



# Laguna Beach USD

Energy Conservation Project  
May 10, 2016



# Selection Process

Action Taken	Date Completed
Issue Request for Proposal for Design and Construction Services for Project	May 27, 2015
Review all 7 Responses Received and Score for Interviews	June 30, 2015
Interview Top 4 Firms Based on Proposals Submitted	September 2, 2015
Recommend Top Firm to Board to Begin Work on Project	October 13, 2015

After the extensive selection process  was awarded a contract to perform an Investment Grade Audit (IGA). The audit is now complete and staff will present the findings and proposed construction scopes on the following slides.





# Electrical Components

Our district has 5,147 interior lights and 699 exterior lights. The majority of the existing lights are compact fluorescent lamps (CFLs).

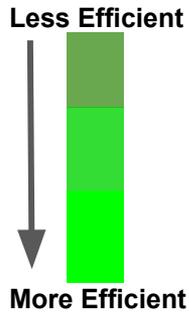
- Majority of bulbs are T8 lamps, but there are some T12 lamps.
- CFLs need to be replaced every few years as they burn out.
- Ballasts get replaced every 5-7 years on each fixture.
- We spend roughly \$3,000 - \$5,000 per year on replacement lights and ballasts.





# Electrical Components

- Fluorescent lights are tube shaped lamps with a chemical phosphor coating on the inside of the tube. They have small pins on each end that fit into the ballasts located in light fixtures.
- T12 lamps have a diameter of 1 ½ inches (or 12/8th of an inch.)
- T8 lamps are fluorescent lights one inch (or 8/8ths) in diameter.
- T5 lamps are 5/8th in diameter.
- LED lights use light emitting diodes to produce light very efficiently. An electrical current passes through semiconductor material, which illuminates the tiny light sources we call LEDs.





# Electrical Components

- LED lights use roughly 71% less energy per fixture than T12 lamps.
- LED lights use roughly 30% less energy per fixture than T8 lamps.
- LED lights do not emit any light in the non-visible light spectrum (T8 lamps emit UV/IR light, which is a leading cause for eye strain and fatigue).
- LED lights are designed to mimic natural daylight, which has shown in multiple studies to dramatically improve test scores.
  - One study involving 20,000 students in California, Colorado and Massachusetts in 1998 and 2002 found that standardized test scores among comparable students could be as much as 26 percent higher when they attended classes in buildings illuminated primarily by natural lighting, compared with those who relied mainly on artificial light.





# Cost to Replace all Lights with LEDs

Site	Interior Lighting Costs	Exterior Lighting Costs	Total Costs
Top of the World	\$488,567	\$31,642	\$520,209
El Morro	\$642,559	\$22,465	\$665,024
Thurston	\$598,250	\$1,540	\$599,790
LBHS	\$1,092,092	\$193,040	\$1,285,132
District Offices	\$61,037	\$14,192	\$75,229
<b>Grand Total for Lighting</b>			<b>\$3,145,384</b>





# Mechanical Components

All existing mechanical units and systems were analyzed using data from individual site inspections, maintenance technician feedback, and the 2014 Facility Condition Assessment.

- Mechanical units older than 2002 are recommended to be replaced.
- Repair and recommissioning of existing units newer than 2002 occurs for several units.
- Additional ventilation and cooling systems are recommended for LBHS and Thurston based on Facility Master Plan.





# Mechanical Components

## LBHS Scope

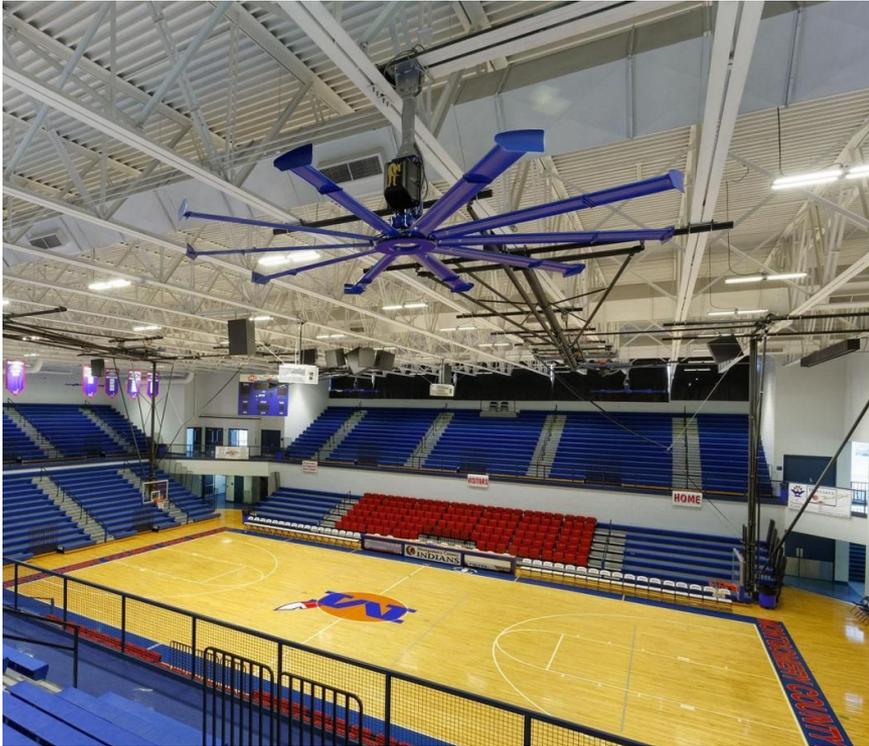
- Replace 7 mechanical units and remove boiler and pumps.
- Add destratification fans at both gyms.
- Add cooling at Duggar, Artists' Theatre, and weight room.
- Replace electrical panel in North Gym and Theatre.
- Test and repair condensate lines in 20s, 30s, and 80s buildings.

## Thurston Scope

- Replace 26 mechanical units.
- Add destratification fan at gym.
- Modify controls and ductwork in 5100 and 5103.
- Test all condensate lines and repair as needed.



# Mechanical Components



In facilities without air conditioning, destratification fans provide a 10°F (5.6°C) cooling effect without the distracting noise and energy draw that accompanies numerous small, high velocity fans. They also work in tandem with AC systems to provide a cooling effect and evenly distribute conditioned air throughout a space.





# Mechanical Components

## El Morro Scope

- Add 10 new access panels at two-story classroom building to mechanical units.
- Modify and repair mechanical systems in counselor office, kitchen, and PE offices.

## District Offices

- Replace all 11 mechanical units.

## Top of the World Scope

- Replace 34 mechanical units.
- Add ventilation to electrical closets in kiln room.
- Add ductless split system to custodial office.
- Replace ventilation fan at lift station.
- Replace inverters at existing solar system.





# Cost for Mechanical Scope

Site	Total Costs
Top of the World	\$1,108,065
El Morro	\$1,000,892
Thurston	\$1,126,230
LBHS	\$2,029,911
District Offices	\$374,199
<b><i>Grand Total for Mechanical</i></b>	<b>\$5,639,297</b>



# Project Cost Breakdown

The total cost for all proposed improvements equals \$8,784,681. Additionally, we have already committed to \$60,000 for the services rendered in the development of the Investment Grade Audit (IGA), bring the potential grand total to \$8,844,681.

- \$5,758,358 in hard costs (labor and materials) for all improvements.
- \$3,086,323 in soft costs (design, engineering, construction management, bonds & insurance, DSA submission fees, profit, and overhead).

Soft costs represent roughly **35%** of the total project, which is in line with projects of similar complexity and scope.





# Project Cost Breakdown

There is roughly \$6.5M identified in the Facilities Master Plan for the lighting and mechanical scope identified in the IGA. That amount was derived from the 2014 Facilities Condition Assessment (FCA), which relied on Rough Order of Magnitude (ROM) cost estimates. The ROM estimates were based on a “like for like” replacement and all units showing a need to be replaced by 2018 were included in the facilities master plan.

- Lighting costs are higher than FCA estimates mainly due to LED replacement vs. fluorescent (like for like) replacements.
- Mechanical costs are higher mainly due to additions of cooling, as well as replacing existing units with more efficient versions.





# Project Cost Breakdown

As proposed, the current project of \$8,844,681 would exceed the \$6,500,000 budget by **\$2,344,681**. Staff recommends that the project be split into multiple phases in order to stay within the existing budget and allow time to save the necessary funding to complete the full scope in future years.

## Proposed 1st Phase (\$6.5M):

- Districtwide LED lighting.
- Mechanical at LBHS and Thurston.
- Minor mechanical at El Morro and Top of the World.
- Replace non-functioning inverters at Top of the World solar array.





# Projected Energy Savings

## Ongoing Annual Savings

- \$115,000 in electrical bills
- \$3,000 in not replacing lights and ballasts

## One Time Grants/Rebates

- \$45,000 in lighting rebates.
- \$500,000 (estimated) in Prop 39 Clean Energy Jobs Act funding towards the project.

# Summary

- Schneider Electric has finished their audit of our electrical and mechanical systems, including reviewing the facilities master plan, FCA, and conducting site visits.
- The proposed improvements total roughly \$8,850,000 (includes \$60,000 for IGA).
- The master plan includes \$6,500,000 for lighting and mechanical repairs/replacements.
- The costs estimates in master plan are based on FCA “like for like” replacements. Staff is recommending that the lighting be replaced with LED’s instead of fluorescents and mechanical units replaced with more efficient versions (not a “like for like” methodology).
- The project brought before the Board for approval at the next meeting should be within the already approved budget of \$6.5M. This will result in some of the scope not being completed at this time, but doesn’t prohibit the district from later completing all the work via a prolonged phasing plan.





# Thank you!

Questions?

