HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING

DEPARTMENT

DIPLOMA PROJECT

A SURVEY IN TO THE DESIGN CONSTRUCTION AND MAINTENANCE OF THE SEWERAGE PLANT IN LARNACA

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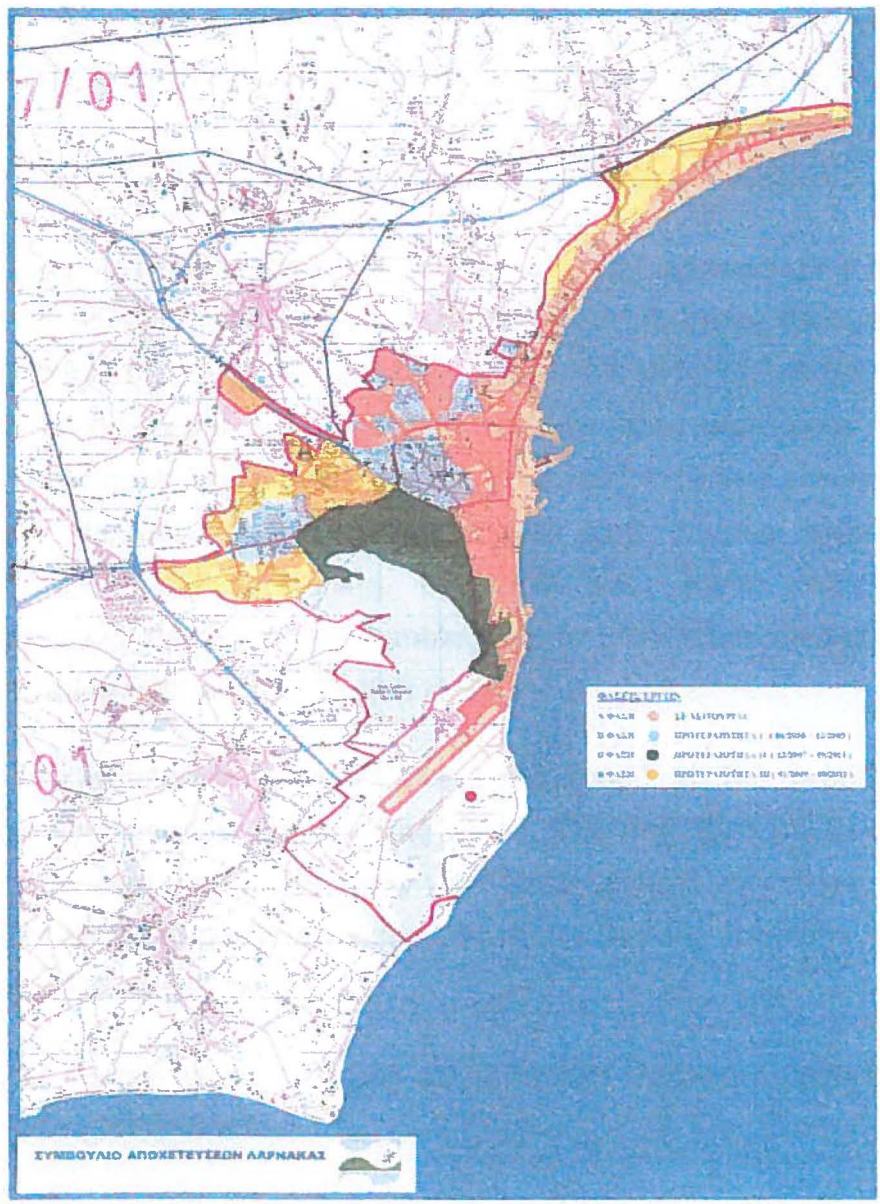

SOTIRIS TSOLAKIS

SECTION 1

1. INTRODUCTION

1.1 Historical sewage conveyance and disposal

The historical focus of sewage treatment was on conveyance of raw sewage to a natural body of water, such as a river or ocean, where it would be satisfactorily diluted and dissipated. Early human habitations were often built next to water sources. Rivers could double as a crude form of natural sewage disposal.

The Indus architects designed sewage disposal systems on a large scale, building networks of brick effluent drains following the lines of the streets. The drains were seven to ten feet wide, cut at two feet below ground level with U-shaped bottoms lined with loose brick easily taken up for cleaning. At the intersection of two drains, the sewage planners installed cesspools with steps leading down into them, for periodic cleaning. By 2700 B.C., these cities had standardized earthenware plumbing pipes with broad flanges for easy joining with asphalt to stop leaks.

The first sanitation system have been found at the prehistoric Middle East and the surrounding areas. The first time an inverted siphon system was used, along with glass covered clay pipes, was in the palaces of Crete, Greece. It is still in working condition, after about 3000 years.

Ancient Minoan civilization had stone sewers that were periodically flushed with clean water.

Roman towns and garrisons in the United Kingdom between 46 BC and 400 CE had complex sewer networks sometimes constructed out of hollowed out Elm logs which were shaped so that they butted

together with the down-stream pipe providing a socket for the upstream pipe.

Higher population densities required more complex sewer collection and conveyance systems in order to maintain (somewhat) sanitary conditions in crowded cities.

The ancient cities of Harappa and Mohenjo-daro of the Indus Valley civilization constructed complex networks of brick-lined sewage drains from around 2600 BC and also had outdoor flush toilets connected to this network.

The urban areas of the Indus Valley civilization provided public and private baths, sewage was disposed through underground drains built with precisely laid bricks, and a sophisticated water management system with numerous reservoirs was established. In the drainage systems, drains from houses were connected to wider public drains.[2]

The system then remained with not much progress until the 16th century, where, in England, Sir John Harington invented a device for Queen Elizabeth (his Godmother) that released wastes into cesspools.

A significant development was the construction of a network of sewers to collect waste water, which began from the Indus Valley civilization. In some cities, including Rome and Istanbul (Constantinople), networked ancient sewer systems continue to function today as collection systems for those cities' modernized sewer systems. Instead of flowing to a river or the sea, the pipes have been re-routed to modern sewer treatment facilities.

However, many cities had no sewers and relied on nearby rivers or occasional rain to wash away sewage. In some cities, waste water