

SDSU

College of Engineering
**Civil, Construction and
Environmental Engineering**

FALL 2023

**SDSU
ENGINEERING
DESIGN DAY**

Friday, December 8th, 2023 • 2-4pm

Printed by: **FILANC**[®]

Thank you to our Sponsors/Mentors

Program Sponsors



Bruce Urquhart

Project Sponsors



Welcome!

Welcome to the **SDSU College of Engineering's Fall 2023 Design Day**. We are proud to have our undergraduate students showcasing their capstone Senior Design projects completed during the Fall 2023 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 of time for developing these projects and mentoring the students, including Black and Veatch, Group Delta, SANDAG, San Elijo Joint Powers Authority, County of San Diego DGS, and Soboba Band of Luiseno Indians. 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 Stepen and Lynne Doyle Family Foundation, Stantec, Black and Veatch, and Bruce Urquhart.

Lastly, I commend the faculty and instructors for having done such a fabulous job! 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!



A handwritten signature in blue ink that reads "Don Zhao". The signature is fluid and cursive, with a long horizontal line extending from the end of the name.

Dongye (Don) Zhao, Ph.D.

Professor and Chair

Department of Civil, Construction, and Environmental Engineering



Contents

Our Sponsors

Welcome!	1
Requests for Projects	3
Carlsbad Landslide Retaining Wall (GROUP DELTA)	4–5
Soboba Reservation Erosion Repairs (Soboba Indian Reservation, Soboba Band of Luiseno Indians, County of Riverside)	6
Fallbrook Sheriff Station (County DGS)	7
Del Mar Tunnel (LOSSAN Rail) (SANDAG)	8–9
SDSU Bike Path to Mission Valley (SDSU)	10–11
Moonlight Beach Pump Station (San Elijo JPA, City of Encinitas)	12–13
San Vicente Hydroelectric Pumped Storage (Black & Veatch)	14–15

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

John Prince, PE, QSD
619-787-5566
jprince@delanegroup.com

Jim Haughey, PE, LEED AP
858-614-5038
jrhaughey@mbakerintl.com

Mark Filanc, PE, DBIA
760-941-3969
mfilanc@filanc.com

Jeremy LaHaye, PE
619-818-7710
jlahaye@tylin.com

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 and Red levels limited to one company each school year
- Funding supports year-end reception, award for best project team, Design Day, Undergrad Researchers, etc.

	BLACK	RED	TEAL	Project Sponsor
	\$5,000	\$3,000	\$1,000	\$0
Present to CIV E 495/CIV E 100 Classes (300+ students)	X			
Public Agency Co-sponsor of Choice	X			
Recognition in all Emails to Industry	X	X		
Company Logo in Course Materials and Social Media Posts	X	X		
Company Logo on Dept Website and Design Day Program	X	X	X	X
Recognition at Year-End Industry Reception	X	X	X	X
Guests at Year-End Industry Reception	10	5	2	2



TEAM 1



Engineering Team

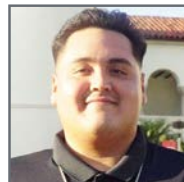
Gerardo Marquina
PM, Geotechnica I / Site Civil

Django Bergcollins
GIS Lead, Traffic / Site Civil

Emily Andreano
Storm Water Lead / Environmental

Yonas Berhane
CAD Lead / Structural

Eisa Alsaleem
Geotechnical



Gerardo Marquina



Django Bergcollins



Emily Andreano



Yonas Berhane



Eisa Alsaleem

Carlsbad Landslide Retaining Wall

Group Delta

DYGEE will be designing improvement plans for the proposed retaining wall to be located in the City of Carlsbad on Park Drive. This project consists of removing the existing retaining wall which has shown signs of failures due to an improper drainage system. The proposed retaining wall will be a cast-in-place retaining wall with an improved drainage system and slope stabilization to limit erosion.

Sponsors/Mentors/Advisors

GROUP DELTA
Chris Vonk, PE
Rob Stroop, PE
Jim Haughey, PE



TEAM 2



Engineering Team

Jacob Daniel Lothrop
PM / Structural

Steven Allen Williams
Hydraulics

Camille Patricia Silverwood
Geotech

Ryan James Muto
Site Civil

Nathan Michael Anthony
Geotech

Tung Ly
Site Civil

Sponsors/Mentors/Advisors

GROUP DELTA
Chris Vonk, PE
Rob Stroop, PE
Jim Haughey, PE



Carlsbad Landslide Retaining Wall

Group Delta

MWALLS Engineering has been tasked with designing a landslide retaining wall for an eroding hillside in Carlsbad, CA. For over 40 years, city maintenance crews have been cleaning soil runoff after every rain storm. The runoff is not only a financial and maintenance issue, but it is a safety issue as well. Along with the new cast-in-place reinforced concrete retaining wall, the MWALLS Engineering team will also be addressing the slope stabilization and drainage system issues. Our design goal is to determine the most cost effective solution that minimizes the impacts to the environment.

TEAM 3



Engineering Team

Vanessa Du
PM / Hydrology

Cecilio C. Cazares
Stormwater

Joshua Josue Gallardo
Geotechnical

Sponsors/Mentors/Advisors

Soboba Soboba Indian Reservation
Soboba Band of Luiseno Indians
County of Riverside
Joseph E. Bonadiman & Associates
Jim Haughey, P.E.



Soboba Reservation Erosion Repairs

Soboba Band of Luiseno Indians

TerraGuard Engineering will provide civil design services for the Soboba Band of Luiseno Indians to solve erosion issues within the reservation. Targeting three specific areas that are crucial to the reservation in times of emergencies and everyday use. The project also includes geotechnical design and stormwater management.

TEAM 4



Engineering Team

Brooke Shibley
PM / Stormwater

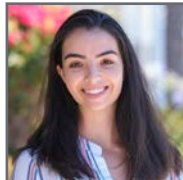
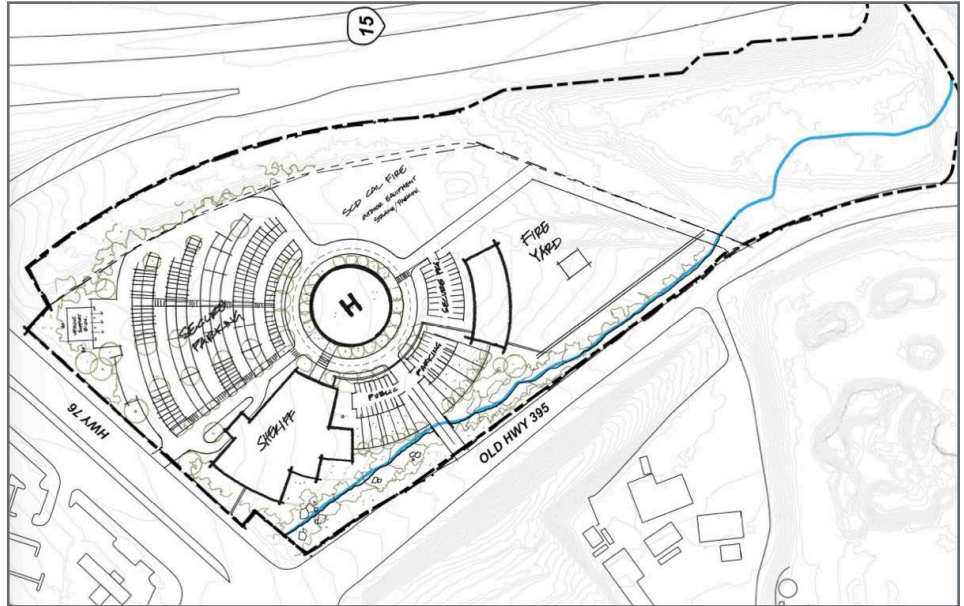
Fernando Gutierrez
Water & Wastewater

Michelle Gile
Geotechnical / Transportation

Anthony Pang
Site Civil

Sponsors/Mentors/Advisors

County DGS
Stephen Schmidt



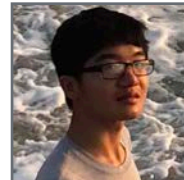
Brooke Shibley



Fernando Gutierrez



Michelle Gile



Anthony Pang

Fallbrook Sheriff Station

County DGS

The project consists of approximately 18.5 acres of land located west of Interstate 15, south of CA State Route 76, and east of Old Highway 395 in the incorporated area of Fallbrook, San Diego County. The proposed project will be located within the northern disturbed area of the parcel approximately 238,000 SF of the site and consists of 37,000 Sheriff Station Facility and a 122,000 SF parking lot with a total of 262 spaces.

TEAM 5



Engineering Team

Jesus Castro-Horta
PM / Structural

Matthew Pardo
Site Civil

Andrew Rodríguez
Construction

Marcus Zofrea
Environmental

Tomas Bautista
Water Resources



Jesus Castro-Horta



Matthew Pardo



Andrew Rodríguez



Marcus Zofrea



Tomas Bautista

Sponsors/Mentors/Advisors

SANDAG

Bruce Smith

Allie De Vaux

Jeremy LaHaye, PE



Del Mar Tunnel (LOSSAN Rail Corridor)

SANDAG

LOSSAN Del Mar Tunnel has five proposed alignments that run through the City of Del Mar. All of the alignments run through various portions of the Del Mar community, ensuing debate. The objective of this project is to determine which alignment is the Least Environmentally Damaging Practicable Alternative (LEDPA). Studies of the environmental impacts and cost-to-benefit of each alignment will be required.

TEAM 6



Engineering Team

Jonathan Pfleger
PM

Marven Kandor
Stormwater

Water/Wastewater

Alireza Emami Taleghani
Geotech/Transpo

Joshua Peter Candelaria

Coral Esmeralda Meza Gonzalez

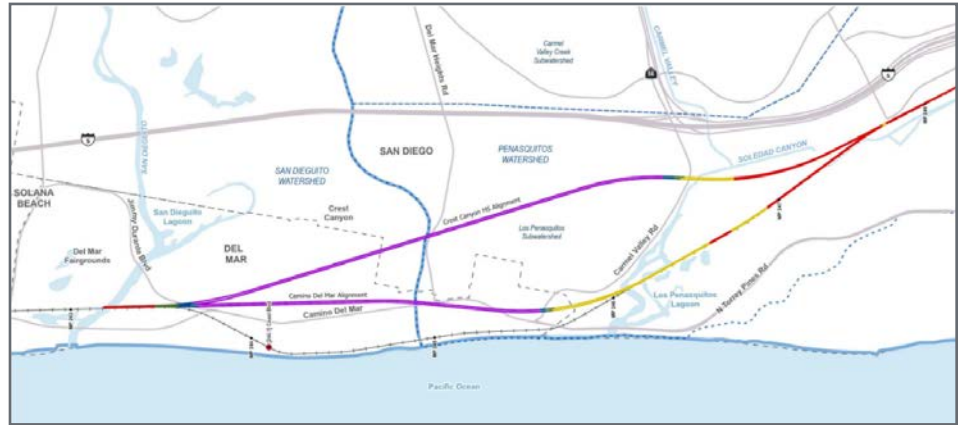
Sponsors/Mentors/Advisors

SANDAG

Bruce Smith

Allie De Vaux

Jeremy LaHaye, PE



Del Mar Tunnel (LOSSAN Rail Corridor)

SANDAG

The Del Mar tunnel project is an initiative to design and construct a new alignment of the rail that runs from Sorrento valley through the Los Penasquitos Lagoon, through Del Mar Heights, through the Del Mar Lagoon finishing at the fairgrounds. The demand for this rail realignment is growing due to bluff erosion and aging infrastructure of critical spans. Our team's main objective was to complete a comparative analysis of two of the alignment alternatives, researching, comparing and contrasting the environmental impact, efficiency, constructability, and feasibility of the two alternatives. We researched environmental, geotechnical, hydrological, economic, and transportation design considerations and weighed the differences in order to evaluate the Least Environmentally Damaging Practicable Alternative. We analyzed technical analysis reports and determined key design specifications and recommendations.

TEAM 7



Engineering Team

Jacob Ninomiya
PM / Geotechnical

Brenden Dougherty
Construction

Pedro Travesia
Land Devel / Groundwater

Danny Truong
Transpo/CADD

Sponsors/Mentors/Advisors

Keller NA

Lito Santos

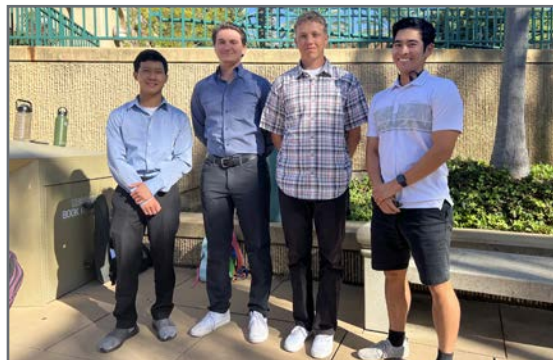
GEI Consultants

Emerson Revolorio

Lima Saft

Tammy Parsons

Jeremy LaHaye, PE



SDSU Bike Path to Mission Valley

The SDSU to MV Bike path is a safe, convenient and scenic connection between the beautiful campus of San Diego State University and the driving area of Mission Valley. As of right now, there is not a pedestrian specific route currently implaced,, so UrbanBuild Innovations has proposed and designed a bike path connecting the two destinations.

TEAM 8



Engineering Team

George Robert Madara
PM

Kori Sean George

Mark Isaac Garcia-Serna

William Frank Dang

Aaliyah Chavolla

Sponsors/Mentors/Advisors

Jeremy LaHaye, PE



SDSU Bike Path to Mission Valley

MAGDAK Engineering is designing a 3-mile long class 1 bike path that will aid in connecting SDSU's Main Campus with the Mission Valley Campus. The goal of this project is to provide detailed exhibits and reports which include but are not limited to: Site Plans, Hydrology Studies, Structural Studies, Environmental Damage Mitigation, and Cost Estimates. MAGDAK Engineering believes this project will positively impact the local community and plans to provide services to the best of our ability.

TEAM 9



Engineering Team

Trinity Elize Magdalena Weary
PM

Jordan Sarah Browne

Brendan Linden Morrison

Denise Renee Pierce



Sponsors/Mentors/Advisors

San Elijo JPA

City of Encinitas

Natalie Mladenov

Mathew Verbyla



Moonlight Beach Pump Station

San Elijo JPA

Coastal Consulting has designed a pump replacement and wastewater force main rerouting for the Moonlight Beach Pump Station. It will divert sewage for the City of Encinitas from the Encina Wastewater Treatment Plant to San Elijo's Water Reclamation Facility. This forcemain rerouting will yield a more sustainable and more cost effective water reclamation system. It also aligns with the treatment facilities capacities, which will allow for more municipal growth.

TEAM 10



NMBR ENGINEERING

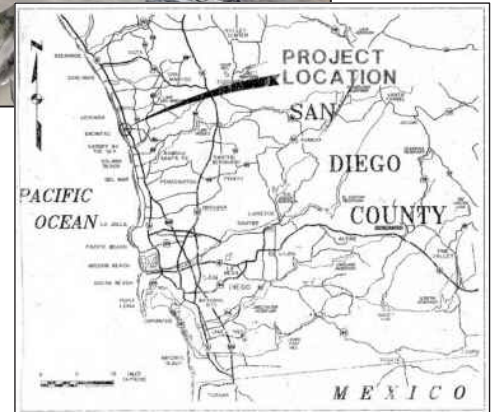
Engineering Team

Brenna Mary Birren
PM

Runzah Qayssar Polus

Masha Pomaskin

Naseem Zoe Bahar



Vicinity Map

Sponsors/Mentors/Advisors

San Elijo JPA

Tom Falk

Michael Thornton

City of Encinitas

San Elijo Joint Powers Authority

Encina Wastewater Authority

Mark Filanc, PE



Moonlight Beach Pump Station

San Elijo JPA

The Moonlight Beach Pump Station currently collects and pumps all wastewater from the surrounding area to the Encina Water Pollution Control Facility. The city of Encinitas is aiming to redirect a portion of this wastewater to San Elijo to reduce costs, conserve energy, and save water for its customers. Therefore, this project will focus on designing an additional pipeline from the Moonlight Beach Pump Station routed to the San Elijo Water Reclamation Facility. For this project, NMBR Engineering Co. has made drawings of the current and proposed pipeline routings. A site visit was conducted to identify and evaluate any pipeline design considerations and parameters. Additionally, any necessary permits, plans, and studies were included in our design to help achieve desired project results.”

TEAM 11



WATTWAVE ENGINEERING
EST. 2000

Engineering Team

Jess Rubio

PM / Environmental

Crysten Gomez

Civil

Mauricio Estrada

Environmental

Ulyssa Jazmin Martinez

Civil

Sponsors/Mentors/Advisors

Black & Veatch

Richard Trembath PE

Mark Filanc, PE



BLACK & VEATCH



San Vicente Hydroelectric Pumped Storage

Black & Veatch

The SVPS project redefines sustainable energy infrastructure by seamlessly integrating an upper reservoir with existing RCC embankment dams at the San Vicente Reservoir in Lakeside, CA. Our focus on environmental preservations is matched by our commitment to community engagement, reflected in our educational initiatives and job creation efforts. Striving for the highest standards of safety and sustainability, we prioritize stringent regulatory compliance and the use of internationally recognized rating systems. The project represents a model of successful integration of innovation, environmental stewardship, and social responsibility, setting a new benchmark for responsible energy development.

TEAM 12



Engineering Team

Garreth Konig
PM

Duncan Belfour
Construction

Ragen Nunez
Hydraulics

Kristelle Moreno
Structural

Jamie Medlin
Hydraulics

Jessica Medlin
Hydraulics



Sponsors/Mentors/Advisors

Black & Veatch
Richard Trembath PE
Nensi Lakrori, PE, MS, LEED AP
Mark Filanc, PE



San Vicente Hydroelectric Pumped Storage

Black & Veatch

San Vicente Reservoir in Lakeside, California is undergoing a transformation into an energy storage facility. This conversion aims to generate 500 MW of power daily, addressing the increasing energy demand in San Diego County. Using sustainable energy, the water used to generate electricity will be pumped from the lower San Vicente Reservoir to the newly constructed reservoir via a tunnel conveyance system that we optimized, including an inlet/ outlet facilities, and combined pump turbine system. Our design will allow water to flow efficiently between reservoirs, playing a crucial role in energy generation. By utilizing the best available resources, our tunnel conveyance system will be designed to last for generations.

SDSU

College of Engineering
**Civil, Construction and
Environmental Engineering**

**SDSU
ENGINEERING
DESIGN DAY**

FALL 2023

