



College of Engineering  
Civil, Construction and  
Environmental Engineering

# SDSU ENGINEERING DESIGN DAY

**FALL 2024**

**FRIDAY, DECEMBER 6, 2024 • 1:30-3:30pm**

Prepared by **FILANC**<sup>®</sup>

## Thank you to our Sponsors

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Bruce Urquhart



## Welcome!

Welcome to the SDSU College of Engineering's Fall 2024 Design Day. We are proud to have our undergraduate students showcasing their capstone Senior Design projects completed during the Fall 2024 semester. These projects encompass various aspects in Civil, Construction, and Environmental Engineering, and address some of the society's most pressing engineering needs. Many of the projects dealt with real-world problems and were advised by frontier engineers and industrial leaders with decades of practical experiences.

Please join me in congratulating our student teams on their innovative design projects. These projects represent the culmination of the technical knowledge that they have learned during their time at SDSU. This unique educational experience provides our students with the opportunity to apply fundamental knowledge to solve real-world problems, develop their critical thinking skills, understand the critical human and societal needs, and design novel and sustainable solutions. Above all, these projects provide the students with real-world project experiences that involve project management, design constraints, teamwork, cost analysis, communication, and deadlines.

As always, we are sincerely grateful to our sponsors for their generous support for developing these projects and mentoring the students, including Water Works Engineers, West Coast Civil, County of San Diego, and Dudek. Their involvement not only provides practically meaningful projects, but also instills a strong professionalism in the student teams. And of course, we are deeply grateful to Caltrans for continuing to allow us to utilize this beautiful facility to host this event.

In addition to the Project Sponsors, I would like to thank our Program Sponsors for their financial support, including the Stephen and Lynne Doyle Family Foundation, Stantec (along with the City of Long Beach), EC Constructors, Black and Veatch, and Bruce Urquhart.

Lastly, I am so grateful to the faculty and instructors for the many extra hours they spent on advising the students as well as planning this event, in particular, John Prince (the team lead), Mark Filanc, James Haughey, JeremyLaHaye.

Inspired and facilitated by our Department's Industrial Advisory Board, our faculty have been actively involved in interacting with the engineering industry. In addition to joint engineering projects, our faculty have been serving on the boards of various industrial organizations, such as the ACE Mentorship, Design-Build Institute of America (DBIA), the Society of American Military Engineers (SAME), and the Industrial Environmental Association (IEA). As the Bipartisan Infrastructure Law is being implemented, we foresee even greater collaborations between our faculty and the industrial partners, which will in turn benefit our effort in educating the next generations of engineers.

Enjoy the College of Engineering Design Day, and thank you for being a part of this exciting event!




Dongye (Don) Zhao, Ph.D.

*Professor and Chair*

*Department of Civil, Construction, and Environmental Engineering*

# Contents



## Our Sponsors

Welcome!	1
Requests for Projects	3
<b>Batiquitos Pump Station Rehabilitation</b>	4–5
<b>East County Private WWTP Influent Pump Station</b>	6–8
<b>Nevada Pacific Highway</b>	9–10
<b>SR-125/Main Street Interchange</b>	11–13
<b>Jacumba Fire Station Site Development</b>	14–16
<b>San Carlos Potable Water Reservoir Replacement</b>	17–18
<b>Past Design Day Projects &amp; Sponsors</b>	19–21

# PROJECT AND PROGRAM SPONSOR OPPORTUNITIES

*Industry Partners,*

We invite you to be a *Project Sponsor* providing real project opportunity to our students (no cost) or be a *Program Sponsor* (donation levels below), or both!

→ Fall Semester runs  
August-December

→ Spring Semester  
runs January-May

Not sure if your project idea will be a good fit for the Capstone Senior Design class? Contact us or submit [this form](#) and we can help. Projects can include a current project your firm is working on, or even a completed or future project.

## CONTACT US

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Jeremy LaHaye, PE  
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## PROJECT SPONSOR PROCESS

- Project sponsors help develop an "RFP" and available project information (topo, soils data, etc.) before each semester. Involvement during semester is as much or little as desired.
- Student Team major submittals include a Proposal and 50% and 100% Design Submittal Packages
- The semester culminates with Senior Design Day, an event showcasing projects to industry and faculty in December/May
- Submit your project ideas to us with this [Google Form](#)



## PROGRAM SPONSOR LEVELS

- Black level limited to one firm each school year
- Funding supports such items as the year-end reception, awards for student teams, Design Day, Undergrad Researchers, Software, etc.

	BLACK <i>taken for 24/25!</i> \$3,000	RED \$2,000	TEAL \$1,000	Project Sponsor No Cost!
Present to CIVE 495/CIVE 100 Classes (300+ students)	X			
Name Public Agency Co-Sponsor	X	X		
Company Logo in Course Materials, Department Website, Social Media, and Emails to Industry	X	X		
Recognition in Design Day Program and Year-End Industry Reception (2025)	X	X	X	X
Guests at Year-End Industry Reception	6	4	2	2



### 1 Butchered Engineering



#### Engineering Team

John Alan Bergstrom  
*Project Manager*

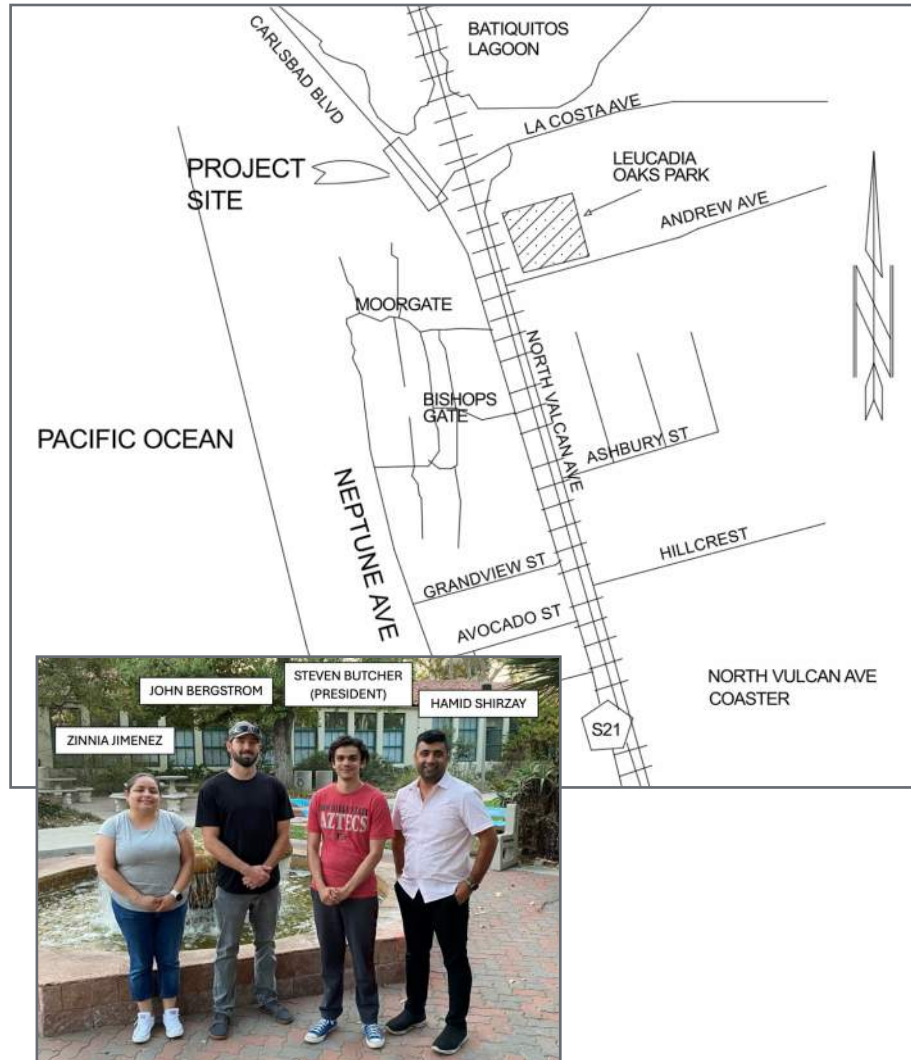
Zinnia Jimenez

Steven Walter Butcher

Hamid Khepelwak Shirzay

#### Sponsors/Mentors/Advisors

Tim Lewis/  
Water Works Engineers  
Dr. Hassan Davani,  
Dr. Julio Valdes,  
Mark Filanc, PE



### Batiquitos Pump Station Rehabilitation

The Batiquitos Station rehabilitation is a project focused on improving the station. It is to ensure not only compliance with safety and environmental standards but also the replacement of pumps and sewer force mains. The project also requires that a flood hazard scenario is identified and improved. A replacement of a generator is required to meet the San Diego County Air Pollution Control Standards. Improve odor control and replace the current systems. A replacement of fencing, gate, driveway, hardscape, and site drainage. All while improving costal aesthetics. Butchered Engineering conducted a thorough evaluation of the premises and found that the pump station has several components that are outdated and therefore are operating at a reduced efficiency. A new pump was selected to improve the required capacity of 15 MGD.

## 2 4G Hydrology INC.



4G HYDROLOGY INC.

### Engineering Team

Charisma Tanaka-Herrera  
*Project Manager*

Yarina Conde Millan

Mar Sophia Balvaneda  
Rodriguez-Armijo

Abigail Gallegos

### Sponsors/Mentors/Advisors

Tim Lewis/  
Water Works Engineers,  
Thomas Zink,  
Ramin Yazdi,  
Christy Dykstra,  
Mark Filanc,  
John Prince,  
James Haughey,  
Jeremy LaHaye



### Batiquitos Pump Station Rehabilitation

The Batiquitos Pump Station collects raw wastewater from the City of Encinitas and the Leucadia Wastewater District sewer collection system. It has a subgrade pump room with two active forcemains sending the raw sewage to the Encina Water Pollution Control Facility. 4G Hydrology Inc. will be working on multiple aspects of this project. Our first and main objective is to replace the existing pumps and resize them to consider the new long-term influent design capacity and further optimize and improve the overall pump station. Secondly, 4G Hydrology Inc. is considering the relocation and need of a new standby generator, it is currently located subgrade and needs to be brought above grade. This is due to the pump station location near the beach and possible flood hazards. 4G Hydrology Inc. is performing the necessary research to improve the pump station flood mitigation system. Thirdly, 4G Hydrology Inc. is looking to improve one of the two forcemains to allow for a more optimized alignment for it to blend in better with its surroundings. Lastly, 4G Hydrology Inc. will be replacing the current odor control and air ventilation system with an improved version with consideration for the residents and establishments nearby. 4G Hydrology Inc. will be taking into consideration the aesthetics of the improvements, ensuring the overall aesthetics of the pump station blends in with the coastal surroundings.

### 3 JLNK WaterWorks



#### Engineering Team

Jesse Christian Pratali  
*Project Manager*

Kayla Emily Yamashiro

Nick Ryan Kenne

Liam Thomas Mason

#### Sponsors/Mentors/Advisors

West Coast Civil  
Michelle Filanc  
Mark Filanc



#### East County Private WWTP Influent Pump Station

Our team, JLNK Waterworks, has been tasked with the design of a new lift station and force main to effectively connect to a new Water Reclamation Plant located in East County, along the Sweetwater River. After analyzing the specific flow data, we have calculated the ideal force main size, pump specifications, and overall lift station design that align with the project's specifications. Through our detailed assessments, we have determined that the proposed force main diameter and material will minimize friction losses and ensure efficient transportation of wastewater. The selected pump size has been chosen based on projected flow rates, considering both peak and average demands, to ensure consistent operation even during high flow conditions. Additionally, the lift station design incorporates features such as redundancy, ease of maintenance access, and safety protocols to protect both personnel and the surrounding environment.

JLNK Waterworks will provide specific engineering plans and drawings that illustrate these recommendations in detail. We will also compile an overall report that captures our complete findings, including design calculations, environmental impact assessments, and cost estimates. We firmly believe that this design approach will address the project's scope, ensuring a sustainable and effective solution for wastewater management in the region.

### 4 TJ<sup>3</sup>



#### Engineering Team

Victor Jeffrey Plunkett  
*Project Manager*

Lyman Joseph Tadewald

Aidan Jay Depra

Wyatt Thomas Stringfellow

#### Sponsors/Mentors/Advisors

WestCoast Civil,  
Filanc,  
Kimberly Horn,  
McCarthy,  
Mark Filanc,  
Kyle McCarty,  
Edward Chavez,  
Nensi Lakrori,  
Michelle Filanc



#### East County Private WWTP Influent Pump Station

In East San Diego County, a private owner is upgrading the existing wastewater infrastructure with a new force main and influent pump station to feed a newly constructed wastewater treatment plant (WWTP). The influent pump station features a state-of-the-art design that integrates two submersible pumps tied into a precast wet well that will service a buildout peak hour flow of 480,000 GPD. Furthermore, the design includes a 1.2-mile, pressurized force main constructed of 8" PVC, slurry encased pipe constructed to the south of Dehesa Road that ties the influent pump station to the WWTP.

### 5 Aztec Civil Solutions



#### Engineering Team

Matthew Carlos Julien  
*Project Manager*

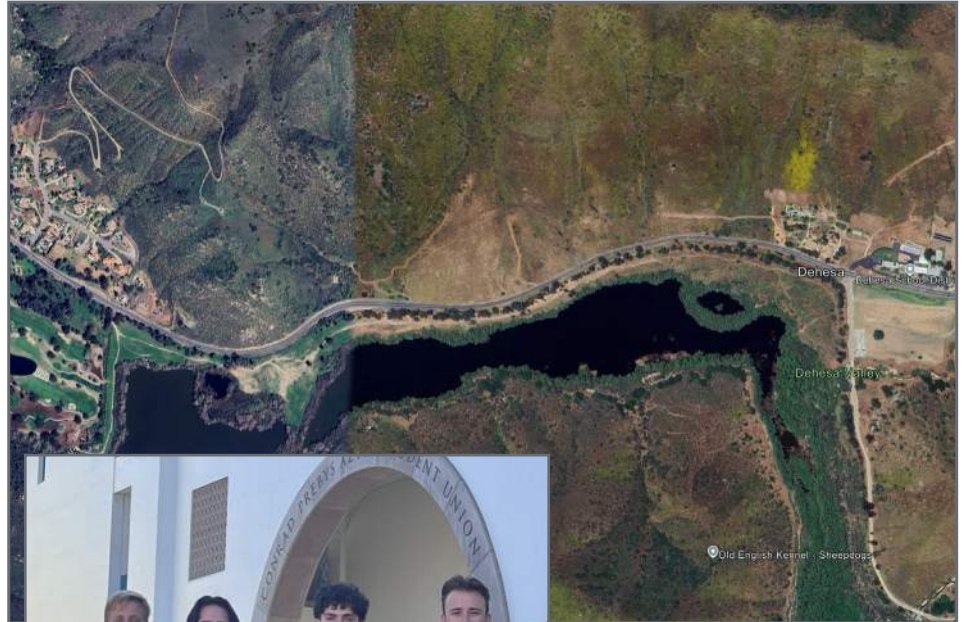
Isaac Carreno

Benjamin Daniel Martin

Peter Krasniy

#### Sponsors/Mentors/Advisors

West Coast Civil,  
Blue Lake Civil  
Tim Monroe  
Maggie Witt  
Dave Giese  
Mike Connor



#### East County Private WWTP Influent Pump Station

Our project involves the design of the East County Pump Station, including its main line and associated components. Our goal is to optimize the station's performance by selecting the appropriate number and types of pumps to accommodate varying demand throughout the day, balancing efficiency and cost. Since the pump station and main line are located in a wilderness area, we will also ensure that proper environmental and wildlife protection measures are implemented.

### 6 Aztecas Engineering INC.



#### Engineering Team

Cedric Bautista &  
Joshua Lazo  
*Project Managers*

Sam Raymond Allen

Anna Macey Burton

Pedro A. Larios

Samuel Llamas Jr.

#### Sponsors/Mentors/Advisors

Jonathan Layog/  
City of San Diego  
Sam Amen,  
Emir Williams,  
Natalie Mladenov,  
Christy Dykstra,  
Julio Valdes,  
Jeremy LaHaye



### Nevada Pacific Parkway

Nevada Pacific Parkway is an already existing road that is currently connected to Interstate 80 in the city of Fernley, Nevada. Our team's main project tasks were to design a roadway extension of Nevada Pacific Parkway to Highway 50 while also widening Highway 50 to improve incoming traffic from the newly developed Nevada Pacific Parkway extension. With certain existing constraints such as the UPRR track that separates the two roads, the team designed a bridge that will not only provide enough space for the existing track but for future tracks as well. This project involved the management of the expected traffic on our roadway design through the use of two separate intersections and the appropriate signing and striping for the roadway: one North intersection on E Newlands Dr & Nevada Pacific Parkway and the second South intersection on Highway 50 & Nevada Pacific Parkway. Due to the topography of the site and the weight of the road and bridge, it is crucial to construct a retaining wall to prevent soil erosion and keep the structures level. Our team designed a proper stormwater system to allow for the necessary drainage of liquids along the roadway. The disciplines and areas the team implemented on this project were Transportation, Structural, Geotechnical, Construction, Environmental, Traffic, Stormwater/Drainage, Permitting, and Cost Estimating.

### 7 WestWard Consulting



#### Engineering Team

Claudia Jane Beaven  
*Project Manager*

Jocelyn Jackeline Santillan Perez

Marcus Gregory Kerrebrock

Daniel Luna

#### Sponsors/Mentors/Advisors

WestWard Consulting



### Nevada Pacific Parkway

The Nevada Pacific Parkway project in Fernley, Nevada extends the existing Nevada Pacific Parkway from Gavin Road to Highway 50 providing increased access to nearby businesses. This connection includes a bridge over the existing Union Pacific Railroad while allowing for UPRR's new plan for the track accompanied by retaining wall design. Our team has examined the existing conditions and selected the best roadway alignment, bridge and retaining wall type with the least impact to the surrounding area while remaining cost effective.

### 8 A.I.C.J. Engineering



**A.I.C.J. ENGINEERING**  
SAN DIEGO

#### Engineering Team

Axel Emiliano Navarro  
*Project Manager*

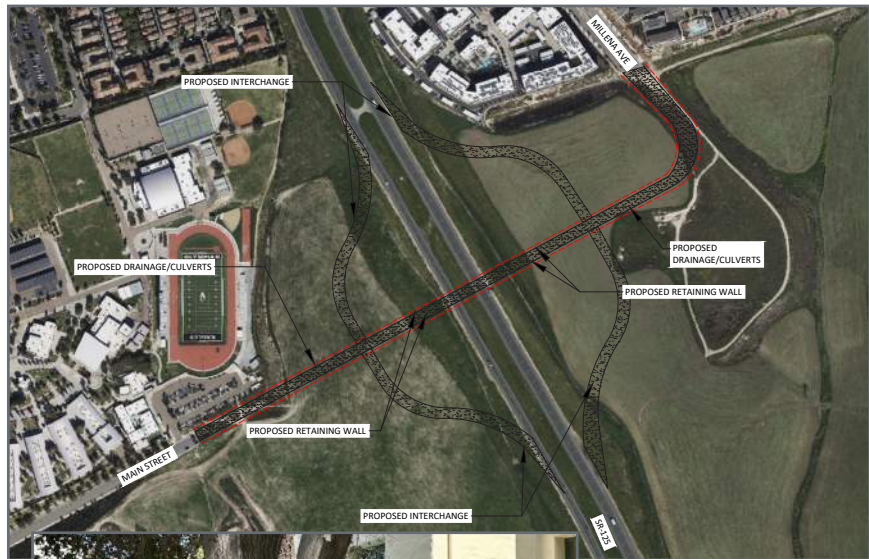
Christian Richard Toy

Isiah Nathaniel Williams

Joaquin Alberto Sandoval

#### Sponsors/Mentors/Advisors

Caltrans,  
The City of Chula Vista,  
Jeremy LaHaye



### SR-125/Main Street Interchange

The SR-125/Main Street Interchange project is in the city of Chula Vista San Diego near Magdalena Ave and E Main St next to the SR-125 highway. The SR-125/Main Street Interchange project has an approximation measurement of 1100 meters, and it will include upgrading the existing infrastructure, improving roadway, adding bicycle facilities, and integrating advanced traffic systems. These improvements aim to improve traffic flow, safety, and accessibility at the intersection of State Route 125 and Main Street. A.I.C.J. Engineering determined that these improvements are necessary and expected to reduce travel delay, support community growth, and improve safety. This will contribute to a more efficient transportation network for the surrounding community.

### 9 JACS Engineering



#### Engineering Team

Joella Khara  
*Project Manager*

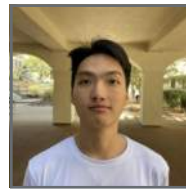
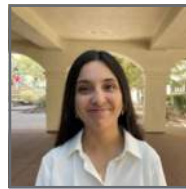
Christopher Alexander Arebalo

Anson Ao

Samuel Iram Mateos

#### Sponsors/Mentors/Advisors

Jeremy Lahaye



### SR-125/Main Street Interchange

Our team provided comprehensive engineering services for the 8,00 SF fire station 43 project. The proposed project is located in the unincorporated community in Jacumba, east of Brawley Avenue and North of Old highway 80 on the southern undisturbed area of Assessors Parcel Number 660-150-18-00. We developed specific designs for the foundation, site utilities, stormwater management, erosion control, and site grading. We ensured the foundation was structurally sound and suited to the site's conditions according to geotechnical reports. We calculated residual water pressure and demand for the domestic water system, sized the meter, and optimized hydrant coverage according to flow requirements. Our stormwater system was designed to handle runoff efficiently while the erosion control measures were implemented to uphold best management practices, minimizing soil loss and protecting the environment. The grading plan ensures proper drainage and overall site stability. All our work is backed by detailed engineering reports.

### 10 Capstone Capital Projects INC.



#### Engineering Team

Guzman Perez &  
Jose Francisco  
*Project Managers*

Ty Ikko Dean

Liam Aris Mcdonald

Daniel Drake

Mohammad Yacoub

#### Sponsors/Mentors/Advisors

Caltrans,  
City of Chula Vista, SDSU CCEE  
Faculty,  
GWAR Consultant/  
Matthew Feigner,  
Jeremy Lahaye,  
Friends and Family



### SR-125/Main Street Interchange

The newly proposed SR-125 interchange and Main St alignment aims to connect current Rock Mountain Rd to Millinea Ave using a newly designed SR-125 interchange. This interchange will consist of a bridge designed for vehicular, cyclist, and pedestrian traffic. Capstone Capital Projects Inc. (CCP) has come to a few conclusions regarding the overall design of the project. For transportation design CCP has started a draft traffic layout, with the overall approach surrounding a diamond interchange. The interchange will allow vehicular traffic to travel in all directions, whether it be east to Millinea Ave or heading west towards E Main St. However, to achieve travel in all directions the bridge design must be completed first. A girder bridge variant will be chosen for the design on the bridge, and will be based on Caltrans bridge design specifications, as well as all other applicable codes & regulations. Additionally, geotechnical data provided by our sponsors, as well as outside resources, will be used to aid the retaining wall design needed for the bridge. With these design components finished all other subject matters such as stormwater, road widening, and traffic layout will be designed as needed according to the applicable standards (Caltrans/City of Chula Vista). Current best management practices (BMP's) and traffic control plans will be provided in order for the construction process to be done safely, efficiently, and with as little impact to the environment as possible. Using the design conclusions mentioned prior as well as further conclusions yet to be decided, the CCP team will produce a comprehensive set of construction plans, including specifications, and estimates, to ensure the successful implementation of the SR- 125 interchange and Main St alignment project.

### 11 JLAD



Civil Engineering  
Surveying  
Land Planning

#### Engineering Team

Jordan Robert Wirtz  
*Project Manager*

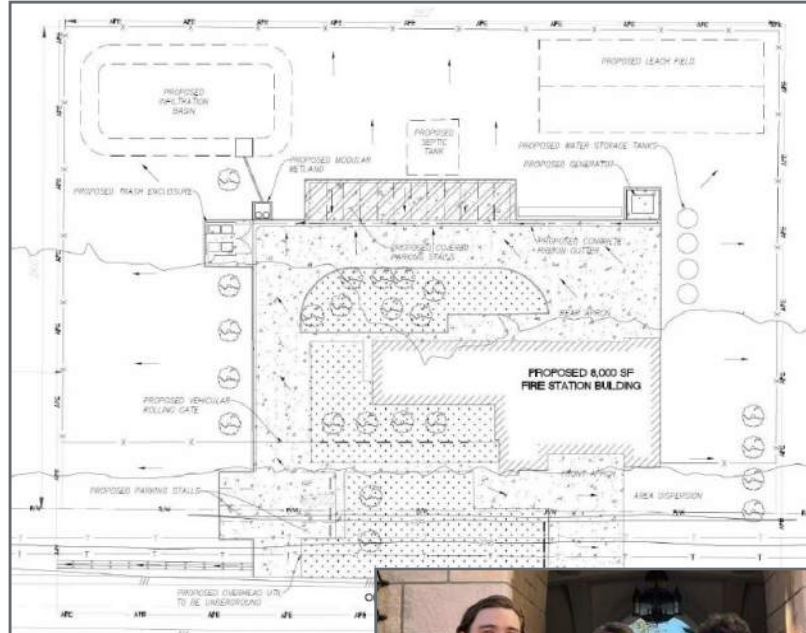
Andy Rios

Dajen David Ronald Lee

Levi Song

#### Sponsors/Mentors/Advisors

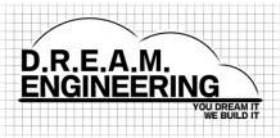
Scott Christman/  
County of San Diego,  
Thomas Zink,  
Julio Valdes,  
James R. Haughey



### Jacumba Fire Station Site Development

Our team provided comprehensive engineering services for the 8,00 SF fire station 43 project. The proposed project is located in the unincorporated community in Jacumba, east of Brawley Avenue and North of Old highway 80 on the southern undisturbed area of Assessors Parcel Number 660-150-18-00. We developed specific designs for the foundation, site utilities, stormwater management, erosion control, and site grading. We ensured the foundation was structurally sound and suited to the site's conditions according to geotechnical reports. We calculated residual water pressure and demand for the domestic water system, sized the meter, and optimized hydrant coverage according to flow requirements. Our stormwater system was designed to handle runoff efficiently while the erosion control measures were implemented to uphold best management practices, minimizing soil loss and protecting the environment. The grading plan ensures proper drainage and overall site stability. All our work is backed by detailed engineering reports.

### 12 DREAM ENGINEERING



#### Engineering Team

Adrianna Cervantes  
De Los Garzas  
*Project Manager*

Daniel Gutierrez Villanueva

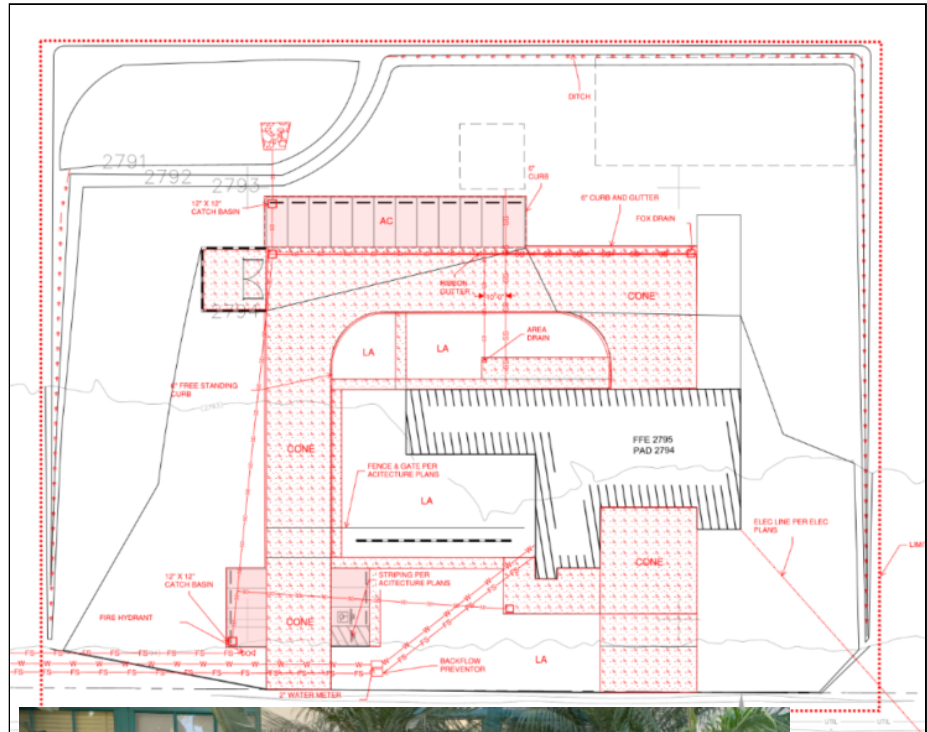
Mario Antonio Castillo

Reah Mae Evangelista Sahagun

Enrique Toshio Yokoyama

#### Sponsors/Mentors/Advisors

Scott Christman/  
County of San Diego,  
James R Haughey,  
John Prince,  
Nensi Lakrori,  
Ziad Bayasi,  
Julio Valdes,  
Emir Williams,  
Dr. Christy M. Dykstra



### Jacumba Fire Station Site Development

The County of San Diego is proposing to construct a new, approximately 8,500-square-foot fire station on an approximately 2.77-acre site (a portion of APN 660-150-18-00) at 44850 Old Highway 80 in the Jacumba community. The new fire station will replace the existing one located at 1255 Jacumba Street (APN 660-053-01). Dream Engineering is responsible for designing a full-service fire station that meets the design standards for county facilities, sustainability criteria, and ADA accessibility compliance. The basis of design is centered around the following disciplines: site civil, structural, stormwater, and water/wastewater.

### 13 GreenPath Construction



#### Engineering Team

Sama Jasim Ahmed  
*Project Manager*

Zoe Hannah McKenzie Shibley

Myra Nichole Modregon

Fatima Ramirez

Cindy Montiel Sanchez

#### Sponsors/Mentors/Advisors

Scott Christman/  
County of San Diego,  
Christy Dykstra,  
Panagiotis Mitropoulos,  
Julio Valdes,  
James Haughey



### Jacumba Fire Station Site Development

The new fire station for the Jacumba community will be a state of the art facility. This new station will be a resource for the community, providing crucial emergency services along with fire protection and safety. The new fire station will be a vision of modernity while still supporting Jacumba's residents wishes of being a sustainable rural place with small town charm. Station 43 will support the needs of the community around it.



### 14 ACK Engineering



#### Engineering Team

Carolyn Lucena Lozada  
*Project Manager*

Anahi Mendez Lozano

Anne Bernadette Aguilar  
Madrona

Angelika Shakirova

Kevin Noe Castrejon

#### Sponsors/Mentors/Advisors

Ian Crano/Dudek  
Alicia Kinoshita, PhD,  
Ali Tasdighi, PhD,  
Yige Yang, PhD,  
Professor Tom Zink,  
Julio Valdes, PhD,  
Marta Miletic, PhD  
James Haughey



### San Carlos Potable Water Reservoir Replacement

ACK Engineering is designing a 3.3 million-gallon (MG) concrete reservoir to replace the existing 4.8 MG San Carlos Water Reservoir. The project, which includes a demolition plan, the construction of a new 130-ft. diameter reservoir, and offsite improvements such as pavement resurfacing and a driveway expansion, will enhance operations and water quality for San Diego's Navajo neighborhood. ACK Engineering, while applying best management practices to reduce environmental impacts, will develop all reservoir features, and a new FRP disinfection building to house a chloramine boosting system that will fulfill the community's need for potable water.

### 15 SERF Engineering



#### Engineering Team

Marsala Jo Enloe  
*Project Manager*

Dylan Ryan Fullerton,

Darius Leonardo Shahrestani

Langley St. John Rowland

#### Sponsors/Mentors/Advisors

Ian Crano/Dudek,  
James Haughey



### San Carlos Potable Water Reservoir Replacement

Our project will focus on the installation of a new water reservoir near the current San Carlos reservoir. Our team plans to install a main to feed the water in the existing to the new tank, along with accompanying infrastructure (pumps, valves, etc.). We are also tasked with widening the access driveway and installing a new pad for the new reservoir.

## Past Design Day Projects & Sponsors

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	PROJECT	SPONSOR
SPRING 2024	Bachman Place Widening/Retaining Wall	Group Delta / 33?
	East County Private Wastewater Treatment Plant	Kimley Horn / FILANC
	Manchester Convention Hotel High-Rise	KPFF / Bowman
	Ramona Sheriff Station	County of San Diego
	Oak Park Library Cost Evaluation/Design	Hoch Consulting
	Mission Trails Pedestrian Bridge for Max	KPFF
	SR-67/Riverford Interchange Roundabouts	Parsons
	San Vicente Hydroelectric Pumped Storage	Black & Veatch
	Carroll Canyon Road Extension	Dokken
FALL 2023	San Vicente Hydroelectric Pumped Storage	Black & Veatch
	Carlsbad Landslide Retaining Wall	Group Delta
	Del Mar Tunnel (LOSSAN Rail)	SANDAG
	Moonlight Beach Pump Station San Elijo	JPA
	SDSU Bike Path to Mission Valley	N/A
	Fallbrook Sheriff Station County	DGS
	Soboba Reservation Erosion Repairs	Soboba Band

## Past Design Day Projects & Sponsors

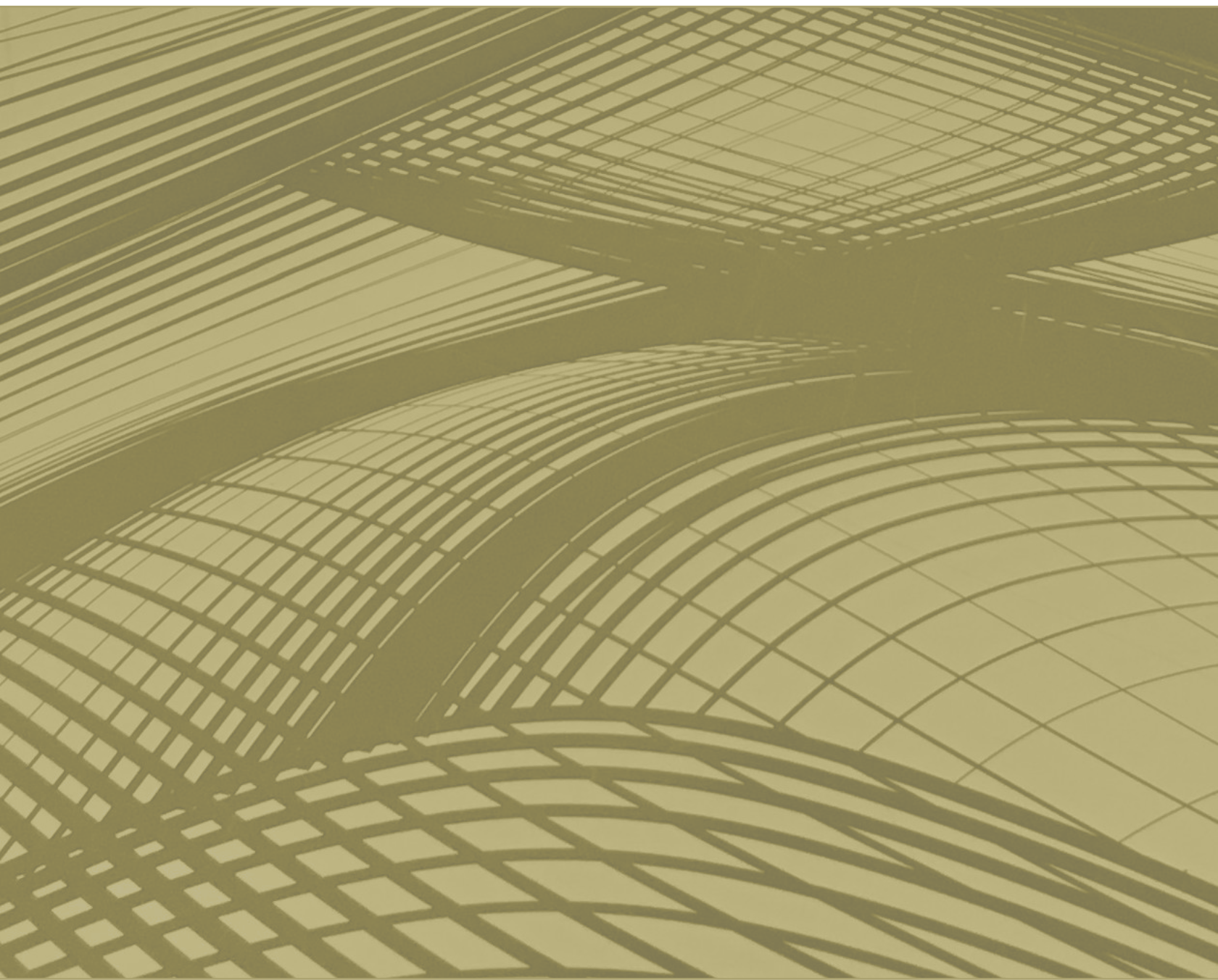
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	PROJECT	SPONSOR
SPRING 2023	Vista Inland Rail Trail	QIC / SANDAG
	San Diego River Bridges	TYLIN
	Carol Canyon Road Extension	Dokken / City of San Diego
	UCSD Pepper Canyon East Housing Development	
	County Highland Valley Storm Drain Improvements	Michael Baker
	UCSD Hillcrest Hospital Development	
	Encinitas Community Park Stormwater Harvesting	FILANC
	Eastern Municipal Reservoir Development	Richard Brady & Assoc.
	Encina Digester 4 Rehabilitation	Encina Wastewater Authority
FALL 2022	San Elijo WWTP Aeration Basin Conversion - Nitrify/Denitrify	SEJPA / Mike Thornton
	SDSU Alvarado Housing Development	SDSU / Amanda Scheidlinger
	SDSU Bike Path (Mesa to MV)	SDSU / Bob Schulz
	Encina Centrate and Scrubber Pump Station and Piping	ENJPA / Scott McClelland
	Seaport San Diego Shoreline Stabilization	Group Delta / Rob Stroop
	Holland St Bike Path Bridge (Pennsylvania)	TYLIN

## Past Design Day Projects & Sponsors

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	PROJECT	SPONSOR
SPRING 2021	Cristobal Subdivision Spring Valley	
	CSUSM Palm Canyon Drive to La Moree Rd	CSUSM
	SDSU Mission Valley High-Rise Hotel	
	Fenton Parkway Bridge	City of San Diego
	Skyline Hills Fire Sta 51s	Michael Baker
	Bay-to-Bay Water Link	
	SEJPA Stormwater Collection and Treatment	San Elijo Joint Powers Authority
	Escondido MFRO Booster Pump Station	City of Escondido
	San Elijo Co-Generation Facility	San Elijo Joint Powers Authority
FALL 2021	Bay-to-Bay Water Link	
	Del Mar Stormwater Capture and Park Irrigation	
	Coastal Rail Trail Oceanside Segment	City of Oceanside / Dokken
	County Animal Center	
	San Elijo JPA New Sludge Dewatering System	SEJPA
	Lemon Grove Roundabouts/Complete Streets	City of Lemon Grove / Rick Engr
	Seaport San Diego Skyway	Gafcon
	Escondido Wastewater Lift Station No. 1 Replacement	
	Rincon Secondary Water Supply Pipeline	Rincon / Dudek



**SDSU**

College of Engineering  
Civil, Construction and  
Environmental Engineering