OFFICE OF SUSTAINABILITY
CAMPUS SUSTAINABILITY FUND

Forms of Rio Tinto - Progress Report

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Project Manager Name
Cynthia Navarro

Requested Metrics

Core project team (planning + execution):

Project Manager (student / Cynthia Navarro):

-50–60 hours total coordinating all aspects of the project, including outreach, communications with the College of Engineering and Honors College, interview and selection process, internal meetings, HR coordination, procurement organization, and technical review sessions with Dr. Kim and Abhijit.

Faculty Advisor (Dr. Kim):

-5–7 hours of limited but essential technical guidance and planning during maternity leave availability.

Doctoral Student Assistant (Abhijit):

-15 hours assisting with procurement procedures, vendor communication, and laboratory readiness tasks.

4 Undergraduate Research Assistants:

Selected; HR onboarding in progress. Hours will begin in January 2026.

Total team members: 7
Total cumulative hours to date: 70–82 hours

Project Accomplishments

This semester, the Forms of Rio Tinto project accomplished several key administrative, technical, and outreach milestones that establish a strong foundation for next semester's experimental work. A

major accomplishment was completing an expanded outreach and hiring process. What was originally planned for one week extended to nearly three due to high interest and the need to work closely with the College of Engineering and the Honors College to reach the right student audience. Using a structured interview rubric, I conducted three days of interviews and selected four research assistants, who received an introduction to the project's goals and their assigned roles.

In parallel, I spent two weeks meeting with Dr. Kim to review technical adjustments, refine the research plan, and outline the sequence for microbial and concrete testing. I also coordinated procurement activities with Abhijit, a doctoral student assisting with purchases. Together, we completed a materials inventory, initiated orders, and communicated with ATTPX regarding Sporosarcina pasteurii cultures and permitting. HR is now processing the hiring paperwork for the student team.

Another notable advancement was being selected to speak at a professional conference, where I presented the project's concept. This created valuable networking opportunities with engineers working in sustainability and mining. Several expressed interest in learning more next semester, opening the door to potential mentorship, collaboration, or resource support.

Overall, the semester established the administrative and technical groundwork required for a successful transition into laboratory experimentation in Spring 2026.

Next Steps

The next steps for the Forms of Rio Tinto project focus on moving from administrative preparation into an active phase of laboratory research, microbial optimization, and fabrication beginning in January 2026. During the first weeks of the semester, the newly hired research assistants will complete all mandatory M2D Lab safety trainings, including concrete handling, biological material protocols, and 3D printing equipment certification. These trainings are essential for ensuring that all team members can safely operate in the lab and independently manage their assigned tasks.

Once trainings are completed, the team will begin a structured literature review to deepen their understanding of microbial-induced calcite precipitation, sustainable material design, and the potential of Rio Tinto slag within bio-enhanced concrete systems. These reviews will guide the development of initial mix-design proposals and help refine the testing matrix for the upcoming experimental phase. In early January, the project expects the arrival of Sporosarcina pasteurii from ATTPX. The team will begin microbial activation immediately and prepare small-scale test batches combining slag, bacterial solutions, and binders. Weeks 3–6 will be dedicated to iterative testing to document curing behavior, mineralization, strength performance, durability, and CO_2 sequestration potential. Insights gained from these experiments will be used to optimize the mix design.

In parallel, the subgroup responsible for 3D printing will begin rheology and pumpability testing to determine whether the microbial-enhanced mix is compatible with the M2D Lab's printing system. By mid-semester, the objective is to fabricate three to four medium-sized planters. Simultaneously, another subgroup will begin constructing plywood molds for the modular lounge chairs, followed by casting and early structural testing.

During April, the team will coordinate site logistics with Facilities Management and prepare transportation plans with support from the Civil Engineering Department. Final installation between the Civil and Electrical Engineering buildings is anticipated for late April or early May, followed by documentation, photography, and completion of the final CSF report.

Challenges Faced

One of the main challenges this semester was the extended recruitment period. Many applicants came from majors outside the project's target disciplines, which required additional outreach, coordination with the College of Engineering and the Honors College, and an extended application window. Although this added time to the original schedule, it ultimately strengthened the visibility of the project and improved the quality of the final applicant pool.

A second challenge involved limited faculty availability while Dr. Kim was on maternity leave. To maintain progress, the project relied on support from Abhijit, a doctoral student who is new to the university's systems and procedures. While his learning curve naturally extended some procurement timelines, his motivation and willingness to assist were essential in keeping the project on track. This experience helped the team better understand internal processes and plan more efficiently for next semester.

Despite these challenges, the project is ending the semester in a strong position. The selected student team is highly talented, motivated, and aligned with the project's sustainability vision. The lessons learned this fall have prepared the team to move confidently into the technical research phase, and the momentum built through confidently into the technical research phase, and the momentum built through outreach, hiring, and planning will support a productive and successful spring semester.

Media/Links