45th Congress of INTA

Lisbon, 9th and 10th Mars, 2023

Cities' Climate Change Adaptation: lost in transition?

The Waterfronts

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45TH CONGRESS OF INTA

LISBON & OEIRAS
9-11 MARCH 2023

From the City to the Civitas

Taking care of the City and giving it back to its inhabitants

The "taking care of the City" Agenda:

Do we all agree on its terms?

How to measure priorities?

Do we have "societal" conditions to implement it?

Let's look at 1 Agenda: CLIMATE CHANGE ADAPTATION

Summary:

1. Premise: there is strong evidence of anthropogenic climate change

2. Climate change adaptation took its time to become an effective Agenda

3. The emergence of the Climate Change Adaptation Agenda in the late 2000's

4. Urban planning and climate change adaptation: the new challenges at the 2010's

5. Is climate change adaptation lost in transition?

Framework for the discussion:

The study of samples, types or parts of the urban phenomenon as a way of contributing to the understanding of its whole:

The waterfronts => The territory

(on the study of urban morphology)

Without going into discussions about the concept of the city, we can say that it represents a dynamic reality; in the study of the city, we cannot do more than group the questions into organized problems, with an internal aspect and logic.

ROSSI, Aldo (s/d); *Consideraciones sobre la Morfología Urbana y la Tipología de la Edificación*; Barcelona; documento policopiado, ETSAB-UPC (author's translation).

1. PREMISE: THERE IS STRONG EVIDENCE OF ANTHROPOGENIC CLIMATE CHANGE

Banksy, 2009. Fonte: www.banksy.co.uk, 19 Março 2015

2. CLIMATE CHANGE ADAPTATION TOOK ITS TIME TO BECOME AN EFFECTIVE AGENDA

Revisiting the climate change agenda:

- **Declaration of the United Nations Conference on the Human Environment**, Stockholm, 1972;
- **Convention for the Protection of the Ozone Layer**, Vienna, 1985;
- **United Nations Framework Convention on Climate Change**, Rio de Janeiro, 1992:
  - "*Noting that there are many uncertainties in predictions of climate change (…)*";
  - "*Recognizing that States should enact effective environmental legislation (…)*";
  - "*Article 2 – Objective: The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, (…) stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*";
  - "*Article 3 – Principles: 3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects (…)*".

Revisiting the climate change agenda:

- Declaration of the United Nations Conference on the Human Environment, Stockholm, 1972;
- Convention for the Protection of the Ozone Layer, Vienna, 1985;
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  - "*Article 2 – Objective: The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, (…) stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*";
  - "*Article 3 – Principles: 3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects*.
  - ***Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost***".

Urbanism and climate change:
(Peter Calthorpe, 2010)

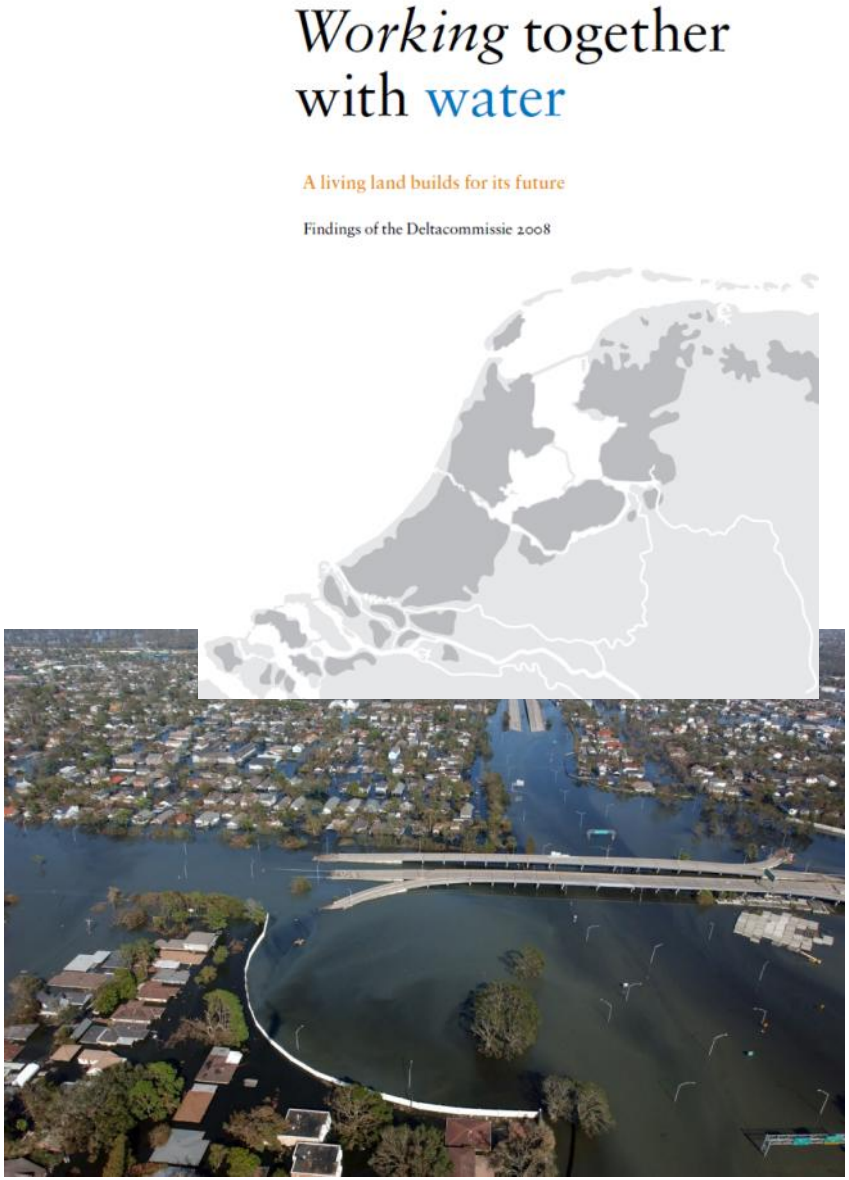
- It has focused essentially on mitigation perspectives, namely:
  - The debate between the compact city, with its "carbon diet", and the "carbon-obese" metropolitan regions;
  - The different forms of "sustainable communities":
    * Sustainable city;
    * The sustainable neighbourhood - ecourbanismo (Miguel Ruano, 1999);
    * The building (micro-generation, solar, passive solar);
    * The orientation of energy efficiency;
  - “Green cities", reinforcing sinks.

Concurso internacional *Re:Vision Dallas*, solução vencedora
Data + MOOV, 2009

Placa Solar Fotovoltaica do Fórum Universal das Culturas
Barcelona, 2004

Adaptation to climate change::

- Since the IPCC 3rd Assessment Report (2001), data on possible territorial impacts have been put forward, motivating disaggregated studies:
  - In Portugal, this was the first report of the SIAM Project (Santos, Forbes, Moita, 2002).
- Conjugation of events precipitated the emergence of this agenda:
  - The shock waves of Hurricane Katrina in New Orleans (August 2005);
  - The IPCC 4th Assessment Report (2007);
  - The Bali Action Plan (December 2007), reinforced by the "shared vision for long-term cooperative action" (Cancun Agreement, December 2010);
  - The Dutch National Adaptation Strategy (NAS), 2007 + report "Working together with water. A living land builds for its future", 2008, by the Dutch Delta Commission.



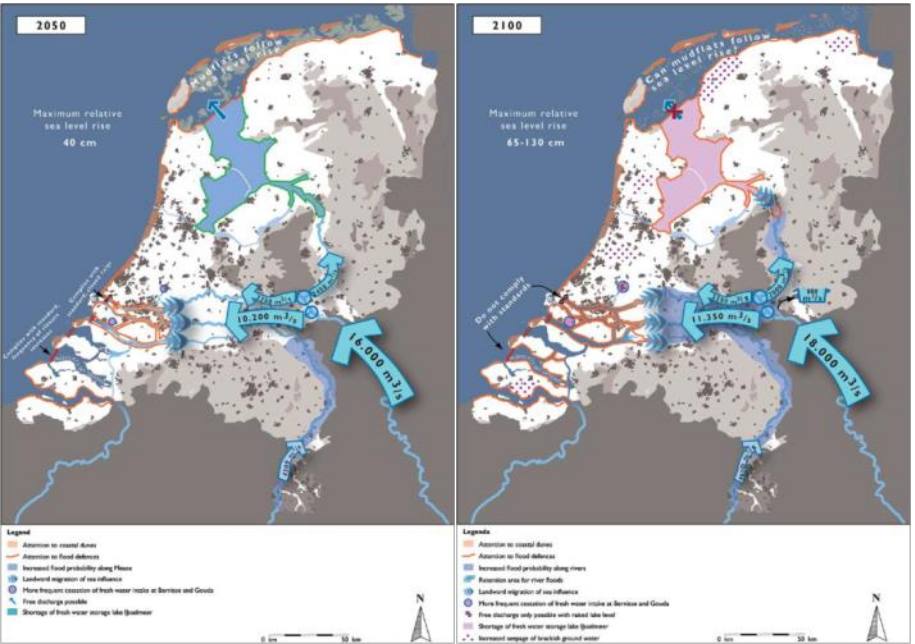
New Orleans, depois da passagem do Katrina (29 Agosto 2005)
Deltares, 2010

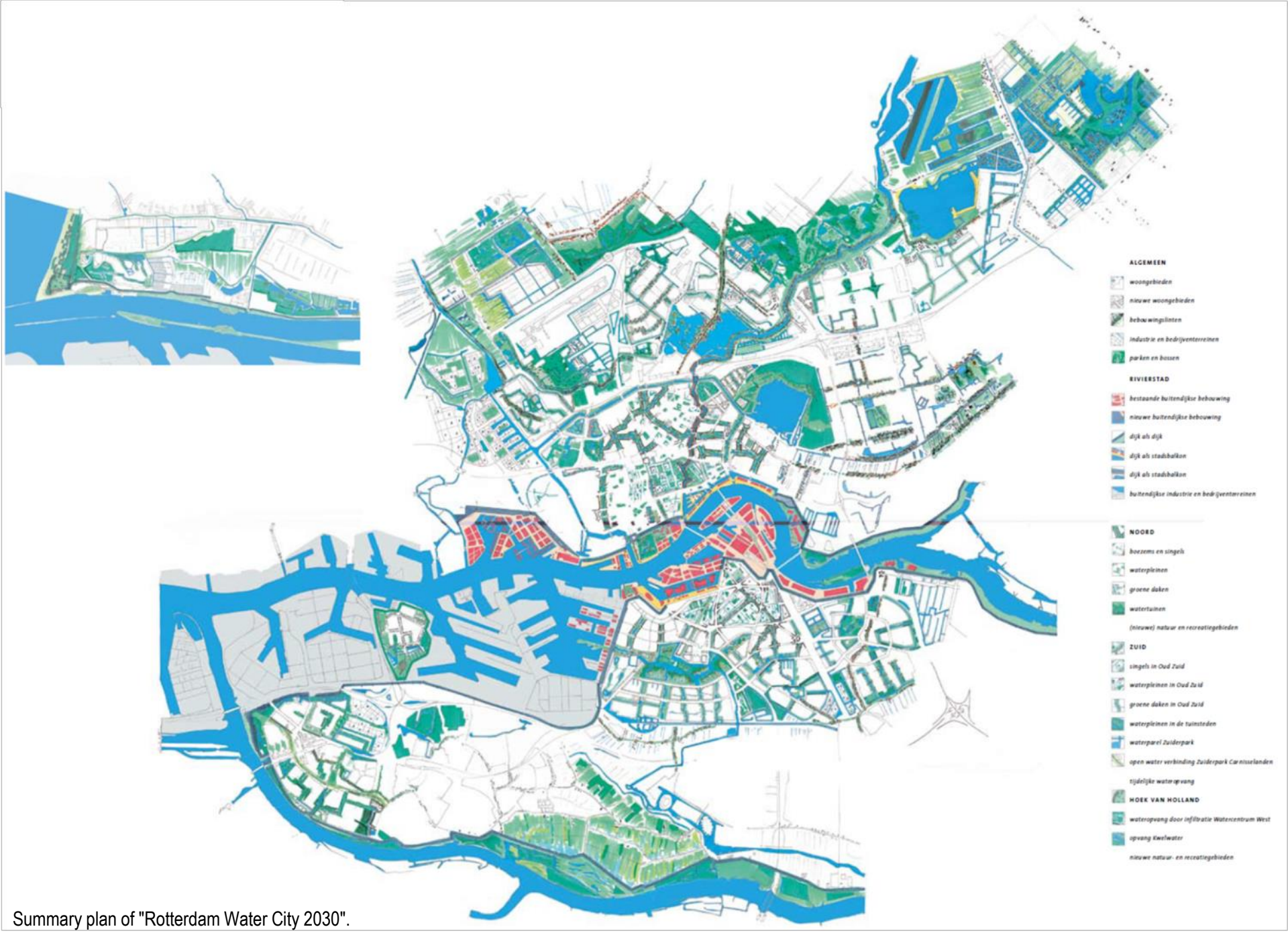
3. THE EMERGENCE OF THE CLIMATE CHANGE ADAPTATION AGENDA IN THE LATE 2000'S

3.1 REPRESENTATIVE CASES: THE NETHERLANDS, ROTTERDAM

Territorial outline of the national actions of the Delta Programme
Deltacommissie, 2008

Territorial scheme of the estimated impact of climate change in the Netherlands at the horizons 2050 and 2100
Deltacommissie, 2008



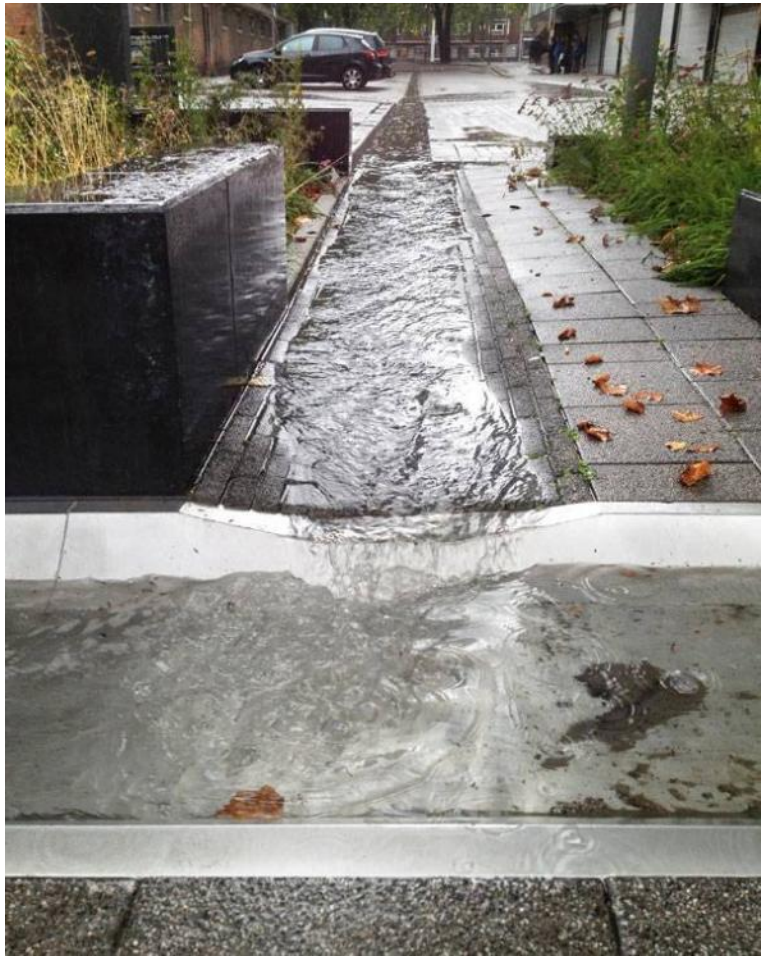


Summary plan of "Rotterdam Water City 2030".
Roterdam Climate Iniciative, 2010

Water plaza, De Urbanisten, 2009

Benthemplein Square , Rotterdam, The Netherlands. *Jurgen Bals, 2014*.

Benthemplein Square , Rotterdam, The Netherlands. *Maria Matos Silva, Johannes Odé, 2014*.



Benthemplein Square , Rotterdam, The Netherlands. *Maria Matos Silva, Jurgen Bals, 2014*.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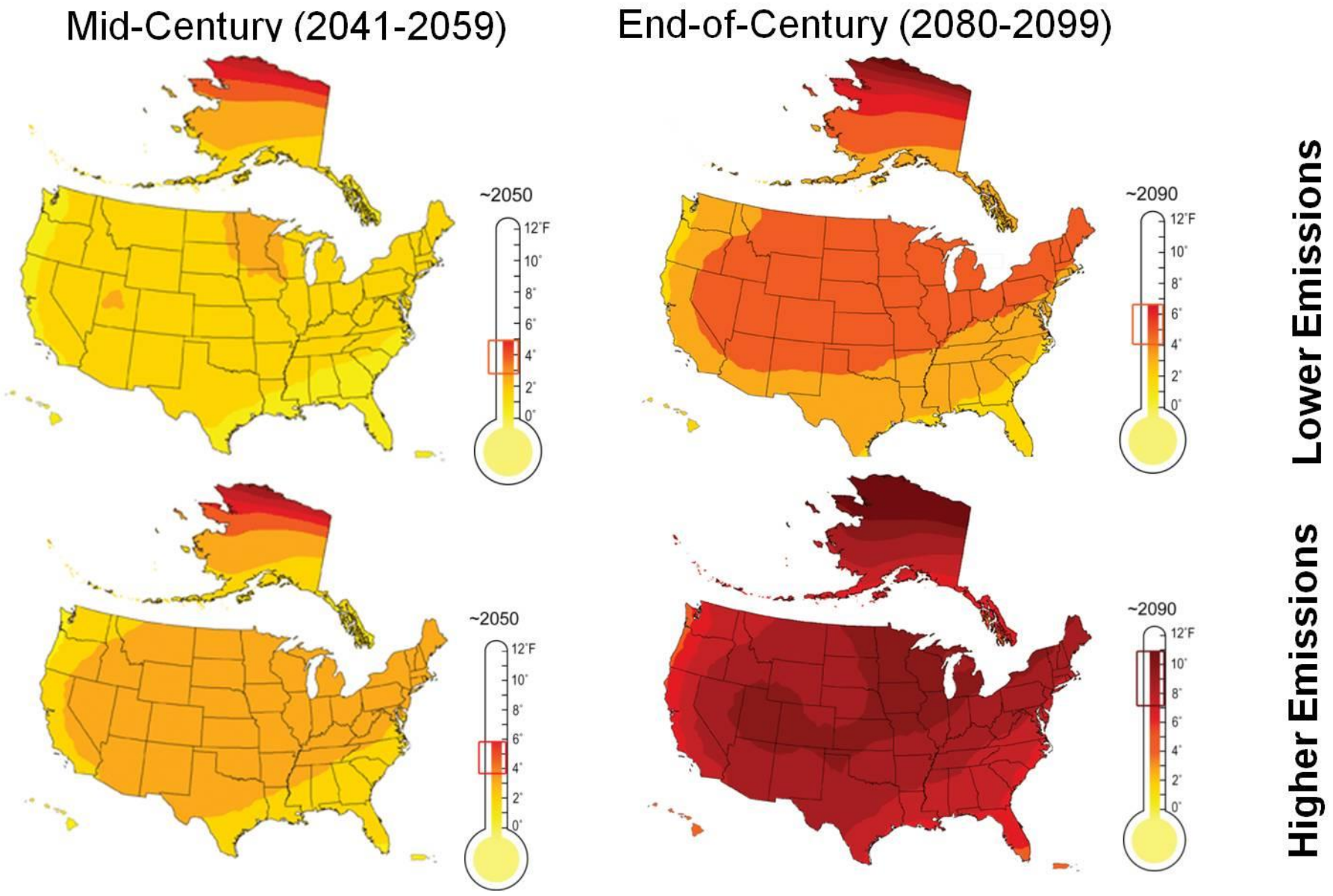
Rotterdam, Westersingel en Eendrachtsweg.

3.2 REPRESENTATIVE CASES: UNITED STATES, SAN FRANCISCO AND NEW YORK



Rising Temperature Projections in the USA for the less favourable scenarios.
Global Climate Change Impact in the USA Report, 2009

Climate change adaptation: simulations

San Francisco Bay US (2008)

San Francisco Bay (2008):

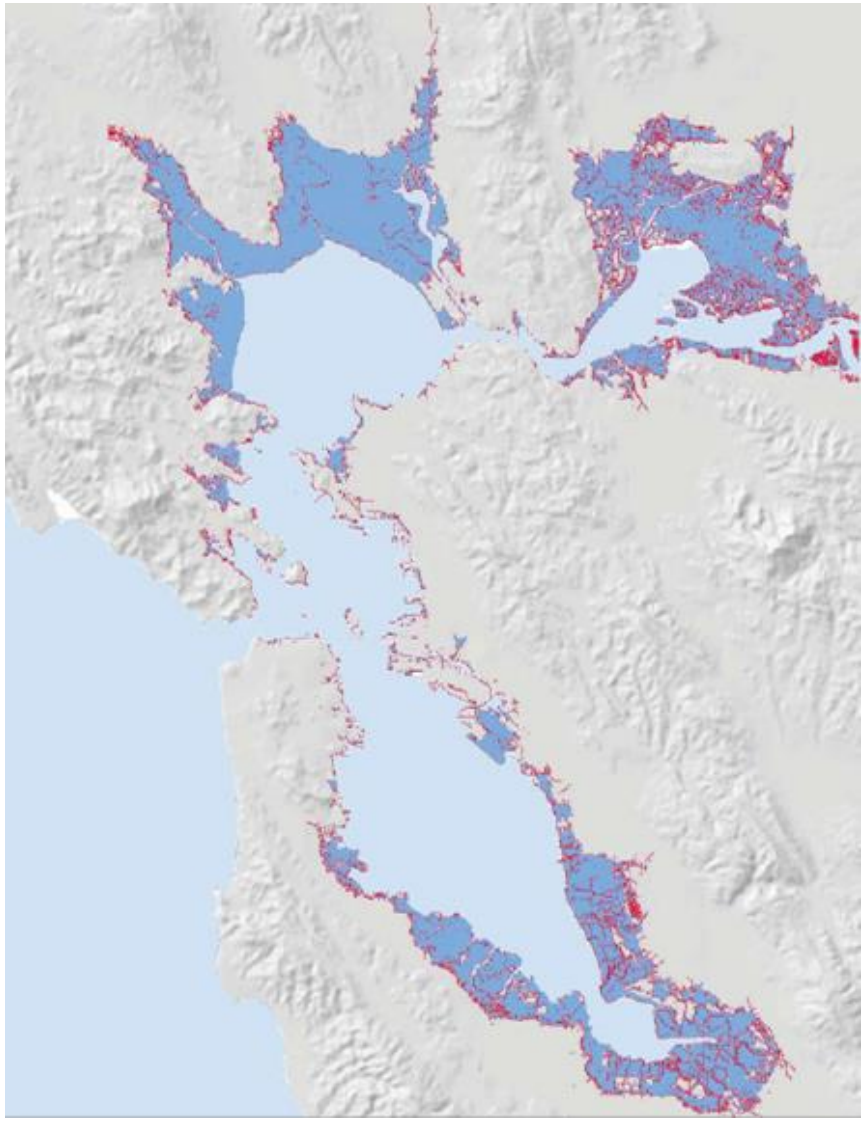
=> San Francisco observed sea level with trend of 19.3 cm last century
(California Climate Action Team Report, 2006)

=> SFB projected temperature warming scenarios:
- Lower emissions scenario: 3.5 – 5.0 ºC
- Medium emissions scenario: 5.5 – 8.0 ºC
- High emissions scenario: 8.0 – 10.0 ºC

=> SFB projected 2100 sea level rise, reviewing IPCC4AS:
(California Climate Action Team Report, 2009)
- B1 scenario: 0.6 – 1.0 m
- A1f1 scenario: 1.0 – 1.4 m

⇒ 30 cm increase in sea level rise would shift the 100-year storm surge-induced flood event to once every 10 years

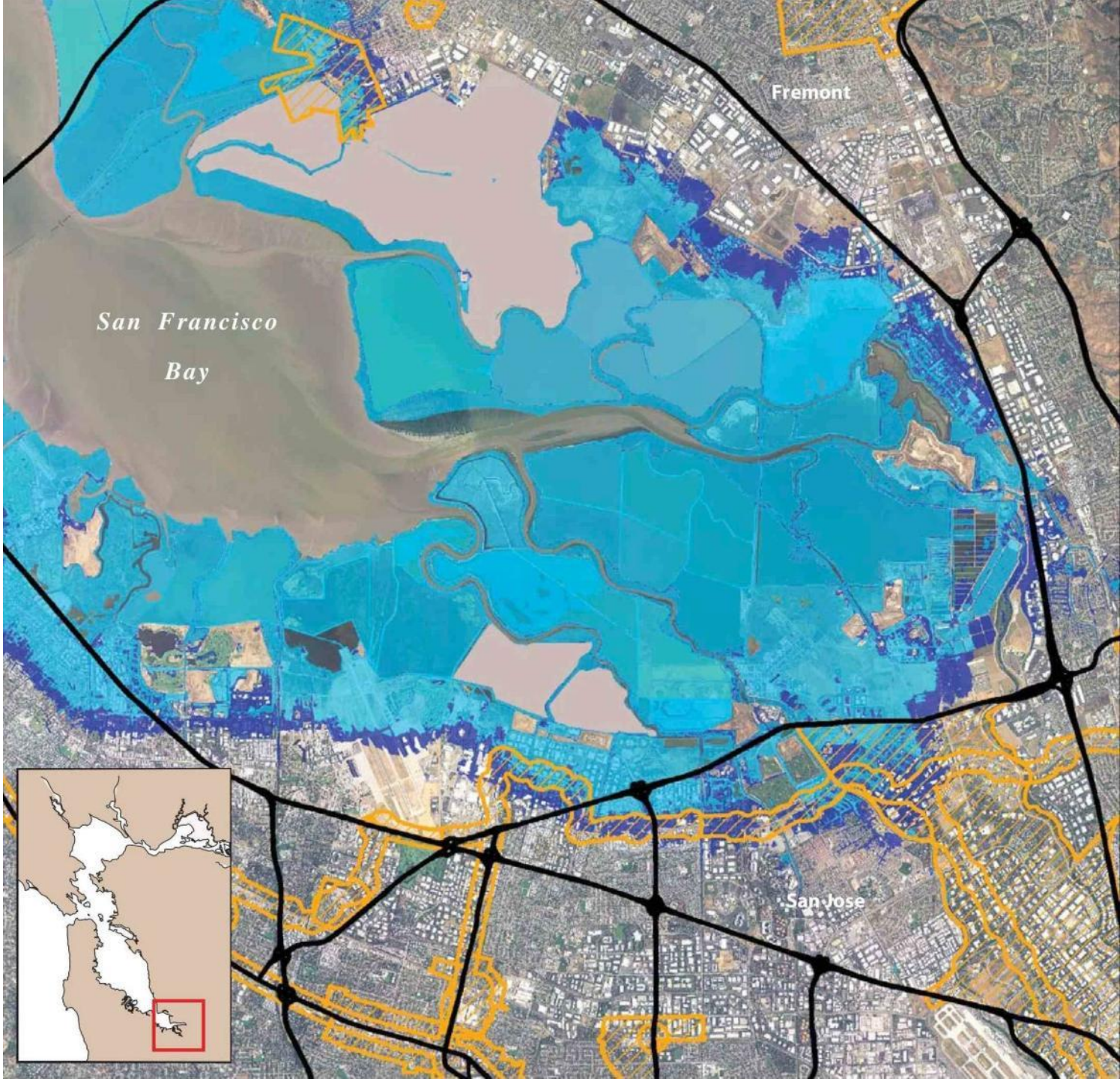
=> Rising Tides Design Ideas Competition, 2008:
www.risingtidescompetition.com



San Francisco Bay, 0.4 m sea level rise simulation
Source: Travis, Will (2010)

Area subject to high tide with 0.4m of sea level rise

Current 100-year flood plain



San Francisco, South Bay (Silicon Valley), projection of mean sea level rise

0,4m, at horizon 2050

1,4m, at horizon 2100

Travis, Will, 2010

San Francisco, Central Bay, projected mean sea level rise

0,4m, at horizon 2050

1.4m, at horizon 2100

Travis, Will, 2010

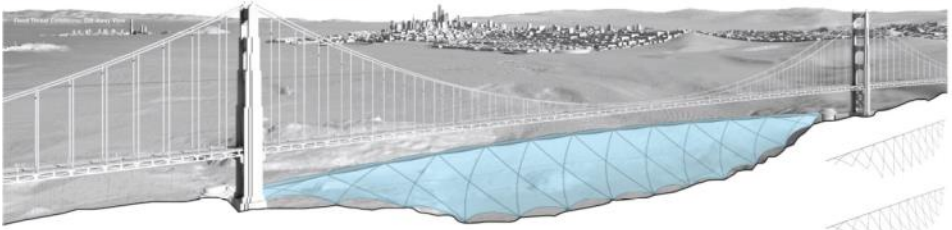
San Francisco, Central Bay, projection of mean sea level rise, showing major infrastructure and parks

0,4m, on the 205horizon

1,4m, on the 2100horizon

Travis, Will, 2010

BAYARC: A Tidal Responsive Barrier



The BayArc is a minimal, lightweight and environmentally sensitive system designed to protect the San Francisco Bay Area from periodic high water levels associated with Sea Level rise. It operates on organic principles of buoyancy and the structural efficiency associated with net membranes and tension. It is a concept that has the potential to eliminate billions of dollars in permanent levees and localized Bay Area flood protection without compromising the Bay's system of ecology and commerce.

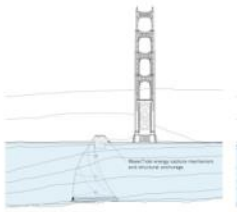
Typically, low-lying areas around the Bay are protected from tidal flooding. FEMA has established extreme high water guidelines and monitors communities that are potentially in danger. In fact, the principle threat of flooding in the next century is not from the rise in the sea level itself, but from the increase in extremes during high tides which create breaches of existing flood defenses for relatively brief periods.

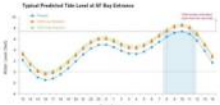
The objective of the BayArc is to prevent the peak of extreme tide events while maintaining a natural tidal exchange between the ocean and the bay.

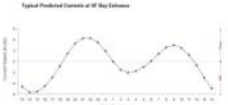
The BayArc consists of a submerged, cable-reinforced membrane anchored to the seabed that utilizes a bladder embedded in a tensile leading edge fastened to structural pylons at the water's edge. When deployed, the BayArc floats to the surface and its tensile membrane creates a barrier stretching from the water's edge to the sea floor. When it is not needed, the bladder is deflated, the BayArc sinks and rests on the sea floor.

The top cable of the BayArc is connected to anchors on each side of the Golden Gate Bridge – holding the membrane in place. A small amount of tidal or wave energy is captured by flotation devices at each anchor. This energy is used to compress air over time and is released quickly when the BayArc is deployed. The principle forces on the membrane result from drag during deployment as well as the hydrostatic imbalance due to the differential water level between the ocean and bay. The resulting gentle arc is a direct consequence of these forces. The arc's curvature in plan directly echoes the arc of the Golden Gate Bridge's primary cables. The curvature is derived from the bay's depth, the arc's material properties and span.

When the peak tide is projected to rise above a threat level, the BayArc is deployed. It remains deployed only until the high-tide peak has passed, "shaving off" the peak into the bay. As the falling ocean tide approaches the bay, the BayArc drops and rests on the sea floor as the currents begin to reverse flow. As noted below, projections for Sea Level rise by 2050 would require deployment for only a few hours per day and only a few times per year.







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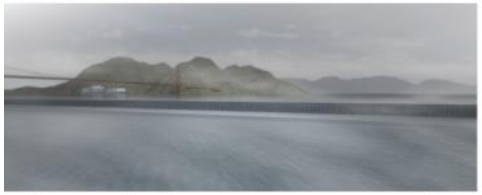
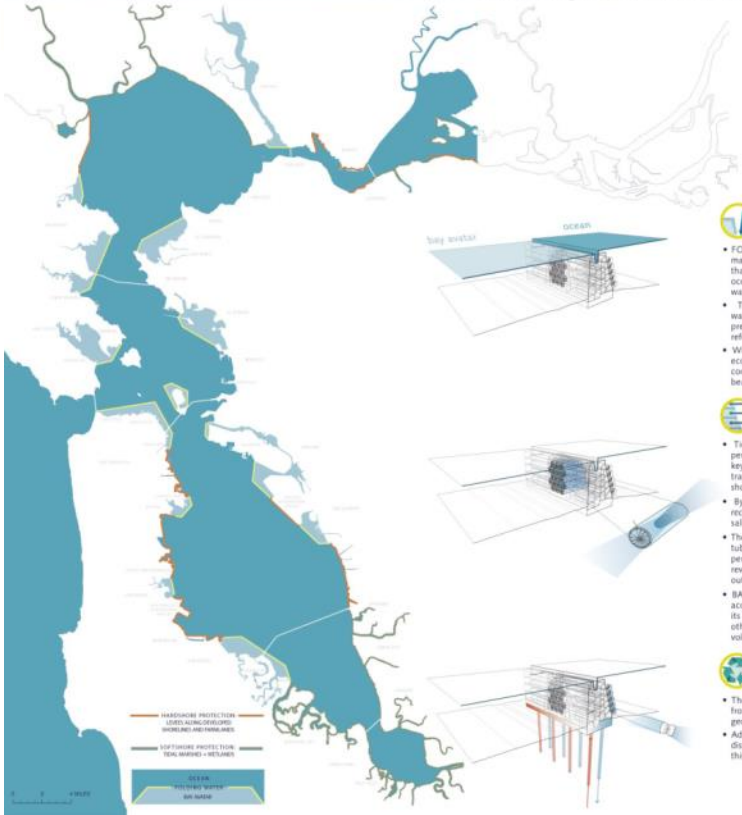
FOLDING WATER: A VENTILATED LEVEE FOR A LIVING ESTUARY



FOLDING WATER is a new "ventilated" levee that protects shorelines by regulating both sides—rising sea levels and the delta and bay waters—mechanically managing tides to create micro-bay estuaries for the shoreline of San Francisco and other key areas within the Bay. Responding to dramatic global and climatic transformations, this *dynamic* levee system meets specific shoreline conditions to preserve waterfront property, activities such as recreation and tourism, and the estuarine ecology dependent on tidal action. It departs from the conventional, static levee—or dam—by exchanging waters through a perforated pump wall to artificially manage tides and to create micro-bay estuaries. These BAY AVATARS essentially maintain the current estuary's levels, activity, and ecology, sustaining the relationship between the estuary and its inhabitants. This mega-scaled civic project provides a vital portal for the cultural and environmental future of the region in the form of a monumental FOLD of water.



WATER LEVEL MANAGEMENT: THE FOLD

- FOLDING WATER is a levee mitigation system that maintains water elevations for existing shorelines that are susceptible to flooding and manages rising ocean waters through the design of a *bifurcated* water surface strategy.
- This *stealth* infrastructural system manages water—and is made of water—artistically preserving the interface of culture and ecology by reforming the bay surface.
- Without a divisive barrier, it extends the natural ecology of the bay and maintains vistas and visual connections that characterize its unique estuarine beauty.

TIDAL MANAGEMENT: THE VENTILATOR

- Tidal cycles are artificially managed through a perforated wall of pump "ventilators," located at key sections along its full height, to allow the transport of the entire water column between the shoreline and ocean waters, creating BAY AVATARS.
- By ventilating the regulated body of water, it recreates the ecological exchanges of sediment, salinity, and biota promoted by the tides.
- The perforations are composed of dual-functioning tubes that exploit the high pressure of the ocean to permit the water to enter the BAY AVATAR and reverse this pressure by pumping the mixed water out.
- BAY AVATARS can be specifically/locally tuned to accommodate the variety of shoreline conditions of its estuary, thus it can be universally applied in other estuaries to regulate flow, salinity and volume.

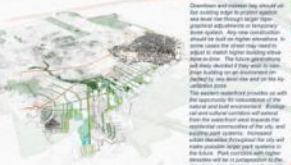
SELF-SUSTAINING ENERGY: GEOTHERMAL AND TIDAL

- The aquatic infrastructure could operate its system from the energy extracted from tidal turbines and/or geo-thermal energy plants.
- Additionally, desalination facilities and waste water disposal could be incorporated within the mass of this levee structure.

REGISTRATION #: 220864

Ezopportunity: proposed green infrastructure system

Eldiversifying the edge-combining economic, cultural and environental systems for a sustainable future



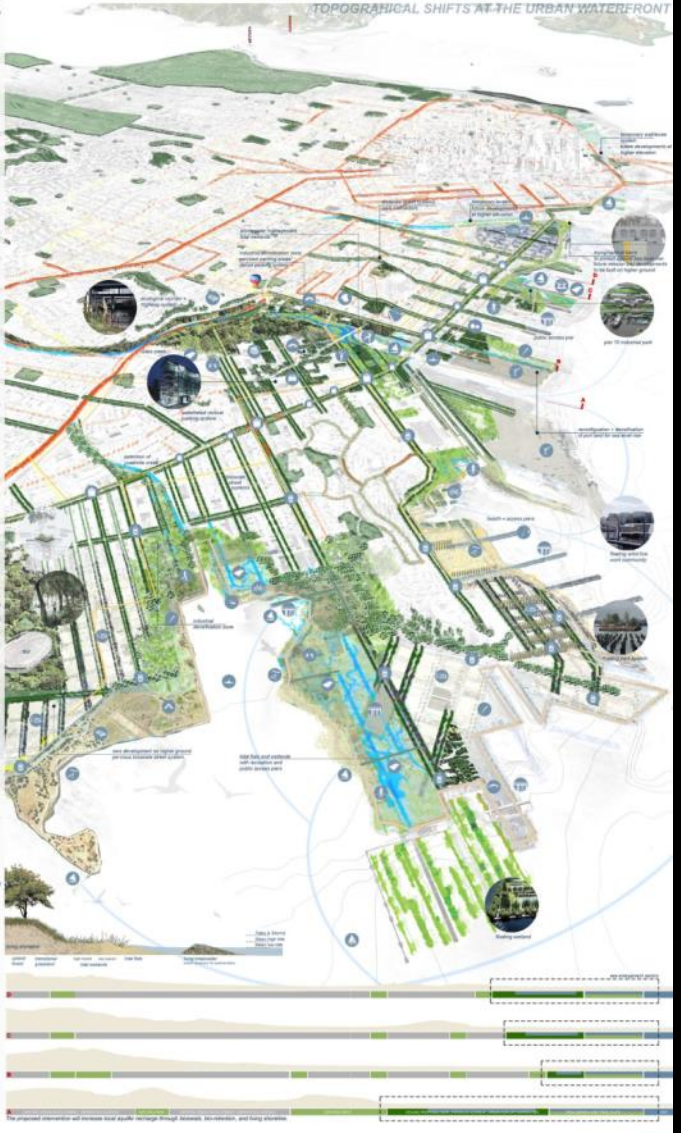
Eproposed ecological system existing park system & dense city fabric

Eltoxins and sea level rise

Elexisting industrial land/public transportation urban barriers

Elzoriginal watersheds and shoreline edge of san francisco

TOPOGRAPHICAL SHIFTS AT THE URBAN WATERFRONT



TOPOGRAPHICAL SHIFTS AT THE URBAN WATERFRONT

OPPORTUNITIES FOR DIVERSIFICATION ALONG THE EDGE

202523

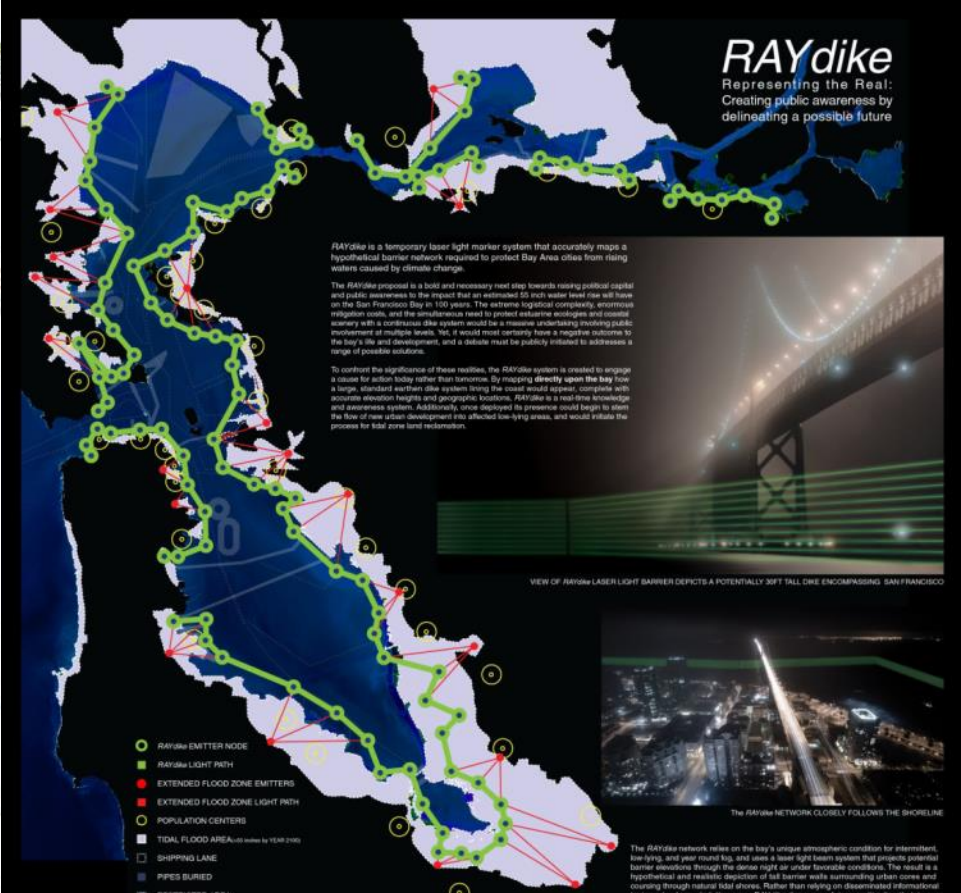
RAYdike

Representing the Real:
Creating public awareness by delineating a possible future

RAYdike is a temporary laser light marker system that accurately maps a hypothetical barrier network required to protect Bay Area cities from rising waters caused by climate change.

The *RAYdike* proposal is a bold and necessary next step towards raising political capital and public awareness to the impact that an estimated 55 inch water level rise will have on the San Francisco Bay in 100 years. The extreme logistical complexity, enormous mitigation costs, and the simultaneous need to protect estuarine ecologies and coastal scenery with a continuous dike system would be a massive undertaking involving public involvement at multiple levels. Yet, it would most certainly have a negative outcome to the bay's life and development, and a debate must be publicly initiated to addresses a range of possible solutions.

To confront the significance of these realities, the *RAYdike* system is created to engage a cause for action today rather than tomorrow. By mapping **directly upon the bay** how a large, standard earthen dike system lining the coast would appear, complete with accurate elevation heights and geographic locations, *RAYdike* is a real-time knowledge and awareness system. Additionally, once deployed its presence could begin to stem the flow of new urban development into affected low-lying areas, and would initiate the process for tidal zone land reclamation.

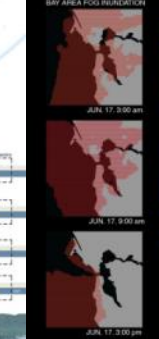


VIEW OF *RAYdike* LASER LIGHT BARRIER DEPICTS A POTENTIALLY 30FT TALL DIKE ENCOMPASSING SAN FRANCISCO

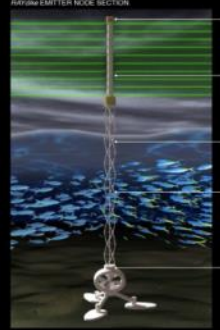
The *RAYdike* NETWORK CLOSELY FOLLOWS THE SHORELINE

The *RAYdike* network relies on the bay's unique atmospheric condition for intermittent, low-lying, and year round fog, and uses a laser light beam system that projects potential barrier elevations through the dense night air under favorable conditions. The result is a hypothetical and realistic depiction of tall barrier walls surrounding urban cores and coursing through natural tidal shores. Rather than relying on disseminated informational texts and color-coded diagrams, *RAYdike* diagrams a future reality directly into our everyday urban lives.

BAY AREA FOG INUNDATION



RAYdike EMITTER NODE SECTION



DEPICTIONS ILLUSTRATE PROBLEMATIC IMPACTS ASSOCIATED WITH A STANDARD DIKE SYSTEM

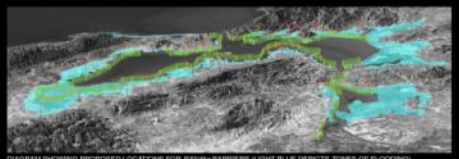
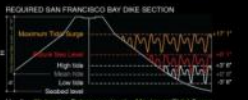


DIAGRAM SHOWING PROPOSED LOCATIONS FOR *RAYdike* BARRIERS (LIGHT BLUE DEPICTS ZONES OF FLOODING)

The *RAYdike* system can be deployed in segmented phases or in its entirety, and might be financed as a public campaign through donor philanthropy. Light emitter nodes are self-powering using existing wave generation technology, and the open truss vertical emitter nodes offer proven methods for seeding fish and shellfish farms underwater. Global warming is not a regional issue alone, and *RAYdike* can be deployed to other cities around the world, where an atmosphere of water, mist, and fog are often present, further aiding in the cause for global action.

REQUIRED SAN FRANCISCO BAY DIKE SECTION



H = h + Δh_land, + Future sea level + Maximum Tidal Surge

H = Total height of dike
h = Current mean water level
Δh = height of tide
land = 1/3
Future sea level = 55 inches
Maximum Tidal Surge = 9 feet

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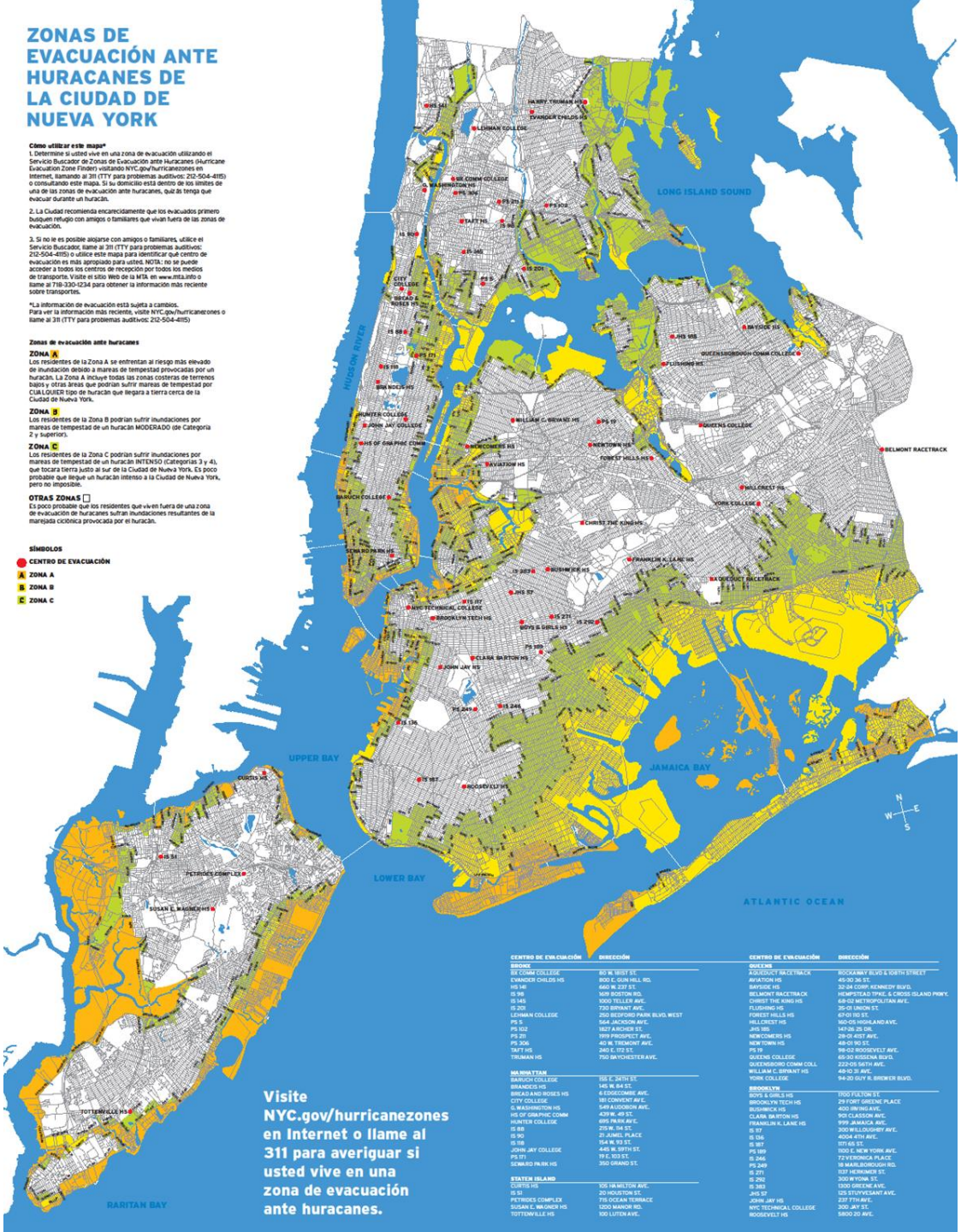
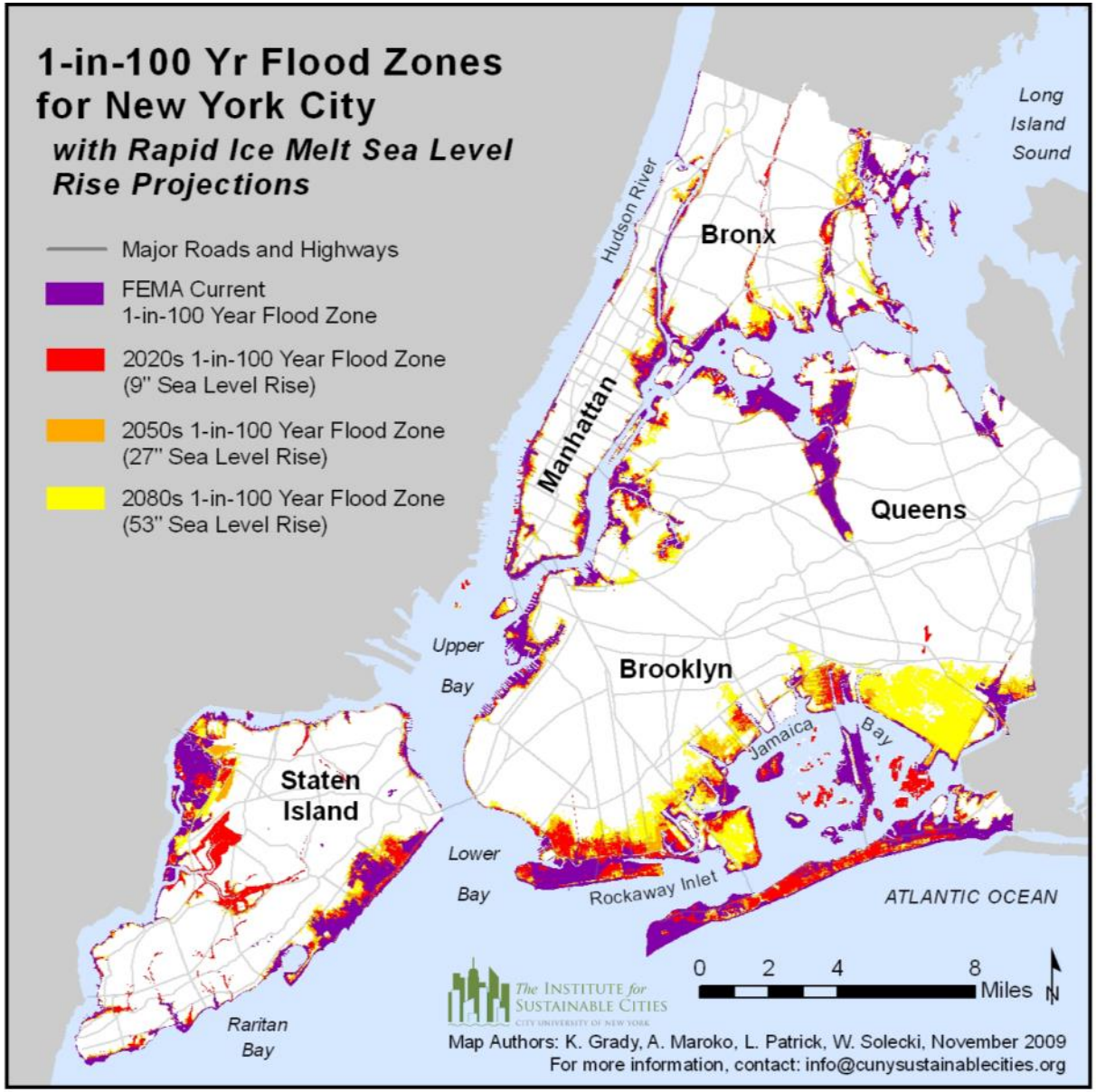


New York: areas potentially affected by the greatest 100-year flood, incorporating IPCC criteria (2007)
Grady, Maroko, Patrick, Solecki, 2009



0.23 m, 2020

0.69 m, 2050

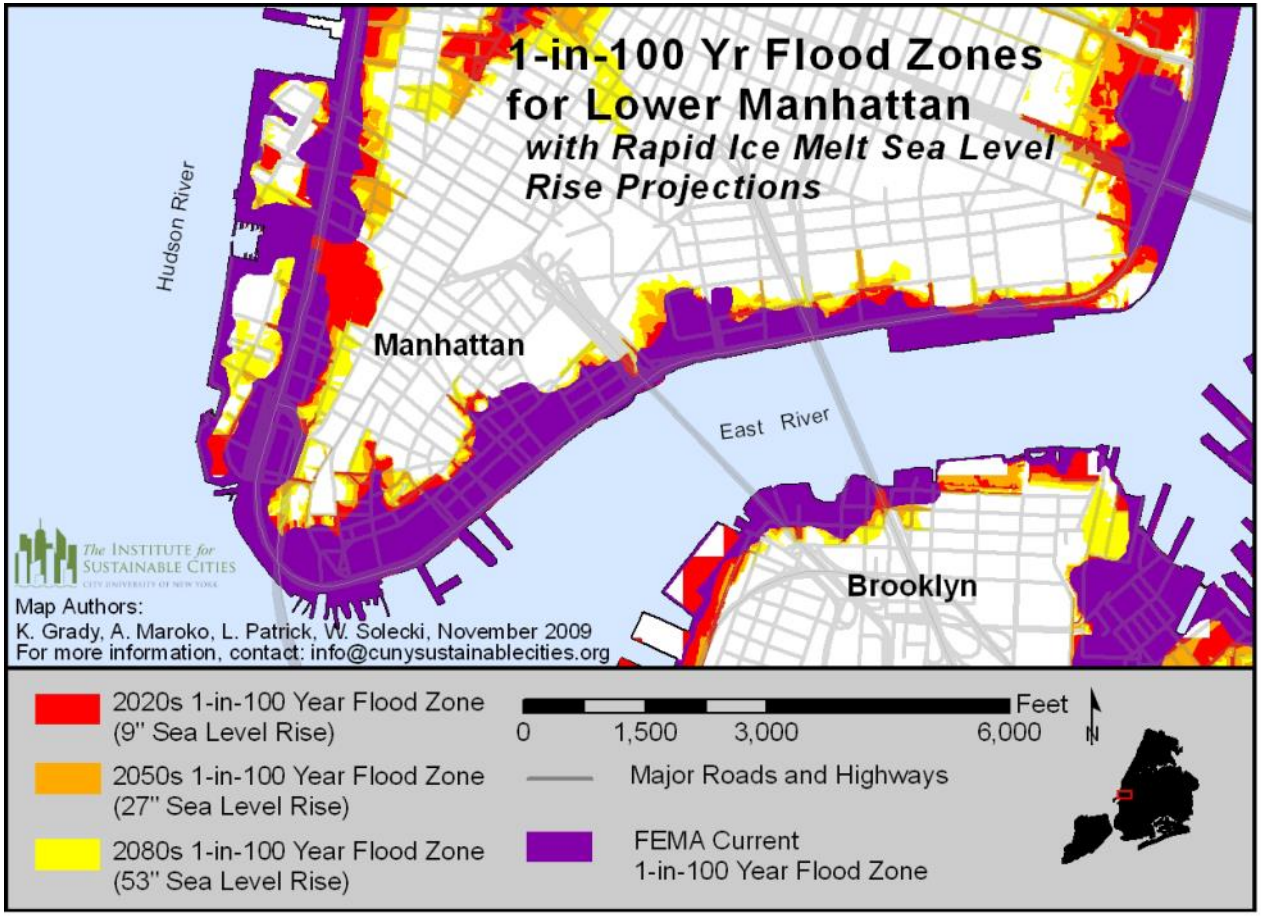
1.35 m, 2080

New York: areas potentially affected by the largest flood in 100 years, incorporating observations of melting ice into sea level rise
Grady, Maroko, Patrick, Solecki, 2009

*Note.*This map is subject to limitations in accuracy as a result of the quantitative models, datasets, and methodology used in its development. The map and data should not be used to assess actual coastal hazards, insurance requirements, or property values or be used in lieu of Flood Insurance Rate Maps issued by FEMA.

Interpretation. The floodplains delineated above in no way represent precise flood boundaries but rather illustrate three distinct areas of interest: 1) areas currently subject to the 1-in-100 year flood that will continue to be subject to flooding in the future, 2) areas that do not currently flood but are expected to potentially experience the 1-in-100 year flood in the future, and 3) areas that do not currently flood and are unlikely to do so in the timeline of the climate projection scenarios used in this research (end of the current century).

New York City, Lower Manhattan: areas potentially affected by the largest flood in 100 years, incorporating observations of melting ice into sea level rise
Grady, Maroko, Patrick, Solecki, 2009



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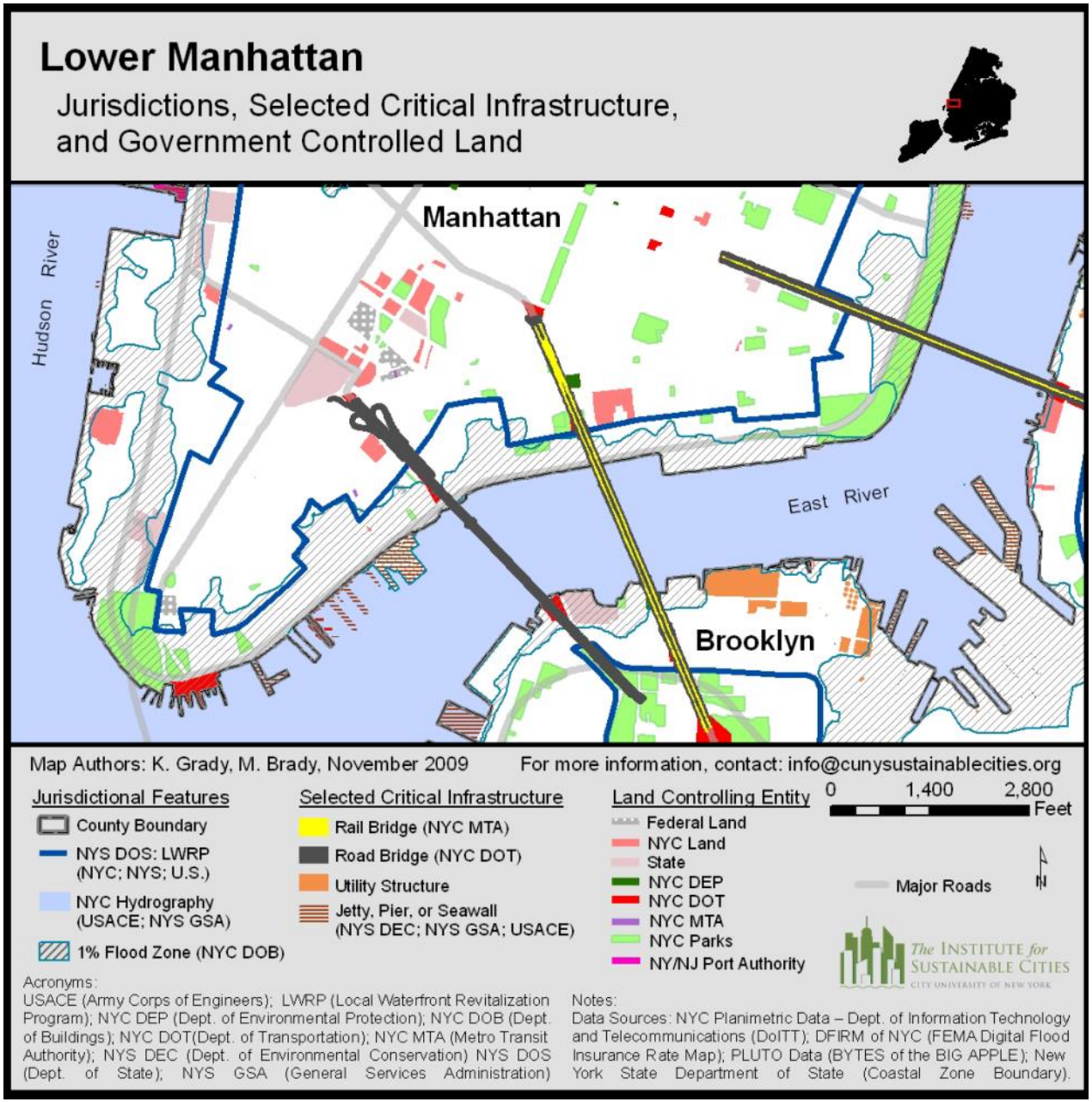
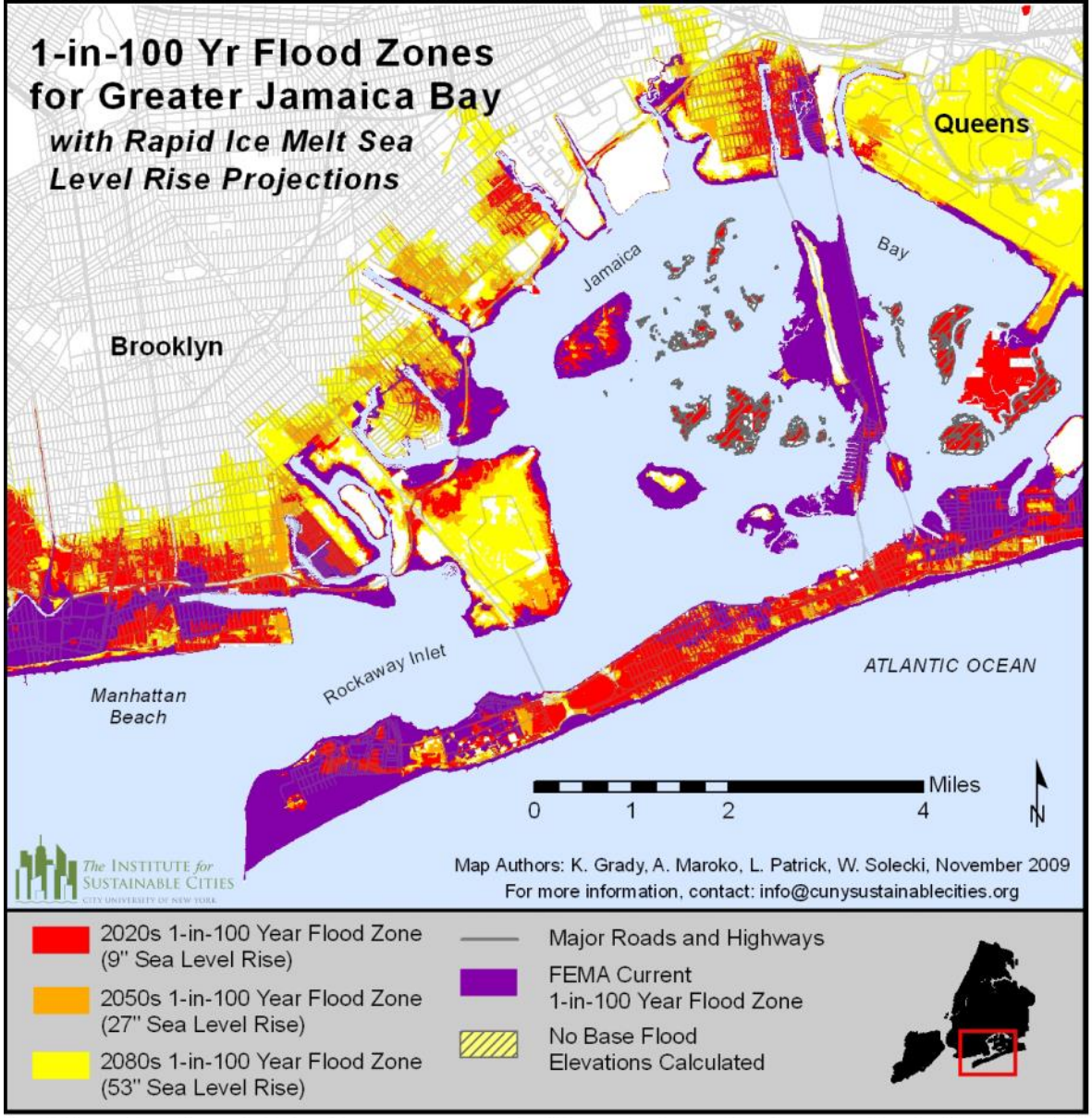


Nova Iorque, Manhattan (sul) e Brooklyn (norte): jurisdições, solo de controlo governamental e infra-estruturas críticas

Grady, Maroko, Patrick, Solecki, 2009

New York, Jamaica Bay: areas potentially affected by the largest flood in 100 years, incorporating observations of melting ice into sea level rise

Grady, Maroko, Patrick, Solecki, 2009



*Note.*This map is subject to limitations in accuracy as a result of the quantitative models, datasets, and methodology used in its development. The map and data should not be used to assess actual coastal hazards, insurance requirements, or property values or be used in lieu of Flood Insurance Rate Maps issued by FEMA.

Interpretation. The floodplains delineated above in no way represent precise flood boundaries but rather illustrate three distinct areas of interest: 1) areas currently subject to the 1-in-100 year flood that will continue to be subject to flooding in the future, 2) areas that do not currently flood but are expected to potentially experience the 1-in-100 year flood in the future, and 3) areas that do not currently flood and are unlikely to do so in the timeline of the climate projection scenarios used in this research (end of the current century).

New York, Jamaica Bay: jurisdictions, government control soil and critical infrastructure
Grady, Maroko, Patrick, Solecki, 2009

New York, proposed light infrastructure to transform the "Upper Bay" into a "Palisade Bay" under scenarios of rising mean sea level.
Nordenson, Seavitt, Yarinsky, 2010

MARYLAND AT RISK

SEA-LEVEL RISE ADAPTATION & RESPONSE

September, 2008

SEA-LEVEL RISE ACTION PLAN—KEY RECOMMENDATIONS

- **Take action now to protect human habitat and infrastructure from future risks.**
  Require the integration of coastal erosion, coastal storm, and sea-level rise adaptation and response planning strategies into existing state and local policies and programs. *Develop* and *implement* state and local adaptation policies (i.e., protect, retreat, abandon) for vulnerable infrastructure. *Strengthen* building codes and construction techniques for new infrastructure and buildings in vulnerable coastal areas.

- **Minimize risks and shift to sustainable economies and investments.**
  Develop and *implement* long-range plans to minimize the economic impacts of sea-level rise to natural resource-based industries. *Establish* an Advisory Committee to advise the state of the risks that climate change poses to the availability and affordability of insurance. *Develop* a *Maryland Sea-Level Rise Disclosure and Advisory Statement* to inform prospective coastal property purchasers of the potential impacts of climate change. *Recruit, foster,* and *promote* market opportunities related to climate change adaptation and response.

- **Guarantee the safety and well-being of Maryland's citizens in times of foreseen and unforeseen risk.**
  Strengthen coordination and management across agencies responsible for human health and safety. *Conduct* health impact assessments to evaluate the public health consequences of climate change and sea-level rise-related projects and/or policies. *Develop* a coordinated plan to assure adequacy of vector-borne surveillance and control programs.

- **Retain and expand forests, wetlands, and beaches to protect us from coastal flooding.**
  Identify high priority protection areas and strategically and cost-effectively direct protection and restoration actions. *Develop* and *implement* a package of appropriate regulations, financial incentives, and educational, outreach, and enforcement approaches to retain and expand forests and wetlands in areas suitable for long-term survival. *Promote* and *support* sustainable shoreline and buffer area management practices.

- **Give state and local governments the right tools to anticipate and plan for sea-level rise and climate change.**
  Strengthen federal, state, local, and regional observation systems to improve the detection of biological, physical, and chemical responses to climate change and sea-level rise. *Update* and *maintain* state-wide mapping, modeling, and monitoring products. *Utilize* new and existing educational, outreach, training, and capacity-building programs to disseminate information and resources related to climate change and sea-level rise.

- **State and local governments must commit resources and time to assure progress.**
  Develop state-wide sea-level rise planning guidance to advise adaptation and response planning at the local level. *Develop* and *implement* a system of performance measures to track Maryland's success at reducing its vulnerability to climate change and sea-level rise.

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1. Johnson, Z., R. Barlow, I. Clark, C. Larsen, & K. Miller. 2006. *Worcester County Sea Level Rise Inundation Model: Technical report.* Maryland Department of Natural Resources, Annapolis, Maryland.
2. Carlisle, A., C. Conn, & S. Fabijanski. 2006. *Dorchester Inundation Study: Identifying natural resources vulnerable to sea level rise over the next 50 years?* Towson University Center for GIS, Towson, Maryland.

Martin O'Malley, Governor — John R. Griffin, Secretary

Chesapeake and Coastal Program
Tawes State Office Bldg, E2
Annapolis, MD 21401
Phone: (410) 260-8741
Toll-free in Maryland: 1-877-620-8DNR ext. 8741
www.dnr.maryland.gov

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FURTHER INFORMATION

For more information, visit
www.mde.state.md.us/Air/climatechange

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Printed on recycled paper

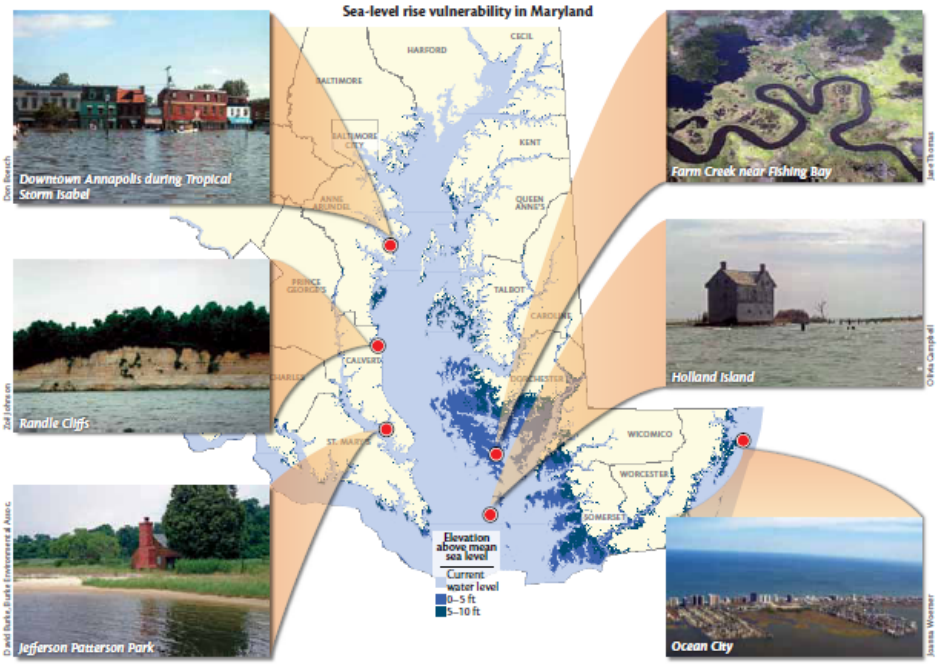
Edited by Zoë Johnson
Office for a Sustainable Future
Maryland Department of Natural Resources

WE MUST TAKE ACTION NOW TO PREPARE FOR THE IMPACTS OF CLIMATE CHANGE

Action is needed now to stem not only the drivers of climate change but also to prepare for the inevitable consequences. Maryland is extremely vulnerable to the impacts of climate change. Historic tide-gauge records show that sea levels are rising along Maryland's coast and, due to a combination of global sea-level rise and land subsidence, have risen approximately one foot within state waters over the last 100 years. As our climate changes, sea levels are expected to continue to rise—potentially twice as fast as they did during the 20th century. Maryland is at risk of experiencing another two-foot of sea-level rise by 2050 and as much as four feet of rise by 2100.

The Comprehensive Strategy to Reduce Maryland's Vulnerability to Climate Change, a key component of Maryland's Climate Action Plan (August, 2008; *www.mde.state.md.us/Air/climatechange*), sets forth the actions necessary to protect Maryland's people, property, natural resources, and public investments from the impacts of climate change. The vision for future preparedness is targeted at: 1) reducing impact to existing built environments, as well as to future growth and development; 2) shifting to sustainable investments and avoiding financial and economic impact; 3) enhancing preparedness to protect human health, safety, and welfare; and 4) restoring and protecting Maryland's natural resources and resource-based industries.

MARYLAND'S PEOPLE, PROPERTY, NATURAL RESOURCES, AND PUBLIC INVESTMENTS ARE AT RISK



Maryland Department of Planning (MDP) – Sea Level Rise

3.3 REPRESENTATIVE CASES: UNITED KINGDOM, KINGSTON UPPON-HULL AND LONDON

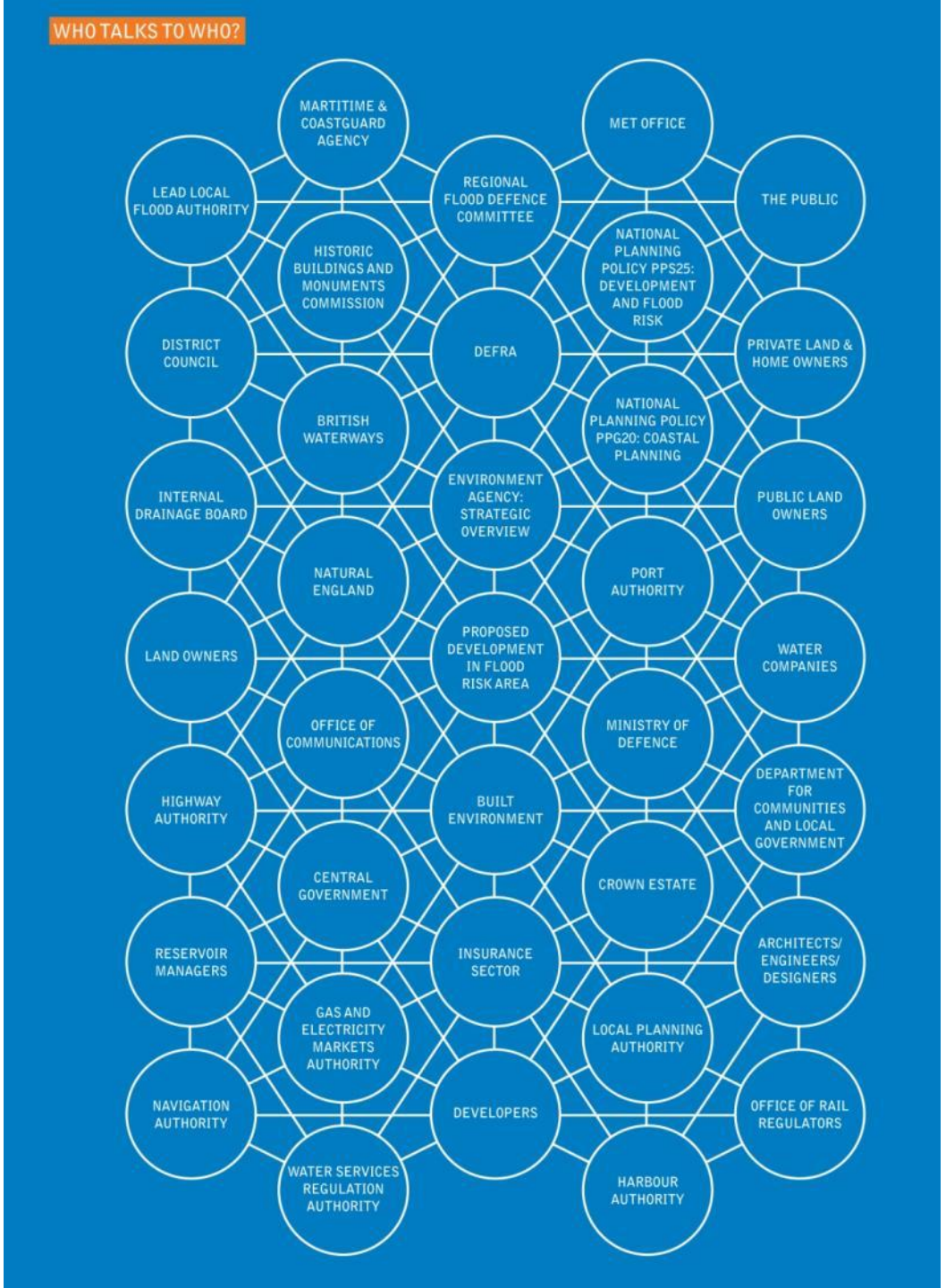
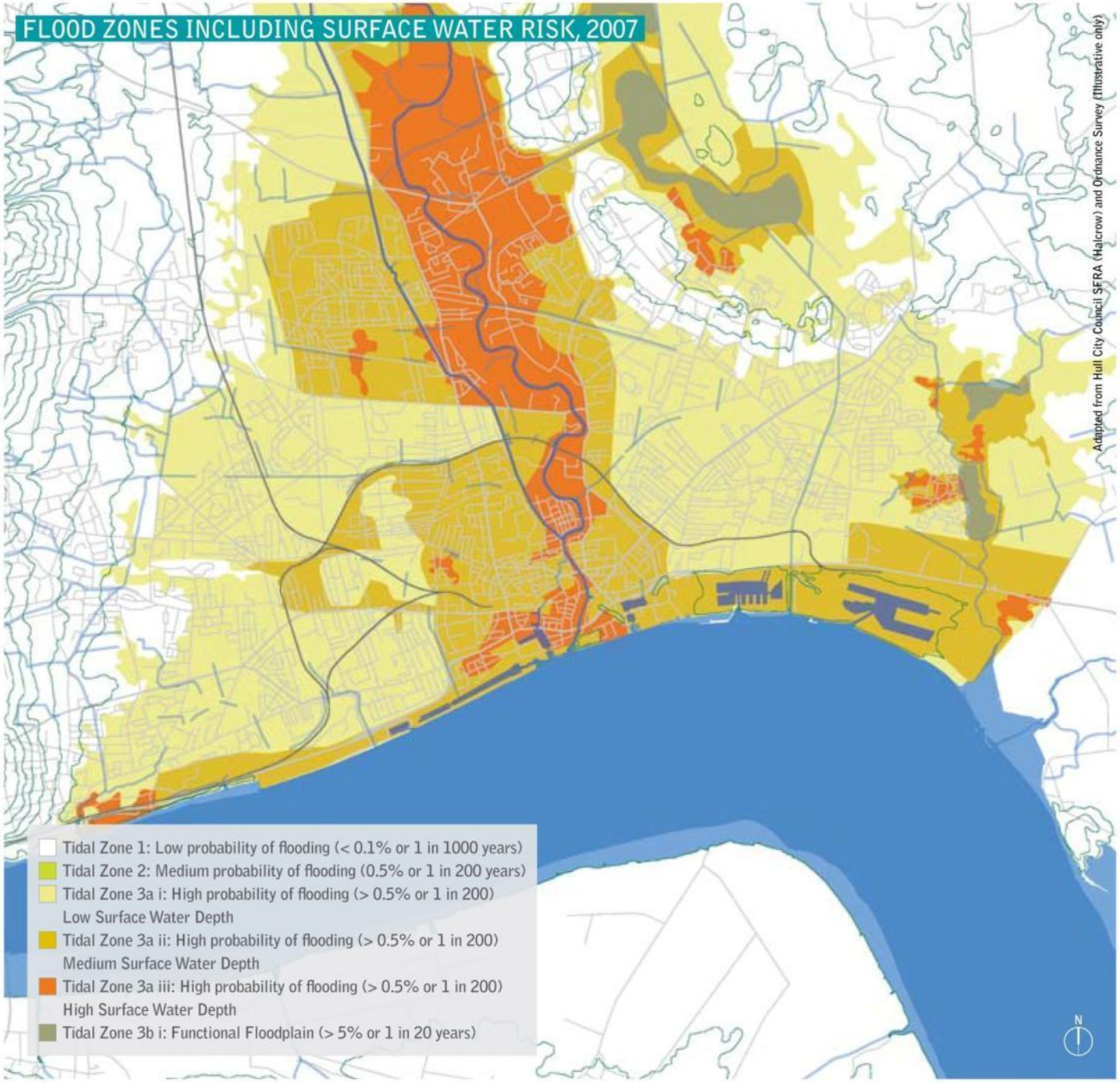
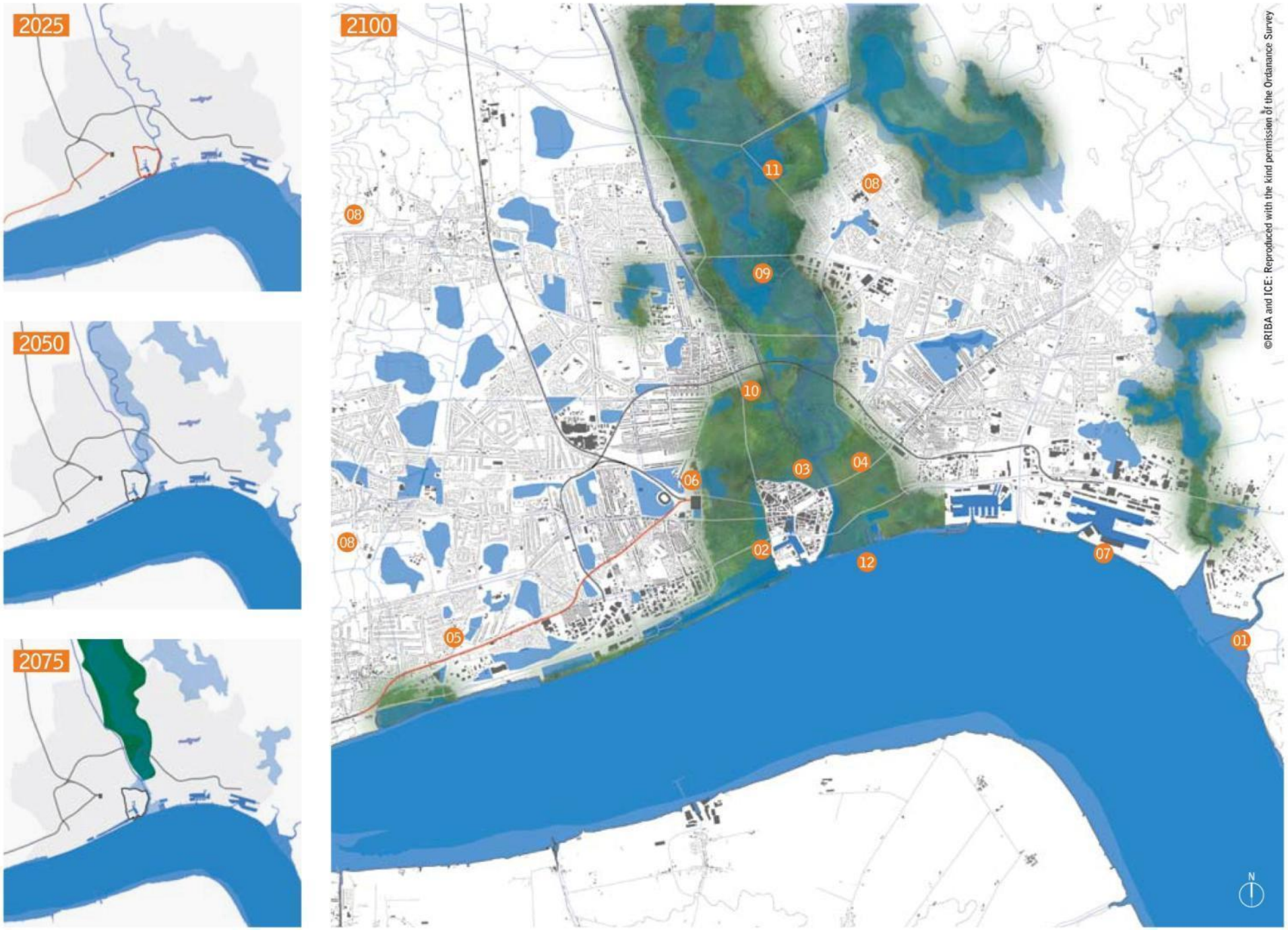


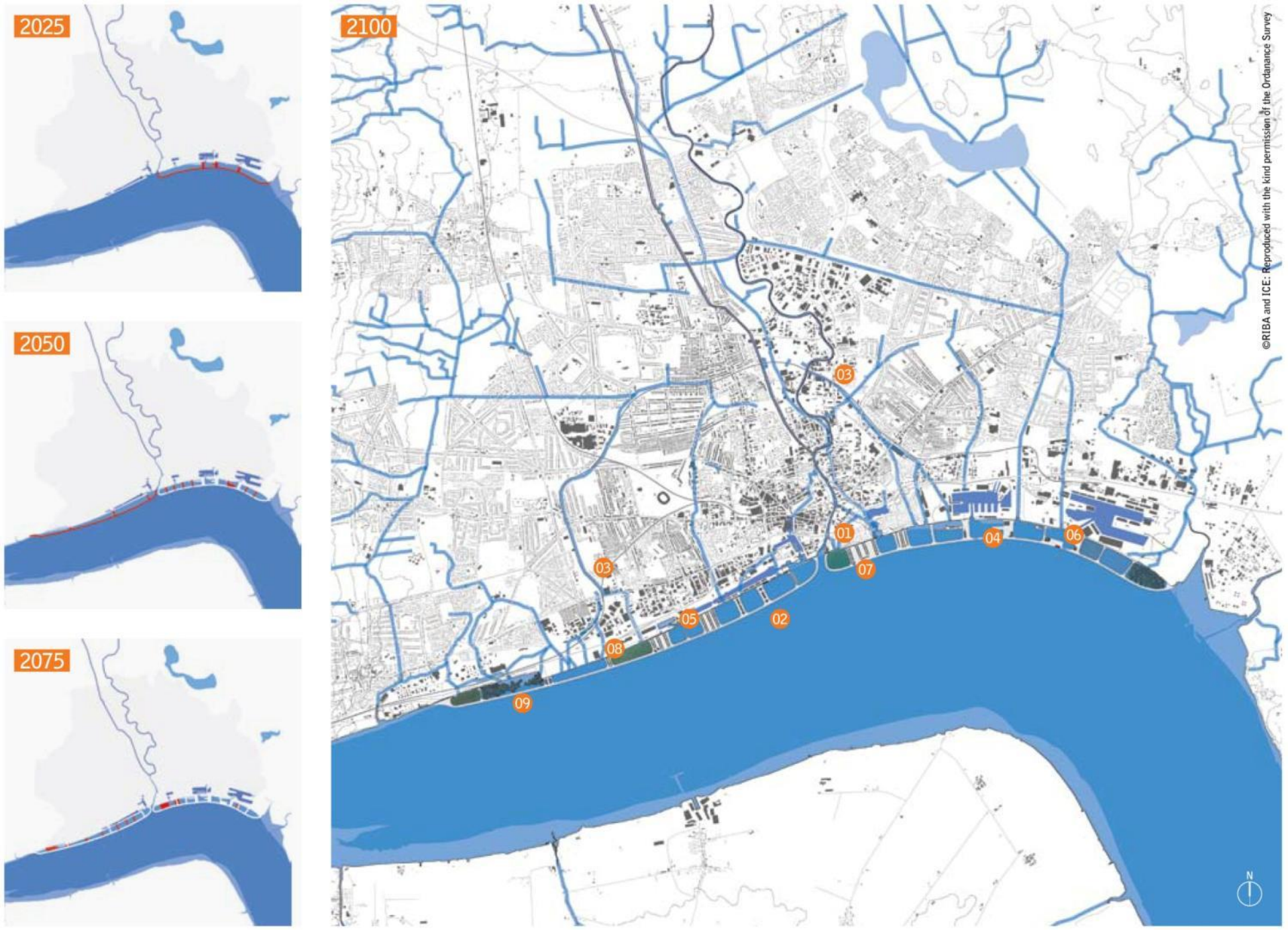
Diagrama de governabilidade para as frentes de água britânicas
Robinson, Hamer, 2009



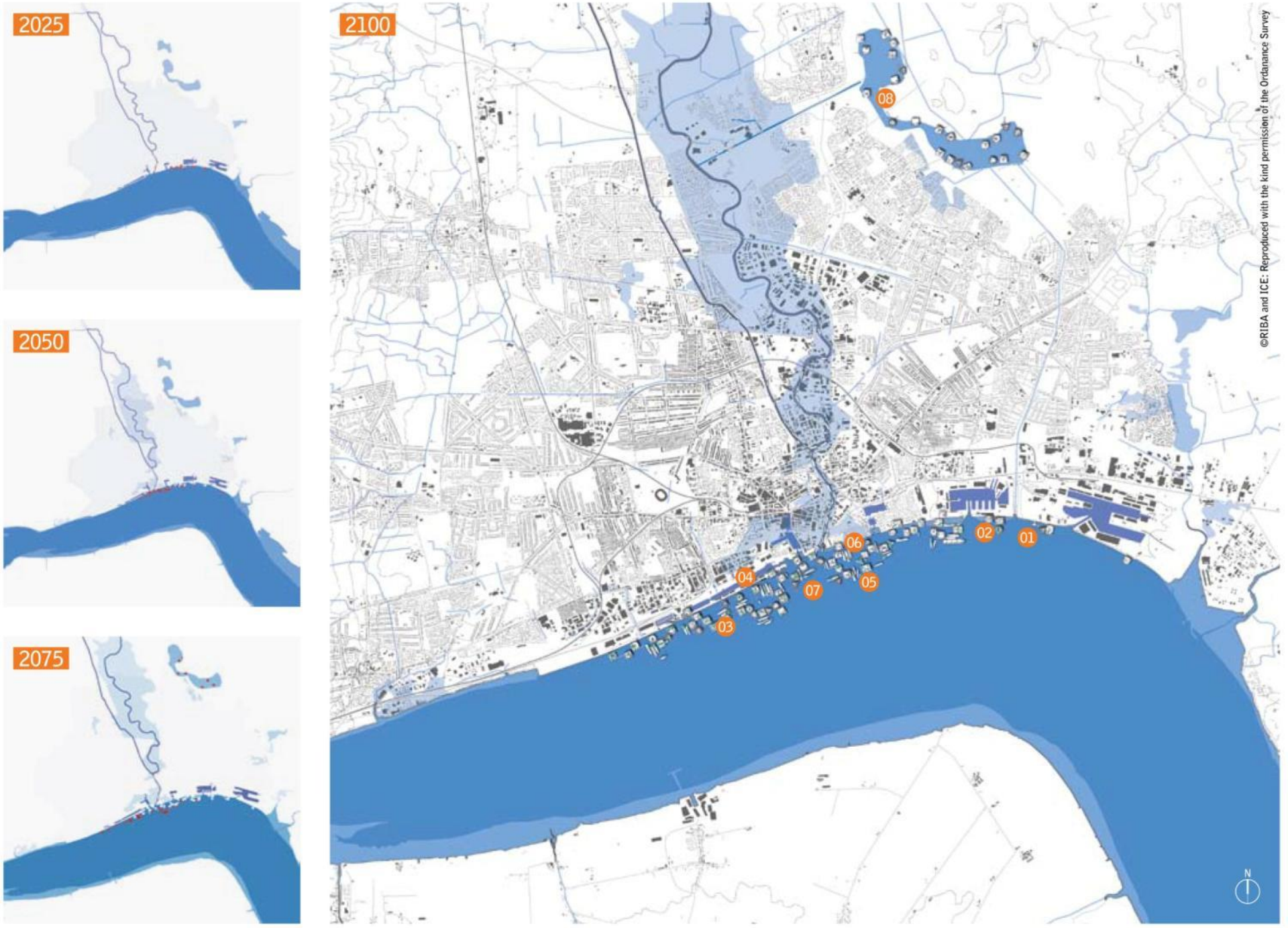
Kingston Upon Hull, carta de zonas de risco de inundação, 2007. *Robinson, Hamer, 2009*



Kingston Upon Hull, estratégia “Retreat” num cenário de subida do nível médio do mar de 2,0 m para o horizonte 2100. *Robinson, Hamer, 2009*

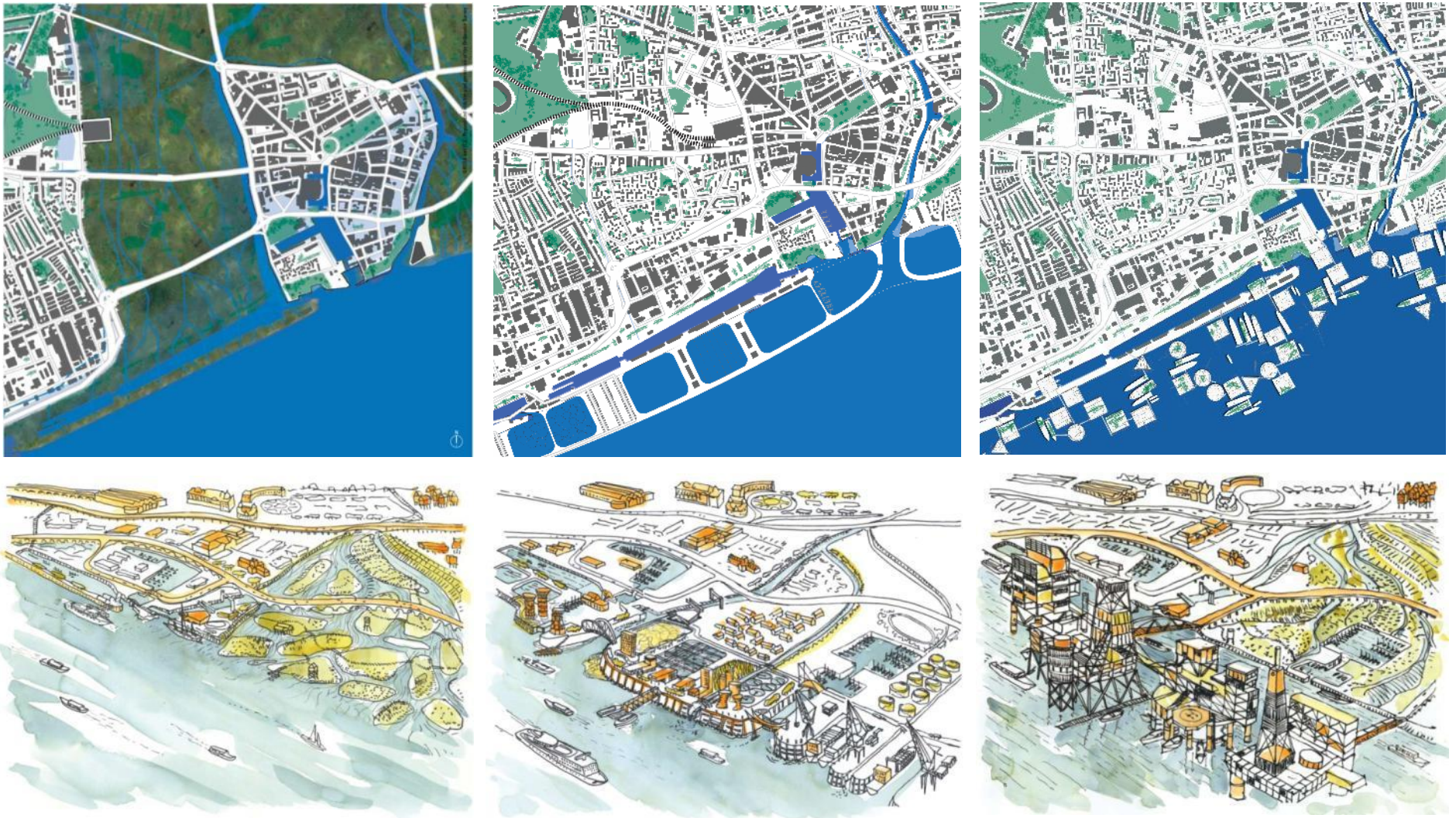


Kingston Upon Hull, estratégia “Defend” num cenário de subida do nível médio do mar de 2,0 m para o horizonte 2100. *Robinson, Hamer, 2009*



Kingston Upon Hull, estratégia “Attack” num cenário de subida do nível médio do mar de 2,0 m para o horizonte 2100. *Robinson, Hamer, 2009*

Retreat **Defend** **Attack**



Kingston Upon Hull, pormenor planimétrico e simulação tridimensional para as três estratégias, no horizonte 2100. *Robinson, Hamer, 2009*

Thames Estuary 2100 Plan (2009):

=> Climate change could lead to increases in sea level, storm surge height and peak river flows but the question is by how much

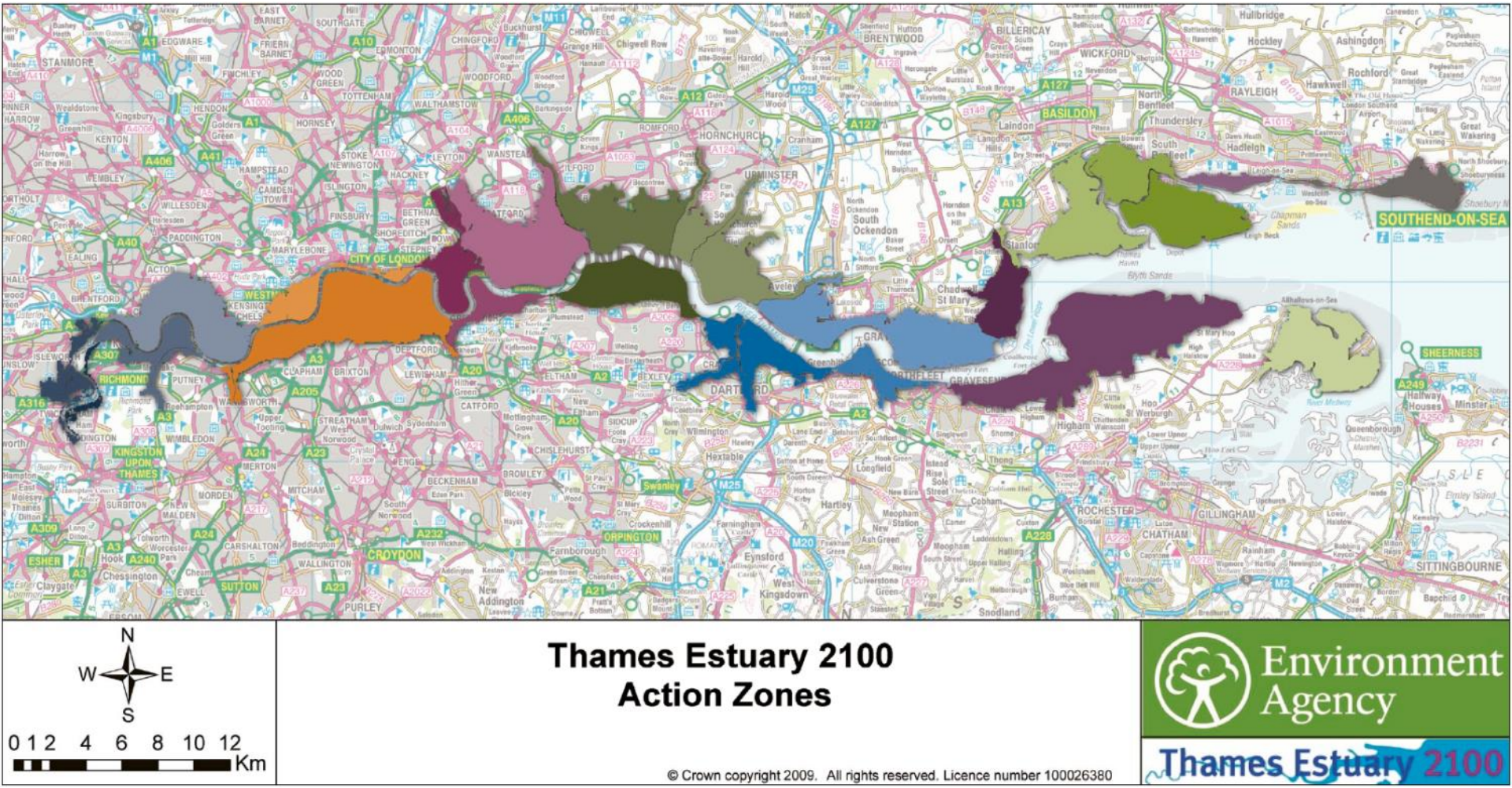
=> SLR in the Thames over the next century due to thermal expansion of the oceans, melting glaciers and polar ice is likely 0.2 – 0.9 m

=> There remains a lot of uncertainty over the contribution of polar ice melt to increasing SLR. At the extreme, SLR may be up to 2.0 m, although this is thought to be highly unlikely

=> Storm surge height and frequency in the North Sea is unlikely to change

=> Peak freshwater flows for the Thames, e.g. at Kingston, could increase by around 40% by 2080

=> Without effective mitigation future generations in London and the Thames estuary may have to deal with climate change which exceeds 2.7 m extreme scenario by 2100



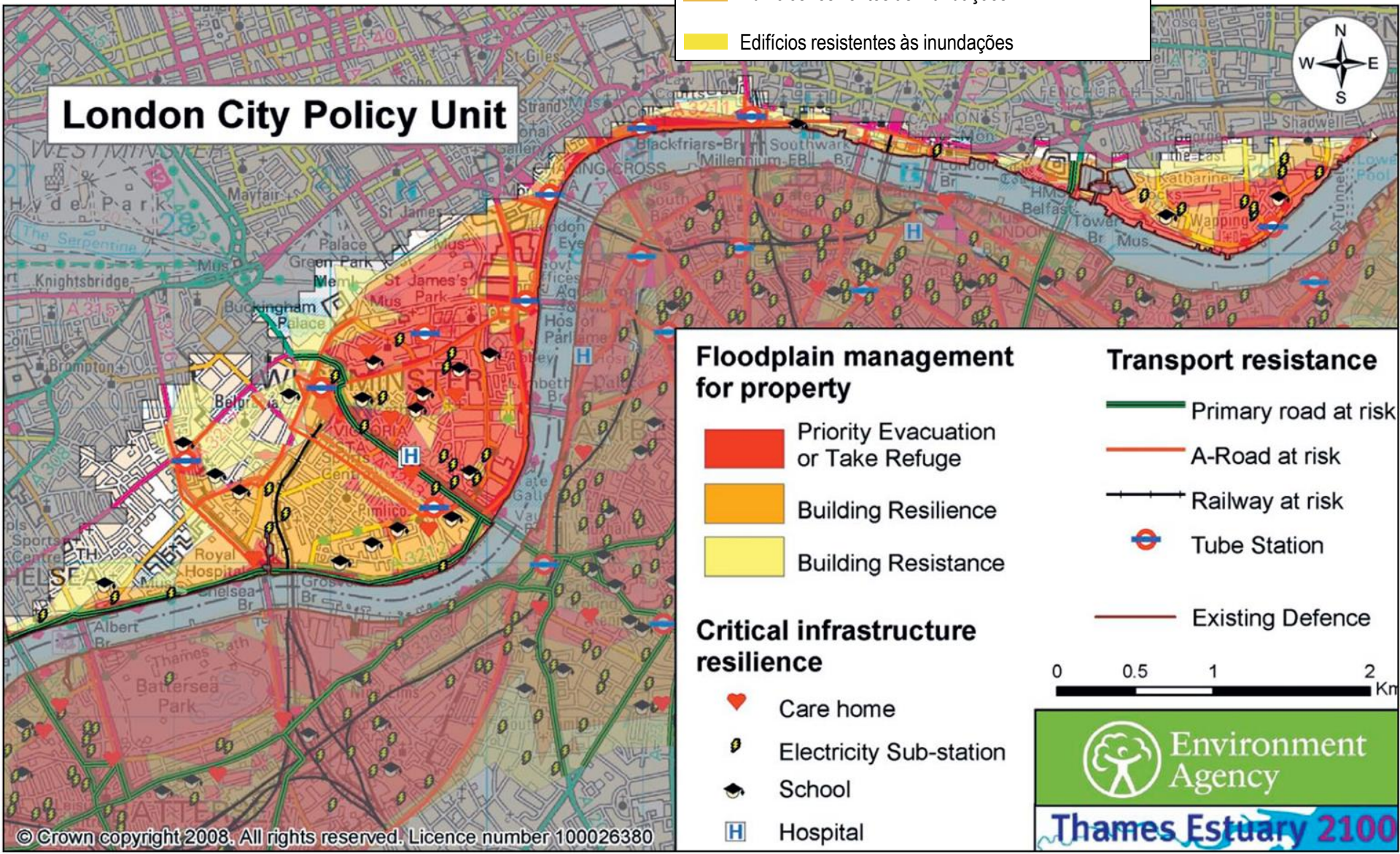
Londres, “Zonas de acção no Estuário do Tamisa”, no horizonte 2100, identificando a laranja a zona 2 – Londres Central, incluindo as subunidades “London City” e “Wandsworth to Deptford”. *Thames Estuary 2100 Plan, 2009*

Londres, “unidades territoriais na gestão do risco de inundações”, no horizonte 2100. Zona 2 – Londres Central, subunidade “London City”
Thames Estuary 2100 Plan, 2009

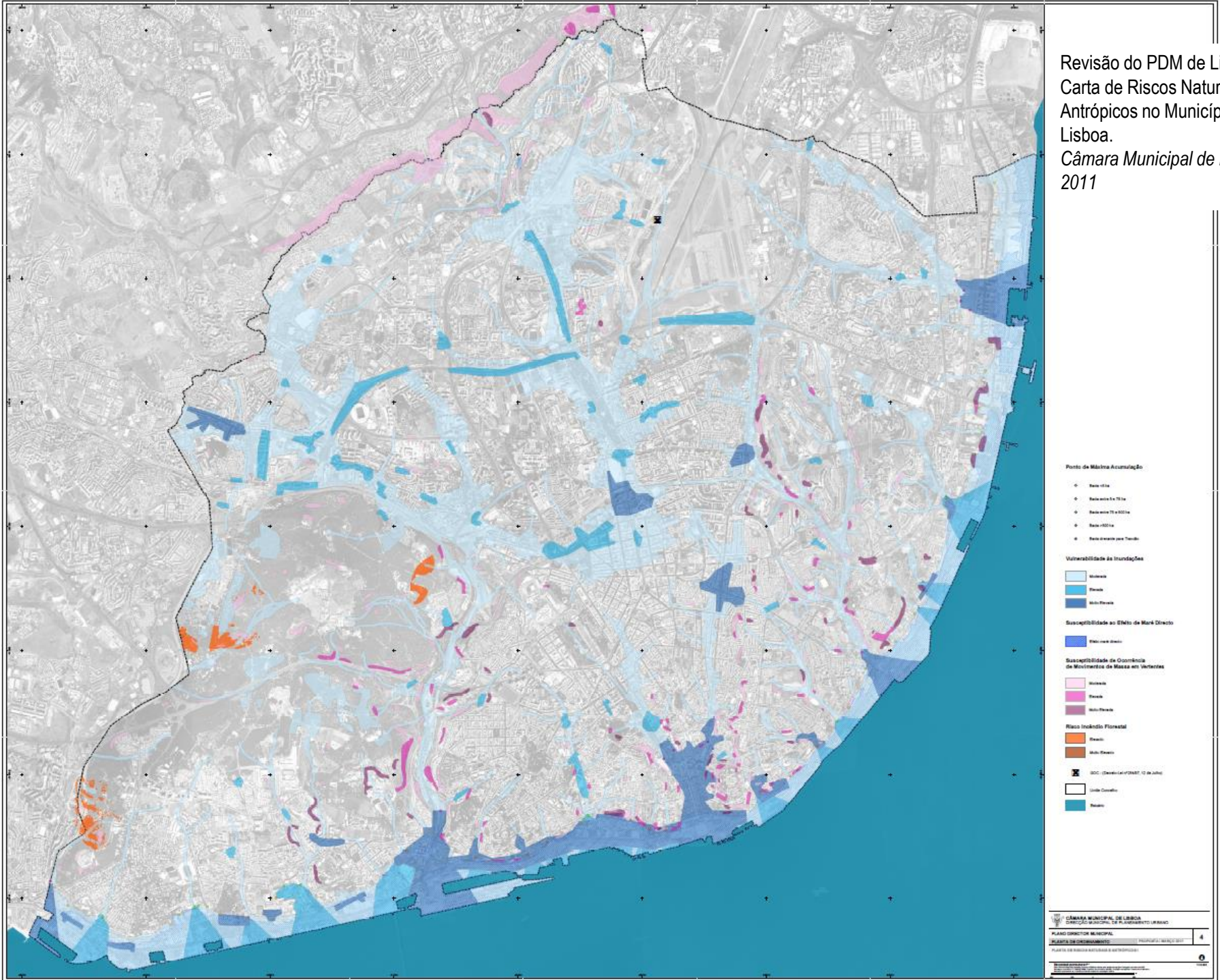
Áreas prioritárias para evacuar e oferecer refugio

Edifícios resilientes às inundações

Edifícios resistentes às inundações



3.4 REPRESENTATIVE CASES: PORTUGAL, LISBON



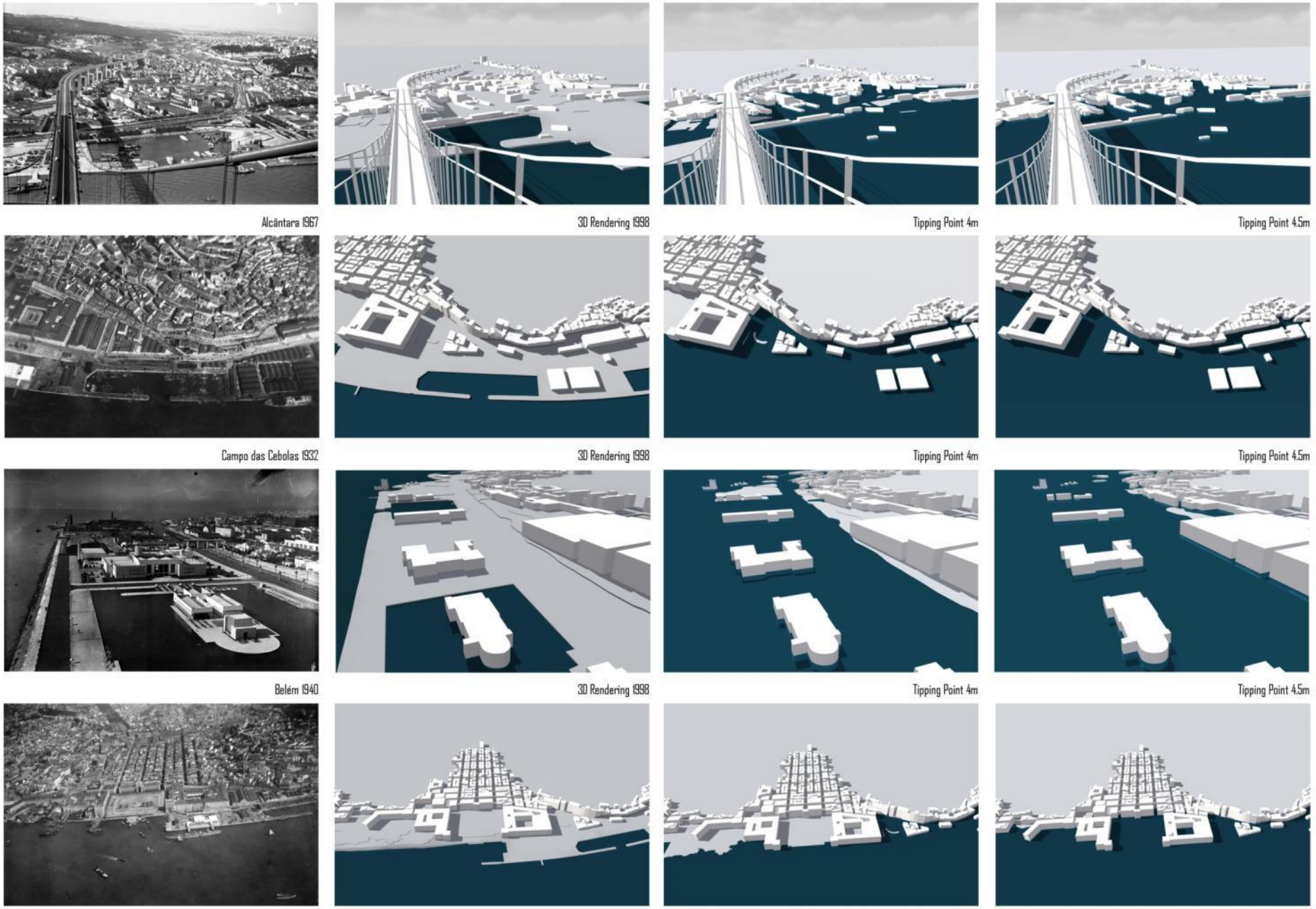
Revisão do PDM de Lisboa, Carta de Riscos Naturais I e Antrópicos no Município de Lisboa.
Câmara Municipal de Lisboa, 2011

Registo de inundação na ribeira de Lisboa, com a Praça do Comércio durante a inundação de 1945. Arquivo Fotográfico da Câmara Municipal de Lisboa, *Judah Benoliel*

Quadro n.º 7: Fatores de cálculo de inundação na ribeira de Lisboa, no horizonte 2100 (incremento relativamente à cota 0,00 da cartografia de terra)

Cenários para 2100	Subida do Nível do Mar	Correcção Cartográfica	Incremento de Maré (corrigido)	Ondulação	Elevação por Cheias	Sobre-elevação Meteorológica
IPCC (2007) cenário A1 **Rahmstorf (2007)** cenário B1 **CCIAM - Portugal (2010)** cenário B1	0.6	0,16 m (Antunes, 2011a)	1.92 m (62 eventos em 2011)	~ 0.20 m (ondulação frequente)	0,15 m (cheias progressivas do Tejo)	0,40 m (1 evento em 5 anos)
Rahmstorf (2007) cenário A1 **CCIAM - Portugal (2010)** cenário A1 **North Carolina SLR AR (2010)** cenário recomendado	1.0					
Vellinga et al (2009) pior cenário **Defra (2006)** cenário recomendado **Climate Rotterdam (2010)** pior cenário	1.2					
Comissão Delta Holandesa (2008) pior cenário	1.3		2.12 m (21 eventos em 2011)	a	+	0,50 m (1 evento em 25 anos)
Rahmstorf (2007) pior cenário **California CATR (2009)** A1f1 **North Carolina SLR AR (2010)** pior cenário **Rahmstorf (2010)** cenário recomendado	1.4			~0.40 m (eventos extremos)	0,45 m ("flash flood" nas ribeiras urbanas)	0,58 m (1 evento em 100 anos)
Defra (2006) pior cenário **New York CPCC (2009)** pior cenário	1.6		2,22 m (4 eventos em 2011)			
Hansen (2007) **Pfeffer et al (2008)** cenário extremo **Thames Estuary Plan (2009)** cenário elevado ++ **Defra, Londres (2010)** cenário extremo	2.0					

Projecto FCT "Urbanised Estuaries and Deltas", FA/UTL e FSHS/UNL, 2012
(articulada com a ARH-Tejo, 2010)



Projecto FCT "Urbanised Estuaries and Deltas" (Arquivo Fotográfico de Lisboa: Artur Inácio Bastos; Paulo Guedes; fotógrafo não identificado. Modelação tridimensional de Luiza Barone, Saul Sieiro, Ana Raquel Ferrão, Ruben Guerreiro, Ivo Nascimento, Duarte Gameiro, Mónica Fernandes, Joana Almeida)

Santa Apolónia 1950

3D Rendering 1998

Tipping Point 4m

Tipping Point 4.5m

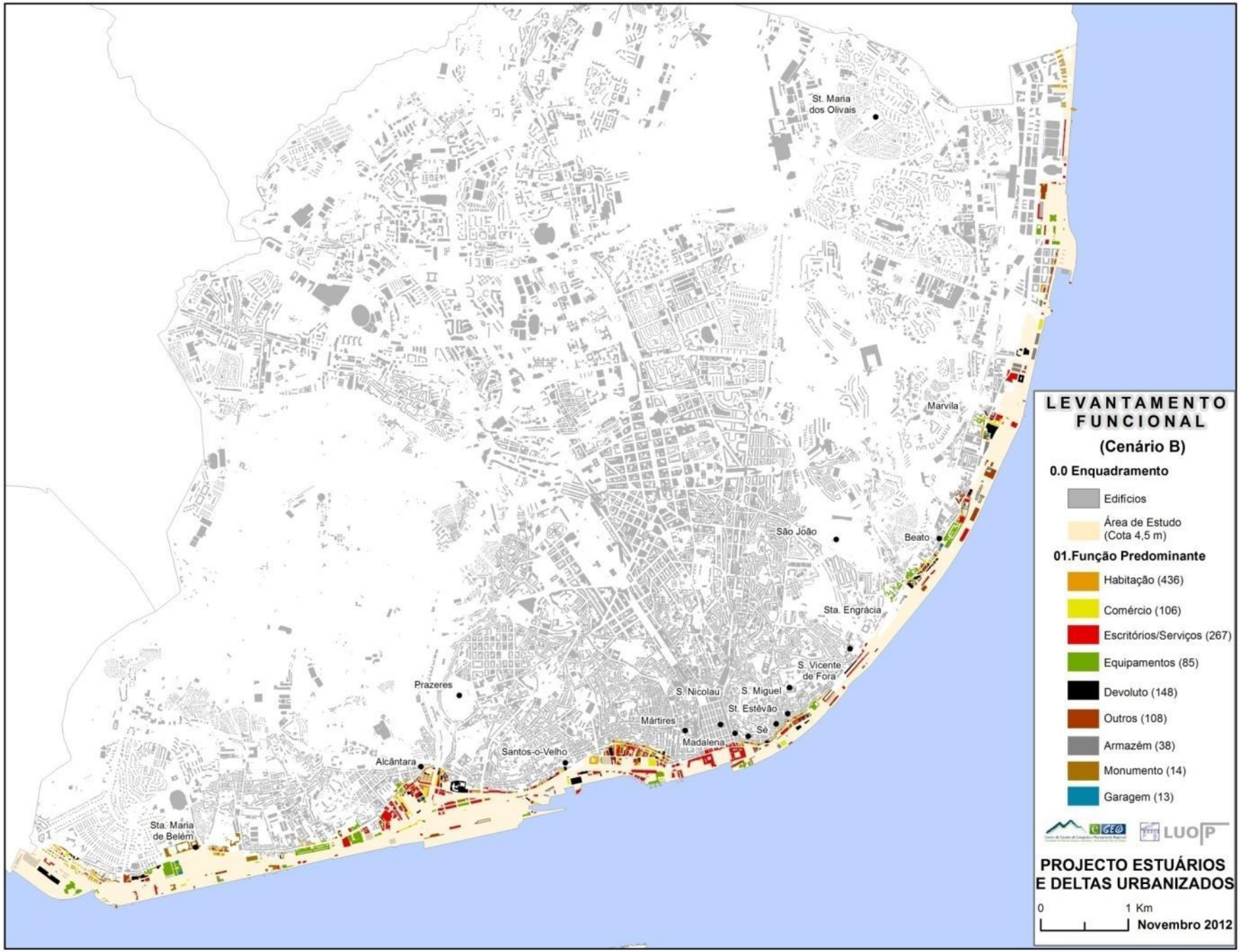
Poço do Bispo 1950

3D Rendering 1998

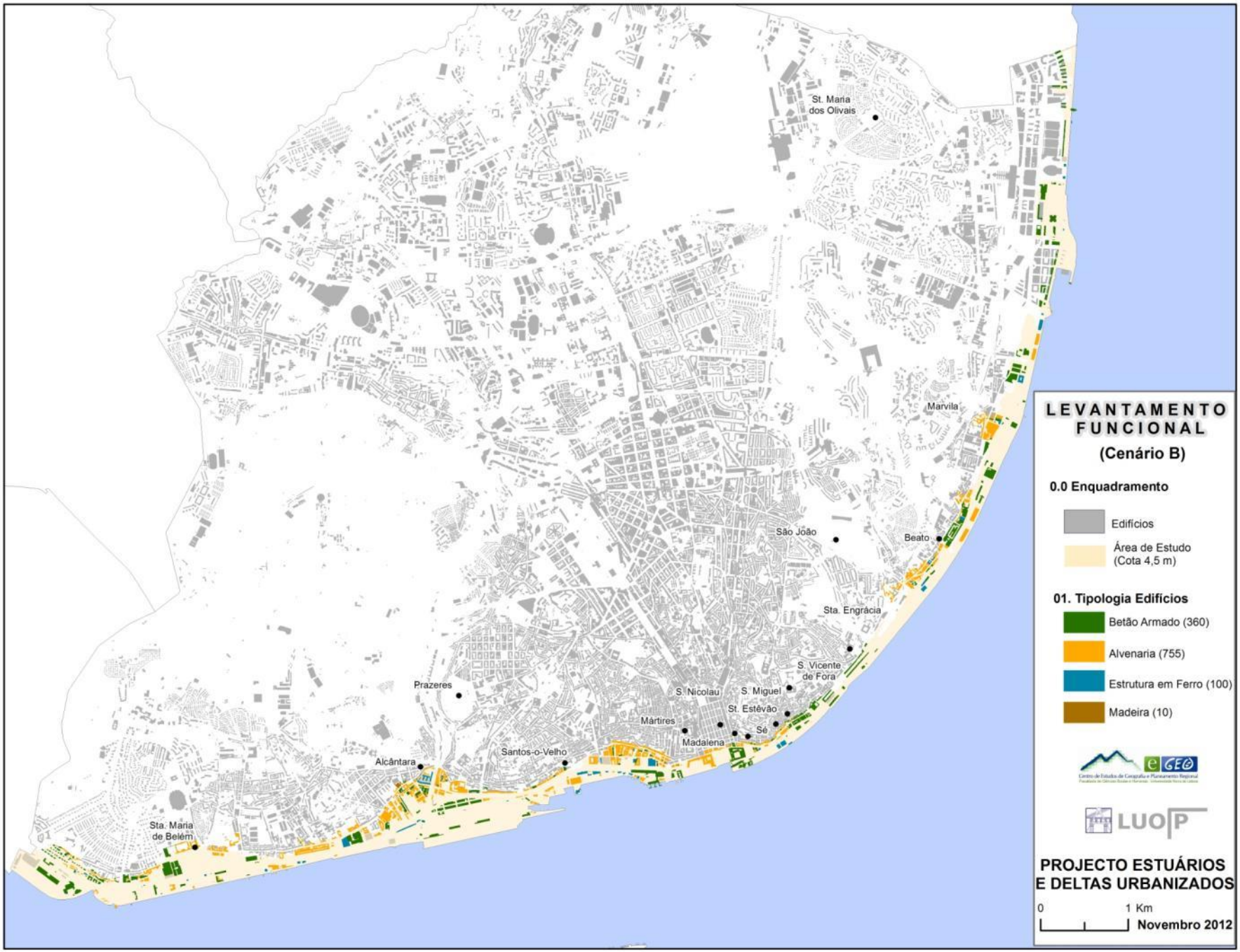
Tipping Point 4m

Tipping Point 4.5m

Projecto FCT "Urbanised Estuaries and Deltas" (Arquivo Fotográfico de Lisboa: fotógrafo não. Modelação tridimensional de Luiza Barone, Deolinda Farinha, Sueli d'Avó, Ana Catarina Cordeiro)



Levantamento funcional do edificado afetado por uma inundação ribeirinha ao atingir o tipping point da cota 4,5m. Projeto FCT Estuários e Deltas Urbanizados, 2012



Levantamento da tipologia construtiva edificado afetado por uma inundação ribeirinha ao atingir o tipping point da cota 4,5m. Projeto FCT Estuários e Deltas Urbanizados, 2012

4. URBAN PLANNING AND CLIMATE CHANGE ADAPTATION: THE NEW CHALLENGES AT THE 2010'S

Urbanism and Climate Change Adaptation, new challenges (2013):

- **To build a close relationship between the two areas of knowledge**

Urbanism and Climate Change Adaptation, new challenges (2013):

- To build a close relationship between the two areas of knowledge
- **Planning, designing and managing the territory under (un)predictable climate scenarios**

Urbanism and Climate Change Adaptation, new challenges (2013):

- To build a close relationship between the two areas of knowledge
- Planning, designing and managing the territory under (un)predictable climate scenarios
- **Anticipating impacts: the "what if?" agenda**

Urbanism and Climate Change Adaptation, new challenges (2013):

- To build a close relationship between the two areas of knowledge
- Planning, designing and managing the territory under (un)predictable climate scenarios
- Anticipating impacts: the "what if?" agenda
- **New time horizons for Urbanism**

Urbanism and Climate Change Adaptation, new challenges (2013):

- To build a close relationship between the two areas of knowledge
- Planning, designing and managing the territory under (un)predictable climate scenarios
- Anticipating impacts: the "what if?" agenda
- New time horizons for Urbanism
- **A new perspective on local risk factors resulting from climate change**

Urbanism and Climate Change Adaptation, new challenges (2013):

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- Recovering lessons concerning the design of the city
- **Develop innovative and creative solutions in Urbanism**

Urbanism and Climate Change Adaptation, new challenges (2013):

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- Planning, designing and managing the territory under (un)predictable climate scenarios
- Anticipating impacts: the "what if?" agenda
- New time horizons for Urbanism
- A new perspective on local risk factors resulting from climate change
- Recovering lessons concerning the design of the city
- Develop innovative and creative solutions in Urbanism
- **Finding new forms of governance**

5. IS CLIMATE CHANGE ADAPTATION LOST IN TRANSITION?

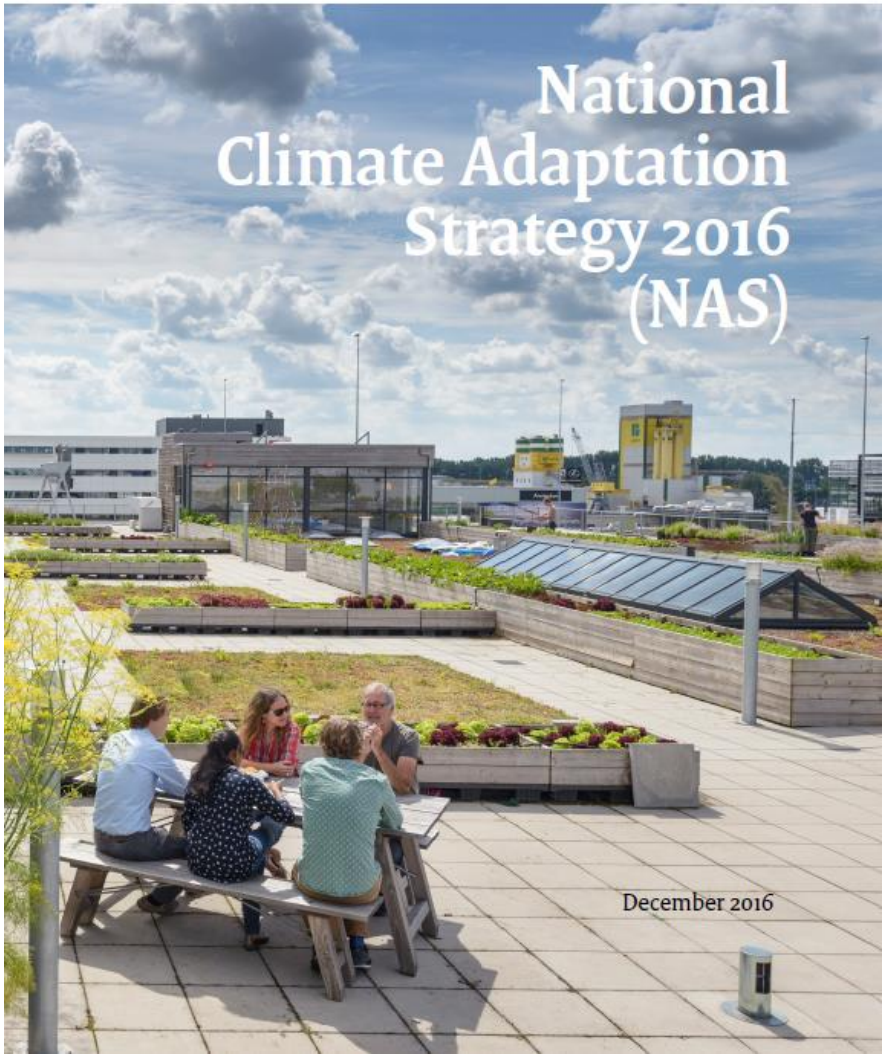
5.1 A QUICK OVERVIEW OF THE RECENT NATIONAL CLIMATE CHANGE ADAPTATION PLANING

Dutch National Adaptation Strategy (NAS):

- NAS 2007 has undergone several updates, the recent one in 2016.

- "Adapting with Ambition":
  - Outlines the major climate risks about economy, people, nature and the environment;
  - Identifies a number of key climate risks, including flooding, heatwaves, and water shortages;
  - Provides a plan for addressing these risks through a combination of short-term and long-term actions.

- NAS 2016 continues increasing the awareness for climate adaptation and implementation of adaptation measures. It innovates by replacing a sector orientated approach by an intersectoral / cross-sectoral and integrated approach to adaptation, including local and regional projects, programs and partnerships.

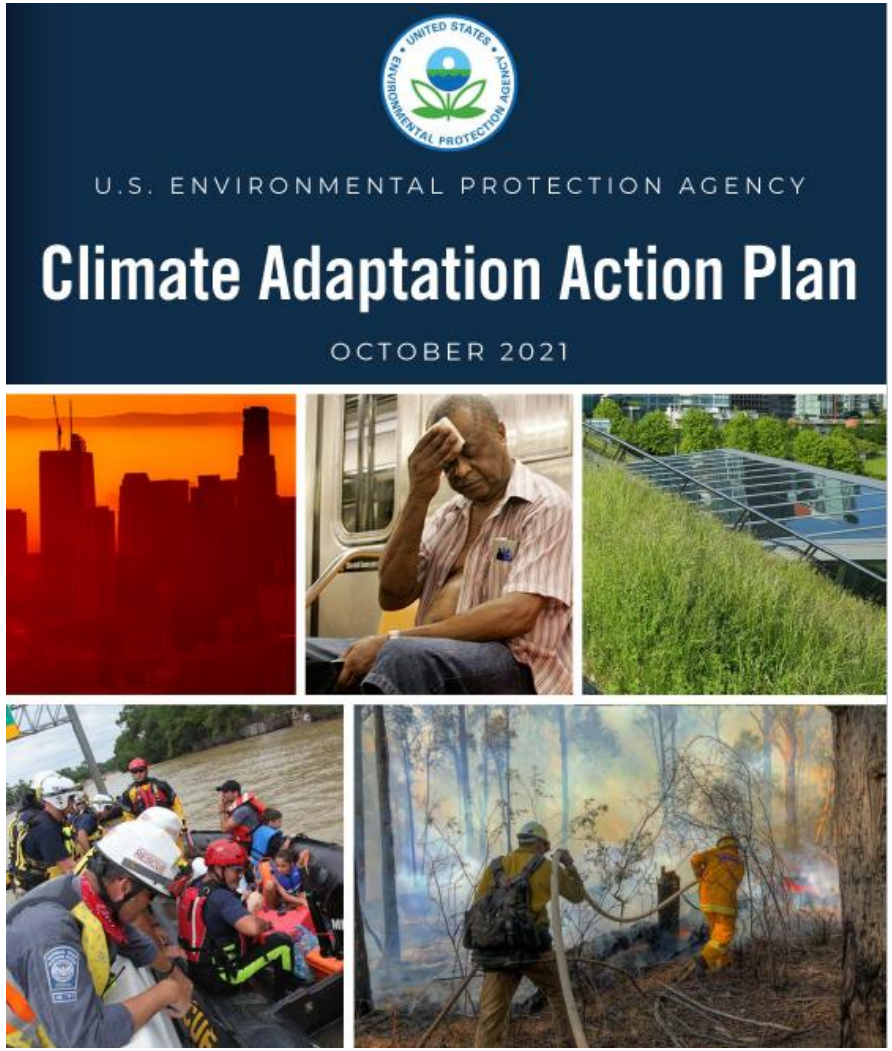


National Adaptation Strategy (NAS), The Netherlands, 2016.
Gamze Kazanci, 2023.

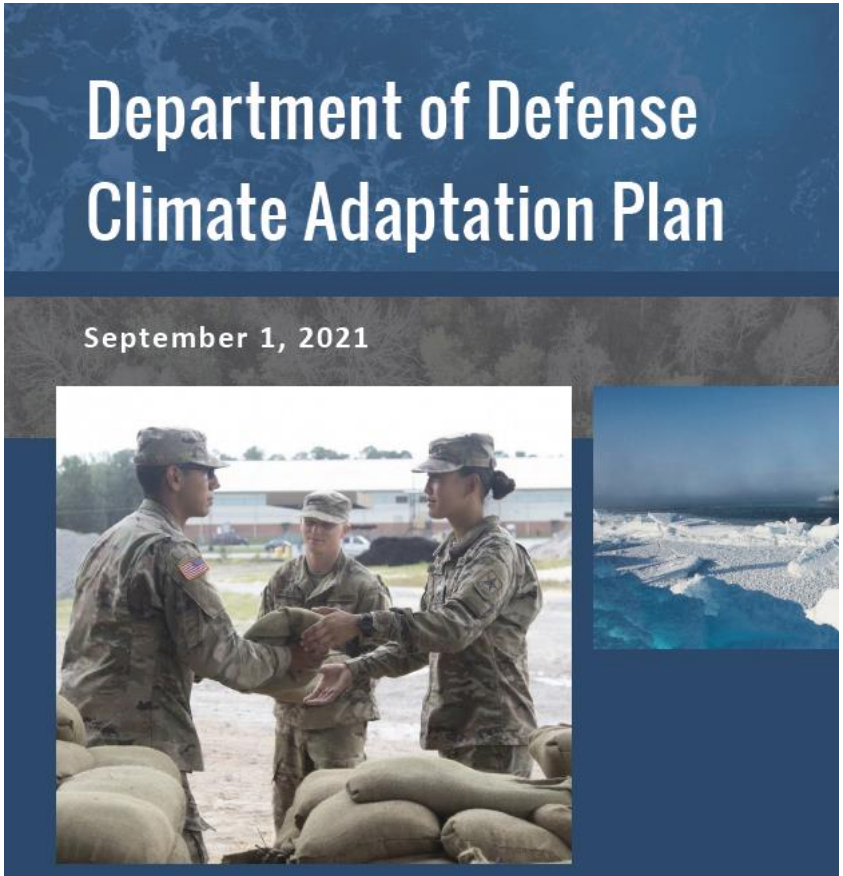
USA National Climate Change Adaptation Plan:

- NCCAP was released in 2020-21:
  - Main goal: achieve a sustainable economic growth, reduce conflict and improve the quality of life, achieving net-zero society;
  - Identifies climate-related risks and projections;
  - Proposes strategies on federally-led investment in clean and renewable energy, transport- advancing low-emission and fuel-efficient cars, trucks, and heavy-duty vehicles, agriculture and waste;
  - Provides a plan for addressing these risks through a combination of short-term and long-term actions.

- NCCAP 2021 follows a sectoral/thematic approach and provides guidance on how to address climate change impacts in various sectors, addressing the impacts of climate change at national, regional, and local levels.



National Climate Change Adaptation Plan (NCCAP), USA, 2021.
Gamze Kazanci, 2023.



DEPARTMENT OF THE INTERIOR
CLIMATE ACTION PLAN

2021

UK National Adaptation Programme (NAP):

- NAP 2013, update, 2018, “Making the country resilient to a changing climate”:
  - Identifies key risks to the natural environment, infrastructure, people and built environment, business and industry, and local government;
  - Defines specific themes, visions, objectives, and key actions for adapting to climate change;
  - Outlines the actions that the government and other stakeholders will take over the next 5 years.

- NAP 2018 highlights the importance of raising awareness about the need for adaptation, improving the evidence base, and taking timely action to increase resilience to identified risks. It identifies a range of policies and actions to help the country successfully adapt to future weather conditions, making the case for action, and involving local authorities and cities in the adaptation process.

National Adaptation Programme (NAS), UK, 2018.
Gamze Kazanci, 2023.

Portugal National Energy and Climate Plan 2021/2030 (NECP):

- NECP 2019 (flowing the National Strategy for Adaptation to Climate Change, 2010):

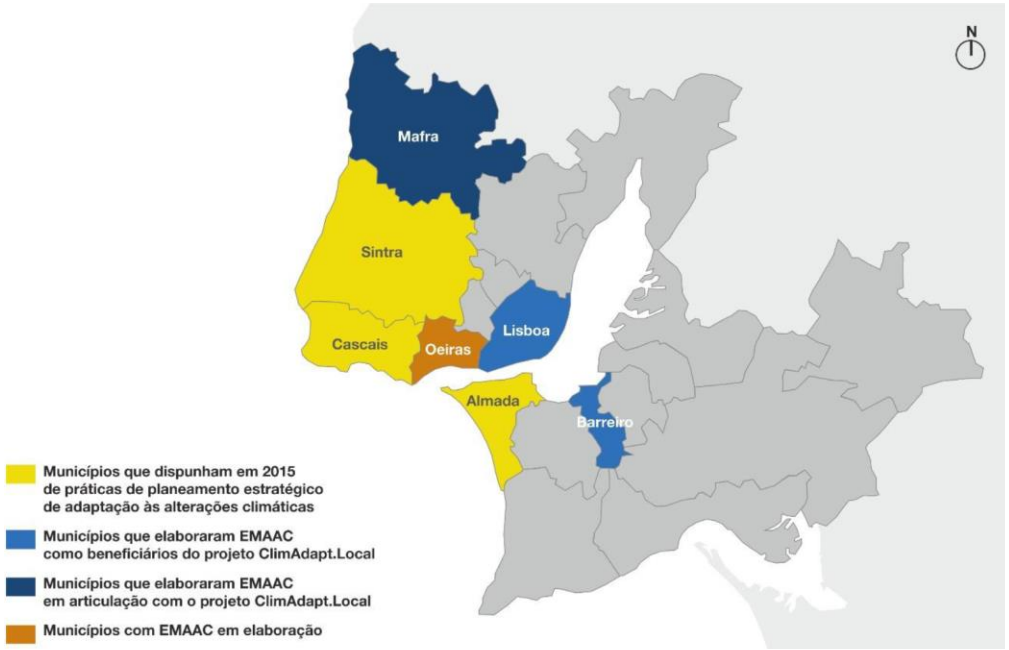
  - Defines sectors for the national and regional levels: energy, agriculture and forestry, mobility and transport, research and innovation, and finance;
  - Sets out goals for 2030: decarbonizing, energy efficiency, renewable energy sources, supply security, sustainable mobility, sustainable agriculture and forestry, and carbon capture.

- NAP 2018 emphasizes the need to raise awareness on adaptation, focusing on decarbonizing the city and economy. It takes a sectoral approach and focuses on specific themes, outlining climate-related risks and objectives.

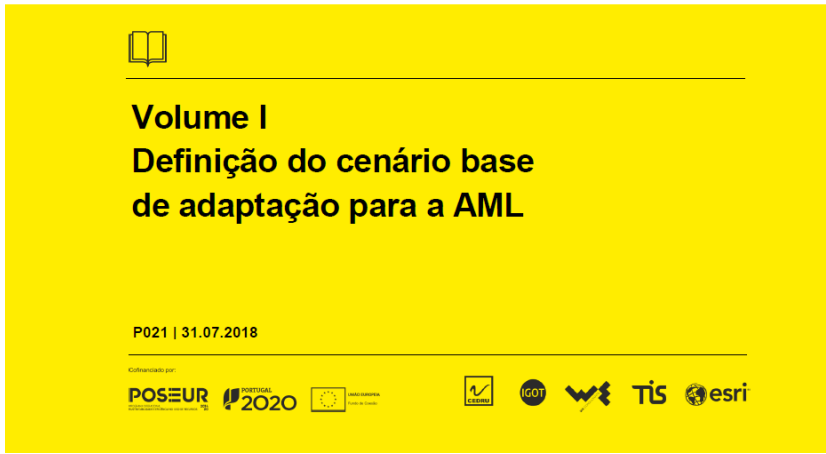
National Energy and Climate Plan 2021/2030 (NECP), Portugal, 2019.
Gamze Kazanci, 2023.

Climate Change Adaptation in the Lisbon Metropolitan Area:

- The ClimAdaPT.Local project, 2015.
- Lisbon's Climate Adaptation Metropolitan Plan (CAMP), 2018.



Climate Change Adaptation Municipal Plans in 2018 & the ClimAdaPT.Local project, Lisbon, Portugal, 2018. Source: CCAMP, 2018.



Climate Change Adaptation Metropolitan Plan (CCAMP), Lisbon, Portugal, 2018.

On The Edge for A Second Generation of National Climate Change Adaptation Policies? The Cases of The Netherlands, UK, USA, Turkey and Portugal

Gamze Kazancı Altınok & João Pedro Costa, 2023

	Qualities	1st PLAN (2010's)					2nd PLAN (2020's)				
		Netherlands	USA	UK	Turkey	Portugal	Netherlands	USA	UK	Turkey	Portugal
ID	Name	Make Space For Climate!	Global Climate Change Impacts in the United States, Progress Report Of The Interagency Climate Change Adaptation Task Force	Adapting to climate change in England- A framework for Action	Climate Change Strategy 2010-2023, National Climate Change Adaptation Strategy and Action Plan	National Strategy for Adaptation to Climate Change	Adapting with ambition	National Climate Change Adaptation Plan	Making the country resilient to a changing climate	NO DOCUMENT YET	The National Energy and Climate Plan
	Date	2007	2009, 2010	2008	2010,2011	2010	2016	2020-21	2018		2019
Main climate risks	Flooding-waterlogging-sea level rise	++	++	++	++	++	++	++	++		++
	Heat waves/ Drought	++	++	++	++	++	++	++	++		++
Priority	Scenario-priority	+	+	+	+	+	+	+	+		+
	Action-priority	++	-	-			++	++	++		
Vision	Awareness	+	+	+	+	+	+	+	+		+
	Action-oriented	++	-	-	++	++	++	++	++		++
	Cross-sectoral	-	-	-			++		++		
	Resilience	++	++	++	++	++	++	++	++		++
Key approach	Hazards-based approach	+	+	+	+	+	+	+	+		+
	Complex-integrative approach	++	-	++			++	++	++		++
Content	Water	++	++	++	++	++	++	++	++		
	Agriculture	++	++	++	++	++	++	++	++		++
	Infrastructure			++			++	++	++		
	Transportation	++	++	++	++	++	++	++	++		++
	Built-environment			++	++	++	++	++	++		
	Natural environment	++	++	++	++	++	++	++	++		
	Energy	++	++		++	++	++	++	++		++
	Waste				++		++	++			++
	Governance			++	++		++	++	++		++
	Public-Society	++	++	++	++	++	++	++	++		++
	Business			++			++	++	++		++
	Industry	++		++	++	++	++	++	++		++
Scale of effect	National strategies	+	+	+	+	+	+	+	+		+
	National and Local strategies	++		++			++	++	++		++
	TOTAL	*32*	*22*	*34*	*32*	*28?*	*44*	*42*	*42*		*32*

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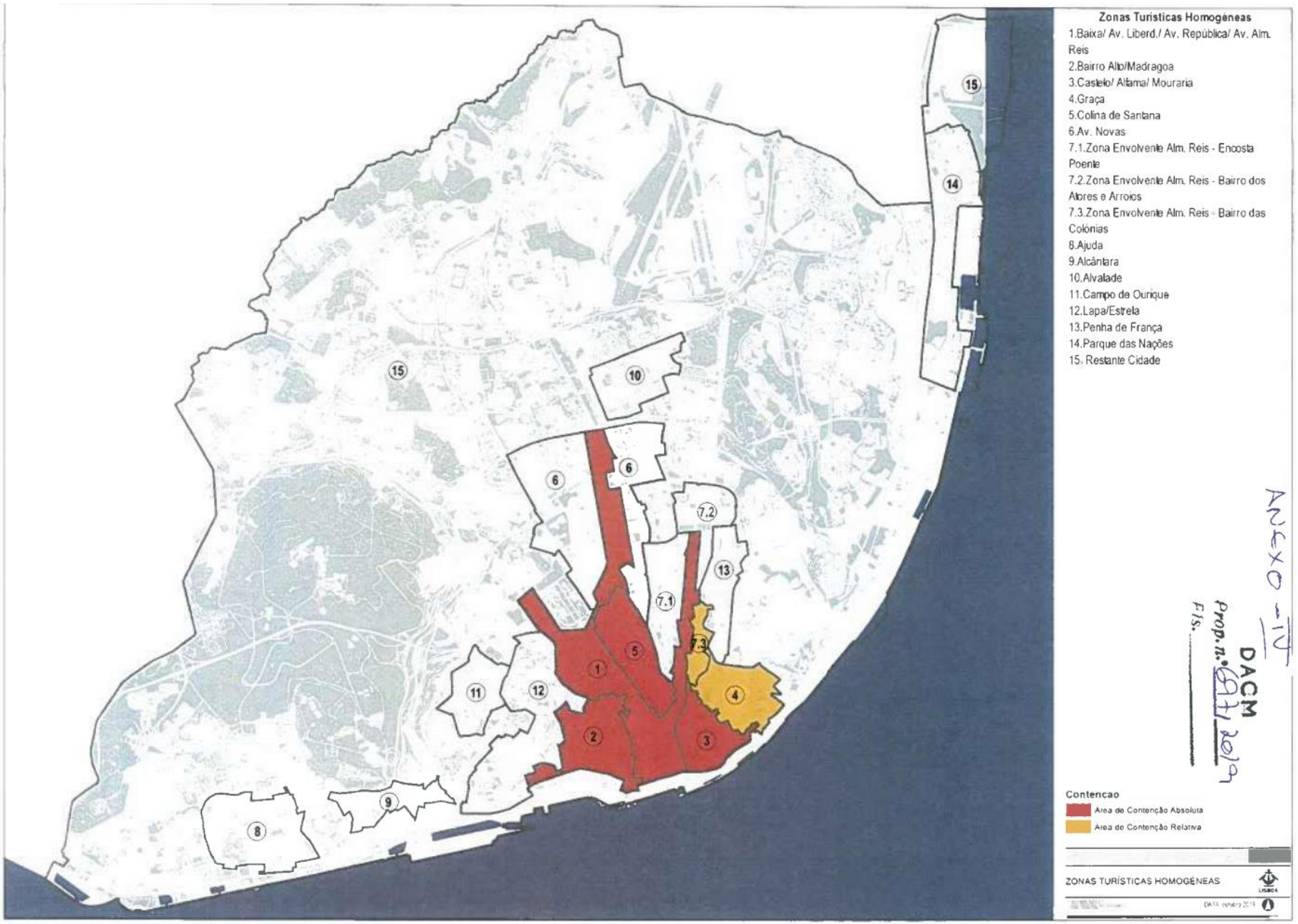
- **Ballancing the risks and the risks perception for climate action**

5.2 THE RAISE OF NEW EMERGENCY AGENDAS

The City's Adaptation to the Digital Platforms Agenda:



The COVID-19 Adaptation Agenda:

The Housing Agenda:

HABITAÇÃO

Habitação. Costa defende que Estado "pode arrendar" casas devolutas mas não fala em coercivo

Numa sessão do PS em Matosinhos sobre habitação, Costa não especificou se esse arrendamento pode acontecer de forma coerciva, ou seja, contra a livre vontade do proprietário.

Lusa e PÚBLICO
1 de Março de 2023, 10:46

Receber alertas

Costa esteve numa sessão do PS sobre habitação em Matosinhos JOSÉ COELHO/LUSA

O primeiro-ministro, António Costa, afirmou nesta terça-feira à noite que o programa Mais Habitação permitirá ter "soluções transitórias" para dar resposta a casos de "emergência" e enquanto se constroem as "soluções definitivas" com recurso ao Plano de Recuperação e Resiliência (PRR).

HABITAÇÃO E URBANISMO

Isaltino Morais diz que pacote do Governo na habitação "não mexe no essencial"

Isaltino Morais defende que programa "Mais Habitação" "não mexe no essencial". Reconhece que ninguém fala em custos de terrenos, que considera ser fator de maior encarecimento das casas".

Hoje, por Agência Lusa

O presidente da Câmara Municipal de Oeiras defendeu esta quinta-feira que o pacote de medidas do Governo para a habitação "não mexe no essencial", referindo-se ao custo de terrenos para construção de casas e à lei do ordenamento do território.

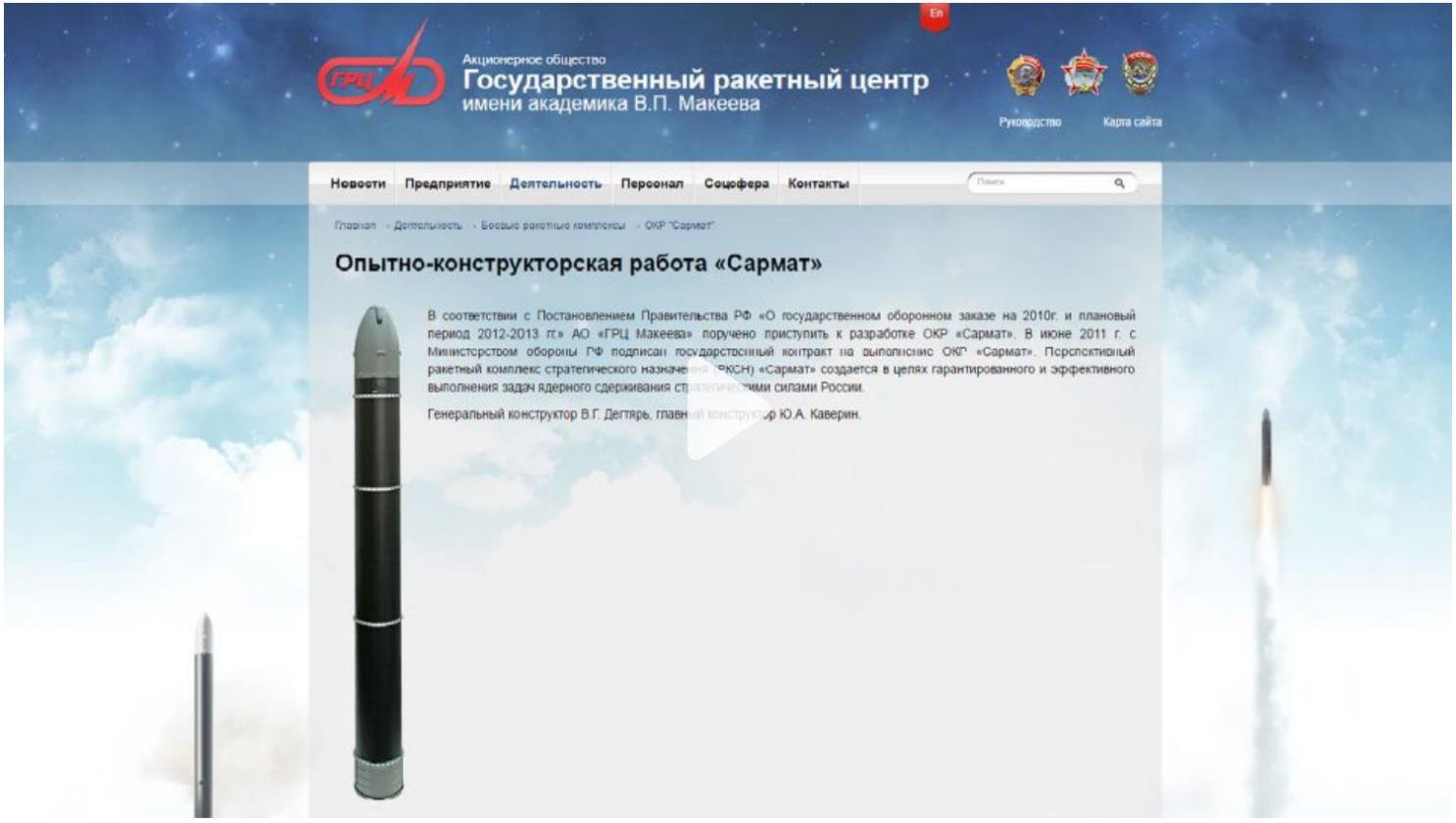
The Nuclear Agenda:

CNN Opinion Political Op-Eds Social Commentary

A reawakening nuclear nightmare

By Peter Zwack

Published 6:12 PM EDT, Fri October 28, 2016



Video Ad Feedback

First photos of Russia's 'Satan 2' missile released

The Everyday Life Remembering Us:

Público, December the 13th, 2022

5.3 DISCUSSION

Urbanism and Climate Change Adaptation, new challenges (2023):

- **Shall we postpone the climate change adaptation agenda, placing the raising emergency agendas at front?**

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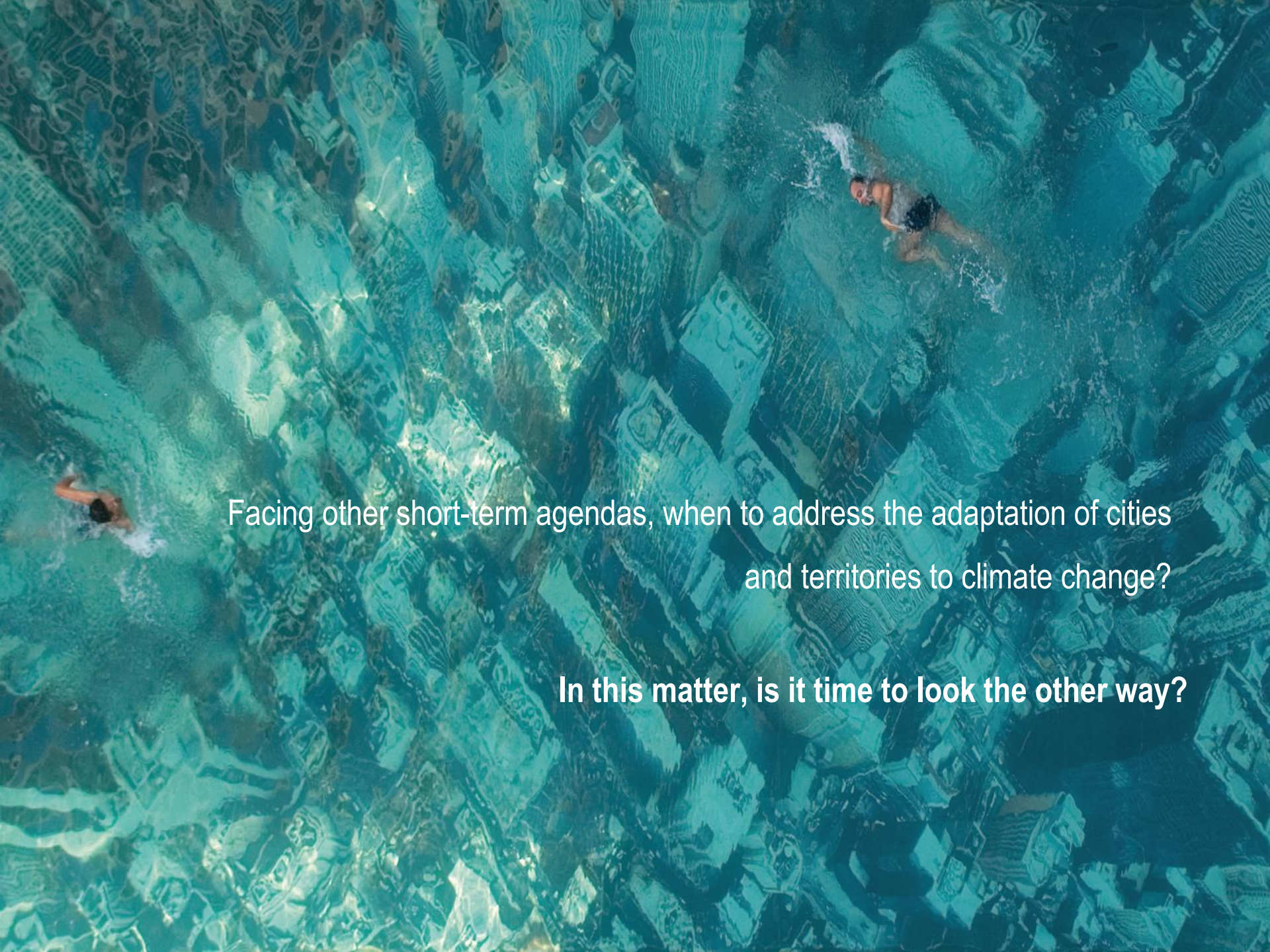
- **How to address the ethics, ballancing the risks and the perception of the risks, to justify the climate action?**


Facing other short-term agendas, when to address the adaptation of
cities and territories to climate change?



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In this matter, is it time to look the other way?

Climate Change Swimming Pool, Ogilvy & Mather, Mumbai, India. Shirin Johari, 2008