

Santaquin City Trail Corridor and Right of Way Design

Purpose

In the Civil Engineering Department at BYU, two professors oversee the capstone program. Each year these professors reach out to local engineering firms and city engineering offices to find projects that can be carried out by students in the department. Students are organized into groups of three and assigned a project to be completed over the course of two semesters. The projects are intended to give students an engineering design experience that is as realistic as possible while maintaining a level of simplicity such that the final result will be valid and useful to the client.

The project to which I was assigned was the full-functioning design of a trail and right of way corridor for the city of Santaquin along Highland Drive. The completion of this project required a culmination of skills acquired in the civil engineering undergraduate program. Several technical skills were necessary for the project including the use of computer aided drafting programs, principles of transportation engineering, materials design, and hydrology. In addition to technical skills, the use of professional interpersonal skills, which is highly emphasized in the civil engineering program, will be a crucial part of the project.

In the civil engineering program significant emphasis is placed on preparation for a career full of continued learning. Students aren't expected to enter the workforce with all of the knowledge necessary to be successful engineers; rather we are expected to have developed the ability to learn new concepts and skills on our own in order to perform any task that may be required of us. This project was my first application of this principle in a real-life work situation, and as such, is an appropriate culminating experience for my bachelor's degree in civil engineering.

Background and Significance

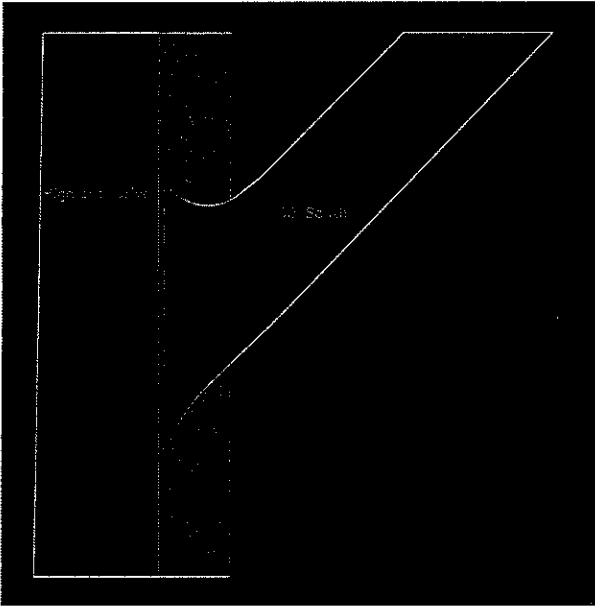
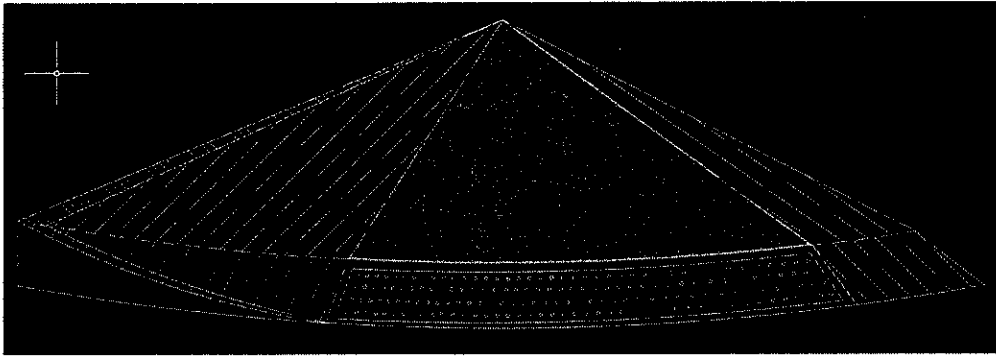
The city of Santaquin, Utah is in the process of constructing a pedestrian trail on the east side of the city adjacent to I-15 that will connect to a larger trail that extends into other cities in Southern Utah County. The purpose of this project is to develop the design of the section of the trail that extends from 120 East to approximately 130 South along Highland Drive.

Santaquin city envisions this trail as a recreational resource for local residents, a safer travel route for student attending Orchard Hills Elementary, and a showpiece for the city visible from Interstate 15.

Separate sections of the larger trail corridor have been designed by other capstone groups in previous years. The design of our section of the trail picks up where the last year's group left off, on Highland Drive, northeast of Orchard Hills Elementary School.

Methods and Procedures

The following list outlines each of the specific design elements requested by Santaquin City. Those in bold are the ones I worked on.



Overall Analysis of Project Results

Overall our project was successful. The engineers with Santaquin City were pleased with the design we created for them...

Overview

This project involves several processes of civil engineering design with which I am not familiar. Thus, it will be necessary to educate myself on these in order to meet the needs of the client, Santaquin City. The processes that will be most important for the completion of my four tasks will be the use of the computer aided drafting program *Civil 3D* and the application of city standards to the design.

Civil 3D is a program used by civil engineers and drafters to develop the design of public works and services and other elements of city infrastructure. As the use of this program is not included in the coursework of my major, I will learn how to use it primarily through trial and error and seeking the help of professors and teaching assistants.

Civil 3D will be the main resource used to complete my first task (**Complete design of an 8 ft. wide trail**) thus, in addition to obtaining general knowledge of the program, it will be necessary to learn how to design a trail corridor. The first step is to create a cross-section of the corridor which includes the **full curb & gutter design**, the asphalt trail, and the **Xeriscape landscape design** on either side of the trail. This cross section is then aligned with topographical data points indicating the current location of Highland Drive which were obtained by city surveyors, and extended along Highland Drive between the desired locations and at the proper elevations. The process will yield a complete 3-D design of the trail corridor. The completion of the trail corridor will allow for the design of **trail-cross street junctions with ADA ramps**

During the design process it will be necessary to adhere to the engineering standards established by Santaquin city. These standards govern design elements such as the dimensions of the curb and gutter, the depth of base material under those components as well as the asphalt trail, and the slope of the trail and the ADA ramps. These standards are obtained from the document *Santaquin City Standards, Specifications and Drawings 10-19-2016* available at <http://www.santaquin.org/engineering>

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Advisors

Honors Coordinator-Michael Scott

Faculty Advisor-Brett Borup

Dr. Borup is the director of the capstone class and is familiar with the scope of my project and the quality of work necessary for it to be successful.

Faculty Reader-Kevin Franke

Dr. Franke is a professor of geotechnical engineering in the civil engineering department. I have taken of his courses and have developed a good relationship with him.

Timeline

Proposal Submission-April 28, 2017

Thesis Completed-September 4, 2017

Thesis Defense Form Submission-October 2, 2017