



CU Baja Specification and Planning Report

2025-2026

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Table of Contents

Project Schedule.....	3
Budget Status and Anticipated Budget.....	3 – 4
Overall Goals.....	4
Sub-Team Goals.....	4 – 6
Specification Table.....	6
Appendix.....	7

Project Schedule:

The project schedule below includes all important dates for deliverables and vehicle milestones.

- Spec and Planning Report – 9/26
- PDR – 10/9
- Steel Order – 10/16
 - (Gives us 1 week to roughly finalize chassis)
- CDR – 11/12
- First Major Parts Order – 11/19
 - (One week after CDR so we can finalize changes)

*** Fall Break – (11/22 – 11/30) ***

- Manufacturing Review – 12/5
 - (Last Day of Classes)
- Start of Chassis – 12/8

*** Winter Break – (12/12 – 1/8) ***

- Rolling Chassis – 1/23
- Running Vehicle – 2/26
 - (Midsemester Reading Day)
- First Round of Testing – 2/28
- Second Round of Testing – 3/14

*** Spring Break – (3/14 – 3/22) ***

- Third Round of Testing – 3/28
- Fourth Round of Testing – 4/11
- Fifth Round of Testing – 4/25

*** Final Exams – (4/27 – 5/1) ***

- Baja SAE Oregon – (5/7 – 5/10)
- Baja SAE New York – (6/11 – 6/14)
- Baja SAE Ohio – (9/24 – 9/27/2026)

Current Budget Status and Anticipated Budget:

The team currently has \$1600 of spendable funds in our donations account and \$2000 of anticipated funds through Design Center Colorado. Based on our research, competition, including food, housing, and transportation will cost in the ballpark of \$9500 - \$10,500. Based on previous years' vehicle building costs, and thinking about what we can reuse, we will budget \$6500. This budget is built on the assumption that we receive zero in-kind sponsorships for

materials, specifically excluding EMJ's contribution. Our goal for sponsorship is to receive \$20,000. This provides a cushion for our anticipated budget and allows us the opportunity to pay expedited shipping fees and make other beneficial, hard to predict, purchases down the road.

Overall Goals:

Our team has two design-oriented goals and one performance-oriented goal (listed in order of priority):

- Complete endurance with no failures.
- Reduce weight by 10% (slightly more than 50lbs) compared to last year's car.
- Increase serviceability and ease of assembly for critical components. (Difficult to quantify)

These goals will steer our overall design initiatives. Sub-team's individual goals and design specifications need to align with the overall goals. Our team will also focus on providing better technical documentation, including testing procedures and results, for future teams to reference.

Sub-team Goals:

Suspension goals:

- I. Goal: Reduce body roll in cornering by 5%.
Reason: This will provide an increase in stability in off-camber turns.
Implantation: Raise the roll center, bringing it closer to center of gravity
- II. Goal: Have zero set-in from suspension travel (shocks return the vehicle to designed ride height after compression).
Reason: This will make all travel constantly usable and the handling more uniform.
Implantation: Redesign bushings and angle shocks to increase progression through travel.

Control goals:

- I. Goal: Make electronic controls more accessible.
Reason: Current controls (for differentials) are in a dangerous spot to reach while driving.
Implantation: Make new wheel that maintains strength and incorporates the differential switch[es].
- II. Goal: Create a lighter brake pedal with more travel.
Reason: This will save weight and improve driver ergonomics.
Implantation: We will create a new pedal that has adjustable geometry and that uses water-jet steel arms.
- III. Goal: Improve the throttle pedal cable clamping reliability.

Reason: This will increase ease of adjusting the throttle (via barrel adjuster), provide a better feel, and won't lose tension if pressed hard due to an impact/ roll over.

Implantation: We will use cable barrel housing (like how motorcycle clutch cables or bike cables attach), add a spring at the pedal, and adding a spring at the throttle body.

Drivetrain goals:

- I. Goal: Complete the endurance course without failure
Reasoning: Allows more points to be scored in competition resulting in better placement.
Implementation: Design critical components to a safety factor of 2 for worst case scenarios.
- II. Goal: Any drivetrain component will be removeable in less than 15 minutes.
Reasoning: In case of a failure at competition, having the ability to fix the car quickly will be extremely valuable.
Implementation: Removeable covers designed in parallel with the drivetrain system, every standard – sized bolt can be accessed by a tool, components can be removed independently from one another.
- III. Goal: Lower the COG of the drivetrain by 30% compared to last year's car.
Reasoning: Lower COG will help with cornering by reducing roll.
Implementation: Lower the engine and CVT to the lowest part of the car, and reduce weight on covers

Chassis Goals:

- I. Goal: Increase manufacturability
Reasoning: talking to Brock and Pat about issues previous teams had with odd joints, not being able to cope tubes/need hand filing, reducing time to assemble.
Implementation: purposeful design of the chassis to avoid complex copes or hand filing. Also, increase cad testing for serviceability, leaving room to remove covers (motion modeling)
- II. Goal: reduce single use bars
Reasoning: reduce weight in areas we can without compromising structural integrity, reduce complexity of frame
Implementation: work with systems engineer more to determine if sub teams can share crossmembers (for example: using the same bar to support brakes, gas, steering wheel rather than individually)
- III. Goal: reduce the wheelbase of the current car by 6 inches, and the overall length by 10 inches

Reasoning: This works with suspensions goal to become closer to square wheelbase/trackwidth, reducing weight with shorter lengths of tubing, improving turning radius

Implementation: We will remove wasted space from current chassis, increase firewall angle to 20 degrees, analyzing designs from teams with smaller cars for packaging, and remove chassis bump-outs beyond suspension pickup points.

Specification Table:

Figure 1 in the appendix presents the specifications for our design. Some of these specifications are carried over from external sources or previous documentation, while others are original to our project. In particular, any specification that references the “Spec and Planning Doc” as its source represents a self-prescribed requirement that our team has created and is formally documenting for the first time.

Appendix:

Revisions Table							
Revision Number	Date	Change Description	Modified By				
0	9/18/2025	Initial Release	Julian				
1	9/19/2025	Added Suspension Based Specifications	Nate				
2	9/20/2025	Added Drivetrain Specifications	Narayan				
3	9/23/2025	Added Chassis Specifications	Aidan				
4	9/25/2025	Edits made to comments and soecifications. Industry codes added.	Julian				

ID	Category	Specification Statement	Source	Applicable Industry Standards or Codes (if Applicable)	Date	Verification Type	Resonsible Team/Engineer	Comment
1.1	Performance	The turning raduis will be equal to or less then 12ft	Spec and Planning Doc	N/A	10-Oct	Test	Suspension/chassis /Controls	Shorten the wheelbase and increase steering angle
1.2	Performance	The car will have at least 10in of travel	Spec and Planning Doc	N/A	10-Oct	Inspection	Suspension	Angle shocks to increase progression
1.3	Performance	Car will have 5% less body roll	Spec and Planning Doc	N/A	10-Oct	Test	Suspension	Raise the Roll center by adjusting A-arm angles
2.1	Design Goal	Covers correctly implemented in CAD	Rulebook/Spec Doc	SAE B.9	10-Oct	Inspection	Drivetrain/chassis	Design covers in parallel with system design
2.2	Performance	Cars COG will be lowered by at least 10%	Spec and Planning Doc	N/A	10-Oct	Analysis	Drivetrain/chassis	Move engine / CVT lower
2.3	Performance	Car will have a maximum speed of 28 mph	Spec and Planning Doc	N/A	12-Nov	Test	Drivetrain	changing CVT range and downstream gear ratios.
2.4	Design Goal	Design for worse-case competition conditions	Spec and Planning Doc	N/A	10-Oct	Analysis	Drivetrain	High safety facotrs where necessary
3.1	Performance	Minimize Bump-Steer	Spec and Planning Doc	N/A	12-Nov	Analysis	Controls	Maximum of 2% through full suspension travel
3.2	Design Goal	Incorporate Controls into Steering Wheel	Spec and Planning Doc	N/A	10-Oct	Inspection	Controls	Put diff. lock and commu-nication button on wheel
3.3	Design Goal	Reliable Throttle Cable with fail safe	Rulebook	SAE B.7.2	10-Oct	Test	Controls	Throttle should achieve 100% power over 50 test cycles
4.1	Design Goal	Increase manufactureability and serviceability	Spec and Planning Doc	N/A	12-Nov	Inspection	Chassis	Minimize hand filing, forming, and assembly interferences early in CAD
4.2	Design Goal	Minimize secondary bars	Spec and Planning Doc	N/A	8-Oct	Inspection	Chassis	Reduce weight, share bars where possible, minimize mistake bars
4.3	Design Goal	Car will be 10 inches shorter end-end	Spec and Planning Doc	N/A	10-Oct	Inspection	Chassis	Implement 20% firewall, tighter packaging, use interior space better
4.4	Design Goal	Target FOS of 2 in all impact tests	ANSI-RHOVA	11.1-11.2.4	12-Nov	Analysis	Chassis	Also test rollover case, last year didn't

Figure 1: Specification Table