

BUILDING A WORLD OF DIFFERENCE

SUSTAINABLE BENEFITS FOR THE CITY OF LOS ANGELES: THE REHABILITATION OF ECHO PARK LAKE

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PRESENTATION OUTLINE

- **History and Background**
- **Key evaluation and design efforts**
- **Key sustainability features:**
 - balancing flood control needs with water quality
 - water harvesting
 - stakeholder input on the Project
 - liner system
 - submerged berm for dam safety compliance
 - provisions for drying, draining, and odor control
 - educational signage
- **Conclusions**
- **Questions**

ECHO PARK: A PART OF LOS ANGELES HISTORY

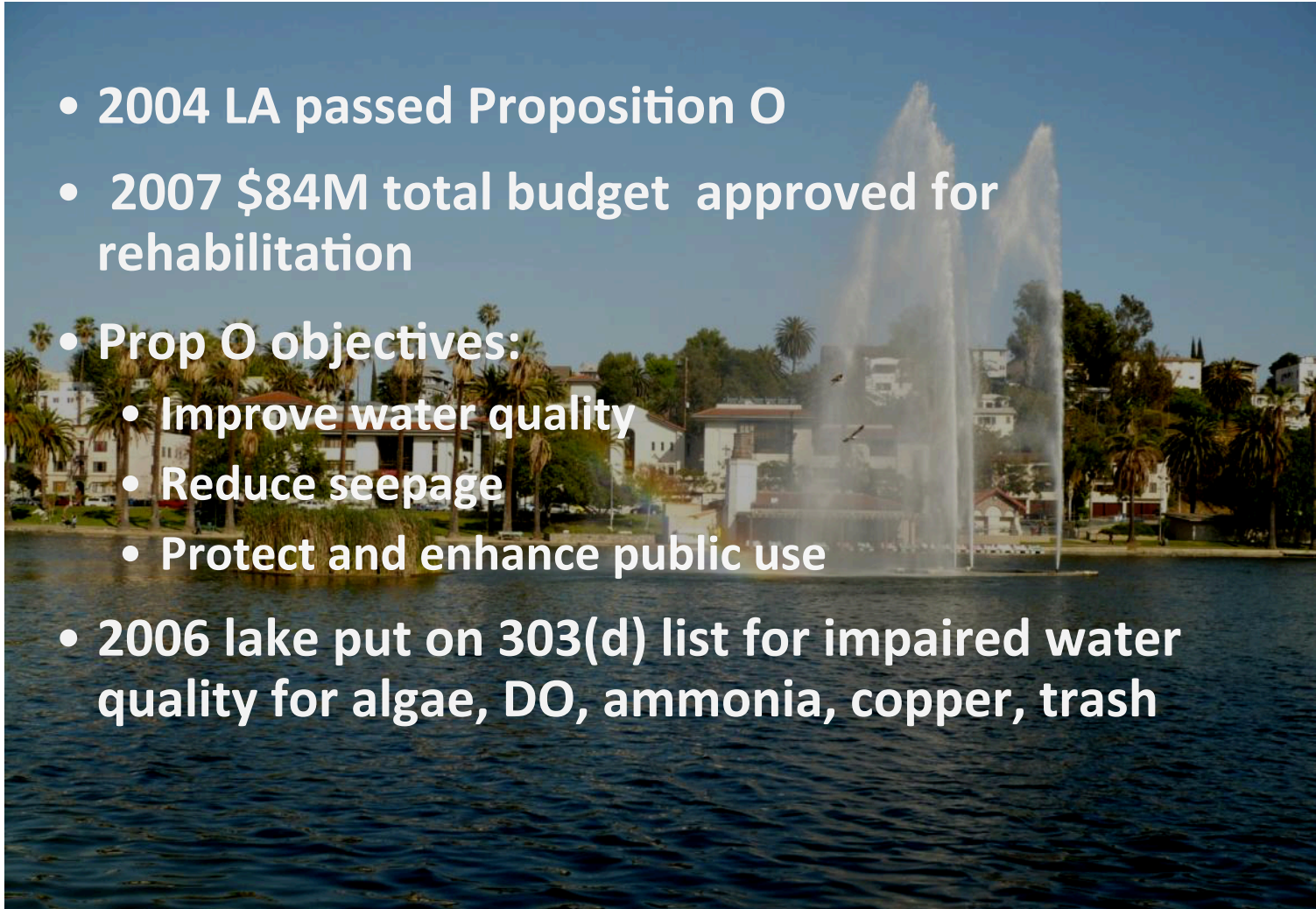


ECHO PARK LAKE - BACKGROUND


- **Echo Park Lake – 14 acre urban lake in Los Angeles northeast of downtown**
- **Surrounded by 16 acres of recreational space**
- **Constructed in 1868 as a water supply reservoir**
- **Area surrounding the lake became a City Park in 1892**
- **Eventually, converted into off-line detention basin**
- **Site of many television, films, and other media focus. Site of filming for Gilligan's Island**

ECHO PARK LAKE - BACKGROUND

- 2004 LA passed Proposition O
- 2007 \$84M total budget approved for rehabilitation
- Prop O objectives:
 - Improve water quality
 - Reduce seepage
 - Protect and enhance public use
- 2006 lake put on 303(d) list for impaired water quality for algae, DO, ammonia, copper, trash



ECHO PARK LAKE - BACKGROUND

- 
- **Rehabilitation objectives:**
 - Improve water quality
 - Conserve water
 - Meet current and future TMDLs
 - Achieve RWQCB goals to restore the lake to its existing and potential beneficial uses
 - **Major Rehabilitation Improvements :**
 - Drain lake and install liner to reduce seepage
 - Restore lotus beds
 - System to improve and maintain water quality

DEGRADATION OF ECHO PARK LAKE

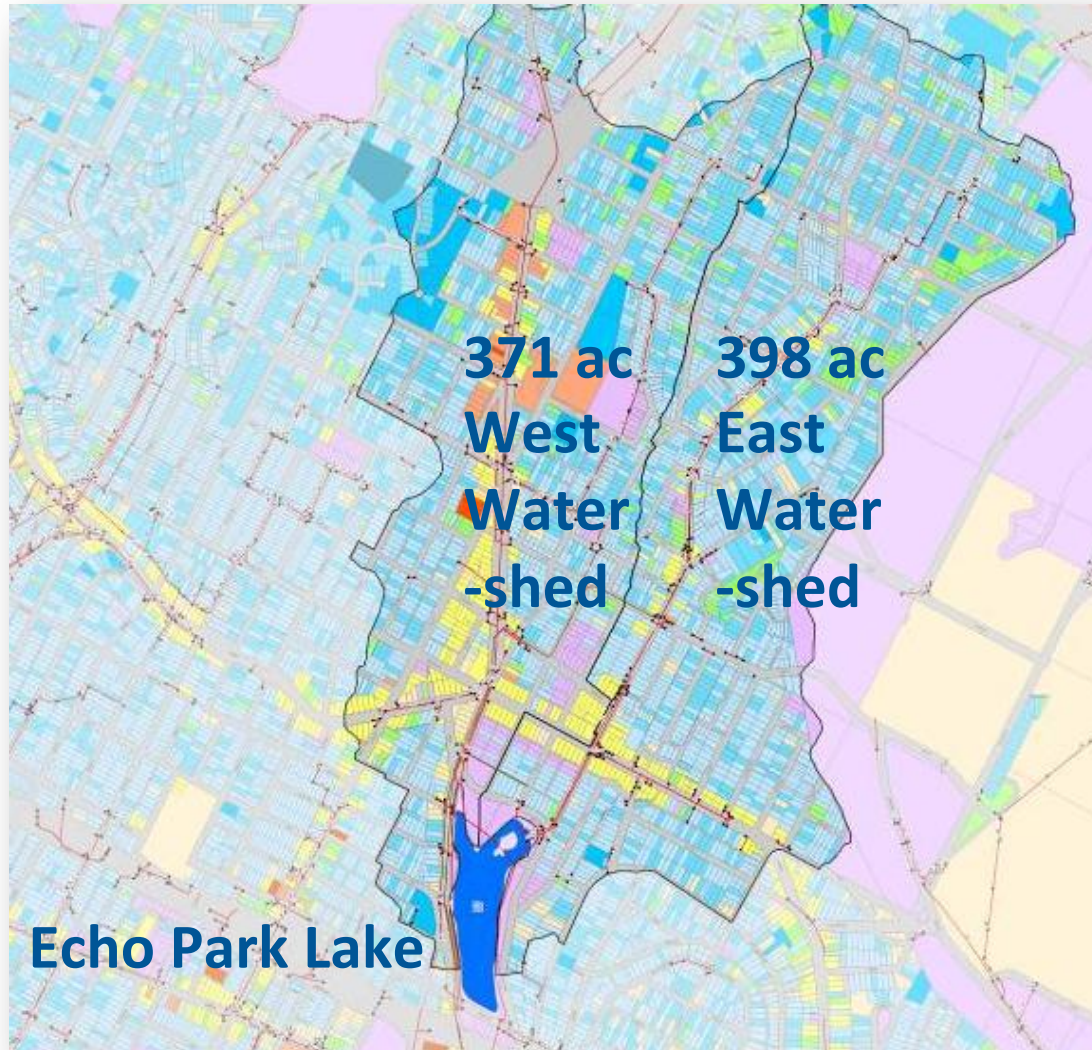
Los Angeles Times

Where have Echo Park's lotuses gone?



LA Times Article, June
2008

ECHO PARK LAKE WATERSHED



ECHO PARK LAKE WATER QUALITY OBJECTIVES

- Total nitrogen = 1 mg/L
- Ammonia = 2.1 mg/L
- Total phosphorus = 0.1 mg/L
- Chlorophyll a = 20 ug/L
- Total copper = 22 ug/L
- Total lead = 11 ug/L
- Total Coliform = 1000 MPN/100mL (monthly geometric mean)
- Enterococci = 35 MPN/100 mL (monthly geometric mean)
- E.Coli = 126 MPN/100 mL (monthly geometric mean)

SUMMARY OF MONITORING RESULTS FROM DRY WEATHER FLOWS IN ECHO PARK LAKE WATERSHED (PRIOR TO REHABILITATION)

- TP = 0.9 mg/L
- TN = 9 mg/L
- Total Copper = 4 ug/L
- Total Lead = 4 ug/L
- Total Coliform = 1,500 MPN/100 mL

SUMMARY OF EXISTING DRY WEATHER WATER BUDGET FOR ECHO PARK LAKE WATERSHED (PRIOR TO REHABILITATION)

- **Incoming dry weather flow - 110,000 gpd**
- **Loss to seepage (piping/exfiltration) - 30,000 gpd**
- **Loss due to evaporation - 60,000 gpd**
- **Decision to mine dry weather flows to make up for future evaporative losses**

SUMMARY OF PUBLIC FEEDBACK THAT SHAPED WATER QUALITY FEATURES AT ECHO PARK LAKE

- **Birds are embraced at the lake and the Park, so nutrient loadings will be accommodated**
- **Restoration of the Lotus Beds are is an important feature of the Project**
- **Constructed wetlands within the lake are desirable to achieve water quality goals**
- **MBR or High Rate Ballasted Flocculation considered as a small footprint/low-profile mechanical treatment option**

ALTERNATIVES EVALUATION W/STAKEHOLDERS

Benefit/Impact	Weighting Factor	Option 1 – 14.4 Ac.	Option 2 – 2.7 Ac.	Option 3 – 4.4 Ac.	Option 4 – Mechanical System
Water Quality	1				
Water Quality Event		4	0	2	3
Dry Weather Flow		4	3	3	3
Cost	0.5				
Construction cost		2	3	3	0
Maintenance cost		1	3	2	0
Cultural value	0.5				
Visual quality / aesthetics		0	3	1	3
Historic compatibility		0	2	1	2
Recreational value	0.4				
Fishing		1	2	3	2
Boating		0	2	1	2
Walking / jogging		2	2	2	2
Open space		2	2	2	2
Educational value	0.3				
Signage opportunity		4	3	3	3
Visual access		4	3	4	1
Habitat value	0.3				
Terrestrial		2	2	2	2
Aquatic		1	3	3	3
Public safety	0.2				
Safety of park user		0	2	2	2
Other impacts	0.2				
Noise		2	2	2	2
Odor		2	2	2	2
Air quality		2	2	2	2
TOTAL		7.3	7.5	7.7	7.2

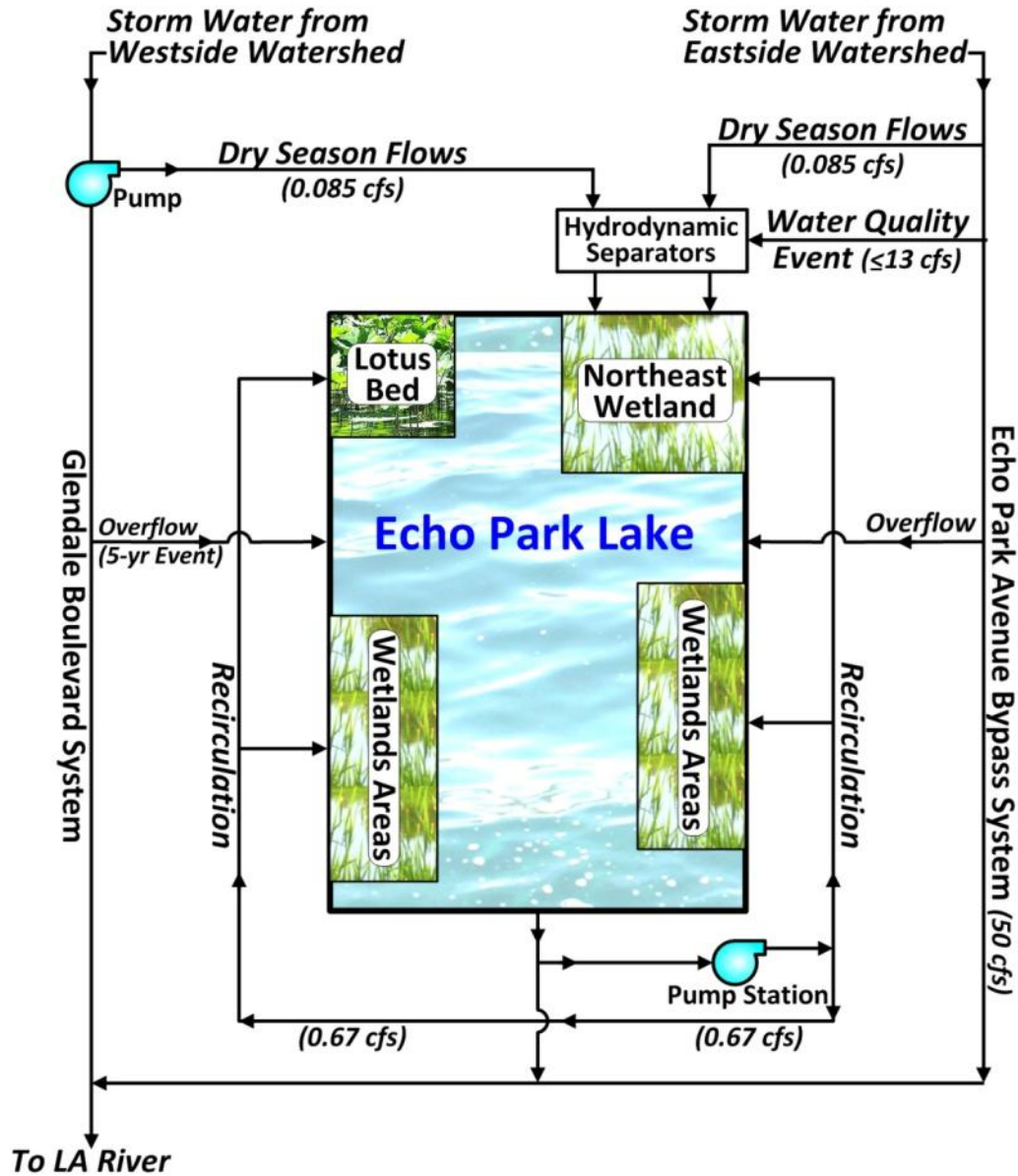
Key for Scoring (Benefits/Impacts)

- 4 Best/Significantly positive
- 3 Good/Moderately positive
- 2 Mid/Neutral
- 1 Low/Moderately negative
- 0 Poor/Significantly negative

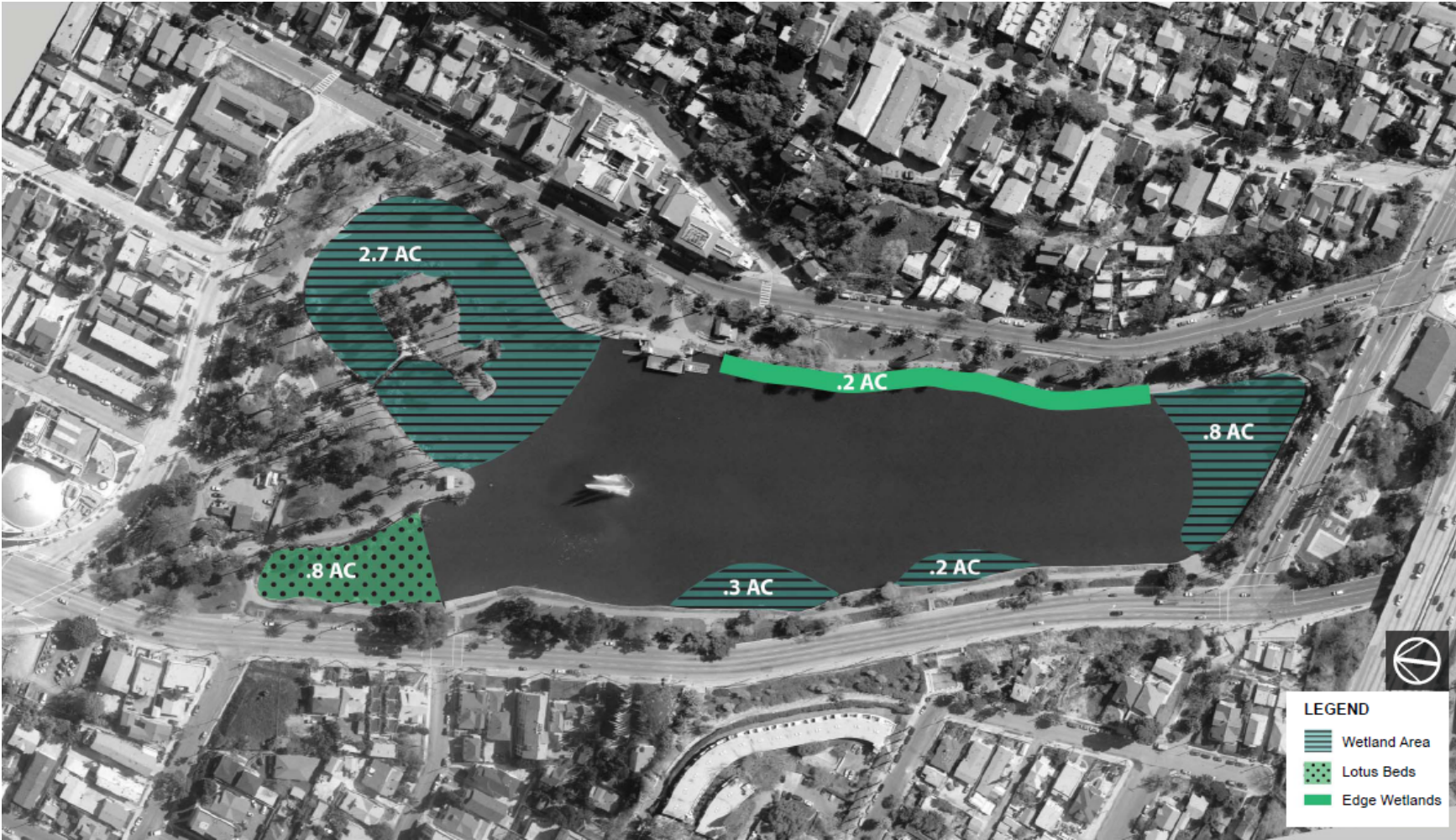
SUMMARY OF INCREMENTAL COSTS

	Option 1 – 14.4 Ac. Wetlands	Option 2 – 2.7 Ac. Wetlands	Option 3 – 4.4 Ac. Wetlands	Option 4 – Mechanical System
Capital Cost	\$3,750,000	\$2,490,000	\$2,445,000	\$8,010,000
Annual O&M Costs	\$42,500	\$13,500	\$20,750	\$400,000

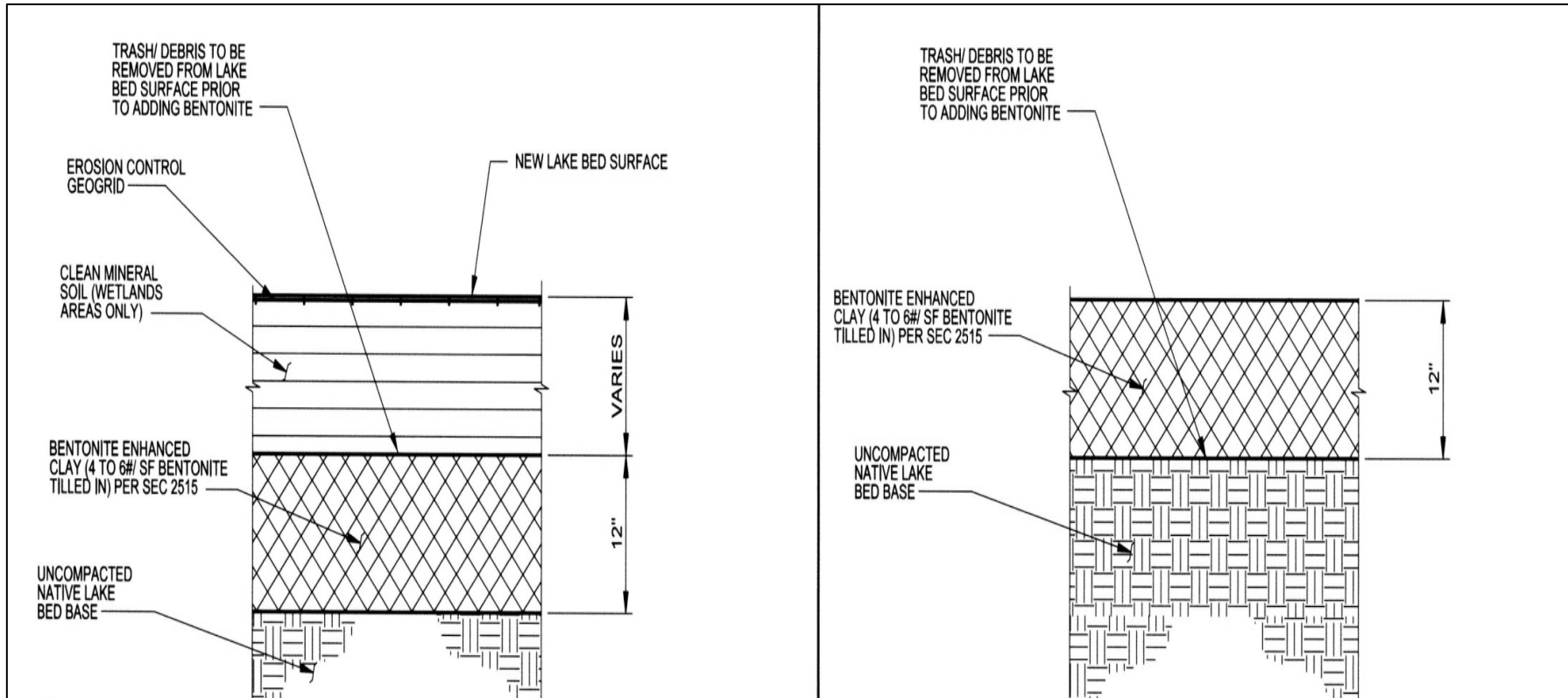
ECHO PARK LAKE FLOW SCHEMATIC



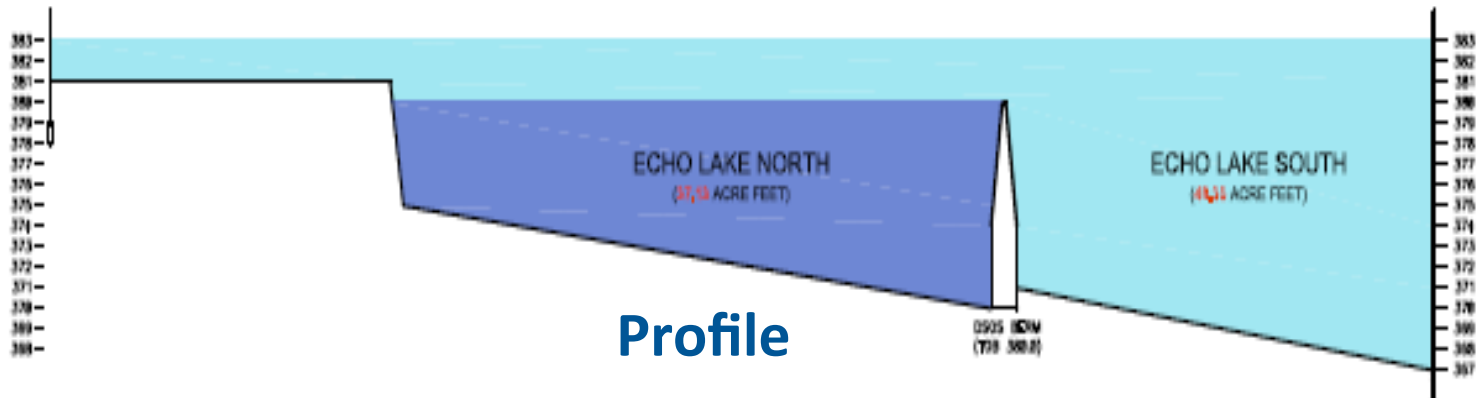
RECOMMENDED OPTION - 3 WITH 4.4 ACRES OF CONSTRUCTED WETLANDS



SUSTAINABLE LINER SYSTEM



SUBMERGED BERM FOR DAM SAFETY COMPLIANCE



DRAINING, DRYING AND ODOR CONTROL



EDUCATIONAL SIGNAGE – LEVERAGES THE CITY'S INVESTMENT IN WATER QUALITY



PROPOSITION O


the ECHO PARK LAKE Rehabilitation Project

In November 2004, Los Angeles voters passed Proposition O by an overwhelming majority. This measure provides funding to protect public health by improving water quality in the City's rivers, lakes, beaches, and oceans. Echo Park Lake was selected to receive Proposition O funding based on the recommendation of Proposition O oversight committees due to its significance within the Los Angeles River Watershed.


GOALS OF PROPOSITION O

- Stormwater Control and Cleanup
- Pollution Prevention Technologies
- Habitat and Wetlands Restoration
- Neighborhood Parks and Greenways
- Drinking Water Protection
- Sliver Conservation


As part of the Proposition O measure, Echo Park Lake has been improved through a variety of sustainable elements and solutions. With the ultimate goal of improving water quality within the watershed, these solutions were designed to fit within the spirit of Echo Park's rich history.




WETLANDS
Wetland plants filter and absorb stormwater pollutants, improving the quality of water.




LOTUS FLOWERS
A reconstructed lotus bed offers optimal conditions for the plants return to glory.




WATER WETLANDS
In unpopulated wetlands, tall grasses and plants help to reduce water use.



PERFORATED PAVING
Perforated paving helps to reduce and filter stormwater runoff by allowing water to seep through it.



LAKELINER AND BOOGIE
New lake decking and a three-day cover underneath the old boat ramp, respectively, encourage the use of active water for Lake Park.




EROSION CONTROL
Soil walls, coir, and park vegetation minimize the flow of sediment and pollutants into the lake.

Examples of Actual Educational Signage


An ICON BLOOMS

The lotus of Echo Park Lake




Aisha Sengul (2012) hosted the International Church of the Fourteenth Gospel and was a well-known figure in Los Angeles. After her husband of the Angeleno Temple in 2012, the population of the Lake Park neighborhood greatly increased as thousands of South Asian immigrants moved together to be closer to "Silver Avenue" as they practice.

In the 1920s, when Echo Park Lake was still an orchard, McPherson imported lotus from China and it is believed planted near Echo Park Lake from their early beginnings in the Lake. McPherson's lotus quickly grew to take on cultural and spiritual significance for the neighborhood as well as the greater City of Los Angeles.



The annual Lotus Festival, begun in 1972 as "The Day of the Lotus," celebrates the City's Asian and Pacific Islander communities. Held in July to coincide with the blooming of the lotus flowers, the festival typically includes multi-cultural presentations, food, music, and dragon boat races.



DID YOU KNOW?

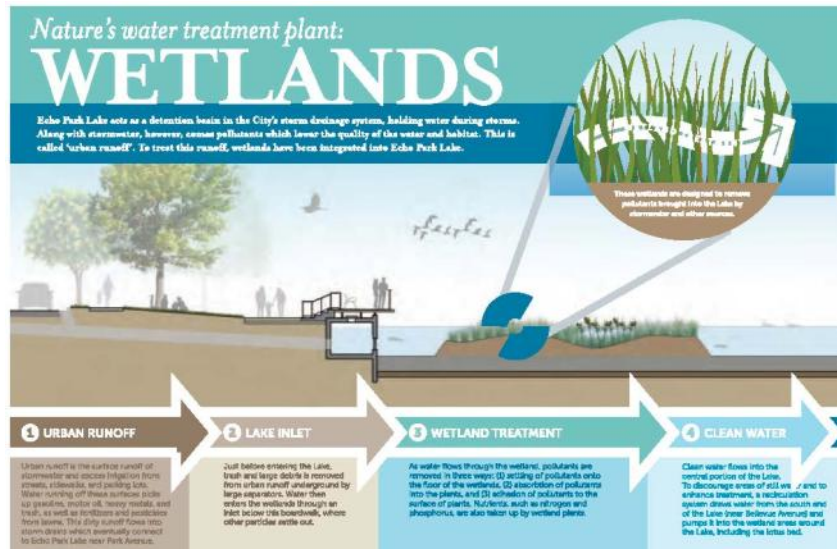
- The leaves of the lotus (Nelumbo) are eaten by many people around the world, serving as a source of healthy, sturdy and life.
- Lotus plants help to improve water quality by taking in nitrogen and phosphorus.
- During the Lotus Festival, each dragon boat team has eight members, including a drummer (the person steering in the back of the boat) and a drummer.

Nature's water treatment plant:

WETLANDS

Echo Park Lake acts as a detention basin in the City's storm drainage system, holding water during storms. Along with stormwater, however, comes pollutants which lower the quality of the water and habitat. This is called "urban runoff." In treat this runoff, wetlands have been integrated into Echo Park Lake.

These wetlands are designed to remove pollutants brought into the Lake by stormwater and other means.



- 1 URBAN RUNOFF**
Urban runoff in the surface runoff of stormwater and erosion infiltration from streets, sidewalks, and parking lots. Water running off these surfaces picks up pollutants, including oil, heavy metals, and trash, as well as sediment and nutrients from lawns. This dirty runoff flows into storm drains which eventually connect to Echo Park Lake near Park Avenue.
- 2 LAKE INLET**
Just before entering the Lake, trash and large debris is removed from urban runoff and captured by large separators. Water then enters the wetlands through an inlet below the boatwalk, where other particles settle out.
- 3 WETLAND TREATMENT**
As water flows through the wetland, pollutants are removed in three ways: (1) settling of pollutants onto the floor of the wetland, (2) absorption of pollutants into the plants, and (3) adsorption of pollutants to the surface of plants. Nutrients, such as nitrogen and phosphorus, are also taken up by wetland plants.
- 4 CLEAN WATER**
Clean water flows into the central portion of the Lake. To discourage erosion of soil, we need to enhance treatment, a reclamation system draws water from the central area of the Lake (near Sedgwick Avenue) and pumps it into the wetland area around the Lake, including the lotus bed.

MULTIPLE BENEFITS FOR THE COMMUNITY



MULTIPLE BENEFITS FOR THE COMMUNITY



Before



After

RESULTS



CONCLUSIONS

- **Stakeholder outreach efforts balanced:**
 - Water quality objectives
 - Recreation
 - Conservation
 - Community Interests
 - Maintenance requirements
 - Flood control
 - Others
- **While providing the City with a sustainable, multi-benefit solution to storm water challenges**
- **These measures saved the City over \$20M**
- **Construction completed on schedule -- Spring 2013**

CONTACTS/TEAM

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QUESTIONS?



SUMMARY OF KEY HYDROLOGIC AND HYDRAULIC FEATURES FOR ECHO PARK LAKE

Watershed	Area (Ac.)	Q for WQE (cfs)	Q at Spill (cfs)*	Frequency to Spill (yr.)*
East	398	53	60	5
West	371	51	360	5

*Estimated based on records and simulations of 2, 5, 10, 25, 50, and 100-year events.

SUMMARY OF WATER QUALITY OPTIONS EVALUATED FOR ECHO PARK LAKE

- 1. Constructed wetlands to treat the mean daily dry weather flow and WQE → 14.4 Acre Wetlands**
- 2. Constructed wetlands to treat 50 percent of the mean daily dry weather flow → 2.7 Acre Wetlands**
- 3. Constructed wetlands to treat 50 percent of both the dry weather flow and the WQE → 4.4 Acre Wetlands**
- 4. A mechanical treatment system to treat the mean dry weather flows and the WQE → Buried MBR or High Rate Ballasted Flocculation**

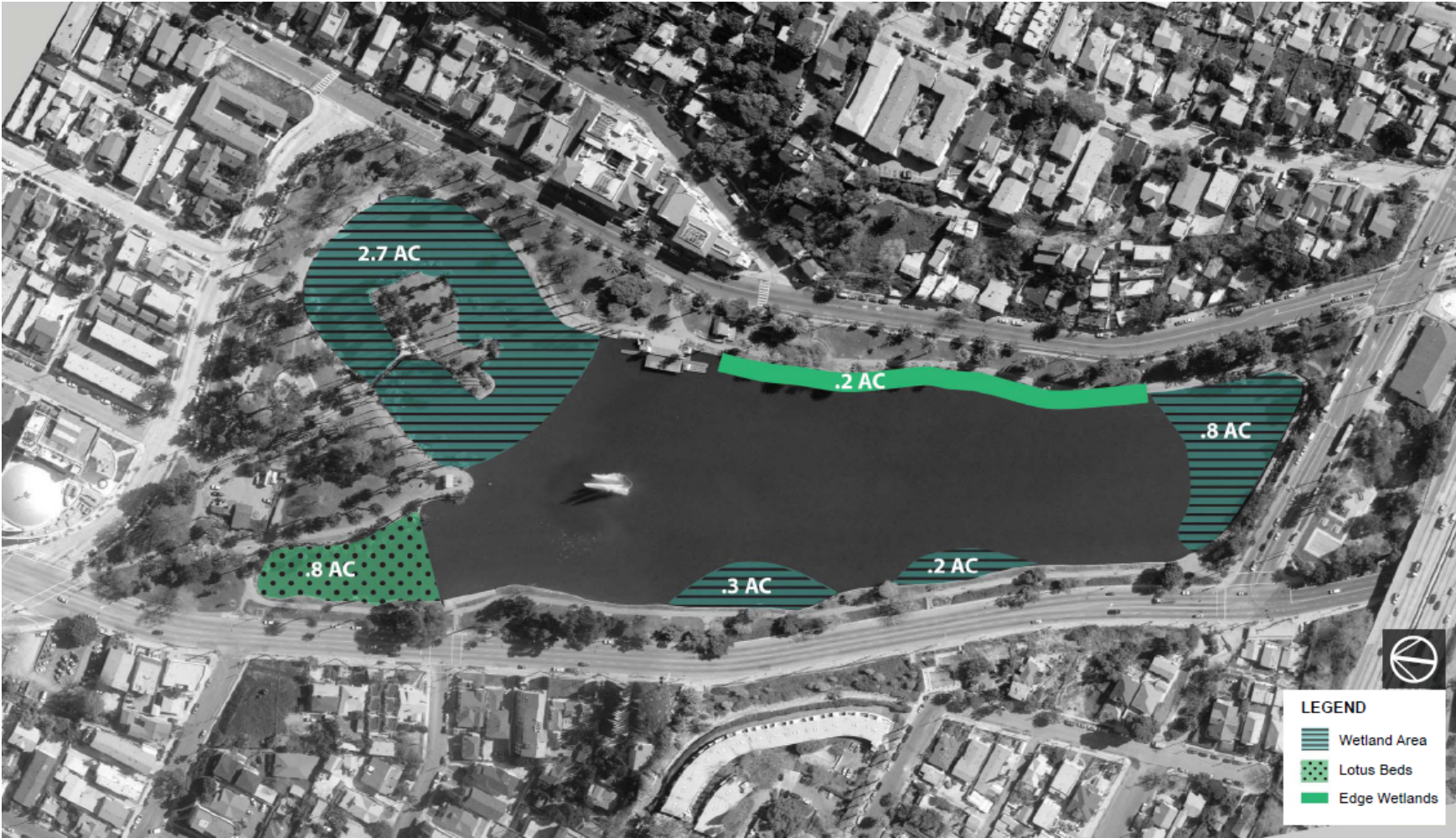
OPTION 1 – 14.4 ACRES OF CONSTRUCTED WETLANDS



OPTION 2 - 2.7 ACRES OF CONSTRUCTED WETLANDS

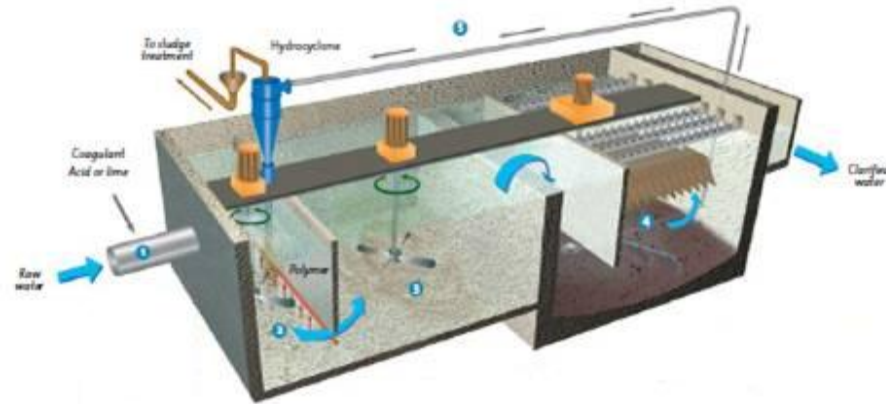


OPTION 3 - 4.4 ACRES OF CONSTRUCTED WETLANDS



OPTION 4 - MECHANICAL TREATMENT

- Buried MBR or High-rate ballasted flocculation favored due to compact foot-print
- Favored by those who prefer open water views
- Mechanical systems are not aligned with the goals of Proposition O
- Also, highest capital and O&M costs



PROPOSED PROJECT DESIGN ELEMENTS



NOTES

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Proposed stormwater inlet wetlands 2 Proposed edge wetlands 3 Existing bridge to remain 4 Pump building replaced by "Lady of the Lake" statue 5 Floating islands to be removed (Typ. of 4) 6 Rehabilitated Lotus beds 7 Stormwater overflow converted to proposed overlook 8 Existing stone terraces/walls to remain 9 Existing fountain to remain | <ul style="list-style-type: none"> 10 Proposed submerged partition 11 Hydrodynamic separators 12 Diversion structure 13 Recirculation pump station & valve vault 14 Existing outlet vault 15 Outlet structure 16 Dredging and sediment removal |
|---|--|

LEGEND OF IMPROVEMENTS

- | | |
|---|---|
| <ul style="list-style-type: none"> Edge condition - Type 1 (vegetated) Edge condition - Type 2 (wall) Edge condition - Type 3 (rip rap) Edge condition - Type 4 (boardwalk) Edge condition - Type 5 (overlook) Path - porous pavement Interpretive signage location Planting buffer - lawn Planting buffer - shrubs | <ul style="list-style-type: none"> Recirculation piping Wetland area Lotus bed area Understory shrubs |
|---|---|

ECHO PARK LAKE

PROPOSED CONCEPTUAL LANDSCAPE PLAN



LEGEND

Interpretive Signage	Lake Edge	Planting	Hardscape / Other
A Wetland	A Planted slope	A Palm tree*	A Concrete / asphalt paving
B Habitat	B Grouted rock	B Canopy tree*	B Porous paving
C Sustainability	C Vertical wall	C Shrubs / ornamental grasses	C Bench (mounted)
D Lotus	D Wood walkway	D Lawn	D Low retaining wall - proposed
E History	E Concrete overlook (using existing structure)	E Wetland vegetation	E Existing landscaping to remain
F "Do Not Disturb Habitat"		F Lotus beds	F Temporary pond

* Tree locations are representational

A Proposition O water quality improvement project by the City of Los Angeles Department of Public Works and Department of Recreation and Parks

Un proyecto de mejora de la calidad del agua que recibe fondos de la Proposición O realizado por el Departamento de Obras Públicas de la Ciudad de Los Angeles y el Departamento de Recreación y Parques



LEYENDA

Carteles interpretativos	Borde del lago	Vegetación plantada	Elementos sólidos del paisaje / otros
A Pantano	A Ladera con vegetación plantada	A Palmera*	A Concreto / pavimento de asfalto
B Hábitat	B Rocas enlechadas	B Árbol de sombra*	B Pavimento poroso
C Sostenibilidad	C Muro vertical	C Arbustos / pastos ornamentales	C Banqueta (montada)
D Lotus	D Sendero de madera	D Césped	D Muro de retención de baja altura - propuesto
E Historia	E Vista de concreto (usando la estructura existente)	E Vegetación de pantano	E El diseño de paisaje actual permanecerá igual
F No alterar el hábitat		F Lechos de loto	F Temporary pond

* Las ubicaciones de los árboles son representativas

AERIAL VIEW WHEN REHABILITATION WAS NEARING COMPLETION

