1. INTRODUCTION

1.1 Background

The concept of *Integrated Resource Planning* or *Least Cost Planning* has been developed over the past fifteen years to integrate supply and demand side planning options into a single planning process. Traditionally water supply planning in Queensland has focussed on supply side planning only, often utilising either guideline values or simplistic regression analysis to determine demands as the base justification for substantial water capital works programs.

The *Least Cost Planning* process involves developing a reliable demand forecast followed by benefit/cost analysis of both supply and demand side alternatives prior to the selection of the most cost effective program to deliver the required supply to consumers.

Least Cost Planning seeks to determine if future capital works, and the associated cost, can be reduced or delayed with a pro-active water conservation program. Programs are generally recommended on both the economic benefit/cost analyses as well as on non-quantifiable indicators such as equity and environmental preservation.

If water demand is reduced, benefits to the water authority, customer and community will include:

- reduction in the water and wastewater system operation and maintenance expenses,
- potential cost savings due to deferral or downsizing of capital works,
- benefits which are important but difficult to quantify such as reduced environmental impact resulting from lower levels of construction of water sources and the maintenance of higher water levels in rivers and reservoirs.

As part of the Least Cost Planning process it is necessary to develop and analyse numerous combinations of conservation measures and determine benefits and costs of their implementation. To achieve a sustained reduction in demand requires a carefully planned combination of measures packaged into a long term conservation program. Such a program can reduce water consumption by up to 25 percent over 10 to 20 years. Conservation in this range can significantly defer or downsize capital works such as dams, pipelines and water storage reservoirs.

While many individual water conservation measures are transferable among locations, water conservation programs should be tailored to a specific study area to develop the most cost effective program. Tailoring conservation programs requires thorough analysis of the service area's demographics, water use, water savings and benefits and costs of the conservation programs.

The Queensland State Government is committed to the efficient use of the state's water resources. As part of this commitment the Queensland Department of Natural Resources has commissioned this study to develop and test a systematic approach to analysing and quantifying the benefits of demand side water management.

1.2 Objectives of Study

The objective of the study is to determine the potential for water use efficiency improvements in the Queensland urban water sector, to develop options to increase the efficiency of water use and to estimate the costs and benefits of implementing such options. To achieve these objectives the following tasks were identified:

- Develop a computer based Decision Support System (DSS) to enable benefit/cost analysis of various conservation measures and initiatives.
- Review the current situation with respect to water efficiency within five pilot towns, by undertaking a detailed multi-variant regression based demand analysis.
- Identify and undertake both qualitative and quantitative analysis of water efficient technologies which have application in the state.
- Outline the benefits and costs of water audits and retrofits for the non-residential sector including schools.
- Review regulatory approaches for the implementation of measures.
- Outline the costs and benefits of various pricing policies for water.
- Review the costs and benefits of undertaking field work to verify assumptions made during the study of the pilot towns.

1.3 Organisation of Report

The report contains two volumes – the main report and a supporting information volume containing background data collected and summarised analysis results for the five pilot towns.

The main report is organised as follows:

- **Section 2 Study Methodology**

  Outlines the methodology adopted for the study and the selection of the five towns used as pilots for the assessment of measures.

- **Section 3 Development of Decision Support System**

  Describes the development of the Decision Support System and the structure of the modules developed for the economic assessment of alternatives. The development of the DSS User Manual is also discussed.

- **Section 4 Demand Analysis**

  This section overviews the data collection process as well as the current efforts and status of demand management in each of the pilot communities. An overview of the demand analysis approach and results of the analysis are provided together with estimates of baseline demand projections and internal external consumption estimates.

- **Section 5 Pricing Policy Approaches**

  Analyses the current water pricing and billing approaches in the pilot areas and investigates alternative structures.

- **Section 6 Regulatory Approaches**

  Reviews the various regulatory measures that may be implemented in Queensland.

- **Section 7 Unaccounted For Water**

  Reviews the current situation with regard unaccounted for water and water leakage and recommends approaches to address these issues.

- **Section 8 Residential Measures**

  Overviews the process adopted to shortlist measures for each community and provides assessment of the measures outlined in the brief for detailed benefit/cost evaluation.

- **Section 9 Non-Residential Measures**

  Overviews the benefit/cost of non-residential audits and retrofits.

- **Section 10 Water Efficiency Plans**

  Discusses and recommends Water Efficiency Plans which may be implemented in the pilot communities including implementation considerations. Identifies the overall plan benefits relating to the Local Government and community as a whole.

- **Section 11 Performance Tracking and Monitoring**

  Recommends a common approach to the collection and analysis of demand data to enable evaluation of the success of demand side conservation initiatives.

- **Section 12 Field Trials**

  Investigates the feasibility of undertaking field trials aimed at confirmation of the assumptions made in the report.

- **Section 13 Future Directions**

  Discusses the possible approaches and initiatives that may be implemented on a Statewide basis to achieve Least Cost Planning, based on the benefit/cost analysis of demand management programs for the five pilot communities.