Municipality

Better basis to make decisions about climate adjustment and the management of increased water levels

New method involves satellite data for local settlement

As part of the EU-Life supported Coast to Coast Climate Challenge project, Geopartner Inspections has developed a new method together with Lemvig Vand and Lemvig Municipality. This method uses satellite data to monitor, map and project the effect of local vertical terrain changes on pipeline transports. This is combined with the projection of the impact of a rising water table on supply networks. The work that we did resulted in a report, titled C17 Thyborøn By og Havn – Klima, kloak og sætninger (in English – C17 Thyborøn Town and Harbour – Climate, sewers and settlement), which draws conclusions that are pertinent and transferable to supply deliveries throughout Denmark, especially in areas which have problems with settlement.

The benefits of the new method:

- Better basis to plan for the redirection of increased volumes of water from extreme rainfall, flooding and rising ground water levels
- Overview of non-uniform ground settlements, which can result in changed water channels
- Overview of areas that are at risk of flooding; now and in the future
- Strong basis to plan the development of areas of residential settlement and of infrastructure
- Robust basis for decisions that involve climate adjustment and climate proofing, such as the height of a particular coastal barrier in ten years' time.

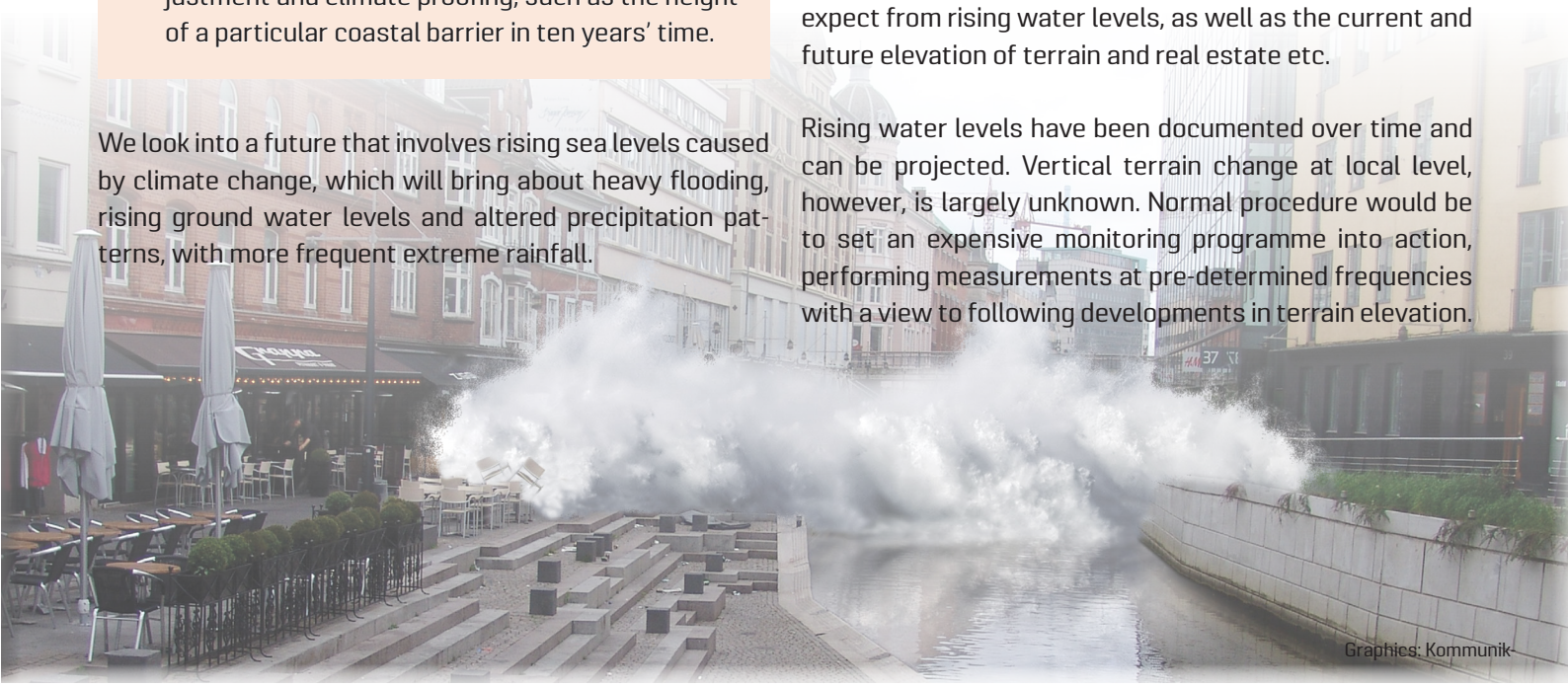
We look into a future that involves rising sea levels caused by climate change, which will bring about heavy flooding, rising ground water levels and altered precipitation patterns, with more frequent extreme rainfall.

At the same time, a number of towns are experiencing ground subsidence, which amplifies the impact of climate change. What are now rare occurrences will become so frequent that they may ultimately make certain areas uninhabitable.

At the same time, local non-uniform ground settlement will affect the ability of water channels and sewer systems to redirect water. Adjustment is a necessity in order to enable infrastructure to manage the consequences of climate change and ground settlement.

As regards the risks of flooding and impeded infrastructural functionality, it is important that we know what to expect from rising water levels, as well as the current and future elevation of terrain and real estate etc.

Rising water levels have been documented over time and can be projected. Vertical terrain change at local level, however, is largely unknown. Normal procedure would be to set an expensive monitoring programme into action, performing measurements at pre-determined frequencies with a view to following developments in terrain elevation.



Graphics: Kommunik

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How we do this:

- Benchmarks are measured using ground level surveying, GPS measurement of well covers, altitude levels are measured by ground level surveying and base water levels are measured in wells by probe dipping.

- Measurements are "interconnected" using measurements from permanent GPS stations, water level probes and radar reflectors to collect and connect with data provided by satellites. Terrain change documentation is therefore data-based.

- Satellite data is locally adjusted to ensure cohesion and reference to the same elevation system. Data about land and water will also be compared and combined. This will result in precise knowledge about how land is sinking and water is rising, and the rate at which they are converging.

- Satellite coverage allows us to update calculations on an ongoing basis and to monitor developments at chosen intervals.

C2C Coast to Coast Climate Challenge

Life

The goal of this project was to implement new, more cost-effective measurement methods to ensure the continued availability of new data and a statistically sustainable basis for projections.

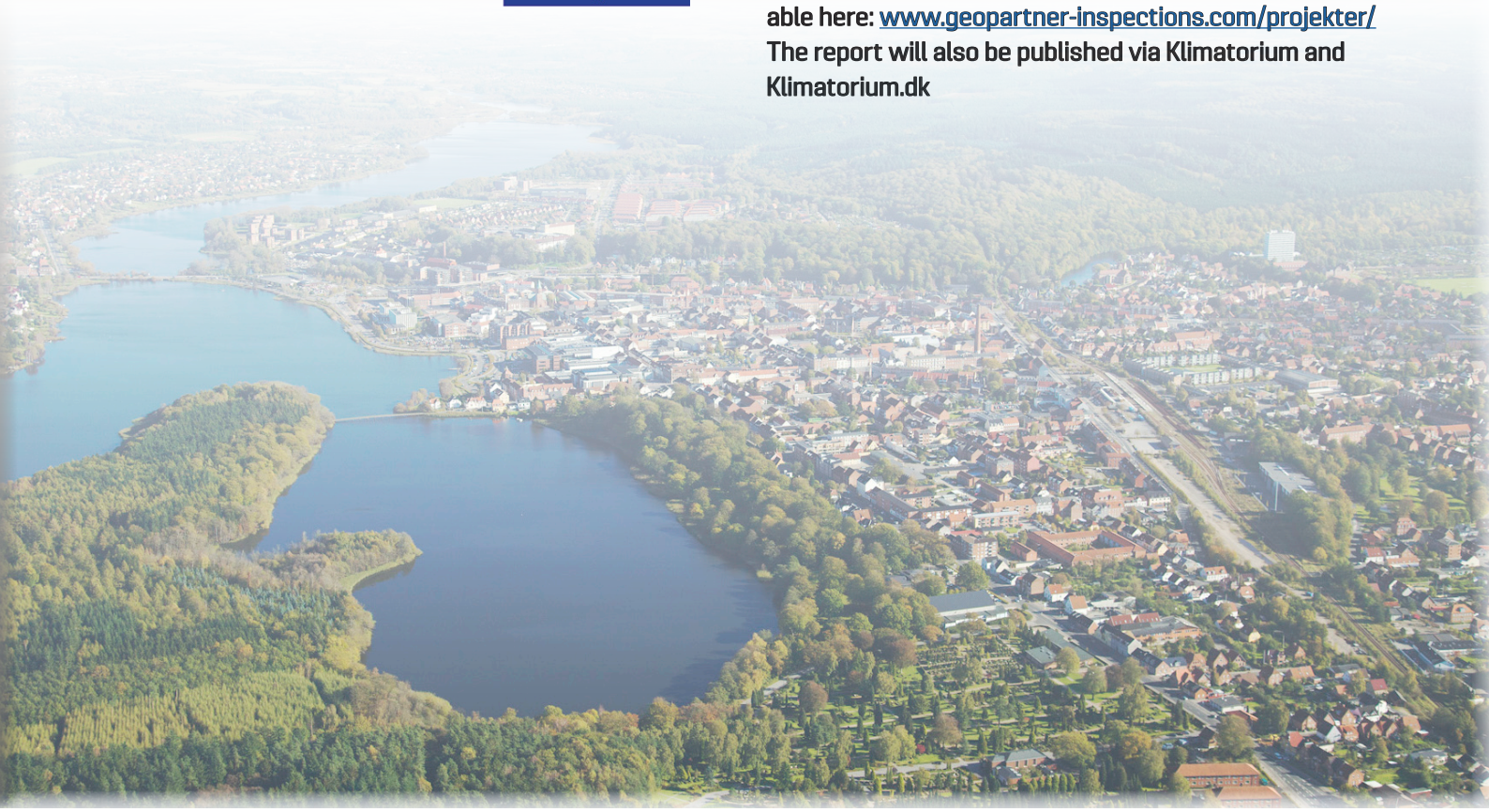
These objectives have been achieved using the new method. At the same time, it is now also possible to produce a detailed, integrated 3D model of the surface and supply pipeline networks that combines terrain elevation with surveys of infrastructure, subsoil geology and climate parameters.

The result of the new method, which involves terrain change at local level, is a significantly increased scientific basis for measures that can be set in motion towards climate adjustment and the planning of the municipality's management of increased volumes of water.

This information can be easily integrated into relevant IT systems that are used in the daily workflows of supply companies and municipalities.

These results are interesting and of relevance to all municipalities in Denmark that would like to see a more data-driven approach to future management of the challenges represented by issues such as climate changes.

The full C17 Thyborøn Town and Harbour report is available here: www.geopartner-inspections.com/projekter/ The report will also be published via Klimatorium and Klimatorium.dk



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