

Lakeland Park Trail Improvement & Stair Design: Rooted Steps



JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Team: Matthieu Giauque, Michelle Law, Serena Mezzetta, Noah Thompson, Tom Lee
Clients: Baltimore City Recreation and Parks (BCRP), National Audubon Society
Instructor: Dr. Rachel H. Sangree

Introduction

Lakeland Park's wooded area provides important environmental and community benefits, including improved air quality and access to green space. However, the existing trail is very steep, poorly drained, and unsafe, making it largely unusable for the community. These conditions limit access and increase erosion across the hillside. This project introduces an economically friendly and sustainable staircase design to improve access, manage water runoff, and preserve the natural landscape while supporting long-term community use and minimizing costs.

Our design emphasizes community involvement by incorporating reclaimed materials, volunteer-built birdhouses, and bilingual signage in both English and Spanish. At the same time, the trail is designed to remain as natural and integrated with other features of Lakeland Park as possible.

Objectives

- Improve safety and accessibility along the steep trail
- Reduce erosion and manage stormwater runoff
- Use sustainable, locally sourced materials
- Encourage community engagement through features like birdhouses and signage
- Create a durable, low-maintenance design

Materials and Methods

- Reclaimed rot-resistant black-locust timber logs from Camp Small
- Timber spikes for anchoring steps
- Compacted soil for step treads
- Natural rocks for drainage and erosion control
- Battery-powered tools for on-site construction
- Wooden materials for birdhouses and signage

Methods:

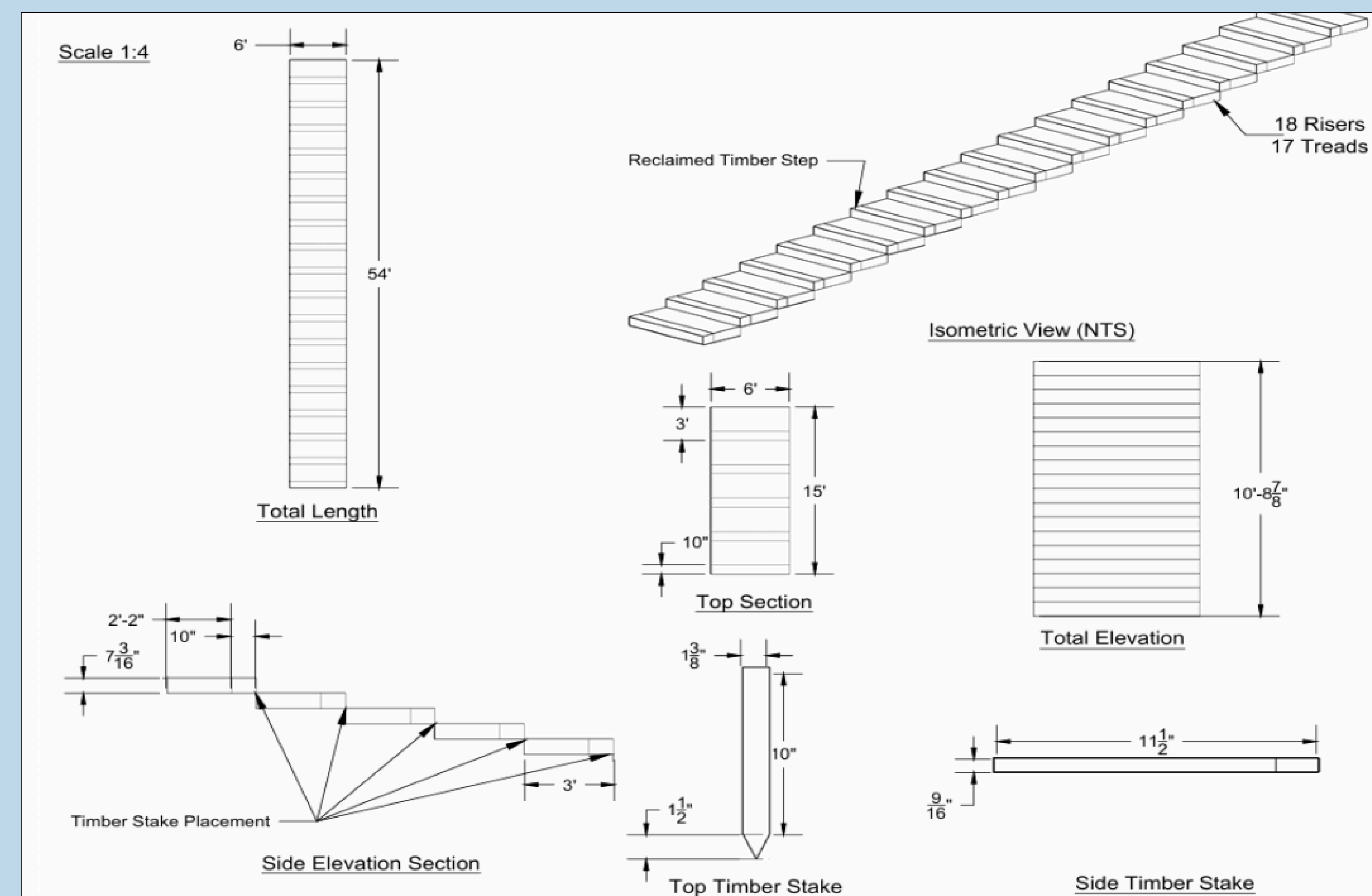
The site is cleared and graded, followed by installation of 18 log-supported steps. Each step is formed using compacted soil and anchored logs. Drainage is managed with strategically placed rocks, while birdhouses and signage are installed to enhance engagement and education.

Cost Estimate

Item	Quantity	Unit	Unit Price	Total
Log 2nds (High quality desirable timber)	30	Whole Log	\$0.30	\$9.00
Home Depot Timber Spikes	3	12-Pack	\$4.98	\$14.94
Volunteer Labor	600	Person-hour	\$0.00	\$0
Dump Truck Delivery	1	Round Trip	\$100.00	\$100.00
Birdhouse	3	Each	\$0.00	\$0.00
Total Cost				\$123.94

Proposed Design

Staircase & Timber Spikes Drawing



AutoCAD drawing of the proposed staircase and timber spike system, showing step dimensions, elevation views, and anchoring details used to secure the logs into the hillside.

3D Rendition of Staircase



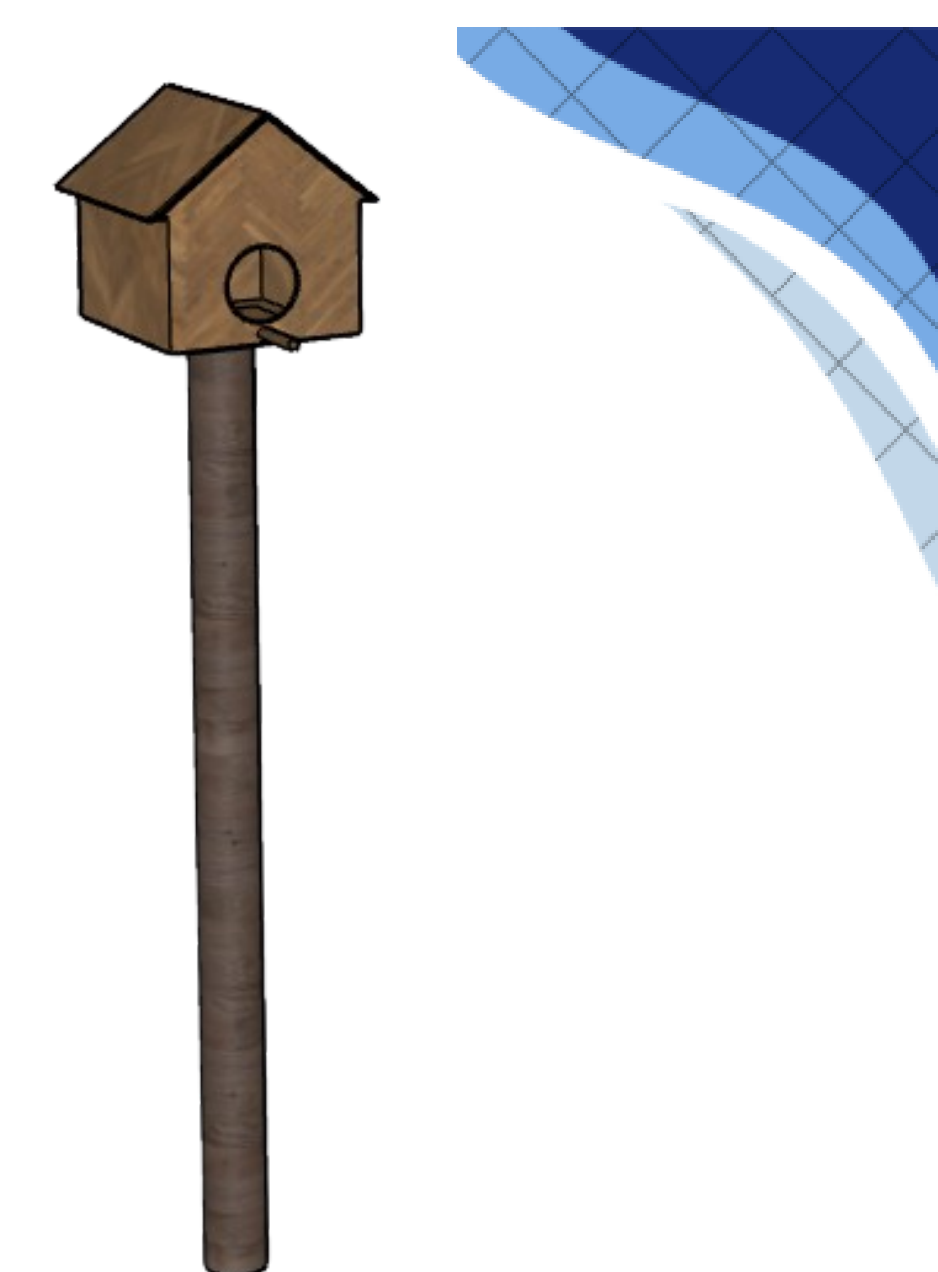
3D SketchUp rendering of the staircase within Lakeland Park, illustrating how the design follows the natural slope and integrates with surrounding vegetation and site features.

Educational Sign



Educational sign displaying local bird species, including the Baltimore Oriole and Downy Woodpecker, designed to promote environmental awareness with bilingual information.

Birdhouse



Reclaimed timber birdhouse mounted on a wooden pole, installed along the trail to provide habitat for local birds and support community engagement.

Conclusion

The proposed staircase transforms an unsafe and unused section of the park into a safe, accessible pathway for the Lakeland community. By addressing erosion and drainage while using sustainable, reclaimed materials, the design preserves the natural environment and improves long-term usability. This project not only enhances access to green space but also fosters community engagement, creating a lasting and meaningful improvement to Lakeland Park.