

2023 ASCE Concrete Canoe Competition

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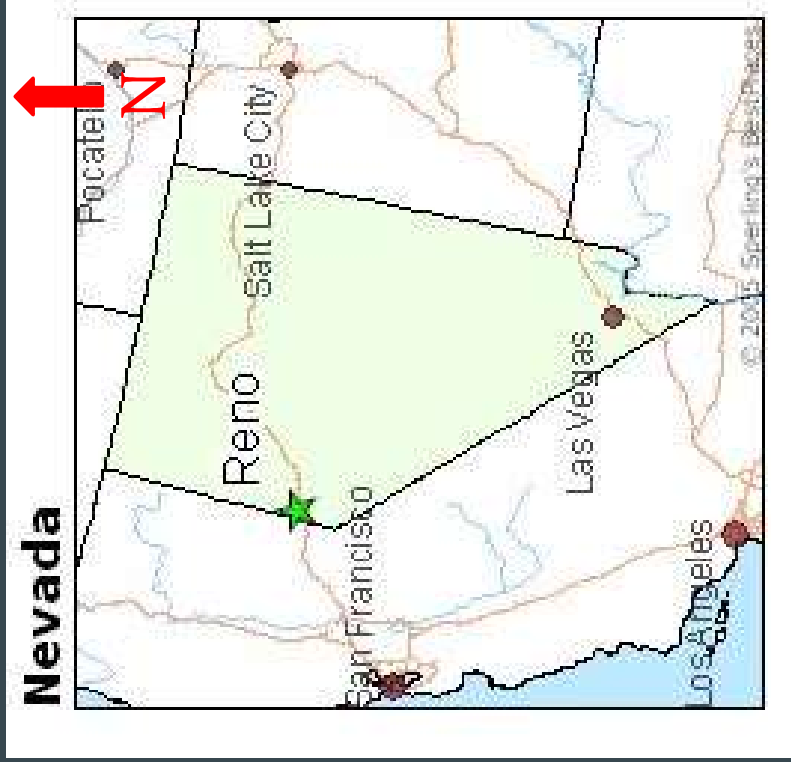
Project Purpose and Background

- Explore concrete mix design and project management through hands-on, practical experience, exposure to new leadership roles
- Create a full-scale concrete canoe prototype for the Concrete Canoe Competition Committee
- Present and Compete at Intermountain Southwest Student Symposium

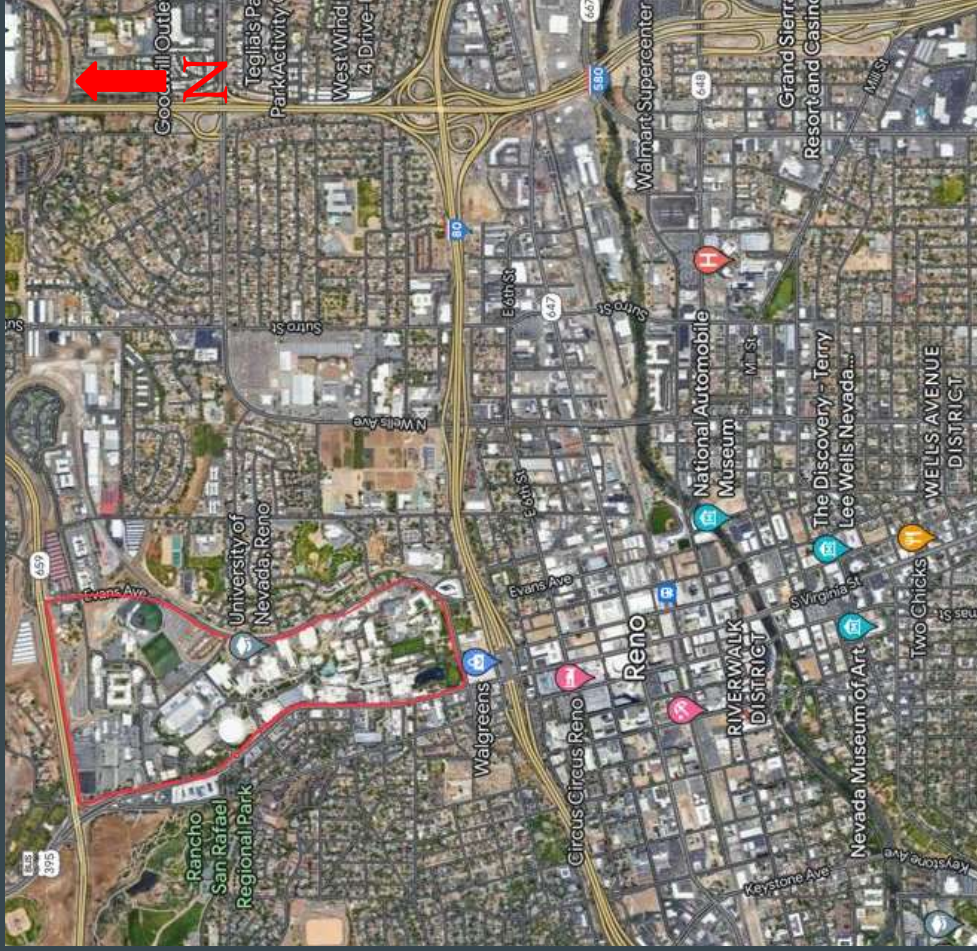


Project Location

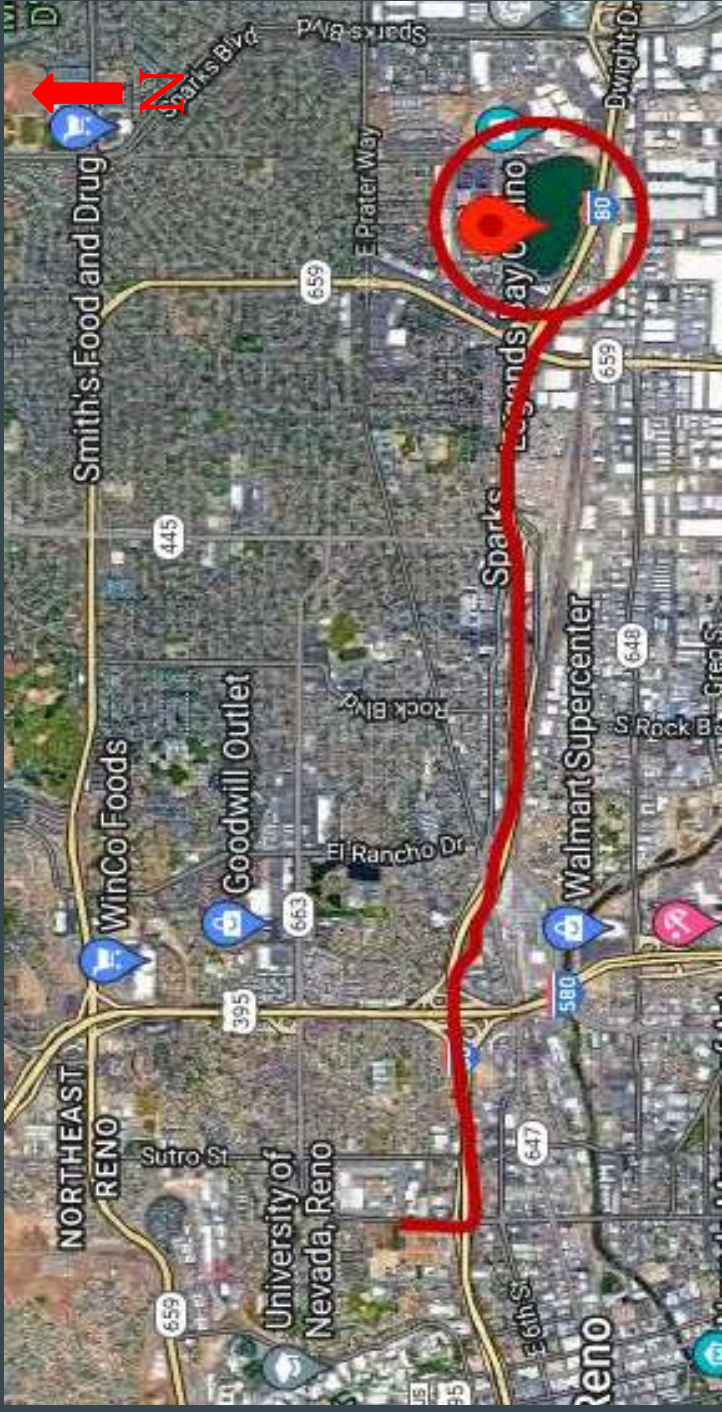
- 2 Primary Locations by phase
 - Competition Phase: University of Reno & Sparks Marina Park



Reno, Nevada [4]



University of Reno



Sparks Marina Park

Scope of Services

- Task 1: Concrete Mixture Design
 - Task 1.1: Mix Design
 - Task 1.2: Mix Development
 - Task 1.3: Testing
 - Task 1.4: Analysis of Test Results
 - Task 1.5: Suite of Potential Designs



Scope of Services

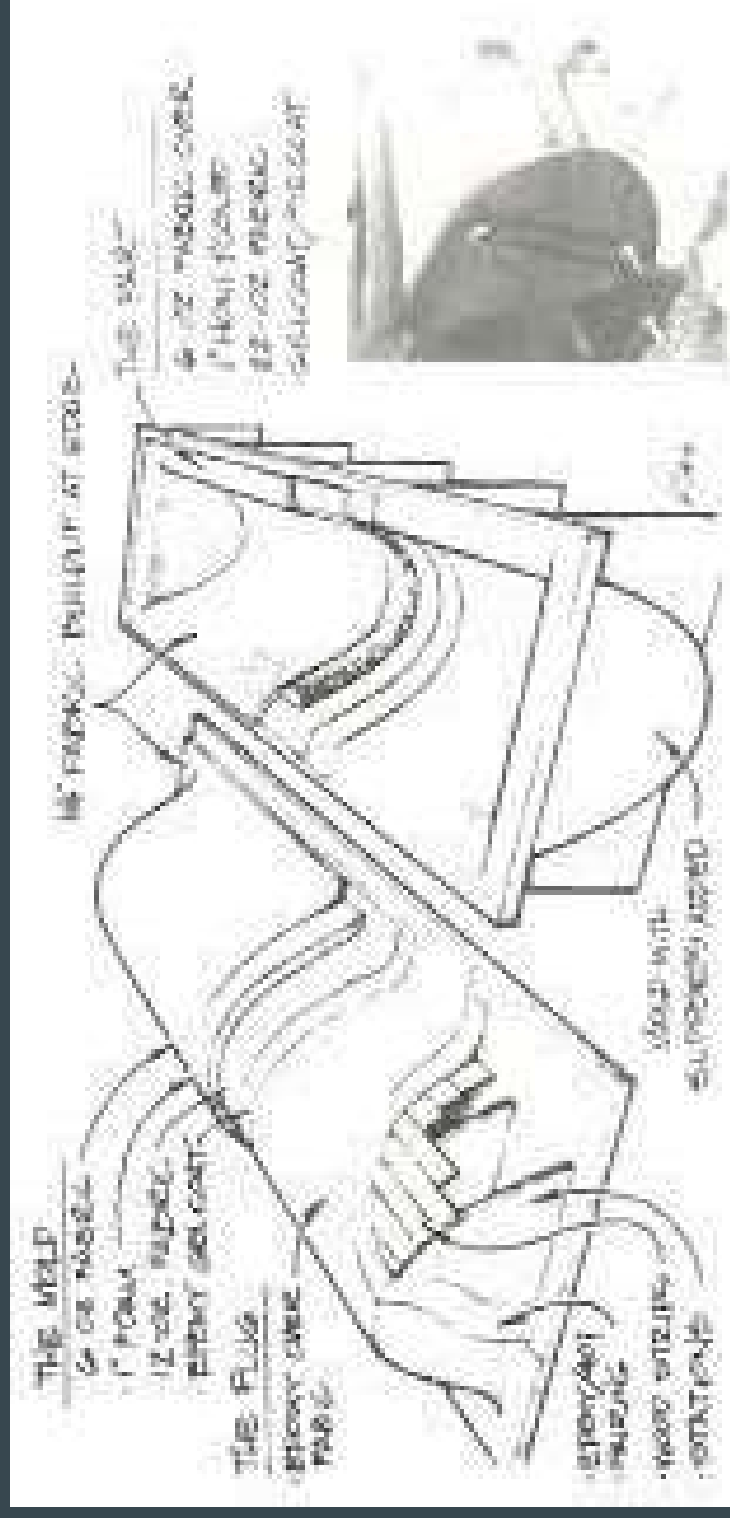
- Task 2: Reinforcement Design
 - Task 2.1: Materials Research
 - Task 2.2: Procurement
 - Task 2.3: Testing
 - Task 2.4: Creation of a Reinforcement Scheme



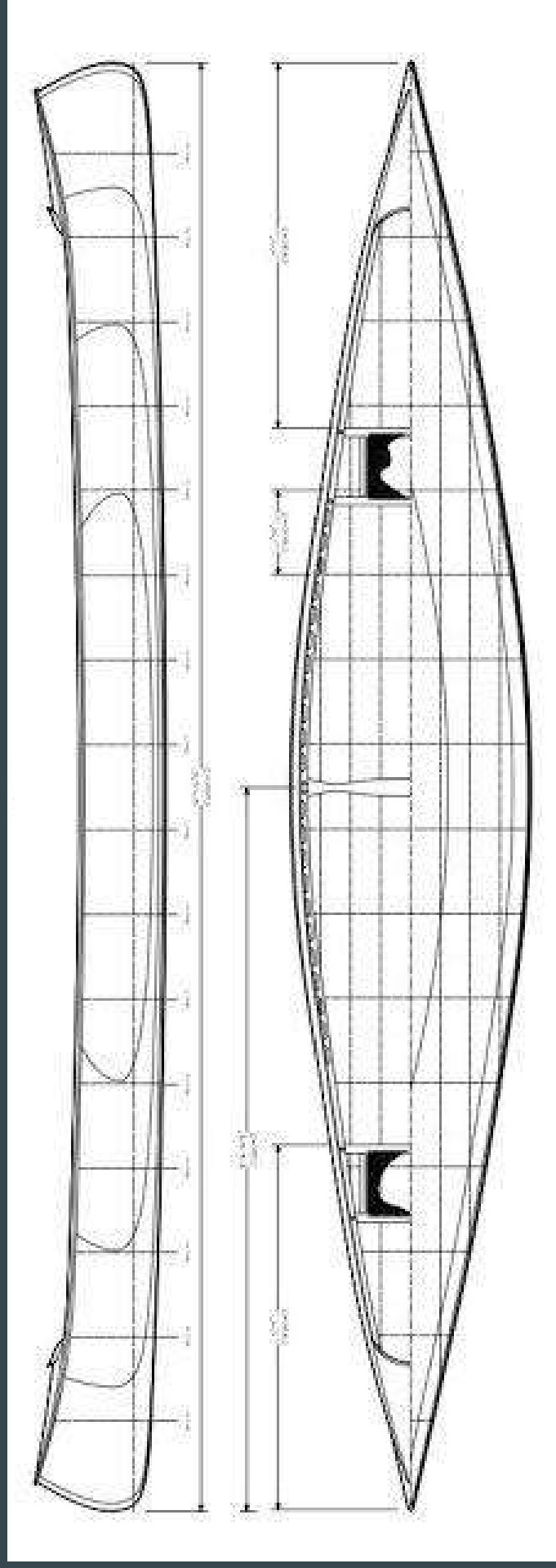
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Scope of Services

- Task 3: Hull Design
 - Taks 3.1: Design Preparation
 - Task 3.2: Suite of Potential Designs
 - Task 3.3: Mold Acquisition



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Scope of Services

- Task 4: Construction
 - Task 4.1: Recruitment of Mentees
 - Task 4.2: Assembly of Formwork
 - Task 4.3: Concrete Batch Mixing
 - Task 4.4: Concrete Placement
 - Task 4.5: Concrete Surface Finishing
 - Task 4.6: Curing



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Scope of Services

- Task 5: Intermountain Southwest Student Symposium Competition
 - Task 5.1: Trailer Preparation
 - Task 5.2: Student and Canoe Transportation
 - Task 5.3: Canoe Racing
- Task 6: Evaluation of Project Impacts
 - Task 6.1: Evaluation of Social Impacts
 - Task 6.2: Evaluation of Environmental Impacts
 - Task 6.3: Evaluation of Economic Impacts



Scope of Services

Project Deliverables

- CENE 486
 - 30%, 60%, 90% Reports and Presentations
 - Final Report, Website, and Presentation
- ASCE
 - Letter of Intent, Pre-Qualification Form
 - Project Delivery Schedule
 - Project Proposal and Material Data Sheet Addendum
 - Competition Display
 - Presentation
 - Races



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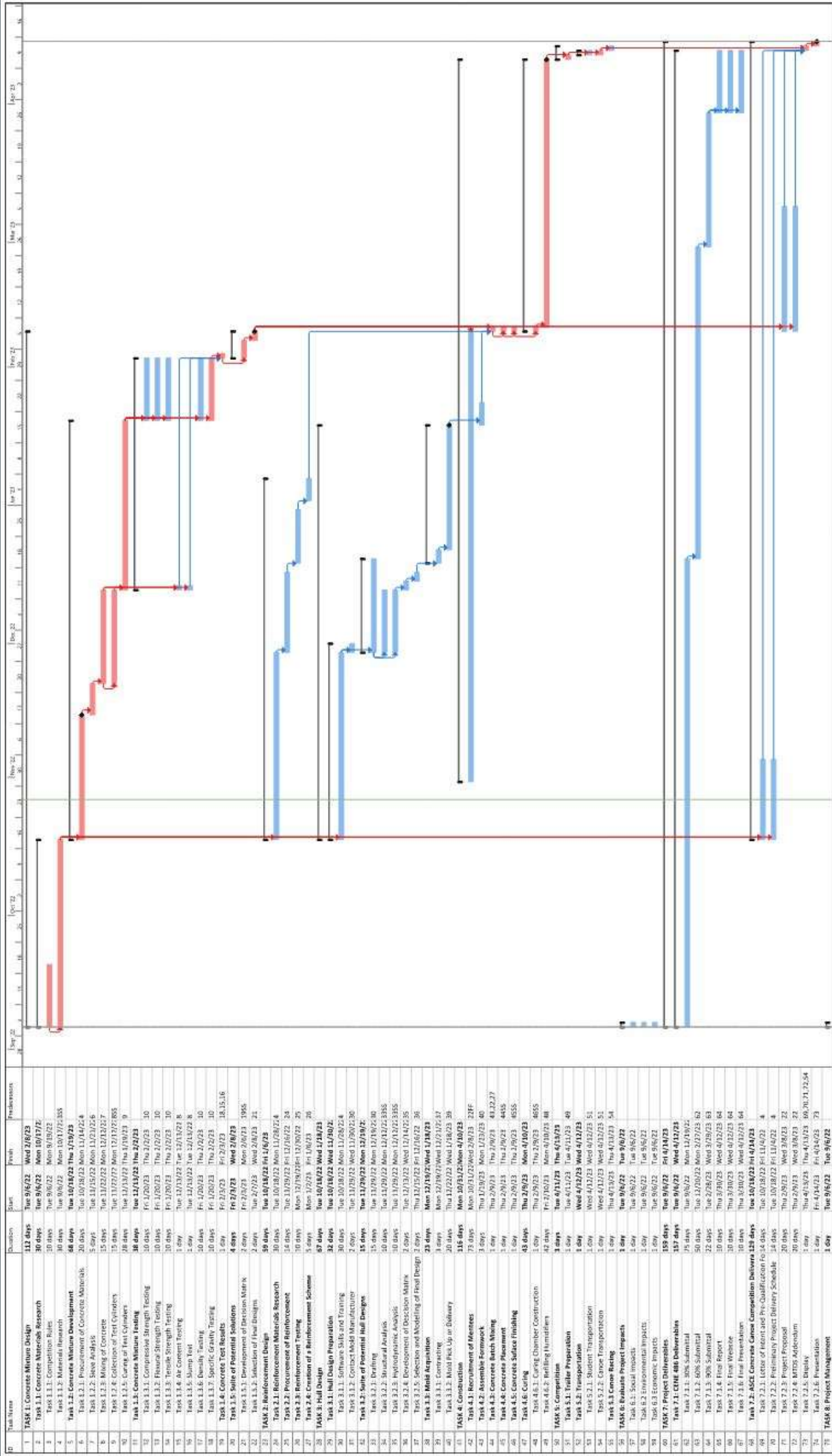
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Scope of Services

- Project Management
 - Meetings
 - General
 - Grading Instructor
 - Technical Advisor
 - Client
 - Schedule Management
 - Resource Management

Project Exclusions

- Outsourced Tasks
 - Select Concrete Cylinder Tests
 - Hull Mold Fabrication
- ASCE Deliverables
 - ASCE Student Chapter Annual and Dues Payment Reports



Staffing

- Staffing Positions
 - Senior Engineer (SENG)
 - Engineer (ENG)
 - Lab Technician (TECH)
 - Safety Officer (SO)
 - Intern (INT)
- Projected 950 total hours

Position	Hours
SENG	125
ENG	225
TECH	150
SO	150
INT	300
TOTAL	950

Task Name	SENG Hours	ENG Hours	TECH Hours	SO Hours	INT Hours
TASK 1: Concrete Mix Design	20	59	78	32	72
Task 1.1: Concrete Materials Research	2	9	21	7	15
Task 1.2: Concrete Mixture Development	0	15	24	14	32
Task 1.3: Concrete Mixture Testing	0	0	18	4	10
Task 1.4: Concrete Test Results	18	35	15	7	15
TASK 2: Reinforcement Design	5	24	16	2	25
Task 2.1: Reinforcement Materials Research	0	10	5	0	10
Task 2.2: Procurement of Reinforcement	0	4	4	0	10
Task 2.3: Reinforcement Testing	0	0	5	2	5
Task 2.4: Reinforcement Scheme Creation	5	10	2	0	0
TASK 3: Hull Design	24	63	10	7	48
Task 3.1: Hull Design Preparation	10	10	0	0	10
Task 3.2: Suite of Potential Hull Designs	14	45	10	7	30
Task 3.3: Mold Acquisition	0	8	0	0	8
TASK 4: Construction	18	22	29	36	49
Task 4.1: Recruitment of Mentees	10	4	5	5	10
Task 4.2: Assemble Formwork	2	4	5	5	5
Task 4.3: Concrete Batch Mixing	2	5	4	4	4
Task 4.4: Concrete Placement	2	5	5	10	10
Task 4.5: Concrete Surface Finishing	2	4	5	10	10
Task 4.6: Curing	0	0	5	2	10

Task Name	SENG Hours	ENG Hours	TECH Hours	SO Hours	INT Hours
TASK 5: Competition	0	2	0	28	33
Task 5.1: Trailer Preparation	0	2	0	0	5
Task 5.2: Transportation	0	0	0	28	28
Task 5.3 Canoe Racing	0	0	0	8	8
TASK 6: Evaluate Project Impacts	6	12	0	15	6
Task 6.1: Social Impacts	2	4	0	5	2
Task 6.2 Environmental Impacts	2	4	0	5	2
Task 6.3 Economic Impacts	2	4	0	5	2
TASK 7: Project Deliverables	16	19	10	5	59
Task 7.1: CENE 476 Deliverables	10	16	2	2	38
Task 7.2: ASCE Concrete Canoe Competition Deliverables	6	3	8	3	21
Project Management	36	24	7	25	8
Meetings	23	24	7	25	8
Schedule Management	11	10	0	1	0
Resource Management	2	0	3	10	0
<i>Subtotal:</i>	125	225	150	150	300
<i>Total (person-hours)</i>	950				

Staffing Qualifications

- **SENG** - Clients, structural analysis, concrete mix design, hydrostatic & hydrodynamic principles, finalizer, and time management.
- **ENG** - Codes, calculations, overseer, structural analysis, concrete mix design, hydrostatic & hydrodynamic principles
- **TECH** - ASTM testing, material pickup, PPE acquisition
- **SO** - Safety lab procedures, safety agreement, PPE acquisition
- **INT** - General work under ENG & TECH, driving, material handling, racing

Cost of Engineering Services

Description	Quantity	Unit of Measure	Rate (USD)	Cost
Personnel				
SENG	125	Hr.	\$120	\$14,950.00
ENG	225	Hr.	\$88	\$19,872.00
TECH	150	Hr.	\$62	\$9,315.00
SO	150	Hr.	\$87	\$13,041.00
INT	300	Hr.	\$38	\$11,385.00
Total Personnel				\$68,563.00
Travel				
Travel for Material Acquisition				
Transportation	300	Miles	\$0.40	\$120.00
Travel for Competition				
Transportation	1,500	Miles	\$0.40	\$600.00
Van Rental	1	Van/Week	\$340	\$340
Hotel Rooms	3	Nights (2 rooms)	\$400	\$1,200
Total Travel				\$2,260.00

Description	Quantity	Unit of Measure	Rate (USD)	Cost
Lab Use				
Field Station	8	Days	\$100	\$800
Materials Testing Lab	4	Days	\$100	\$400
Total Lab Use				\$1,200.00
Sub-Contracting				
ASTM Testing	8	Hr.	\$200	\$1,600
Mold Cutting	1	Mold	\$2,000	\$2,000
Total Subcontracting				\$3,600
Materials				
Cementitious Materials	10	Cubic Feet	\$8	\$80
Aggregate	12	Cubic Feet	\$22	\$264
Admixtures	1	GAL	\$20	\$20
Reinforcement	20	Square Yard	\$15	\$300
Total Materials				\$664
Project Total				\$76,287

Questions?

References

- [1] ASCE Committee on Concrete Canoe Competitions, "2023 American Society of Civil Engineers Concrete Canoe Competition Request for Proposals," American Society of Civil Engineers, Reston, 2022.
- [2] ASCE, "ASCE Concrete Canoe Competition," American Society of Civil Engineers, [Online]. Available: <https://www.asce.org/communities/student-members/conferences/asce-concrete-canoe-competition/>. [Accessed 18 September 2022].
- [3] Sperling's Best Places, "Flagstaff, Arizona," [Online]. Available: <https://www.bestplaces.net/city/arizona/flagstaff>. [Accessed 24 September 2022].
- [4] Sperling's Best Places, "Reno, Nevada," [Online]. Available: <https://www.bestplaces.net/city/nevada/reno>. [Accessed 24 September 2022].
- [5] "University Transit Services Vehicle Rental," Northern Arizona University, [Online]. Available: <https://in.nau.edu/university-transit-services/fleet-services/vehicle-rental/>. [Accessed 4 November 2022].
- [6] N. ASCE, "Instagram," Instagram, 27 November 2022. [Online]. Available: https://www.instagram.com/p/CceAGFnvqZ9/?next=%2Fnau_asce%2F&hl=en.
- [7] SUNDT, "Media Kit," SUNDT, 2022. [Online]. Available: <https://www.sundt.com/news-updates/media-kit/>.
- [8] Chevrolet, "2023 Express Vans," Chevrolet, 2022. [Online]. Available: <https://www.chevrolet.com/commercial/express>.
- [9] I. REMAL Consulting, "About Us," REMAL, 2022. [Online]. Available: <https://remalconsulting.com/about-us>.
- [10] B. Knight, "Light-Duty Mold Construction," Epoxysworks, 4 May 2014. [Online]. Available: <https://www.epoxyworks.com/index.php/light-duty-mold-construction/>
- [11] B. Backus, "4 Important Steps to Reliable Concrete Test Cylinder Samples," Gilson Company, Inc. [Online] Available: <https://www.globalgilson.com/blog/four-important-steps-to-reliable-concrete-samples>. [Accessed 28 November 2022].