FINAL REPORT

WASTEWATER FACILITIES EXPANSION AND FINANCING PLAN

Prepared for

Rancho Murieta Community Services District
15160 Jackson Road
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July 2007

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1. Introduction

1.1 Background

Rancho Murieta is a 3,500-acre residential development located 20 miles east of Sacramento on State Highway 16 (Figure 1-1). The Rancho Murieta Community Services District (RMCSD) was formed in 1982 to provide, among other services, water and wastewater services to the community. In the provision of the wastewater services, the RMCSD operates a Wastewater Reclamation Plant (WWRP) that treats the wastewater to a tertiary level of treatment in accordance with the *California Code of Regulations Title 22, Water Recycling Criteria* for disposal on areas with unrestricted access and disposes of the effluent by providing it to the Rancho Murieta Country Club (RMCC), which utilizes the effluent to irrigate its two 18 hole golf courses.

Currently, there are slightly in excess of 2,500 connections to the wastewater system, consisting primary of residential connections. Current dry weather flow to the treatment facility is approximately 0.51 million gallons per day (MGD). At build-out of the Planned Development Community and adjacent service area of the RMCSD, and subject to County approval, approximately 2,300 more connections to the wastewater system could be added.

On February 2, 2006, the Regional Water Quality Control Board (RWQCB) directed the RMCSD to submit a Wastewater Facilities Expansion and Financing Plan (the Plan) for all work and improvements needed to provide adequate treatment, storage and disposal to accommodate all planned growth through final build-out of the area to be served by the RMCSD or year 2019.

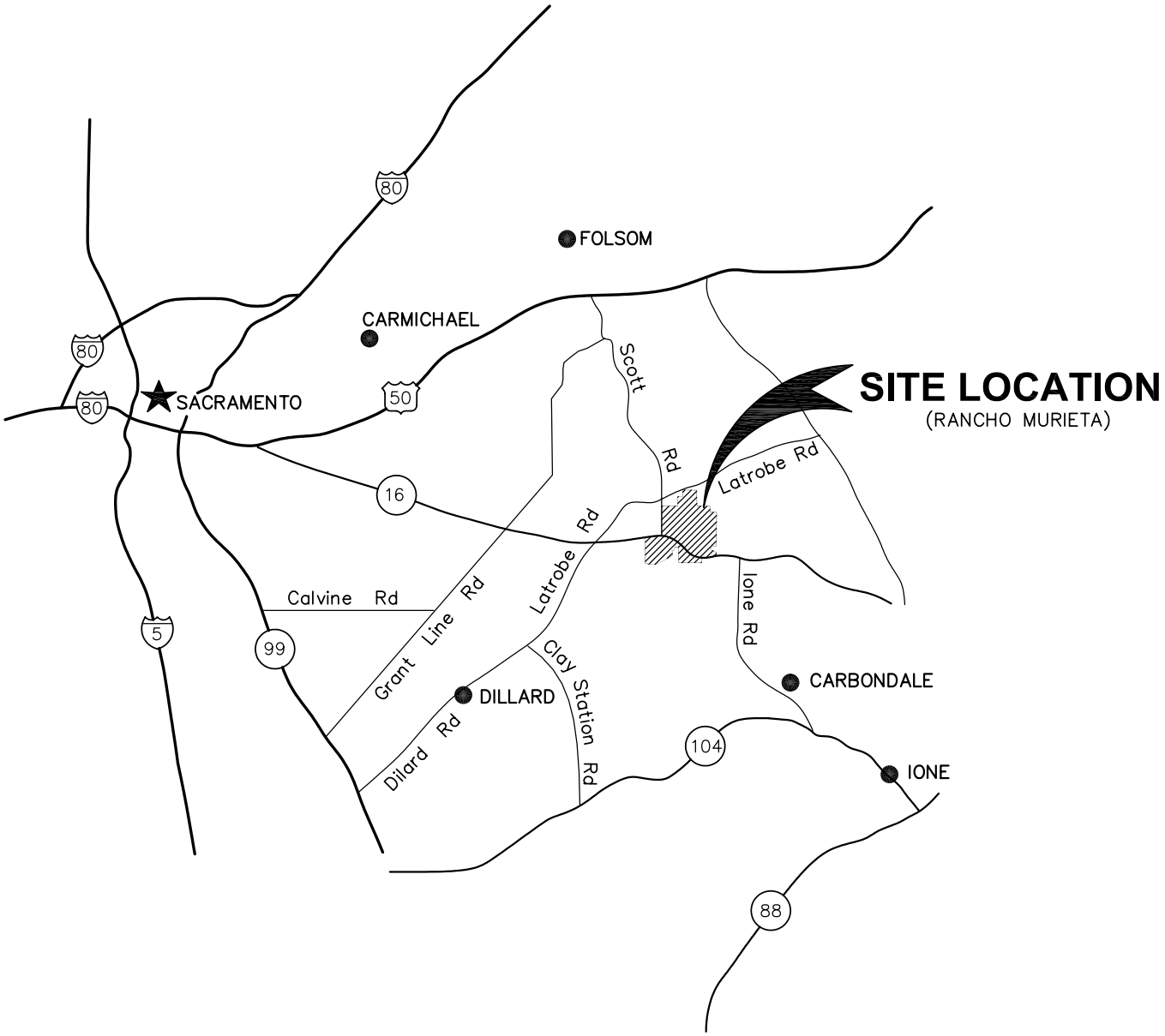

Figure 1-1
Wastewater Facilities Expansion and Financing Plan
SITE VICINITY AND LOCATION MAP

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1.2 Report Purpose and Organization

The purposes of this Report are to:

1. Identify facilities that will be needed by the RMCSD to provide for wastewater treatment and disposal for future growth within the RMCSD service area;
2. Evaluate alternative means of providing the facilities and capacity expansions required, including preliminary cost estimates; and
3. Provide a discussion of the alternatives and the preferred alternative(s) selected by the RMCSD Board of Directors and the means of financing the facility expansions.

Section 2 of this Report describes the WWRP, including its storage and disposal facilities and reviews existing conditions at the WWRP.

Projected growth within the RMCSD service area and the associated increased flows to the RMCSD facilities are presented in Section 3 of the Report. The ability of the existing facilities to treat, store and dispose of the increased flows is discussed and additional facility needs are identified and quantified for the anticipated phasing of build-out of the community.

Section 4 of the Report identifies and discusses the alternatives for providing the required components of increased capacity and presents a recognizance level estimate of their respective costs. Evaluation of the alternatives and the plan for implementation of the selected alternatives is presented in Section 5, along with a description of the “developer financing” program that has been employed by the RMCSD and which will continue to be used to finance the new facilities needed to serve the new growth.

2. Current Facilities and Flows

This section of the Report describes the WWRP, the existing flows at the facility and the ability of the existing facility to adequately treat, store and dispose of the wastewater discharged to the system.

2.1 Overview

The WWRP treats wastewater to a tertiary level in accordance with *California Code of Regulations Title 22, Water Recycling Criteria,,* for use on areas with unrestricted access. The sources of raw wastewater for the WWRP are primarily residential homes in the Rancho Murieta community with a small portion of the flow generate by commercial facilities, such as stores and restaurants, which serve the community. There are no industrial discharges to the WWRP. The tertiary treated wastewater is used to irrigate approximately 250 acres on the two adjacent 18 hole golf courses of the RMCC. Golf course turf irrigation is the only current means of disposal.

2.2 Treatment Plant Unit Processes and Related Facilities

For the year 2006, average dry weather flow (ADWF) to the WWRP is approximately 510,000 gallons per day (gpd) from approximately 2,500 wastewater connections. The WWRP secondary treatment facilities consist of a series of five (5) aerated ponds having a capacity of 1.55 million gallons per day (MGD) and were sized to serve a projected build-out capacity of 5,200 equivalent dwelling units (EDU). This build-out projection has since been reduced to approximately 4,800 connections. Secondary effluent is stored seasonally during the winter wet season in two storage reservoirs having a combined capacity of approximately 728 acre-feet (ac-ft.). When the golf courses require irrigation, stored secondary treated water is pumped to the tertiary treatment facilities, which consists of coagulation, dissolved air flotation (DAF), and sand filtration, followed by chlorine disinfection. The disinfected tertiary treated water is then distributed to the golf courses for irrigation. Biosolids generated from wastewater treatment operations are collected, dewatered, and hauled off-site for disposal to a landfill. The plant layout is

Capacities of components of the WWRP are summarized in Table 2-1, below.

TABLE 2-1 CAPACITY OF EXISTING WWRP COMPONENTS

Facility Component	Capacity
Nominal Secondary Treatment Capacity (MGD)	1.55
Secondary Treated Storage Capacity (ac-ft.)[1]	728
Nominal Tertiary Treatment Capacity (MGD)	3.0
Disinfection Capacity (MGD)	2.3
Disposal Capacity (two golf courses-Ac-ft)[2]	620

NOTES:

1) Includes two (2) feet of freeboard in the secondary treated wastewater storage reservoir.

2) Disposal capacity represents historical average year recycled water irrigation demands of the two golf courses (total average irrigation demand has been 650 ac-ft). Reduced irrigation application rates on the golf courses during extreme wet weather and changes in irrigation practices must be used to evaluate future disposal facility requirements.

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Figure 2-1
Wastewater Facilities Expansion and Financing Plan
WWRP FACILITY LAYOUT

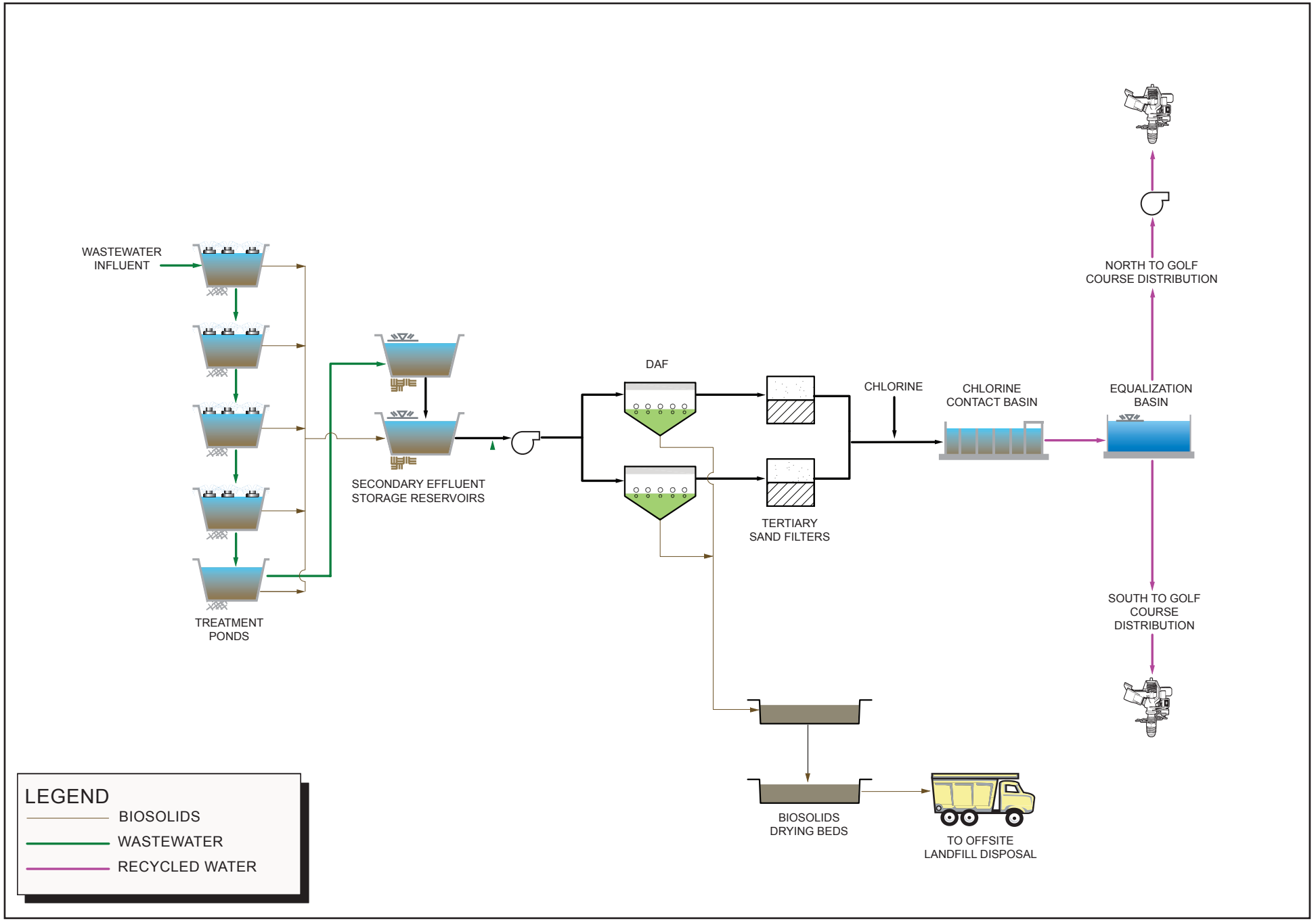

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Figure 2-2
Wastewater Facilities Expansion and Financing Plan
PROCESS FLOW DIAGRAM

2.3 Current Flows and Facility Requirements

For the year 2006, which was a relatively wet year, ADWF to the WWRP was approximately 0.51 MGD.[1] This average day dry weather flow results in a projected total annual flow (including inflow and infiltration of rainwater to the sewage collection system) to the WWRP of 227 million gallons (696 ac-ft), during a hypothetical 365 day, 100-year return period rainfall event- the criteria established by the RWQCB to evaluate the adequacy of the existing facilities (100-year event). For current conditions the water balance is shown in Exhibit A-1 of Appendix A. This water balance demonstrates that there currently exists sufficient secondary treated wastewater storage capacity in the reservoirs (provided the secondary storage reservoirs do not start that wet season with more than approximately 170 ac-ft of stored secondary treated water (i.e. disposal of the carryover volume) and that there is sufficient disposal capacity at the two golf courses.

The water balance assumes the disposal of 484 ac-ft of recycled water on the two RMCC golf courses during the 100-year event. This rate of application of recycled water from the WWRP corresponds to an annual demand of approximately 620 ac-ft of recycled water (650 ac-ft of total irrigation); the historical average demand on the two golf courses. However, the RMCC has advised that it is in the process of planting Bermuda grasses over the existing rye grass. This may result in a continuing reduction in golf course irrigation demands that have been taken into account in determining future disposal requirements at the WWRP.

[1] RWQCB Order No. R5-2006-001 limits average dry weather flow to the WWRP to 0.52 MGD until such time as the excess secondary treated water stored in the reservoirs has been reduced to 100 ac-ft.

3. Projected Growth and Resulting WWRP Facility Requirements

This Section of the Facilities Expansion and Financing Report analyzes projected growth within the RMCSD service area and the wastewater flows to the WWRP that will result from that growth. The ability of the existing facilities (storage and disposal) and WWRP treatment facilities to adequately treat and dispose of the additional flow is evaluated and the additional facilities required at the WWRP are identified.

3.1 Projected New Development and Influent Flows Within the RMCSD Area

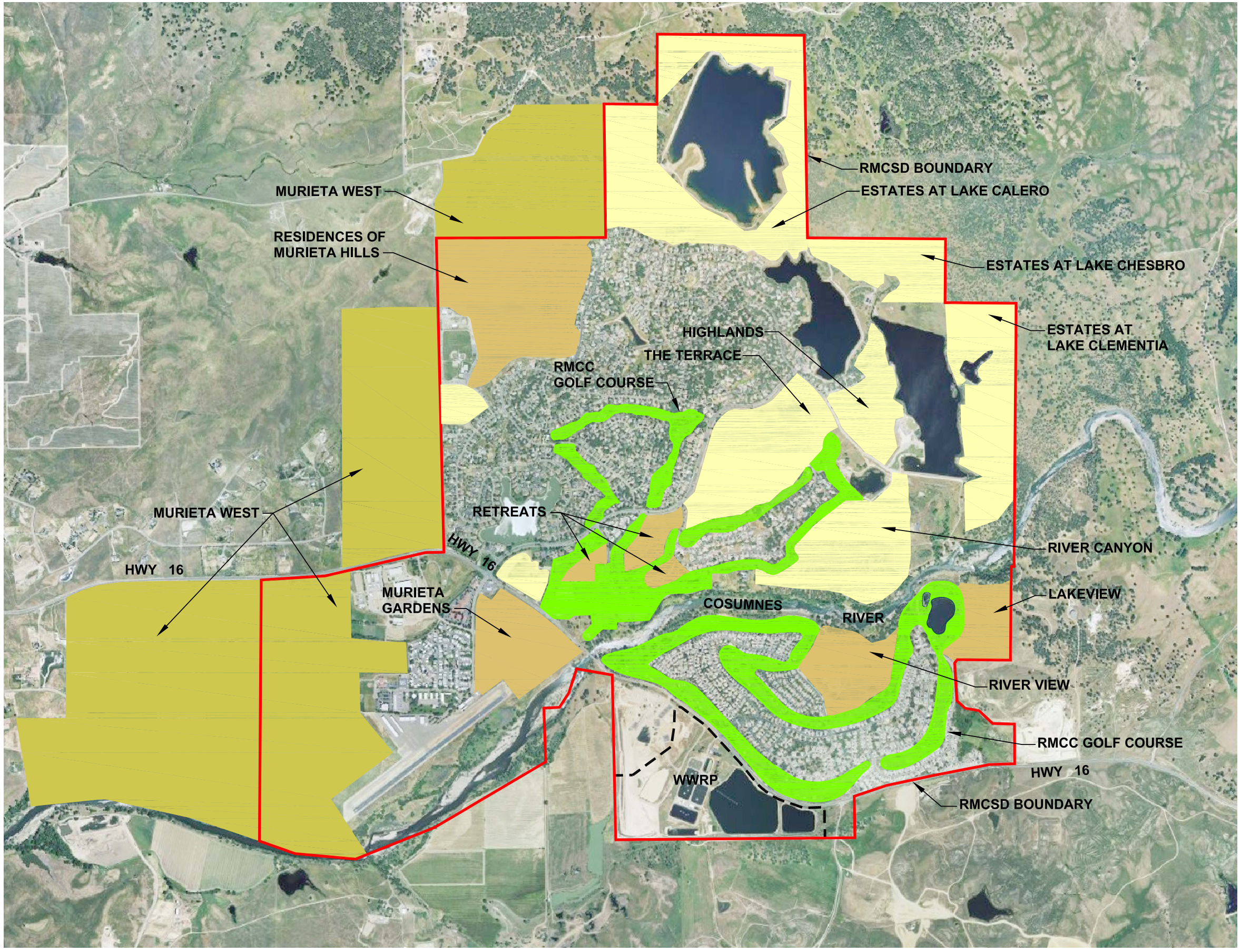
The number of connections to the WWRP is expected to nearly double at build-out of the RMCSD service area, which may be expanded to serve planned adjacent development. The new development is anticipated to develop in specified areas in phases. This new development has been divided into three (3) unequal phases; phase 1, near-term (less than 5 years); phase 2, mid-term (5 to 10 years); and phase 3, long-term (beyond 10 years). Based upon information obtained from both approved and preliminary development plans, the potential number of new wastewater connections that could be served by the WWRP are estimated at 700, 1000 and 600 for the respective near-term, mid-term and long-term development phasing of the community. Figure 3-1 shows the location of the potential new development and Table 3-1 summarizes the estimated additional wastewater flows to the WWRP by Development Phase[1].

[1] An average day dry weather flow of 210 gallons per connection has been used in developing the water balances. This unit flow is slightly greater that historical flows for existing connections, which consist primarily of residential connection with some commercial and institution connections (e.g. the Operating Engineers training facilities). Future connections to the system are not anticipated to be materially different in character or resulting unit flows. Exhibit A-1 of Appendix A presents the development of the unit flow used in this Report.

TABLE 3-1 CUMULATIVE INFLUENT FLOWS TO THE WWRP

Development Phase	Additional Connections	Average Day Dry Weather Flow (MGD)	Annual Average Wastewater Flow (Million Gallons)	100-Year Event Wastewater Flow (Million Gallons)
Current	----------	0.509	196	227
Phase 1	700	0.656	252	292
Phase 2	1000	0.866	333	386
Phase 3	600	0.992	381	442

The 100-year event and resulting wastewater flows to the WWRP are critical for determining the increased storage and disposal capacity requirements imposed by new development. During extreme wet years, the amount of water that enters the WWRP is significantly higher than in average years due to the increased direct inflow to the sewer system and increased infiltration of the sewers due to the saturation of the soils. In addition, during the 100-year event, the amount of recycled water that is needed for golf course turf irrigation, or which can be agronomically applied to other irrigated areas is reduced, thereby increasing the area required for the application of recycled water. Finally, during the 100-year event the amount of direct rainfall on the wastewater treatment ponds and secondary treated storage reservoirs is nearly twice that which is experienced in an average year, thus adding to both the storage and disposal volumes that must be handled by the new facilities.



N

1000 0 1000 2000

1 INCH = 2000FT

LEGEND:

- RMCSD BOUNDARY
- PHASE 1
- PHASE 2
- PHASE 3
- RMCC GOLF COURSE

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Figure 3-1

Wastewater Facilities Expansion and Financing Plan

POTENTIAL NEW DEVELOPMENT BY PHASE

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3.2 Additional Storage Volumes Required to Serve New Development

Water balances were developed for the three development phases in order to project the additional secondary treated wastewater storage and tertiary treated recycled water disposal volumes generated with each phase of development. The water balances are shown in Exhibits A-4 through A-5 of Appendix A., together with a Technical Memorandum (June 21, 2005) that describes the methodology used for the water balances. The water balances are mathematical models that compute the storage and disposal requirements of the WWRP based on wastewater flows from connections to the system; inflow and infiltration to the sewer system and direct rainfall on the storage facilities during the critical 100-year event; evaporation and the application of recycled water to the golf courses (beginning in May for the 100 year event) and other irrigated areas. The wastewater volume that must be seasonally stored for each phase of development is shown in Table 3-2, below.

TABLE 3-2 INCREMENTAL SEASONAL STORAGE REQUIRED FOR NEW DEVELOPMENT

Phase	Number of Additional Connections	Cumulative Storage Volume Required per Water Balance (Ac-ft)	Additional Storage Volume Required (Ac-ft)
Current		589	0
Phase 1	700	712	0
Phase 2	1000	932/768 [1]	204/39 [1]
Phase 3	600	1059/814 [1]	330/165 [1]

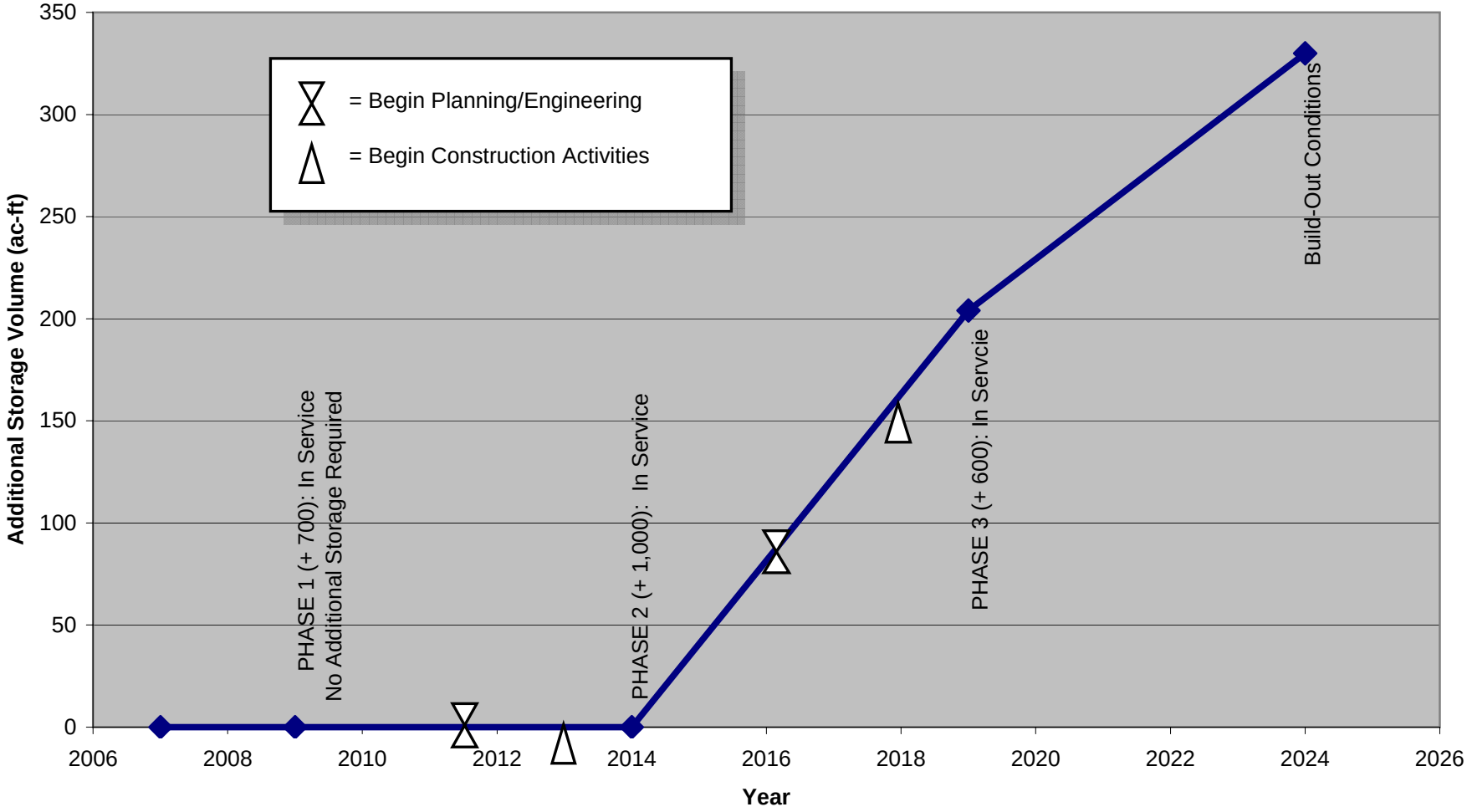
NOTE:

1) If the secondary storage facilities are covered, and thus not required to store the direct rainfall during the 100-year event, the required additional storage capacity is reduced by approximately 165 ac-ft (assuming the same surface area of storage facilities for Phase 2 and 3 -i.e. the storage capacity required at build-out would be installed for Phase 2 to achieve economy of scale).

As shown in Table 3-2, in Phase 2 of the potential new development the available seasonal storage capacity of the WWRP becomes fully utilized and additional seasonal storage capacity must be provided for Phases 2 and 3. Figure 3-2 depicts graphically the additional seasonal storage required as a function of the number of connections to the WWRP for an open storage reservoir.

Because a water balance is a mathematical model containing many variables and coefficients that must be estimated and to which judgment must be applied (e.g. surface areas, rainfall and rainfall distribution, evaporation, runoff, irrigation water application rates), it should be recognized that water balance modeling of systems of this nature is not an exact science and further engineering judgment should be applied in the sizing and design of the facilities.

FIGURE 3-2
Wastewater Facilities Expansion and Financing Plan
ESTIMATED MILE STONES FOR STORAGE
BASED ON DEVELOPMENT PHASING (YEARLY SCHEDULE)



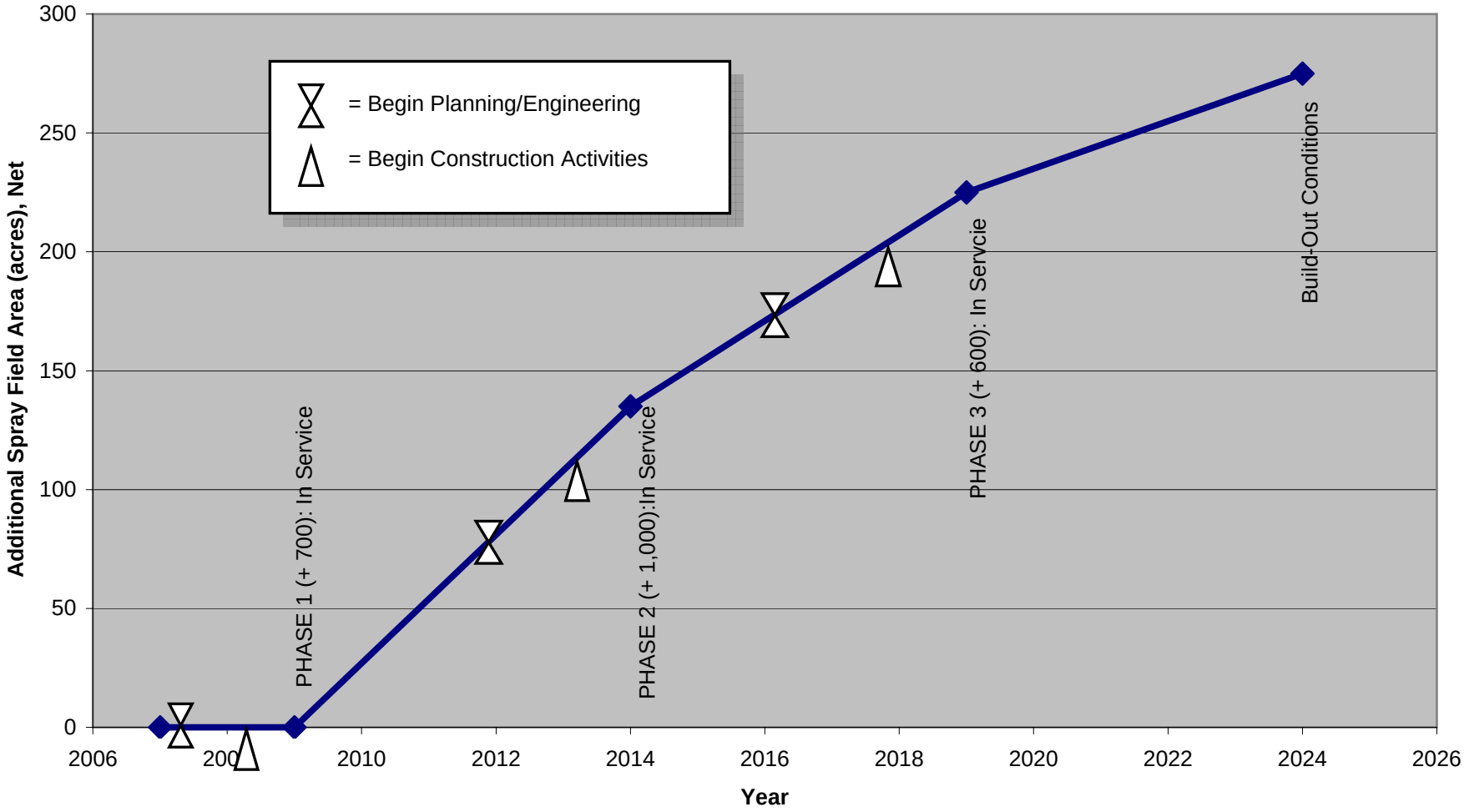
3.3 Disposal Capacity Requirements Generated by New Development

The criteria for determining additional disposal capacity requirements for new development are such that a two-year cycle is examined; the first year being the 100-year rainfall event and the second year being an average rainfall event. The disposal capacity requirements of each phase of new development is determined through a re-iterative water balance analysis that allows for the disposal of the 100- year, plus the average year rainfall events in the two consecutive irrigation seasons. In evaluating the additional disposal capacity requirements for future flows, recognition was given to the fact that the golf course irrigation application rates will trend downward with the planting of Bermuda grass. Thus, a lower application rate for golf course irrigation was used for projecting future disposal facility requirements. Table 3-3 summarizes the additional irrigated acreage that would be required if the recycled water was applied by spray irrigation to grazing lands at agronomic rates. Figure 3-3 presents the disposal volume and required irrigation area as a function of the number of new connections to the WWRP.

TABLE 3-3 PROJECTED INCREMENTAL IRRIGATION AREA REQUIRED

Phase	Number of Units	Net Irrigation Area Required (Acres)	Net Cumulative Irrigation Area Required (Acres)
Phase 1	700	135	135
Phase 2	1000	90	225
Phase 3	600	50	275

FIGURE 3-3
Wastewater Facilities Expansion and Financing Plan
ESTIMATED MILE STONES FOR DISPOSAL FACILITIES
BASED ON DEVELOPMENT PHASING (YEARLY SCHEDULE)



3.4 Other WWRP Facility Improvements Needed for Future Growth

The additional storage and disposal capacities needed for future growth within the RMCSD service area have been identified in sections 3.2 and 3.3. The capacities of other facilities and unit processes at the WWRP were also reviewed to determine if they were of adequate capacity to serve further growth. Based upon the capacities of the various unit processes evaluated in the *Comprehensive Technical Evaluation Report for the WWRP* (HydroScience Engineers, Inc. 2004), with the exception of *disinfection facilities,* the existing facilities are of sufficient capacity to adequately treat the flows from future growth within the RMCSD service area to current Title 22 standards for recycling on golf courses and other areas with unrestricted access. However, as discussed in section 4.1.1, headworks improvements are also recommended. Also, as this Report was being completed, the WWRP began to experience odor problems due to solids build-up in pond 1. Appendix C identifies certain piping modification and other improvements at the ponds that may be considered to facilitate solids removal in the ponds as well as operational practices that would help eliminate the potential for future solids and odor problems at the facility.

Table 3-4 summarizes the capacities and projected flows at the WWRP and assumes that the facilities have been, and will continue to be, adequately maintained and necessary repairs and equipment replacements are timely made[1].

TABLE 3-4 WWRP TREATMENT CAPACITY AND PROJECT FLOWS

Facility Component/Unit Process Capacity	Capacity (MGD)	Required Capacity at Build-Out (MGD)	Current Adequacy
Secondary Treatment	1.55	1.04	Yes
Tertiary Treatment	3.0	2.81	Yes
Disinfection	2.3	3.0*	No

NOTE:

* Matched to tertiary treatment peak capacity to improve operational flexibility.

[1] A Comprehensive Technical Evaluation Report (CTER) of the wastewater reclamation plan t was prepared by HydroScience Engineers, Inc. in 2004. A full evaluation of the condition and performance of the treatment facilities was not part of the scope of this report.

The WWRP treats the wastewater to a secondary level year-round, and because of the long detention times in the secondary treatment ponds, spikes in the flow to the treatment plant are readily equalized. However, the tertiary facilities – dissolved flotation and filtration, followed by disinfection of the tertiary treated wastewater - operate only during that part of the year when recycled water can be delivered for irrigation. During a wet year the irrigation season could be severely limited (depending upon rainfall distribution). Thus at build-out of the service area the tertiary treatment and disinfection facilities should be able to treat the annual flow in a four and a half month period in order to draw down the stored secondary storage reservoir. Based upon the foregoing criteria, the tertiary and disinfection facilities should therefore be sized to treat 2.7 times the average daily flow to the WWRP. At build-out this flow corresponds to 2.81 MGD. Thus, while the tertiary processes at the WWRP have adequate capacity for the projected growth; the current capacity of the disinfection facilities (2.3 mgd) will need to be increased. This capacity should match the capacity of the tertiary facilities (3.0 mgd) for operational flexibility. The increased capacity for the disinfection facilities will need to be in service no later than such time as an average annual flow of 0.92 MGD is experienced at the WWRP, but it is recommended that it be added sooner if practical, due to the temporary nature of the recent chlorination facility improvements.

Flows to the treatment facility should continue to be monitored regularly to verify that unit flows have not varied over the build-out period and the necessary improvements to the facility are in place to meet the additional flows attributable to growth. Although not needed to serve new growth, in order to help assure that flows are accurately monitored, flow metering equipment, together with modifications to the head works of the WWRP should also be considered.

The alternatives for upgrading the disinfection facilities upgrades are discussed in Section 4 of this Report.

4. Alternatives for Providing the Additional Facilities to Serve Growth

This section of the Report addresses the alternative means available to the RMCSD to provide the needed capacities to adequately treat, store and dispose of the additional wastewater flows that will generated by new development within the RMCSD service area. Preliminary evaluations of the probable cost of the various improvements are presented. These evaluations are based upon preliminary layouts of the various facilities and not specific designs and are intended to provide a relative cost comparison of the alternatives. In addition, because land acquisition costs are not yet known, a value of $20,000 per acre has been assumed for preliminary evaluation purposes to determine the relative costs of the alternatives. Details of the preliminary construction cost estimates are presented in Appendix B.

4.1 Summary of Facility Requirements

The WWRP facility upgrades that are required in order to serve all of the identified potential new growth have been identified (in the sequence of flow through the WWRP) as follows:

1. Disinfection facilities – increase capacity to 3 MGD
2. Storage Capacity – 360 ac-ft of additional capacity required (195 ac-ft if covered)
3. Disposal Capacity – Increase of 868 ac-ft (approximately 275 net acres under irrigation)

Figure 4-1 is the process flow diagram for the WWRP modified to show the recommended facility improvements required. In addition to the storage, disinfection and disposal capacity expansions listed above that are needed to serve new development, metering and headworks improvements are also recommended.

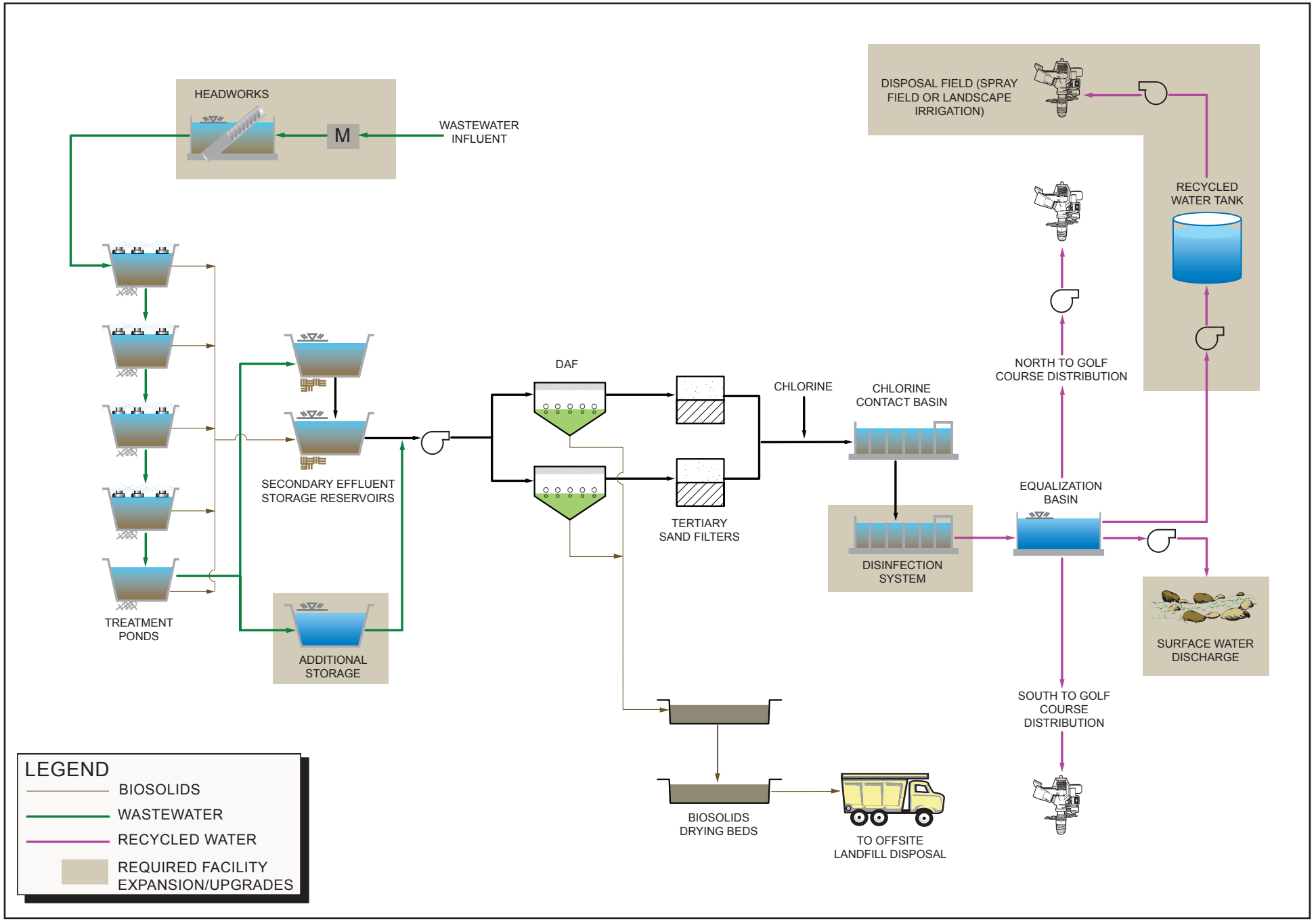


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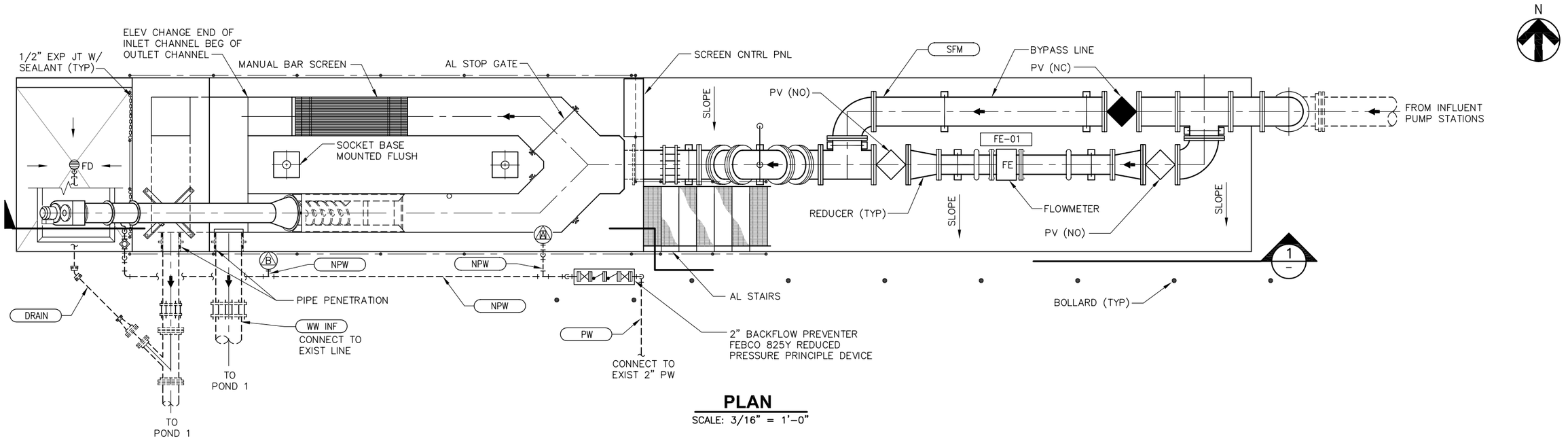
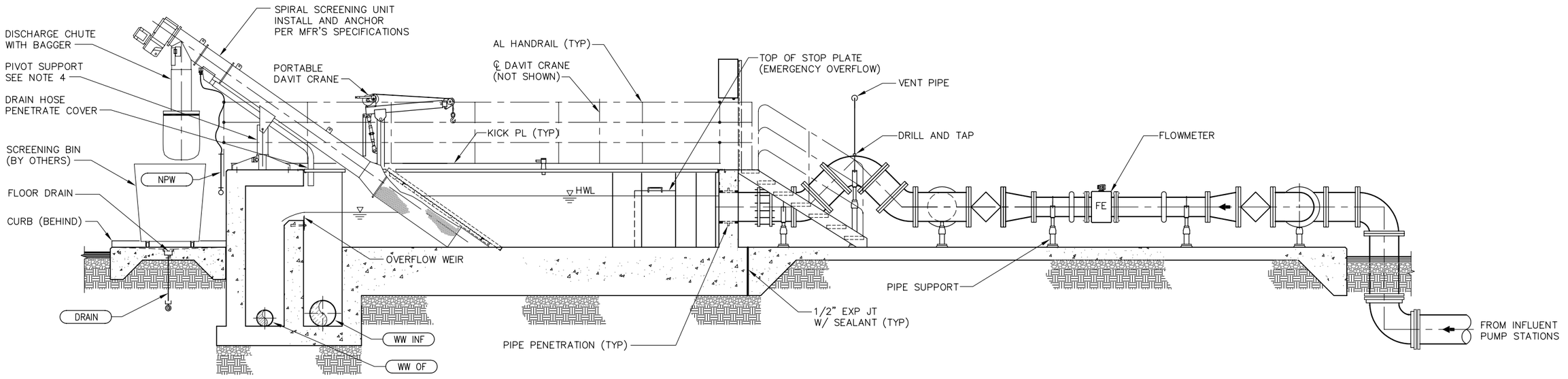
Figure 4-1
Wastewater Facilities Expansion and Financing Plan
MODIFIED PROCESS FLOW DIAGRAM

4.1.1 Metering and Head Work Improvements

Figure 4-2 is a typical layout of the recommended metering and headwork improvements. A magnetic flow meter is recommended. The metering will provide accurate data on inflows to the WWRP, which flows are currently obtained by combining calculated flows from the sewage pump stations. The screening equipment will remove coarse materials from the inflow to the plant and will improve secondary treatment reliability and help prevent damage to the aeration equipment in the secondary treatment ponds. The screening process will also help keep non-degradable materials out of the ponds. It is further recommended that the headworks is covered with fiberglass reinforced plastic (RFP) covers to contain odors. The foul air under the covers should be scrubbed. The cost of these improvements is preliminary estimated at $370,000 including air scrubbers to mitigate potential odor problems.



PLAN
SCALE: 3/16" = 1'-0"



SECTION 1/–
SCALE: 3/16" = 1'-0"

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Figure 4-2
Wastewater Facilities Expansion and Financing Plan
TYPICAL LAYOUT OF HEADWORKS AND METERING MODIFICATIONS

4.1.2 Disinfection Facilities

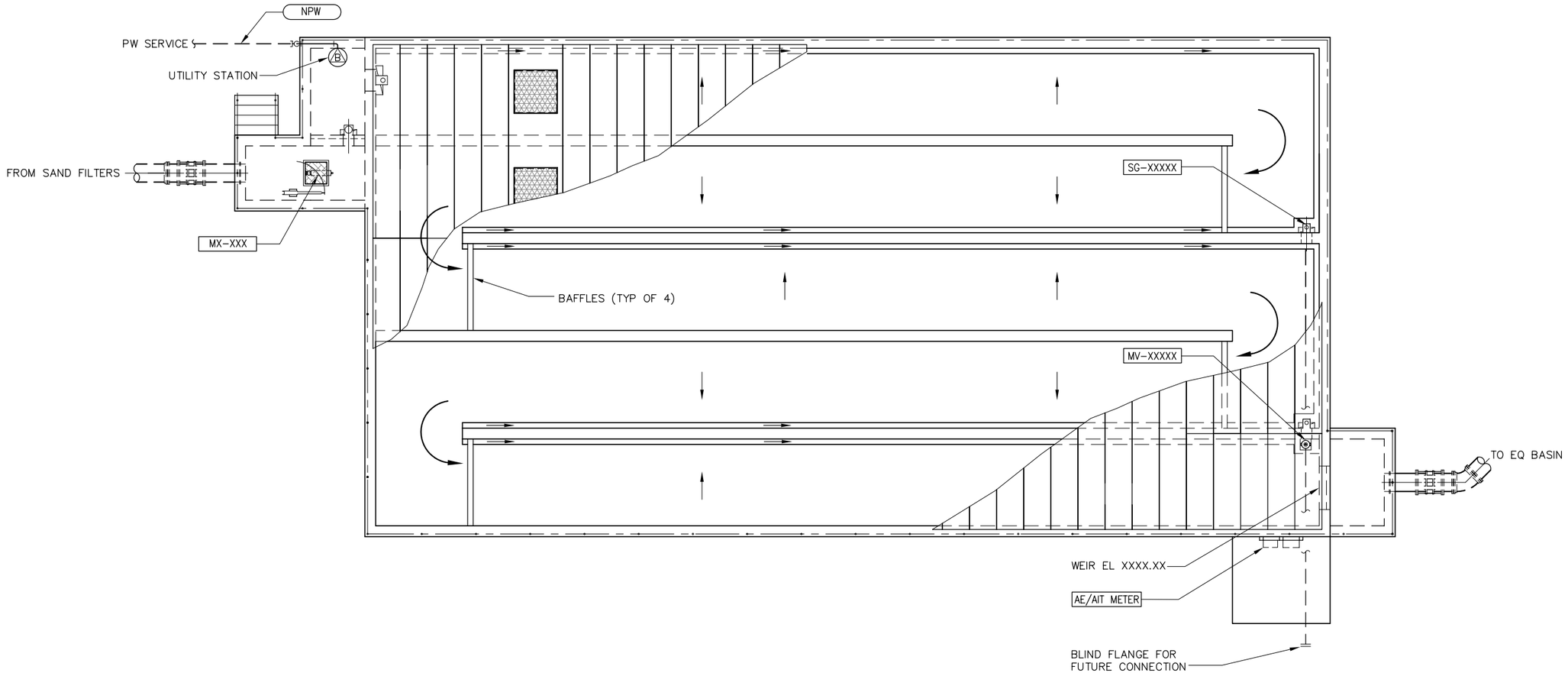
The recycled water that the WWRP supplies to RMCC golf courses must comply with full Title 22 Code of California Regulation requirements for application where there is unrestricted access. Title 22 requires that if a chlorine disinfection process is employed, as is the case at the WWRP, it must provide a CT (the product of total chlorine residual (C) and modal contact time (T) measured at the same point) value of not less than 450 milligrams-minutes per liter (mg-min/L) at all times, with a modal contact time of at least 90 minutes. In addition, the median concentration of total coliform bacteria shall not exceed a MPN of 2.2 per 100 ml.

The existing WWRP chlorine contact disinfection facilities consists of a conventional serpentine concrete chlorine contact basin (CCB) followed by a double barrel PVC chlorine contact pipe (CCP) that was recently installed (spring 2006) in the WWRP's equalization basin to provide the additional contact time required to comply with the regulations. Following installation of the chlorine contact pipe, tracer dye studies were performed verifying that with the latest modifications to the disinfection facilities, a flow of 2.3 mgd will receive the required modal contact time.

A typical layout of a CCB that will provide the required modal contact time for a flow of 3 MGD is shown in Figure 4-3. As it is not practicable to build the increased capacity CCB incrementally, if it is decided to continue to use chlorine to disinfect the tertiary treated wastewater, the entire 3 MGD CCB should be built in a single stage. The estimated cost for the 3 MGD CCB, including yard piping is $2.7 million.

An alternative to the replacement of the CCB is the use of Ultra Violet (UV) disinfection. UV disinfection has been primarily used to avoid problems that can be encountered with the bi-products of chlorination if the treated wastewater is ultimately discharged to receiving water. However, UV disinfection is becoming more common, and if disposal of excess treated wastewater under a National Pollution Discharge Elimination System (NPDES) permit is considered a viable alternative to providing the required additional storage and disposal facilities, (see section 4.2, below), UV disinfection should be given further consideration. A typical layout of the UV disinfection equipment located in the

existing CCB is shown in Figure 4-4. The preliminary estimated cost of those facilities is $2.2 million.



PLAN LAYOUT
SCALE: 3/32" = 1'-0"

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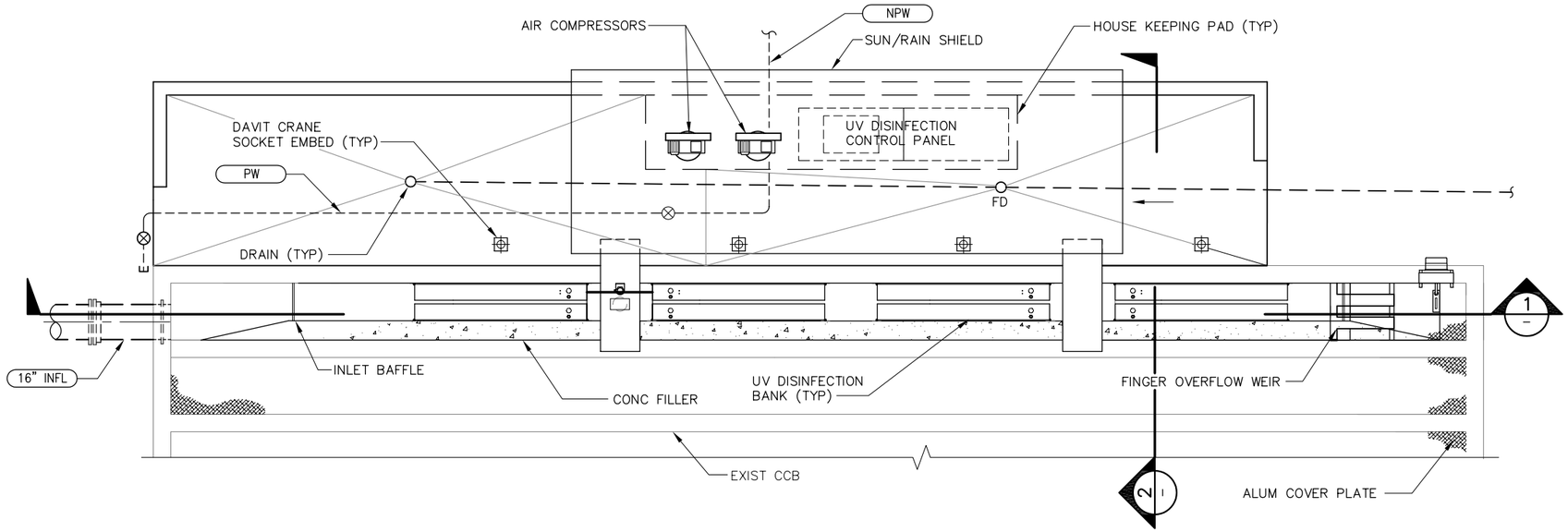
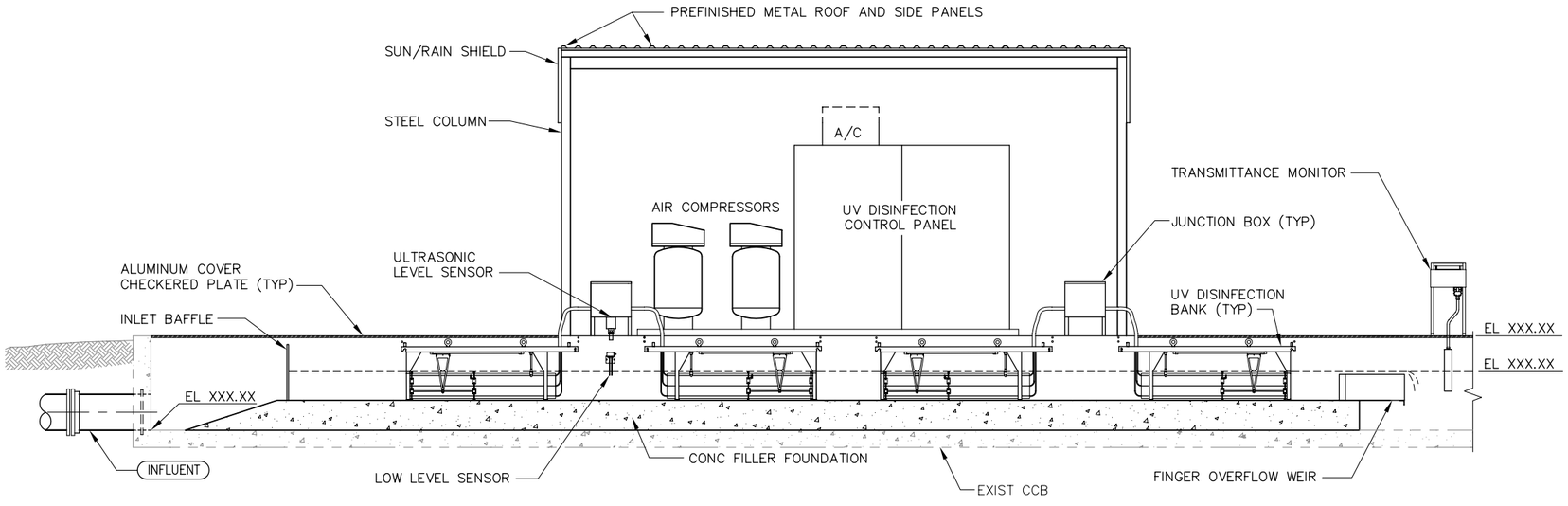
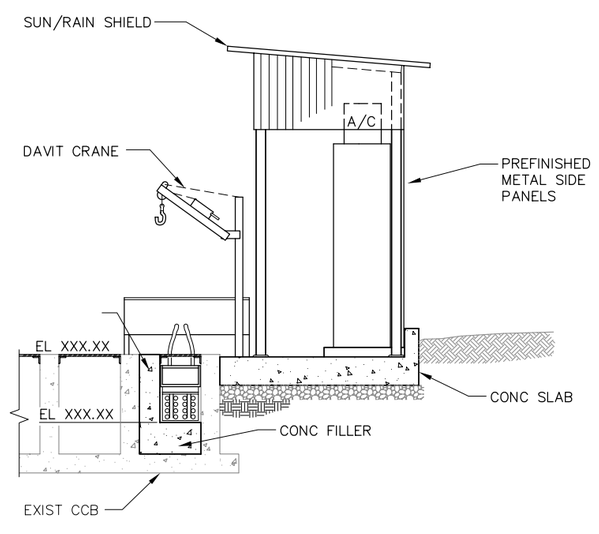
Figure 4-3
Wastewater Facilities Expansion and Financing Plan
TYPICAL LAYOUT OF CHLORINE CONTACT BASIN



PLAN LAYOUT
SCALE: 3/16" = 1'–0"



SECTION 1
SCALE: 3/16" = 1'–0"



SECTION 2
SCALE: 3/16" = 1'–0"

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Figure 4-4
Wastewater Facilities Expansion and Financing Plan
TYPICAL LAYOUT OF UV DISINFECTION SYSTEM

4.1.3 Increased Storage Capacity

As noted in section 3.2, approximately 334 ac-ft of additional seasonal storage capacity is required at build-out of the service area. However, this additional storage capacity can be reduced to approximately 165 ac-ft, if the storage reservoirs are covered because the direct rainfall (45.4 inches during the 100-year event) does not need to be stored. Figure 4-5 shows the possible locations of additional seasonal storage reservoirs on and nearby to the WWRP site. Only about 200 ac-ft of storage can be provided on site, leaving about 160 ac-ft of storage off the WWRP site. Table 4-1 summarizes the estimated costs of the additional seasonal storage required.

TABLE 4-1 PRELIMINARY ESTIMATED COSTS OF SEASONAL STORAGE ALTERNATIVES

	COVERED RESERVOIR ALTERNATIVE		UNCOVERED RESERVOIR ALTERNATIVE	
	Cover Existing	Phase 3	Phase 2	Phase 3
COST ELEMENT	Reservoirs	165 ac-ft	204 ac-ft	130 ac-ft
Excavation	NA	$4,100,000	$5,100,000	$3,200,000
Lining	NA	$600,000	$700,000	$600,000
Cover	$7,300,000	$1,500,000	NA	NA
Pumping & Piping	NA	$1,800,000	$1,800,000	$3,000,000
Land Costs	NA	On-site	On-site	$200,000
Sub-Total	$7,300,000	$8,000,000	$7,600,000	$7,000,000
TOTAL	$15,300,000		$14,600,000	

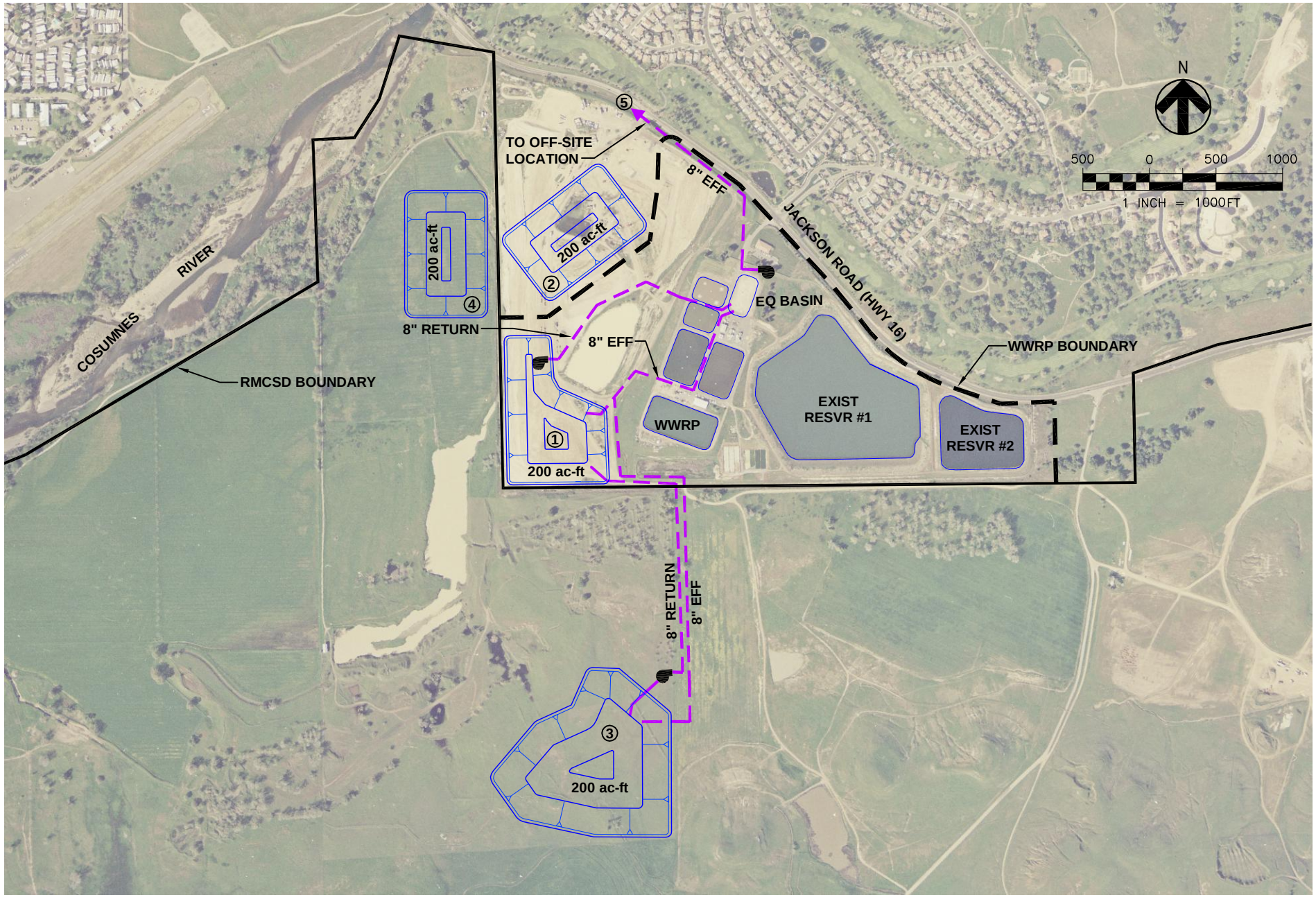

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Figure 4-5

Wastewater Facilities Expansion and Financing Plan

SEASONAL STORAGE SITE ALTERNATIVES

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4.1.4 Increased Disposal Capacity

The alternatives for disposal of the additional volume of wastewater produced by new growth that have been considered are:

- Spray Irrigation on nearby grazing land
- Title 22 landscape irrigation
- Seasonal discharge to the Cosumnes River (NPDES Permit)
- A combination of the above disposal methods
- Connection to the Sacramento Regional Sanitary District

4.1.4.1 Spray Irrigation on Nearby Grazing Land

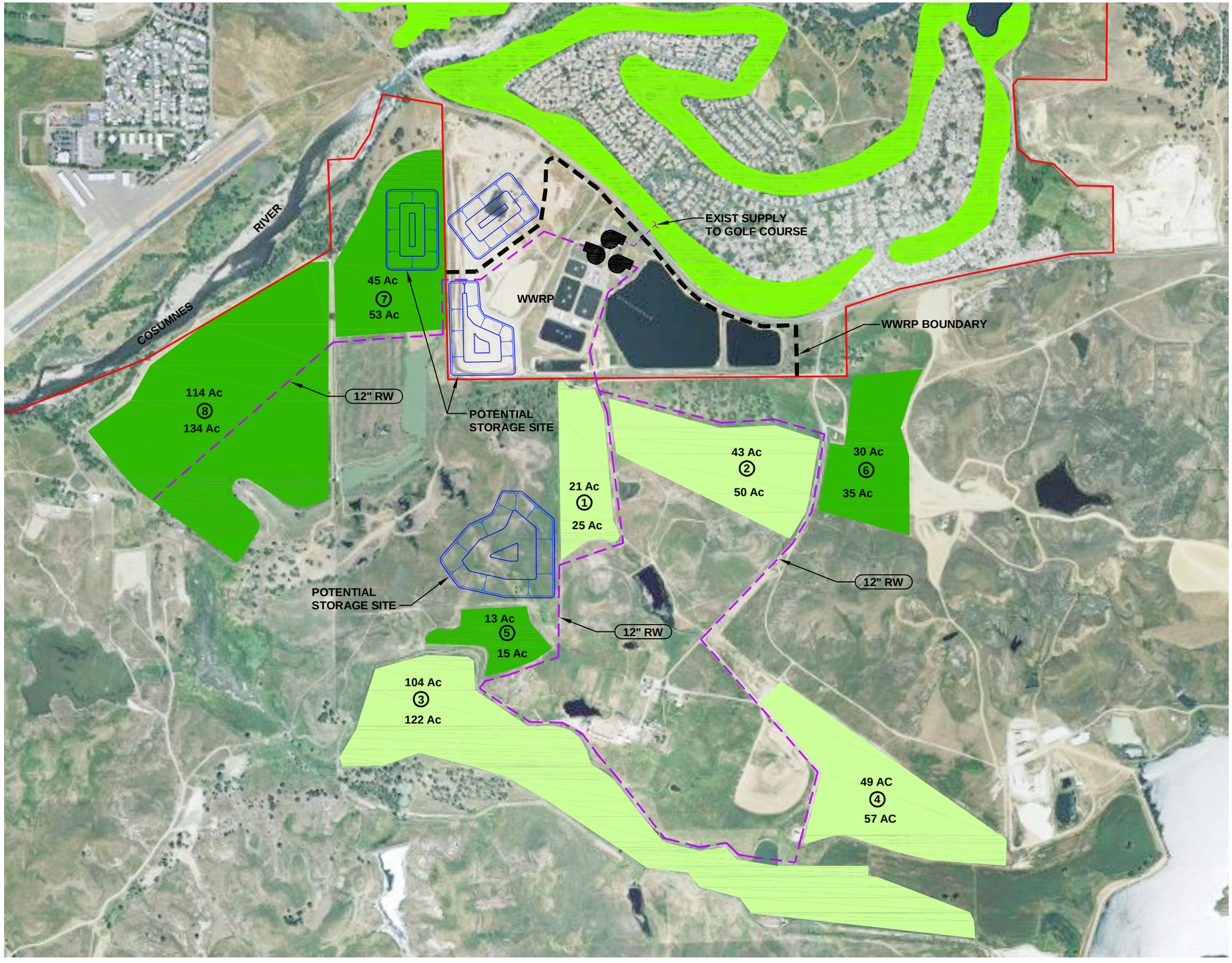
Under critical 100-year conditions, at build- out, approximately 1,736 ac-ft would have to be applied over two irrigation seasons. Figure 4-6 shows the potential areas of spray irrigation. The areas are numbered sequentially to correspond to the likely order of utilization as growth occurs. If spay irrigation was used to dispose of the all the additional flows, 280 net acres would be required in addition to the golf course irrigation. Table 4-2 summarizes the piping and land disposal entitlement costs for the all 280 acres, plus the additional estimated area required for offsets and access.

TABLE 4-2 SPRAY FIELD IRRIGATION COSTS

Cost Element	Cost Per Acre [1]	Total Costs
Land Costs	$20,000	$6,350,000
Pumping & Pipeline	$29,300	$9,300,000
Distribution & Spray Equipment	$5,400	$1,700,000
TOTAL	**$54,700**	**$17,350,000**

NOTE:

1) A total of 280 acres, net, is required to meet full build-out conditions. For estimation purposes, an additional 15 percent is allocated for easements, access, and maintenance. A plug number of $20,000 per acre for land costs has been used as negotiations are ongoing and confidential.



N

600 0 600 1200

1 INCH = 1200FT

LEGEND:

- RMCSD SERVICE BOUNDARY
- RMCC GOLF COURSE
- INDENTIFIED SPRAY FIELD
- POTENTENTIAL SPRAYFIELD AREA

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Figure 4-6

Wastewater Facilities Expansion and Financing Plan

POTENTIAL SPRAYFIELD SITES

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4.1.4.2 Title 22 Landscape Irrigation

Utilizing the WWRP effluent for Title 22 landscape irrigation within new residential developments and park areas can make beneficial use of the effluent and help offset potable water demands, thereby providing additional potable water supply availability during drought conditions and improving reservoir levels, while at the same time providing a means of disposing of the effluent. Application of the effluent for landscape irrigation would require a system of storage, transmission and distribution of the recycled water similar to that used for the potable system. Figure 4-7 shows a preliminary layout of the system that would be required to provide recycled water to new development and the estimated volume of recycled water (ac-ft) that would be applied to the developments served. Table 4-3 presents the preliminary cost estimate for providing recycled water to new development within the RMCSD service area. Distribution piping within the individual residential developments would be the obligation of the developer and those costs are not included. The detailed estimate of the recycled water facilities required for Title 22 landscape irrigation is provided in Appendix B. As discussed herein, providing recycled water for Title 22 landscape irrigation for all new development is not practical or cost effective in the case of certain developments depending on their respective state of development or location and lot size. Operational costs and considerations of residential irrigation with recycled water are discussed in the Section 5 of this Report.

Depending on lot size and landscaping choices, a residential lot may be expected to utilize between 0.3 and 0.5 ac-ft of water annually, assuming front and back yard irrigation with recycled water, with estate sized lots having the potential to use greater amounts. Policies respecting the commodity pricing of the recycled water will also affect consumption. Assuming an average residential application rate of 0.35 ac-ft per residential unit per year, approximately 805 ac-ft of recycled water could be disposed of via Title 22 landscape irrigation if the 2,300 potential new units were all suitable for landscape irrigation with recycled water. However, as may be observed from Figure 4-6, certain Phase 1 developments, owing to location, require substantially more piping to receive the recycled water and thus, from a disposal perspective are less cost effective for Title 22 landscaping irrigation. Also, a significant portion of the development in Phase 1 will not have lots that require landscape irrigation. Thus, Title 22 landscape

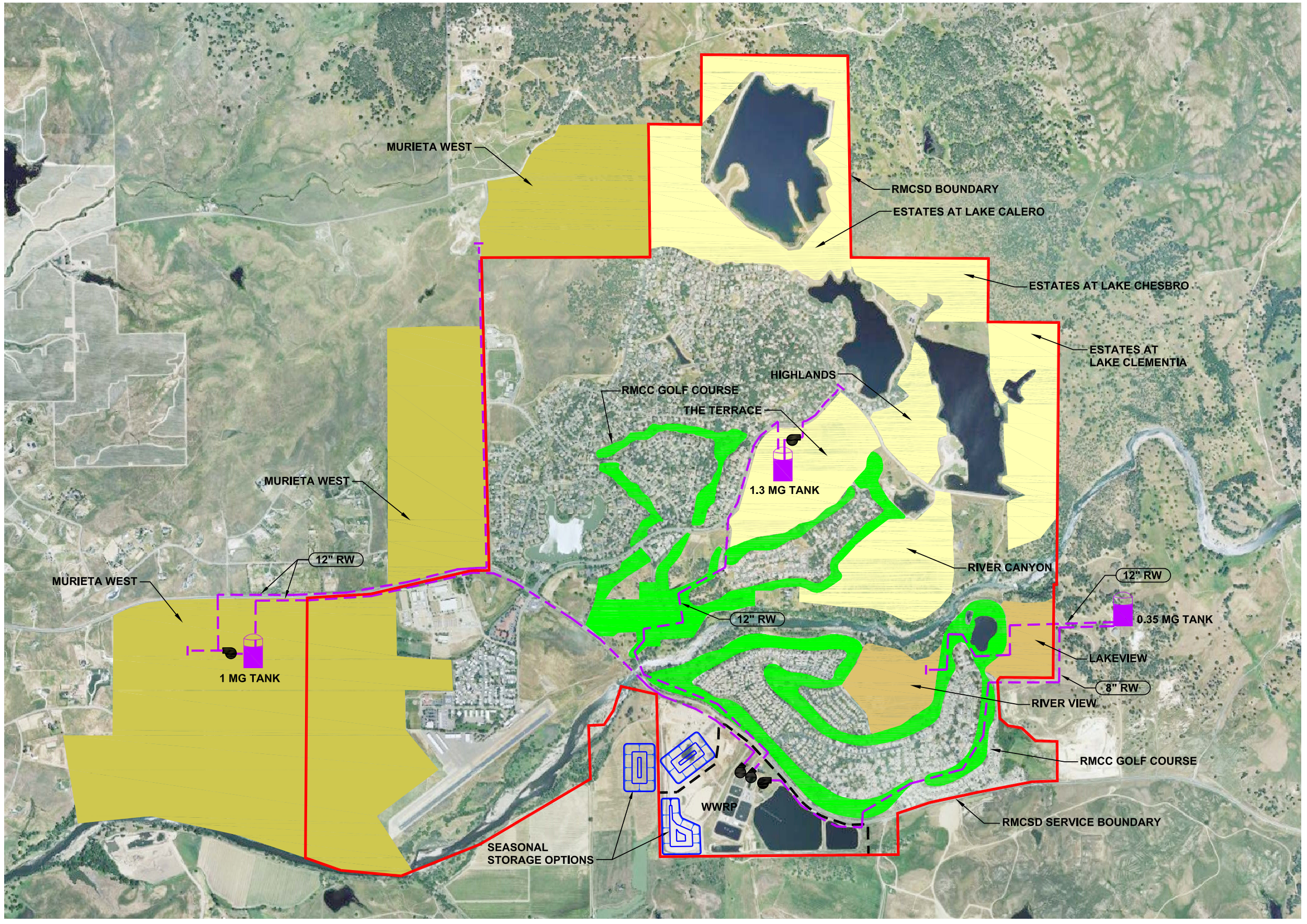
irrigation could be a beneficial use of the recycled water for the later phases of the new development at Rancho Murieta, but is not practicable or even feasible for Phase 1.

TABLE 4-3 PRELIMINARY ESTIMATE OF TITLE 22 LANDSCAPE IRRIGATION COSTS

Cost Element	Costs	Cost per Unit Served
Phase 1		253 Units
Pumping and Piping	$6,100,000	$24,110
Tank Storage	$1,100,000	$4,350
TOTAL	**$7,200,000**	**$28,460**
Phase 2		700 Units
Pumping and Piping	$7,600,000	$10,860
Tank Storage	$1,800,000	$2,570
TOTAL	**$9,400,000**	**$13,430**
Phase 3		600 Units
Pumping and Piping	$12,100,000	$20,170
Tank Storage	$1,500,000	$2,500
TOTAL	**$13,600,000**	**$22,670**
GRAND TOTAL	**$30,200,000**	**$19,450**

NOTES:

- Phase 1 consists of the River View and Lake View subdivisions
- Phase 2 consists of the remaining PTF properties
- Phase 3 consists of Murieta West



N

1000 0 1000 2000

1 INCH = 2000FT

LEGEND:

- RMCSD BOUNDARY
- PHASE 1
- PHASE 2
- PHASE 3
- RMCC GOLF COURSE

HydroScience Engineers, Inc.

Figure 4-7

Wastewater Facilities Expansion and Financing Plan

PRELIMINARY LAYOUT OF TITLE 22 LANDSCAPE IRRIGATION FACILITIES

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4.2 Alternatives to Increasing Storage and Disposal Capacities

Two alternatives to expanding the storage and disposal capacities of the WWRP to accommodate the anticipated growth at Rancho Murieta that were examined are:

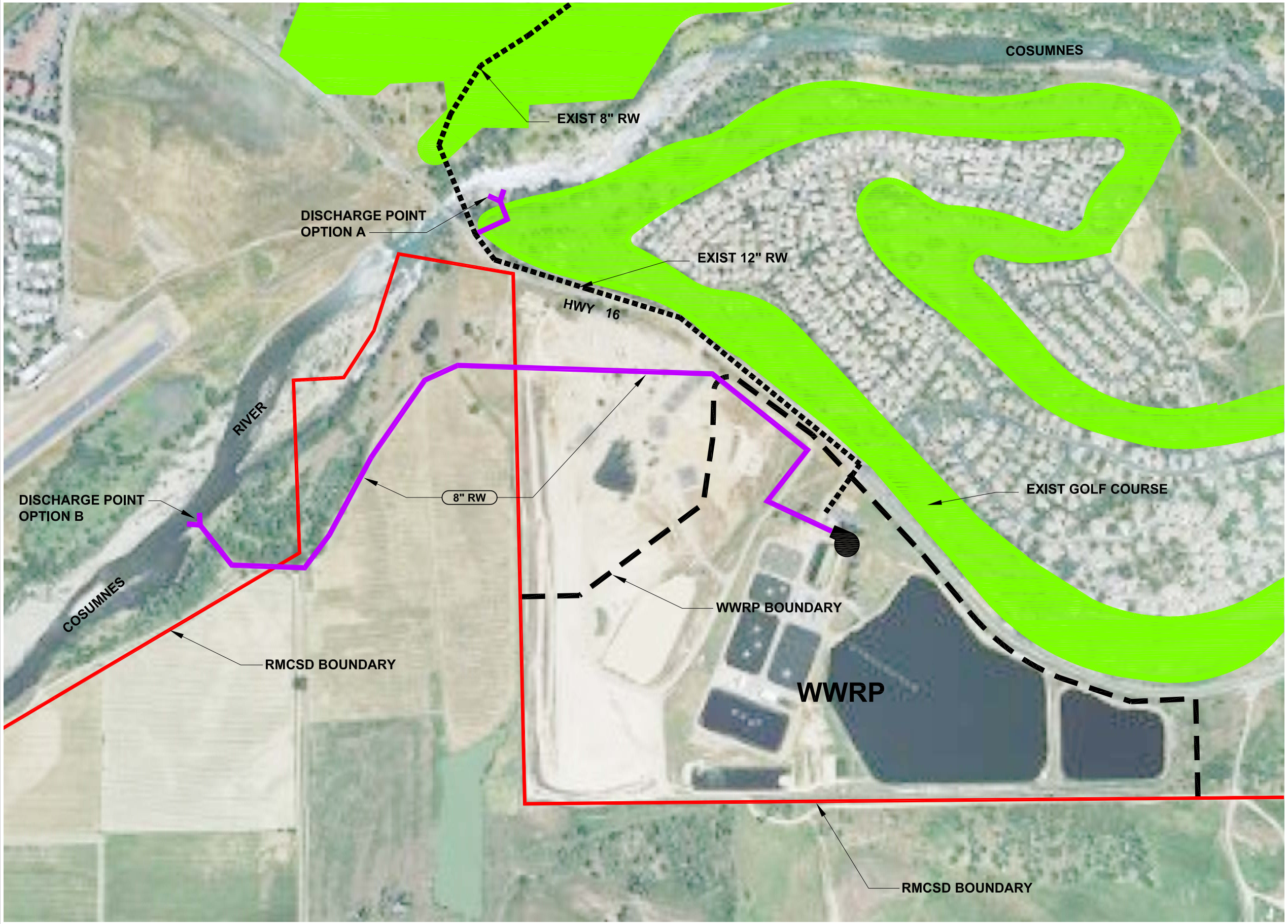
- Seasonal discharge of the effluent in excess of the golf courses irrigation needs pursuant to an NPDES permit; and
- Discharge of the effluent in excess of the golf courses irrigation needs via a connection to the interceptor sewer of the Sacramento Regional County Sanitation District (SRCSD or Sac Regional).

Discussion of these alternatives and preliminary cost estimates for their implementation follow, with evaluation of these alternatives presented in Section 5 of this Report.

4.2.1 NPDES Permit for Seasonal Discharge of Excess Flows

Under this alternative the RMCSD would apply for an NPDES permit for seasonal and intermittent discharge to the Cosumnes River. The discharge would be limited to such times as flows in the receiving stream were of significant magnitude as to insure that there was abundant dilution available to assure that water quality standards in the Cosumnes would be achieved. With seasonal discharge, the need for additional storage and disposal facilities are eliminated.

Application for an NPDES permit for seasonal discharge was first made by the RMCC to address the overflows, during winter wet weather conditions, of its golf course irrigation lakes that contain tertiary recycled water commingled with storm water that entered the lakes. The NPDES permit in this case would apply to discharge directly from the WWRP. Possible outfall locations are shown on Figure 4-7 and account for the range of potential capital costs.



N

300 0 300 600

1 INCH = 600 FT

LEGEND:

RMCSD BOUNDARY

RMCC GOLF COURSE

RECYCLED WATER ALIGNMENT

HydroScience Engineers, Inc.

Figure 4-8

Wastewater Facilities Expansion and Financing Plan

POTENTIAL NPDES PIPELINE ALIGNMENTS

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The costs for this alternative include prosecuting an NPDES application, water quality sampling and analyses, as well as capital costs of the outfall. The estimated costs are summarized in Table 4.4. Operating considerations are discussed in Section 5 of this Report.

TABLE 4-4 PRELIMINARY ESTIMATED COSTS OF SEASON DISCHARGE

Cost Element	Cost
Consulting Fees (Permit Preparation)	$70,000
Water Quality Sampling and Analysis	$100,000
Consulting Fees (Permit Compliance Reporting)	$80,000
Dedicated Pumping, Piping, and Outfall	$500,00-$2,250,000
TOTAL	**$750,000 - $2,500,000**

4.2.2 Connection to Sacramento Regional County Sanitation District

Connection to the Sacramento Regional County Sanitation District (Sac Regional) was evaluated as an alternative to expanding storage and disposal capacity to serve new growth. However, upon investigation and discussions with Sac Regional staff, it was discovered that this alternative would not necessarily eliminate the need for additional storage. Construction of approximately 13 miles of sewer force main from the WWRP to the SRCSD interceptor sewer in the vicinity of Douglas Road and Sunrise Blvd. (Figure 4-7) would be required to implement this alternative. In addition to the cost of the transmission main, a connection fee would need to be negotiated with the SRCSD. Preliminary discussions with Sac Regional staff indicated that a discount of the standard connection fee charged by Sac Regional could be obtained (and was utilized in the preliminary estimate); however, the RMCSD would be purchasing “dry weather capacity” at the regional treatment facility. Thus, wet weather flows would have to be retained at the RMCSD until wet weather flows to the regional facility subsided and capacity became available. Because the 100-year event controls the facility planning criteria, wet

weather flows would be high over much of the wet weather season and the storage capacity required at the WWRP would likely be nearly equal to the other disposal alternatives. Table 4-5 summarizes the preliminary estimated cost components of this alternative. A monthly service charge of approximately $13 per unit per connection would be charged by Sac Regional, in addition to transmission costs paid to the improvements district that operates the wastewater conveyance system bringing the monthly charges to approximately $27 to $30 per unit.

TABLE 4-5 PRELIMINARY ESTIMATED COSTS OF SRCSD CONNECTION

Cost Element	Cost
Pumping and Piping[1]	$15,600,000
Right of Way (ROW) Acquisition[2]	$1,600,000
Connection Fee Allowance	$11,400,000
TOTAL	**$28,600,000**

NOTES:

1) Includes allowance for traffic control and CEQA approvals.
2) Estimated at 15% of cost to install pipe.

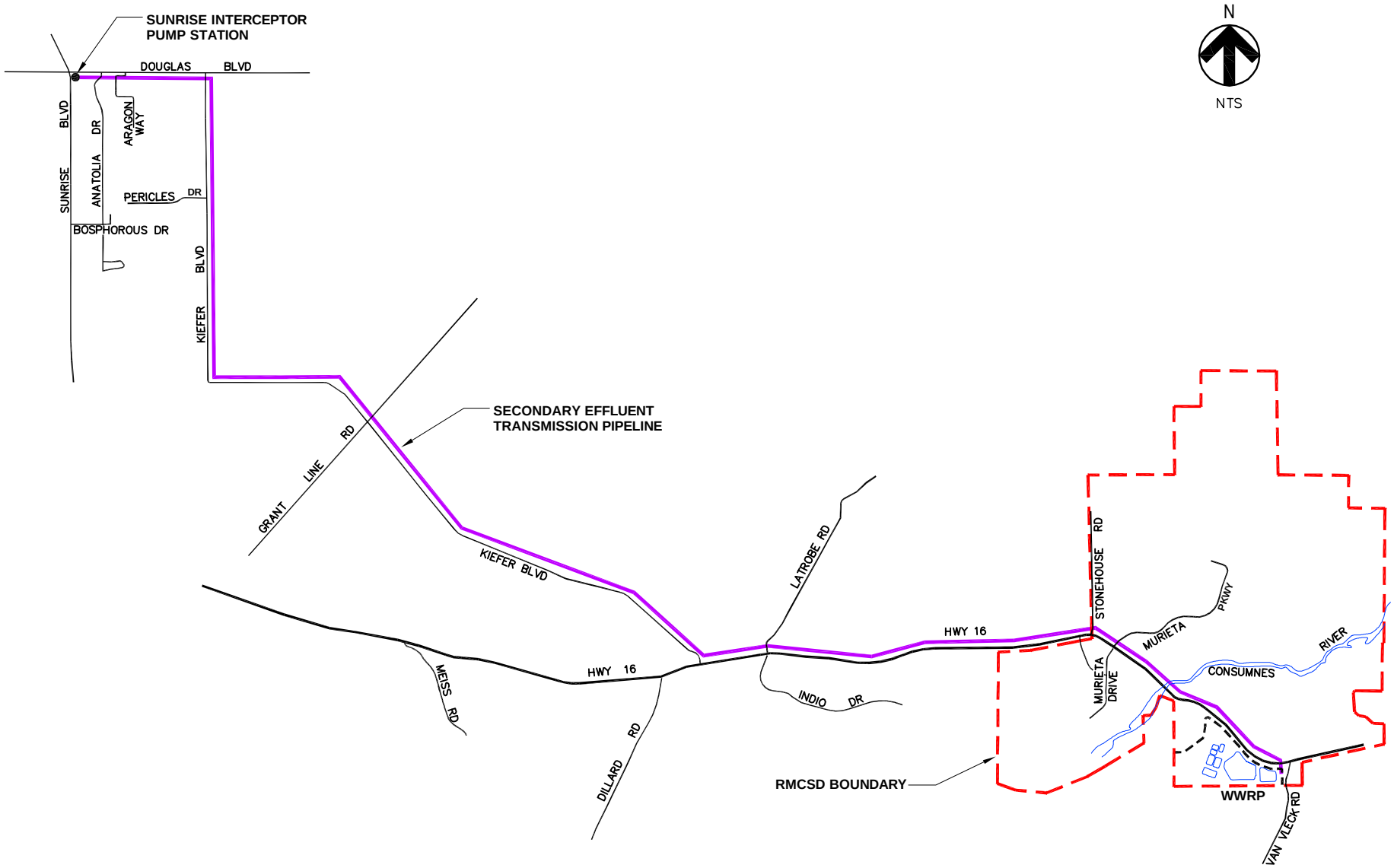

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Figure 4-9

Wastewater Facilities Expansion and Financing Plan

INTERCEPTOR PIPELINE ALIGNMENT

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5. Facilities and Financing Program

This section of the Report evaluates the alternatives for facility expansion needed to serve new development at Ranch Murieta and presents the program that the RMCSD has adopted and the bases therefor. The RMCSD's financing plan for the recommended facility expansion is presented and the assurances that the plan provides for having the needed facilities on-line to serve new development are discussed.

5.1 Discussion of Alternatives

The preliminary estimates of the capital costs of the three (3) alternatives for providing the storage and disposal facilities to serve new growth are summarized in Table 5-1. These alternatives area: 1) Spray Irrigation; 2) Title 22 Irrigation; and 3) Seasonal Discharge NPDES Permit (Spray Field for Phase 1). It should be noted that connection to Sac Regional facilities has been dropped from further consideration for the reasons presented (Section 4.2.2 and Table 5-2), and that the costs for this alternative is not included in Table 5-1.

From a capital cost perspective, the seasonal discharge alternative is the lowest cost alternative. While the RMCSD's financing plan requires that the developers fund the cost of new facilities, the RMCSD believes that capital costs considerations are nevertheless important, even though the costs are not to be borne by the RMCSD, provided that other relevant criteria and considerations are fairly and adequately evaluated in formulating the Plan.

To facilitate evaluation of non-capital cost criteria, Table 5-2, which is a matrix of considerations for the alternatives, was developed. It notes the Positive, Negative, Environmental, Financing and Regulatory considerations associated with each of the alternatives. It notes for example, that while the seasonal discharge alternative is the most attractive in terms of capital costs, it has associated with it significant uncertainty in terms of discharge limitations, particularly as they may change in the future and thus this alternative could potentially require plant upgrades sooner than other alternatives. Similarly, it notes that the Title 22 Landscape Irrigation alternative will result in a substantial savings in potable water resources, but brings with it significant operational

considerations both in terms of costs and administration, in addition to the significantly higher capital costs associated with this alternative.

TABLE 5-1 SUMMARY OF COSTS

COST ELEMENT	PHASE 1	Cost	PHASE 2	Cost	PHASE 3	Cost	BUILD-OUT TOTAL
ALTERNATIVE 1							
Storage (ac-ft)	0	$ 0	204	$7,600,000	130	$7,000,000	$14,600,000
Spray Fields (Acres)	135	$8,500,000	90	$5,700,000	50	$3,200,000	$17,400,000
Headworks & Disinfection	Lump sum[1]	$3,000,000	--	--	--	--	$3,000,000
TOTAL		**$11,500,000**		**$13,300,000**		**$10,200,000**	**$35,000,000**
ALTERNATIVE 2							
Storage (ac-ft)	0	$ 0	204	$7,600,000	130	$7,000,000	$14,600,000
Spray Fields (Acres)	135	$8,500,000	--	--	--	--	$8,500,000
Title 22 Landscape	--	--	700 Units	$9,400,000	600 Units	$13,600,000	$23,000,000
Headworks & Disinfection	Lump sum[1]	$3,000,000	--	--	--	--	$3,000,000
TOTAL		**$11,500,000**		**$17,000,000**		**$20,600,000**	**$49,100,000**
ALTERNATIVE 3							
Spray Fields (Acres)	135	$8,500,000[2]	--	--	--	--	$8,500,000
NPDES Permit	--	--	--	$750,000-$2,500,000	--	--	$750,000-$2,500,000
Headworks & Disinfection	Lump sum[1]	$3,000,000	--	--	--	--	$3,000,000
TOTAL		**$11,500,000**		**$750,000-$2,500,000**		**Included in Phases 1& 2**	**$3,750,000-$14,000,000**

NOTES:

1) Allowance for headworks and disinfection facilities shown in Phase 1.
2) Contingent upon timing of NPDES Permit determination

TABLE 5-2 DISPOSAL ALTERNATIVES EVALUATION MATRIX

DISPOSAL OPTION	***COST***	**CONSIDERATIONS** ***Positive***	***Negative***	***CEQA /Financing/ Other***	***RWQCB/ Regulatory***
- 1 - **Spray Fields**	Middle	1) Scalability Costs can be incurred incrementally to match development 2) Ability to coordinate application – positive control on disposal	1) Requires additional seasonal storage beyond Phase 1 2) Requires coordination with operators of pastures 3) Operations Costs Requires additional Staff of approx. 1+ 4) Site acquisition Negotiation or eminent domain	1) CEQA documentation – Relatively Extensive 2) Lends itself to developer financing as developments come on line	1) WDR/Title 22 Report required; 5 year renewals 2) Potential groundwater impacts – monitoring and mitigation requirements
- 2 - **Title 22 Landscape Irrigation**	Relatively High	1) Offset in annual potable water demand for new connections - nearly 50% 2) Scalability Phased to development with some backbone plant installed before actual use 3) Positive “green” statement	1) Not practical for Phase 1 2) Lack positive control over irrigation rates and thus disposal 3)Requires additional seasonal storage beyond Phase 1 4) Requires additional Staff of approx. 3+ for: i) Public outreach and education to users and contractors ii) inspection during construction and during use 5) Subject to Potential Health and Safety issues (cross-connections)- outreach & educational considerations 6) may require augmentation with potable supply at times 7) Rate Policy Tariff, billing and cost of service issues	1) CEQA documentation – Moderate 2) Lends itself to developer financing as developments come on line; some backbone plant to be advanced by first developers	1) Title 22 Report required; 2) Development, monitoring and enforcement of User Regulations.

TABLE 5-2 DISPOSABLE ALTERNATIVES EVALUATION MATRIX (Continued)

DISPOSAL OPTION	**CONSIDERATIONS**				
	COST	***Positive***	***Negative***	***CEQA /*Financing*/ Other***	***RWQCB/ Regulatory***
- 3 - **NPDES Permit for Seasonal Discharge**	Lowest Cost	1) Additional Storage not required 2) Scalable	1) Subject to unknown future discharge limitations and possible plant upgrades could be required sooner than under other alternatives 2) Greater monitoring costs, particularly in first year	1) CEQA documentation – Minimal	1) NPDES Permit required -5 year renewal 2) Potential for significant fines for violations of discharge limitations

There are other overriding constraints and considerations that are summarized below because they significantly influence the Plan developed by the RMCSD; these are:

1) Timing issues- The additional facilities must be available to serve the Phase 1 development. Some of the development is well along in planning, engineering and in obtaining land use entitlements. Moreover, a substantial portion of the Phase 1 development will not require landscape irrigation of any significant amount. These considerations, combined with the uncertainty of obtaining a seasonal discharge NPDES permit with conditions and limitations acceptable to the RMCSD within the time frame required and the lack of suitability of Title 22 Landscape Irrigation for Phase 1, militate for the Spray Fields alternative for Phase 1.

2) The desire of the RMCSD to retain flexibility in fulfilling the facility expansion requirements for later development phases. In particular, the RMCSD believes that because of the significant capital cost disparity between the Seasonal Discharge alternative and the other alternatives, this alternative should be fully explored and if practical implemented for later phases of development. Likewise, the RMCSD recognizes the importance of conserving potable water and would consider Title 22 Landscape irrigation for later phases of development.

3) The desire of the RMCSD to provide a fair amount of redundancy and safeguards in providing the required facilities expansion without adding undue costs to the developers.

With the foregoing considerations and constraints, the RMCSD has developed a program for facility expansion that is set forth in section 5.2, below.

5.2 The Facilities Expansion Program

The RMCSD program for implementation of the required facilities expansion is as follows:

1) Assist developers in their discussions and negotiations regarding acquisition and development of the spray field area needed to serve Phase 1 of the future development. Approximately 135 net acres are required, including approximately

50 acres that could be required to offset the anticipated reduced irrigation demand of the two golf courses. These facilities will be adequate to meet the disposal facility requirements for approximately five (5) years; no additional storage facilities will be required until Phase 2 (see Figures 3-3 and 5-2). To assure that adequate disposal capacity for the Phase 1 development, connection of units within the Phase 1 developments will not be permitted until the needed facilities are in service.

2) Proceed to prosecute an application for an NPDES Permit that will allow for seasonal discharge to the Cosumnes River.

3) Depending on the outcome of No.2 above, discharge seasonally and/ or continue to utilize spray fields up to the storage limits of the existing reservoirs; or add the additional storage and disposal facilities required for phases 2 and 3. If additional storage and disposal facilities are required, (because seasonal discharge is not feasible or practical) the RMCSD will consider utilizing Title 22 landscape irrigation for Phases 2 and 3.

Figures 5-1 and 5-2 indicate the currently estimated milestone dates for the proposed engineering and in service dates of the required additional storage and disposal facilities should seasonal discharge prove not to be feasible or practical. The estimated mile stone dates assume the number of units constructed in each year is equal to the number of units in each phase divided by the estimated duration of each phase as discussed in section 3.1. The actual schedule over the build-out period will reflect market conditions at the time and will almost certainly vary from that presented.

5.3 RMCSD Financing Plan

RMCSD policy regarding the financing of facilities needed to serve new development is to require that the developer provide the funding for the needed facilities as a contribution in aid of construction, or in certain instances, build the facilities and convey them to the RMCSD (e.g. water and sewer mains within a subdivision). This policy will continue to apply to the wastewater storage and disposal facilities expansion requirements identified in this Report.

FIGURE 5-1
Wastewater Facilities Expansion and Financing Plan
ESTIMATED MILE STONES FOR STORAGE
BASED ON DEVELOPMENT PHASING (Number of Connections)

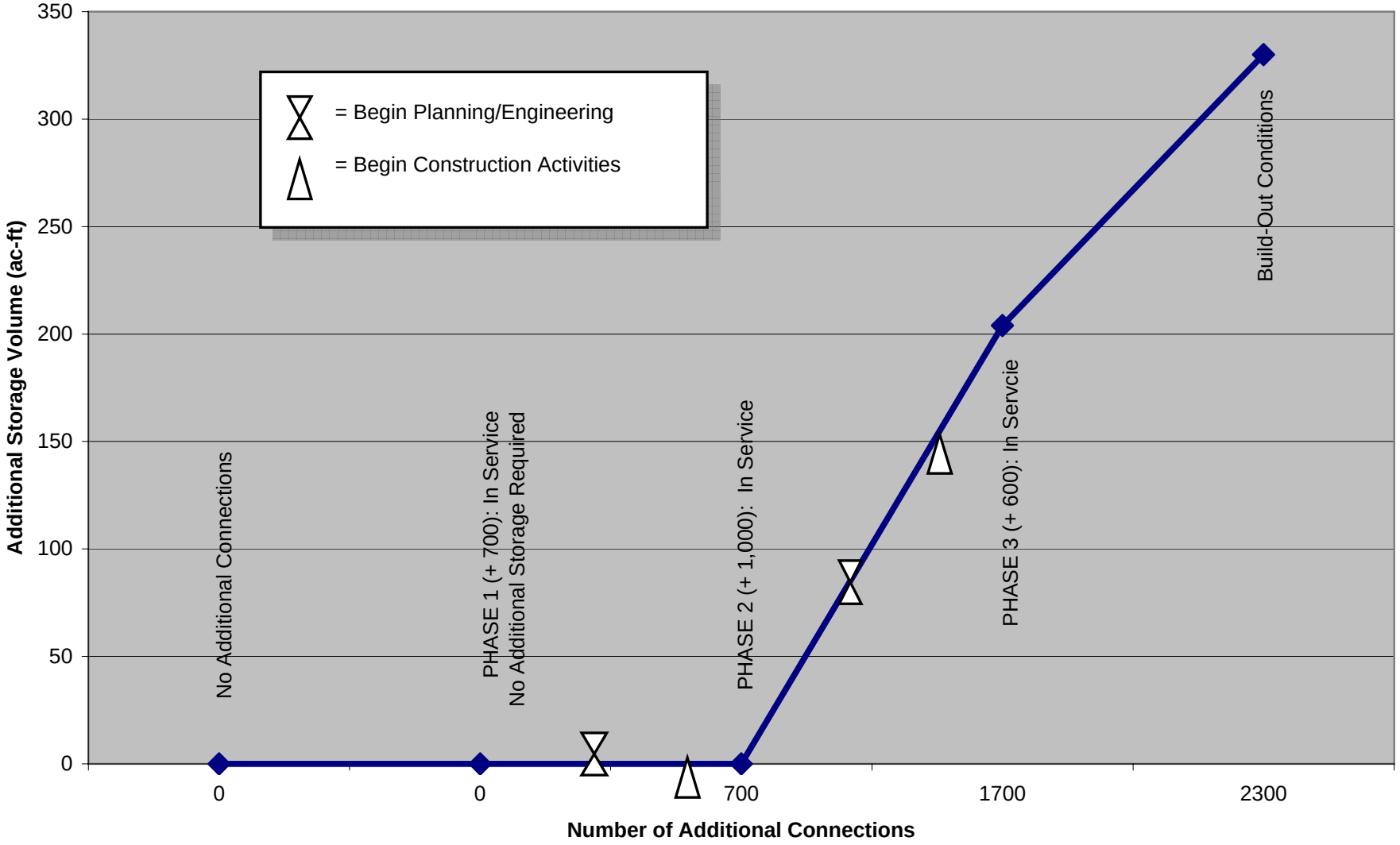
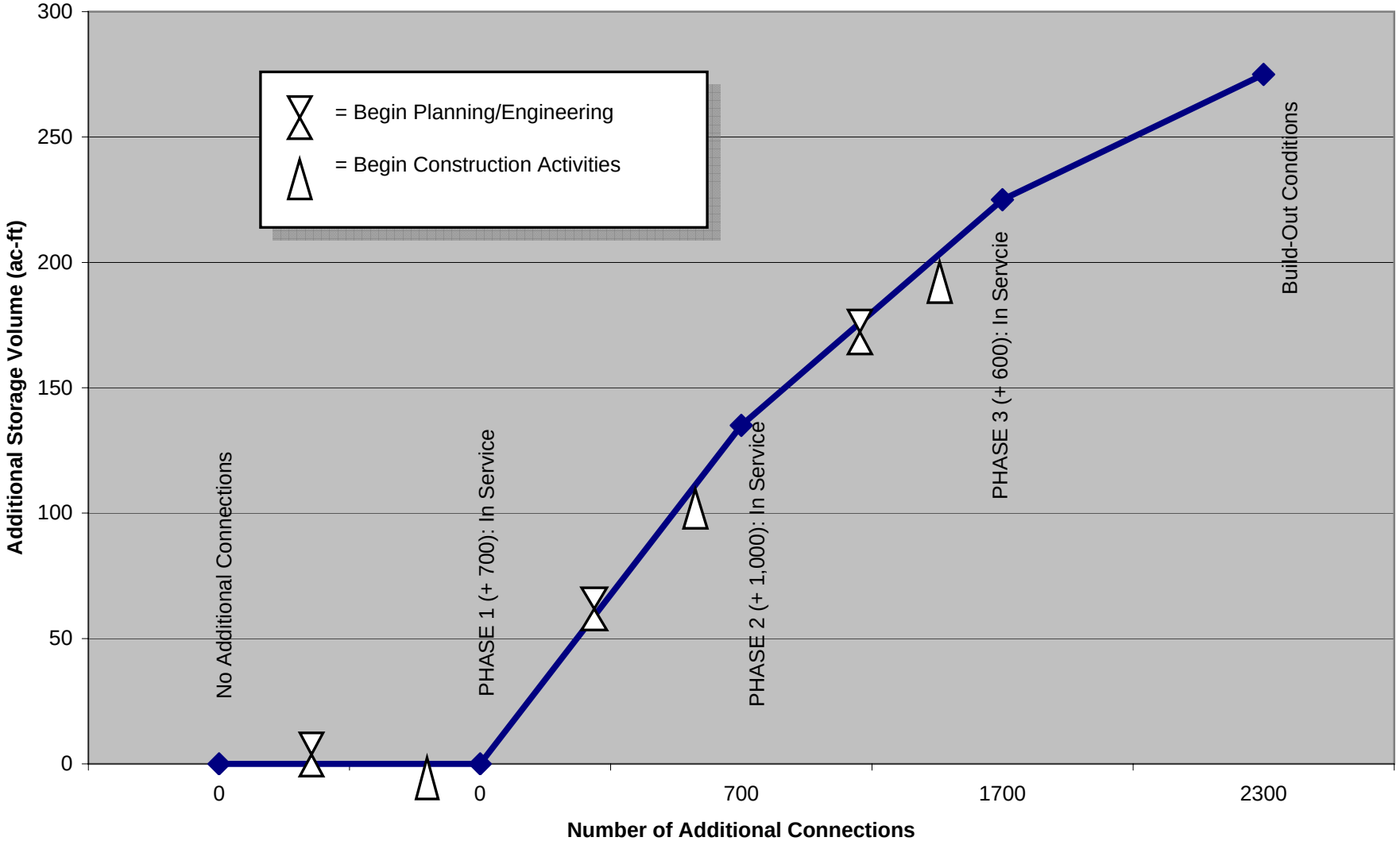


FIGURE 5-2
Wastewater Facilities Expansion and Financing Plan
ESTIMATED MILE STONES FOR DISPOSAL FACILITIES
BASED ON DEVELOPMENT PHASING (Number of Connections)



This policy has certain benefits for the RMCSD and its existing ratepayers, while also providing assurances that the facilities needed to serve new development will be in service when needed. The benefits of this policy include:

- The risk of new development rests almost entirely with the developer as the RMCSD will have no capital investment in the facilities that are brought on line to serve the new development. Thus, with the vagaries of market conditions, if delays in build-out of the new developments, or changes in expected development densities should occur, the RMCSD financial exposure is minimal and generally limited to replacement reserves collected on the new facilities.

- Existing rate payers are not impacted by the capital costs of the new facilities and thus their rates are not negatively impacted (increased) by service to new development. In fact, because of the growth in customer base and resulting economies of scale, incremental overall system operating costs are generally reduced and the existing ratepayer may be benefited.

- The RMCSD's borrowing capacity for needed future system improvements is not impacted.

5.4 Assurance That the Expanded Facilities Will Be Provided Timely

The assurance that new development will not connect to an RMCSD system that does not have adequate seasonal storage and disposal capacity in service is provided by the following procedures and safeguards.

- The storage and disposal capacities for each phase of new development have been identified and quantified as a function of the number of connections. Figures 5-1and 5-2 show the currently anticipated milestone dates for the facility expansions and will be revised to reflect changes in conditions and development schedules. Each development's facility requirements are thus readily determined.

- As part of the County planning approval process, each new subdivision is required to obtain from the RMCSD a “will serve letter” respecting the provision of water and wastewater services as a condition of approval of the subdivision. The RMCSD does not issue “will serve letters” unless and until the developer has provided the funding for the facilities required to provide service to the development.