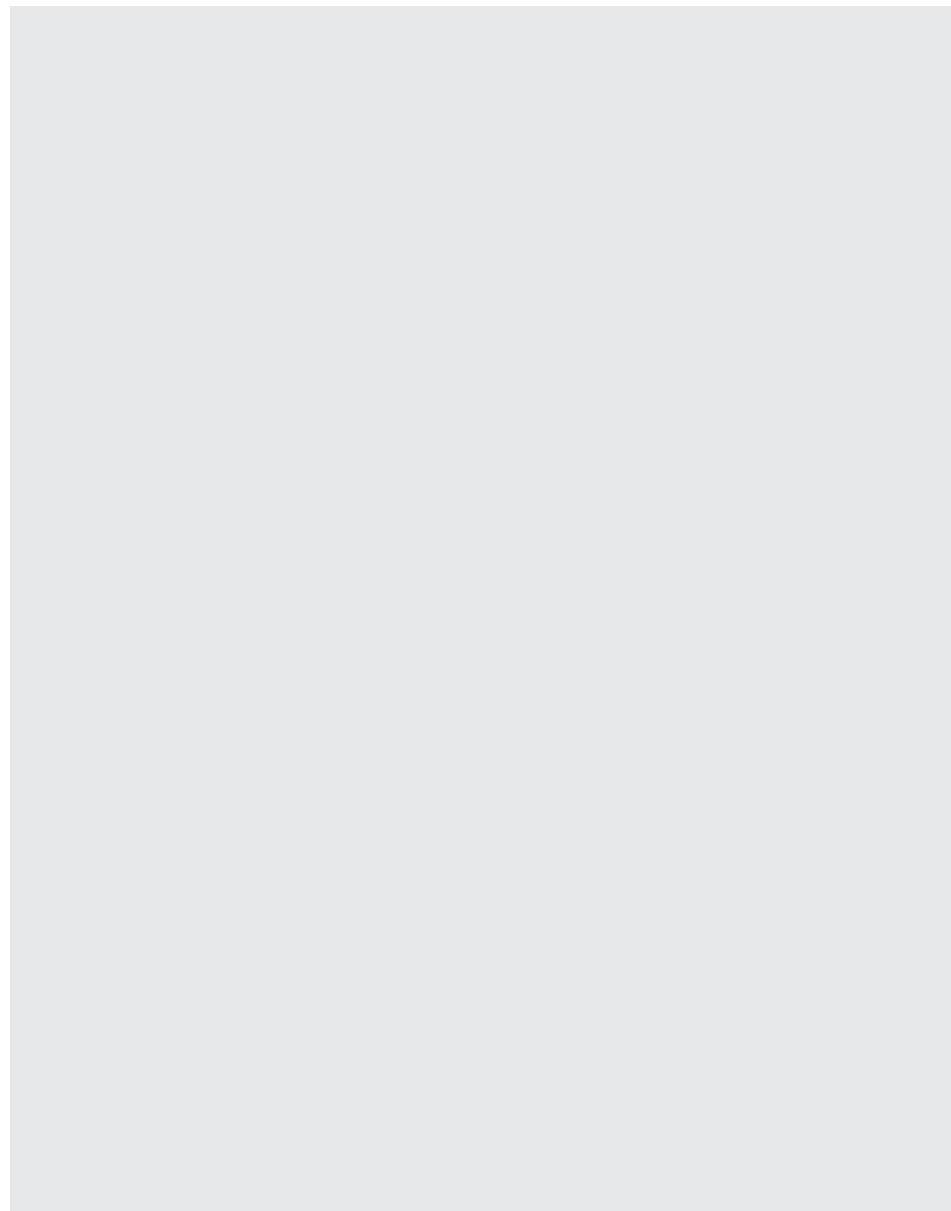
DIFFERENT PRACTICES - CONTEXT MATTERS

DENSITIES AND FUNCTION (HOLIDAY HOMES, CULTURAL HERITAGE)

PATTERNS OF URBAN DEVELOPMENT (LOW LYING AREAS, HARBOUR FRONT)

LEVEE EFFECT

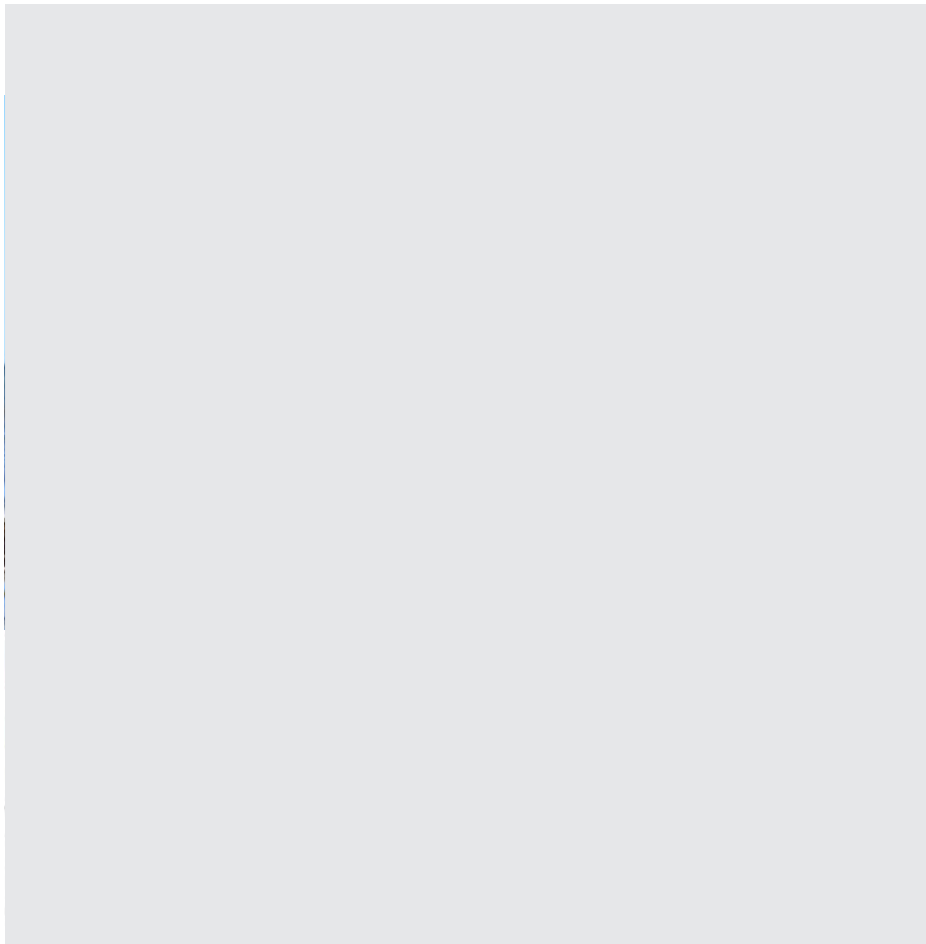
INCENTIVES FOR CHANGE

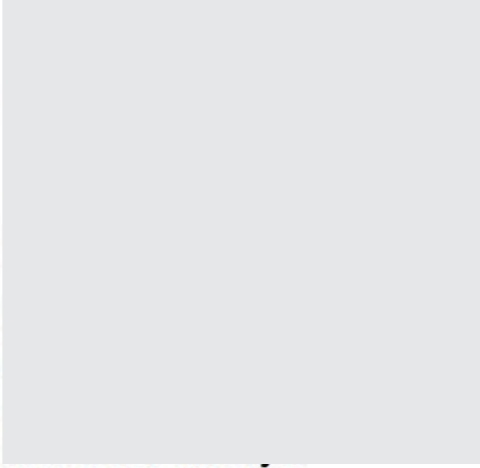
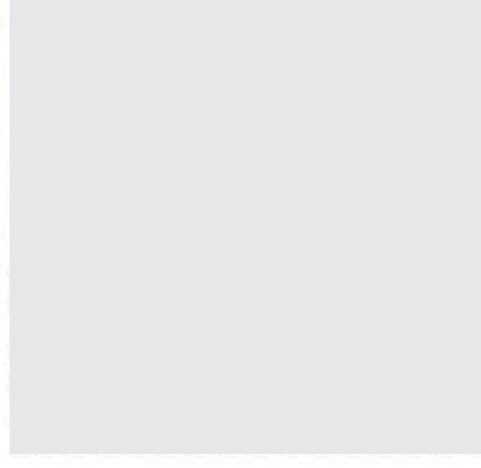
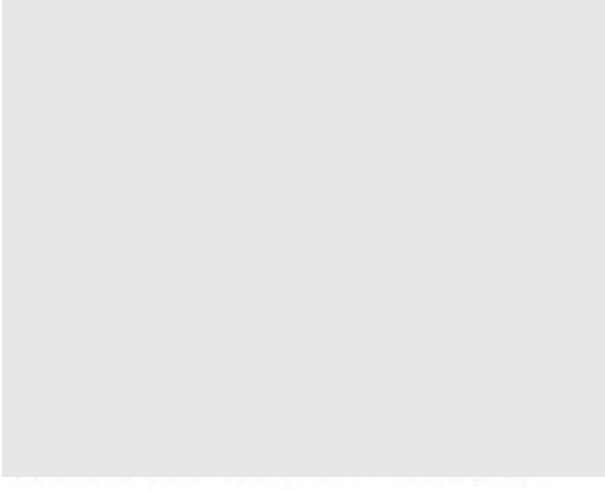
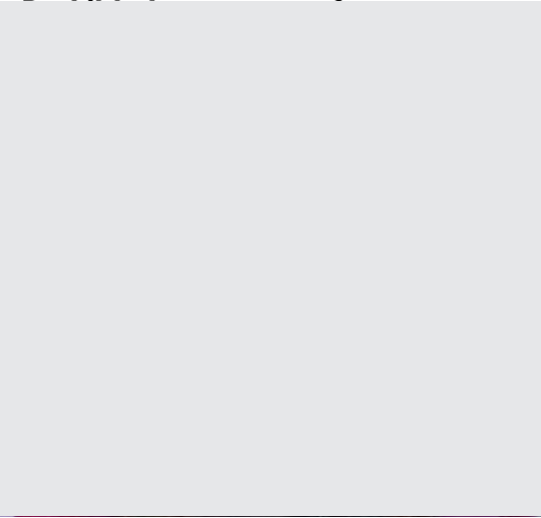
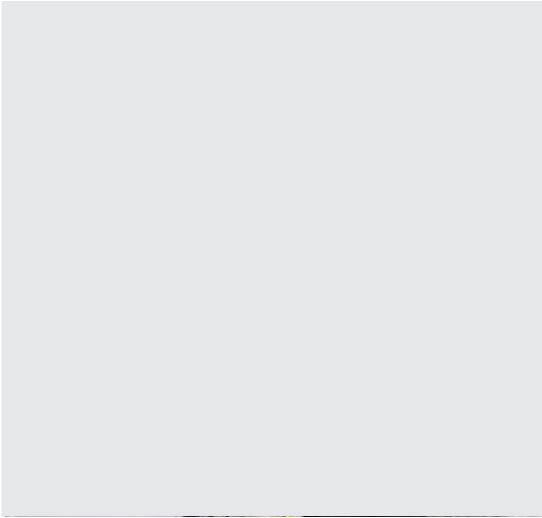
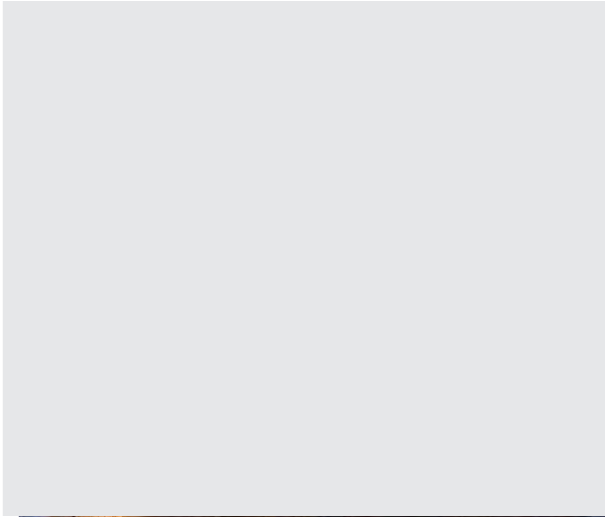
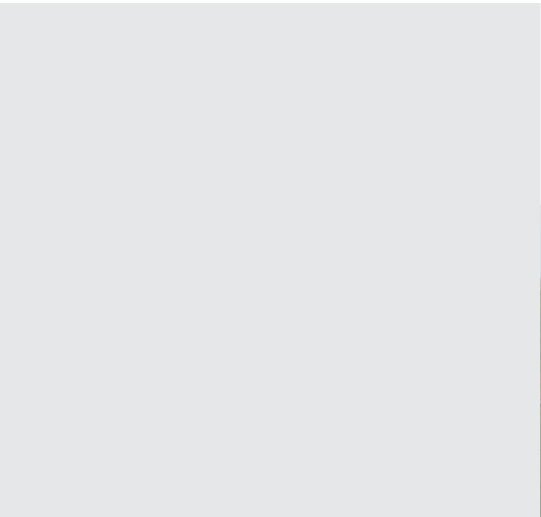
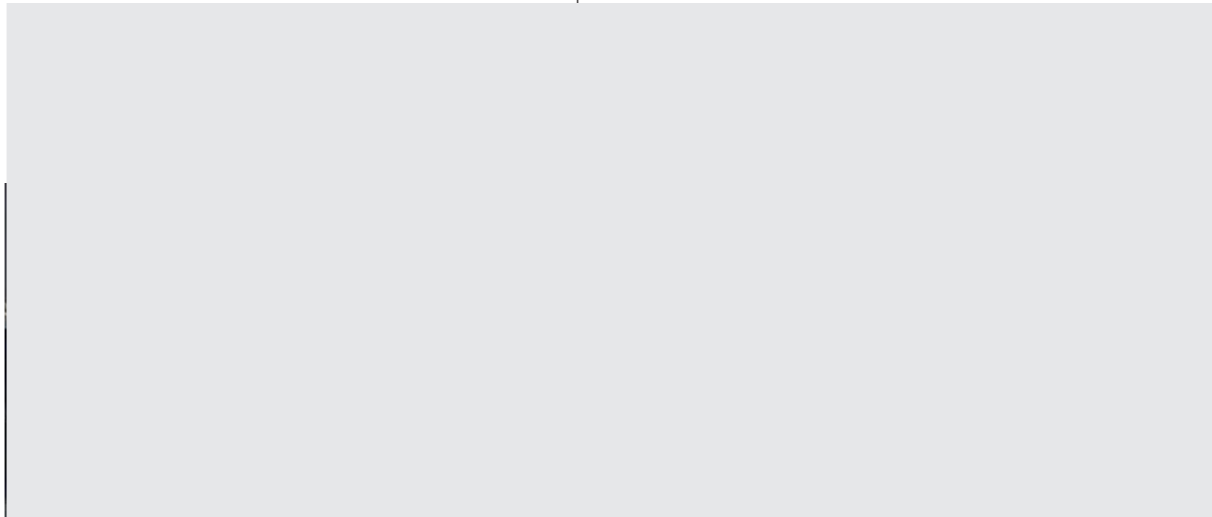


VALUE AND DISPUTE

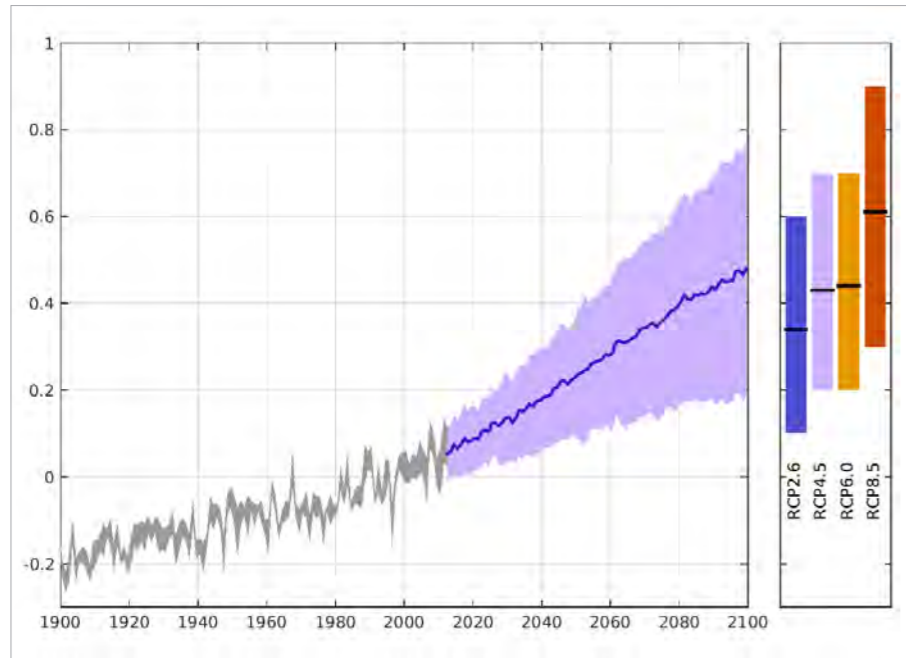
CONFLICTING INTERESTS
MULTIPLE BENEFITS

LEVEE EFFECTS
URBAN DEVELOPMENT
THE CITY IS BUILT FOR LASTING CENTURIES



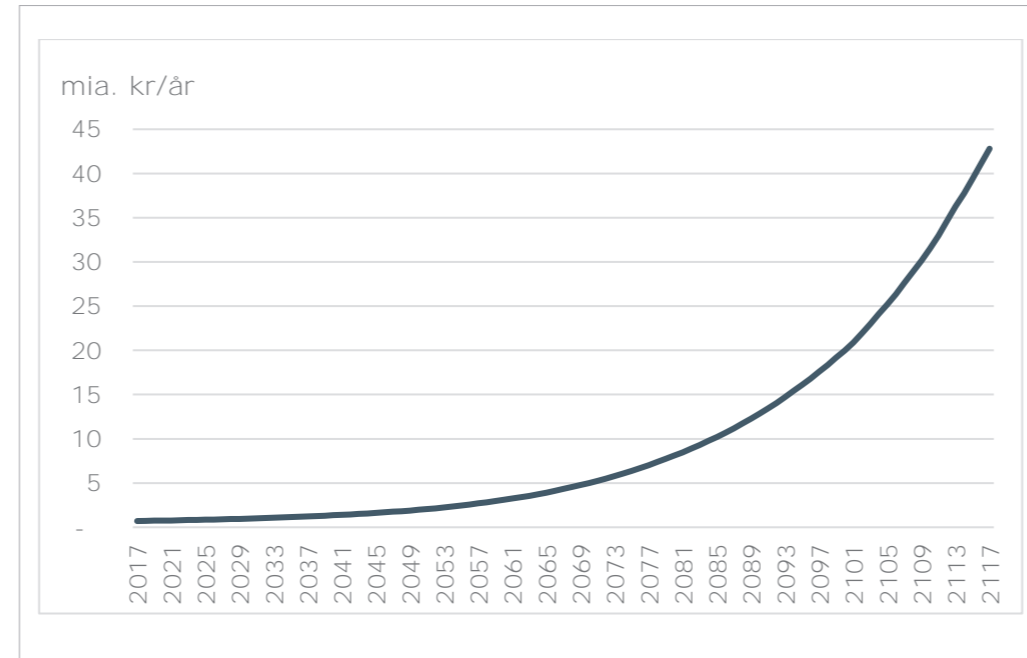
<p>holiday house owners receive state money for coastal protection</p> 	<p>holidayhouse owner in critical debths- it's unfair</p> 	<p>holiday house owner sued for illegal coastal protection</p> 
<p>mayor promise to help citizens -but who's to pay</p> 	<p>municipalities want the state to pay billions</p> 	<p>mayors threat to file lawsuit against the state</p> 
<p>local breakwater initiatives are wasting billions</p> 	<p>property blames municipality and file law suit against the state</p> <p>coastal protection make summerhouse owners properties even more worth</p> 	

2 DENMARK AS THE CONTEXT

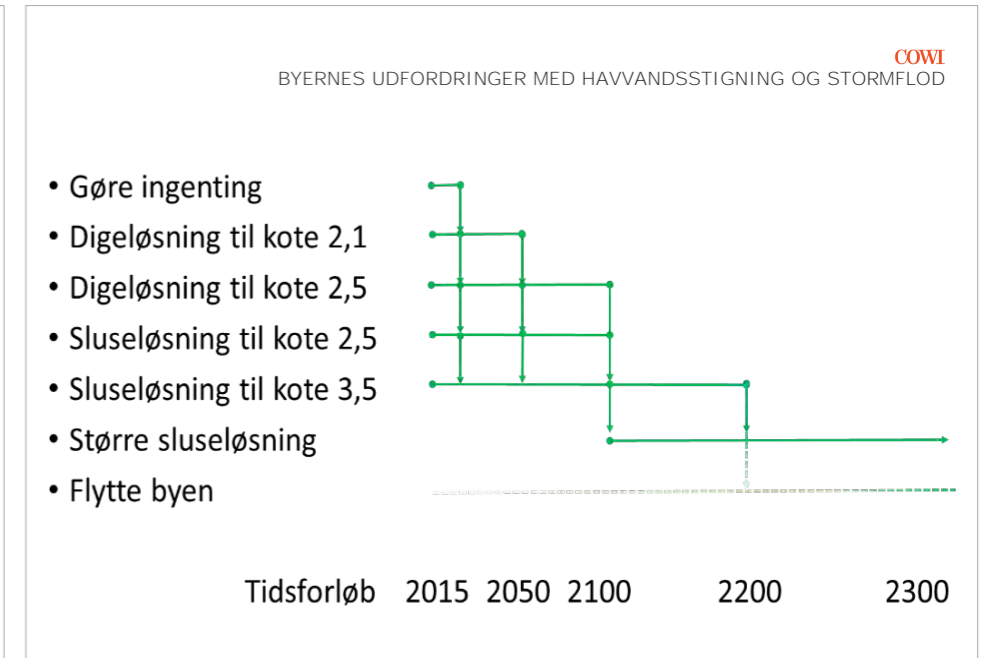


Temaforside: Fremtidens vandstand
 Hvorfor havet stiger
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 Temaansvarlig Kristine Skovgaard Madsen og Torben Schmith
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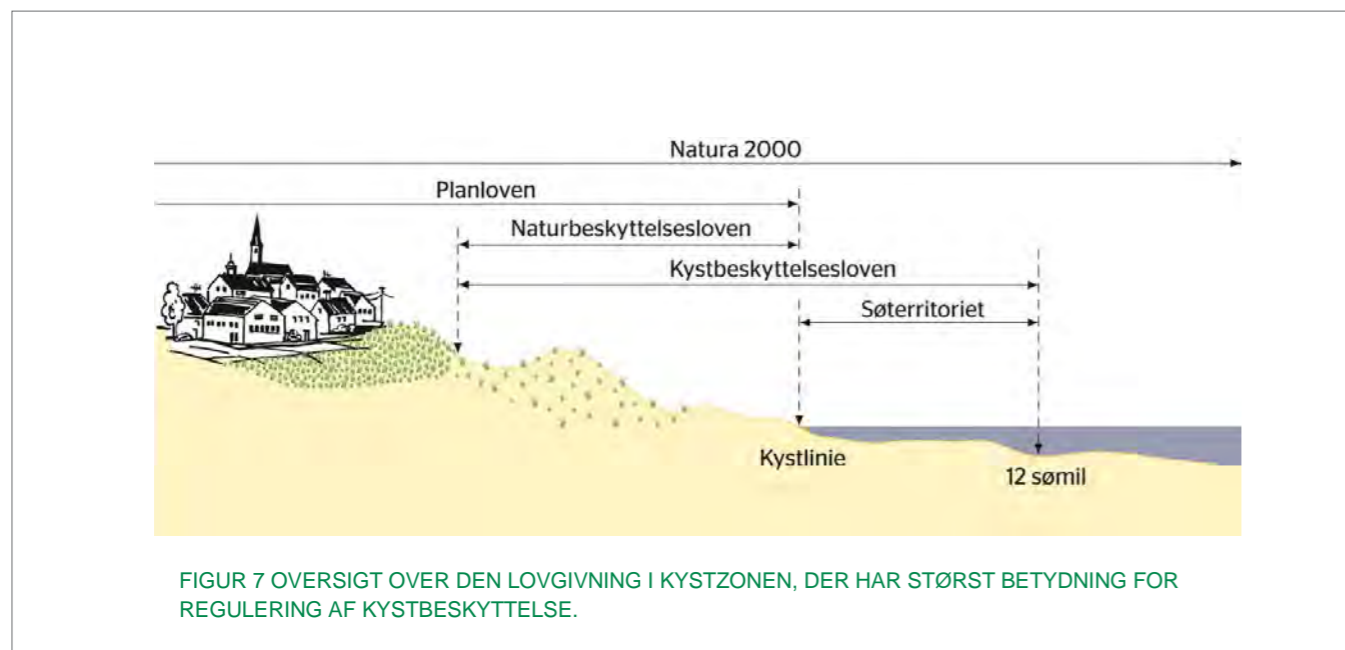
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Realdania 2017
 Byernes udfordringer med havvandsstigning og stormflod, rapport af COWI, side 10

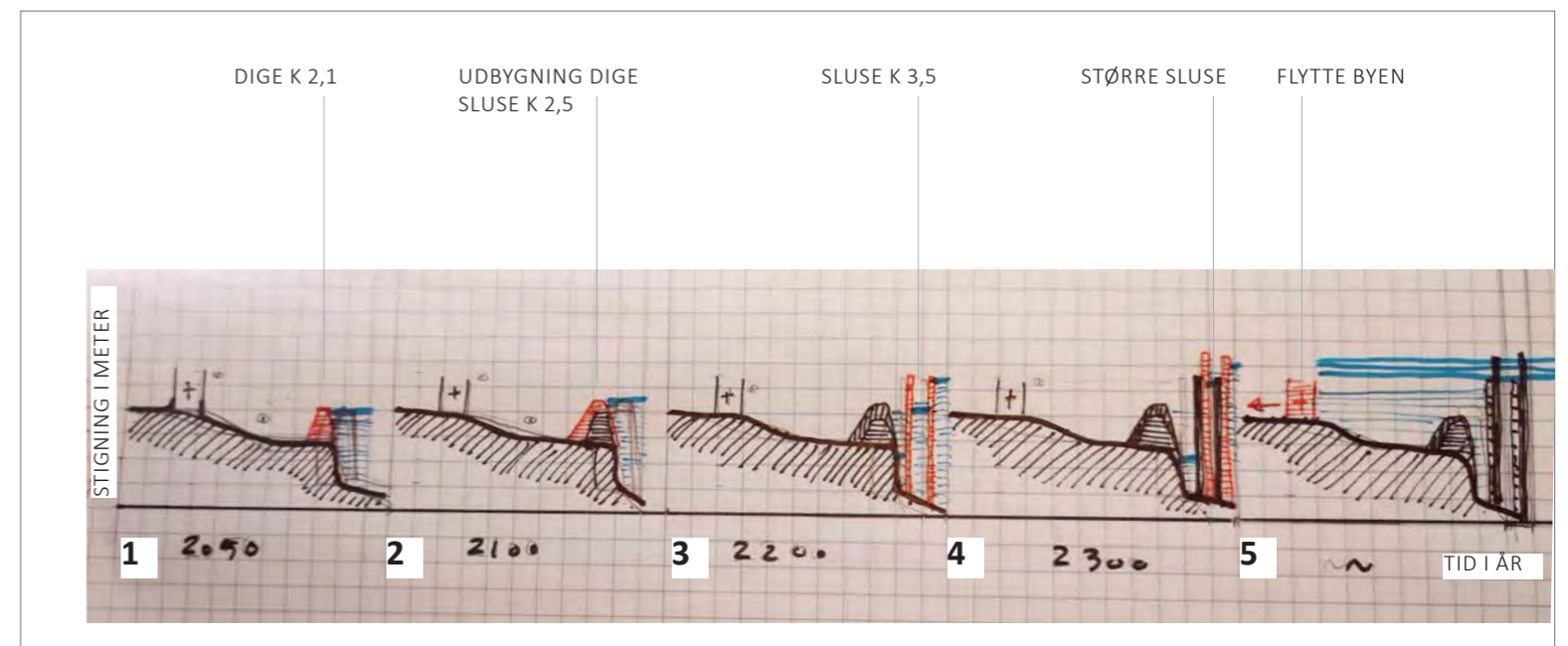


Realdania 2017
 Byernes udfordringer med havvandsstigning og stormflod, rapport af COWI, side 55:
 Figur 8-1 Eksempel på løsningsmuligheder for en konkret by.



FIGUR 7 OVERSICHT OVER DEN LOVGIVNING I KYSTZONEN, DER HAR STØRST BETYDNING FOR REGULERING AF KYSTBESKYTTELSE.

Miljø- og Fødevarerministeriet / Kystanalyse -
 2016 page 16, 28



Drawing and diagram: Katrina Wiberg

3 A LANDSCAPE STRATEGIC APPROACH

ADRESSING UNCERTAINTY

TIME & UNCERTAINTY

flexibility, incremental,
changing practices



LANDSCAPE (NATURAL, BUILT)

ecological inventory
built environment



MULTIPLE BENEFITS

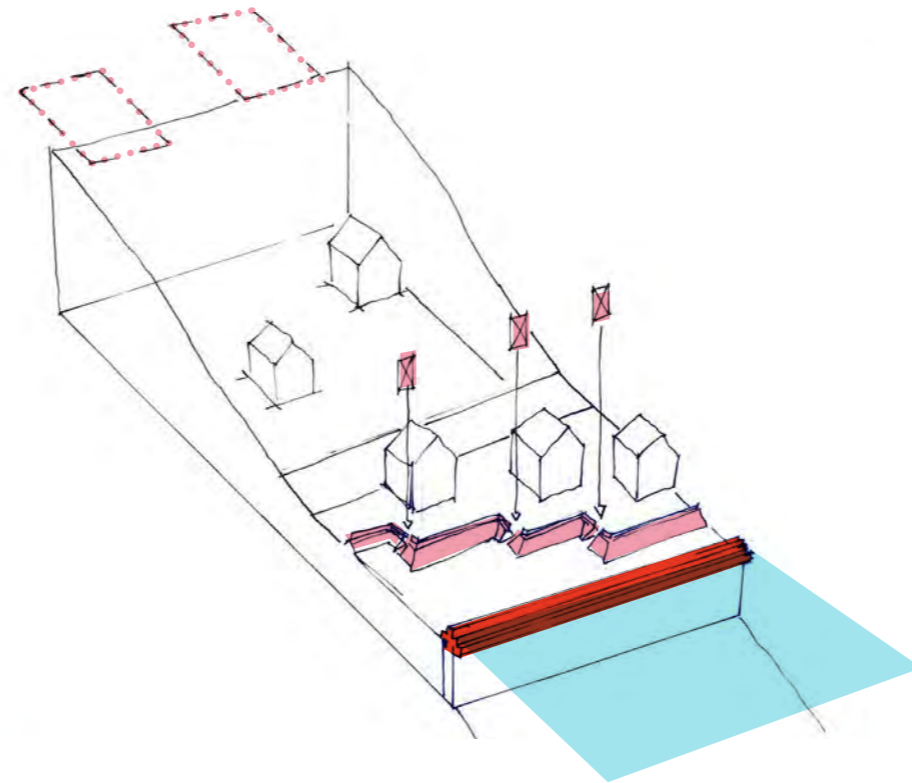
new business models, biodiversity, recrea-
tion, equity

INCREMENTAL APPROACH

landscape strategic long term scenarios and multiple benefits

instigating pilot initiatives inbetween 'actions' instigating multiple values, values addressing multiple stakeholders to create meaningfulness, new opportunities, business models, building and planning practices as a way to support new funding models through engagement. Furthermore, the long term strategic approach is meant to add a level of flexibility through incremental coast protection actions that can embed uncertainty, e.g. uncertainty caused by e.g. accelerated climate change or new prognosis.

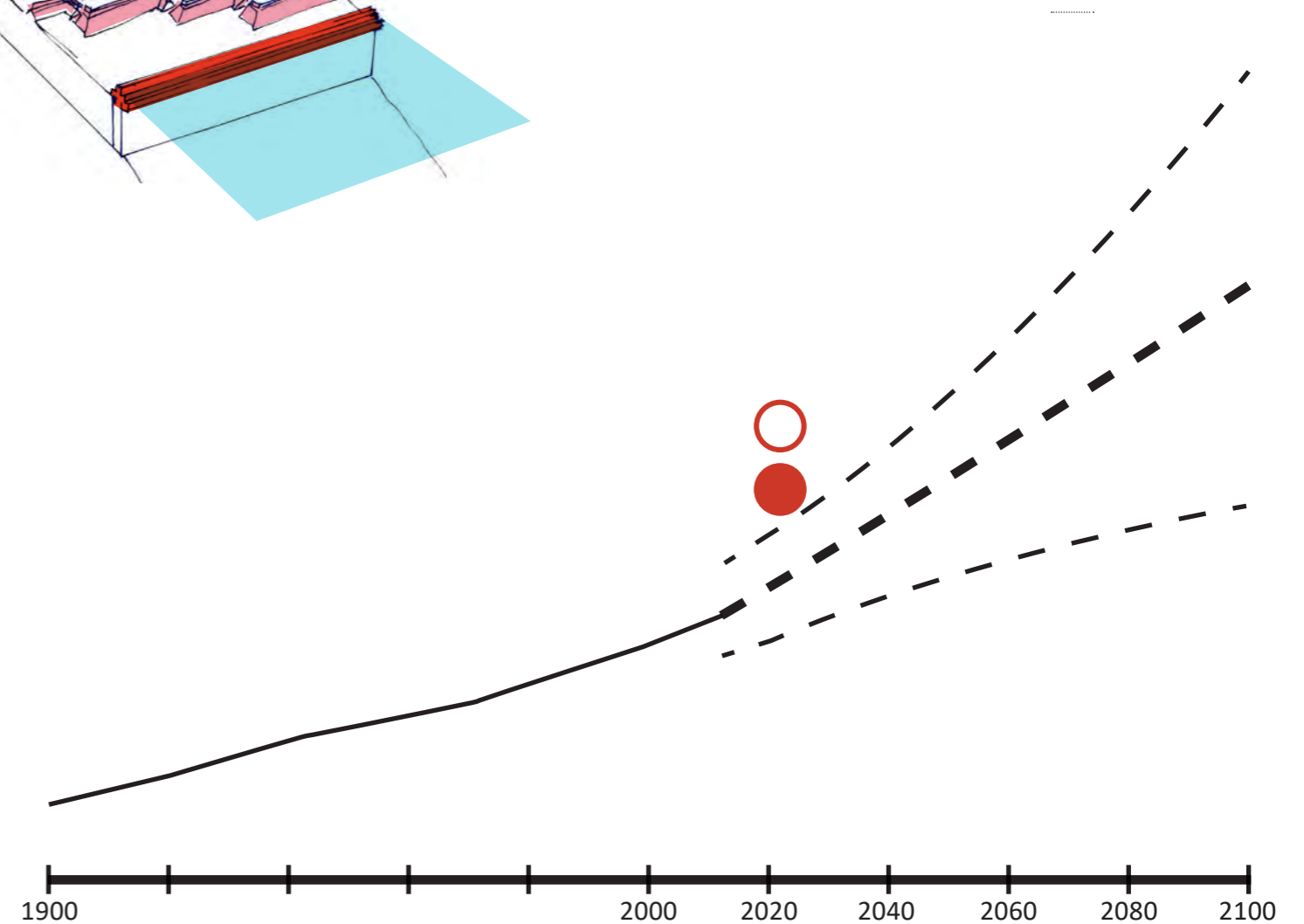
Drawing and diagram: Katrina Wiberg



The graph is a diagrammatic representation of time and sea level rise (informed by RCP 4.5)

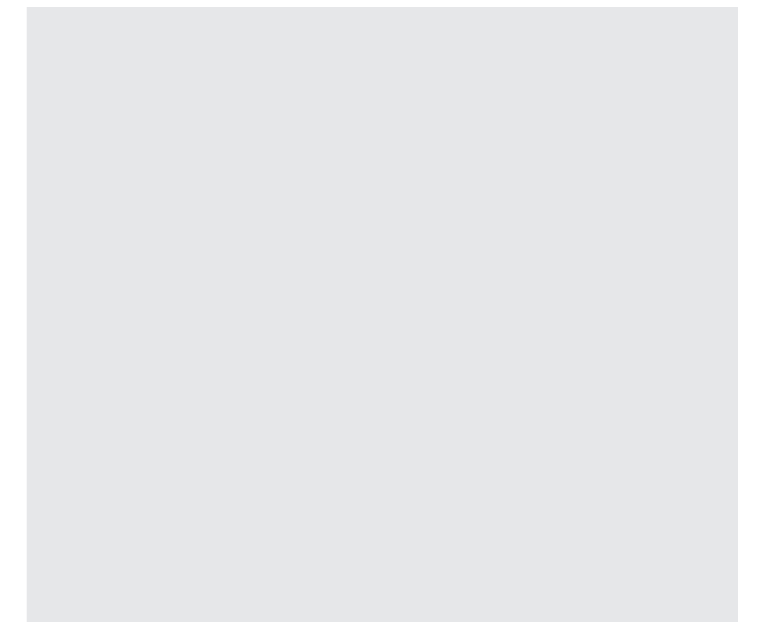
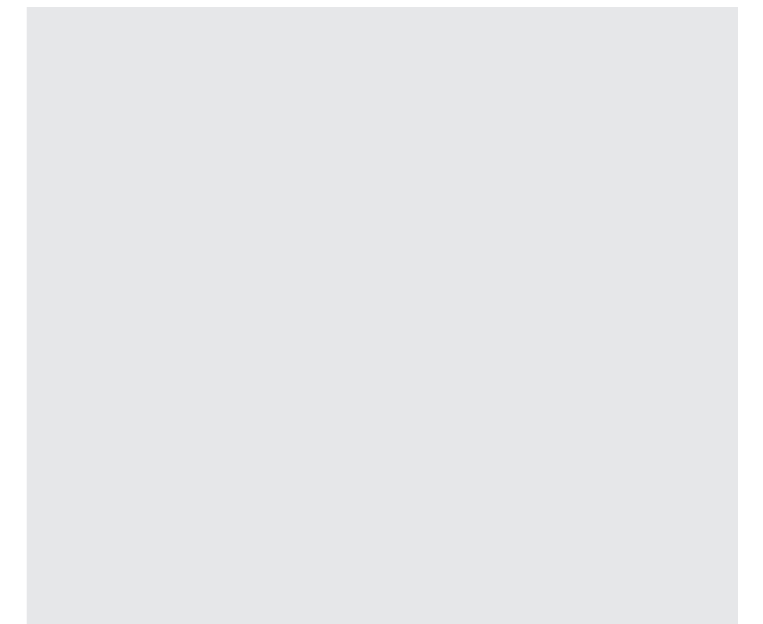
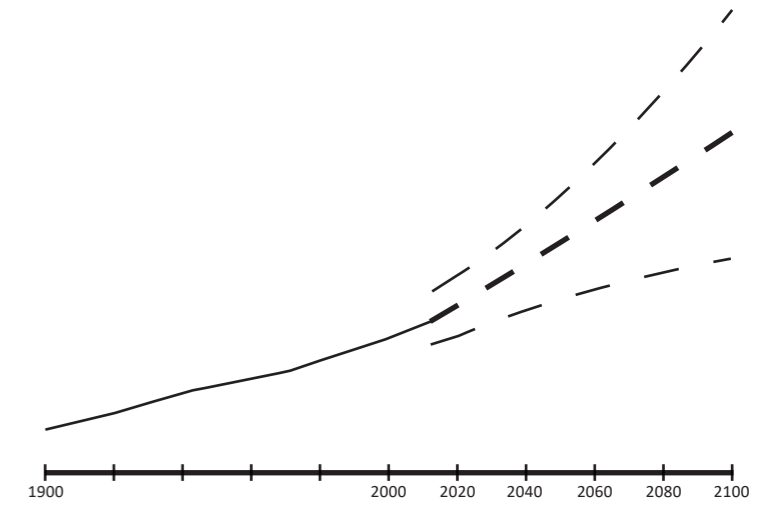
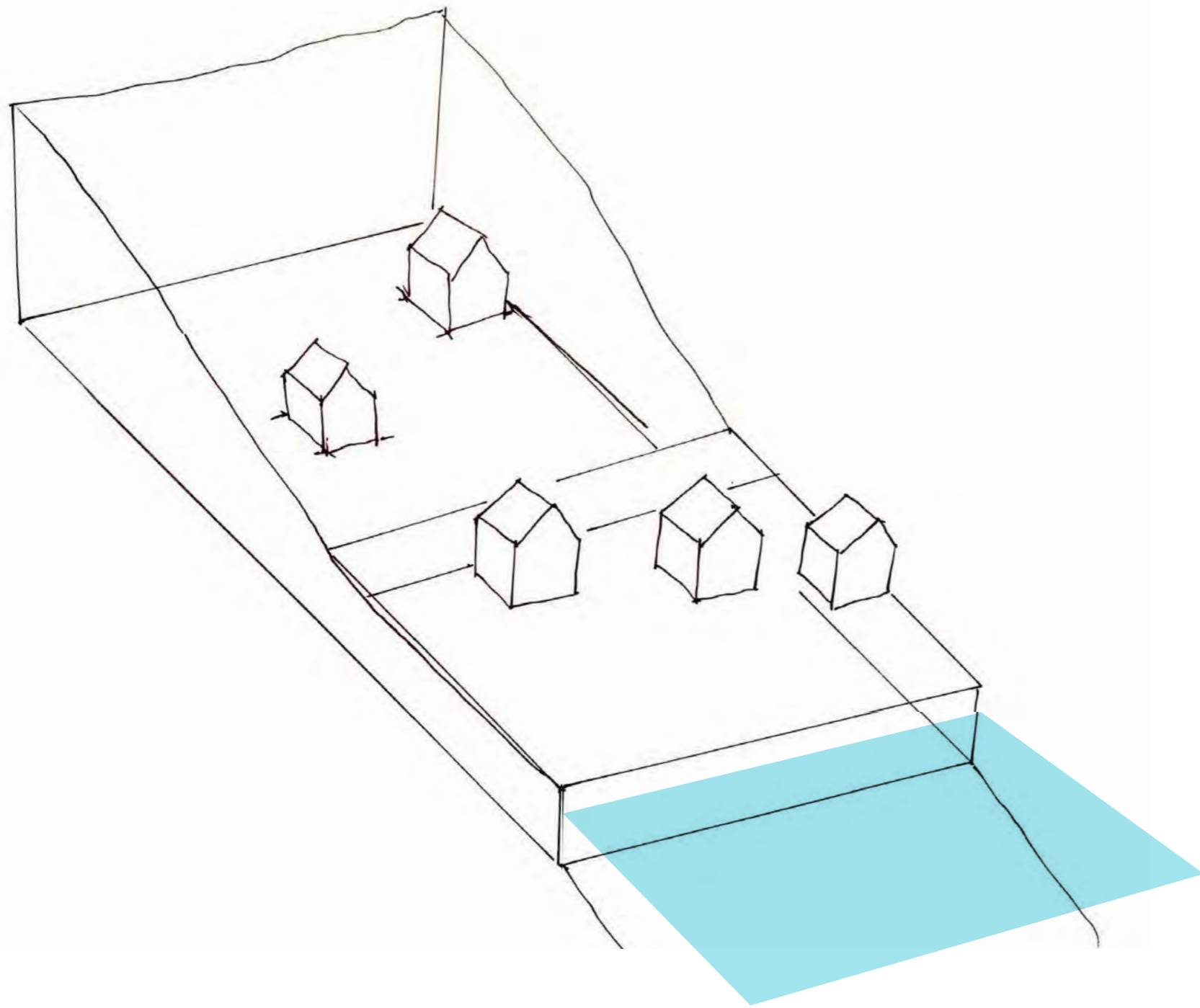
- sea-level rise (+ erosion) actions
- storm surge (+ erosion) actions
- Pilots: instigating landscape stragic, multiple benefits and multiple actors initiatives
- Pilots over time: continuing the initiatives which develops over time to contribute to new SS and SLR actions, multiple benefits and business cases, etc

Abbreviations:
 SS = Storm Surge (+ erosion)
 SLR = Sea Level Rise (+ erosion)



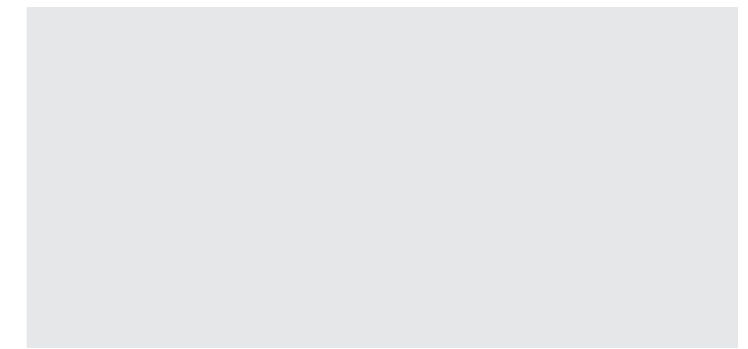
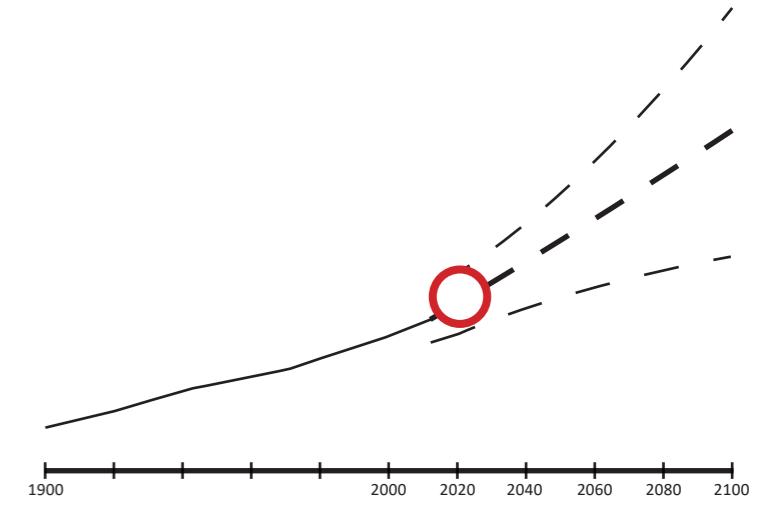
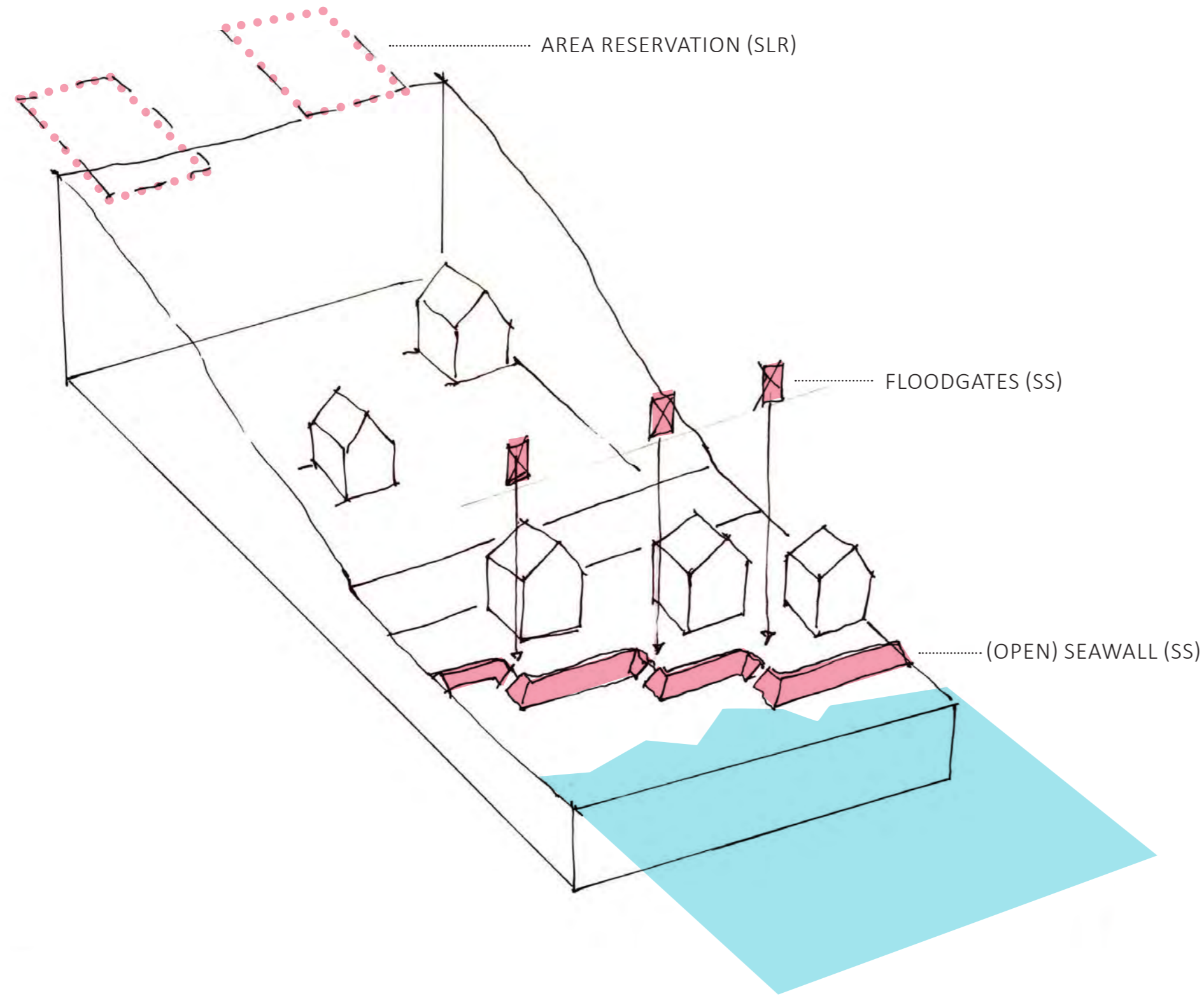
-2019 HARD EDGE COASTAL TOWN

Drawing and diagram: Katrina Wiberg



2020+ HARD EDGE COASTAL TOWN - ELEMENT

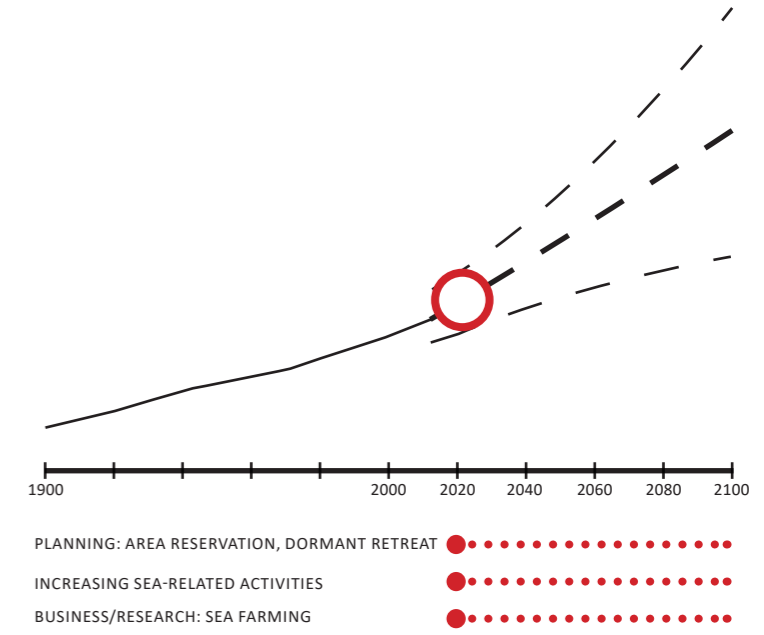
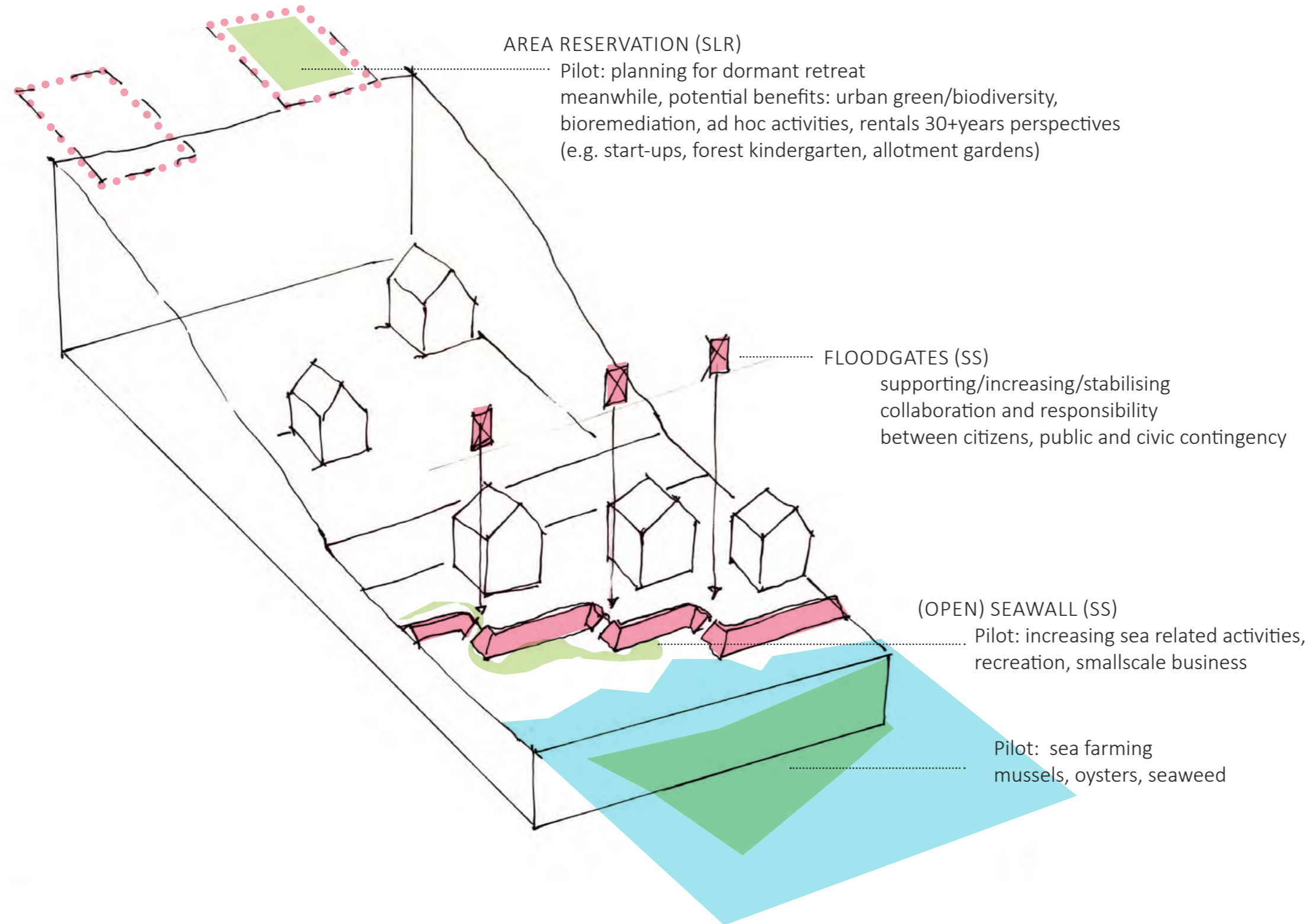
Drawing and diagram: Katrina Wiberg



Existing references, from top to bottom:
 (1-2) Middelfart 'Klimabyen' (3) Lemvig seawall and new harbour activities (Photo: Wiberg)
 (1-3 are municipal projects, co-founded by Realdania and other foundations)

2020+ HARD EDGE COASTAL TOWN - INTERMEDIARY STRATEGY

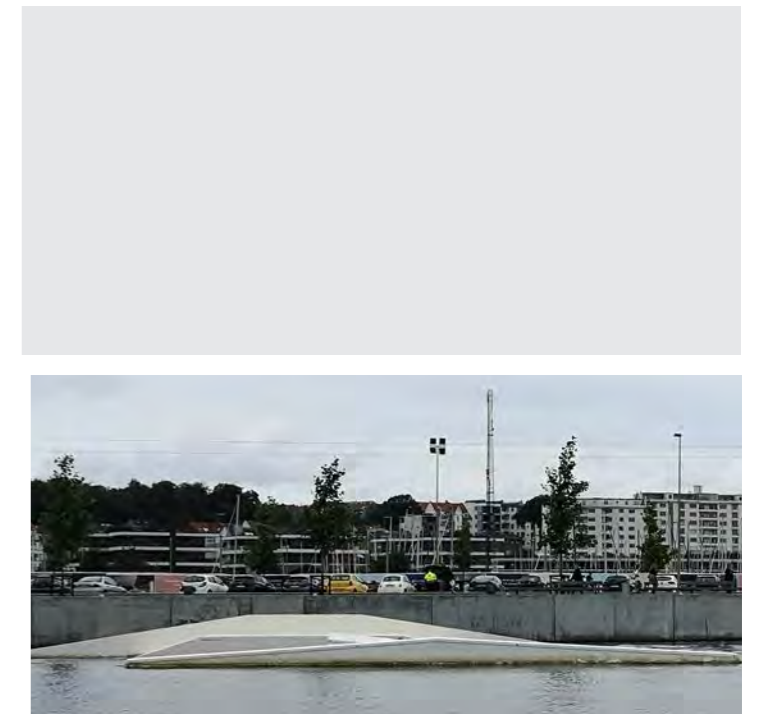
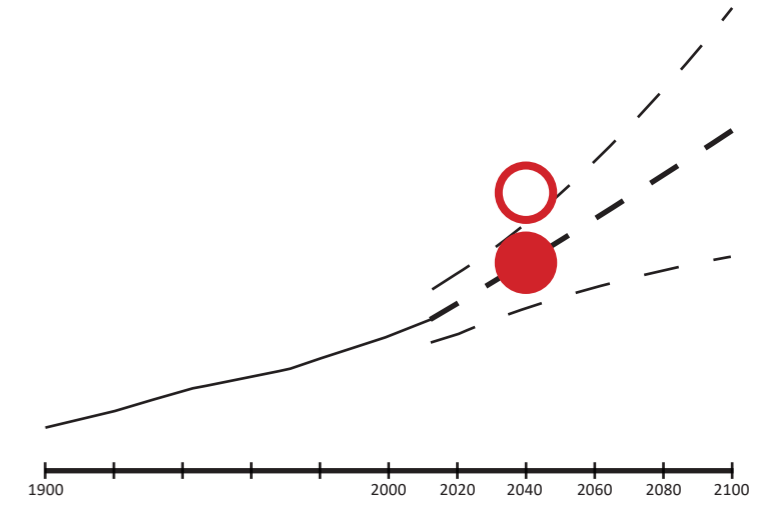
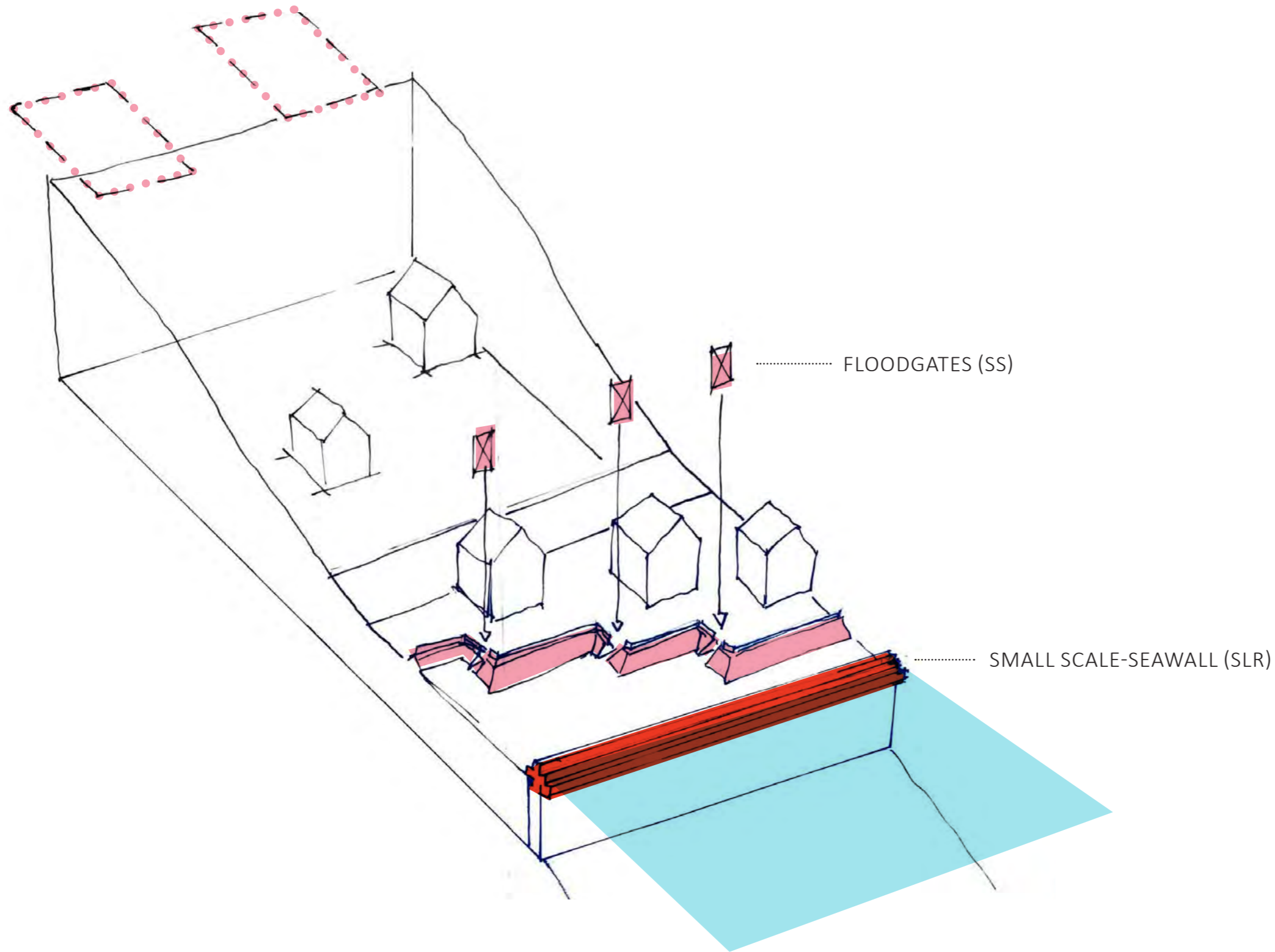
Drawing and diagram: Katrina Wiberg



Existing references, from left to right: (1) Collaboration between citizens and contingency responders (2) Cultural heritage and renewed harbour activities at Samsø (co-funded by realdania) (3) Oyster farming.

2040+ HARD EDGE COASTAL TOWN - ELEMENT

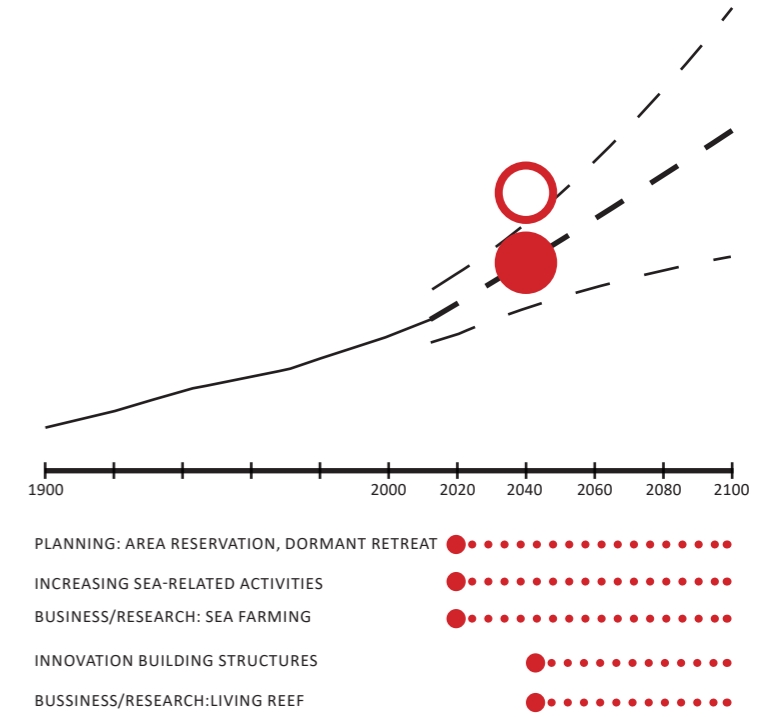
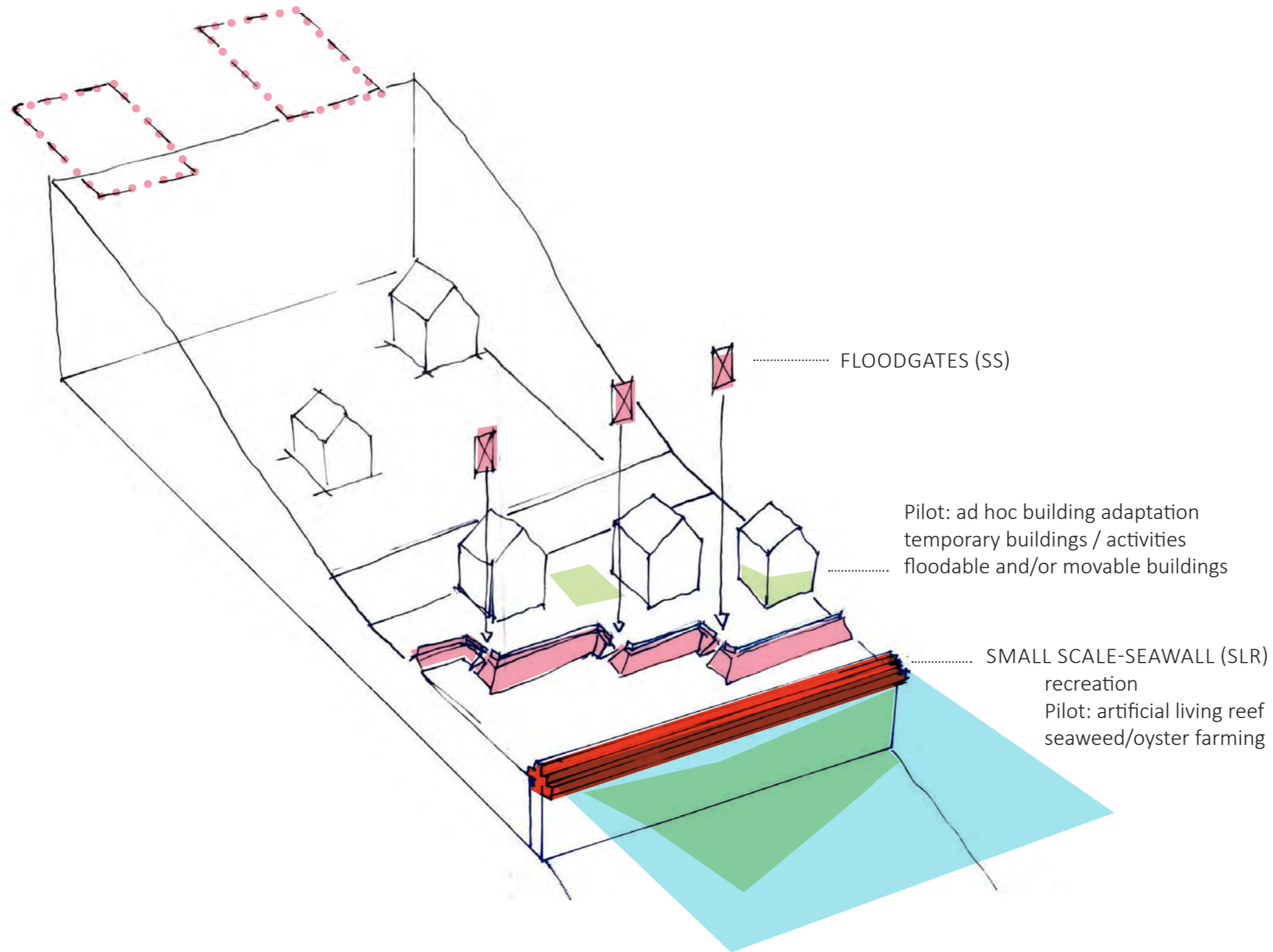
Drawing and diagram: Katrina Wiberg



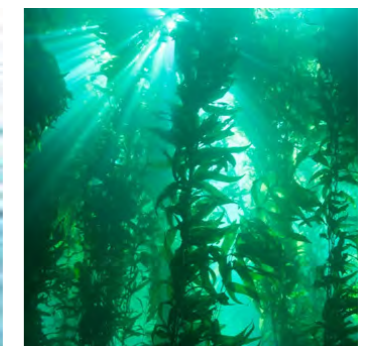
Existing references, from top to bottom:
(1) Lemvig seawall and new harbour activities, co-founded by Realdania and other foundations (2) Aarhus Harbour, sculptural element for activities which could have been part of SS action (photo: Wiberg)

2040+ HARD EDGE COASTAL TOWN - INTERMEDIARY STRATEGY

Drawing and diagram: Katrina Wiberg

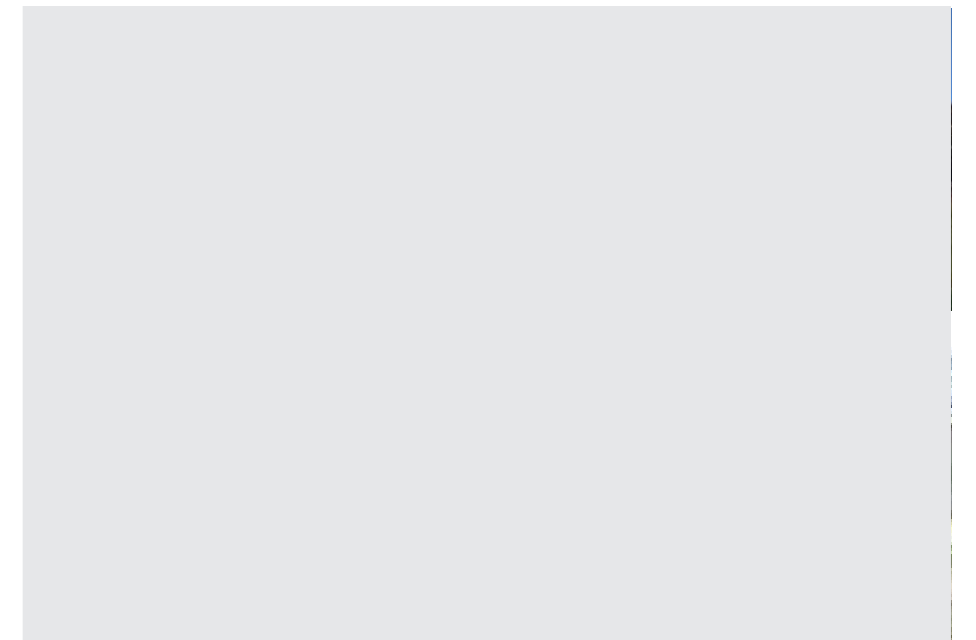
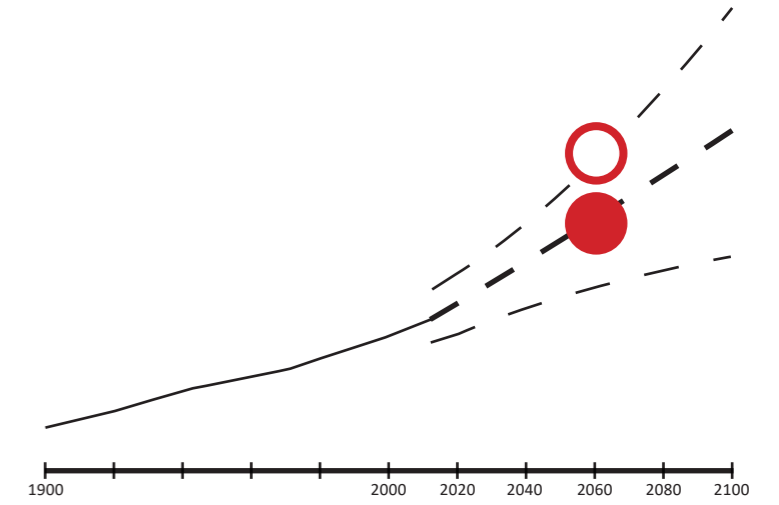
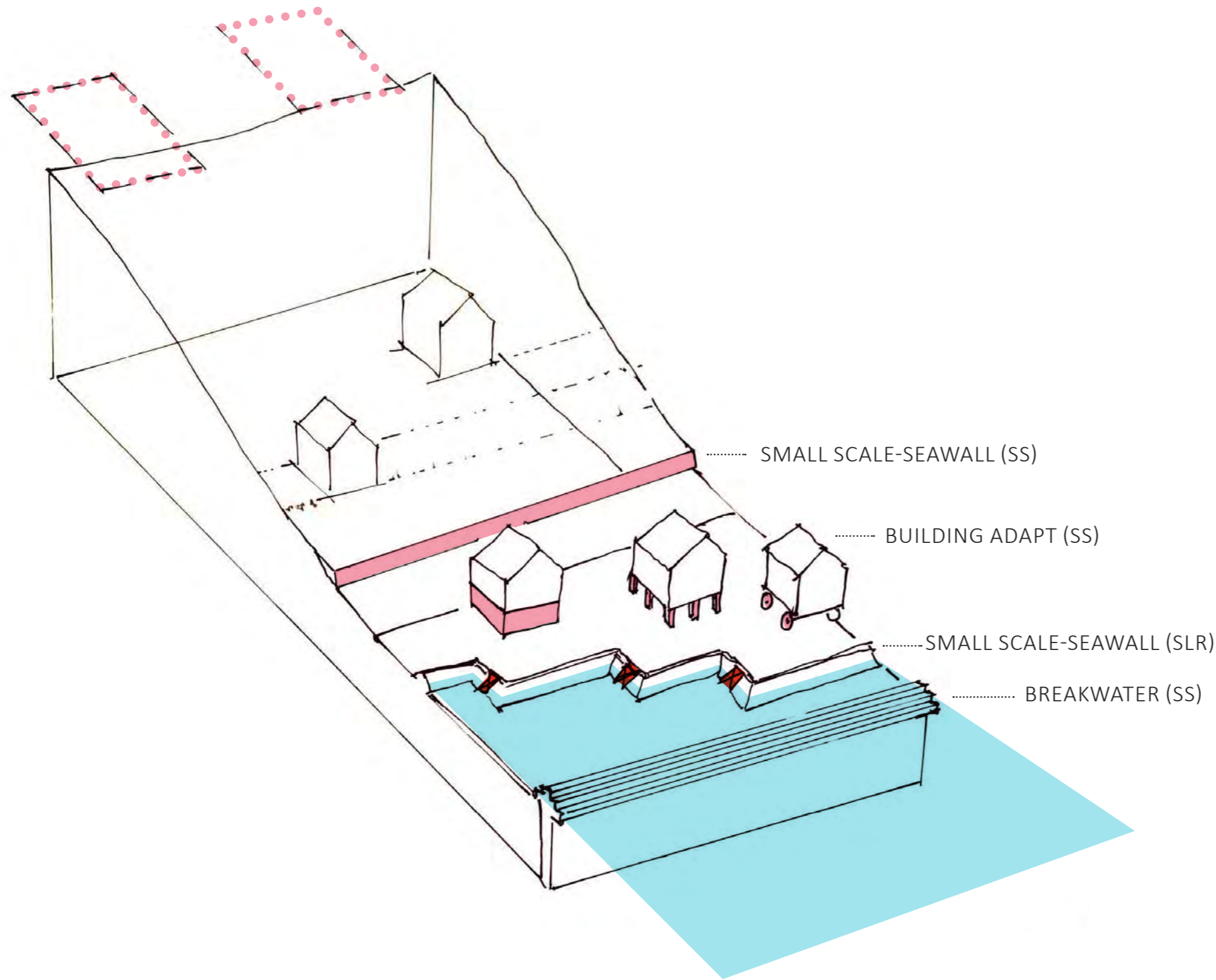


Existing references, from left to right: :
 (1) light, floodable construction (2) flood-wall-potentials (3) movable dome, public events, sustainability, recreation, harbour gardening (3-4) sea weed and oyster production



2060+ HARD EDGE COASTAL TOWN - ELEMENT

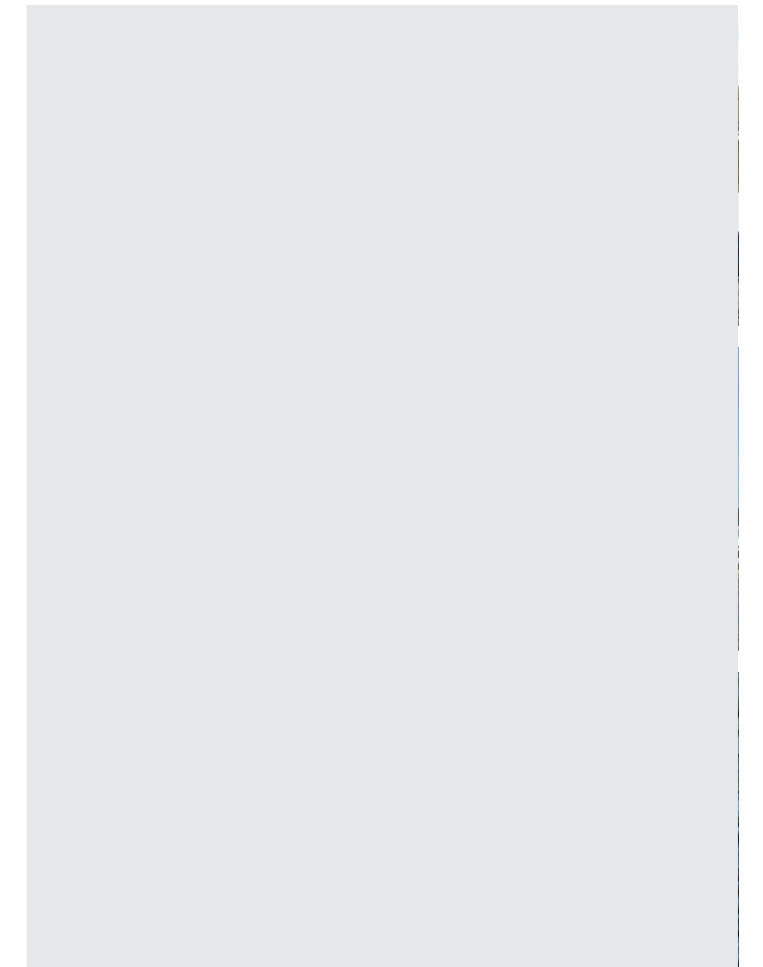
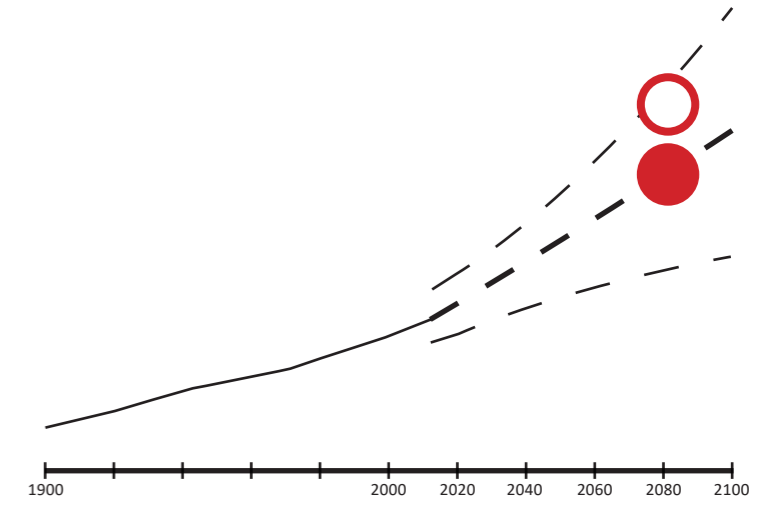
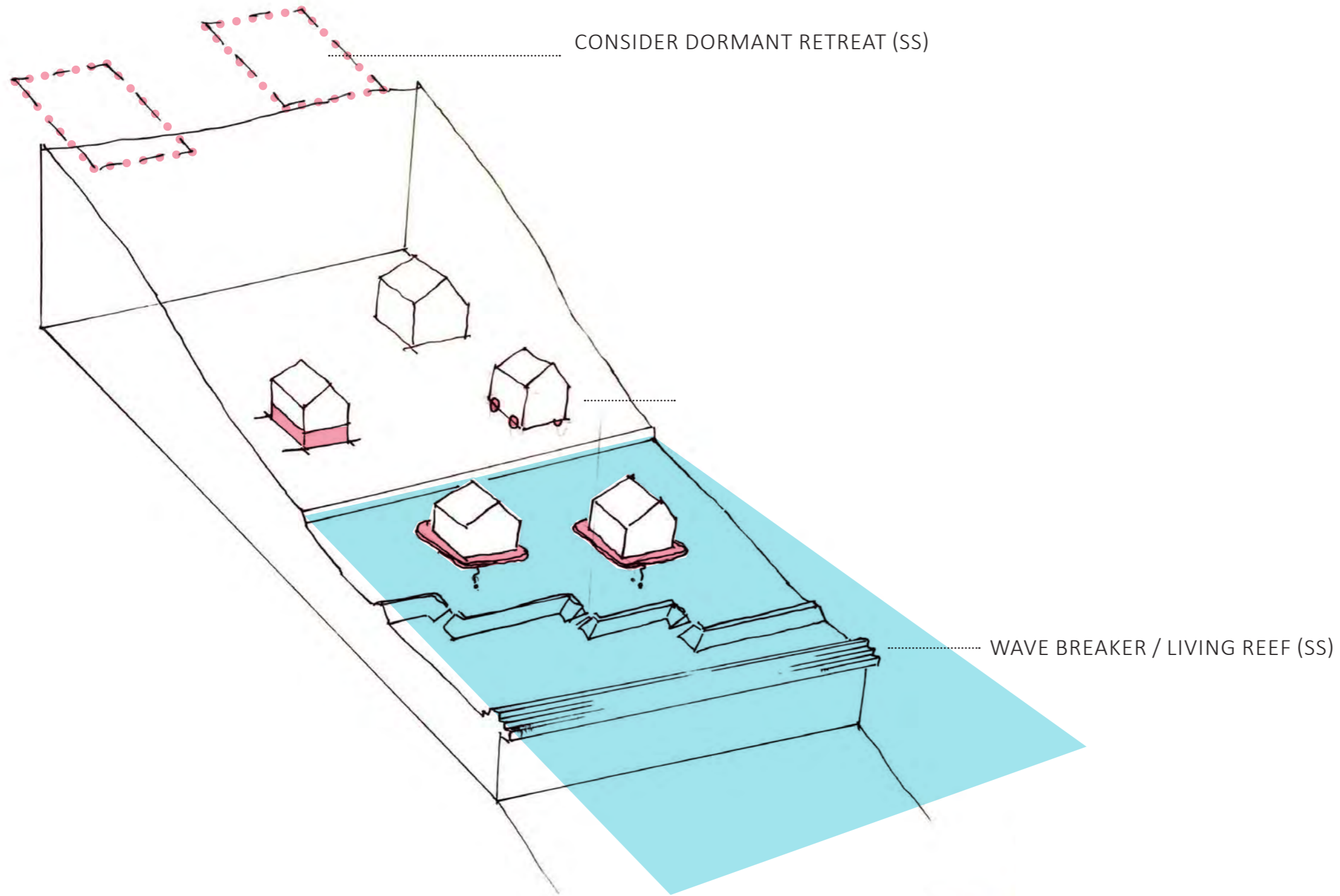
Drawing and diagram: Katrina Wiberg



Existing references, from top to bottom:
 (1-2) Hanging gardens, wall near Harbour, Middelfart (photo Wiberg). Floodgates, Venice (photo Kari Moseng)
 (3-4) temporary buildingstructures (5-6) movable dome, public events, sustainability, recreation, harbour gardening

2080+ HARD EDGE COASTAL TOWN - ELEMENT

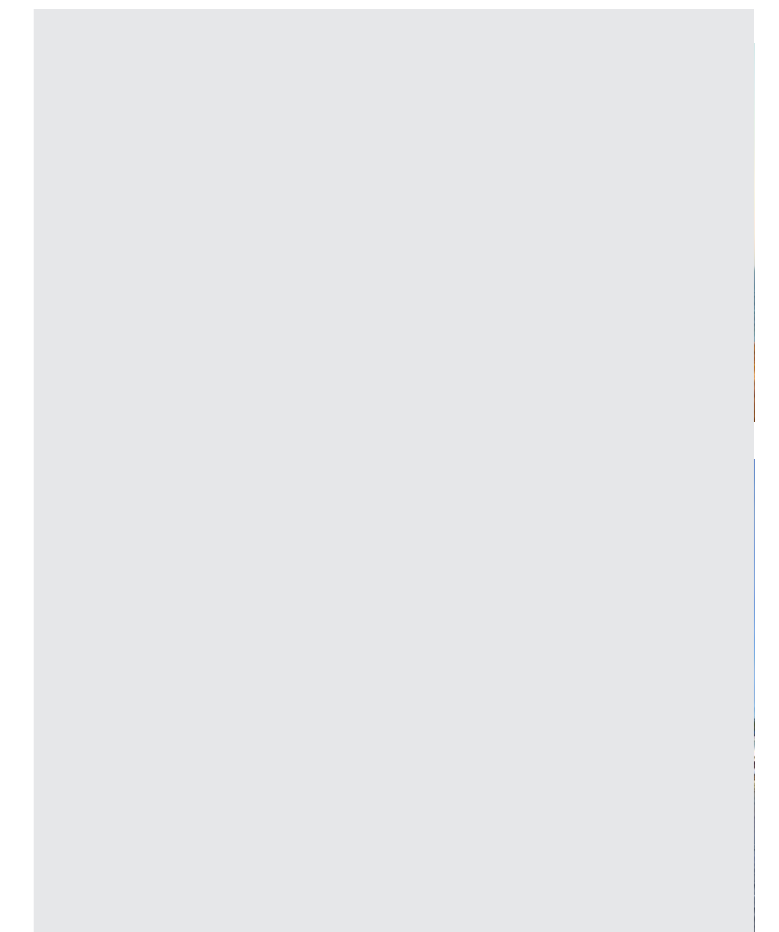
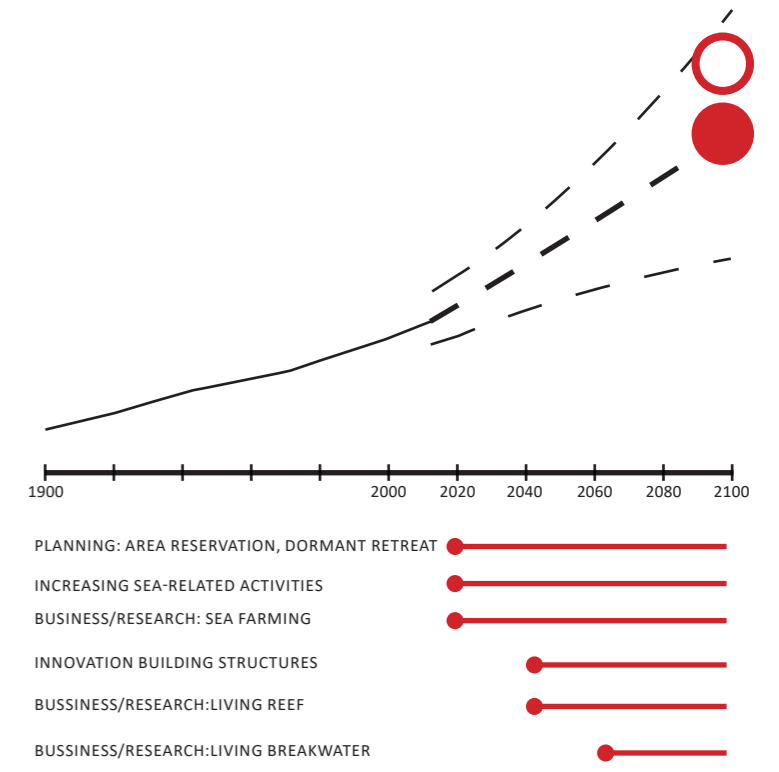
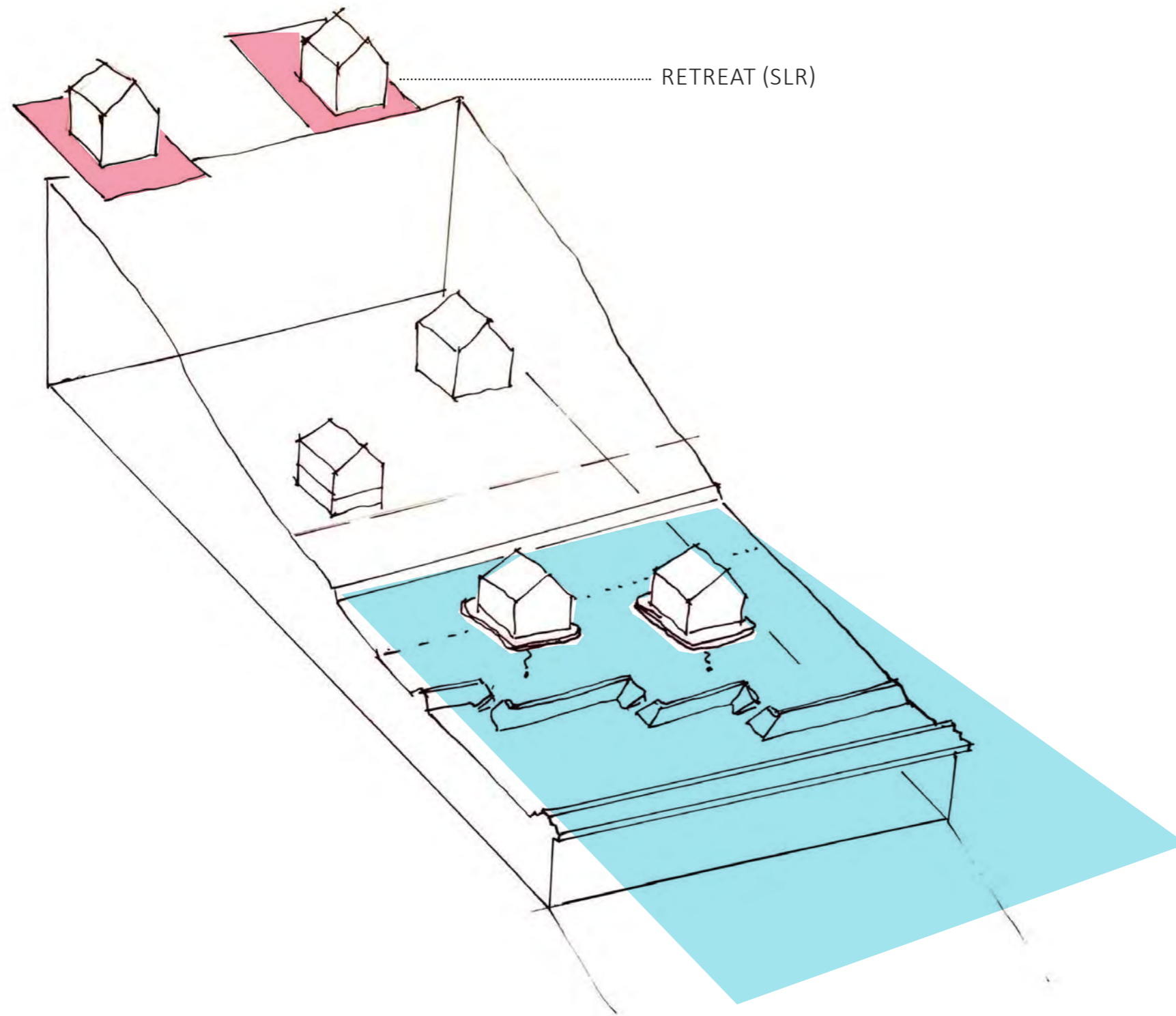
Drawing and diagram: Katrina Wiberg



Existing references, from top to bottom:
(1) temporary building structures (2) Eco Barrio Flotante, floating houses (3) living seawall (4-5) sea farming

2100+ HARD EDGE COASTAL TOWN - ELEMENT

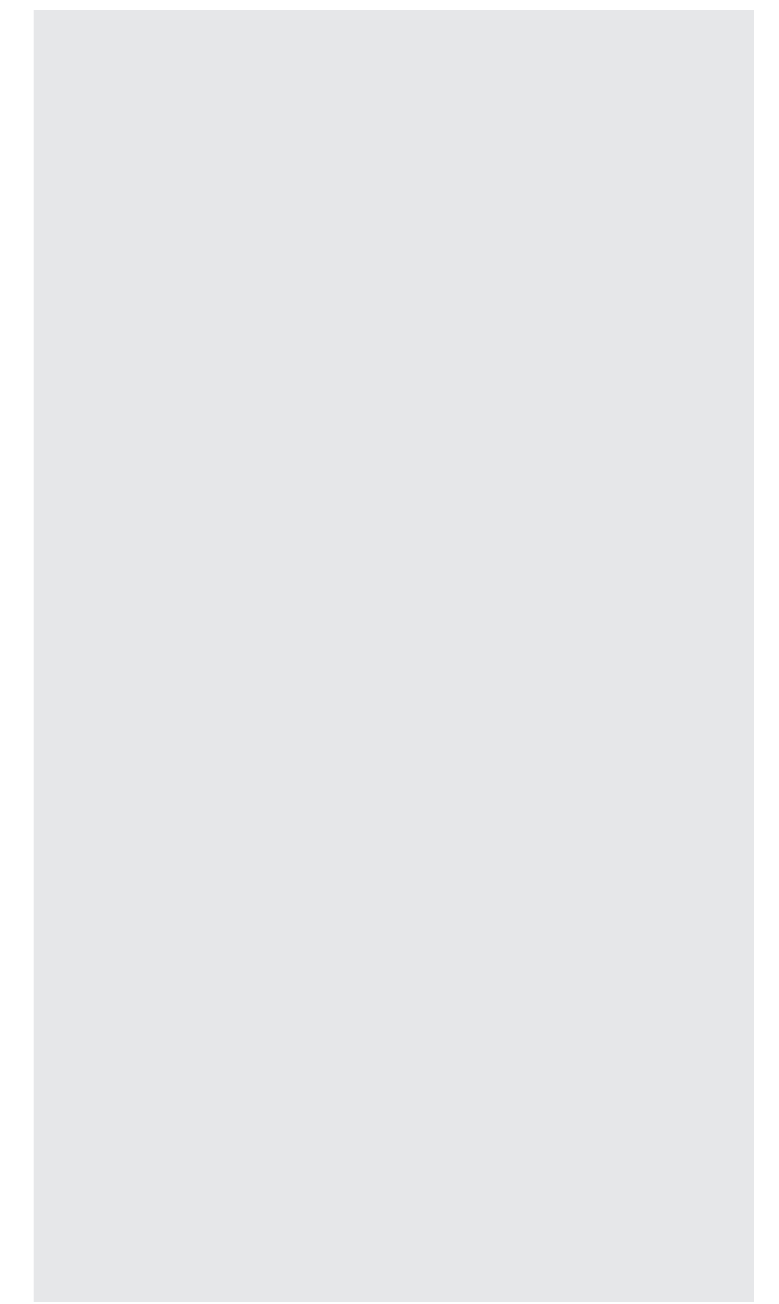
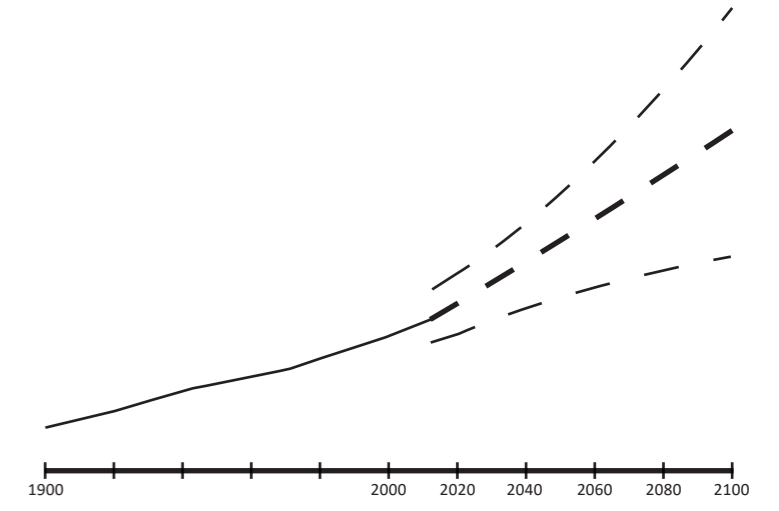
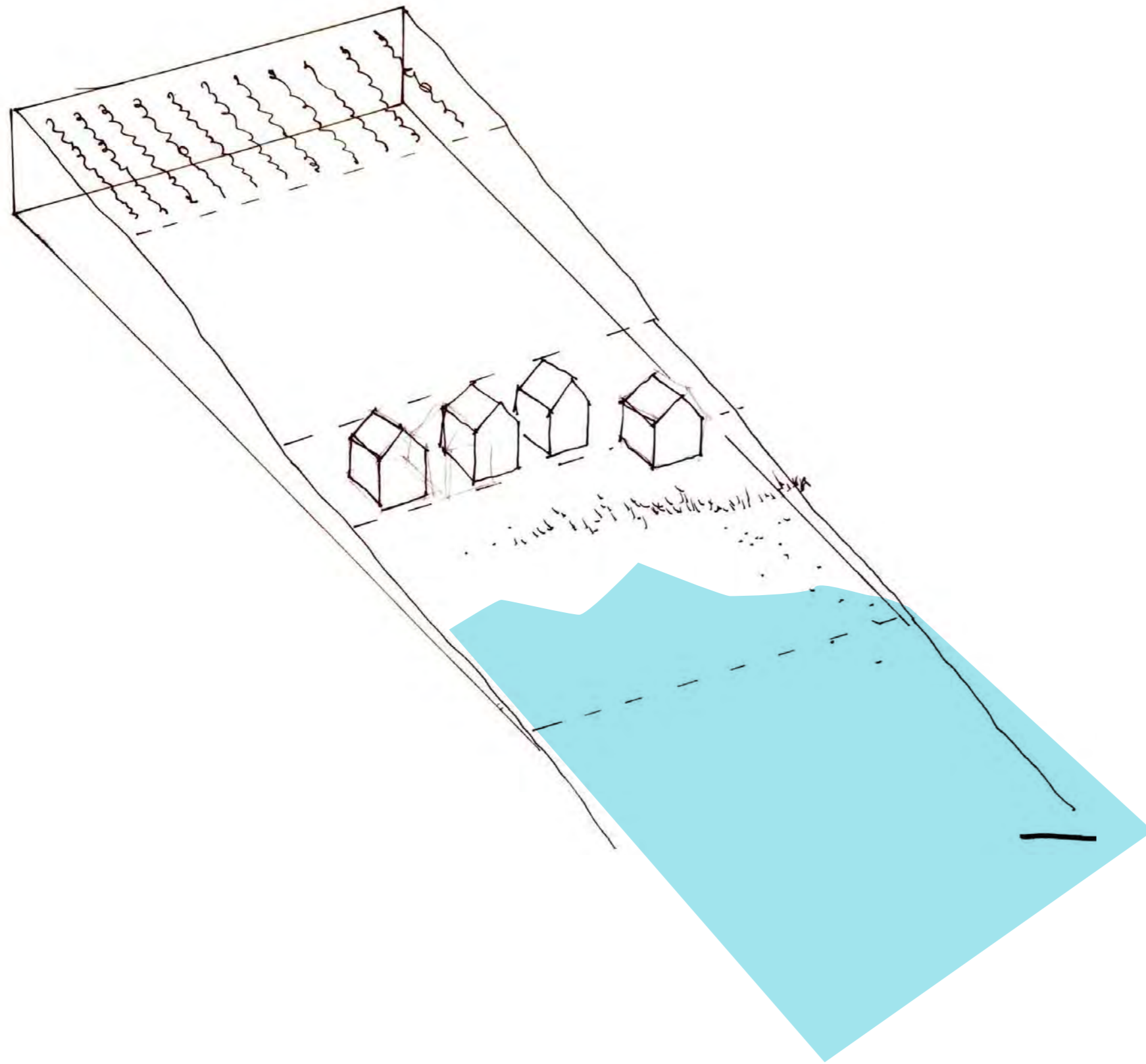
Drawing and diagram: Katrina Wiberg



Existing references, from top to bottom:
 (1) Living with a view, Sea Ranch (2) Eco Barrio Flotante,
 floating housies

- 2019 SOFT EDGE RURAL

Drawing and diagram: Katrina Wiberg

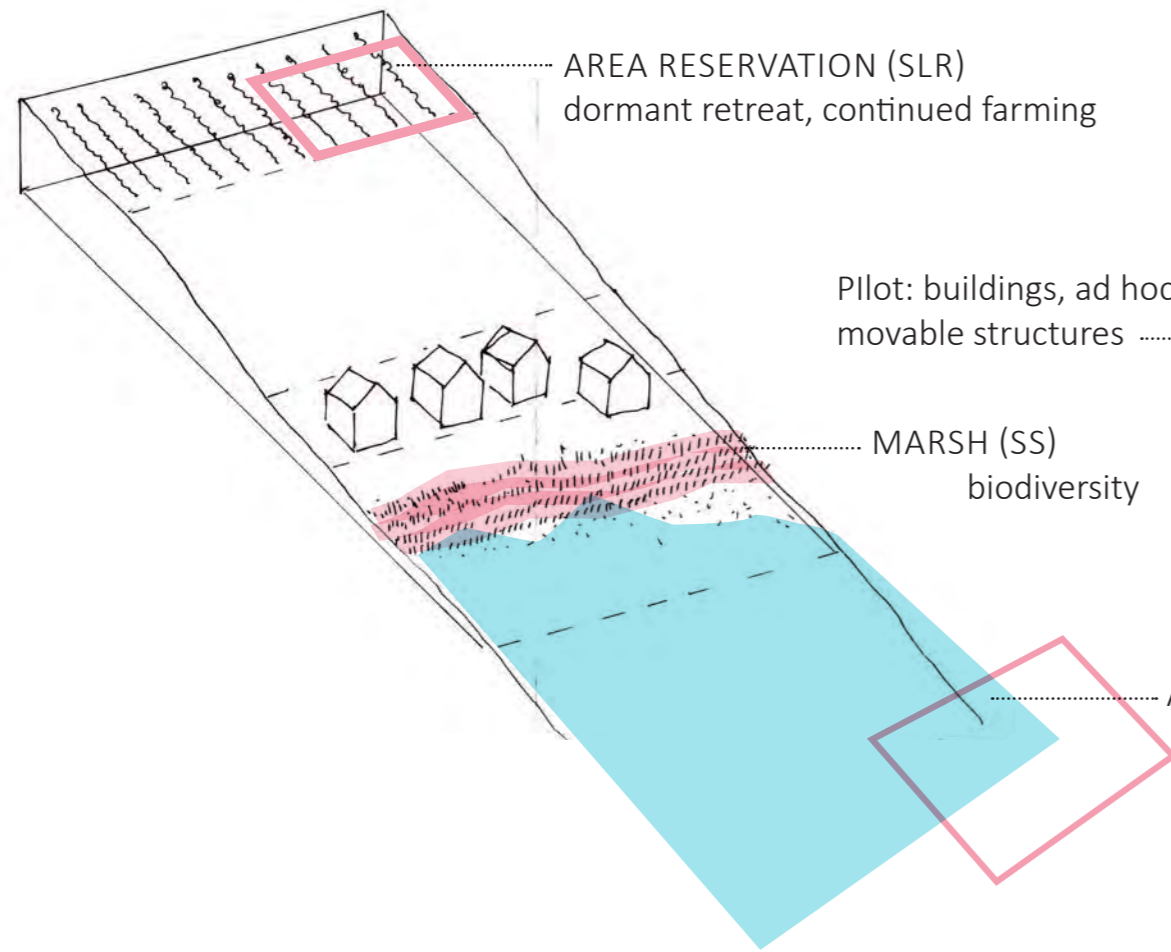


(1) coastal erosion holiday houses (2) Flooded residential area after the storm Ingolf

2020+ SOFT EDGE RURAL

Drawing and diagram: Katrina Wiberg

ELEMENT



INTERMEDIARY STRATEGY

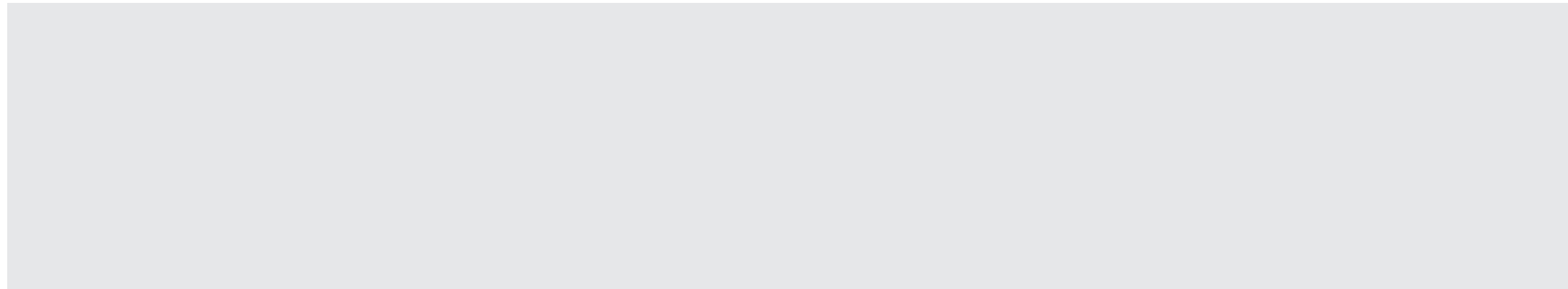
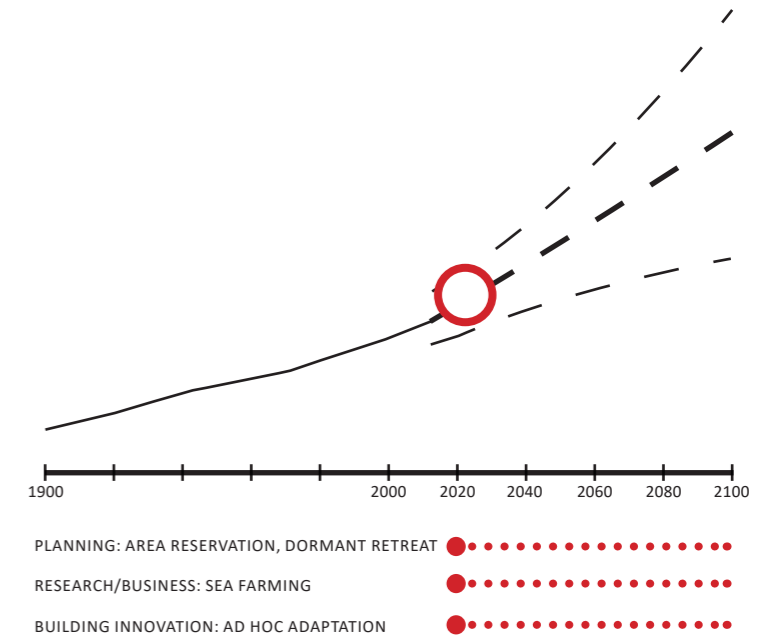
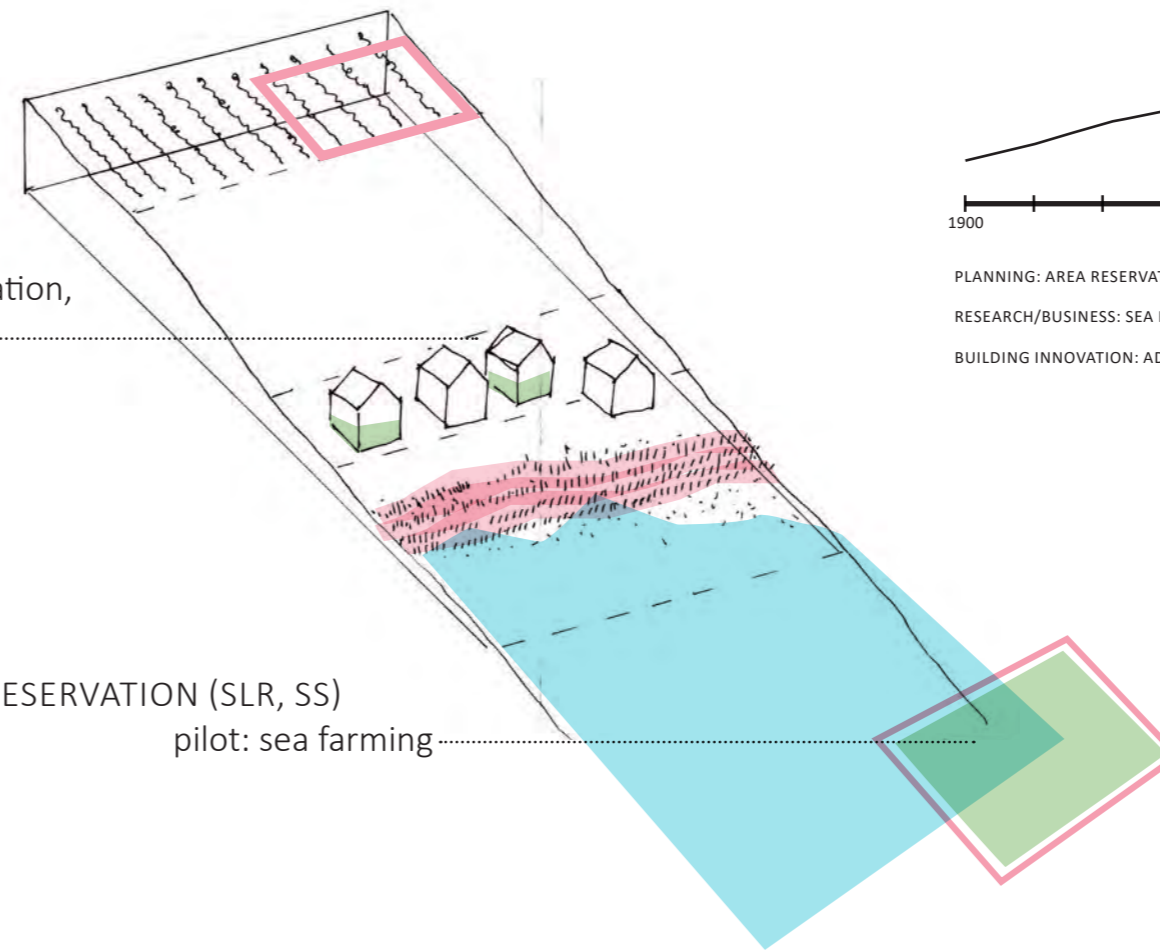
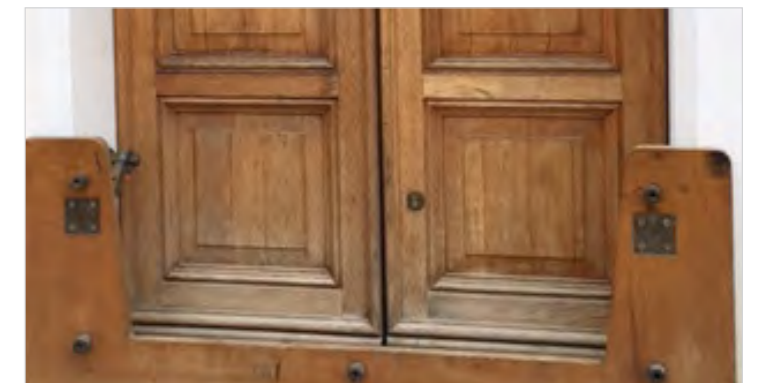


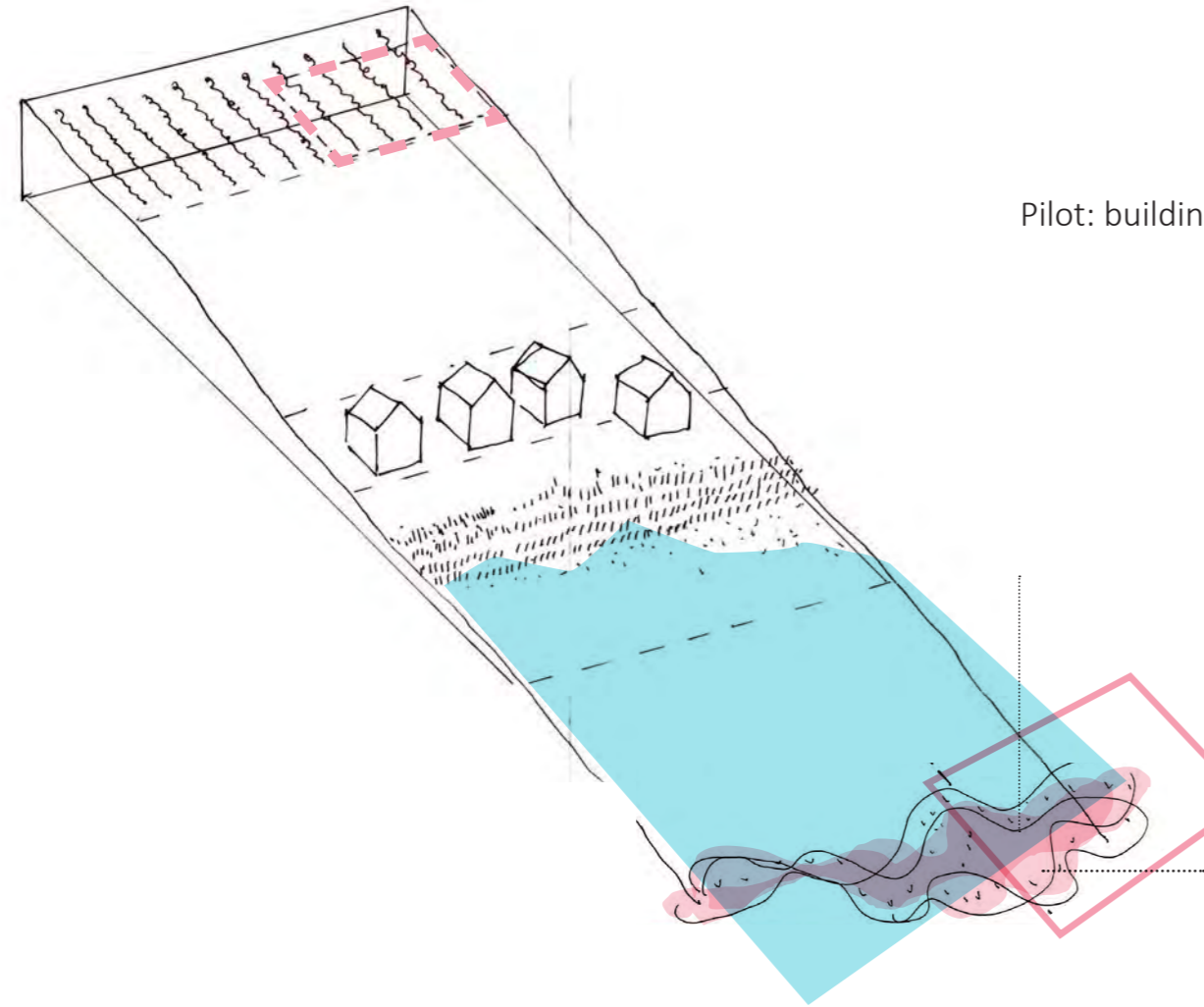
photo: Kari Moseng



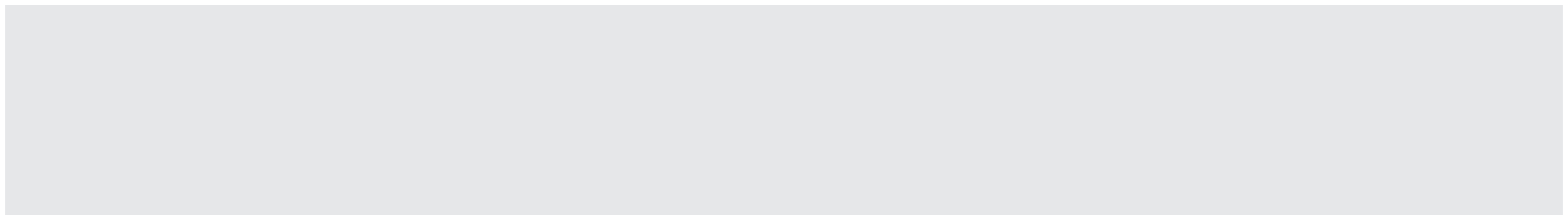
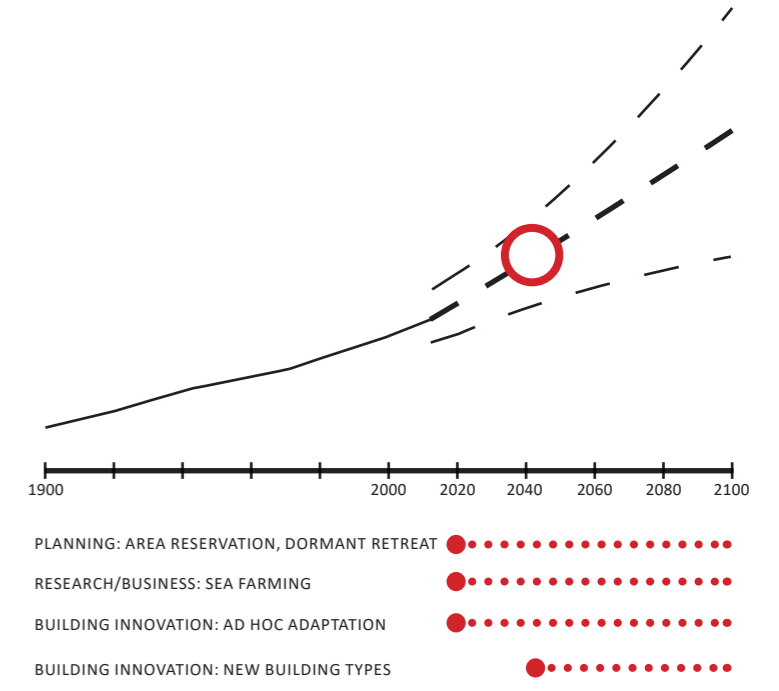
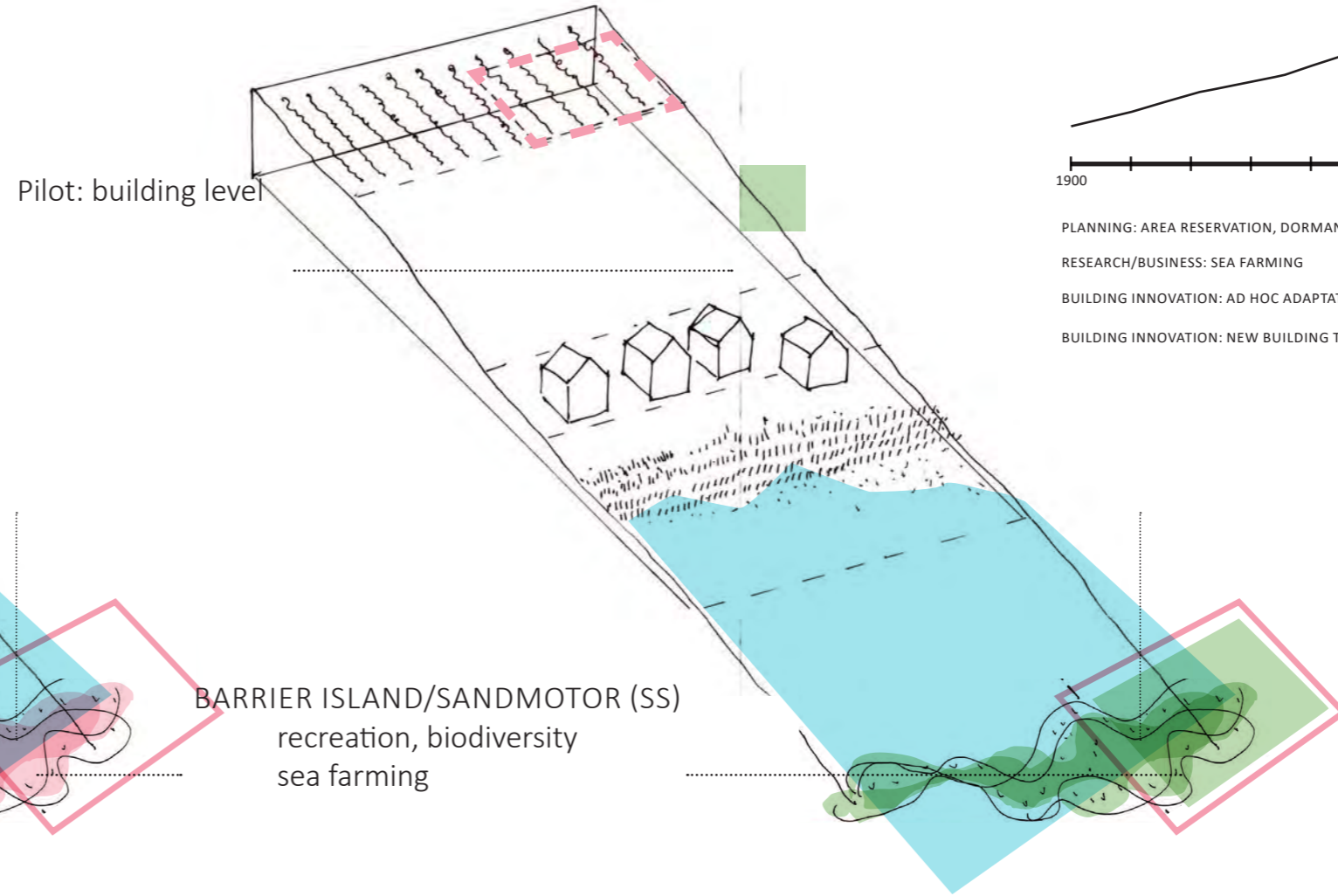
2040+ SOFT EDGE RURAL

Drawing and diagram: Katrina Wiberg

ELEMENT



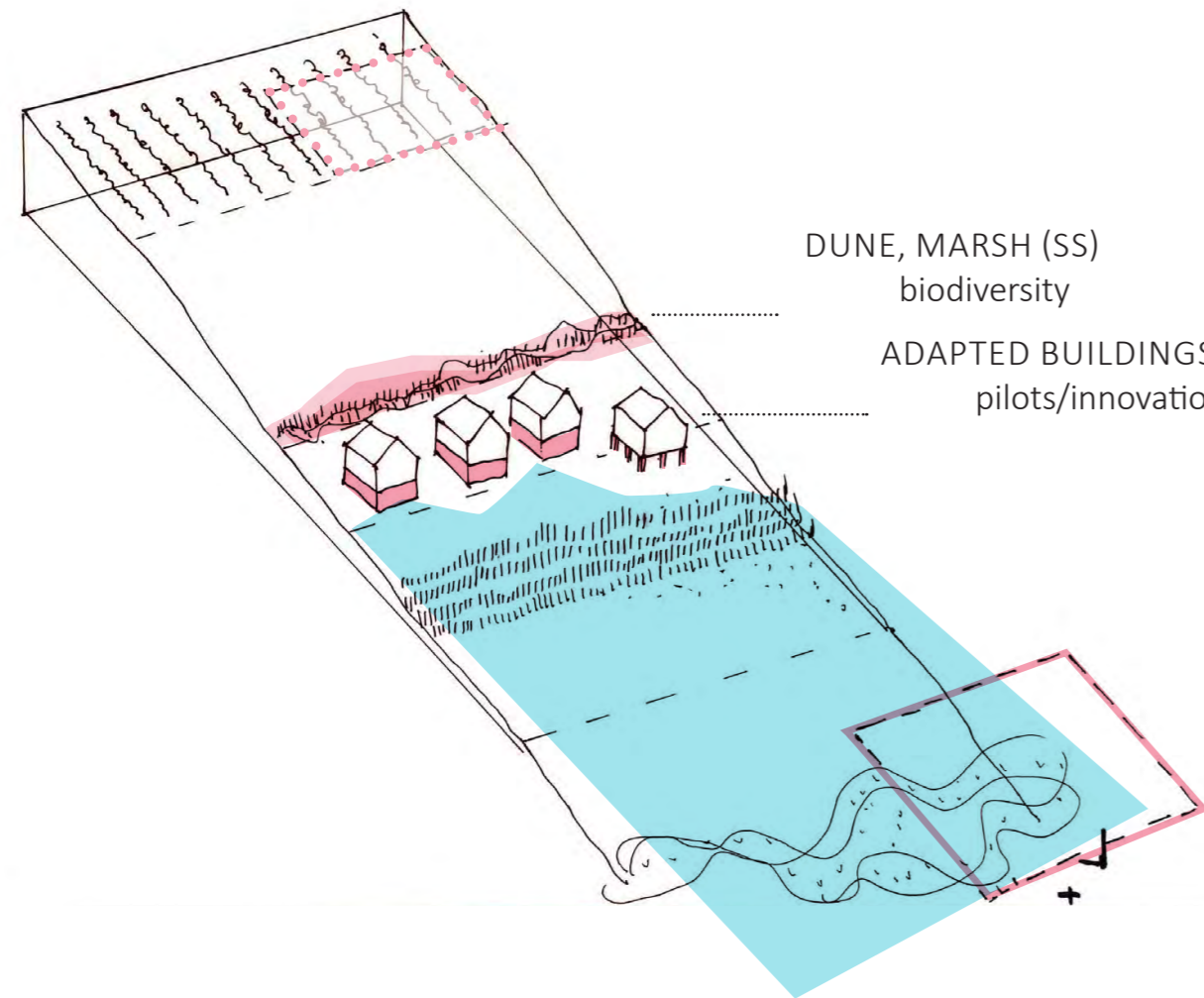
INTERMEDIARY STRATEGY



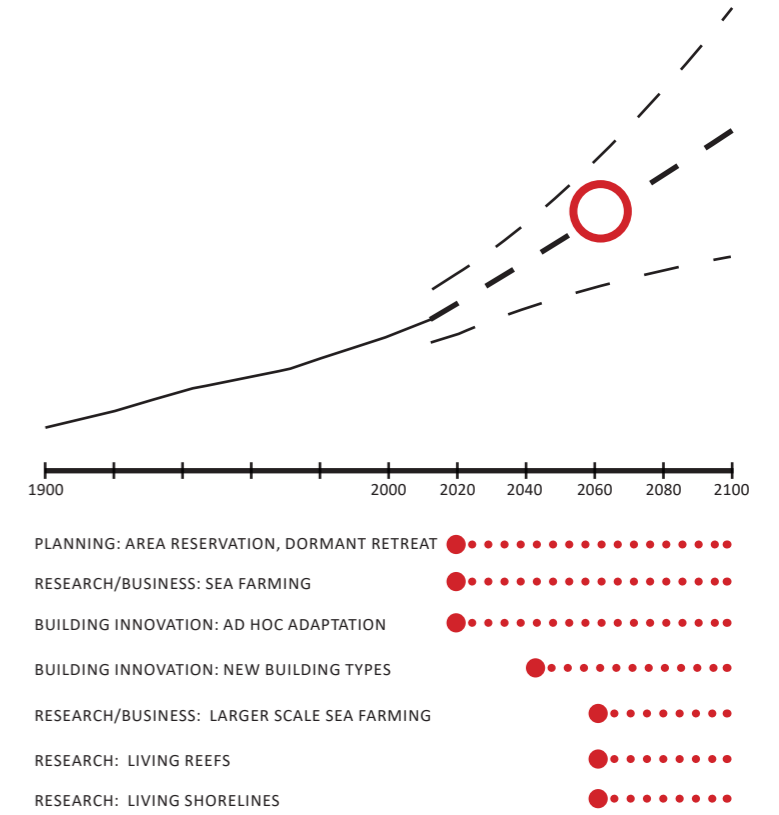
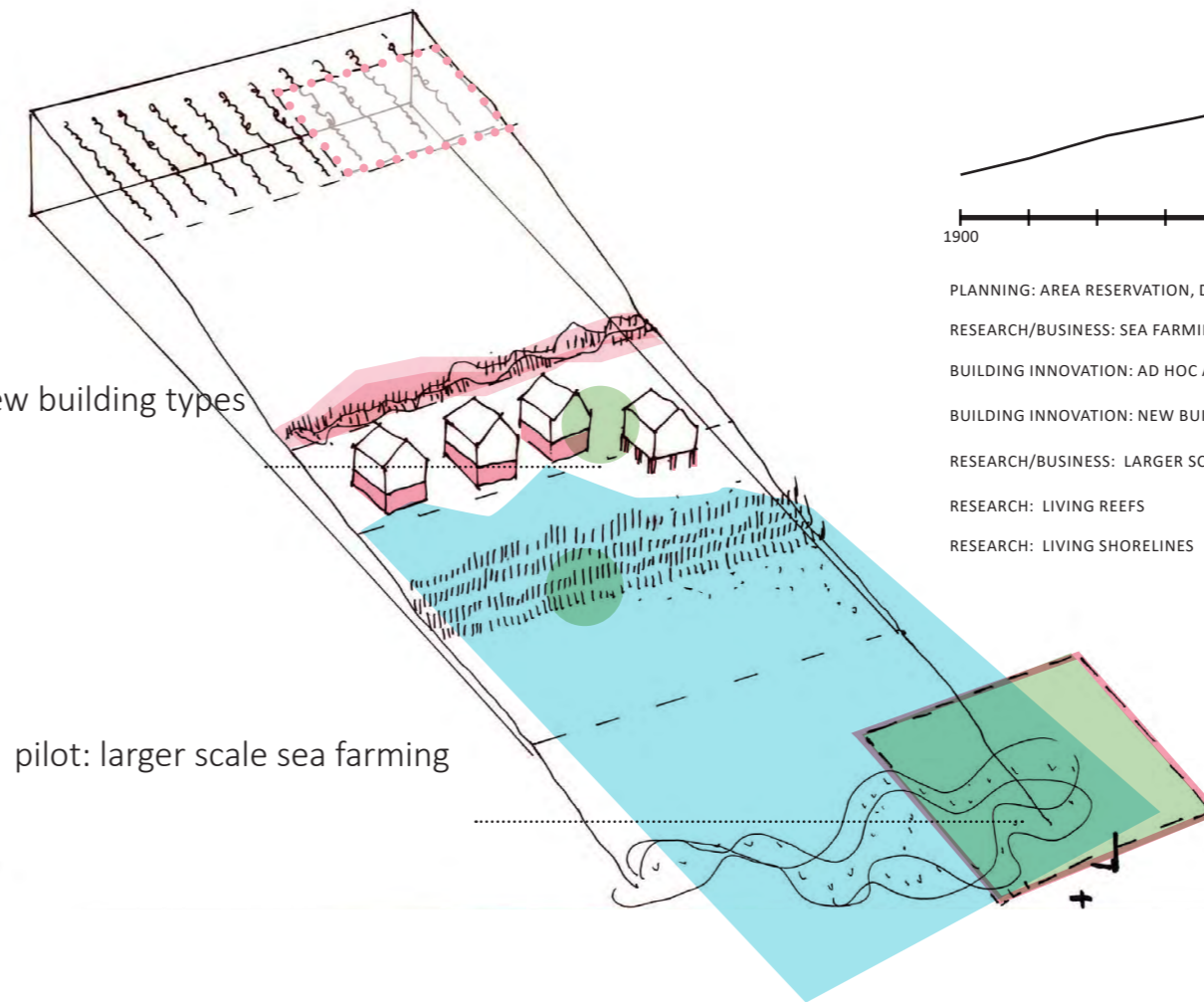
2060+ SOFT EDGE RURAL

Drawing and diagram: Katrina Wiberg

ELEMENT

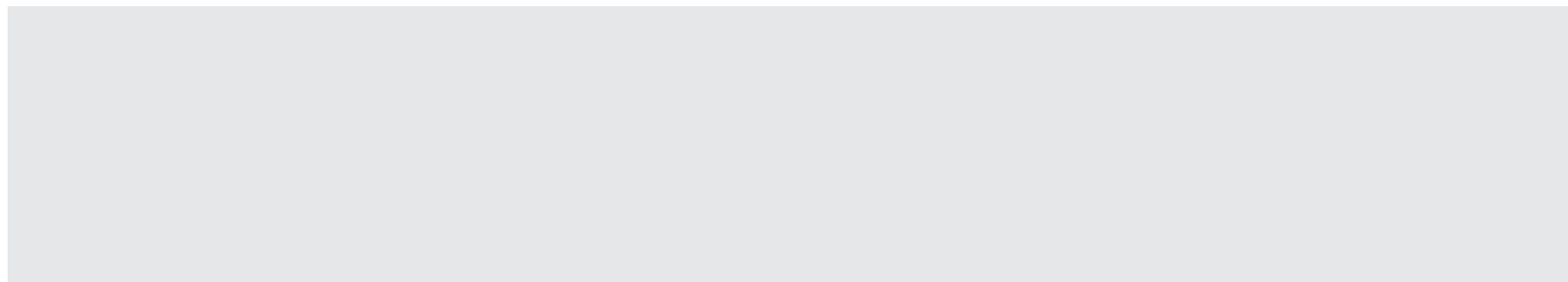
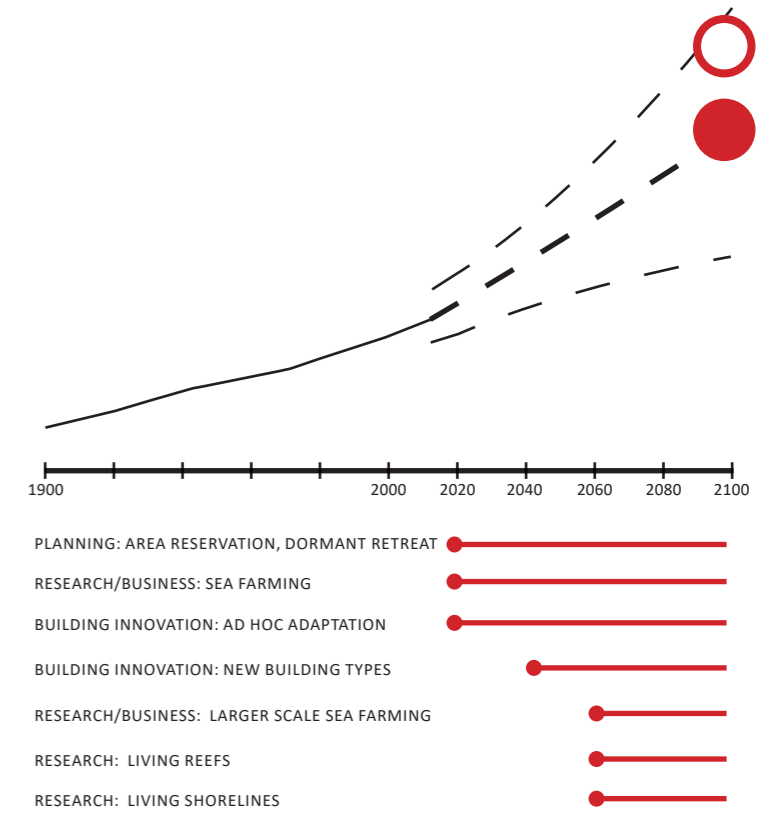
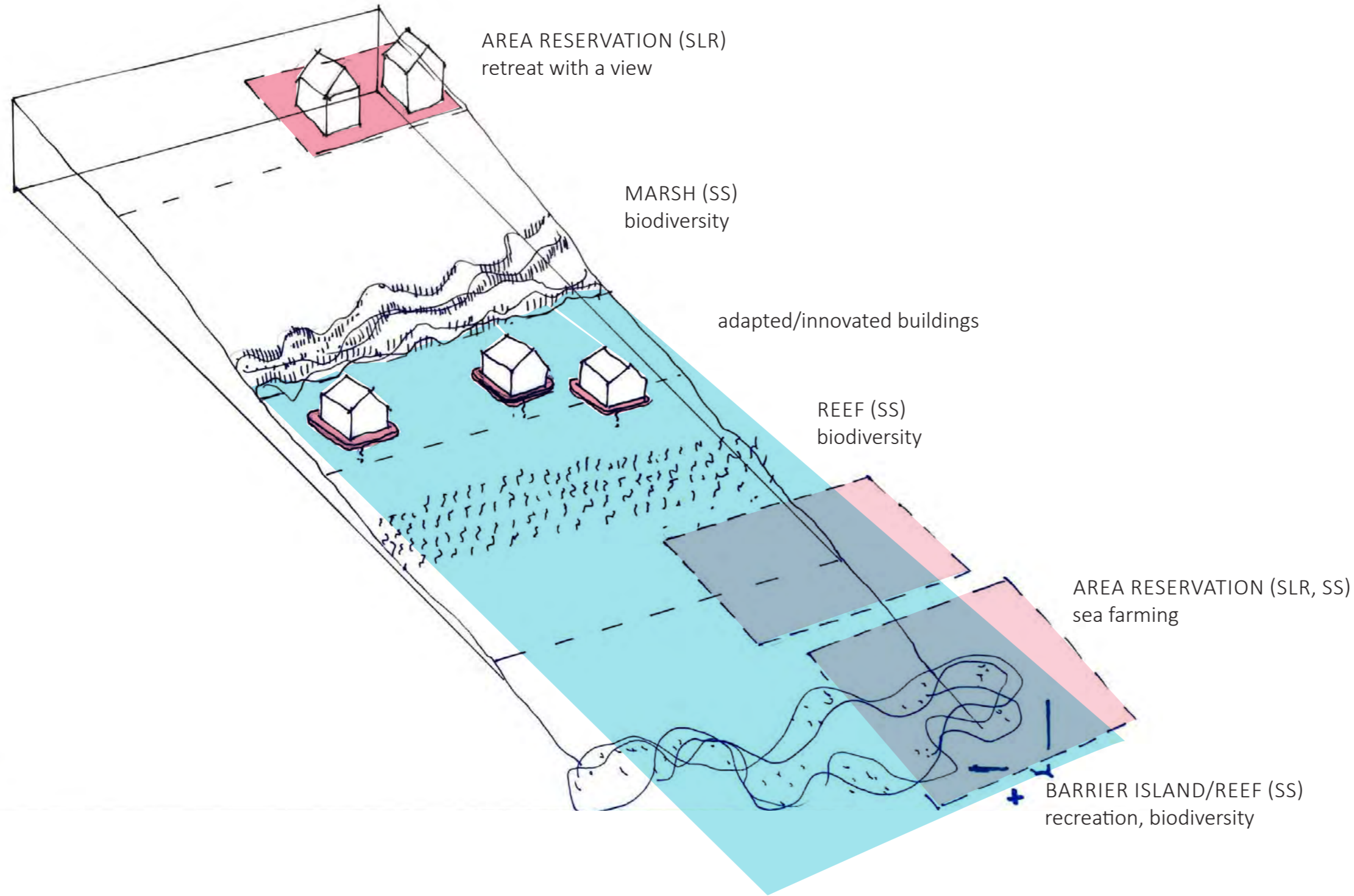


INTERMEDIARY STRATEGY



2100+ SOFT EDGE RURAL

Drawing and diagram: Katrina Wiberg



LANDSCAPE POTENTIALS OF UNCERTAINTY

USING A LANDSCAPE APPROACH AND MULTIPLE BENEFITS TO FOSTER
INCREMENTAL COASTAL STRATEGIES AND FUNDING MODELS

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