



WRPI: Water Resources and Policy Initiatives Final Report

Engineering Approach to the Restoration of Vogel Flats Picnic Site

Rafael N. Reyes

Riverside City College

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Advised by:

George Farra

Forest Engineer

Angeles National Forest

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Executive Summary

Vogel Flats picnic area is located in the southwest region of the Angeles National Forest, accessible through Big Tujunga Canyon Road. The picnic site features shaded benches and grills, while being in close proximity to Big Tujunga Creek. Unfortunately, the picnic site also experiences heavy sediment deposits and is hindered by its crumbling parking lots. The engineering staff at the Angeles headquarters had considered Vogel Flats as a prime candidate for restoration, and placed the conceptual design in my hands to serve as my final project. I was responsible for a preliminary assessment of the site and any solutions that could be achieved from an engineering standpoint.

Project Objectives

The conceptual restoration of the Vogel Flats Picnic site served to provide me with real life engineering experience in the form of site analysis. Site analysis included; recognition of the picnic sites problems and their underlying causes, proposed solutions to said problems and a realistic cost estimate of those solutions. The project shed light on my potential career choices in the Forest Service by highlighting just how much engineering can be done for something as simple as a picnic site. The possibilities ranged from facilities, to environmental and roads engineering. Overall the project solidified my desire to work as a civil engineer in the public sector.

Project Approach



Figure 1: Site Map, created by fellow intern Cristina Plemel

Methodology began with several visits to Vogel Flats to better understand the natural surrounding area. My search for engineering based solutions led me to inspect the drainage channel highlighted above in blue. The channel was a prime suspect for the cause of Vogel's sediment deposits. The channels dimensions were measured on site and used to calculate various flow statistics via computer programs. Those statistics were illustrated with the use of AutoCAD and presented in a PowerPoint for advising. Another issue that hindered the success of Vogel Flats as a campsite was its deteriorating pavement. The parking lots were measured in person and through satellite imagery. While the calculations for roads were much less complicated, the cost estimation provided valuable experience in regards to engineering economics.

Project Outcome

Analysis of field data proved the discharge in the channel was at or near capacity. The water flow during flood events through the associated culvert was moving with velocities that caused erosion. This erosion would pool up in relatively flat portions of the channel and deposit sediments into the picnic site. Using CAD software and knowledge gained throughout the summer, a riprap structure was proposed to dissipate the flow energy. Riprap is a term designated for any collection of rocks/ boulders used to slow the movement of water. It is typically installed at the outlets and inlets of culverts and along roads atop bare hillsides.

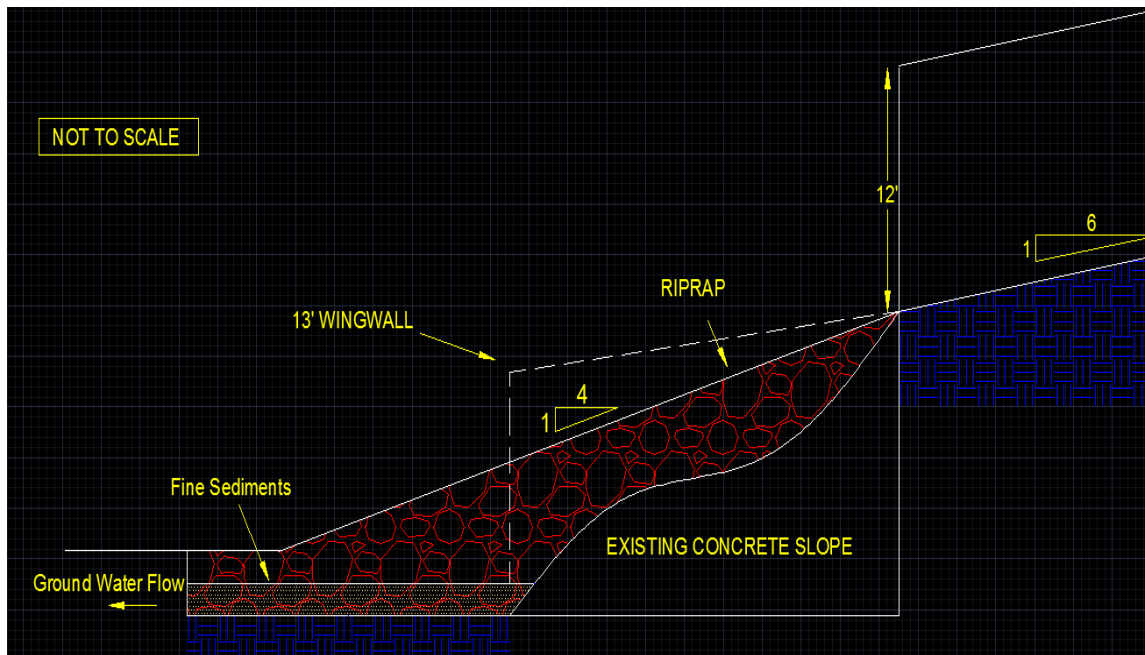


Figure 2: CAD drawing of proposed riprap, cross sectional view.

The proposed riprap feature was deemed successful in the presentation, but would need further examination if it were to ever be implemented. The issues regarding the pavement were also addressed, with a conclusion that the paved ways were past their expectancy and needed to be

repaved or replaced entirely. The method in which I was required to present my data proved to be a valuable learning experience. My findings were critiqued by various departments within the Forest Service, ensuring that my solutions would be compliant with all of their requirements. The project also included weekly updates with my advisor, simulating deadlines in the real world proposal process. In retrospect, I would have liked to include more geology/hydrology findings into my project, seeing as how those concepts are fundamental to the engineering solutions.

Conclusions

The Vogel Flats Picnic Site restoration project was an ideal project for my summer internship. It challenged me to think critically about real life engineering problems and how to propose those solutions in a federal work place. If the site were to be re-evaluated, I would recommend for the researchers to examine portions of the channel closer to Big Tujunga Creek. Often times sediment solutions can have a lasting effect on portions of the channel that are further down stream.

My time spent at the Angeles National Forest has reassured me in my decision to pursue a degree in civil engineering. Furthermore, it has made me realize how fulfilling it is to be involved in projects that serve to better public lands. It is for this reason, that I will be pursuing a civil engineering career in the public sector. The USDA offers various careers within that scope but if I were given the choice, I would love to return to the U.S Forest Service.