1.0 INTRODUCTION

1.1 Overview

This report presents Phase II of the Chino Basin Recharge Master Plan. The project purpose and background information on the Basin and the OBMP are discussed below. The methodology for assessing future groundwater recharge potential is also described. As noted in the References subsection at the end of this chapter, this Master Plan builds upon several previous studies and reports.

1.2 Purpose

The purpose of Phase II of the Master Plan is to update and expand opportunities for groundwater recharge within the Basin. This Phase II Report identifies storm water and imported water recharge facilities improvements that can be implemented immediately. Also identified are recycled water recharge facilities improvements that can be implemented as part of IEUA's recycled water program.

1.3 Background

The Chino Basin consists of about 235 square miles of the upper Santa Ana River watershed. The Basin is bounded by Cucamonga Basin and the San Gabriel Mountains on the north; the Rialto-Colton Basin on the northeast; the chain of Jurupa, Pedley, and La Sierra Hills on the southeast; the Temescal Basin on the south; Chino Hills and Puente Hills on the southwest; and San Jose Hills and the Pomona and Claremont Basins on the northwest. The Basin lies within the Counties of San Bernardino, Riverside, and Los Angeles.

The Basin is an integral part of the regional and statewide water supply system. One of the largest groundwater basins in Southern California, the Basin contains about 5,000,000 acre-feet (acre-ft) of water and has an unused storage capacity of about 1,000,000 acre-ft. Cities and other water supply entities produce groundwater for all or part of their municipal and industrial supplies. Agricultural users also produce groundwater from the Basin, but irrigated agriculture has declined substantially in recent years and is projected to be almost gone by 2020 [Ref. 1].

The boundary of the Chino Basin is legally defined in the Judgment in the case of Chino Basin Municipal Water District vs. the City of Chino et al. (SBSC Case No. RCV 51010), issued in 1978. Since that time, the Basin has been operated as described in the Judgment through a court-

appointed Watermaster. The OBMP is being implemented pursuant to the Judgment and several more recent court rulings.

1.3.1 Goals of the OBMP Water Supply Plan

The Court officially accepted the scope of work to develop the OBMP on November 5, 1998. The OBMP Phase 1 Report was completed August 19, 1999 [Ref. 1]. Table 1-1 provides a summary of OBMP goals and lists activities necessary to meet the goals. A more thorough description of goals and actions items is found in Table 3-8 of Ref. 1.

The goals and action items will be developed and implemented through nine Program Elements: (1) Comprehensive Monitoring Program, (2) Comprehensive Recharge Program, (3) Water Supply Plan for the Impaired Areas of the Basin, (4) Comprehensive Groundwater Management Plans for Management Zones as needed, (5) Regional Supplemental Water Program, (6) Cooperative Programs To Improve Basin Management, (7) Salt Management Program, (8) Groundwater Storage Management Program, and (9) Conjunctive-Use Programs.

This Phase II Master Plan is a component of Program Element 2: Develop and Implement a Comprehensive Recharge Program.

1.3.2 OBMP Groundwater Recharge Component

Ref. 1 and Ref. 2, respectively, state the need for a comprehensive recharge program and present a proposed scope of work. Scope of work tasks conducted as part of this Phase II Study include meetings with appropriate agencies, development of a financing concept, review of new hydrogeologic and facilities information, evaluation of new computer simulations of runoff and recharge, identification of existing and proposed recharge facilities that merit detailed investigation, and a reconnaissance level feasibility investigation of using injection wells for recharge in Management Zone 1. The financial concept subtask will be developed as part of the implementation plan, and the injection well analysis has been deferred. All other subtasks have been completed, and the results are presented in this Report.

Table 1-1
Goals of the OBMP

Goal	Activities Necessary to Meet Goals
Enhance Basin Water Supplies	Enhance Recharge of Storm Water Runoff
	Increase Recharge of Recycled Water
	Develop New Sources of Supplemental Water
	Promote Direct Use of Recycled Water
	Promote Treatment and Use of Contaminated Groundwater
	Reduce Groundwater Outflow
	Re-determine Safe Yield
Protect and Enhance Water Quality	Treat Contaminated Groundwater To Meet Beneficial Uses
	Monitor and Manage the Basin To Reduce Contaminants and To Improve Water Quality
	Manage Salt Accumulation Through Dilution or Blending and the Export of Salt
	Address Problems Posed by Specific Contaminants
Enhance Management of the Basin	Develop Policies and Procedures That Encourage Stable, Creative, and Fair Water Resources Management in the Basin
	Optimize Use of Local Groundwater Storage
	Develop and/or Encourage Production Patterns, Well Fields, Treatment and Water Transmission Facilities, and Alternative Water Supply Sources To Ensure Maximum and Equitable Availability of Groundwater and To Minimize Land Subsidence
	Develop Conjunctive-Use Programs with Others To Optimize Use of the Chino Basin for In-Basin Producers and the People of California
Equitably Finance the OBMP	Identify an Equitable Approach To Spread the Cost of OBMP Implementation
	Identify Ways To Recover Value from Utilizing Basin Assets

1.4 Methodology

As part of this project, Black & Veatch performed a system inventory and data review, including site reconnaissance. Wildermuth Environmental, Inc., provided data on existing basins and potential future recharge capacity and updated basin modeling simulations. Black & Veatch then developed potential improvements to existing basins and reviewed development of new recharge areas. The consultant team, the Watermaster, and the Basin Stakeholders worked together to develop the implementation plan described in this Report.

1.4.1 System Inventory and Data Review

To evaluate the existing system of water conservation and flood control basins, Black & Veatch conducted site visits, assisted by Watermaster staff. Photographs were taken, and care was taken to note the location and condition of each inlet and outlet structure, as well as the condition of the basin itself. The most recent plan and profile reference drawings were collected from SBCFCD. Wildermuth Environmental, Inc., provided data on current ownership, surface area, percolation rate, and potential increase in recharge capacity.

1.4.2 Modeling

Simulation models were used to estimate potential groundwater recharge. The model estimates all the inflow and outflow terms of the continuity equation for each basin using 41 years of historical data. Storm water inflows into each basin are calculated from these estimates and combined with potential imported water and recycled water inflows. Basin hydraulics for proposed improvements and improved operating procedures were used to develop preliminary estimates of potential groundwater recharge at each basin. Following implementation of the proposed improvements, a more accurate interpretation of recharge capacity will be realized.

1.4.3 Development of Implementation Plan

Existing basins were evaluated to determine their future recharge potential. The availability of storm water, recycled water, and imported water was assessed, and preliminary plans and facilities improvements were developed to increase groundwater recharge. For each basin, the capital cost of improvements was estimated. Also reviewed in lesser detail were areas for new recharge facilities including development of new basins, on-site recharge, and injection wells. Through meetings with the Watermaster, Basin Stakeholders and others, it was agreed to move forward immediately with storm water recharge and imported water recharge facilities improvements. It was also agreed that recycled water recharge facilities improvements would move forward under the auspices of IEUA.

1.5 Abbreviations/Acronyms

The following abbreviations/acronyms are used in this report:

ac	acre
acre-ft	acre-feet
acre-ft/yr	acre-feet per year
Basin	Chino Basin
ft/day	feet per day
CBWCD	Chino Basin Water Conservation District
CDFM	cumulative departure from mean
CIM	State of California Institution for Men
CRA	Colorado River Aqueduct
DHS	California Department of Health Services
DWR	California Department of Water Resources
g/L	grams per liter
gpm	gallons per minute
IEUA	Inland Empire Utility Agency
Metropolitan	Metropolitan Water District of Southern California
mg/L	milligrams per liter
NPDES	National Pollutant Discharge Elimination System
OBMP	Optimum Basin Management Program
PEIR	Program Environmental Impact Report
PGRRP	planned groundwater recharge reuse projects
Phase II Report	Chino Basin OBMP Recharge Master Plan Phase II Report
RCFCWCD	Riverside County Flood Control and Water Conservation District
RWC	recycled water contribution
RWQCB	Regional Water Quality Control Board
SARWQCB	Santa Ana Regional Water Quality Control Board
SAWPA	Santa Ana Watershed Project Authority
SBCFCD	San Bernardino County Flood Control District
SBVMWD	San Bernardino Valley Municipal Water District
SWP	State Water Project
TDS	total dissolved solids
TMDL	total maximum daily load
TOC	total organic carbon
USACE	US Army Corps of Engineers
Watermaster	Chino Basin Watermaster

1.6 References

Reference 1: Mark J. Wildermuth, Water Resources Engineer, Chino Basin Recharge Master Plan, Phase 1 Final Report, prepared for Chino Basin Water Conservation District and Chino Basin Watermaster, January 1998.

Reference 2: Wildermuth Environmental, Inc, Optimum Basin Management Program Phase 1 Report, prepared for Chino Basin Watermaster, August 19, 1999.

Reference 3: Mark J. Wildermuth, Final Task 2.2 and 2.3 Report, Describe Watershed Hydrology and Identify Current TDS and TIN Inflows to the Watershed, prepared 1997.