CHAPTER 1
INTRODUCTION

1.1. General

The recent economic development of Thailand has bought about increases in water requirements in industrial, commercial and domestic sectors, particularly in the Bangkok area and its vicinity. In order to serve such dramatic change in demand of water, groundwater is heavily pumped, resulting in increased and widespread land subsidence in some areas. Moreover, groundwater also plays an important role as an alternative source of water for industrial development and agricultural uses. It is still the only source of water supply for households in the Bangkok Metropolis Area and its vicinity where the public water pipeline is not available.

Phra Nakhon Si Ayuthaya is one of many provinces shared boundary with Bangkok. From the last ten years, a rapid economic development stimulates an explosive expansion of demand for water services: irrigation, domestic and industrial water supply. The government devoted significant resources to meet these demands. An approach toward water management emerged with emphasis on expansion of access to services – irrigation and water supply for domestic purposes. However, as groundwater has become increasingly scarce, this approach is no longer appropriate.

1.2. Statement of The Problems

Statement of the problems in the research area can be summarized as follow:

a. The distribution of surface water is not enough to support human activities in that area.
b. No information about groundwater quantity and quality, in the research area.
c. Research area will be developed as an agricultural area that need groundwater supply for irrigation.
d. Over exploitation of groundwater causes negative effect to the environment.

The economic development of Phra Nakhon Si Ayuthaya province can't be separated with the natural resources in that area, especially groundwater. The research about groundwater in that area is very few. Management of groundwater needs to know

about groundwater potential and groundwater system in order to guarantee sustainable groundwater use. Therefore, the modelling of groundwater is a logical step toward achieve these the goals.

1.3. Objectives of The Research

Considering the above background and statement of the problems, the objectives this research is defined as follow:

- To investigate the hydrogeology system in the research area.
- To determine the groundwater potential and groundwater quality.
- To develop groundwater flow model at Phra Padaeng, Nakhon Luang and Nonthaburi aquifers.
- To calculate the water balance.
- Recommendations for groundwater management and abstraction.

1.4. Usefulness

The final results from this research will benefit the groundwater management in this area such as:

- To maintain groundwater balance for sustainable use.
- To minimize the negative effects of groundwater abstraction.
- To develop mass transport model.

1.5. Scope of The Research

1.5.1. Scope of area

The research will be conducted at Klong Praya Bunlue, Phra Nakhon Si Ayuthaya province. This area is located approximately 76 km in the northern of Bangkok (see Figure 1.1). The research area covers 216 km^2.

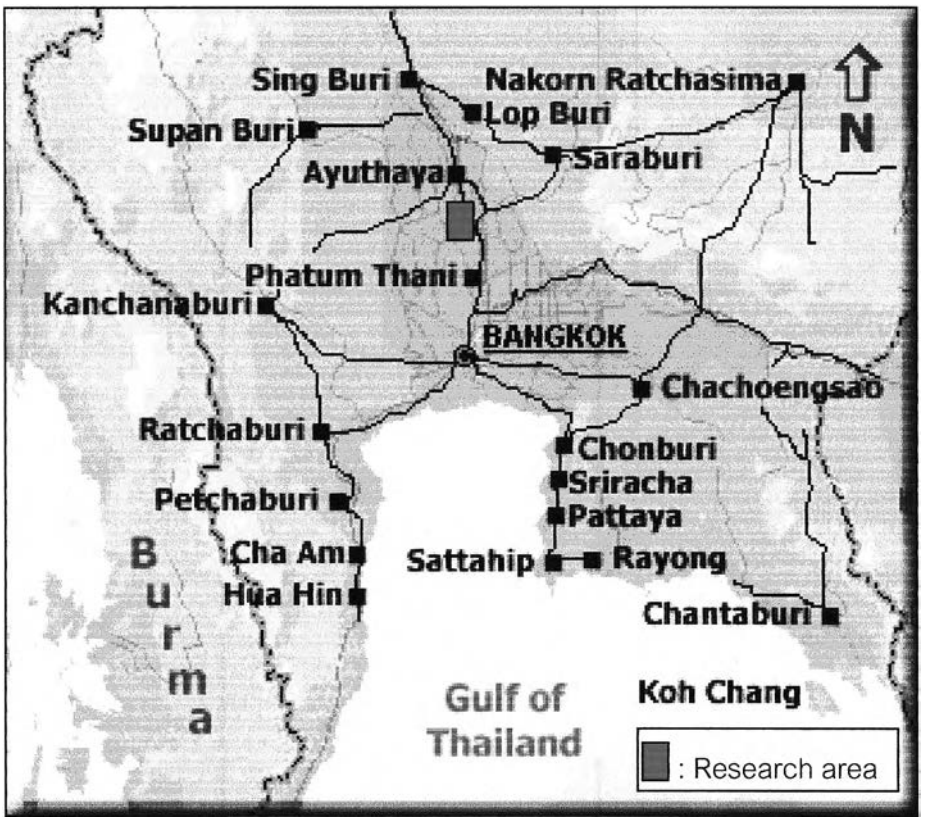

Figure 1.1. Location of the research area.

1.5.2. Scope of activities

Scope of activities in this research as follow:

- Collecting secondary and primary data (if necessary) about geology, aquifer hydraulic properties, hydrogeology, hydrology, quality of surface water and groundwater.
- Analyzing data

  Analyzing data include: natural system (geology, hydrogeology and hydrology); physical, chemical and biological analysis of groundwater and surface water; groundwater abstraction; rainfall and evaporation.
- Groundwater flow modeling

  Modeling of groundwater flow will be conducted by mathematical approach using Visual Modflow software version 3.1 from Waterloo Hydrogeologic Inc.

- Interpretations and recommendations

  Interpretations and recommendations in here include groundwater potential and the response from groundwater abstraction; groundwater flow system; groundwater balance for sustainable use, and potential of environmental restoration.