Paso Robles PD Roof Extension and Gun Cleaning Counter

Lucas Decasper and Max Lassiter
California Polytechnic State University
San Luis Obispo, California

Over the past few years the Paso Robles Police Department and the Cal Poly Construction Management Department have developed a professional relationship. Paso PD, looking for a cost-efficient solution to upgrading their shooting range decided to partner with Cal Poly students looking to gain field experience and complete their senior project. This shooting range, starting as just a few targets in an open area, has been developed into a 24-hour usable training facility equipped with storage, water, and electricity. As part of the department's requested scope, two gun cleaning counters as well as a roof extension to protect these counters were required. After an initial site visit, the general requirements were outlined. The first step included developing an appropriate design within the means of the budget. The design process involved regular meetings with the project SME and owner to ensure that the project met required specifications. Once Complete, the construction process began including material procurement, site preparation, and installation. Throughout the course of the project, scheduling and conducting professional meetings with both design professionals and owners of the project, creating an appropriate budget and design, procuring funds, and project closeout were all required skills to learn.

Key Words: Gun Cleaning Counters, Roof Extension, Police Department, Design, Installation

Project Inception

The original project’s scope of work included the installation of an electrical generator, a lighting system, and wiring for the entire electrical system. However, upon the team's first visit on site, it was discovered that another Cal Poly CM group had already completed the required scope of work. After deliberating with the owner of the project, a solution was agreed upon. The owner of the project tasked us with constructing two finished gun-cleaning counters as well as a roof extension to protect these counters. After confirming this project's feasibility with our SME, the preconstruction process began. Part of the preconstruction process involved deciding how the work would be split between team members. I was in charge of coordinating material transportation, developing the budget and getting it approved, and planning out the construction process. Physical construction of the counters and roof extension was done together, split evenly.
Steps

The first step for this project involved a few site visits. These visits were crucial to properly understand exactly how we were going to approach this project. These visits included myself, Max, and Commander Davis. Throughout these visits, we asked the commander various clarifying questions to get a strong understanding of our site conditions before construction. In addition to asking loads of questions we took all of our preliminary measurements during these visits. These measurements were crucial for creating our design and budget.

It was during these site visits that the Commander listed all his requirements for the project. They were as follows:

- Roof extensions to be sloped to the west allowing rain water to fall off the west end. This would match the existing slope of the roof.
- Roof extension needs to protect exposed electrical receptacles.
- Gun cleaning counters spanning the entire post-to-post distance besides the sea trains.
- Counters to be slightly above waist height.
- Counter to be finished with a carpeted, weatherproof, finish.
- Counter to be level.

Once we had a basic plan approved by both our SME and owner, the next step was to get an official design and budget approved by Commander Davis. I personally took on the budget. Creating the budget was challenging, especially because the Commander explicitly stated that this project had to remain low-costing. In order to satisfy this demand, I compared numerous material options to one another to find the best value. This process was tedious, especially because certain materials had to have certain specifications. A good example of this would be having to find a pressure treated option for our roof sill and posts allowing the project to be weather resistant. Using the Home Depot website and communicating with Max to make sure the materials I selected worked with our design, I was successfully able to get our budget approved.

Once we had an approved schedule, the material procurement process began. During our first trip to Lowes, we acquired the materials required for post and frame installation. These materials included quikrete, pressure treated 4x4’s, and 2x6 framing members. These materials were used in the first phase of construction. Over the course of two days, Max and I worked together to set 12 posts, 6 for each counter, and the frames for both counters. With an uneven terrain and nothing but mason’s line to ensure our design was symmetrical and level, this process was very tedious with us having to consistently measure and level each member we installed.

Once the posts and frame were completed the second stage of material procurement began. This second stage involved acquiring four 4x8 planks along with 2 roles of carpet. Due to neither me or Max having a vehicle capable of moving these materials, I had to coordinate with the Paso PD department to get an officer with a truck to help transport materials. Once successfully transported,
the second stage of construction began. Working together Max and I attached the 4x8 planks to our constructed frame, again ensuring that everything was level. This process involved cutting the planks to 36” wide - the width of our frame. Once the planks were successfully secured, we began attaching the carpet. Working together, we kept the carpet snug on the constructed counter while using a staple gun to secure the carpet to the counter.

Once the counters were completed, we began with our final phase of construction, the roof extension. Our final material procurement phase involved acquiring two 8’ roof panels and two 12’ roof panels and 2x4 pressure treated sills. With these materials we were able to begin the final phase. Again, working with Max, we ensured the roof panels were properly fastened and angled. In order to do this, we conducted a series of tests involving dumping a 5-gallon bucket of water on the roof and observing how the water moved.

An important note for all the above steps - All equipment and fastening devices used for this project were either provided from my personal collection or borrowed from the Paso Robles Police Department.

Challenges

- **Tight Budget** - Our tight budget posed a challenge because we were forced to complete a design that not only met all the owners expectations but would also be constructed to last.
- **Existing Site Conditions with no Plans or Specs** - Existing underground utility lines were unmarked and no existing plans existed to call them out.
- **Soil Conditions** - Tough soil along with a layer of asphalt made digging difficult.
- **Existing Structure Had no Plans or Specs** - This made matching materials we bought with the materials already on site extremely difficult.
- **Scheduling Conflicts** - Between our SME, our two group members, and the Paso Robles Police department, it was difficult to find times that worked for everyone.
- **Ensuring Roof Slope** - One of the project requirements was to ensure the roof sloped towards the west to ensure rain water does not pool up on the roof, this was difficult to complete without any real grade measuring tools. Involved a lot of eyeballing and roof testing with buckets of water.
- **Limited Tool Set** - Being students, we did not have all the necessary tools to properly complete this project. Budgetary constructions meant we had to rely on what we could gather ourselves and what the police station had ready on-hand.
- **Minimal Electrical Access** - The only electrical access on site through the power of a gas generator. This generator died on us a couple of times leaving us without power.
- **Purchasing Difficulties** - We were only able to use the Paso PD credit card in the city of Paso limiting us to Lowes. Additionally, the card could only be used through online orders meaning materials had to be selected prior to arrival. Furthermore, the card got flagged for fraud when we tried to use it during material procurement, delaying our construction start.
• **Limited Transportation Availability** - For this project we were required to transport 600 lbs of concrete as well various lengths of wood and metal material. This was a challenge considering we do not own a truck capable of carrying these loads and therefore had to coordinate transportation with the officers of the police department.

• **Existing Ground Not Level** - Having a perfectly level table top surface was a key component of this project. This was made difficult by the fact that the ground level throughout the length of counters was not level itself. We accounted for this by having varying length leg posts as needed to maintain a level height.

### Deliverables

Due to the project based nature of this project the primary deliverable is our project itself. In addition, the owner of the project did not require any preliminary drawing prior to construction and instead had requirements for the finished product. After initial investigation it was discovered that the design would need to be adjusted as the construction process continued and for this reason the design was never put into digital format. In the end project deliverables included a budget, the gun cleaning counters, and the roof extension.

Our preconstruction deliverables included a budget, The approved budget has been included below. This budget based material costs off of Home Depots online website. While we understood there would be a price discrepancy between Lowes and Home Depot’s materials, the Home Depot website was much more detailed and user friendly, allowing us to find specific product specifications with ease. While some unforeseen conditions along the construction project did slightly alter our material selection and quantities, we still managed to stay close to budget, totaling out at $1152.22.

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UNITS</th>
<th>EA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10ft. SM-Rib Galvalume Steel 29-Gauge Roof/Siding Panel in Gray</td>
<td>4</td>
<td>Ea</td>
<td>68.47</td>
<td>273.88</td>
</tr>
<tr>
<td>2</td>
<td>SST Outdoor Accents ZMAX, Black Powder-Coated for 2x4 Lumber</td>
<td>4</td>
<td>Ea</td>
<td>2.58</td>
<td>10.32</td>
</tr>
<tr>
<td>3</td>
<td>2x4in x 8ft Construction Common Redwood Lumber</td>
<td>16</td>
<td>Ea</td>
<td>1.16</td>
<td>18.52</td>
</tr>
<tr>
<td>4</td>
<td>SST LUS Galvanized Face-Mount Joint Hanger for 2x4 Nominal Lumber</td>
<td>24</td>
<td>Ea</td>
<td>0.96</td>
<td>23.52</td>
</tr>
<tr>
<td>5</td>
<td>3/4 4x8 Prefinished Birch</td>
<td>4</td>
<td>Ea</td>
<td>90.56</td>
<td>362.32</td>
</tr>
<tr>
<td>6</td>
<td>‘12’ Viking Stingrat Carpet</td>
<td>90</td>
<td>Sq. Ft</td>
<td>0.84</td>
<td>75.60</td>
</tr>
<tr>
<td>7</td>
<td>4x4 x 8 Ft Premium #2 Douglas Fir Lumber</td>
<td>6</td>
<td>Ea</td>
<td>18.62</td>
<td>111.72</td>
</tr>
<tr>
<td>8</td>
<td>Amerimax Home Product 5’x10’ White Vinyl K-Style gutter</td>
<td>4</td>
<td>Ea</td>
<td>5.68</td>
<td>22.72</td>
</tr>
<tr>
<td>9</td>
<td>White All Purpose Strong Flexible Watertight Multipurpose Sealant</td>
<td>1</td>
<td>Ea</td>
<td>12.96</td>
<td>12.96</td>
</tr>
<tr>
<td>10</td>
<td>Quikrete50 lb. Concrete Mix</td>
<td>12</td>
<td>Ea</td>
<td>3.77</td>
<td>45.24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>1,123.58</strong></td>
</tr>
</tbody>
</table>

The gun cleaning counters and roof extension are pictured at the end of this report. Commander Davis was satisfied with our work and agreed that our work met all required specifications.
Lessons Learned

I learned a few personal lessons throughout the course of this project. One of the large personal takeaways I learned was that a slow yet detailed and professionally done project is much better than a rushed and averagely built project. This was noticeable on our particular project. The days where we were running behind schedule and had to work quickly, resulted in a much poorer quality of construction than the days where we had plenty of time. Additionally, this can be observed between our two gun cleaning counters. The south-most counter was done at a much more reasonable face than the north-most counter and the difference can be observed. Our southernmost counter had nearly no flaws, with all post holes being symmetrical, the frame being perfectly level and symmetrical, and the counter just looking overall smoother and more professionally built. While the northernmost counter fulfills all necessary requirements, its build quality is visibly lower with post holes being slightly offset which consequently caused the frame to be slightly offset. These minor differences can make all the difference in the professional world and I definitely learned the importance of producing quality craftsmanship, even when on a tight schedule.

Along with this large overall take-away, I had many other lessons learned. One additional lesson learned from this project was the importance of strong communication skills in the construction field. Between Max and I, our SME, and the Paso Robles Police Department, finding times that suit everyone's needs was difficult. It required attentive planning and attention to detail. Additionally, we quickly learned that communication is vital for staying on schedule as one missed email can delay a project significantly. Furthermore, we learned the importance of creating an accurate budget. With extremely fluctuating prices, more extensive research was required to create the most accurate budget possible. While our budget was close to the actual amount spent, the team would have felt much more satisfied with our work if we had been able to stay under budget.

Once physical construction began, we quickly began learning new lessons. One lesson we learned was the importance of ensuring material procurement will not be delayed. Having to use the Lowes in Paso Robles as our only source of materials, it was surprising to experience material procurement delays. In one instance, the Paso Robles Police Station credit card was put on hold and flagged as fraud when trying to order materials. Consequently, we were unable to procure our materials in a timely manner and our schedule was pushed back an entire day. After this event, we made sure to have online confirmation on our material orders prior to arriving. An additional lesson learned with our materials is the importance of having the proper hauling equipment. Our first few phases of the project included us using our personal vehicles to transport materials, many of which did not properly fit. This made traveling with materials inefficient and unsafe. We quickly learned we were better off organizing a method of delivery with the Paso PD department, usually involving an off-duty officer helping us out with a truck. This made material delivery efficient and safe.

Material installation came with some lessons learned as well. A large lesson we learned during this process was to always ensure you have the right tools for the job. For example, the first step of our project involved the post installations. For the first gun cleaning counter, we chose to hand dig all
six post holes, which after the discovery of 2” asphalt beneath the surface took much more time than expected. Once completed, we reached out to Paso PD and discovered there was an auger available for use at the police station. We quickly acquired this auger and were able to dig the 6 remaining post holes for the second counter in a matter of minutes. During this process we learned the importance of the pre-construction site visit. We were unaware of known site conditions and were set back by the miscommunication. Once we acquired the auger, the proceeds moved quickly making us realize the damage our error had caused. If we had reached out and inquired about the underground site conditions prior to construction, we would have been more capable to complete this job in a timely manner.
Project Photos

Setting Table Posts
Framing for Gun Cleaning Counter
Installing Countertop

Installing Carpet Finish
Completed Counters
Roof Extension Sill Install
Attaching Roof Panels to Sill
Fastening Roof Panel
Finished Roof Extensions