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SITES Program Overview

By Adriene Murphy

The Hire LA's Youth Initiative is a collaborative effort between Mayor Eric Garcetti, Economic and Workforce Development Department (EWDD), and the Los Angeles Unified School District (LAUSD). Hire LA's Youth is one of the City's most exciting programs to put young adults to work, ensuring they have "first time" job experience that will set them on the path of lifetime earners.

In 2015, LA Sanitation (LASAN) expanded the Mayor's Initiative by establishing the Summer Introduction to Engineering and Science (SITES) Program in collaboration with LAUSD. The six-week Program was designed to groom students with an interest in Science, Technology, Engineering or Math (STEM) to pursue careers in the environmental field.

This year, LASAN was able to hire and mentor 25 students who will be entering their Junior or Senior year of High School in the Fall of 2018 or who have recently graduated from High School and will be entering college in the Fall of 2018.

The Program was held June 18 through July 27, 2018 and provided students with opportunities to learn about environmental issues, including One Water LA, Zero Waste, and Greenspace among other topics. To supplement their learning experience, various field trips were incorporated into the Program, including a tour of the Hyperion Water Reclamation Plant and a presentation at the Board of Public Works. The Program concluded with a Ceremony in the Public Works Building Atrium, where students were provided an opportunity to share their experience with their parents and LASAN Executives. Each student was presented with a Certificate of Recognition and a gift bag for his/her participation in the Program.

One Water LA

by Edith Martinez, Student Intern

Credit—Azya Jackson, Environmental Engineer, LASAN



One Water LA was designed by the City of Los Angeles in 2013 as a “collaborative approach to develop an integrated framework for managing the City’s watersheds, water resources, and water facilities in an environmentally, economically, and socially beneficial manner”. The semi-arid circumstances of Los Angeles made the implementation of this project crucial. For example, this City naturally struggles with drought and climate change, while rising population growth worsens the situation by increasing water demand. Aging infrastructure, stringent regulations, limited funding, and heavy dependence on imported water all accentuate why One Water LA is necessary. Currently, Los Angeles fails to contribute its own water- 90% of L.A. water supplies are actually imported from Northern California, Mono Lake, and Hoover Dam.

One Water LA has made great progress since it began Phase 1 back in 2013. After 2 years the groundwork was successfully established, allowing Phase 2 to begin in 2015. The development of One Water LA 2040 was complete in 2017 and in 2018 the final environmental impact report was finalized. One Water LA is now actively dedicated to reaching their goals by 2040.

One Water LA strives to ensure LA’s water future. In order to achieve this broad vision, detailed objectives were established:

- Integrate management of water resources and policies
- Balance environmental, economic, and societal goals
- Improve health of local watersheds
- Improve local water supply reliability
- Implement, monitor and maintain a reliable wastewater system
- Increase climate resilience
- Increase community awareness and advocacy of sustainable water

Additionally, 3 key considerations were imposed: integration, collaboration, and innovation.

Integration

Integration includes conserving, reusing, and capturing water. By conserving water, water supply will last longer. Every household should take part through small chang-

es at home such as turning off the water when brushing teeth, taking shorter showers, or fixing broken pipes. More helpful information on how to conserve water can be found online at savethedropLA.org. Integration also focuses on reusing both non-potable and potable water. This involves utilizing the urban water cycle, which first takes water from the source to a water treatment plant, followed by distributing the water for usage, and lastly returning the water to the source after going through wastewater collection and treatment. By doing so additional water collection is negligible. The last aspect of integration is to capture water. New innovations have been created for this purpose, one being Riverdale Green Street. Here infiltration units capture runoff from 14 acres of residential land, while also conserving water by featuring drought-tolerant native plants.

Collaboration

In adherence to Mayor Eric Garcetti's request to “include and engage all city departments” more than 20 departments and agencies actively participate in One Water LA. Work is being done with LAUSD to increase stormwater capture and with Planning on Recode:LA. Also, City Engineering specifications now allow recycled water in concrete. One Water LA has branched out to stakeholder meetings, special topic groups, outreach events, schools and academia in order to work together to address complex issues. Through collaboration alternative analysis, project and policy identification, funding strategies, and partnerships are worked on.

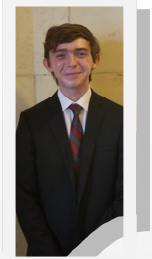
Innovation

One Water LA’s mission requires innovation for its success. The first-ever flow balance of L.A.’s entire water cycle has been constructed through collaborative data efforts of multiple departments. The Water Balance Tool features normal, wet, and dry year hydrology and annual flow projections from 2015-2040. New innovations for creative water management include, “augmenting sewer flows with runoff to increase water recycling”, “reconfiguring sewer alignment(s) to increase flows to WRPs”, and “new strategically located City-

Green Space

by Gregory Gorobets, Student Intern

Nearing the close of the SITES Program, we met with a Landscape Architect who elucidated more scientific career paths. To most of our surprise, the



presenter didn’t commence with talks of engineering or science but rather art and philosophy. She noted that at the Doctoral level, even science becomes an art, as you are creating new ideas. She continued, explaining how we can be creative with solutions to challenging problems, such as improving stormwater quality, providing flood management, and harvesting rainwater for use. Although each problem could easily be solved independently of one another, our presenter showed us how she and other Engineers and Architects built a natural treatment plant that could address every problem at once. “Instead of having machines and chemicals that will further pollute and damage the environment, why don’t we just let nature do all the work?” We then got a chance to visit one of her creations.

When we arrived at the treatment plant, it was hard to tell that it was even there. To many, it looks like a park, and that’s exactly what it’s going for. Not only does it help control stormwater by having roots hold soil in place, it also provides a communal area for nearby residents and wildlife. The plants

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Green Space—

continued from Page 2

hold the water in a sort of closed system, which prevents the water from becoming polluted. This is unlike other types of irrigation systems that have the chance of being contaminated and are also more costly to install and maintain.

This whole opportunity demonstrated the vast range of career options and choices there are in the sciences and engineering. With creativity and imagination, we too can create and design such projects that will not only save money, but preserve nature and aid communities.

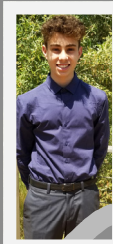


Reflections from the Hyperion Water Reclamation Plant

By Ben Knepper, Devin Cooke, Mariana Pedro, Takeen Shamlo, Diana Morales—Student Interns

Introduction—Ben Knepper:

Ever consider where water goes to after using a sink or flushing a toilet? Well, contrary to popular belief, it doesn't disappear at all and in fact requires a lengthy and exhausting process to be dealt with. Because water supply is limited and water is never created or destroyed, water reclamation plants have the responsibility of treating wastewater. They ensure it is safe to be released back into nature or, sometimes, for public use.



One of these plants is the Hyperion Water Reclamation Plant, which the LASAN SITES interns recently toured. First, the interns embarked on a tram tour of the Plant, which explained each step of reclaiming wastewater. After returning from the tour and visiting the Environmental Learning Center, the interns learned about LASAN's attempts to reduce both land and water waste. Hyperion based interns Ben Knepper, Devin Cooke, Mariana Pedro, Takeen Shamlo, and Diana Morales will share how their experiences in the internship thus far relate to the wonderful tour.

How the Plant Works—Ben Knepper:

The Hyperion Water Reclamation Plant was established in 1894. It has undergone improvements ever since and currently

runs 24/7, pumping out approximately 275 million gallons of reclaimed wastewater per day. That is enough to fill the LA Coliseum twice! The Plant consists of two stages of treatment: primary and secondary. Raw sewage, or influent, enters the Plant and goes straight to headworks, where large objects such as debris, trash, and home appliances are removed through large filter screens. Next the water is sent to primary treatment where it flows through a series of four settling tanks. In this stage, the majority of sludge from wastewater settles to the bottom of the tanks and is removed. Secondary treatment then handles liquids and solids, or sludge, separately. The sludge from primary treatment is pumped to large egg-

One Water LA* —continued from Page 2

owned satellite water reclamation plants".

When absorbing all this information many Angelinos might ask themselves "Why should I care?" Los Angeles residents should care because it determines their quality of life. One Water LA plans for "smarter land use, healthier watersheds, increased efficiency, enhanced communities, climate change resilience, and greater protection of public health". Supporting One Water LA is rewarding to both Angelenos and the environment. Benefits include more livable communities with green streets, parks, and open space, perfect for inner city children. LA's environment will prosper through ecosystem restoration and reduced carbon emissions (cleaner atmosphere). There will also be economic benefits such as local job creation and utility efficiencies. According to One Water LA, \$22 million in added benefits or avoided costs is gained for \$1 million in Water Quality investments.

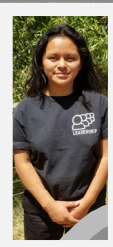
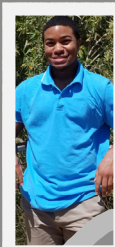
Everyone can get involved by taking simple, yet impactful actions at home or simply sharing ideas with others. Further participation can be done by taking a tour, requesting a presentation, or even becoming a One Water partner!

shaped digesters. These digesters decompose the toxic organic matter in the sludge by introducing various bacteria and high pressure and temperature. **Fun fact:** the methane gas produced inside the digesters is harnessed and recycled to provide sustaining energy for the entire Plant. Hyperion workers then transport the digested sludge to a large centrifuge, which turns the sludge into “wet cake,” or biosolid which can further be reused for fertilizer. As for the liquids, the intermediate pumping stations lift the water from primary to secondary treatment. Here, the water passes through multiple reactors where aerobic bacteria consume most all of the leftover pollutants. From the reactors the liquids move into clarifier pools, the final stage of secondary treatment. The clarifiers have a constant sweeping arm that eliminates any residual contaminants. Finally, the reclaimed water, or effluent, is pumped through a five mile pipe back out into the ocean.

Environmental Learning Center—

Devin Cooke & Mariana Pedro:

Throughout the duration of the internship, Mariana and I have worked in the Administration Division at the Hyperion Water



Reclamation Plant. We have guided tours and assisted with the operation of the Environmental Learning Center (ELC). With the information acquired about the function of the Plant, we have been able to give informative presentations about the different tasks at Hyperion, and have taught tourists about the information in the different exhibits in the ELC. This has made me realize that the ELC building plays a huge role in the future of the Hyperion Water Reclamation Plant. The ELC provides a building block for the careers of Engineers at

or aspiring to be at a wastewater treatment plant like Hyperion. Learning from the plethora of information the building provides for the tourists, interns and workers is essential for the growth of Hyperion and Sanitation Engineers for years to come. After a wonderful tour of the Hyperion Water Reclamation Plant, Mariana and I gave presentations regarding the topics of Advanced Water Purification, recycling, and biogas. I started off the presentation with an overview of the process of Advanced Water Purification, explaining how the wastewater gets to the treatment plants and each of the different treatments involved in transforming the wastewater into reclaimed water. I later explained to my audience of interns and LASAN staff how Hyperion extracts biogas for their power needs and the importance of making the eco-friendly choice of recycling. My explanation on the extraction of biogas expanded on the known fact of Hyperion being “powered by our poop.” Mariana followed up on my presentation giving us a general overview of the benefits of using Biogas, Water Purification, and Recycling. Emphasizing the reasons why governmental funding should increase to help find better ways to create fuel and energy for our communities by using methods that will reduce the amount of pollution we exert on a daily basis.

Throughout my experience at Hyperion, the amount of knowledge and job skills acquired have impacted me tremendously. Working alongside people who are eager in educating the community, especially witnessing the next generation of children coming in and out of the ELC building, has taught me why my passion for bettering the environment is important. The new and next generation is the reason why the ELC exist. Taking the tour with the rest of my intern colleagues reminded me of why I had applied for the internship in the first place. Being able to see first hand the water purification process and hearing our tour guide explain where we receive the water and how the treatment plant is doing what it can to keep our water



flowing into our homes; it was a wonderful learning experience that has paved the way to my goals as an Engineer. With all the wonderful opportunities that this Internship has given us, it has helped me meet professional Engineers that have advised me on career paths and create connections with people that I look up to as Engineers.

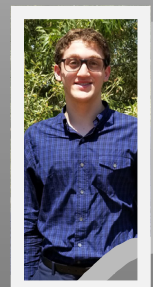
My first day at Hyperion, Devin and I were able to go into the control room which I fell in love with. The visuals of the Treatment plant, the function of how different parts of the plant is managed, and the amount of work (no matter how small) can make big changes to how the recycled water is processed. I gained a surmount of knowledge in this internship and will definitely apply the knowledge that I have gained in the future as a college student and Engineer.

Environmental Monitoring

Division—

Ben Knepper & Takeen Shamloo:

Ben and Takeen have worked within the Environmental Monitoring Division (EMD) throughout the duration of the internship program, which incorporates many relevant aspects of the Hyperion Tour. EMD is responsible for conducting lab tests of Hyperion’s influents, processes,





Hyperion — continued from Page 4

and effluents to ensure their work is not further harming the environment. EMD has four main branches or sections of labs: Conventional Chemistry Section (CCS), Instrumental Chemistry Section (ICS), Biology, and Sample Collection. While at EMD, Ben and Takeen experienced first-hand the Process Control, Microbiology, and Semi-Volatile Organic Chemistry Labs.

The Semi-Volatile Organic Lab tests influent and effluent samples for organic compounds that could potentially be harmful to flora/fauna in high concentrations. Through performing extractions and running tests in high tech machinery, they can qualitatively and quantitatively determine these compounds. The Microbiology Lab searches for fecal indicator bacteria along the Santa Monica Bay, such as Total Coliform, E Coli, and Enterococcus. Lastly, the Process Control Laboratory monitors the quality of the Plant's process. The Lab examined samples from all around the Plant looking for things like turbidity (transparency), chlorine, biosolids, and even hydrogen sulfide. The process control Lab Technicians run dozens of samples each day to determine the Plant's efficiency.

With regard to the Hyperion tour, EMD proves to have a necessary presence and function. In the tour, an LASAN employee combined sedimentary, particulate, and viscous matter to simulate a visual

representation of sewage. Similarly, when waste enters the sewer system, it can be in one of multiple states: solid, liquid, or dissolved solids. Depending on the rigidity/viscosity of the waste entering the water column, it can either dissolve in the water, have a higher viscosity than the water causing it to displace water, break apart into fine sedimentary particles, or just float/sink within the water column.

ICSD—Diana Morales:

Diana has worked in the Information and Control Systems Division (ICSD) which is responsible for ensuring Engineers, Plumbers, Electricians, and others have access to necessary information. Time is essential in water reclamation plants making technology a dire need. However, there are many potential threats in integrating technology to any place that deals with public health with today's tech criminals.

Throughout her personal experience at ICSD, Diana has had the opportunity to monitor networks using Ipswitch and WhatsUp Gold. Using this tool she has learned to request updates from devices and has even installed one herself. She installed fiber optics on an assignment to change a switch with the capacity of 1GB to 10GB port connections, which was a crucial update made by ICSD to



communicate information at a faster rate.

While learning about hardware, she was also assigned a software project to create a one-stop NOC website. During her project, she ran into many obstacles and learned about the Software Development Life Cycle. Today, she has designed and built a NOC website for ICSD IOC members to access vital information and tools and is currently in the process of configuring the authentication page. This website will help shorten the time it takes for teams to communicate and ultimately provide a one stop resource center.

As we learned that Hyperion is a reclamation plant that operates 24/7, ICSD technicians keep a close eye on network and lab data, ensuring that there is no unusual activity from users, which can raise a threat to the private information at Hyperion. Without ICSD, the water reclamation process as we saw on the tour would take longer, technicians among others would have a harder time communicating updates, and disasters would be waiting to happen without any warning. For example, if the information monitored by ICSD ends up in the wrong hands, millions of lives are endangered because without that information other Divisions could be left with no information at all! By monitoring networks to ensure safe communication, extra precautions are taken to make tools like work order updates, speed up the reclamation process. With safe communication, data access, and technology, ICSD is the backbone of information at Hyperion ensuring the recovery of bio-resources.

Conclusion—Ben Knepper:

Conclusively, the Hyperion Tour not only complimented Devin, Mariana, Ben, Takeen, and Diana's work within the ELC, EMD, and ICSD respectively, but also allowed for them to expand their previous knowledge to its fullest potential.



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Student Testimonials

Henry Gomez

I dived headfirst into the SITES experience, taking notes from professionals and brainstorming project ideas for alternative fuels for vehicles. With every week being a new topic to go over, I was eager to learn more. This program, with no doubt, was fun and amazing.

Sarah Hakim

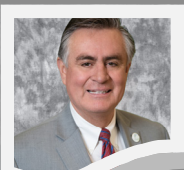
Engineering is about aesthetics, sustainability, conservation, persistence, innovation, and hard work. Being able to shadow Engineers through the SITES Program let me experience how creativity and knowledge allow Engineers to improve LA while also conserving the environment.

Yanbing Jiang

SITES is a great program for career exploration, networking and gaining experiences. It exposes me to the real working environment. It enables me to learn as much as possible from a great amount of good leaders, knowledgeable Engineers and supportive team members.

Justin Willis

Overall, I think this internship was great. The exposure it gave me to a professional worksite, how employees commingle and collaborate on various projects, and what it takes to run merely a portion of the City's tasks is amazing. I enjoyed aiding all the people I met through the assignments I was given and will utilize this experience to help plan career choices.



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