Design and Development of Eagle Canyon Residential Community

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Affiliation: California State University Los Angeles

Summary

•The California State University, Los Angeles Civil Engineering Senior Design Team was presented with an opportunity by Aztec Engineering to design a site plan with specifications of maximizing the site's potential and yielding profitable returns with sustainability as its focus. The site plan addressed effective designs for its grading, retaining walls, hydraulics, road design, drainage, utility configuration, and an environmental assessment to ensure constructability, sustainability, and feasibility. The Senior Design Team meticulously researched the aspects of a site layout for an eco-conscious residential community of 106 homes, identified technical and non-technical constraints, developed multiple alternatives, determined the most practical solution, and prepared a preliminary design package.

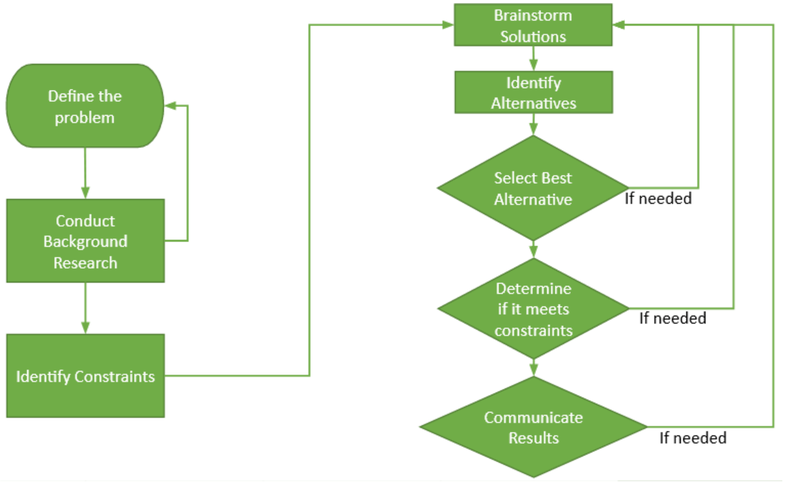
Introduction

•Aztec Engineering (client) presented the Civil Engineering Senior Design Team (team) with the opportunity to design a sustainable and feasible residential community project in Corona, California.

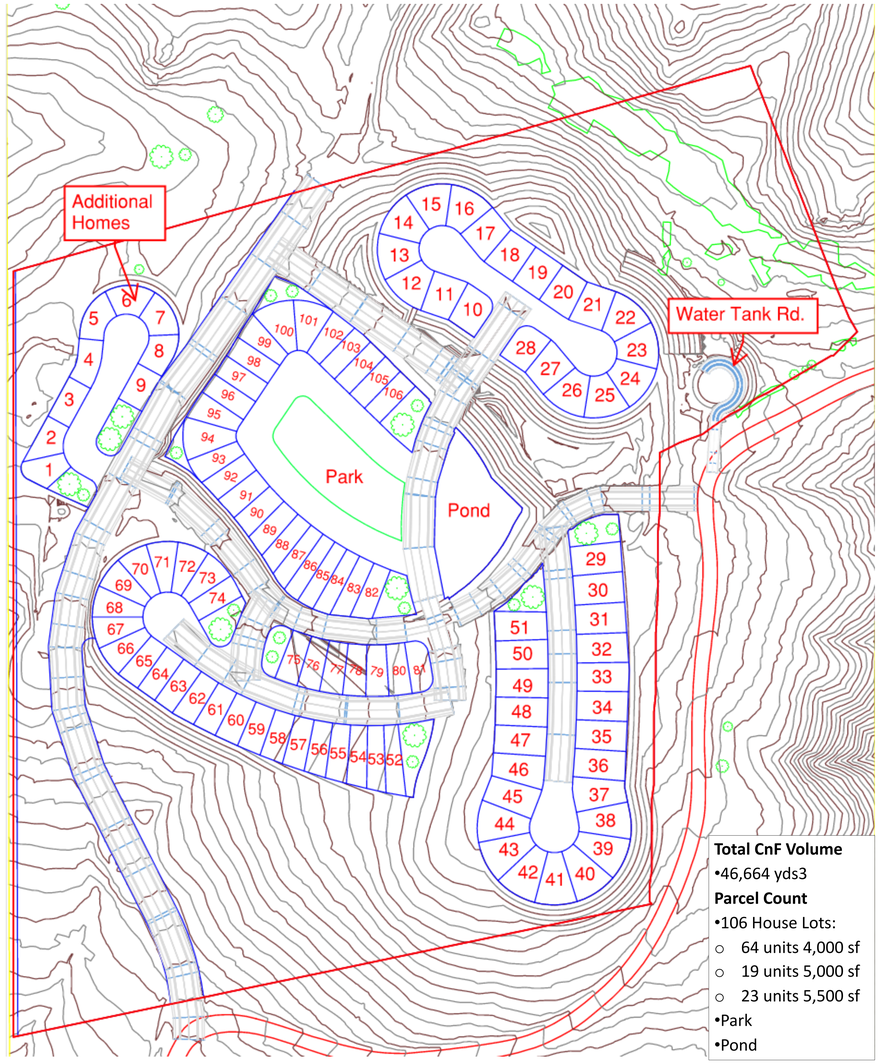
•The team's primary objective was to develop a site plan that effectively utilized the project site (42.77 acres) and generated profitable returns with a focus on sustainability.

•The team designed a site layout for 106 homes and created effective designs for grading, retaining walls, hydraulics, road design, drainage, and utility configuration. An environmental assessment was conducted to ensure the project's constructability, sustainability, and feasibility.

Methodology



Site Layout



Total CnF Volume
•46,664 yds3
Parcel Count
•106 House Lots:
- 64 units 4,000 sf
- 19 units 5,000 sf
- 23 units 5,500 sf

•Park
•Pond

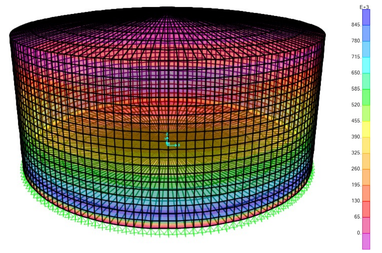
Sustainability



•Include native vegetation to preserve wildlife
•Mitigation measures for California Environmental Quality Act (CEQA) such as the use of Environmental Protection Agency (EPA) Tier 4 Equipment and Burrowing Owl habitat assessment
•EV charging stations implemented
•Follow Corona's Climate Action Plan

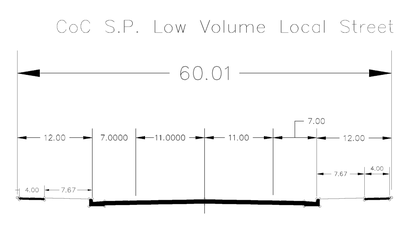


Structural Design



•Design of the water storage tank using SAP2000
•Designed for the resultant force of dead loads, water pressures, and seismic forces
•Specifications: Height = 20 ft, Diameter = 46 ft, Capacity = 223,775 gal, Thickness of Shell = 0.5 in
•The design meets the demand of our proposed population

Transportation Design

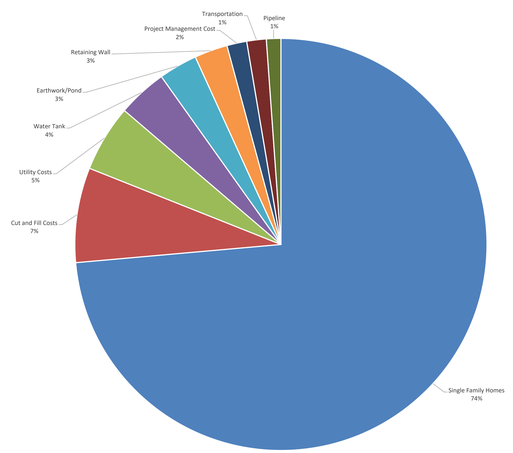


•Road classifications: low volume local, private residential, and cul-de-sac
•In compliance with the City of Corona using their General Plan
•Proposed materials: Recycled concrete, asphalt, permeable pavers, ashcrete for road materials
•LED street light fixtures

Water Resources Design

•The Municipal Water District will provide potable water to the community
•Pipe Design: Ductile iron pipes with a diameter of 12 in
•Pond Design: Size, capacity, pump system, and aquatic biodiversity

Cost Estimate



•Total Construction Cost: $48,068,658