The Voice Exhibit showcases the testimonials of BIPOC and queer environmental engineers, activists, and industry professionals and shares the connection between sustainability and identity. The goal of the builder was to utilize a condensed Design Build methodology and project management tools learned throughout his time at Cal Poly in order to deliver a design with a temporary structure for the showcase. Design of the exhibit floor, post + curtain barrier, testimonial displays, and bay door mosaic was done after a meeting by the show runner, architect, and builder was conducted. The barrier and exhibit floor design was created after a site survey utilizing takeoff software and CAED programs. After the design was approved by the show runner, an initial estimate came just under budget. With the use of recycled materials and donations there was a large reduction in the final cost of construction material while maintaining the vision sought by the showrunner. Temporary structures were constructed for the exhibit with easy dismantling in mind as after the event was complete a majority of materials were reused or donated in order to maintain the overall message of sustainability.

**Key Words:** Sustainability, Exhibit, Temporary Structure, Design Build

**Background**

The goal of the Voice Exhibit was to showcase the voices and experiences of black, indigenous, and queer environmental engineers, activists, and industry professionals. Liliana Elola is an Environmental Management and Protection Undergrad at Cal Poly and was given funding from the school to bring her vision to life. Her short-term goal for the project was to provide an engaging platform with which to amplify and legitimize the experiences of underrepresented individuals in environmental engineering, science, technology, climate change and sustainability. The exhibit’s long-term goal is to provide visitors with a lasting sense of value in a diverse and equitable environmental workforce. Kenzie Pelletier aided in the design of the exhibit and acted as the architect. Gage Davenport was the project manager/builder for the project and managed the design, estimate, and construction of exhibit deliverables.

**Design**

After a venue was decided as the High Bays in the Bonderson Projects Center, an initial scope meeting was set up to discuss the details of how the exhibit would run and what deliverables would be necessary by the project manager. During this meeting the show runner provided photos and descriptions to show her vision for the exhibit. With this, the architect developed an inspiration board and color pallete (Figure 1).
With a vision defined, the next step was to create a tangible design and scope for construction of the exhibit. This required a site visit to take measurements of the building and a discussion with the showrunner on the goal of the structures being built. Due to the size of the high bay building, it was clear that the room needed a barrier to create a more intimate space. The project manager visited the site to take measurements and observe any constraints within the room. The height of the bay doors and the distance from the door to where the barrier would lie are important constraints for post and barrier construction (Figure 2).
**Floor Plan**

With the parameters of the building measured, the project manager developed a floor plan (Figure 3) to meet the needs of the showrunner. Within this plan would be a post and hanging canvas barrier that would block off a small area of the room to showcase quote bubbles of the interviewed environmentalists. While the floor plan only shows four boxes, the final design would require 10 pots to hold the signs. The final part of the plan would require the measurement of the bay door windows in order for a mosaic art installation.

![Figure 3. Exhibit floor plan](image)

**CAED**

One of the goals for the project manager was to utilize his experience with design build at Cal Poly by working with an architect to deliver a clear picture of what was to be built before actual construction began. Part of this was achieved by the architect through bringing the canvas wall into a 3D CAED environment (Figure 4). This allowed the show runner to visualize a simplified view of what the space would look like with the barrier.
Once the overall design was complete to the approval of the show runner, it was time to begin estimating materials and procuring any long lead items. Before diving into how the project was estimated, it is important to know how it was funded.

**Project Funding**

The Natural Resources Management & Environmental Sciences department has a LEAD Scholars program with the goal of preparing future leaders in the environmental field. The Leadership Education, Application and Discovery (LEAD) donor-supported program provides a select number of students with funds in leadership projects. The show runner of this exhibit was allocated $1,000 for the project and enabled the project manager to utilize all of this funding due to the fact that interviews, advertisement, and other parts of the project would be done by her at no cost. Materials and construction would be the only costs.

**Initial Estimate**

The total initial estimate finalized at $911.40 (Figure 5). Some of the materials included in this early cost were the lumber needed for six wooden posts. 2x4x8’ as well as the dye and canvas needed for the barrier between the posts. Sandbags would be estimated in the case that wind through the exhibit would blow over the 10-foot posts. PVC pipe would be utilized to hang the canvas between the posts. Testimonial boxes would be changed to plant pots to reduce cost and allow for reuse after the project’s completion. Plastic panels for the mosaic would also be ordered.
Within this estimate a few items would need to be ordered online and shipped. Shipping could take two to three weeks. These items included a bulk order of plastic panels for the mosaic and the 12 x 9’ canvas. The plastic mosaic needed to arrive with enough time to cut the panels to size and deliver to the artist in charge of painting them. This process took three weeks to complete. The canvas needed to be delivered in time to dye the massive surface. However, after delivery, the show runner decided to keep the off-white color of the canvas and go for a dark stain on the wooden posts instead.

**Final Cost**

Utilizing a number of recycled materials as well as switching design direction to reduce cost. The final total was able to drop to an incredibly low amount of $648.40 (Figure 5). Some notable items of savings were the reduction in paint cost due to no dye being needed for canvas, as well as donated black paint for the recycled PVC and sign sticks. The sign supplies were heavily reduced due to pre-dyed poster board at a reduced price.
Construction

As materials began to arrive construction began. There are two main deliverables that needed to be constructed before the exhibit. These include the 10’ high posts with a way to easily mount the PVC hung canvas on the day of the event, as well as the ten testimonial pots to showcase the quotation bubbles.

Posts

The wooden posts would act as the main source of actual construction for this project. In order to utilize the 8’ long 2x4 lumber without creating any waste, the posts would be constructed at 10 feet high with a plus pattern base (Figure 6) made of one 2x4x8’ sawed into four parts. Each post would use exactly 3 ½ 2x4 totaling to 21 pieces. Duplex nails would be used in order to make deconstruction and recycling of the posts easier. The posts would each have a 1” hole drilled at the top to allow for the PVC pipe to fit snug.

![Figure 6. Post Construction](image1.png)

Staining

After it was agreed by the project manager and showrunner that the canvas wouldn’t be dyed, the light color wood posts would need to be stained to complement the off-white color. Each post would be painted a dark walnut color approved by the show runner (Figure 7). This change reduced the cost of dye but increased the cost for the posts.
Testimonials

The testimonial quotes would need to be connected to a stick and stand at eye level for the exhibit. The original design would have required a set of constructed boxes in various geometric shapes. However, due to time constraints the show runner decided to switch to buckets. The project manager found an alternative in the form of planter pots that would give the same aesthetic as the buckets at a reduced cost. The pots would be filled with sand in order to hold each testimonial sign up.

Exhibit

The Voice Exhibit was held on June 2\textsuperscript{nd} from 7pm to 8pm. The project manager was allocated 2 hours before the event for set-up. During this time posts were moved into the space, PVC pipe was laid down to ensure proper spacing between posts. The canvas was laid flat and clipped over the PVC (Figure 8) and hung between the posts. The testimonial pots were constructed and placed throughout the floor (Figure 9). During this, mosaic pieces were put in place on the bay door (Figure 10).
Deconstruction and Recycling

One of the goals going into the construction of the exhibit was to hold the same message of sustainability. This was achieved with recycled materials as well as the recycling of most exhibit materials. All wood will be donated to the CAED wood shop (Figure 11). Canvas sheets were donated to various volunteers during setup and deconstruction. Each testimonial sign was donated to each of the interviewees. This reuse of materials grounds the exhibit in the message that it is portraying.

![Deconstructed Posts](image)

Figure 11. Deconstructed Posts

Lessons Learned

Overall, this project ran rather smoothly. One of the biggest lessons learned is beginning design earlier than one quarter before the exhibit. Having more time to research would allow for better understanding of the details of a realistic, sustainable, and innovative design. Construction of the posts would have taken less time with more project managers/designers. Having a fully involved architect and multiple builders would allow for an increase in scale for the project.

Conclusion

The Voice Exhibit was a passion project by Lily Elola. Gage Davenport was able to utilize his resources at Cal Poly to simulate a Design Build project delivery where he worked closely with the owner and designer to design, estimate, and construct a project to Lily’s approval. The exhibit’s message of sustainability was able to be carried into the design and use of materials through construction and deconstruction.