

# Local adaptation as a future flood management strategy in Rotterdam?

Acqua Alta 2011  
Panel I

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Gemeente Rotterdam  
dS+V



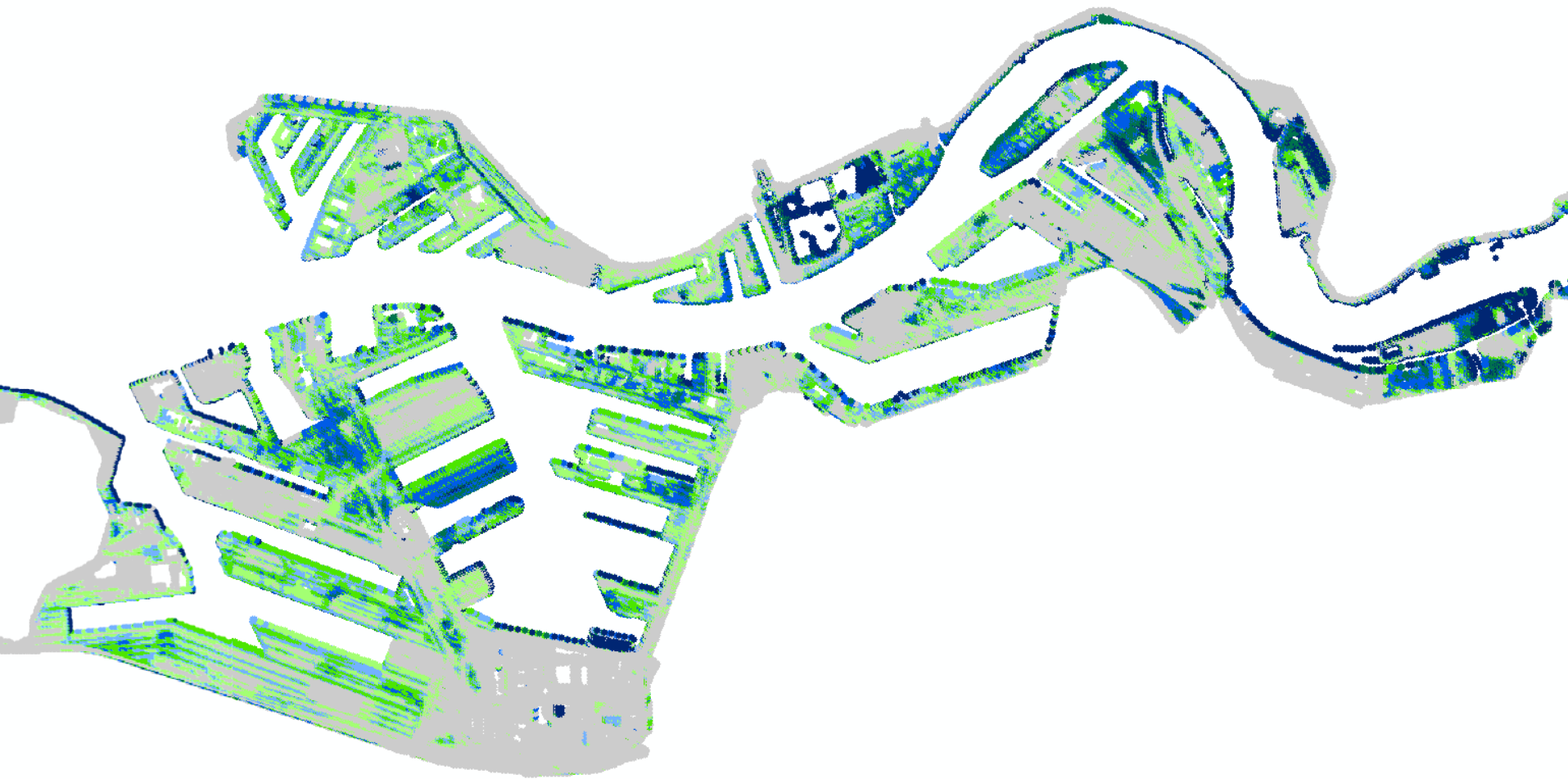
ROTTERDAM CLIMATE INITIATIVE







## Flood risk of the Rotterdam flood plain



Source: Unesco-IHE







1 March 2008

Noordereiland

max. water level: 2,32 m plus sea level

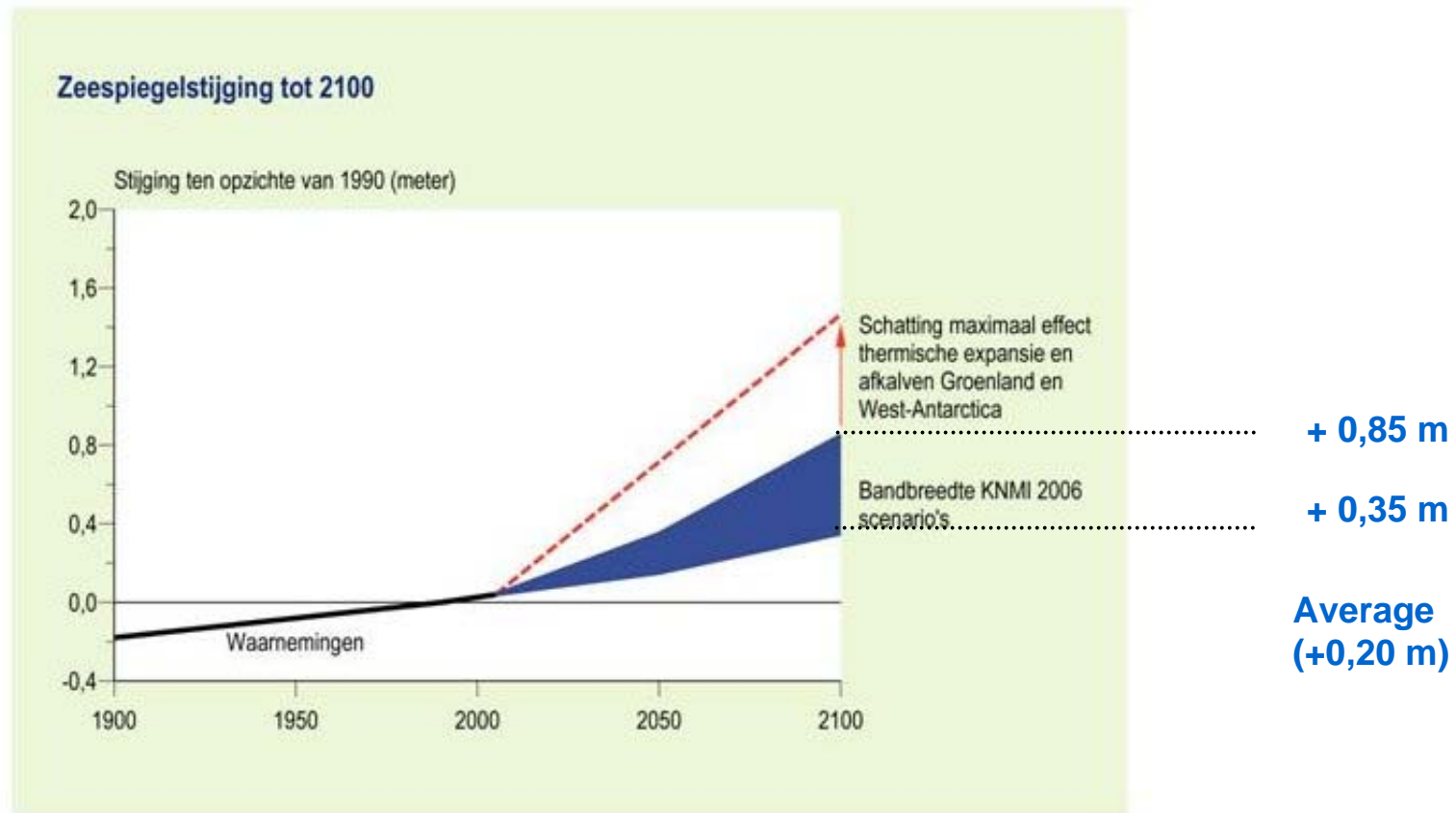


1 februari 1953

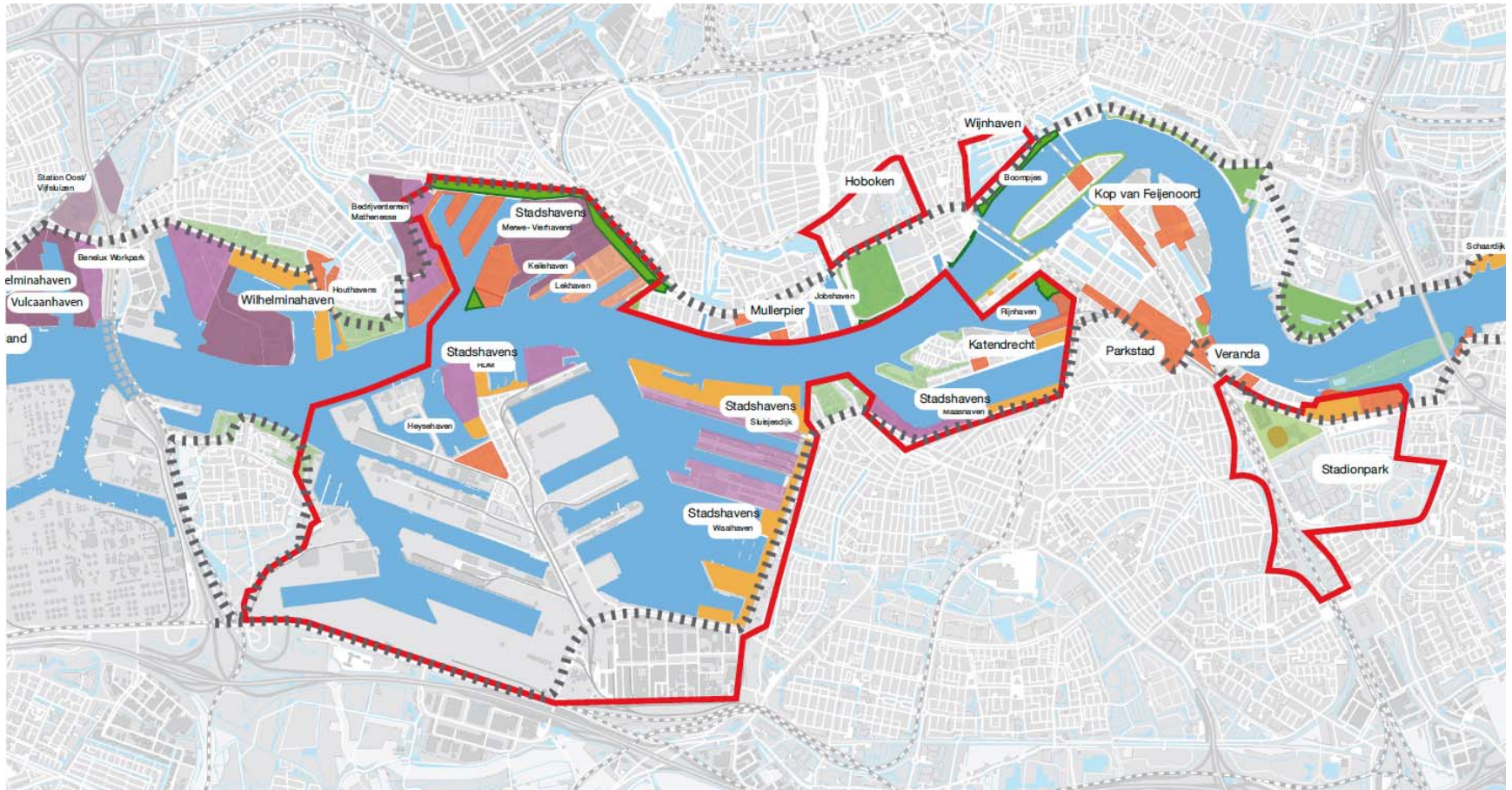
Feijenoord

max. water level 3,85 m plus average sea level

# Changing climate causes acceleration of sea level rise

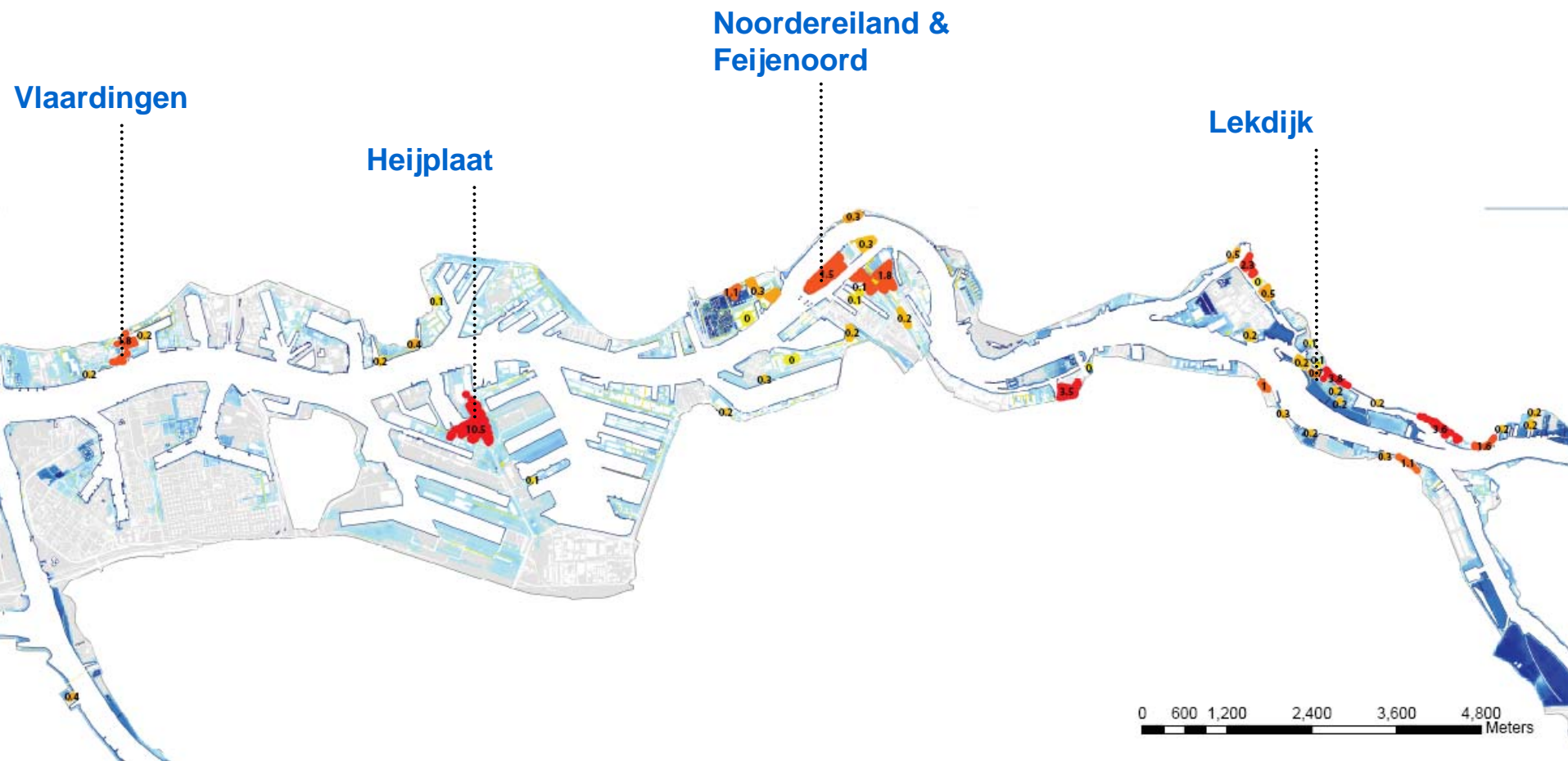


# Vulnerability is increasing due to urbanization





## Most vulnerable areas at a 1/1000 event







*Hotel New York – Wilhelminapier Rotterdam*





Mullerpier





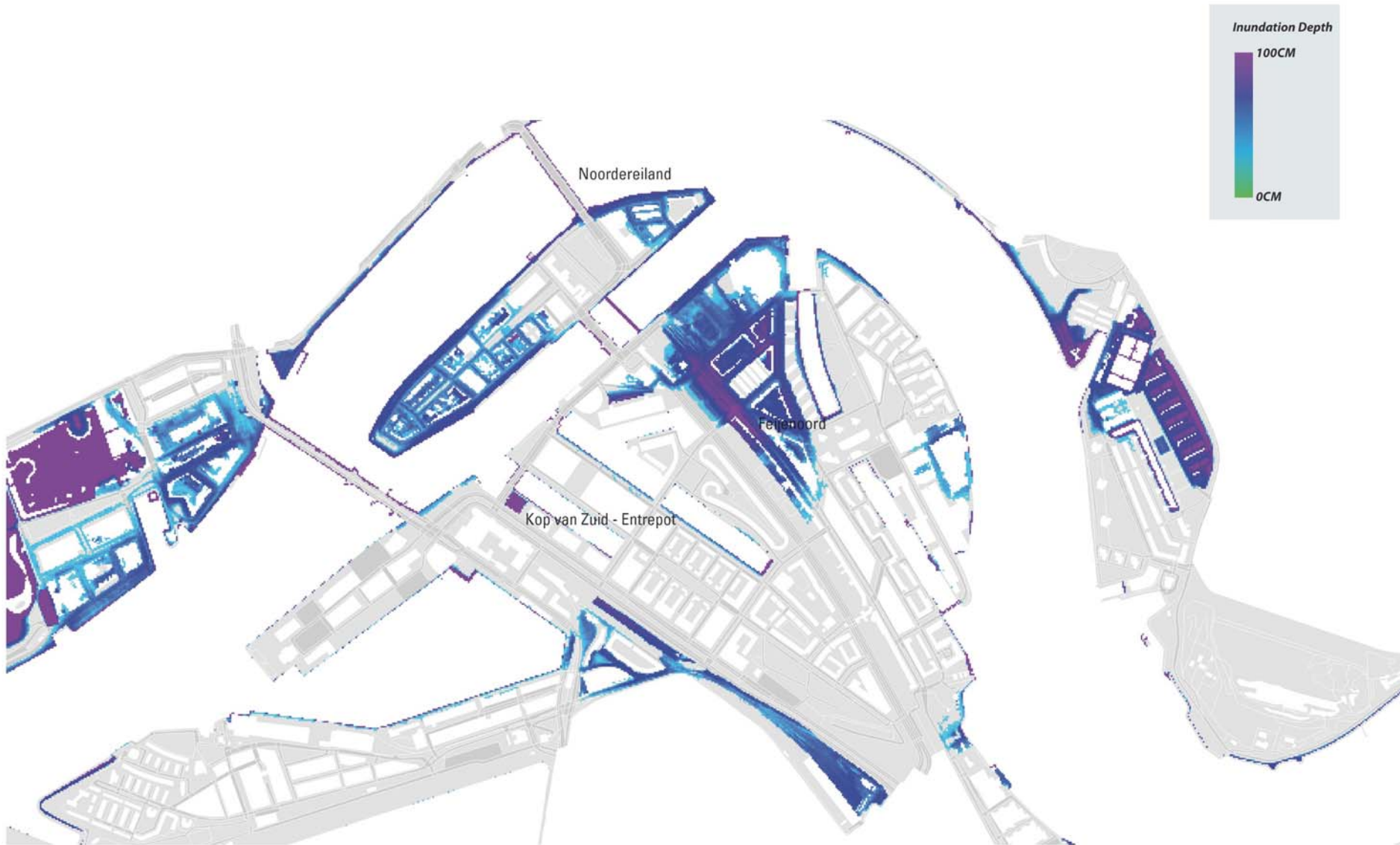
Kop van Feijenoord



## Regional prevention or local adaptation?

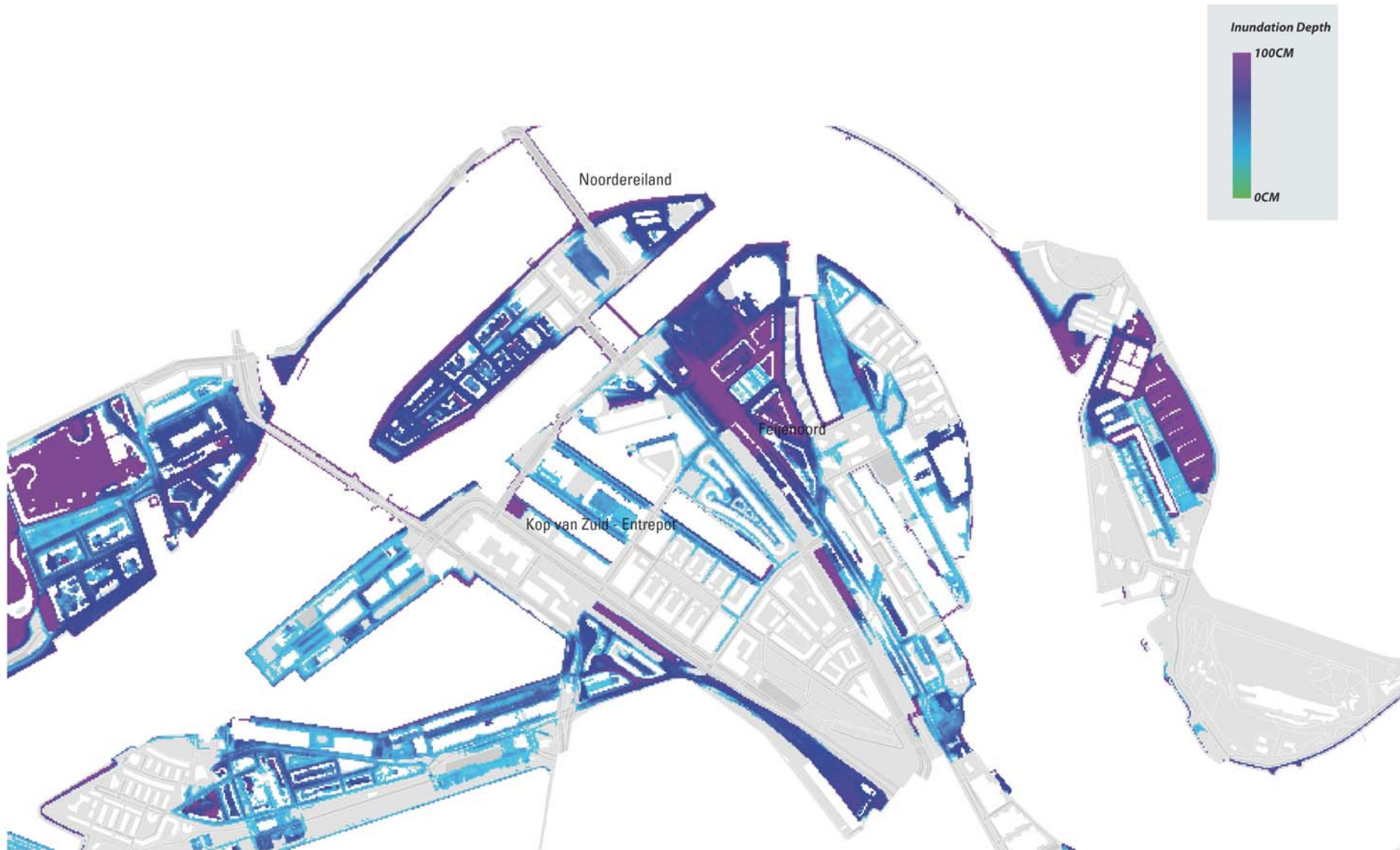


## Feijenoord: current situation at a 1/1000 flood event



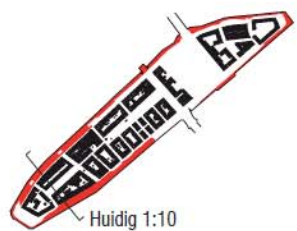


## Feijenoord: situation at a moderate climate scenario (+ 15 cm)





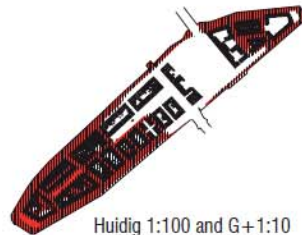
# Local impact Noordereiland



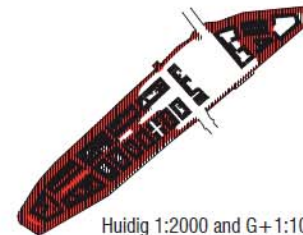
Huidig 1:10



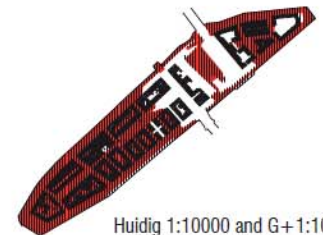
Huidig 1:50



Huidig 1:100 and G+1:10

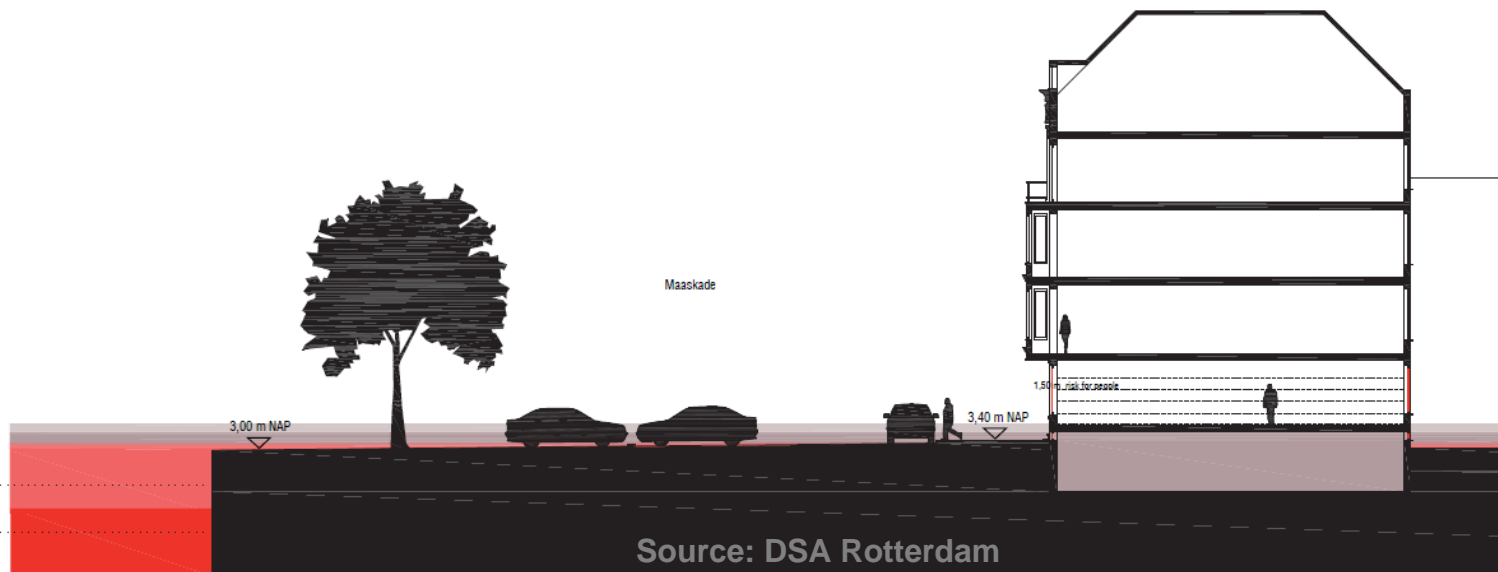
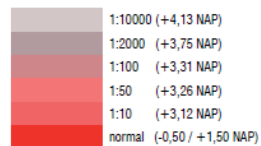


Huidig 1:2000 and G+1:100



Huidig 1:10000 and G+1:1000

G+2050



# Local impact Feijenoord



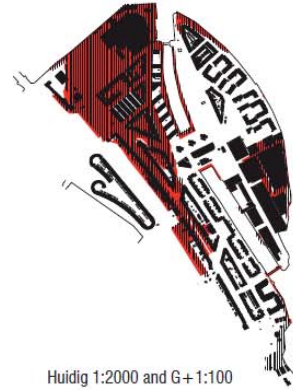
Huidig 1:10



Huidig 1:50



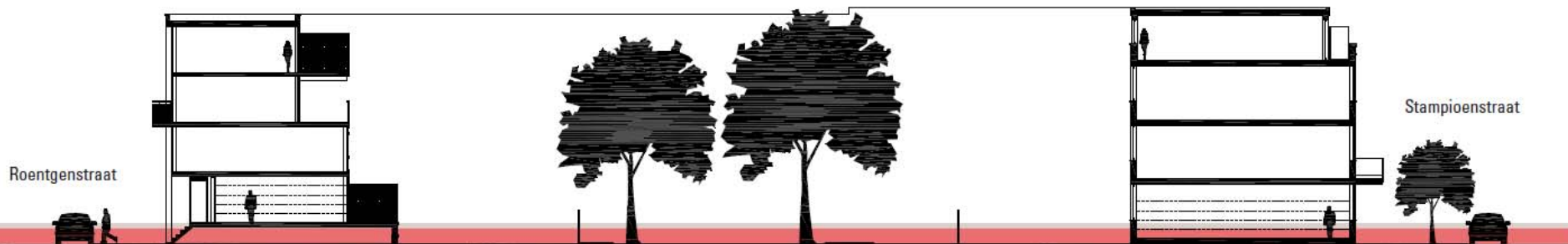
Huidig 1:100 and G+1:10



Huidig 1:2000 and G+1:100



Huidig 1:10000 and G+1:1000

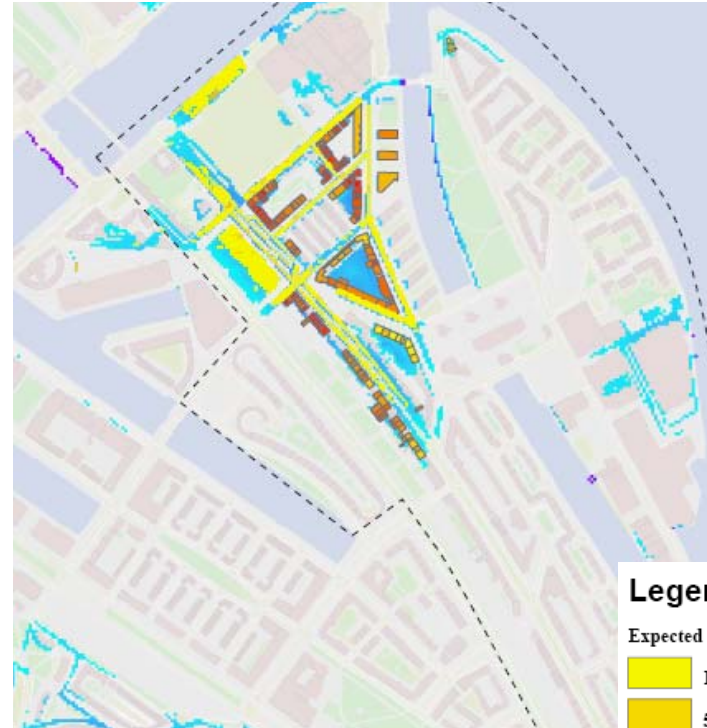


Source: DSA Rotterdam

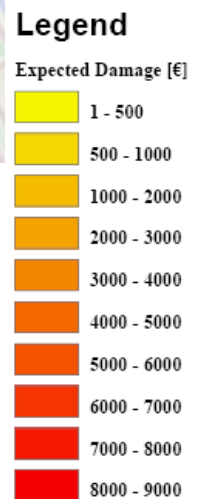
## Expected damage at a 1/1000 event



**Noordereiland**  
Expected damage  
0,5 – 0,9 mln Euro



**Feijenoord**  
Expected damage  
0,7 – 1,0 mln Euro

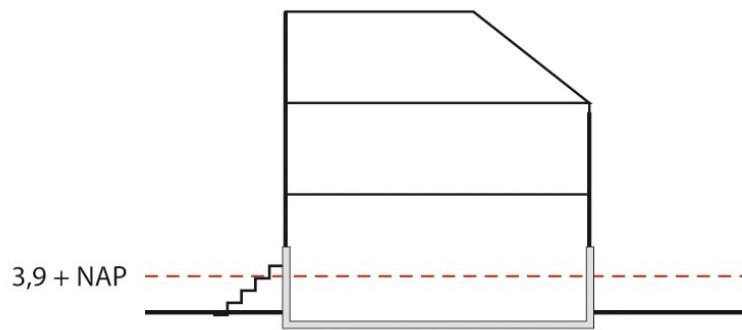




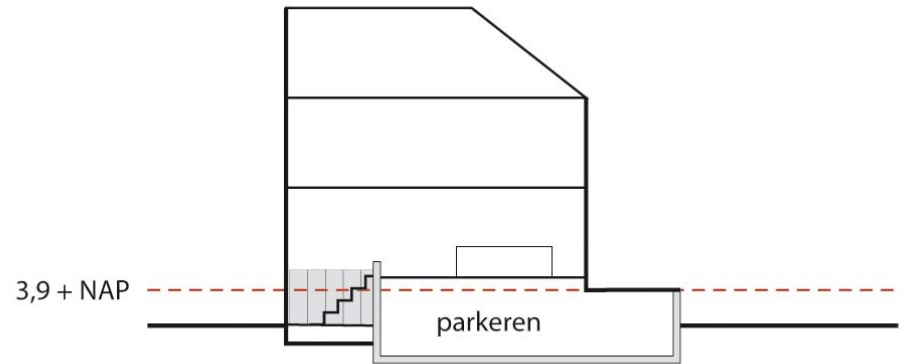
## Case Feijenoord: linking local adaptive measures to urban renewal



# Dry proof or wet proof architecture



flood proof plint

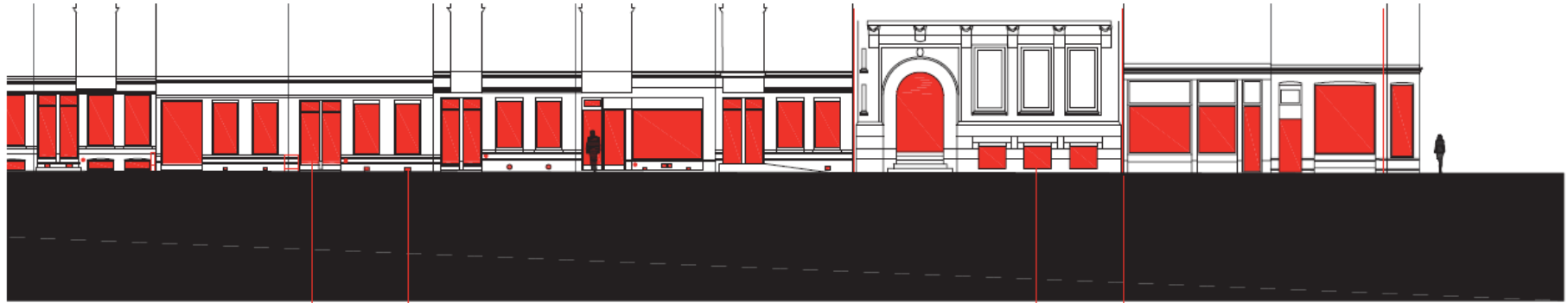


gedeeltelijke wetproofinrichting  
parkeerdoos flood proof





# Dryproofing the facade of existing buildings



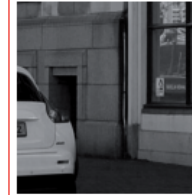
low doorsteps without defensive slots  
(20-30 cm)



low openings for ventilation  
(0-30 cm)



important functions in the basement  
(0-10 cm)



cables and pipes





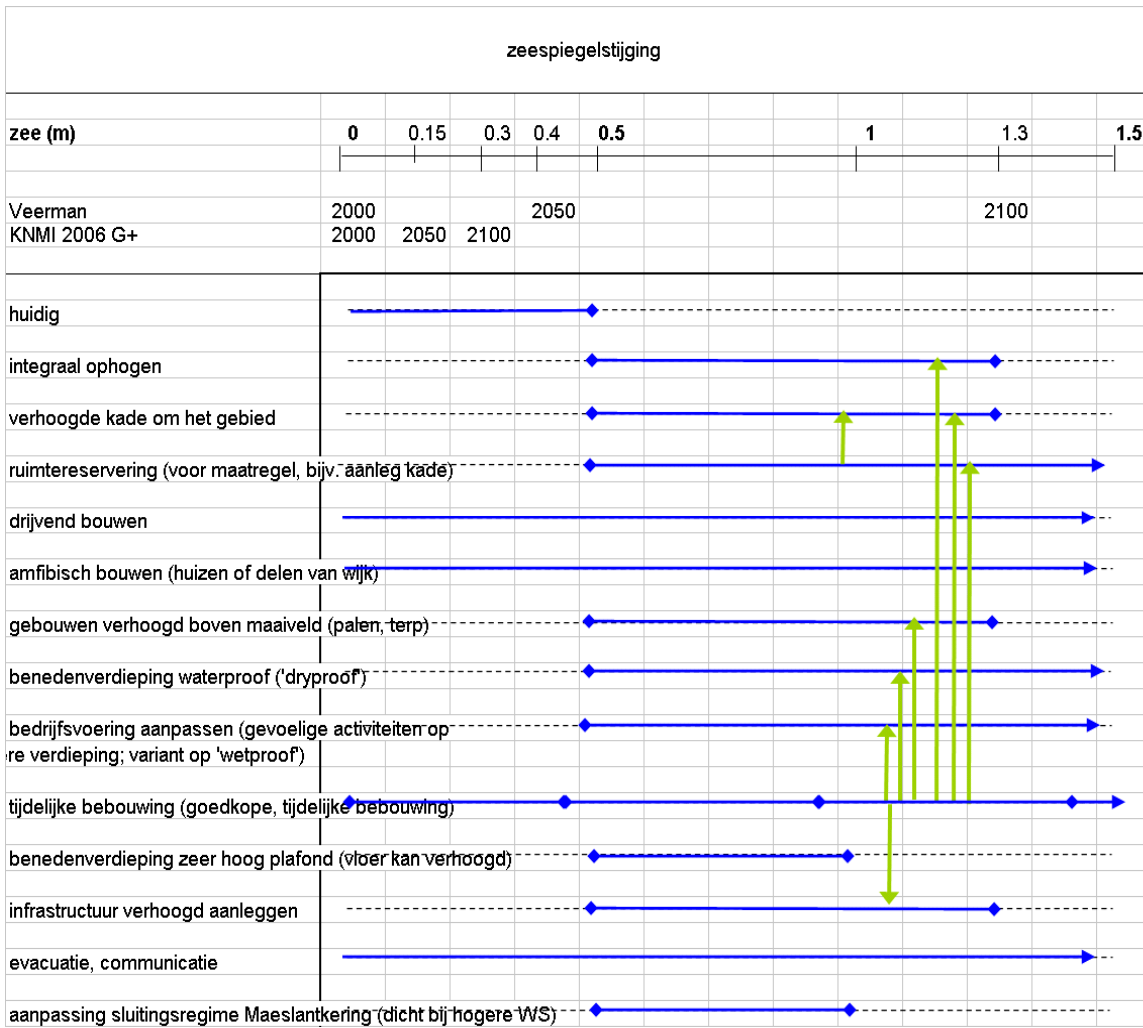
## Reducing local risk by adjustments in public space



Picture: Anne Loes Nillesen TU Delft

# Adaptive planning

zeespiegelstijging



beperking kosten	veiligheid (voorkomen van slachtoffers)	leefklimaat	economische functie haven	economische functie overige bedrijven	onafhankelijkheid van anderen	aant. betrokken partijen (problemen bij realisatie)	imago / marketing (innovatief, duurzame E. klimaatbest.)	robuustheid	flexibiliteit/aanpasbaarheid
++	-	-	0	-			-	-	-
-	++	0	++	++			-	+	-
-	+	-	+	++			-	+	-
++	0	0	0	0			-	+	++
-	+	+	0	+			++	++	-
-	+	0	0	+			++	++	-
-	+	-	-	-			0	+	-
-	0	0	-	-			0	+	-
0	-	-	-	-			-	+	-
+	0	0	+	+			+	0	++
0	+	-	-	-			0	0	-
-	+	0	++	++			0	+	-
++	++	-	-	-	-		-	++	0
++	-	-	+	0	-		-	0	0

## Principles for an local adaptive strategy for flood management

- *Robust on the long-term (resistant to major changes)*
- *Flexible on the short term (easy to exchange different measures)*
- *Easy to phase (not too early, certainly not too late)*
- *Cost effective (make use of the dynamism of the city)*
- *Shared responsibilities*



# Thank you for your attention

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