



Applications in the SKINT Project

Watertown – a simulation tool for city water planners

Professor Chris Jefferies
University of Abertay
Dundee
Scotland

Thanks also to;
Dmitirjs Cernagovs, Neil Berwick, Floris Boogard



Introduction

1. Context - problems with communicating city water issues
2. A simulation model or a game?
3. Model / Game development.
4. WaterTown city layout
5. Playing the game



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The context of Urban Water Planning

- Flooding and drainage issues are complex to communicate.
- Many techniques for modelling flooding and watercourses.
- Many issues are difficult to understand by non-specialists.
 - Planners.
 - Decision makers (politicians).
 - The public
- WaterTown is intended to bridge the gap in understanding.



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Problems of pluvial flooding



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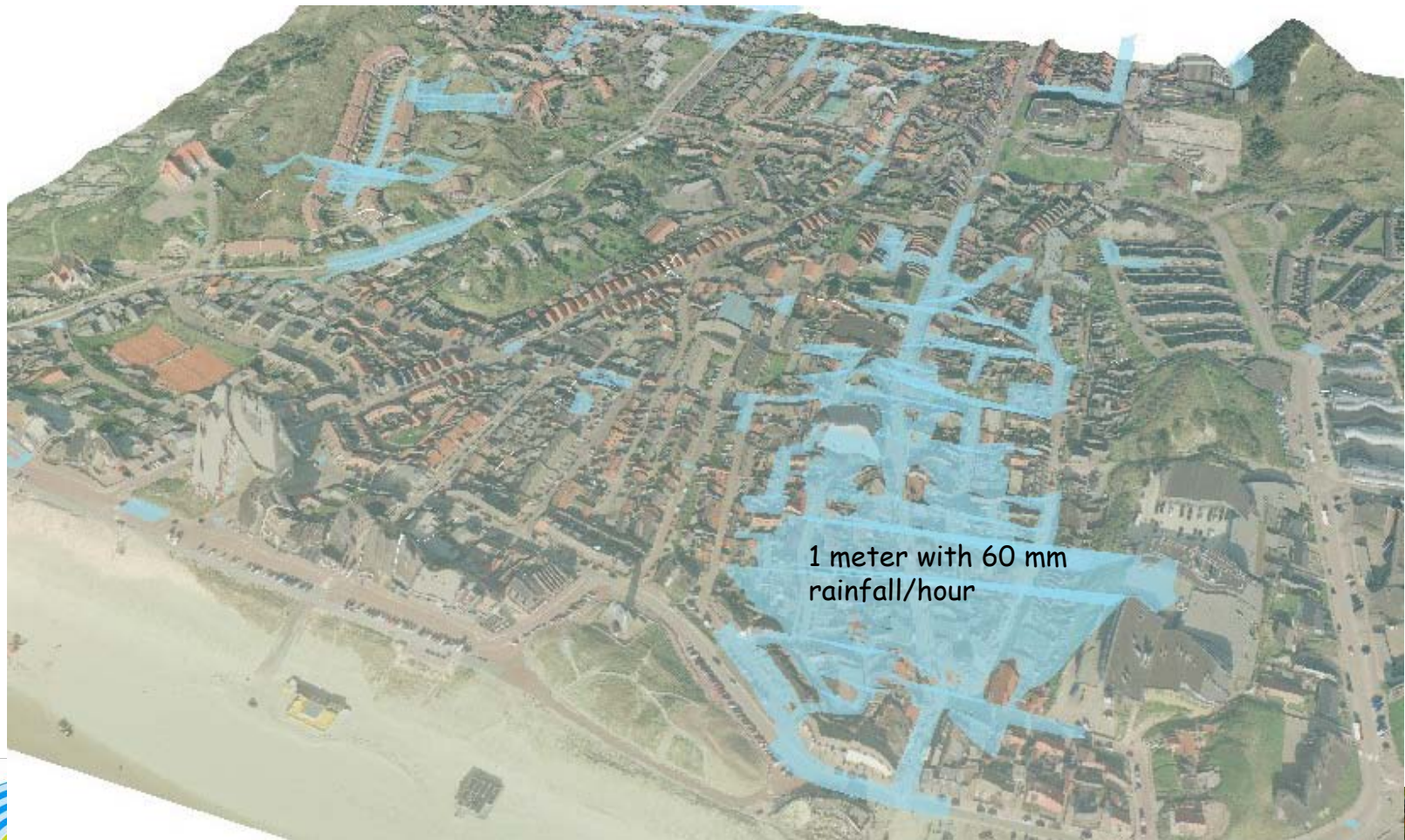
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Egmond – economy suffers



Simulation model response

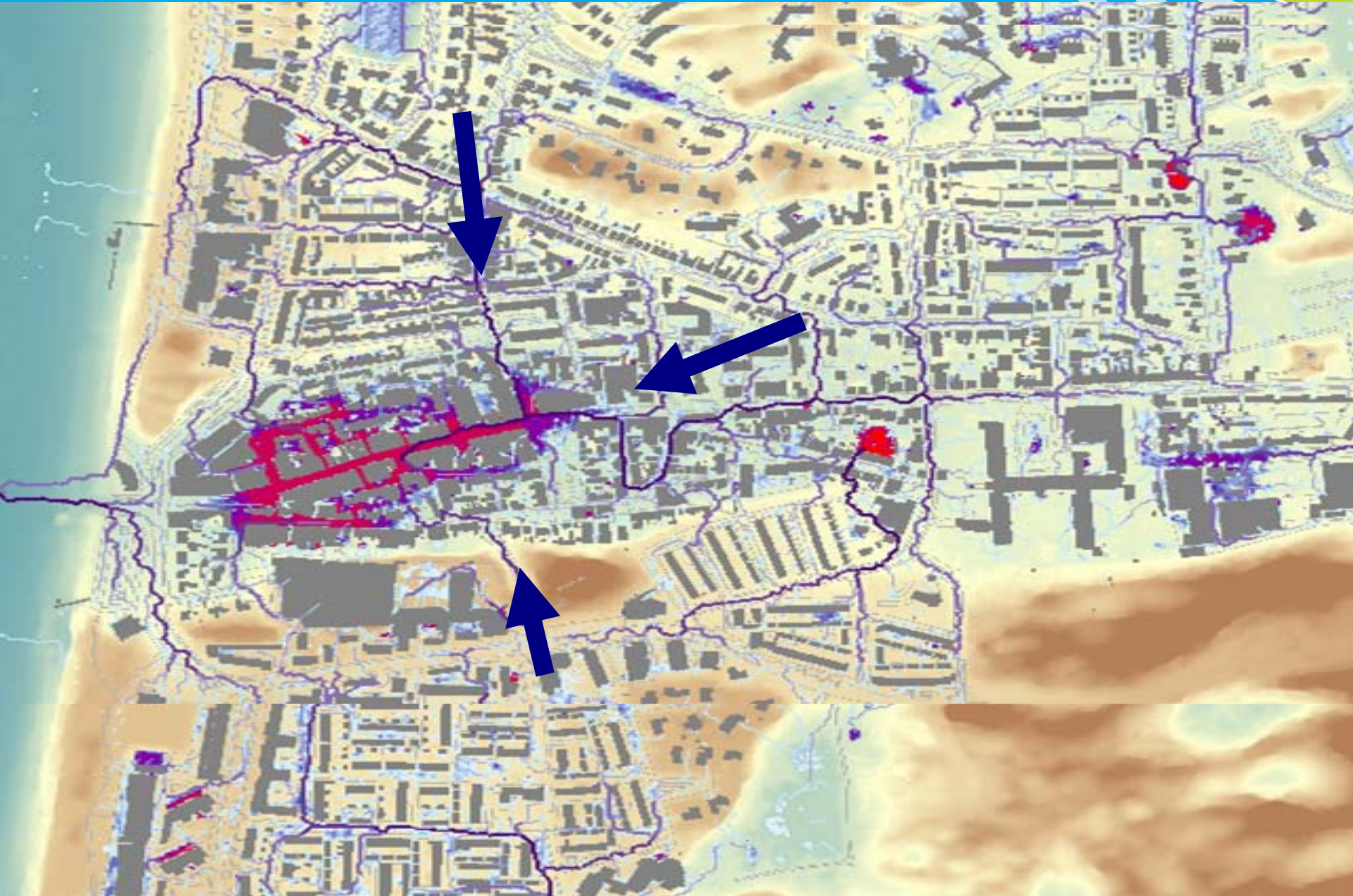


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Typical means of communicating solutions





Deterministic – complete the boxes

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
		Urban areas				Groundwater			Drain. infrastructure				Rivers			Surface water					Coastal		
		Rural greenspace	Greenspace at urban fringe	Greenspace within urban area	Developed urban surface	Anthropogenic superficial deposits	Natural superficial deposits	Bedrock	Sewers	Subs/Source control	Pipe drain	Open Drain	Small Streams and ponds	Large Streams and pond	Rivers and lakes	Exceedance pathways	Natural surface water bodies	Drainage channels	Canals	Reservoirs	Estuaries	Deltas	Open sea
1	Modelling																						
2	Organisational infrastructure																						
3	Tools																						
4	Planning policy, guidance, legislation									X													
5	Procedures																						
6	Risk																						
7	Planning									X													
8	Action plans																						
9	Awareness (political, prof., public)																						
10	Stakeholder engagement and communication									X													
11	Construction & maintenance									X													
12	Data management and mapping																						
13	Water quality and pollution												X										
14	Capacity building																						
15	Climate change																						
16	Sustainable development																						
17	Cultural heritage and common memory																						
18	Flooding												X										



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Some issues are simpler

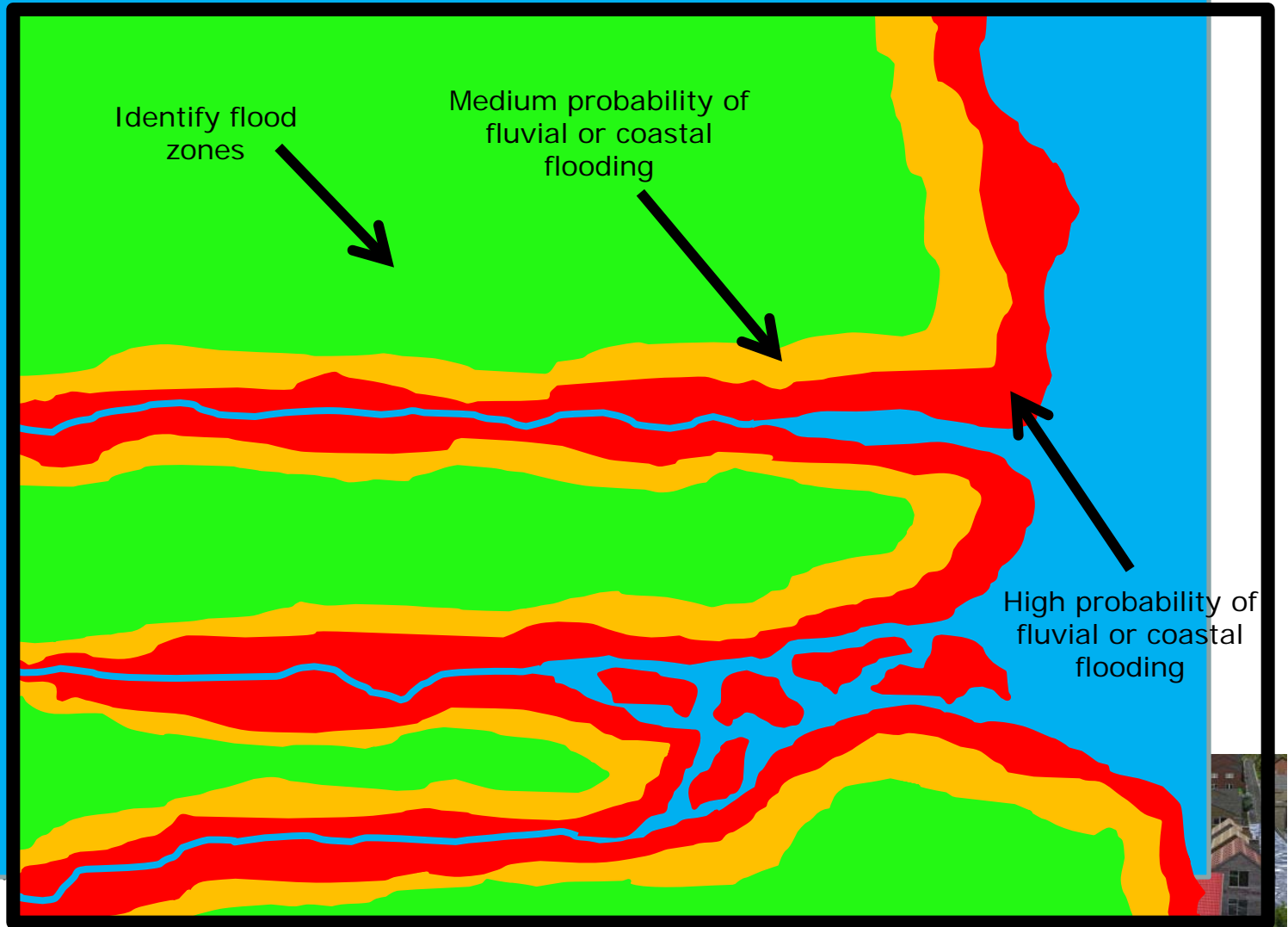


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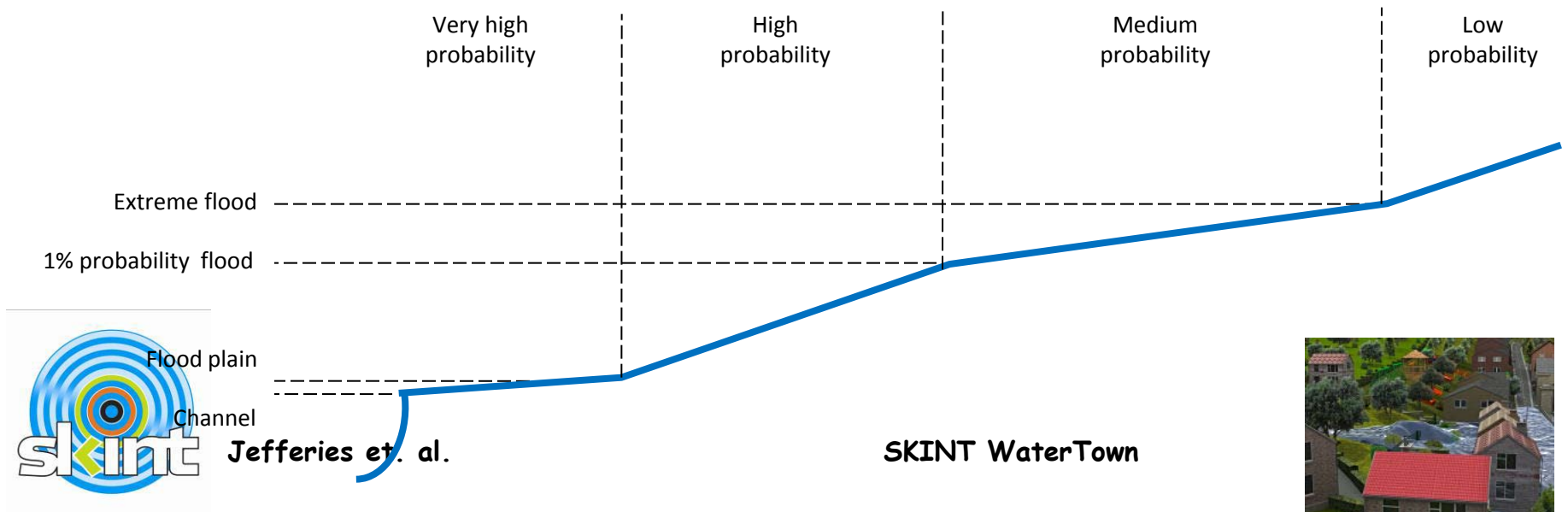


Different probabilities of flooding



Floods directive requirements

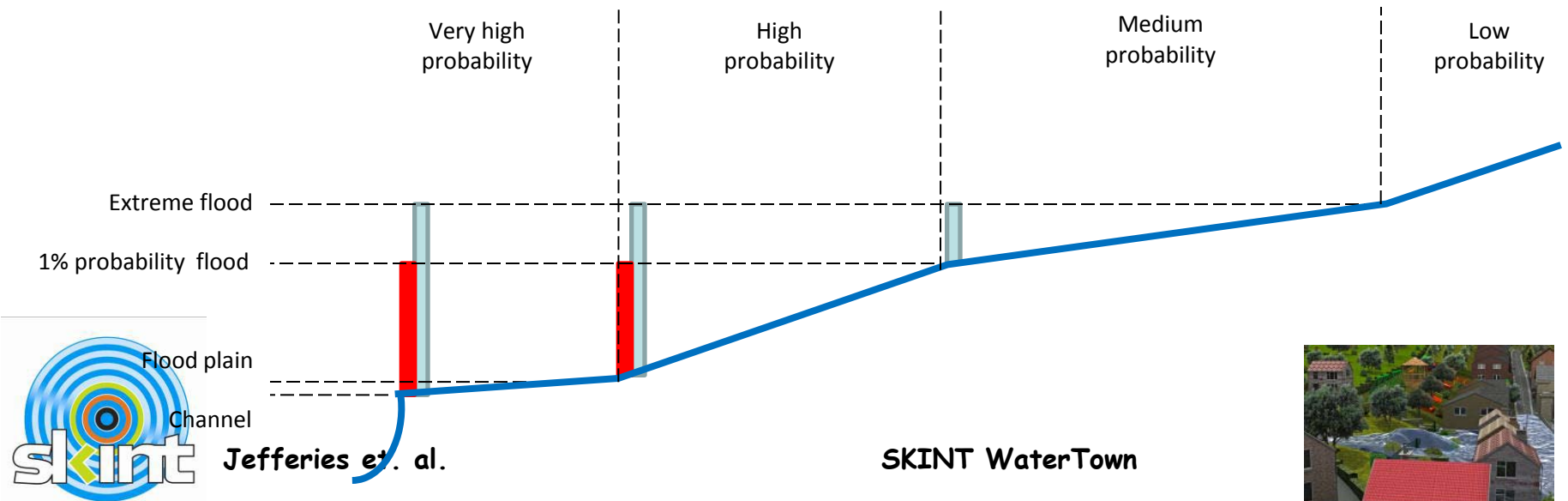
The floods directive identifies flood zones for high, medium and low probability flooding. These are represented in the illustration below



Typical locations of flood defence

Flood defences may be located at any position and at any elevation

Typically might be the level of the 1% flood or extreme flood with freeboard addition



WaterTown is a communication tool

Run Flash Video of 'Do-Nothing' scenario



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Aims of WaterTown

- To engage with decision makers
- To provide understandable examples of urban water management issues.
- To provide an interactive means of developing knowledge of real life water management issues.
- To assist with capacity building within key organisations.
- Offer WaterTown in different European countries and the player can play the game in English, Dutch, German and Norwegian



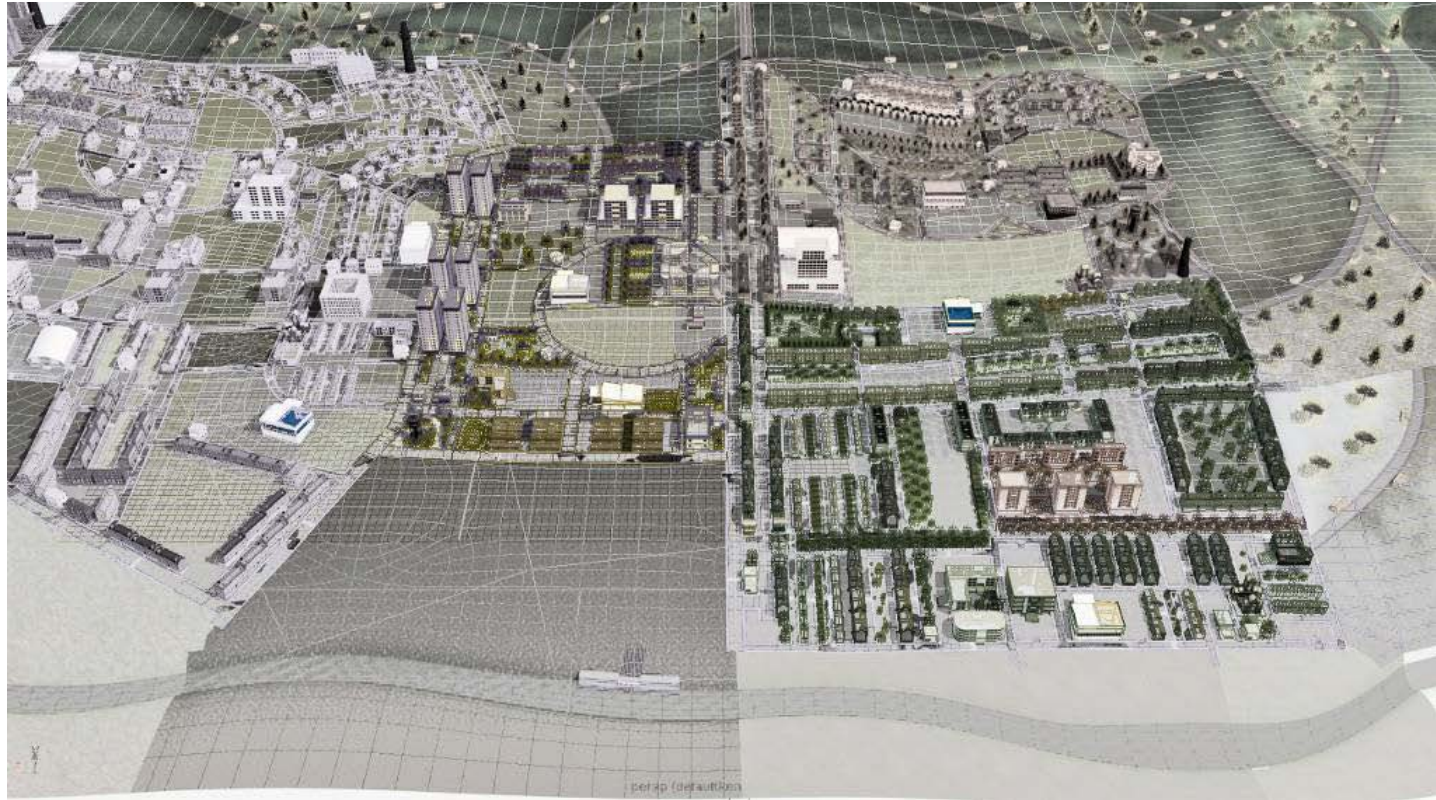
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Game Development

City is
extensive



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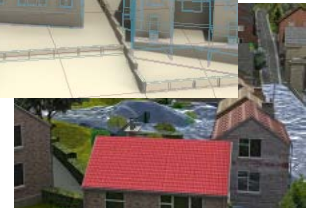


Game Development



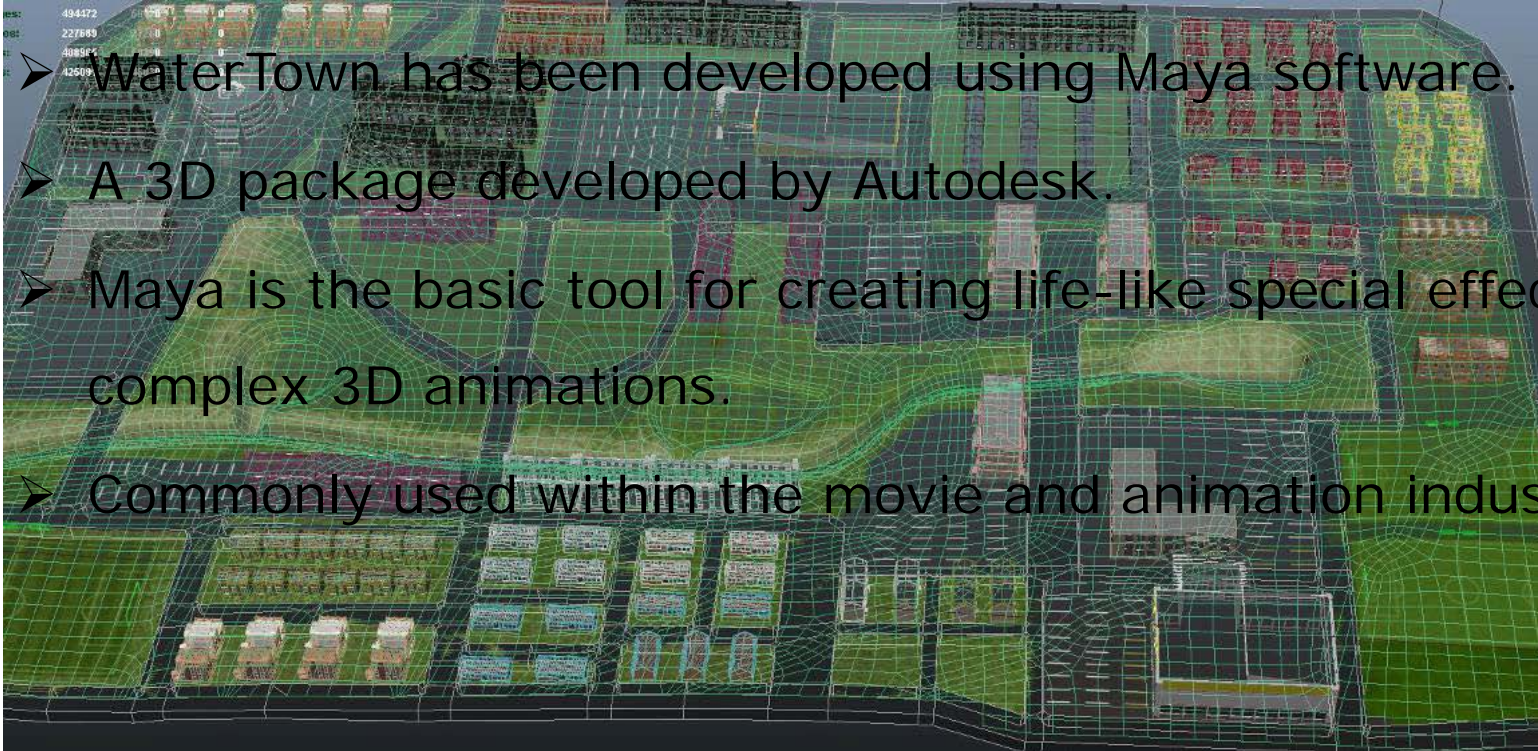
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Game Development

- WaterTown has been developed using Maya software.
- A 3D package developed by Autodesk.
- Maya is the basic tool for creating life-like special effects and complex 3D animations.
- Commonly used within the movie and animation industries.



A grid lies under WaterTown



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Adding the complexity of detail

- Objects – Buildings, roads, trains
- Textures are linked to the objects
- Textures are combination of different aspects - image, colour palette or gradient.
- Texture dictates how light and shadow, appear on the object



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Adding the complexity of detail

- Less complex low polygon items with high resolution textures.
- Provide photo-realism to the landscape.
- Examples include trees, street signs, cars, bins, and post boxes



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Adding Water to WaterTown

Realistic water is key to WaterTown

Believable water scenarios are the backbone

Stream, pond, sewer

Water particles are essentially small balls with vortex, gravity and 'stickyness'.

Balls roll down the slope.

The physics of the particles is adjusted to give realism.



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Adding Water to WaterTown



Game Development



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Adding Water to WaterTown



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Four Districts of WaterTown

WaterBurgh – integrated
planning

Wetley-Tetley – Pluvial
flooding

EGMOND

BRYGGEN

Egmond – political
decisions

Bryggen – settlement of
historic buildings



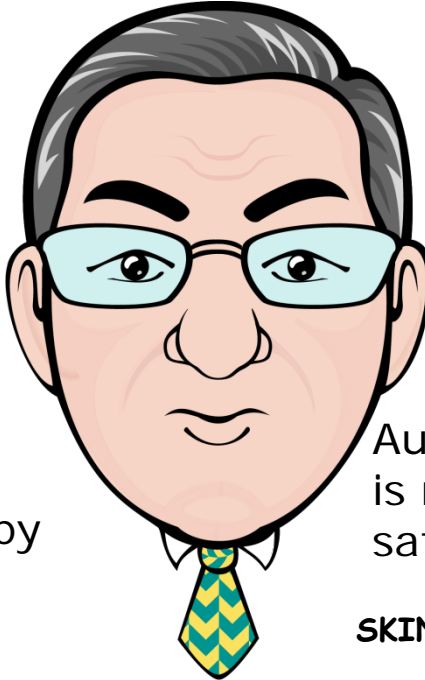
Playing WaterTown

- There are several scenarios in each district
- Select different options
- Each option has a cost and outcome
- Simple expression of complex outcomes



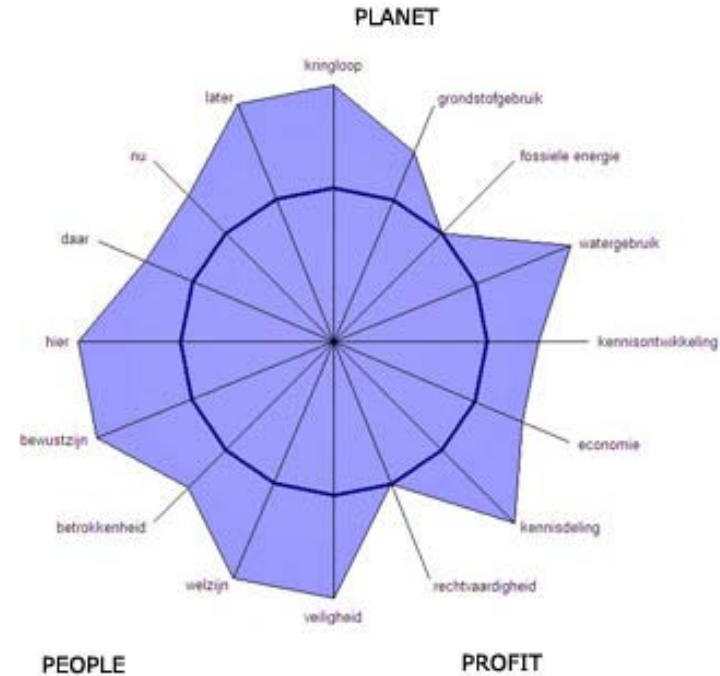
Option makes residents happy

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Authority is not satisfied

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Traditional options diagram



Playing WaterTown

- Each option runs a video
- Video is followed by feedback



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Solution in Brygggen, Norway

The problem is due to settlement of foundations of ancient buildings
because of poor surface water management

Change paving to permeable

Construct infiltration system

Change paving to permeable



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Bryggen



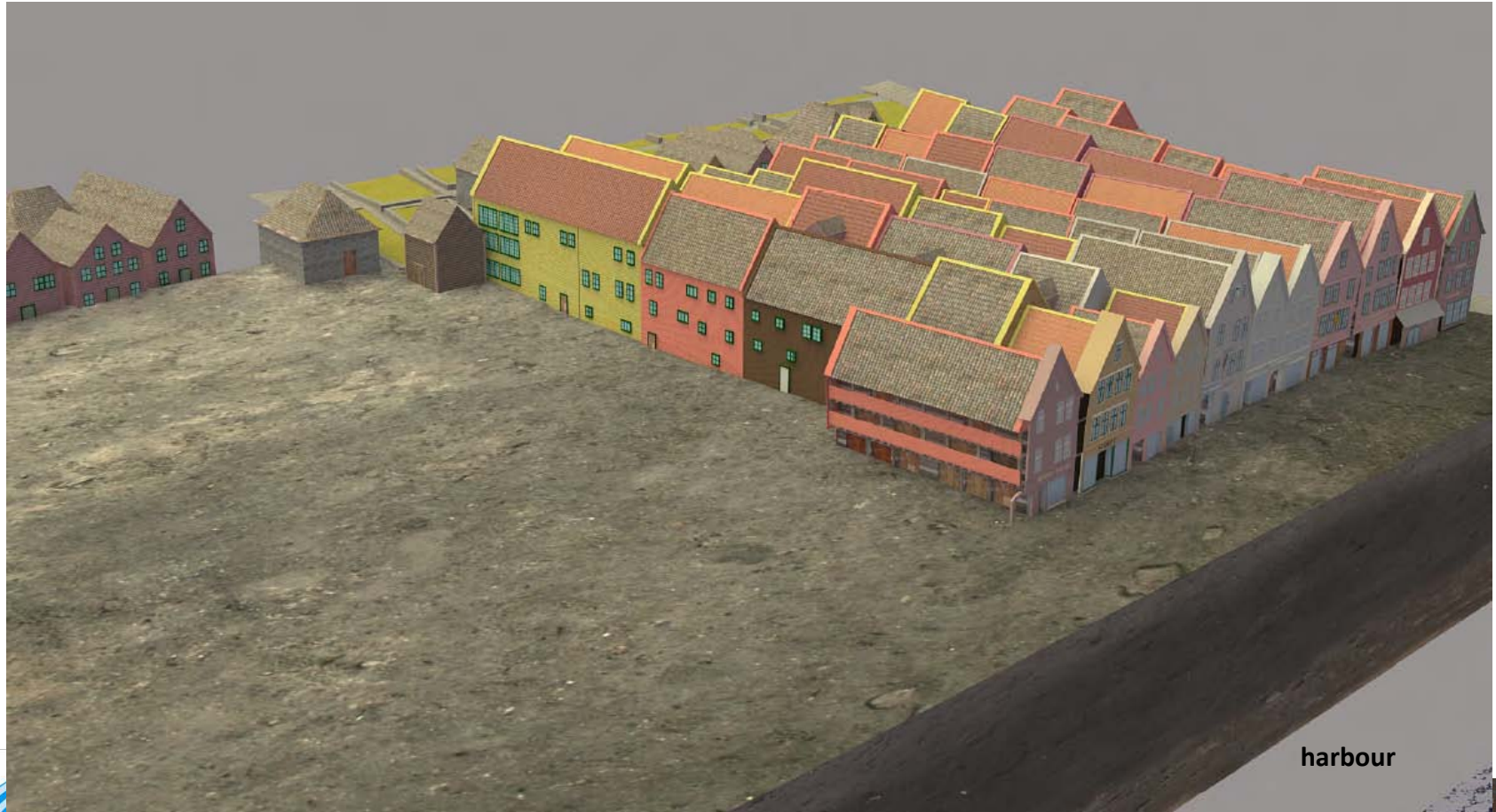
Historic city centre before the big fire, in 1950's.

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Bryggen

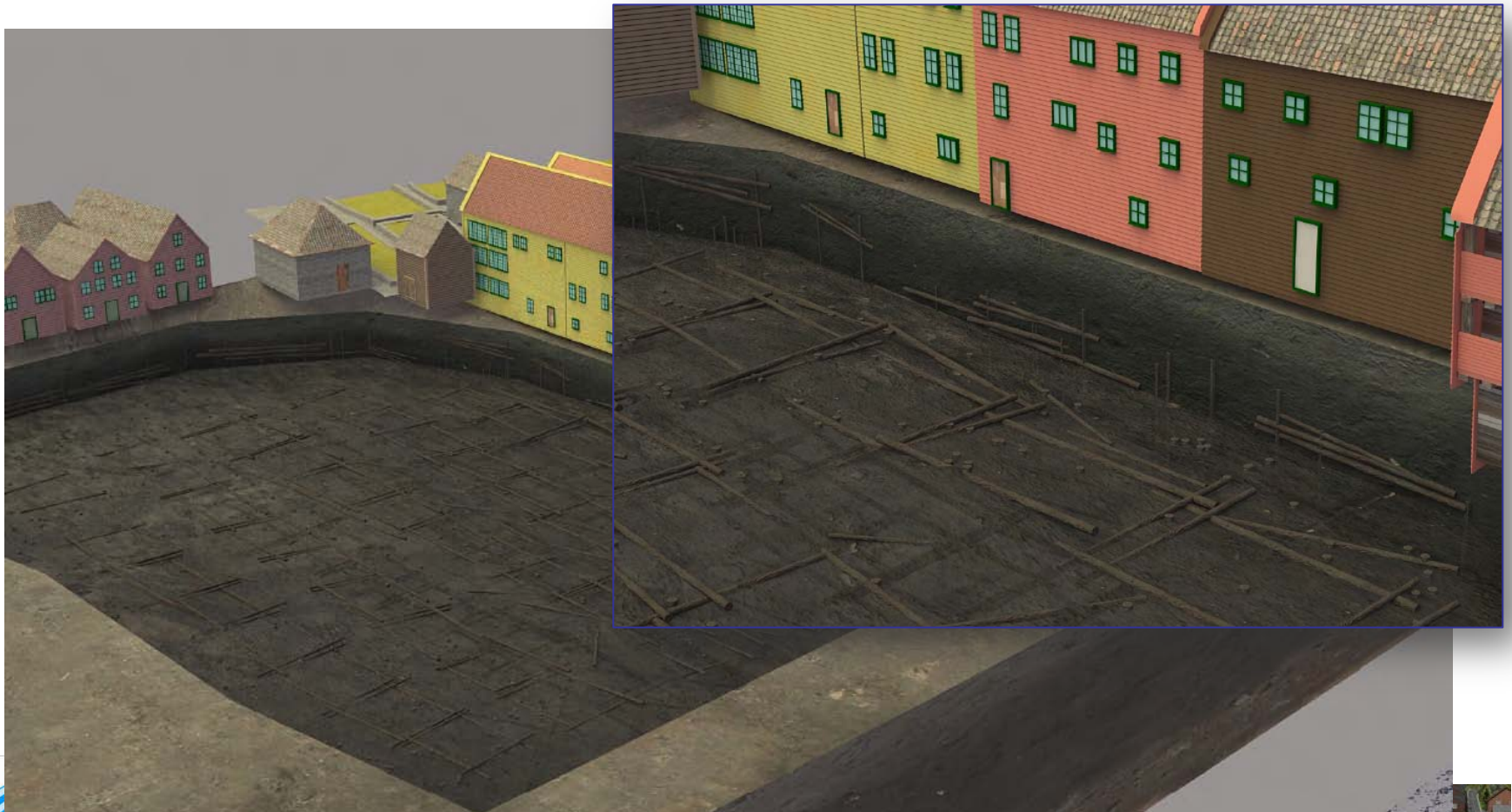


Situation after the fire in the 1950's.
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Bryggen



A unique heritage site, with excellent preservation conditions
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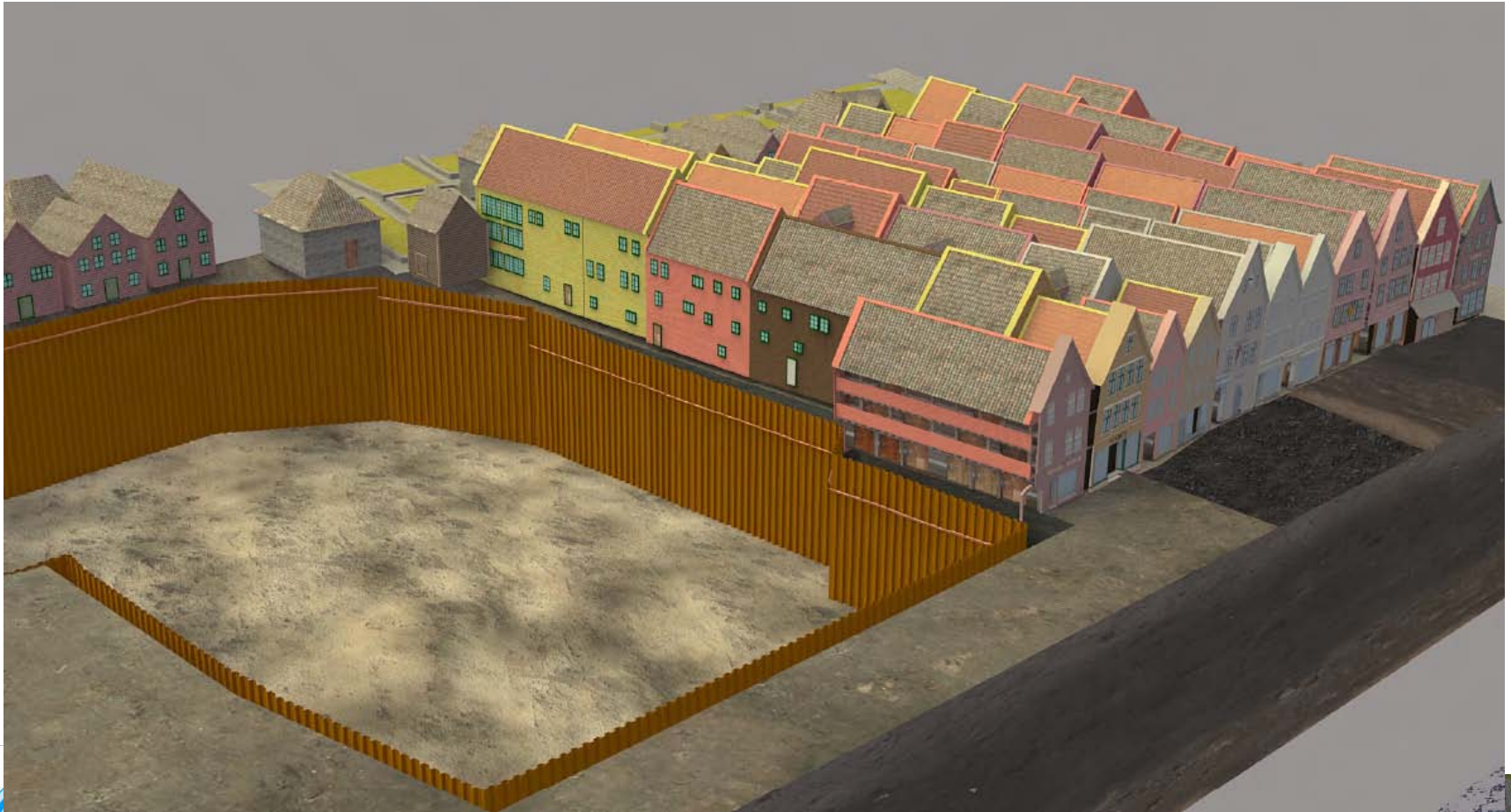
Bryggen



Lowest level: foundation logs on former beach sands
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Bryggen

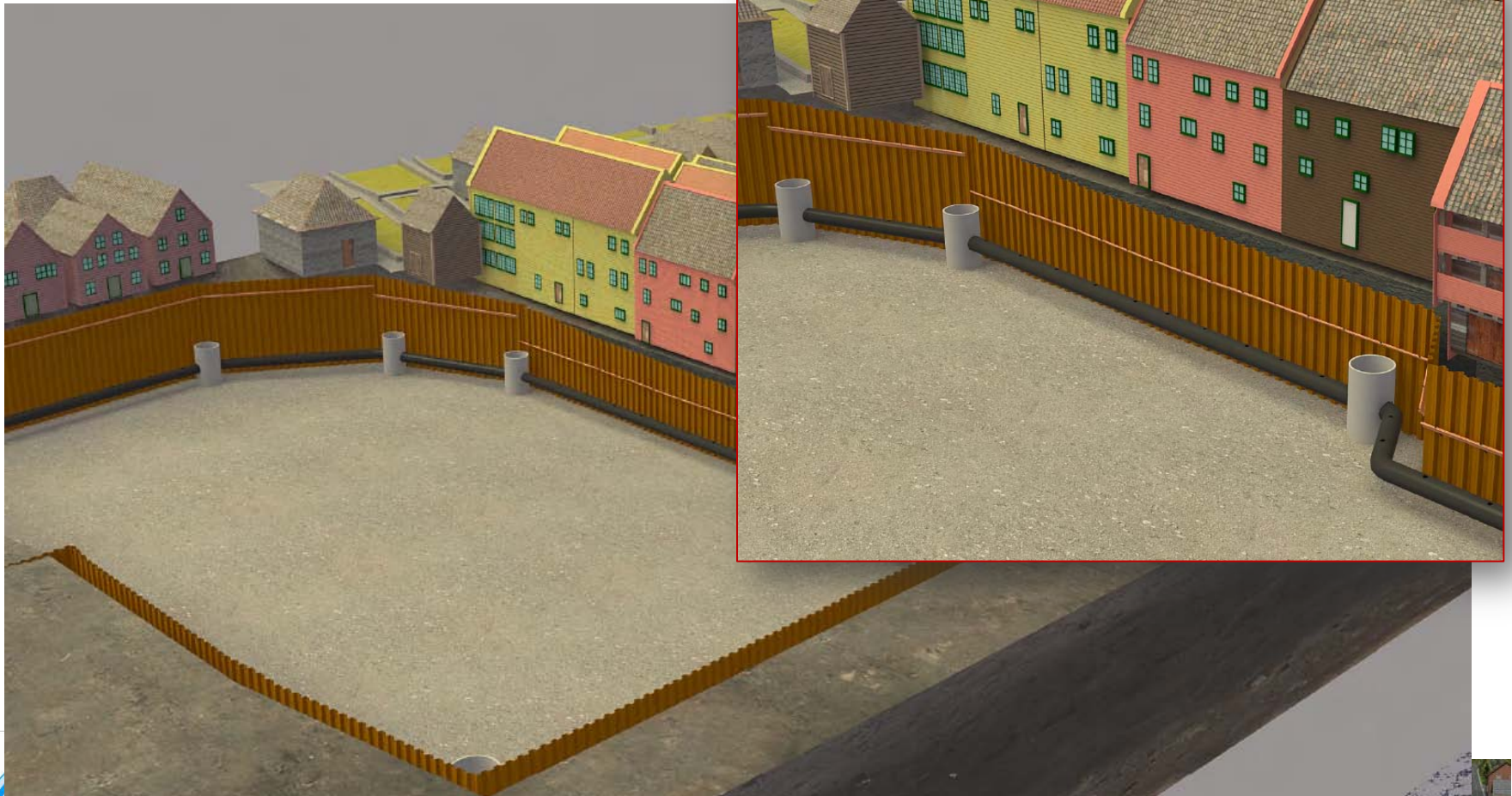


Construction of hotel begins. Sheet piling is constructed.
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Bryggen

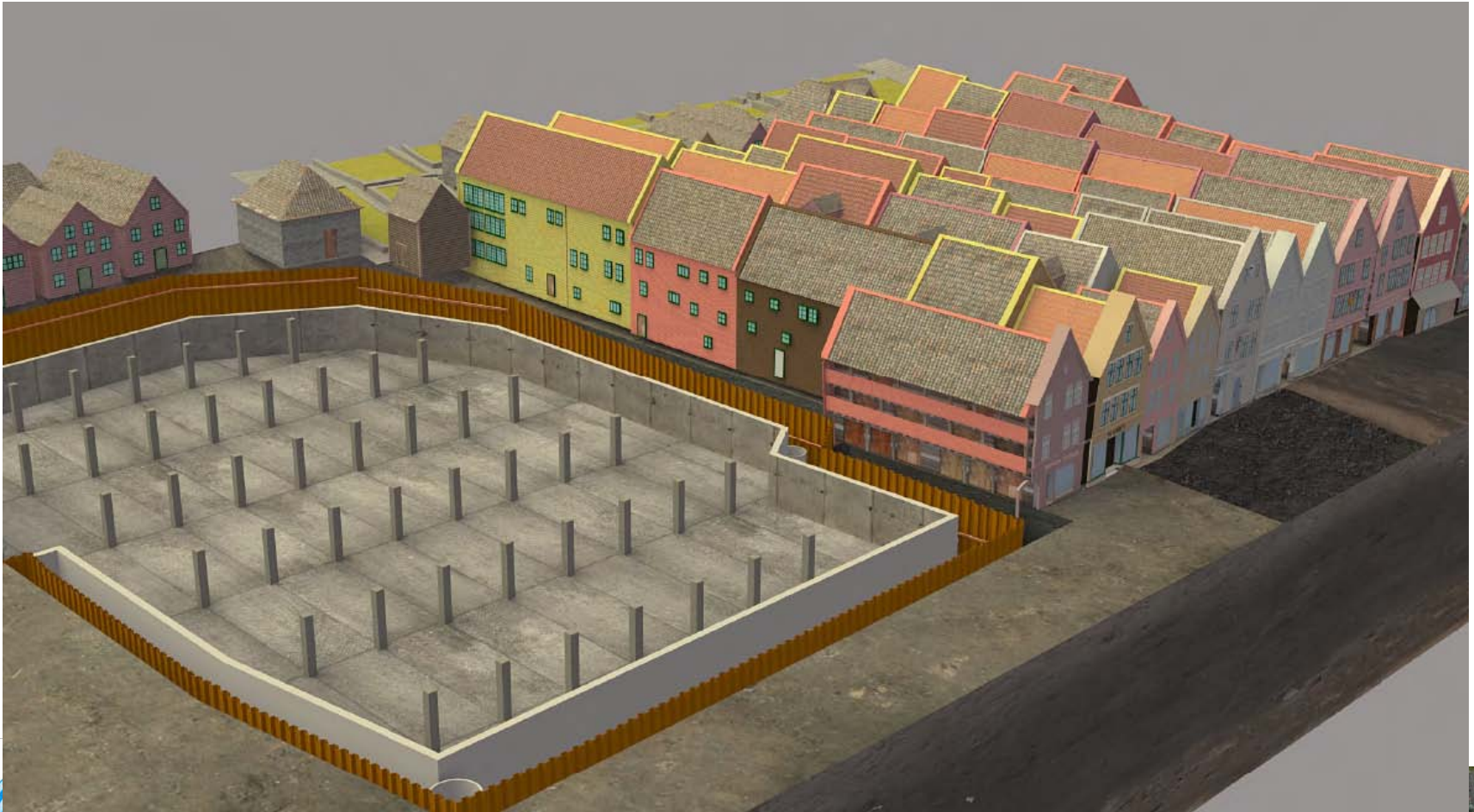


A groundwater drainage system is constructed
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Bryggen

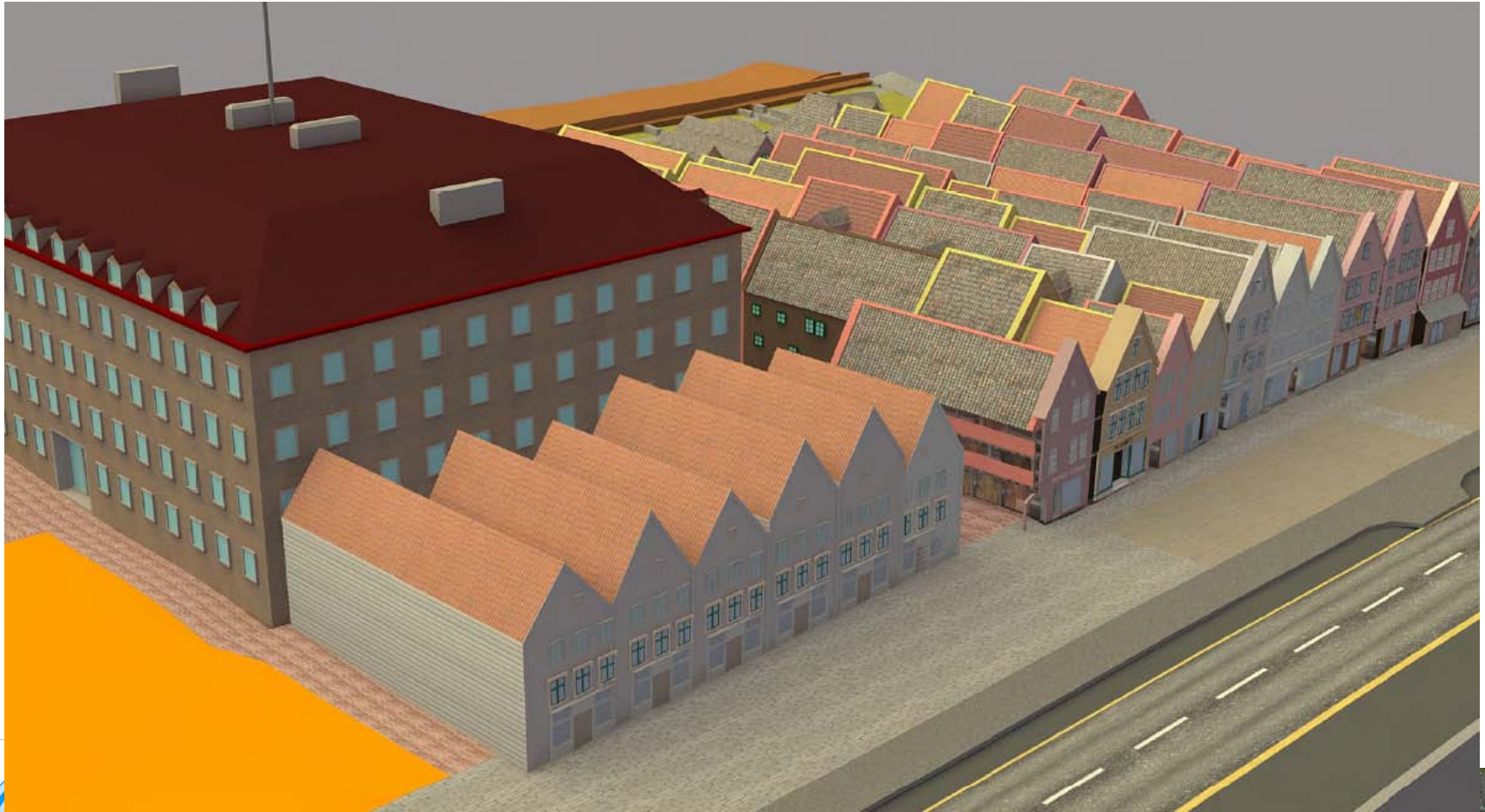


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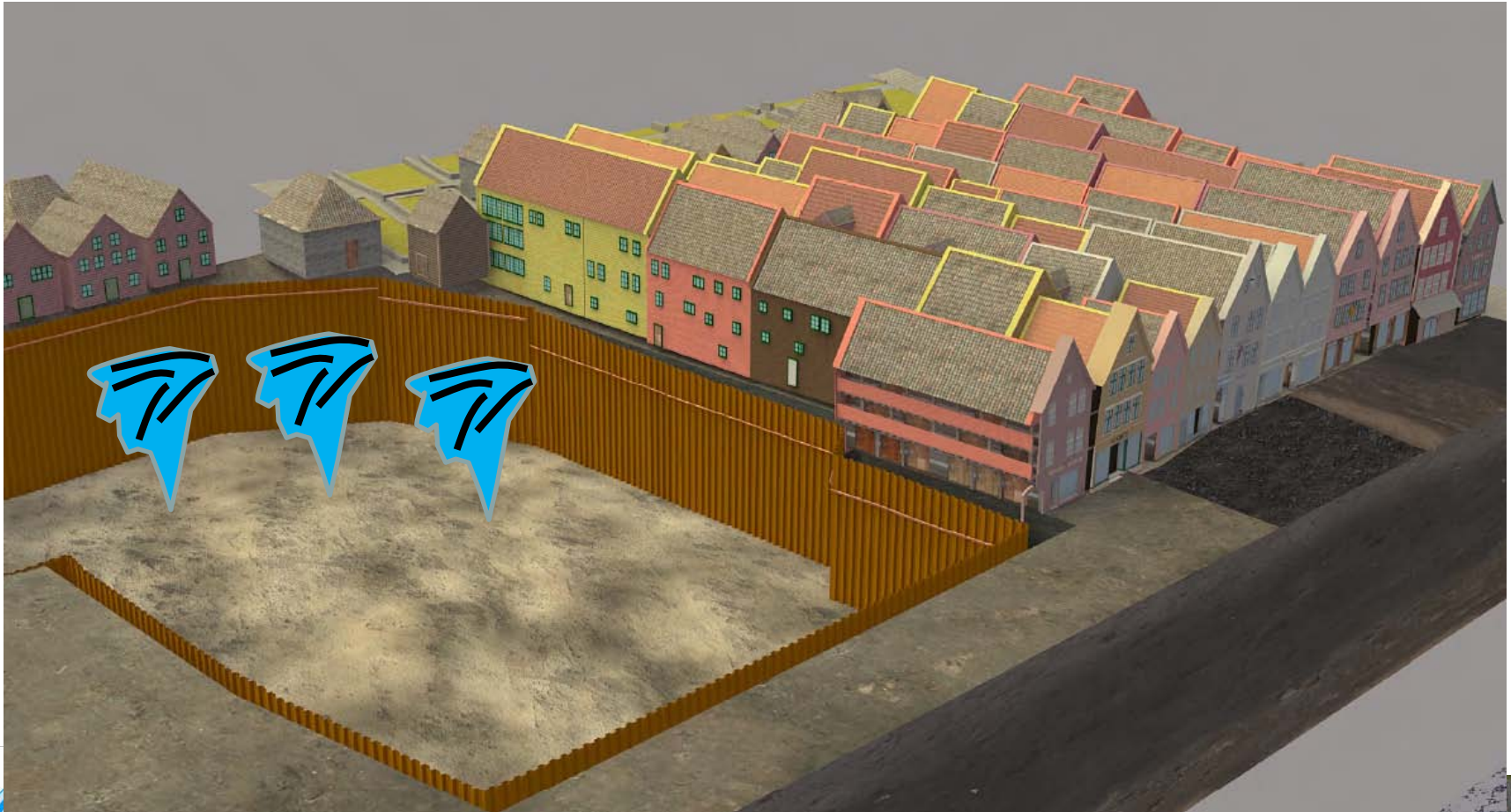


Office building finished, replicas of former buildings at front.
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Bryggen – the problem



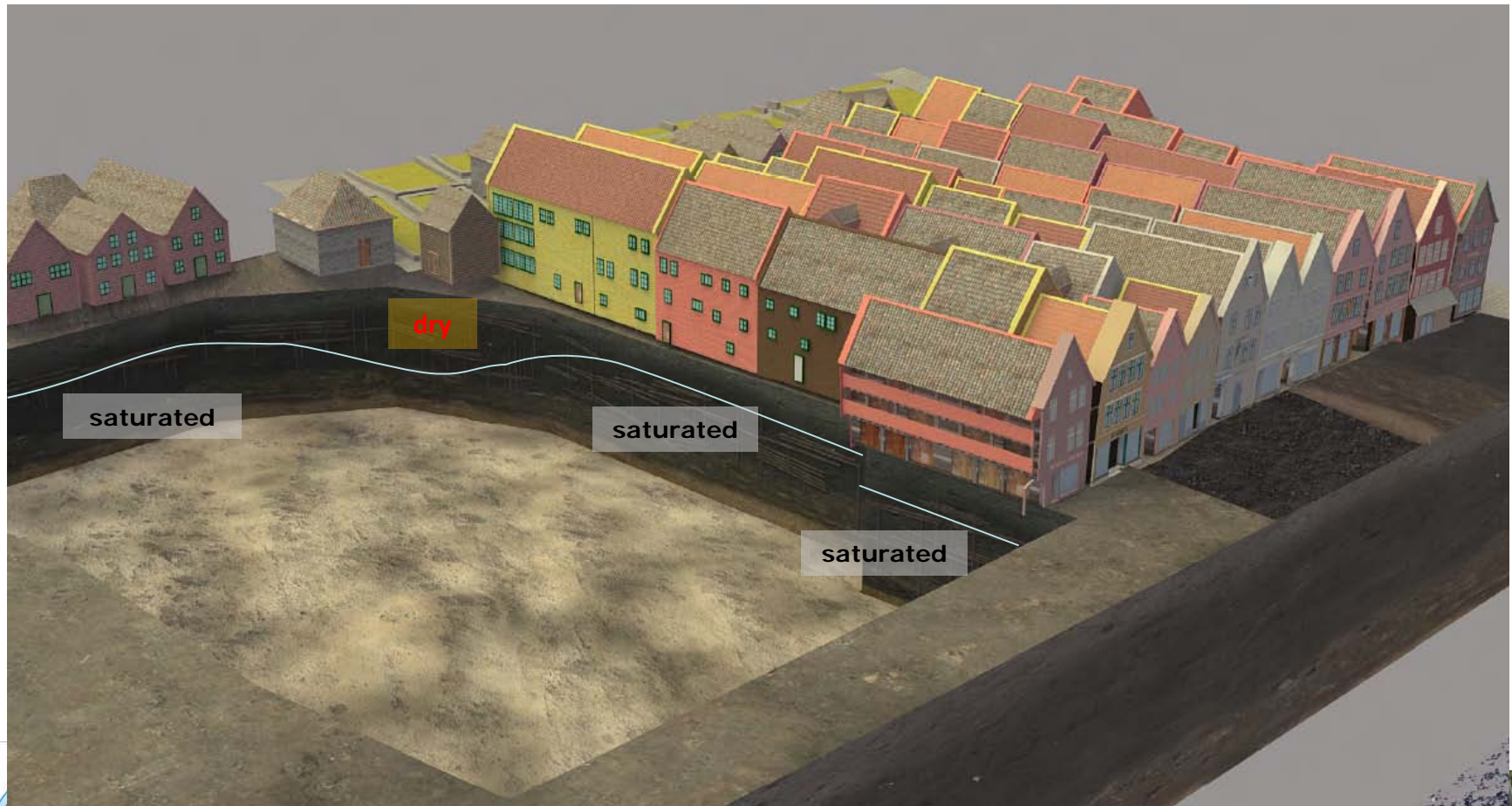
Sheet piling is leaking!

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Bryggen



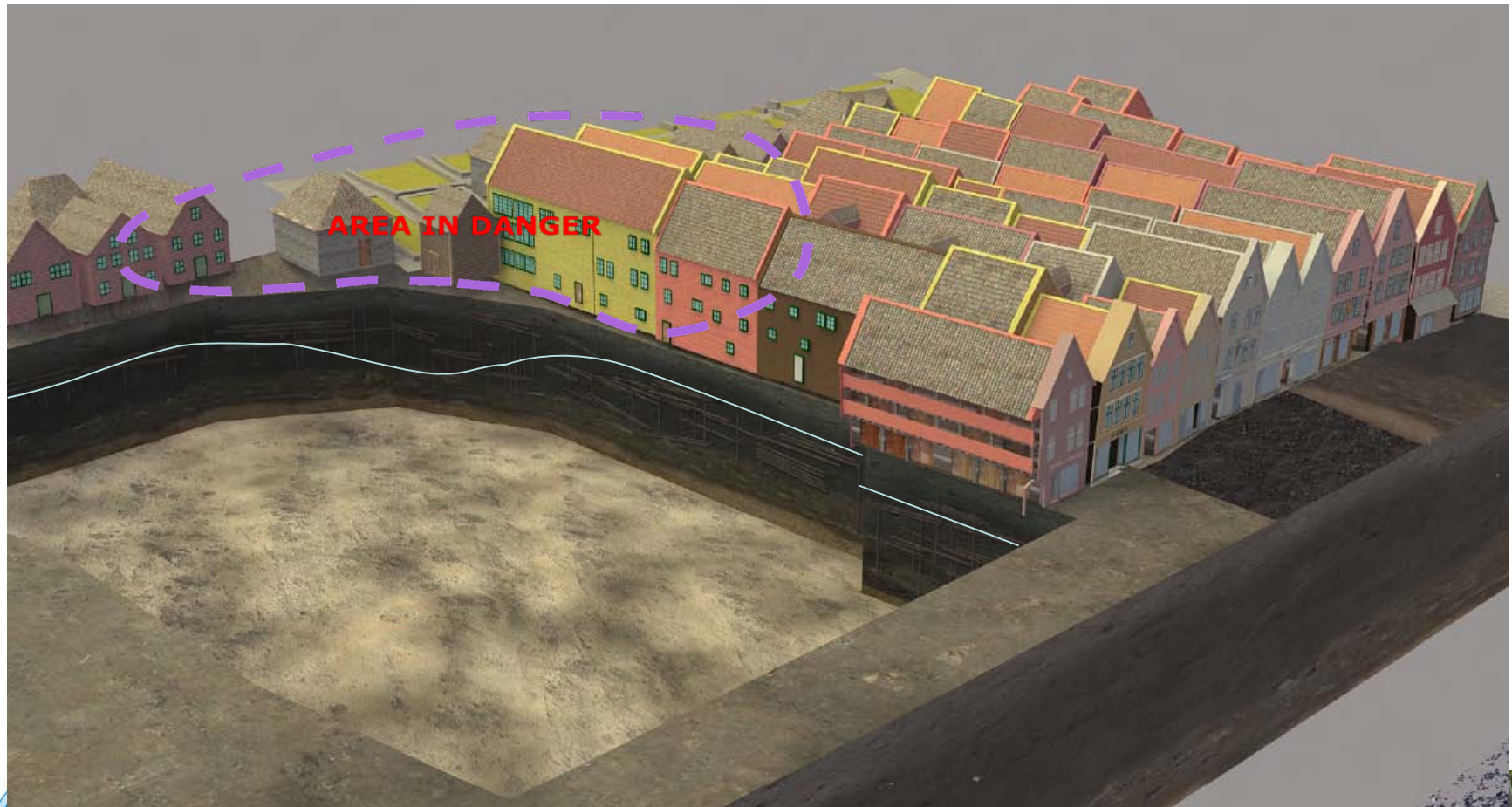
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What is happening BEHIND the sheet piling

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Jefferies et al. A large area is in danger for dessification.

CRACK WATER TOWN



Main points

- Many urban water planning issues are very complex
- Standard ways of communicating are single issue
- WaterTown is a different way of getting ideas across
- It is fun, it is accessible
- It is about training, not directly about solutions



Thank you

Thank you for your attention

www.skintwater.eu

Chris jefferies

c.jefferies@abertay.ac.uk



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