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Sepulveda Basin Treatment Wetlands Park

Revised Draft Concept Design Report
Executive Summary

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City of Los Angeles
Department of Public Works
Bureau of Engineering
Environmental Engineering Division
Bureau of Sanitation
Wastewater Engineering Services Division

May 2003

SEPULVEDA BASIN TREATMENT WETLANDS PARK

REVISED DRAFT CONCEPT DESIGN REPORT
EXECUTIVE SUMMARY

May 2003

Submitted to

City of Los Angeles
Department of Public Works
Bureau of Engineering
Environmental Engineering Division
Bureau of Sanitation
Wastewater Engineering Services Division

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ABBREVIATIONS

Basin	Sepulveda Basin
BUREAUS	City of Los Angeles Bureau of Engineering and Bureau of Sanitation
CEQA	California Environmental Quality Act
CDR	Concept Design Report
City	City of Los Angeles
Corps	U.S. Army Corps of Engineers
FAA	Federal Aviation Administration
GLACVCD	Greater Los Angeles County Vector Control District
LAUSD	Los Angeles Unified School District
LA River	Los Angeles River
mgd	million gallons per day
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
Regional Board	Los Angeles Regional Water Quality Control Board
SCM	Sewer Construction and Maintenance
SF	surface flow
SSF	subsurface flow
Tillman	Tillman Water Reclamation Plant
TMDL	total maximum daily load
TN	total nitrogen
ULARA	Upper Los Angeles River Area
urban runoff	urban stormwater runoff
VF	vertical flow
The Wetlands Park	Sepulveda Basin Treatment Wetlands Park
Wildlife Committee	Wildlife Area Steering Committee

Executive Summary

History and Background

On February 4, 2002, the City of Los Angeles (City) Bureau of Engineering and Bureau of Sanitation (Bureaus) released the draft Concept Design Report (CDR) for a proposed constructed wetlands project in the Sepulveda Basin (Basin).

Prior to the release of the draft CDR, the Bureaus and wetlands project team met with many groups, individuals, and potential stakeholders to review and discuss the proposed project (note Appendix D of the full CDR for information regarding the public outreach). A copy of the draft report was provided to each group with whom the project team met, project stakeholders and others who requested a copy of the report. Additionally, a full copy of the draft report was posted on the City's website.

Following the release of the draft report, the Bureaus convened four community meetings to review and discuss the proposed project and address questions and concerns posed by the community, project stakeholders and others. The meetings were held on March 26, April 2, April 10, and June 26, 2002.

The community has expressed four main areas of concern about the proposed project:

1) Potential problems associated with mosquitoes, midge flies, and other insects.

2) The possible accumulation of solids and silt at/near the proposed wetlands project site when flooding occurs.

3) The possibility of odors associated with the project.

4) The potential for increased aircraft safety hazards.

During the past 10 months the project team and other experts have reviewed and evaluated these issues as well as others. A summary of all issues and questions raised at the community meetings, and those received in writing is included in Appendix I of the full CDR. The final CDR has been revised to reflect and include additional research about these issues.

The proposed Sepulveda Basin Treatment Wetlands Park[1] (the Wetlands Park), as described in the CDR released on February 4, 2002, has been revised and a new project site identified in response to questions and issues raised during the public review of the Draft CDR and based on further technical evaluation.

Project Description

This section describes the initial concept for the Wetlands Park followed by the revised concept.

The proposed project – the Wetlands Park – is a constructed treatment wetlands in the Basin. The Basin is located in the San Fernando Valley, and is owned by the U. S. Army Corps of Engineers (Corps). Supplied with reclaimed water from the Donald C. Tillman

[1] Project name is subject to change based on review and input from the community, other project stakeholders, and the City.

Water Reclamation Plant (Tillman) and local urban stormwater runoff(urban runoff)[2], the Wetlands Park will demonstrate the effectiveness of a constructed treatment wetlands system in reducing certain water pollutants, while at the same time providing educational and recreational opportunities, as well as habitat restoration for plants, birds and other wildlife. The Wetlands Park will use reclaimed water from Tillman, which is the same source of water that currently supplies the Wildlife Lake (Figure 1), Japanese Garden (Figure 2), and Lake Balboa (Figure 3).

FIGURE 1: WILDLIFE LAKE

Initial Project Concept

The February 2002 draft CDR identified a 50 to 75-acre area south of Burbank Boulevard and west of Woodley Avenue as the potential project site. An aerial photograph illustrating the Basin and the project site location is provided on Graphic Plate ES-1A. (All ES Graphic Plates are located at the end of this Executive Summary).

FIGURE 2: JAPANESE GARDEN

Revised Project Concept

In response to issues raised during the public review of the draft CDR and based on further technical evaluation, the Initial Project Concept has been revised.

Under the Revised Project Concept, the Wetlands Park would be comprised of an approximately 30 to 40-acre treatment wetlands located to the south of Tillman and along either side of Woodley Avenue to Burbank Boulevard. Graphic Plates ES-1A and ES-1B depict the revised project site. Graphic Plate ES-2A illustrates the general concept of the Wetlands Park, which is explained and described in further detail in subsequent sections of this report.

The revised project site locates the wetlands further away from the nearest residential neighborhoods and addresses flooding/siltation concerns while maintaining the initial project goals and benefits. The revised project concept report also includes an integrated vector control plan to address concerns related to mosquitoes,[3] as raised by the community.

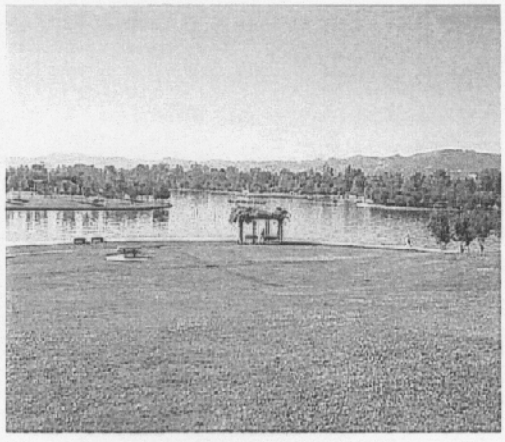

FIGURE 3: LAKE BALBOA

[2] Urban runoff (also known as stormwater) is Southern California's number one source of water pollution. Urban runoff includes water from rain, irrigation, garden hoses or other activities that pick up pollutants (including cigarette butts, trash, automotive fluids, pesticides and pet waste) from streets, parking lots, driveways and yards and then carries this waste through the stormdrain system and into the ocean.

[3] The Conceptual Integrated Vector Control Plan has been prepared in coordination with several mosquito experts and the Greater Los Angeles County Vector Control District (see Appendix H of the full CDR).

In addition, the proposed revised site is located closer to Tillman, which would result in reduced pumping costs. Furthermore, the smaller site size would reduce project costs. The revised site location is consistent with the City's commitment to keep the project size below 75 acres.

Included as part of the revised project concept is the proposed development of a active recreational field, and a dry habitat and native plant nature area on the initial 50 to 75-acre project concept site (see Graphic Plate ES-2B).

In compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), the City will be required to include and evaluate project alternatives, including a "no project" alternative and alternative sites, if the proposed project moves into the environmental planning phase.

Purpose/Goal

The Bureaus' initiated a feasibility and planning study (December 2000) that focused on developing a constructed treatment wetlands to further reduce ammonia and other nitrogen compounds, such as nitrites and nitrates, from Tillman, and to treat urban runoff. The Wetlands Park concept has been developed with an overall goal to demonstrate the effectiveness of a wetlands treatment system that provides the multiple benefits listed in Table ES-1.

TABLE ES-1
Project Benefits

Provide restoration/creation of native wetland habitats.
Provide beneficial reuse of reclaimed water for environmental enhancement.
Improve water quality in the Los Angeles River in an energy efficient manner.
Advancing wetlands technology.
Create active and passive recreational use opportunities.
Create an interactive educational science and nature program.
Provide treatment of stormwater runoff.

Background/Need for Study

Water quality in the Upper Los Angeles River Area (ULARA) watershed is governed by numerous Federal, State, and local regulations. Federal and State requirements, or standards, impose water quality limits on bodies of water (e.g., rivers, streams and lakes). The limits or standards are determined by assessing the total maximum daily load (TMDL)[4] of specific compounds that a water body can receive without becoming impaired. The Los Angeles Regional Water Quality Control Board (Regional Board) will require the reduction of nitrogen and other compounds in the Tillman plant effluent (treated water from the plant) and its subsequent discharge to the Los Angeles River (LA River). The Regional Board will also require the reduction of certain other compounds, including bacteria and trash in urban runoff. The State has not yet released the new regulations nor defined how it will enforce the new regulations in the upcoming treatment plant permits.

[4] TMDL is the maximum amount of a particular pollutant that a body of water (e.g., stream, lake, river) can assimilate or handle without violating state water quality standards.

In view of existing and increasingly stringent proposed water quality requirements, there is a need for the Bureaus to evaluate and implement effective methods that would meet these requirements. The City recognizes that water quality treatment can be consistent with environmental leadership, involve the community and other stakeholders, and result in sustainable improvements in the quality of life in Los Angeles. The Wetlands Park concept represents a water treatment method that has demonstrated environmental benefits and proven treatment efficiency. Examples of successful operating constructed wetlands include Victoria Wetlands (Texas), Wakodahatchee Wetlands (Florida), Prado Dam Wetlands (California), and San Joaquin Marsh (California).

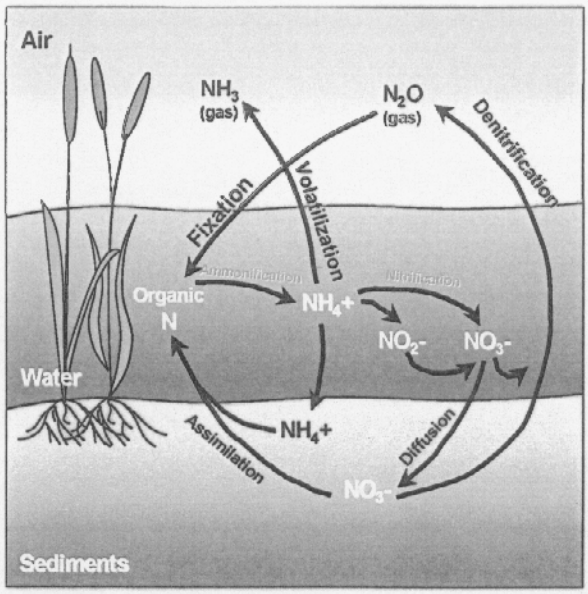

FIGURE 4: NITROGEN CYCLE

The discharge of nitrogen compounds such as ammonia, nitrite, and nitrate into local receiving waters, such as the LA River, can adversely impact those waters. The nitrogen cycle (illustrated in Figure 4) in water bodies is complex, and involves the conversion of many nitrogen compounds into other compounds. High concentrations of ammonia and nitrite may be toxic to freshwater fishes and aquatic invertebrates (e.g., larvae and insects) while high nitrate concentrations can cause excessive algae growth. However, properly operated treatment wetlands will successfully reduce many pollutant compound concentrations through various natural processes. The nitrogen cycle is a multi-step process that includes converting ammonia to nitrite and nitrate (nitrification), and then converting nitrite and nitrate to nitrogen gases (denitrification), which are released to the atmosphere. Nitrite and nitrate are also used as nutrients by the wetland plants. The result of these biochemical processes is the overall reduction in the concentration of the three nitrogen compounds in the Tillman effluent.

The Bureaus' initial feasibility and planning study evaluated the ability and effectiveness of constructing treatment wetlands in the Basin to treat a portion of the reclaimed water from Tillman and to treat urban runoff. The Bureaus are working in partnership with the City's Department of Recreation and Parks, the Corps, and other stakeholders to develop this project.

Benefits Discussion

Restoration of Native Wetland Habitats

The loss of natural wetlands, forests, parks, and other wildlife habitats is an unfortunate result of urban growth and construction. In fact, less than 10 percent of California's historical wetlands still exist. To compensate for these losses, many Federal, State, and local agencies have been partnering with local communities to restore existing, or construct new, wildlife habitats such as the Wetlands Park.

The wildlife habitat and native ecosystems of the LA River have been substantially degraded through river channelization (lining with concrete) completed over five decades ago and

urbanization of the region. These activities eliminated the riparian (stream-side vegetation) and wetland vegetation communities that were typically observed along rivers and streams. As a result, the available habitat for birds, wildlife, and riparian/wetland plant species has been eliminated, or at best, highly modified and fragmented.

Over the past 20 years, extensive efforts have been put forth by community and environmental groups to revitalize, enhance, and protect the LA River. Through the Wetlands Park, the City will work in collaboration with these groups to augment their efforts.

To restore wetlands within the greater Los Angeles Basin, four broad categories of plant communities (note Section 3.1 of the CDR) are proposed that recreate some of the upland and wetland habitats consistent with historical native habitat conditions. Deep and shallow emergent marshes, open water ponds, and diverse riparian woodlands will be created and populated with plant species selected based on their ability to be established and maintained within the designated habitat, to readily absorb nutrients for treatment purposes, and to create beneficial wildlife habitat.

Beneficial Reuse of Reclaimed Water for Environmental Enhancement

Currently, Lake Balboa, the Japanese Garden, and the Wildlife Lake beneficially use reclaimed water from Tillman. Additionally, beneficial use of reclaimed water could increase in the future. A summary of average flows from Tillman and possible future recycled water demands are shown in Graphic Plates ES-3 and ES-4. The potential future demand for recycled water includes an additional 9 million gallons per day (mgd) for water reuse projects such as irrigation and industrial cooling water applications and 1 mgd for golf courses and landscaping in the Basin.

The Wetlands Park would divert and further polish[5] a portion of the remaining flow from Tillman that is discharged to the LA River. Initially, 2 to 5 mgd will flow through the Wetlands Park. As the quality of reclaimed water from Tillman improves (through in-plant modifications to remove nitrogen), and the wetlands treatment system is optimized, increases in overall wetland flow can occur (up to 5 to 15 mgd) without expanding the Wetlands Park. The use of reclaimed water for the Wetlands Park would result in environmental enhancements through the creation of wetlands habitat.

Improved Water Quality in the Los Angeles River

Tillman provides advanced tertiary treatment with disinfection that results in high quality reclaimed water effluent that meets the State's water reuse criteria. As described previously, the nitrogen discharge standards for the LA River are expected to become more stringent. To meet the anticipated new National Pollutant Discharge Elimination System (NPDES) permit requirements as well as the new TMDL requirements for the LA River (see Table ES-2), the Bureaus have successfully completed in-plant pilot-scale operations at Tillman to reduce nutrients, and a full-scale in-plant nitrogen removal project is underway. In addition, resolution of ongoing NPDES permit litigation and interim discharge limits may require the implementation of further treatment processes (such as microfiltration and reverse osmosis), which would further reduce pollutant discharges to the LA River, and could affect the scope of the Wetlands Park.

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[5] Tillman treats the water to the advanced level of reclaimed water. Polishing refers to additional treatment and reduction of compounds including nitrogen.

TABLE ES-2
Anticipated Nitrogen Requirements for the LA River

Tillman Existing and Proposed Nitrogen Effluent Limits for Nitrogen Compounds	Discharge Limit, mg/L, Daily Maximum				
	Existing NPDES Permit (1) Order 91-102	Stayed TSO DCT (2) Order 98-046 Order 98-070	Water Quality Control Plan for the LA Region 1994 (Basin Plan) (3)	Projected California Toxics Rule (CTR) (4)	Potential (5)
Ammonia	NL	4	2	2	2
Nitrite	NL	1-2	1	1	1
Nitrate	NS	NS	NS	NL	NS
(Nitrate + Nitrite)	8	NL	8	8	8
Total Nitrogen	NL	8	NL	NL	NL

NL = no limit. NS = Not Stated. All constituents are reported as Nitrogen.

(1) Receiving water limitation for the LA River at Tillman contained in Order No. 91-102 NPDES No. CA0056227 Revised September 5, 1991. The Tillman plant is currently operating under this permit.

(2) Waste Discharge Requirements for the City of LA (Tillman) Order No. 98-046 NPDES No. CA0056227 Revised June 15, 1998. On September 17, 1998 revisions to an order for issuance of a time schedule were presented. The primary deviation between these two documents is the elevation of the nitrite level to provide the City with treatment flexibility while conducting pilot studies and implementation of projects to reduce nitrogen compounds in the effluent. Subsequently, Order 98-046 has been suspended (stayed). Nitrite limit if 2 mg/L is an interim limit.

(3) Water Quality Control Plan Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties June 13, 1994.

(4) In April, 2000 the EPA promulgated the California Toxics Rule which set numeric water quality criteria, based on reasonable potential analysis, for Priority Toxic Pollutants for California Inland Surface Waters, Enclosed Bays and Estuaries. This is expected to be integrated in the next round of NPDES Permits.

(5) In a January 11, 2002 letter, the Regional Board directed the City to the standards presented in the 1994 Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties. In addition, potential limits were discussed at a November 5, 2001 workshop between the Regional Board and the City. These proposed limits are consistent with the Basin Plan.

The wetlands project would divert and further treat a portion of the plant effluent at its current nitrogen levels prior to completion of the pilot/full-scale nitrogen removal program. Upon completion, the Wetlands Park will also divert and treat higher quality effluent in the future.

The projected flows from Tillman in 2005 and 2020 (with and without wetlands) are illustrated in Graphic Plates ES-3 and ES-4. ES-5 illustrates an example of projected wetlands performance for ammonia (NH_4), and ES-6 illustrates examples of projected wetlands polishing effect in 2005 and 2020. Graphic Plate ES-5 and ES-6 provide examples of anticipated flows and nitrogen (as NH_4) loading. As shown, the wetlands discharge would have lower nitrogen concentrations that would be blended back in with the Tillman effluent, further reducing the nitrogen content of the discharge to provide an added margin of performance.

In addition to receiving Tillman effluent, the LA River also receives urban runoff that flows from the portion of the River upstream from Tillman; the Encino Creek; Haskell Channel and Caltrans right-of-way. The Wetlands Park will help improve the quality of water in the LA River by treating and reducing pollutants in a portion of the runoff (from one or more of the runoff sources above) before it is released into the LA River.

Water quality improvements would be incremental, and a function of the flow and quality of water to be treated. As water quality improvements are made via the in-plant nitrogen-removal system, wetland flow can be increased without expanding the Wetlands Park (Graphic Plate ES-7 shows that as Tillman meets anticipated future nitrogen limits, increased amounts of flow

can be treated by the wetlands). The total amount of wetlands flow to be treated is expected to increase from 2 mgd to 10 to 15 mgd as the constructed ecosystem matures, wetland treatment process refinements are made, and reclamation plant process improvements are implemented. For these future conditions, estimates of wetland performance indicate that total nitrogen (TN) in the Tillman effluent would be reduced by about 25 percent under typical winter temperatures.[6] Existing and likely future NPDES compliance monitoring locations[7] are shown in Graphic Plate ES-8.

Stormwater within the LA River[8], and urban runoff in general, can contain high levels of contaminants such as bacteria and metals. Per existing data on wetlands removal (Kadlec and Knight, 1996), about 50 to 90 percent of the metal contaminants in stormwater flows will be reduced, and a 100-fold reduction in bacteria concentrations in the low-flow water can be expected. For the Wetlands Park project an initial 2 to 5 mgd stormwater diversions of urban runoff can be accommodated. The quantity and quality of urban runoff will be confirmed during final design of wetland facilities.

Greater Permit Compliance Certainty for Water Quality Discharges

As mentioned above, the Bureaus have conducted the nitrogen-removal pilot test (nitrification/denitrification processes) on one-half of Tillman's treatment system. Through the pilot project, the Bureaus have determined the most appropriate plant process modifications for the nitrification/denitrification (additional treatment facilities). The Bureaus are still in the process of determining the extent of potential de-rating (reduced flow capacity) on the existing plant's 80 mgd capacity. Preliminary results indicate that the extent of the de-rating could range from 0 to 15 percent.

Because wetlands are naturally effective at denitrification, the Wetlands Park could complement the in-plant nitrogen removal process currently being pilot tested.

Advancing Wetlands Technology

The Wetlands Park will demonstrate space-efficient treatment wetland enhancements that are expected to be of interest to the City and other regional and national water quality management agencies. For the portion of the wetlands that would treat stormwater, runoff would first pass through an aquatic pond designed for sedimentation and trash removal, as well as flow equalization. Vertical flow (VF) treatment wetlands would be created for passive nitrification of Tillman effluent, followed by parallel subsurface flow (SSF) and surface flow (SF) wetlands for denitrification (potentially enhanced by carbon supplements) and the recycling of treated effluent through the wetland inlet for additional denitrification. Flow from the denitrification wetlands would cascade through riparian habitats graded to allow overland flow through a forest of cottonwoods and willows, alternated with open pools to establish diverse wildlife habitats. The flow from these riparian habitats could then be combined and discharged back to the main effluent outfall from Tillman, which releases to the LA River downstream from the Sepulveda Dam. Graphic Plate ES-2A shows a conceptual layout of the wetlands habitats within the Park for the revised project site. Figure 5 shows an example of a local constructed treatment wetland in Southern California (Prado Wetlands, California).

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[6] Based on wetlands model results for the various wetland types, the details of which are presented in the Concept Design Report.

[7] Future NPDES Locations are projected based on wetlands effluent being discharged to existing Tillman effluent pipeline.

[8] Based on monitoring data from stream gage located at the Los Angeles River/Wardlow Street, as presented in the Los Angeles County 1994-2000 Integrated Receiving Water Impacts Report (LACDPW, July 31, 2000) Table 4-5a and Table 4-3.

All of the wetland types proposed would be configured to resemble natural marsh habitats for wetland animals, while accomplishing the prescribed treatment. The SF wetlands would consist of dense productive marshes alternating with open pools, and the riparian habitat would be similar structurally and functionally to natural riverside woodlands. Comparative monitoring of these systems would allow water quality performance to be assessed and improved. Carbon enhancement with such materials as yard grindings and mulch can be used to improve performance. Wetland construction and operation guidelines could then be developed for implementation at other sites, as needed. In addition, expert panels and/or review bodies including scientists, members of Basin user groups, neighborhood councils, homeowner associations, teachers, environmental and other organizations will provide input to the design, construction, and future management of the wetlands.

FIGURE 5: PRADO CONSTRUCTED WETLANDS

Creation of Active and Passive Recreation Use Opportunities

Recreational opportunities at the Wetlands Park would include paths for walking or jogging, regional bike trails between other park sites, and educational facilities at appropriate locations along boardwalks using signage or staffed facilities. Figure 6 shows an existing example of how a boardwalk can be incorporated into a treatment wetland.

A conceptual layout that incorporates recreational opportunities for the revised project site is provided as Graphic Plate ES-2A. Where possible, boardwalks and/or trails should reflect the City's commitment to the environment and conservation of natural resources by utilizing recycled materials. A discussion has been initiated by the Bureaus, and the City's Department of Recreation and Parks to include active recreational uses, such as soccer or cricket fields, in conjunction with the Wetlands Park. Future planning, design, construction, and use for active and passive recreation will be determined with the Bureaus, the Recreation and Parks Department, and the community.

FIGURE 6: BOARDWALK THROUGH WETLANDS

Included in the revised project concept, is the proposed development of a 3 to 4-acre dry habitat and native plant nature area on the initial 50 to 75-acre project concept site (see Graphic Plate 4). Also under consideration is the use of a 2-acre area adjacent to Hjelte Field as an active recreation field. Users of the active recreational field can be directed to the Wetlands Park to

take advantage of the Park's passive recreational use opportunities. The active and passive recreational uses are consistent and compatible with the existing and planned uses within the Basin.

By viewing the LA River as a continuum of habitat with aesthetic restoration opportunities, educational and recreational amenities can be incorporated along the LA River at appropriate and accessible locations.

Creation of Interactive Educational Science and Nature Program

Once the wetlands are established, experience at other wetlands projects indicates there is likely to be a significant increase in the level of public interest and involvement in the Wetlands Park. This program will complement current successful educational programs in the Basin. Regional elementary through secondary school programs can incorporate field trips and focused wetland studies into their science curricula. Students can benefit by having direct access to wetland and riparian habitats that is typically not available in urban areas. Water quality improvement, wildlife use, and the ecology of wetland plants can be studied and experienced in this type of well-maintained wetland environment. Docent programs can be developed to provide and promote public awareness about the importance of wetland restoration and the benefits of natural treatment systems. Examples of the kinds of educational use and public outreach opportunities in multi-purpose wetlands are found at the Dupont Victoria Wetland in Texas[9] and the Wakodahatchee Wetland[10] in Florida.

The Wetlands Park concept includes an Interactive Educational Science and Nature Program (Educational Program) potentially staffed by Los Angeles Unified School District (LAUSD) science teachers or teacher candidates (district interns), docents, retired teachers, or other educational leadership. The Educational Program can serve as a science educational center for City of Los Angeles students.

During the early development of the Basin for recreational uses, the Corps produced a master plan for the basin (1981). As a result, much of the Basin land was leased to the City Department of Recreation and Parks. The Sepulveda Basin Wildlife Area Steering Committee (Wildlife Committee), was formed to act in an advisory capacity to the City Department of Recreation and Parks. The Wildlife Committee oversees the wildlife refuge areas within the Basin (the area generally east of Woodley Avenue and south of Tillman), and supports the policies and programs that ensure their long-term preservation and protection.

The Wildlife Committee is comprised of representatives from national, state, and local environmental organizations. Wildlife Committee members include representatives from the following organizations:

- Audubon Society/Los Angeles Chapter
- Audubon Society/San Fernando Valley Chapter
- California Native Plant Society
- Canada Goose Project
- Friends of the Los Angeles River
- Resource Conservation District of the Santa Monica Mountains

[9] Victoria Wetlands: http://www.dupont.com/corpB420010615/environment/wetland/vctwtlnd.htm

[10] Wakodahatchee Wetlands: http://www8.myflorida.com/environment/learn/waterprograms/wastewater/dom/wetwako.html

- Sierra Club/San Fernando Valley Chapter
- Southwestern Herpetologists Society
- The River Project

The City's Audubon Society, California Native Plant Society, the Canada Goose Project, the Japanese Gardens, the Sierra Club, and other organizations currently conduct tours for thousands of students each year to teach them about birds and their habitats, and about wildlife within the Basin. The popularity of the existing programs is demonstrated by an increase in tours and student participation, as well as the positive feedback received. The City will work closely with the existing programs to develop a complementary program.

The new educational facilities would include a classroom setting that will allow the Educational Program to integrate classroom education with a real life science and nature component. There is a key need to involve LA's Best, the City's after school program and the LAUSD in the design and development of the Educational Program at this concept stage. The Educational Program will provide the opportunity for classes to be taught at the facility for extended periods (school tracks) in order to build and teach in-depth science and nature classes about wetlands, biology, chemistry, wildlife, and their habitats, water quality, water recycling and reuse, watershed management, and other science/nature/wildlife matters. Figure 7 shows a student taking a sample of water.

FIGURE 7: STUDENT TAKING A WATER SAMPLE

Table ES-3 illustrates how educational topics can be integrated with the wetlands.

TABLE ES-3
Potential Wetlands Educational Topics

EDUCATIONAL SUBJECT	WETLANDS ACTIVITY
Water Quality	Water Sampling at Wetlands
Water Recycling	Wetlands Use of Effluent
Wildlife	Wildlife Footprints and Tracks in Sand
Biology	Plant Identification, Coliform Reduction
Stormwater Treatment	Wetlands Observation
Wastewater Treatment	Nutrient Uptake
Hydrological Cycle	In-Field Explanation of Transpiration/Evaporation/Precipitation
Ecology	Observation of System Relationships

In addition, the Educational Program will further provide an opportunity for LAUSD and other school districts to supplement their science and nature programs with both classroom and "in-

field" learning at the Wetlands Park. This program will provide valuable educational opportunities for urban students who may not otherwise have such opportunities. Similarly, school districts that may want to enhance their science/nature programs will be able to create such in-class programs based on the Educational Program at the wetlands, and expand classroom learning with an approved curricula, including detailed lessons and field trips to the wetlands.

From a teaching standpoint, the Educational Program at the wetlands may also serve as a formal and comprehensive platform to provide professional development for science teachers through district in-service and other professional development workshops. Since the Wetlands Park would involve many science and natural disciplines, the Educational Program provides the opportunity to supplement existing professional development programs at school districts in the areas of biology, chemistry, the environment, engineering, ecology, and other science-related areas of study.

Close coordination among the school districts, the Bureaus, City's Department of Recreation and Parks, the Mayor's office, Council offices, other City departments and staff, the Corps, the Audubon Society, Wildlife Area Steering Committee, Canada Goose Project, California Native Plant Society, Sierra Club, other environmental/educational programs, and other organizations, combined with an extensive public education and outreach effort will help make the Educational Program successful.

Key Project Issues To Be Addressed

The Wetlands Park will require effective management of mosquitoes, the solids accumulation, flood damage effects, to address and ensure long-term performance and public acceptance. In addition, the public has raised concerns regarding aircraft safety and odors. These issues are briefly described below.

Vector Control

The public has expressed concern about the potential of the Wetlands Park to attract mosquitoes and other nuisance organisms (e.g., midges and black flies). To address this issue, the project team has contracted with several mosquito experts to prepare a nuisance vector control strategy and has requested the Greater Los Angeles County Vector Control District (GLACVCD) to review the control strategies. Appendix H of the full CDR includes the draft Nuisance Vector Control Strategy and the names of the experts.

The vector control strategy outlines a multifaceted approach to control mosquitoes and other nuisance vectors. One aspect of the strategy proposes the use of several design features to facilitate vegetation control, proper berm design to help regulate water depth, and parallel wetlands cells to control water flow rates.

Another component of the strategy involves controlling mosquito habitat. To do this, vegetation would be maintained on a regular basis to limit potential mosquito breeding areas. Supplementing this, mosquito larvae would be controlled through biological means (mosquito fish and other larvae predators such as guppies) and through the application of biological larvicides such as *Bacillus thuringenis* and *Bacillus israelenis*. These *Bacillus* agents attack the digestive systems of mosquito larvae, are currently registered for use against mosquitoes in

much of the United States, and are used throughout the area by GLACVCD to control mosquitoes.

In addition, an extensive monitoring program would be implemented to continuously identify areas in the wetlands that could harbor mosquitoes so that corrective measures could be implemented. The above-referenced measures are expected to control the mosquitoes in an adequate manner, and minimize the potential for mosquito-related diseases.

Solids Accumulation During Typical Operations

The public has expressed concerns about the possible accumulation of solids in the proposed wetlands. The accumulation of solids from Tillman effluent and the proposed constructed treatment wetlands is expected to be minimal given the standard, existing high level of pretreatment at Tillman. Solid particles and debris from the stormwater component of the wetland influent would be removed as the water passes through a screening facility and a sedimentation pond.

Flood Damage Effects

The public has expressed concerns about the possible accumulation of silt in the proposed wetlands when flooding of the Basin occurs. Since the Wetlands Park is located within a flood control detention basin, the effect of flood events requires careful consideration. Survival of the wetland and riparian plants is not expected to be a significant problem because the plant species selected are adapted to and can tolerate periodic, short-term inundation (periodic flooding is common in natural wetlands). Public use facilities will be designed with periodic flooding considerations. The potential for damage by floodwater movement through the wetlands will be minimized by design features such as perimeter berms and by operational approaches such as raising water levels within the wetlands when flooding conditions are anticipated.

The initial site proposed for the Wetlands Park (the agricultural field located south of Burbank Boulevard and west of the LA River) had the potential for excessive silt and debris deposition during severe flooding, which would pose additional maintenance requirements and increased annual costs for that site. These silt deposits would need to be physically removed, which could warrant periodic replanting and repair to the wetlands. Silt control measures (i.e., perimeter berming) were identified at the initial project site to provide control of silt deposition, and additional silt control measures would need to be developed during design. The initial project site would have required considerable annual maintenance related to silt deposition on the Wetlands Park. Consequently, this is one of the aspects which contributed to the decision to relocate the project site, as previously described.

As part of the revised project concept, it is proposed that any upgrades to the initial project site include provisions (such as berming) to help with the silt deposition in this area. These provisions would be incorporated into the design of the proposed dry habitat and native plant nature area and coordinated with the Corps during the following stages of the project Coordination with the Corps will also occur to ensure that there will be no net decrease in the Basin's flood control capacity regardless of the project site location.

Odors

The public has expressed concerns about the possibility of odors associated with the proposed wetlands project. Water used by the Wetland Park would be the same high quality water that supplies Lake Balboa, the Japanese Gardens, and the Wildlife Lake. It is important to note that odors typically associated with treatment wetlands are the types normally associated with natural wetlands and lakes. See Section 10.3 of the CDR for more information regarding this concern.

FAA Guidance on Wetlands

The Federal Aviation Administration (FAA) provides guidance for wetlands that are within 10,000-feet of runways. Although not required, the FAA requests that proposers of constructed marshes and wetlands within the recommended 10,000-foot distance of an airport runway provide notice to FAA of such intentions (using FAA Form 7460-1, Notice of Proposed Construction or Alteration) in order to give the FAA an opportunity to evaluate the effects on aviation safety. The former project site for the Wetlands Park was located outside the 10,000–foot buffer for the Van Nuys Airport. The revised project location would be located within the 10,000–foot buffer. The Bureaus will coordinate and work closely with the FAA and Van Nuys Airport during the planning phase of the project. A safety evaluation will be performed.

Multi-Agency Coordination

Multiple agencies will be involved with the development, engineering, construction, and operation of the project. Table ES-4 includes a preliminary listing of those agencies.

The Bureaus' have initiated a working relationship with the Corps. Coordination with the Corps will be required because the proposed wetlands will be located in the Basin upstream of the Sepulveda Dam, and because the Corps owns the property and manages the Basin use. A key consideration in the design of the Wetlands is that it does not impede the primary flood control purpose of the Basin. The Bureaus and project team will work with the Corps throughout the design of the Wetlands and will enter into operating agreements as necessary.

TABLE ES-4
Sepulveda Basin Treatment Wetlands Park – Key Agencies And Government Entities

California Department of Fish and Game
California Department of Transportation
California State Water Quality Control Board
City of Los Angeles, Department of Airports (Van Nuys Airport)
City of Los Angeles, Department of Public Works
City of Los Angeles, Department of Recreation and Parks
City of Los Angeles, Department of Water and Power
County of Los Angeles, Department of Public Works
Federal Aviation Administration
Greater Los Angeles County Vector Control District
Los Angeles Regional Water Quality Control Board
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
Upper Los Angeles River Area Water Master

Coordination with the Corps will also include technical participation and potential Corps funding. The Corps has experts and technical staff associated with wetlands and has programs for habitat and wildlife restoration projects. Frequently, the Corps seeks local partners to participate and lead such projects. One program, the Corps' 1135 Program, provides up to 75 percent Federal matching dollars for habitat restoration. The sequence of work by the Corps is to initiate an in-house Preliminary Restoration Plan, followed by an Environmental Restoration Report, and then followed by any necessary environmental documentation, then design and construction. Close coordination between the City's environmental process and the Corps will occur.

In addition to governmental agencies, the City will consult with other organizations, including the Audubon Society, the California Native Plant Society, the Canada Goose Project, Sierra Club, and other Wildlife Committee members, community and user groups, and organizations in developing the plant selection for the wetlands as well as other aspects of the wetlands.

Community Involvement

Community feedback and involvement are integral components of the Wetlands Park. The project team has met with representatives of the Basin user groups, community groups, homeowner associations, environmental groups, teachers and others (see Appendix D of the full CDR). These individuals and groups will continue to be involved with the Wetlands Park project throughout the design and other phases of the project.

Summary and Recommendations

The Wetlands Park will help the City meet regulatory compliance and provide improved water quality, environmental enhancement, and recreational benefits to Los Angeles residents.

The following recommendations are proposed:

- Explore the revised project concept with project stakeholders, Basin user groups, and the community.
- Utilize appropriate wetlands habitat vegetation and technologies to reduce nitrogen in Tillman effluent and treat urban runoff.
- Incorporate a 2-acre active recreational field east of Hjelte Field and a 50 to 75-acre dry habitat and native plant nature area.
- Incorporate public use/education and passive recreational components.
- Further define the project and initiate the CEQA/NEPA process, which would include (but not be limited to) an evaluation of potential vector-related health risks, an aircraft safety evaluation, evaluation of potential odors, and an analysis of project alternatives, including a "no-project" alternative and alternative sites.
- Continue meeting and working with the community and other stakeholders throughout the process.

Costs

The preliminary cost estimate to construct the Wetlands Park on a 30 to 40-acre parcel is approximately $12 million, as shown in Table ES-5.

Funding

The estimated construction cost of the project is approximately $12 million. Funding for the project has been included in the City's Wastewater Capital Improvement Expenditure Plan, which is funded out of the Sewer Construction and Maintenance (SCM) fund. Other potential funding sources are being pursued, including Propositions 13, 40, 50 (State), and 1135 Program (Federal) funds.

Schedule

There are two schedules for the design, environmental clearance, and construction of the Wetlands Park, a conventional schedule and a design-build schedule (see Appendix A of the full CDR). With the conventional schedule, the Wetlands Park could be operational in approximately 40 months. With the design-build schedule, the Wetlands Park could be operational in approximately 29 months.

TABLE ES-5
Concept Level Total Construction Cost Estimate[11]

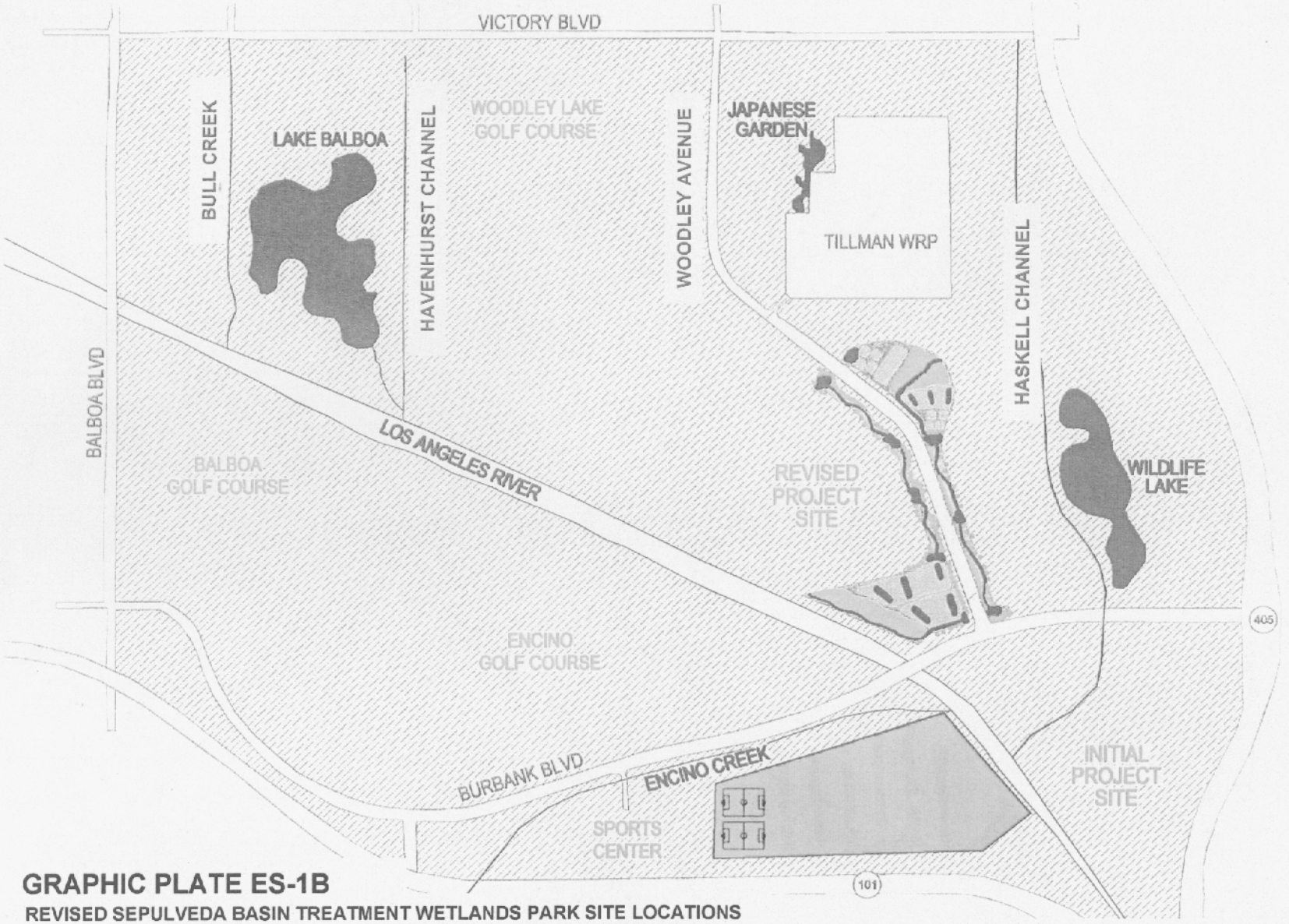
FEATURE	COST (millions)
1. Wetlands Construction	$ 10.1
2. Additional Options and Costs	
2.1 Additional Passive Recreation (i.e., Boardwalks, etc.)	$ 0.6
2.2 Additional Active Recreation (i.e., Soccer Field(s), etc.)	$ 0.2
2.3 Educational & Public Use Facilities (i.e., Kiosks, Educational Center, etc.)	$ 1.1
Total Construction Cost:	$ 12.0

[11] The total capital costs, including engineering costs and contingencies, is estimated at $17 million.

GRAPHIC PLATE ES-1A

SEPULVEDA BASIN TREATMENT WETLANDS PARK SITE LOCATIONS

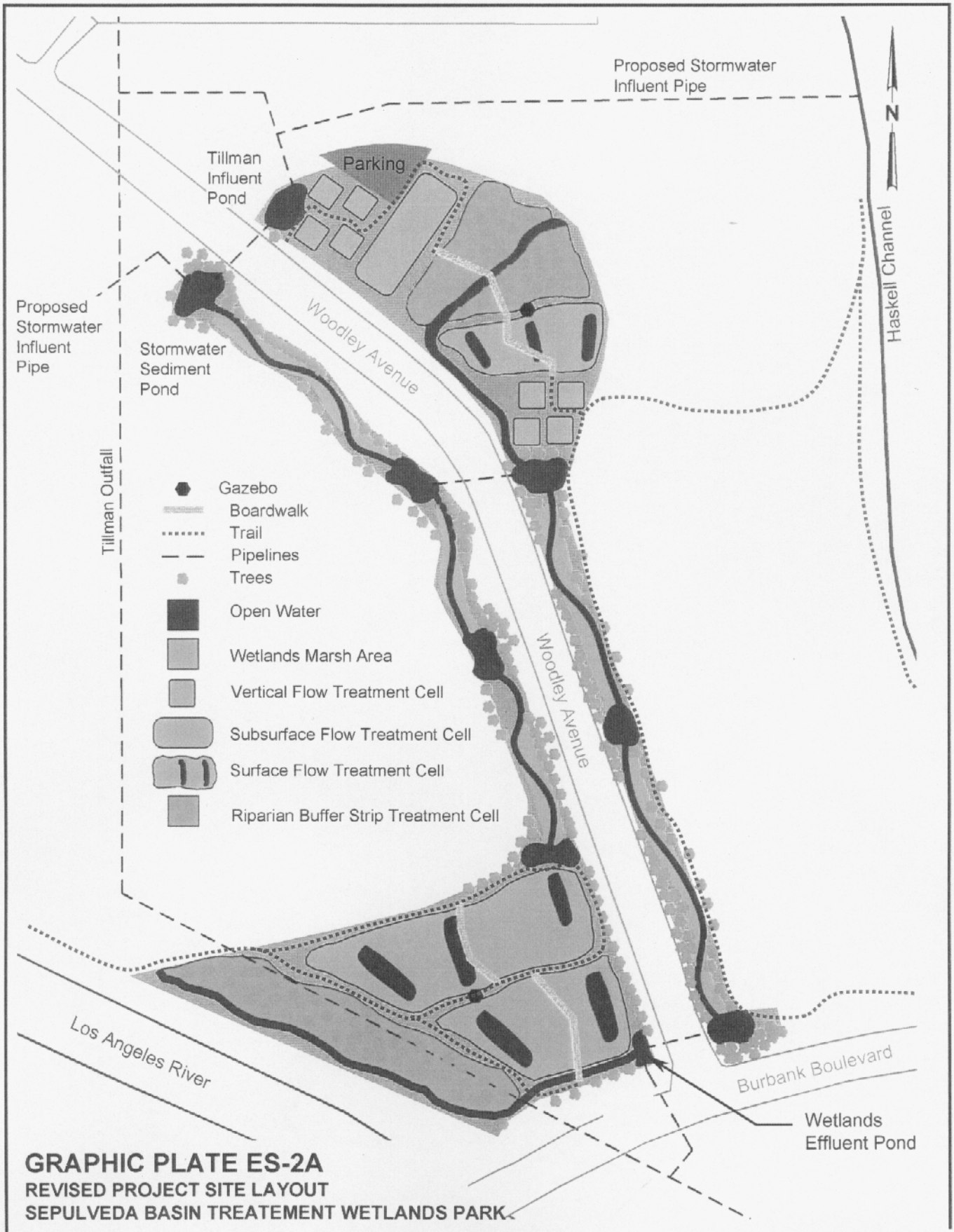
CH2MHILL



GRAPHIC PLATE ES-1B

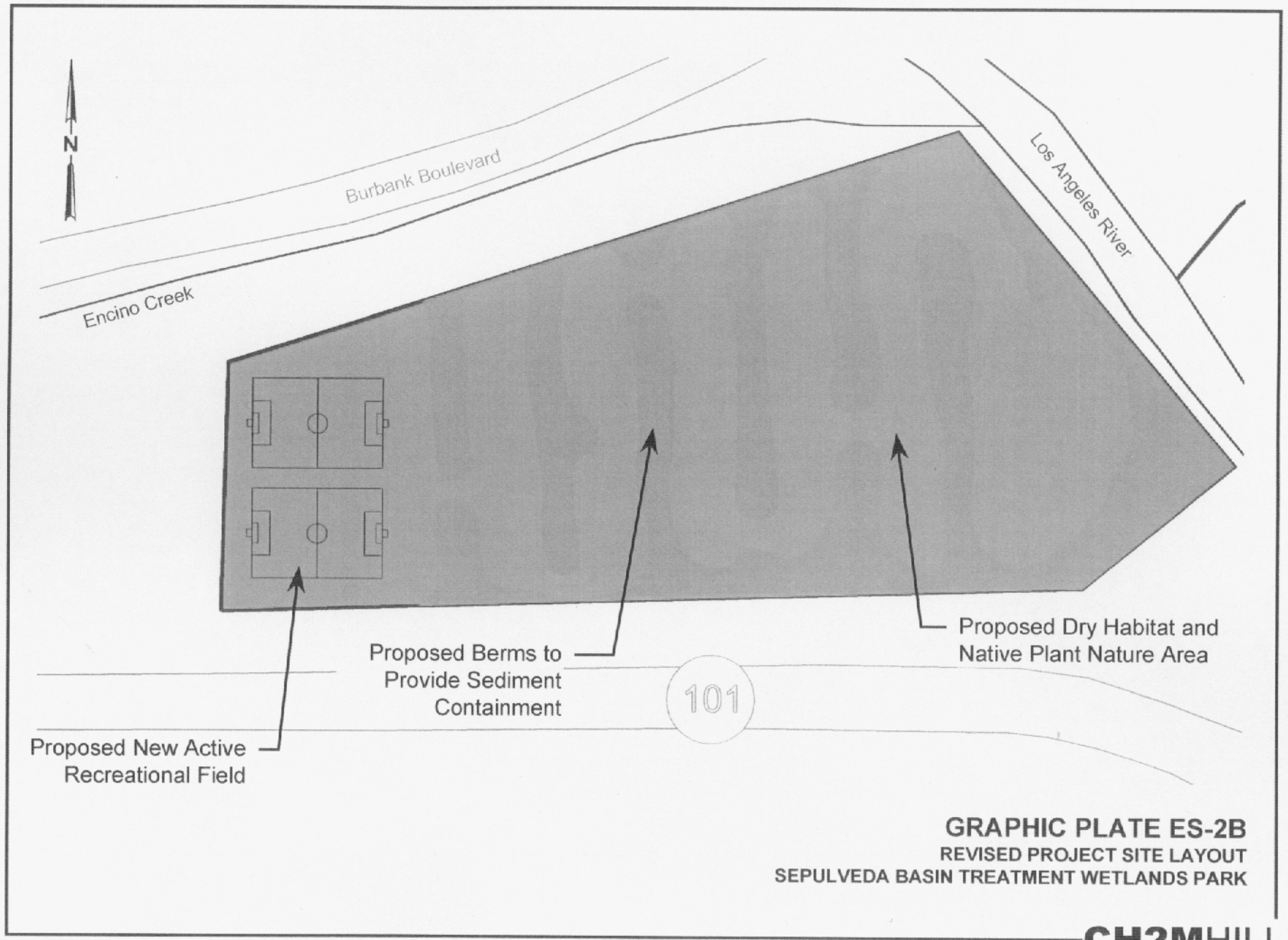
REVISED SEPULVEDA BASIN TREATMENT WETLANDS PARK SITE LOCATIONS

CH2MHILL



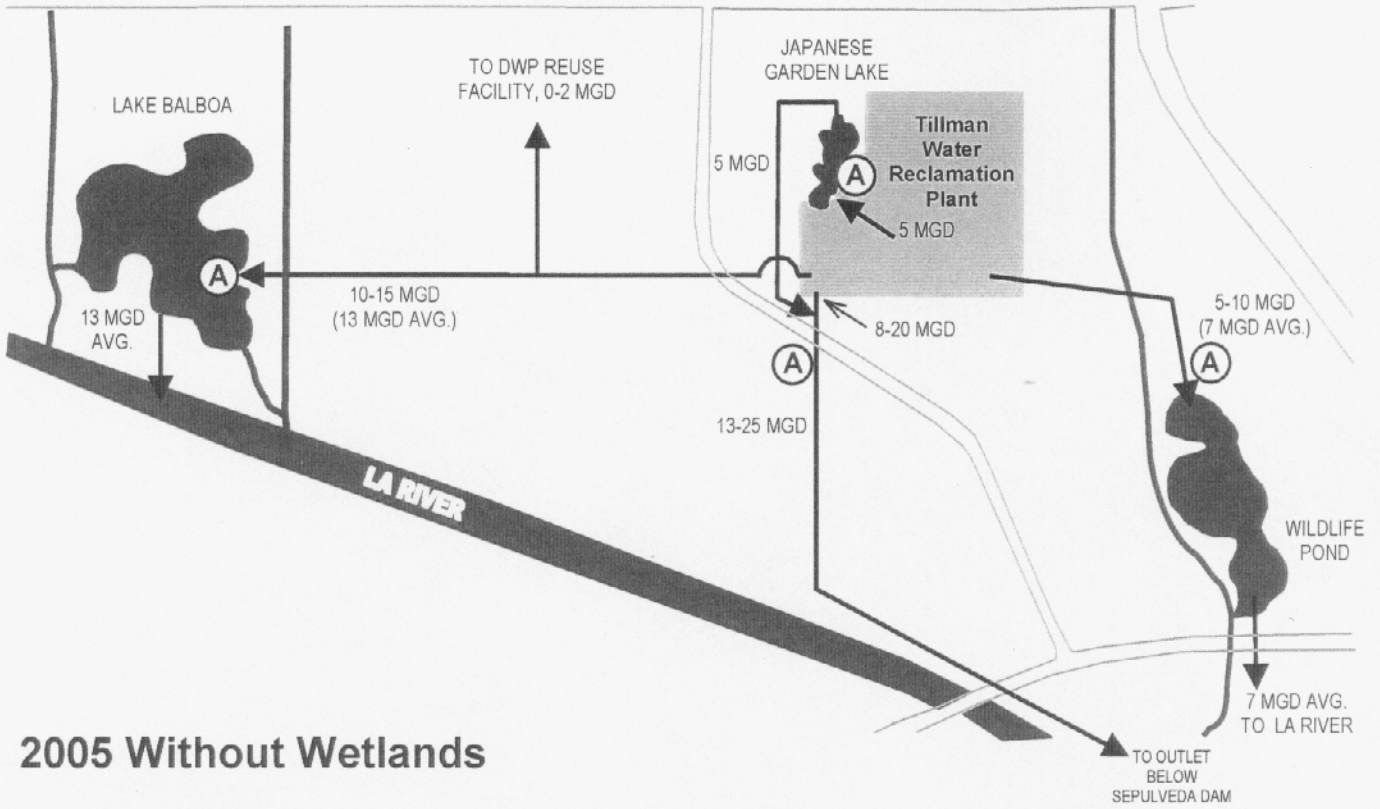
GRAPHIC PLATE ES-2A
REVISED PROJECT SITE LAYOUT
SEPULVEDA BASIN TREATEMENT WETLANDS PARK

CH2MHILL

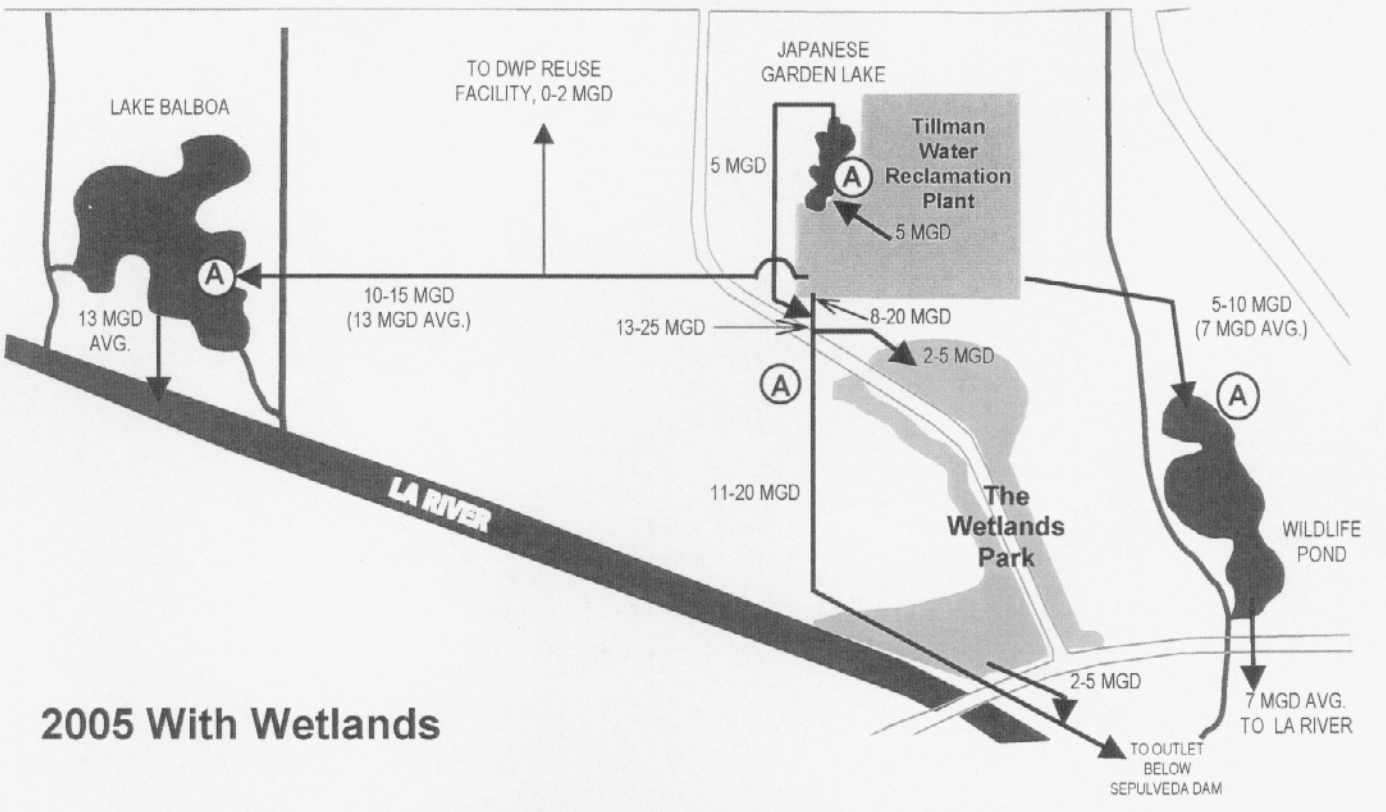


GRAPHIC PLATE ES-2B
REVISED PROJECT SITE LAYOUT
SEPULVEDA BASIN TREATMENT WETLANDS PARK

CH2MHILL



2005 Without Wetlands



2005 With Wetlands

(A) Current Limits
$NO_3 + NO_2 = 8$

(B) Anticipated Limits
$NO_3 + NO_2 = 8$

$NH_4 = 2$

This diagram shows potential effluent usage patterns in the near-term with and without a portion of the effluent being diverted to the Wetlands Park.

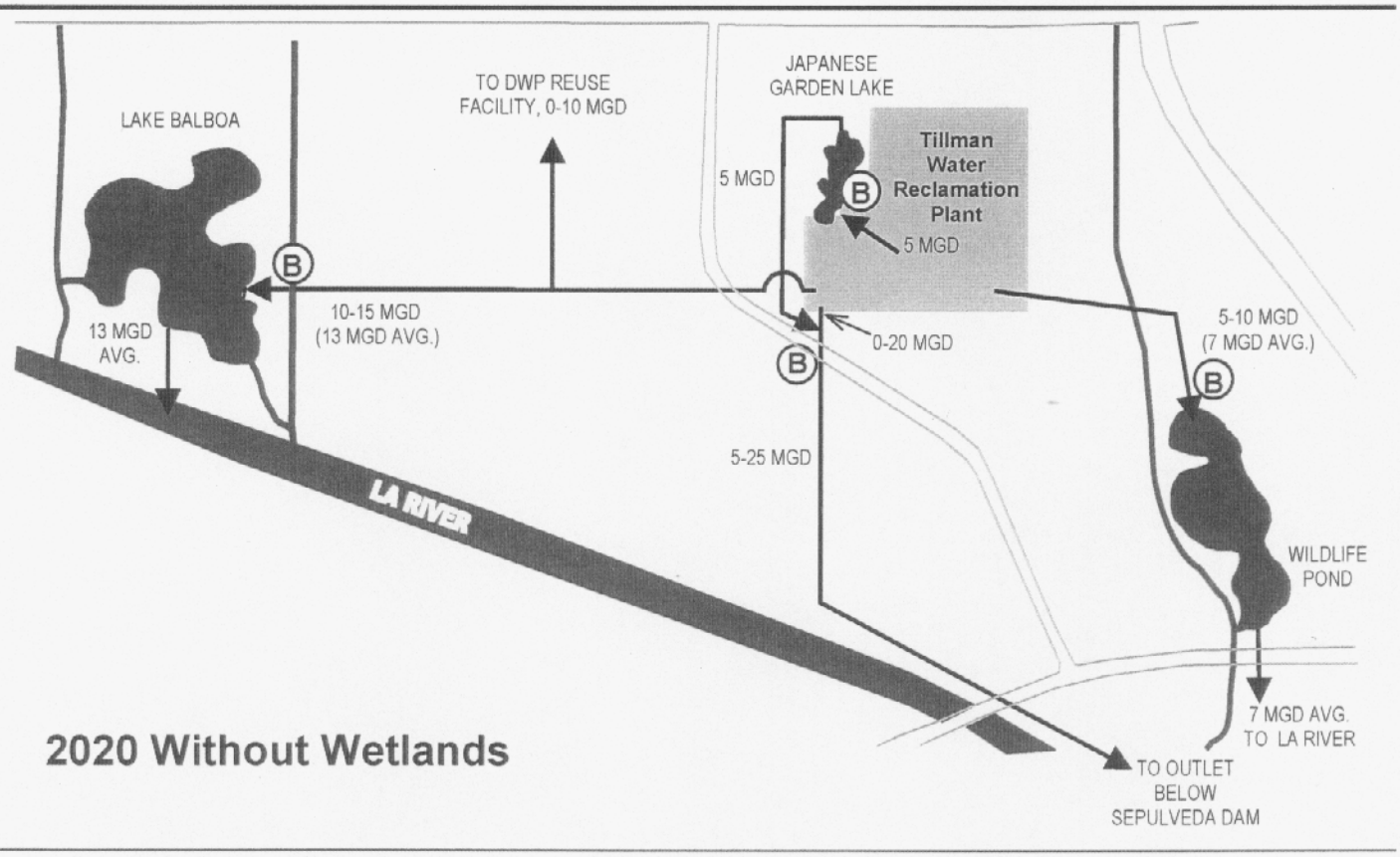
- Flow provided for Wetland planning purposes.
- Schematic does not reflect stormwater flow.
- Assumes 40 MGD TWRP effluent based on current operations.
- Does not include losses due to evapotranspiration.

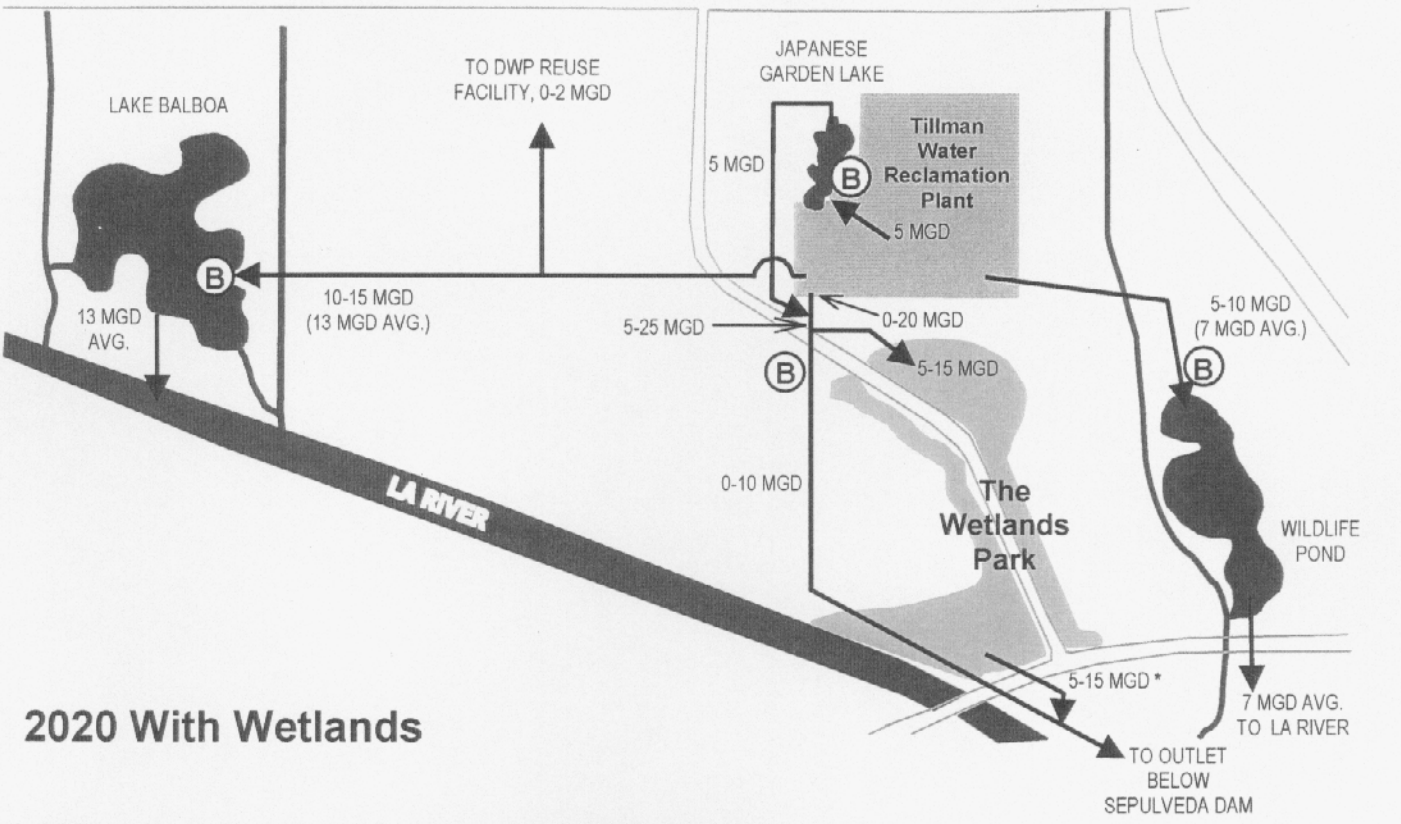
Graphic Plate ES-3

Sepulveda Basin Treatment Wetlands Park

Tillman Water Reclamation Plant Effluent Usage

CH2MHILL





(A) Current Limits
$NO_3 + NO_2 = 8$

(B) Anticipated Limits
$NO_3 + NO_2 = 8$

$NH_4 = 2$

This diagram shows potential effluent usage patterns in the long-term with and without a portion of the effluent being diverted to the Wetlands Park.

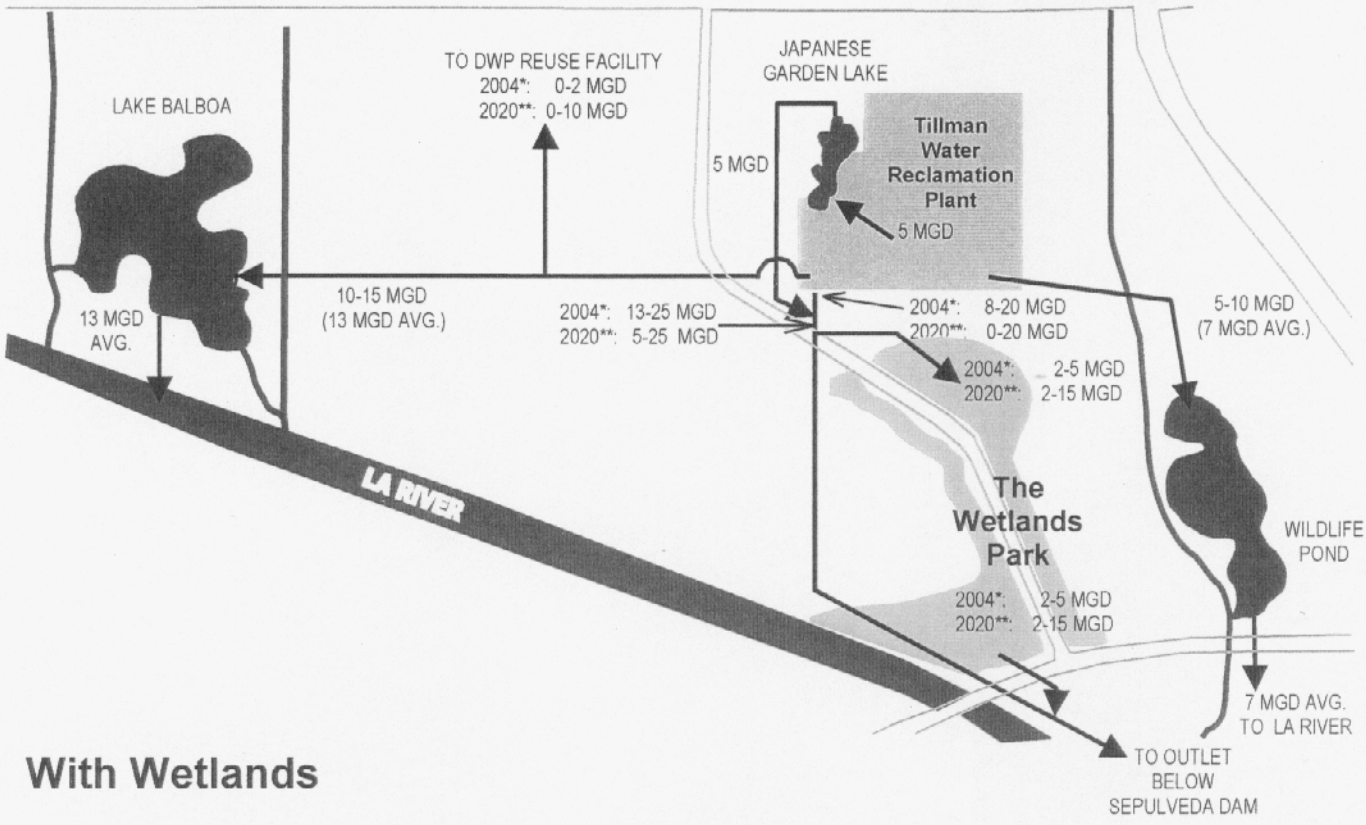
- Flow provided for Wetland planning purposes.
- Schematic does not reflect stormwater flow.
- Assumes 40 MGD TWRP effluent based on current operations, pending completion of the Integrated Resources Plan.
- Does not include losses due to evapotranspiration.

Graphic Plate ES-4

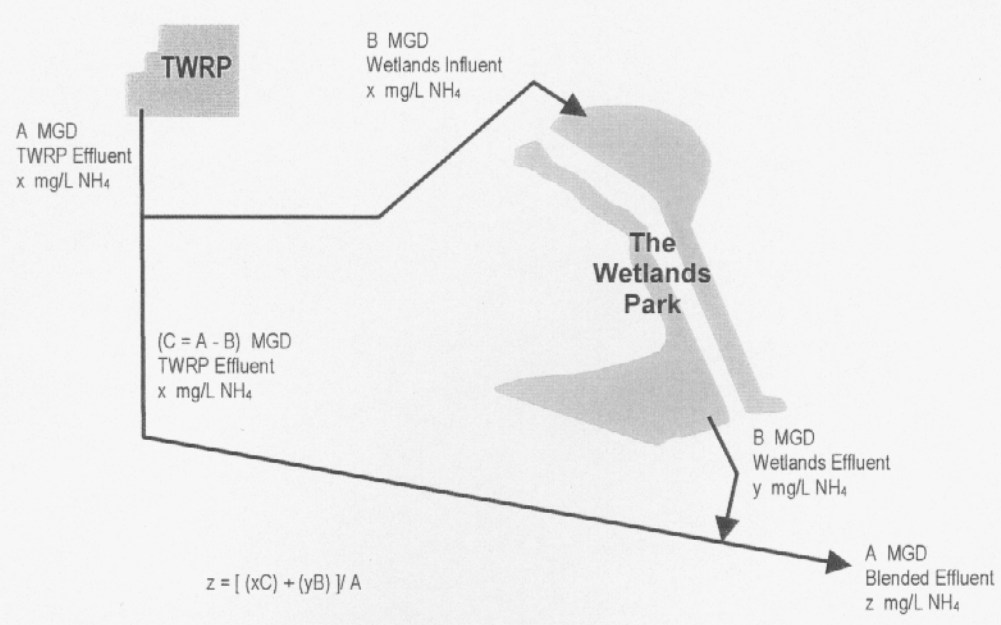
Sepulveda Basin Treatment Wetlands Park

Tillman Water Reclamation Plant Effluent Usage

CH2MHILL



With Wetlands



A

Example Wetland Flow & Concentration Equation for NH_4

* Assumes 40 MGD TWRP Effluent based oncurrent operation.

** Assumes 40 MGD TWRP, pending completion of the Integrated Resources Plan.

This diagram shows a schematic of TWRP effluent and an example of N Parameter for determining the polishing effectiveness of the wetlands.

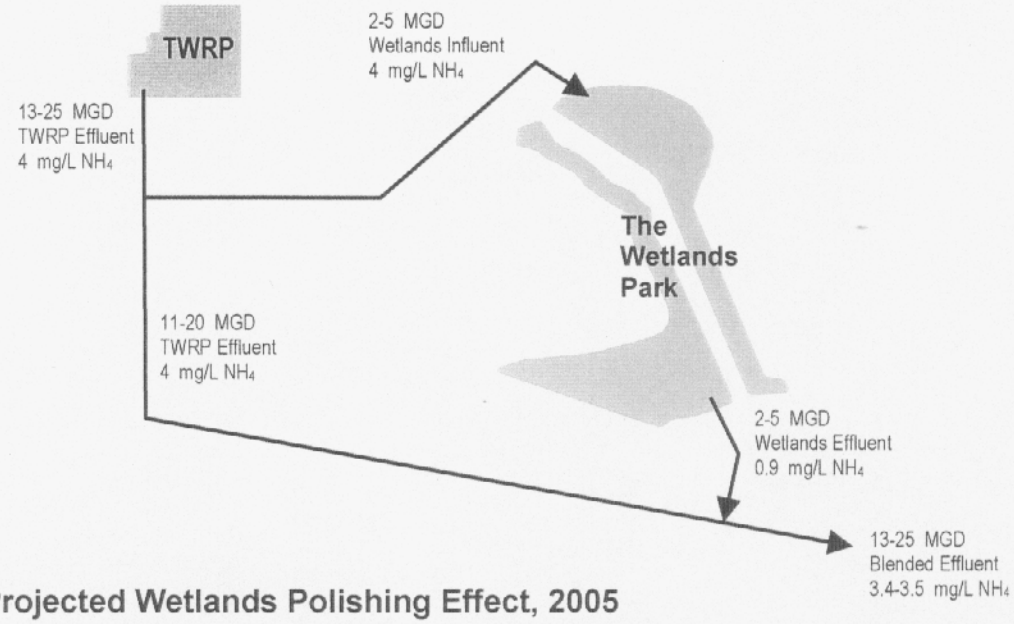
- Flow provided for Wetlands Conceptual Planning purposes.
- Polishing effect does not reflect stormwater flow.
- Does not include losses due to evapotranspiration.

Graphic Plate ES-5

Sepulveda Basin Treatment Wetlands Park

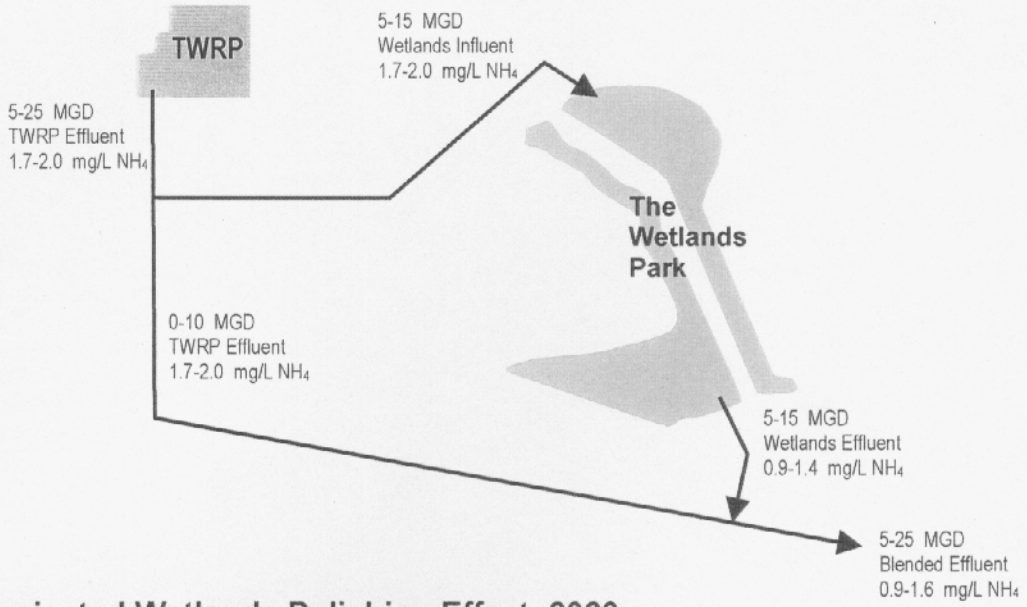
Projected Wetlands Performance

B



Example Projected Wetlands Polishing Effect, 2005

C



Example Projected Wetlands Polishing Effect, 2020

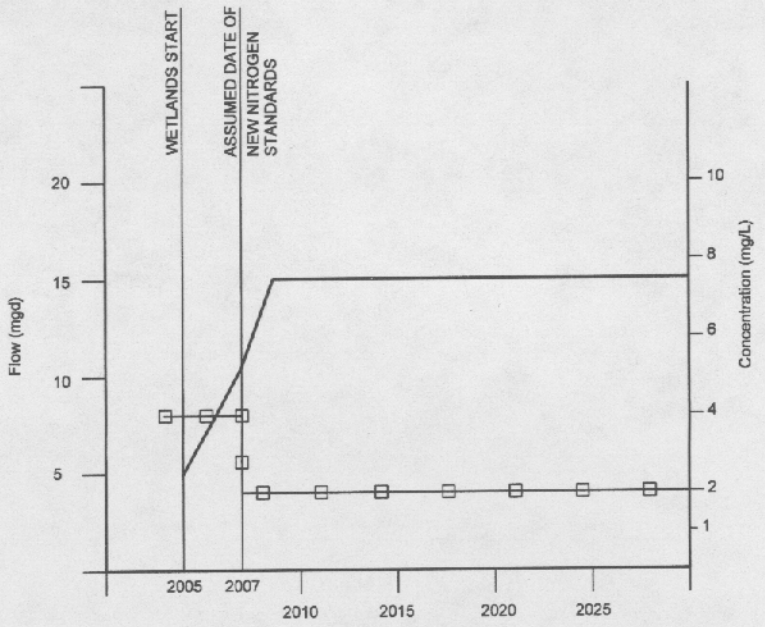
This diagram shows an example of the polishing effect of the Wetlands Park on TWRP effluent in the near-term when only a small portion of effluent is utilized by the Wetlands Park and in the long-term when a greater amount of effluent would be utilized. It assumes increased TWRP effluent quality due to more stringent future nitrogen standards.

- Flow provided for the Wetlands conceptual planning purposes.
- Polishing effect does not reflect stormwater flow.
- Does not include losses due to evapotranspiration.

Graphic Plate ES-6

Sepulveda Basin Treatment Wetlands Park

Projected Wetlands Performance

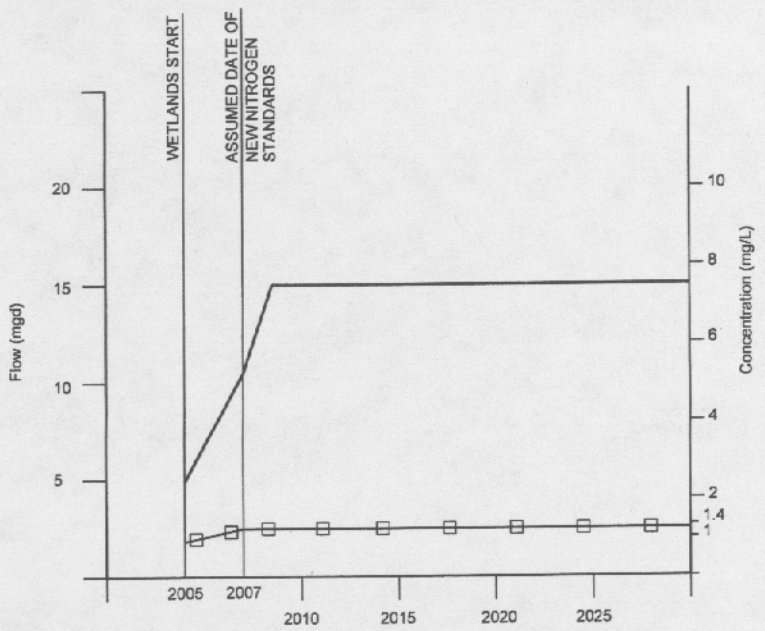


LEGEND:

FLOW (mgd) THROUGH WETLANDS

CONCENTRATION OF NH_4 IN WETLANDS INFLUENT (ASSUMED COMPLIANCE LEVEL OF 2 mg/L NH_4 IS MET AT TWRP IN 2007)

WETLANDS INFLUENT (TWRP)



LEGEND:

FLOW (mgd) THROUGH WETLANDS

CONCENTRATION OF NH_4 IN WETLANDS EFFLUENT (ASSUMED COMPLIANCE LEVEL OF 2 mg/L NH_4 IS MET AT TWRP IN 2007)

NOTE: NITROGEN LEVELS WILL FLUCTUATE.

WETLANDS EFFLUENT

NOTE:

THIS DIAGRAM DEPICTS A CONCEPT OF THE EFFECTIVENESS OF WETLANDS OVER TIME. IT ASSUMES THAT THE NEW NITROGEN STANDARDS WILL BECOME EFFECTIVE IN A REVISED TWRP NPDES PERMIT IN 2007 AND THAT THE CITY WILL MEET THE STANDARDS UTILIZING TECHNOLOGY CURRENTLY BEING TESTED AS PART OF THE NITROGEN REMOVAL PILOT STUDY. WETLANDS TREATMENT EFFICIENCIES INCREASE AS THE WETLANDS DEVELOP AND GROW, AND AS OPERATIONAL EFFICIENCIES ARE OPTIMIZED. IN ADDITION, GREATER AMOUNTS OF TWRP EFFLUENT CAN BE TREATED BY THE WETLANDS AS THE NITROGEN LEVELS IN THE TWRP EFFLUENT DECREASE. THIS FIGURE THEREFORE REFLECTS INCREASES IN WETLANDS FLOW OVER TIME.

THE ASSUMED EFFECTIVE DATE FOR THE NEW NITROGEN STANDARDS HAS BEEN SET AT 2007 FOR WETLANDS CONCEPTUAL PLANNING PURPOSES ONLY. A CONVERSATION WITH CHUCK TURHOLLOW OF THE CITY'S REGULATORY AFFAIRS DIVISION INDICATES THAT THE NEW NITROGEN STANDARDS COULD COME INTO EFFECT ANYTIME AFTER 2005.

Graphic Plate ES-7

Sepulveda Basin Treatment Wetlands Park

Wetlands Conceptual Flow Level/ NH_4 Concentrations

June 2001

Los Angeles, California

CH2MHILL

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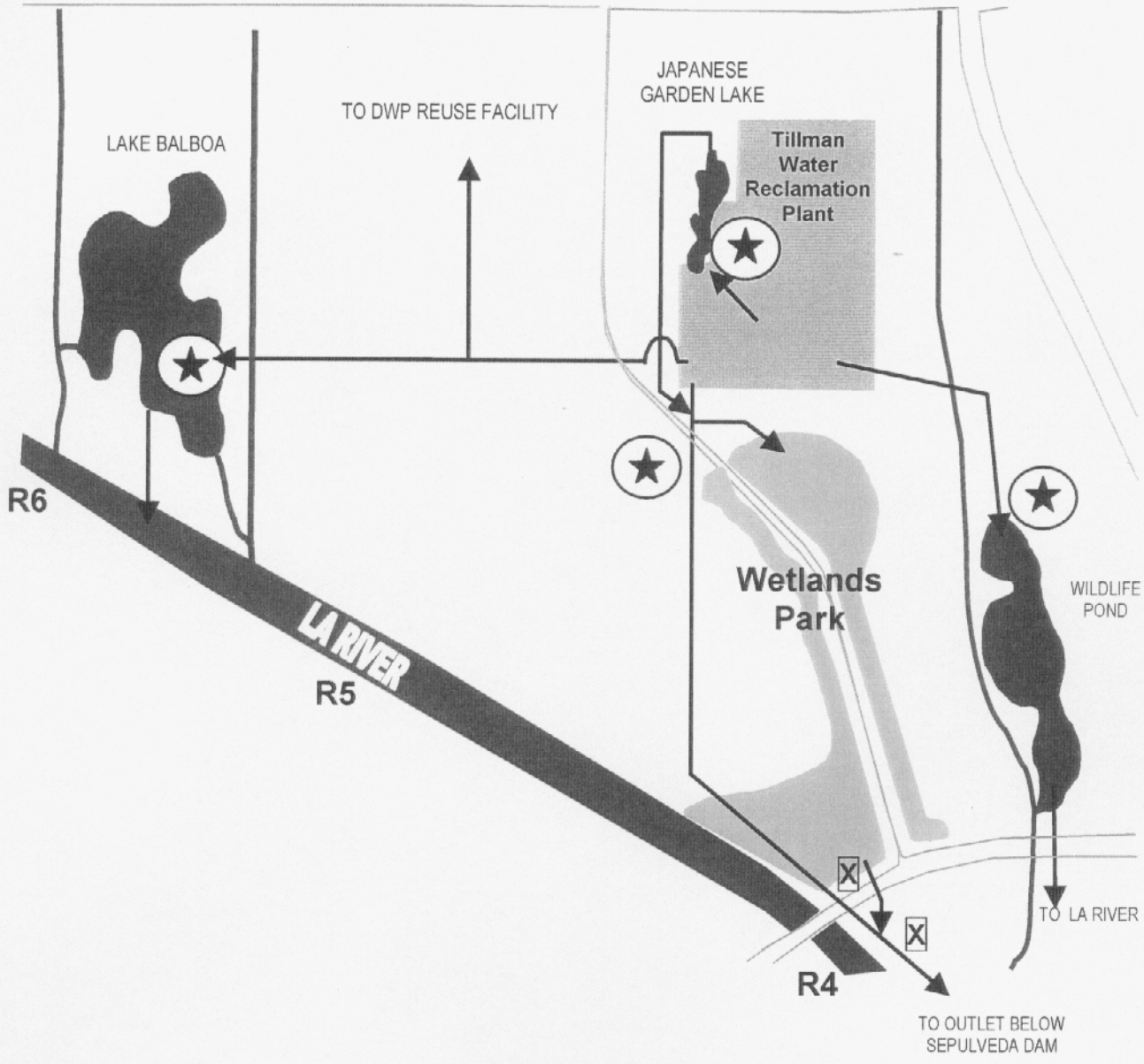

★ = NPDES Monitoring/Compliance Loation

R# = Los Angeles River TMDL Reach

X = Potential Future NPDES Permit Monitoring Location

Graphic Plate ES-8

Sepulveda Basin Treatment
Wetlands Park

Compliance Information:
Tillman Water Reclamation Plant