SECTION 1.0
INTRODUCTION

1.1 NITRIFICATION STUDY BACKGROUND AND OBJECTIVE

1.1.1 Background

When the Manitoba Environment Act was modified in 1988, one of the major concerns that arose was the maintenance of appropriate water quality in the Red and Assiniboine Rivers.

To address these concerns, in 1989 the Minister of Environment requested that the Clean Environment Commission (CEC) convene public hearings and provide recommendations on proposed water quality objectives for the Red and Assiniboine Rivers within and downstream of the City of Winnipeg. Hearings were held in late 1991 and early 1992.

The City of Winnipeg is committed to protecting our rivers as is evident from the magnitude of its past and planned expenditures directly related to this issue. However, the City firmly believes that it has an obligation to its citizens to make informed decisions concerning level of protection afforded to the rivers and the related expenditures of public funds. To this end, the City of Winnipeg spent considerable effort studying the water quality situation in the Red and Assiniboine Rivers and raised several concerns during the public hearings. The main concerns were related to combined sewer overflows (CSOs), treatment plant effluent disinfection and the impacts of un-ionized ammonia in the river.

With respect to un-ionized ammonia, during the hearings, the City indicated that there were uncertainties with respect to the objectives proposed by Manitoba Environment. Furthermore, the City contended that the U.S. EPA limits were applied inappropriately for Winnipeg, and recommended that site specific guidelines based on site specific testing and conditions be used to set objective levels for un-ionized ammonia. The City also argued that the benefits obtained by improving the treatment efficiencies of its Water Pollution Control Centres (WPCCs) were low and that nitrification at the three WPCCs would be extremely costly.

Following the hearings, in 1992 the CEC made its recommendations and published a report entitled “Report on Public Hearings, Application of Water Quality Objectives for the Watershed Classification of the Red and Assiniboine Rivers and Tributaries within and Downstream of the City of Winnipeg”. The CEC made fourteen

recommendations in total. Recommendations 2 and 6 pertained directly to the un-ionized ammonia issue and were as follows:

"Recommendation 2 (Class 2 - Category B - Cool Water Aquatic Life and Wildlife)

Rivers and streams specified within the classification area should be classified for the protection of cool water aquatic life and wildlife. However, the acceptance of the proposed classification is qualified because there is uncertainty regarding the specific requirements for un-ionized ammonia parameters. The Commission recommends that the site specific requirements for un-ionized ammonia be set at those prescribed by the U.S. EPA by 1997 unless site specific research has determined otherwise. Research requirements have been specified in Recommendation 7."

"Recommendation 6 (Un-Ionized Ammonia Study)

Detailed site-specific studies should be undertaken to determine both the acute toxic and chronic effects of un-ionized ammonia from wastewater effluent on the cool water aquatic life of the rivers. Members of the scientific community within Manitoba should be invited to collaborate in the study design. Recommendations should be available before July, 1997 as to the program required to deal with un-ionized ammonia in wastewater at the water pollution control sites along the river system being considered.

The study results will be utilized to establish the un-ionized ammonia objective at a public hearing to be held within six months of the completion of the study."

1.1.2 Objective

As noted in the foregoing paragraphs, the level of environmental protection to be provided to the Red and Assiniboine Rivers is a major public policy issue. Discharge of un-ionized ammonia from the City's three Water Pollution Control Centres (WPCCs) is one of several aspects that have to be considered in reviewing the broad water quality issues related to our rivers. There are potentially many approaches available for reducing ammonia discharges from the WPCCs, but provision of any level of ammonia control could be very costly. The City, the Province and the public require comprehensive information to be in a position to make the appropriate policy decisions on this matter.

The City has decided to conduct a Nitrification Study to evaluate the various alternatives for upgrades at its three WPCCs. Together with the Un-ionized Ammonia Study (Ammonia Study) recommended by the CEC (Recommendation 6), the City will have an information matrix that is sufficient to make appropriate policy decisions related to the planning of future upgrades to its three WPCCs.

For the purposes of developing information to support these policy decisions, the engineering approach to nitrification will be dealt with in broad terms to establish the regulatory requirements through discussion with the province and the public. Further refinements to the engineering can be completed once the regulatory framework has been formulated. The precision of the engineering needs to be only to the level required to make the appropriate decisions to move the planning process forward. Further refinement of the engineering concepts will be completed once the regulatory requirements are better defined.

Considering all of the foregoing, the objective of the Nitrification Study is to produce conceptual level engineering plans and costs estimates for potential upgrades to the City's three WPCCs at a level of detail that allows the proper planning level decisions to be made by the City. The direction of the Nitrification Study must be consistent with the requirements of the Ammonia Study so that the integrated result of the two studies provides the City with the information required to conduct informed discussions with the province and the public regarding the regulatory requirements for the three WPCCs.

1.2 PURPOSE AND OBJECTIVES OF PRELIMINARY DESIGN PHASE

The Nitrification Study will be carried out in two phases – the Preliminary Design and the Conceptual Design. This document summarizes the work completed in the Preliminary Design phase.

The purpose of the Preliminary Design phase is to assemble the information required to facilitate the Conceptual Design of the various alternatives for ammonia control. The specific objectives of the Preliminary Design are as follows:

- To gather site information and plant data.
- To establish the design basis for the plant upgrades to be considered in the Conceptual Design phase.
- To identify technologies on which to base the conceptual design of plant upgrade approaches for various levels of ammonia control.
- To identify potential approaches to nutrient removal (particularly biological nutrient removal) that might be applied, if this is required at some time in the future.
- To increase the understanding of the treatment technologies and approaches to setting ammonia standards that are being applied in similar situations by other jurisdictions.

1.3 NOTE ON TIMING OF PUBLICATION OF FINAL VERSION OF PRELIMINARY DESIGN REPORT

This Preliminary Design Report was published as a Draft for City Review at the end of 2000. The City provided its authorization to finalize the Draft in November 2002.

During the time between the Draft and the Final Report, various advances in items such as technology, regulatory framework, costs, and other items likely occurred. However, the City's preference was not to update the Draft to take these items into account, since several of these items were reviewed during the subsequent Conceptual Design Phase.