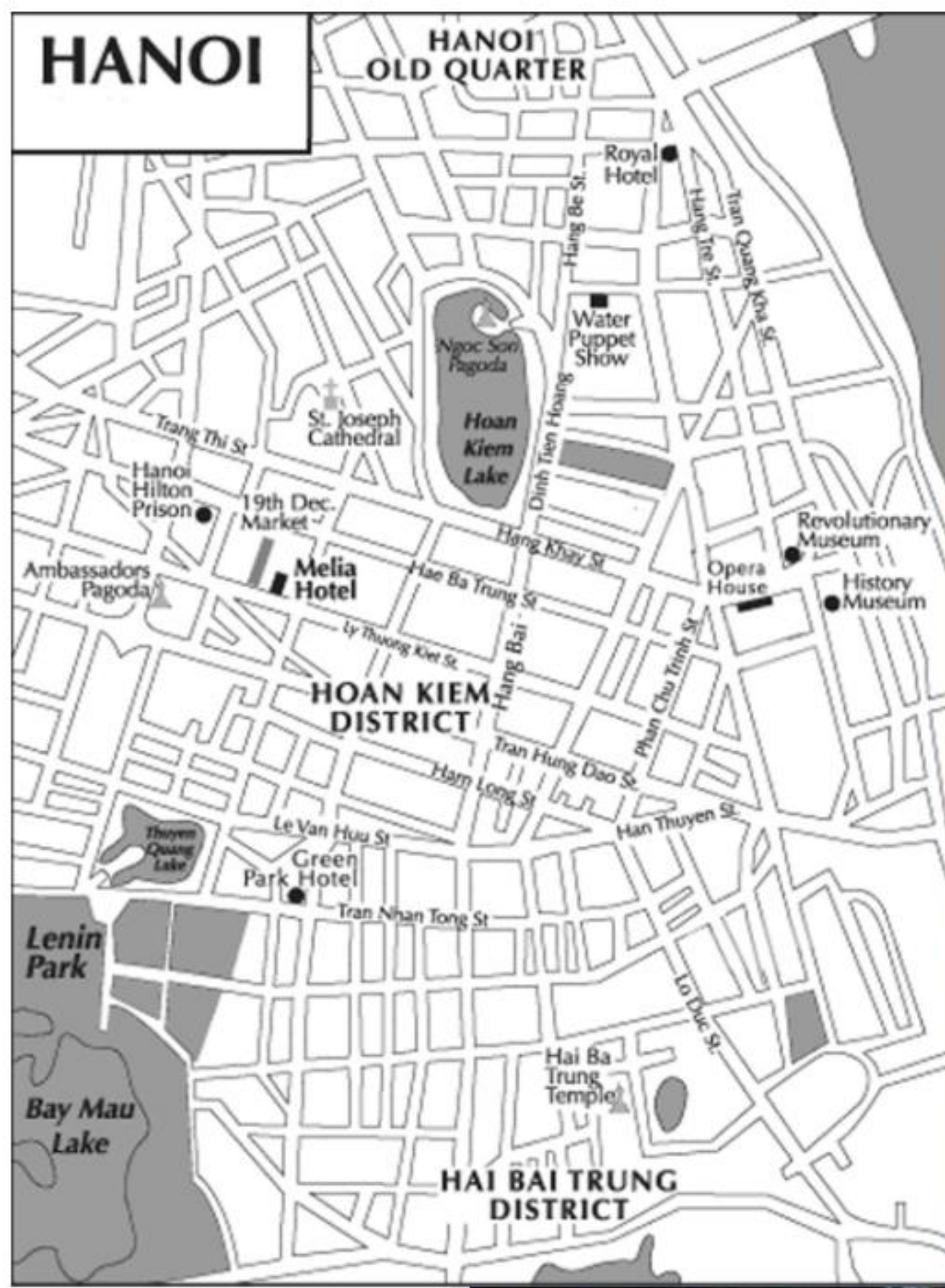




Restoration of the Hoan Kiem Lake in Hanoi

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Underwater sucker



Giant turtle of HOAN KIEM LAKE

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Introduction

The HOAN KIEM lake is situated in the heart of the prospering city of Hanoi. The downtown area round the lake is the historical, cultural and economical center of Hanoi. The population density of the area is similar to Paris (24 000 inhabitants/km²). Moreover thousands of visitors are coming to Hanoi each year.

For centuries the lake inhaled a particular cultural and spiritual acceptance. Legend has it that the lake and the giant turtle, which is still living in the lake and which is worshiped in the culture of Vietnam, played a major role in the liberation of the vietnamese people from the foreign rule of China.

The lake is a relict of the Red River. 1000 years ago the lake had an oblonged shape and connected to the Red River. The increasing urbanisation of the shore led to the isolation of the lake and gave it the today's oval shape.

Pollutions

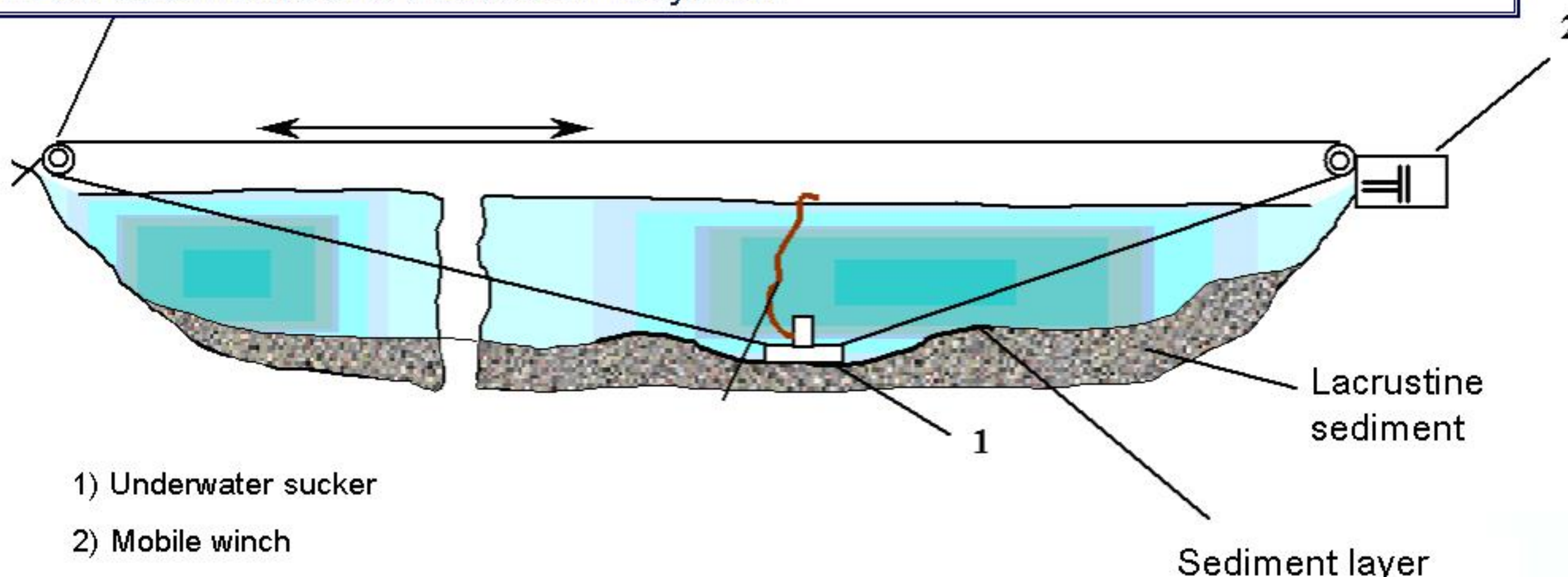
The size of the lake is about 13 ha and has a water volume of about 150 000 m³, the average water depth amounts to 1.5 m. The deeper sediment layers are yellowish lacustrine-fluviatile sands and loams. The upper layers have an obviously antropogenic origin. During the centuries the sewages produced were guided into the lake. Since the beginning of the 19th century a lot of dyeing factories and tanneries settled in the north of the lake, which polluted the lake additionally.

This very day a lot of small businesses of all kinds, whose pollutants can entry into the lake, can be found downtown. Another unsolved problem is the entry of faecal germs by the use of domestic and public toilets near the lake, which are indiscriminately guided untreated into the lake.

During two measurement campaigns in the years 1997 and 1998/1999, lake sediments were collected and analysed. A high contamination of heavy metals was detected in the sediments. To evaluate the real impact, a planned sample collection is supposed to investigate the whole lake sludge.

Method

The SEDITURTLE® is a modular-built facility system which is working environmentally sound and cost effective. The electrical-driven underwater sucker works according to lift principles. The sediments are removed layer by layer and are dispatched as a sediment-water-mixture by using penstocks. The removed sediments are treated or recycled.



The project

The project work is planned to be executed in 3 consecutive phases in close cooperation with the MOST and HSDC.

- 1 •Sludge and water sample collection and analysis. Assessment of existing available data. Extension of contacts with relevant Vietnamese authorities.
- 2 •In the second project phase, concepts of the remediation of the lake will be compiled and first experiments will be carried out.
- 3 •The third phase will be the restoration and desludging by using the method of soft-desludging.