



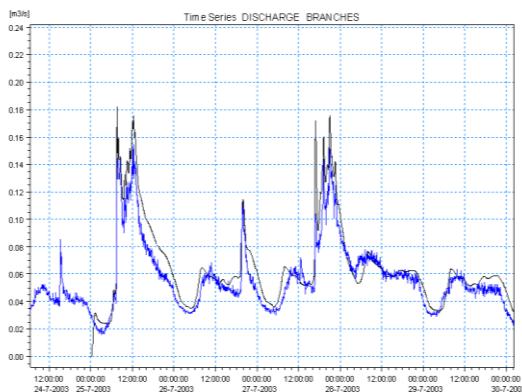
Modeling the sanitation systems to new control rules, adapted operation of wastewater treatment and adapting water supply to enhanced NOM levels

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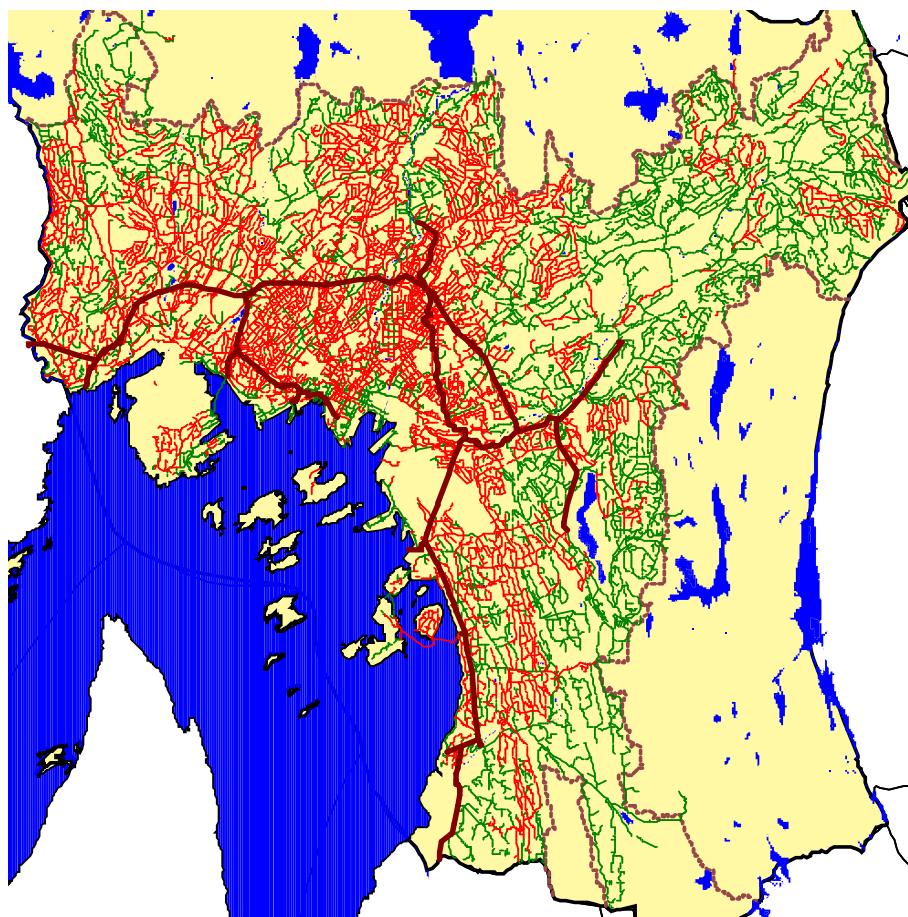


OSLO: HOW CAN CLIMATE CHANGE IMPACT THE CITY WATER SUPPLY AND SANITATION SYSTEM?

The major challenges for Oslo are related to the combined sewer operation, increased hydraulic peak loads on the wastewater treatment plants and deterioration of raw water quality for water supply:



- Increased intensity of rain combined with frequent snow melting, in what until now have been stable winter conditions, will give increased discharge to the combined sewers, with increased CSO (combined sewer overflow) and possible reduced efficiency of the wastewater treatment. In order to handle the increased peak flows and rapid changes in flow from combined sewers, a new 50,000 m³ storm water retention basin (just upstream of the eastern wastewater treatment plant) is under construction. This will be added to an existing basin of 35,000 m³. However, the new basin will not be in operation before 2014, therefore after the completion of the PREPARED project and as such not included in the project.
- Increased intensity of rain combined with frequent snow melting during winter time will give increases in NOM and reduced ice coverage in the raw water sources. Increased NOM will be a challenge for water treatment and may increase the biofilm formation potential in the distribution network, while reduced ice coverage will reduce the natural hygienic barriers in the lakes during wintertime.



OSLO: BE PREPARED

SINTEF (research partner), Aquateam and Oslo water and sewerage works will be demonstrating three decision support tools developed during the PREPARED project:

(1) Real time control of sanitation systems to improve water quality in receiving waters

The demonstration in Oslo will include modeling and demonstration of the proper operation of the existing storage volume in the eastern part of Oslo, in order to minimize CSOs and negative impact on recipients. The model will also be connected to a fjord model. In this way we can see the correlation between heavy rain, CSOs, the storage volume and bathing water quality in the fjord. This makes it possible to test new control rules for minimizing the impact on the environment from CSO and wastewater treatment plant effluent.

(2) Models and knowledge for operation and maintenance of wastewater networks exposed to rapid changes in flow

The task includes new technologies/methods to meet the need for adapted operation of wastewater systems (network and treatment plant) with special focus on handling of sediments in the network and manipulating unit processes in the wastewater treatment plant. The City of Oslo has an existing storage basin and a new storm water retention basin just upstream one of their wastewater treatment plants is currently under construction (Bekkelaget wwtp), which is a primary-biological-chemical treatment plant for BOD, phosphorus and nitrogen removal. The treatment plant is designed for large flexibility by way of combining the different unit processes, and in this task the treatment plant will be operated in different regimes in order to demonstrate the handling of variations in flow and pollution load to the plant.

(3) Remedial actions to prevent adverse effects of re-growth in networks at higher temperatures

In this task we will focus on the optimization of water treatment to minimize the biofilm formation potential in the water in order to compensate for an assumed increase in micro-biological activity because of increased temperatures. In particular, actions that may reduce the possibility for growth of opportunistic pathogens will be tested.

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