5.0 DEVELOPMENT OF NEW RECHARGE AREAS

5.1 Overview

In addition to the existing basins, this study considered development of new basins, development of on-site recharge, and groundwater injection wells.

5.2 Development of New Basins

This subsection reviews development of the College Heights Basins, the RP-3 Recharge Basin, and recharge potential in the Cities of Fontana and Rancho Cucamonga. A summary of the basin improvements for storm water and imported water recharge are presented in Table 4-2. (Specific facilities associated with recharge of recycled water will be identified as part of IEUA's expanded recycled water program.) Table 5-1 summarizes the management zone, storm water and imported water recharge capacity, and capital costs for improvements for each basin.

Table 5-1
Recharge Capacities and Costs for New Basins

Recharge Facility	Mgmt. Zone	Potential Recharge Capacity (acre-ft/yr) (1)									Project Capital Cost
		Storm Water			Imported Water			Recycled Water (2)			
New Basins											
College Heights Basin	1	70	to	100	5,300	to	7,900	70	to	100	$5,625,000
RP-3 Basins	3	1,200	to	1,700	5,800	to	8,600	1,200	to	1,700	$5,595,000
Total	--	1,270	to	1,800	11,100	to	16,500	1,270	to	1,800	$11,220,000

Notes:

(1) Based on optimum recharge operations. Low estimate assumes a recycled water contribution of 20% and the high estimate assumes a recycled water contribution of 50%

(2) It has been assumed that the average annual recharge of recycled water will be the same as storm water. The recycled water recharge capacity is currently under evaluation by IEUA in it's Recycled Water System Feasibility Study.

5.2.1 College Heights Basin

Field investigation of the existing quarries at College Heights revealed that extensive improvements would be required to operate these quarries as spreading basins. The land towards the northwestern section is located directly above a fault and any recharge in this area may not directly benefit Chino Basin. The section of land directly east on the other side of the San Antonio Channel has been filled in with rubbish by surrounding neighbors. The remaining two southern quarries, located on each side of the channel, could be made into groundwater recharge basins. Extensive site work and improvements would be required to get the basins online. The table on the following page presents the cost break down for developing College Heights Basins. The total construction cost is estimated to be about $5,625,000. Table 5-2 provides a breakdown of the costs for improvements. Figure 5-1 illustrates a preliminary facilities layout.

Owner

CBWCD

Location

Upland, California

Recharge Area

22.0 acres

Percolation Rate

2.5 ft./day

Potential Recharge Capacity

Storm Water	70-100 ac-ft/yr
Recycled Water	70-100 ac-ft/yr
Imported Water	5,300-7,900 ac-ft/yr
Total	5,440-8,100 ac-ft/yr

PROPOSED IMPROVEMENTS

Storm Water

- Diversion Structure at San Antonio Creek
- Outlet Facilities
- Deepen and Optimize Basins for Recharge

Recycled Water

- Pipeline from Montclair 1 Regional Recycled Water Pipeline

Imported Water

- None

Table 5-2
Improvement Costs for College Heights Basin

Description of Work	Quantity	Unit	Unit Cost	Total
Storm Water Recharge				
Diversion structure at San Antonio Creek [2]	1	ls	$650,000	$650,000
Gated outlet structures [1]	2	ea.	150,000	300,000
Conveyance structure to connect SE basin to Upland Basin [2] (bore & jack under road)	200	ft.	500	100,000
Deepen and optimize basin for recharge [1]	500,000	cy	5	2,500,000
Subtotal Storm Water Recharge				$3,550,000
Recycled Water Recharge				
Pipeline (from Montclair 1 Pipeline) [2]	1,000	ft.	$96	$96,000
Inlet structure [2]	2	ea.	58,000	116,000
Subtotal Recycled Water Recharge				$212,000
Imported Water Recharge				
None				
Total Construction Cost				$3,762,000
Direct Construction Cost (+ 30% Contingency)	1	ls	$4,890,600	$4,891,000
Indirect Cost (15% of Direct Construction Cost) [3] [4]	1	ls	733,590	734,000
Total Capital Cost				**$5,625,000**

Notes:

(1) CBWCD (potential confining layers below surface may increase excavation)

(2) B&V

(3) Includes administration, design, and construction management

(4) Values does not include environmental licensing estimate

5.2.2 RP-3 Recharge Basin

The approximately 60-acre RP-3 site in Management Zone 3 is located north of the Declez Channel, between Live Oak Street and Beach Street. The basin would extend along the existing Declez Channel and be constructed using a balance cut/fill design with an earthen embankment. The RP-3 Basins would be designed for 8 – 5 acre spreading basins in series of four on two parallel lines. The height of the proposed embankment would be approximately 20 feet with a facing side slope of 3:1. The outlet works would convey 20 cfs from the Declez Channel through a new slide gate structure to the basins. In order to import water for recharge, a pump station and pipeline from Jurupa Basin is proposed. The table on the following page presents the costs for developing the RP-3 Recharge Basins. The estimated construction cost is estimated to be about $5,595,000. Table 5-3 provides a breakdown of the costs for improvements. Figure 5-2 illustrates a preliminary layout of the proposed facilities.

Owner

IEUA

Location

Fontana, California

Recharge Area

30 acres

Percolation Rate

1 ft./day

Potential Recharge Capacity

Storm Water	1,200-1,700 ac-ft/yr
Recycled Water	1,200-1,700 ac-ft/yr
Imported Water	5,800-8,600 ac-ft/yr
Total	8,200-12,000 ac-ft/yr

PROPOSED IMPROVEMENTS

Storm Water

- Diversion Structure at Declez Channel
- Clearing and Grubbing
- Deepen and Optimize Basin for Recharge
- Diversion Structures
- Inlet Structures
- Conveyance Structures
- Pipeline from Jurupa Basin
- Pump Station at Jurupa Basin
- Monitoring Wells

Recycled Water

- Pipeline connecting to proposed Regional Recycled Water Pipeline
- Inlet Structure

Imported Water

- New Turnout at Etiwanda Forebay (Share costs with Banana, Declez, Jurupa, and Hickory Basins)
- New 5,000-ft. Pipeline to connect new turnout with Hickory Basins(share costs)

Table 5-3
Improvement Costs for RP-3 Recharge Basin

Description of Work	Quantity	Unit	Unit Cost	Total
Storm Water Recharge				
Channel diversion from Declez Channel [2]	1	ls	$450,000	$450,000
Clearing & Grubbing [2]	1	ls	150,000	150,000
Deepen and optimize basin geometry for recharge [2]	135,000	cy	5	675,000
Division structures [2]	4	ea.	50,000	200,000
Inlet structure [2]	8	ea.	30,000	240,000
Monitoring Wells	1	ea.	300,000	300,000
Conveyance to Spreading Basins	4,000	ft.	144	576,000
Pipeline from Jurupa Basin to RP- 3 [2] (split w/ Declez Basin)	5,000	ft.	96	480,000
Jurupa pump station [2] (split w/ Declez Basin)	1	ls	230,000	115,000
Subtotal Storm Water Recharge				$3,186,000
Recycled Water Recharge				
Inlet structure [2]	1	ls	$58,000	$58,000
Pipeline or lateral from proposed regional line [2]	600	ft.	96	58,000
Subtotal Recycled Water Recharge				$116,000
Imported Water Recharge				
New Turnout (split cost) [2]	0.20	ls	$1,000,000	$200,000
Pipeline from New Turnout (split cost) [2]	1,000	ls	240	240,000
Subtotal Imported Water Recharge				$440,000
Total Construction Cost				$3,742,000
Direct Construction Cost (+ 30% Contingency)	1	ls	$4,864,600	$4,865,000
Indirect Cost (15% of Direct Construction Cost) [3] [4]	1	ls	729,690	730,000
Total Capital Cost				**$5,595,000**

Notes:

(1) CBWCD

(2) B&V

(3) Includes administration, design, and construction management

(4) Values does not include environmental licensing estimate

5.3 Additional Recharge Potential

The preferred area to develop new basins, as found in a preliminary study done by Wildermuth Environmental, is located within the Cities of Fontana and Rancho Cucamonga. Planning and zoning maps were acquired from the City of Fontana to determine if there were any parcels of land adequate for use as recharge basins. These maps indicate that there are no parcels of land of significant size available for recharge basins. Land is either zoned residential/commercial or are allocated for other improvements. Alternative methods of recharge, such as injection wells or on-site recharge, should be considered in order to increase groundwater recharge in this area. Multi-use activities, such as using existing utility corridors for smaller recharge facilities, hiking and biking trails, have not been actively explored but will be in the near future. Such activities could provide additional recharge capabilities.

Although the Cities of Fontana and Rancho Cucamonga are the preferred areas for recharge, other areas of the basin are currently being acquired for this purpose. The CCWD in particular has acquired land for recharge in their service area.

5.4 On-Site Recharge

The recharge opportunities described in Chapter 4 and in Section 5.3 above assume collecting storm water and routing the runoff to storm water channels. This has been the traditional approach to utilizing storm water. However, a less traditional management approach has been receiving attention: capturing and using storm water runoff on site.

On-site recharge was the subject of a recent conference entitled "Beyond BMPs: Integrated Storm Water Management Opportunities for Multiple Benefits in the Chino Basin." The conference was held at the Kellogg West Conference Center, California Polytechnic University, Pomona in July 2001. Concepts explored at the conference included use of state-of-the-art models for routing storm water runoff into on-site landscaping and decorative features. Specific opportunities for construction design in the Chino Basin were also discussed.

Currently, IEUA is working with the Rocky Mountain Institute in developing these innovative management programs for on-sire recharge and other on-site issues, such as constructing a cistern for on-site irrigation. The results of these efforts will be presented in a report issued later this year.

5.5 Injection Wells

Monte Vista Water District (MVWD) is currently conducting a grant-funded feasibility study on the use of injection wells for recharge. Results will be presented at a later date upon completion of the study.

INSERT FIGURES 5-1 THROUGH 5-2