BYU | CIVIL & ENVIRONMENTAL ENGINEERING

IRA A. FULTON COLLEGE

CAPSTONE

CEEn-2018CPST-009

Sewer System Consolidation

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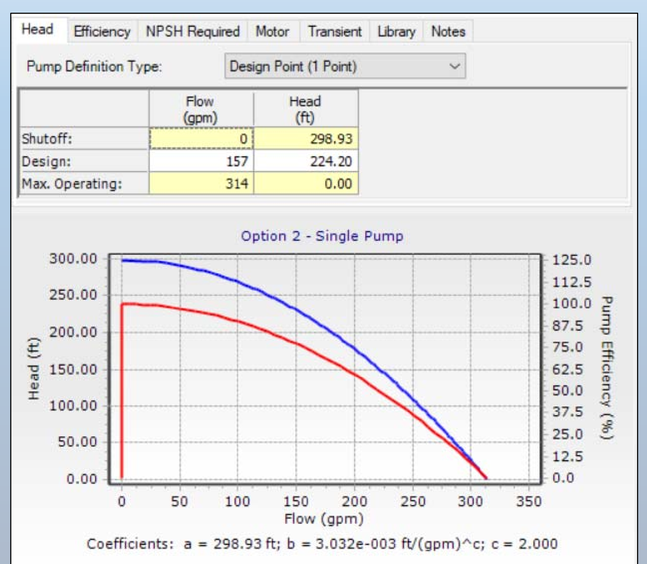
Project Description

Preliminary design of a sewer system to consolidate two existing systems. This project evaluated multiple options for new sewer force main pipe alignments, the potential upgrade of an existing sewer lift station, and the addition of new sewer lift stations to determine the most economical solution.

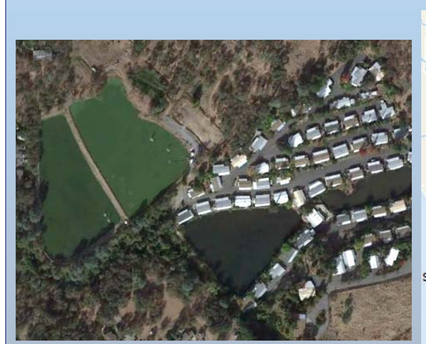
WaterCAD Analysis

WaterCAD (a Bentley product) was used to model the different options and to ensure the resultant velocities and pressures in the pipes met utility district standards. To simulate the proposed conditions, the locations and elevations of pipe junctions were entered into the model; design flow and heads were calculated and entered. All of these inputs were required to run the model.



Existing Pipeline Conditions

Castle City Mobile Home Park (in Newcastle, California) has its own sewer collection and treatment system. The treatment ponds are over 40 years old and are nearing the end of their expected service life. Coleman Engineering provided two options for consolidating the system into the neighboring South Placer Municipal Utility District system.



Cost Analysis

The cost analysis included line items such as supplies, construction, and controls. **Option 2** was found to be the least expensive alternative.

Option	Sub-total Estimated Cost	Contingency (15%)	Total Cost
1	$ 1,182,000.00	$ 177,000.00	$ 1,359,000.00
2	$ 865,000.00	$ 130,000.00	$ 995,000.00

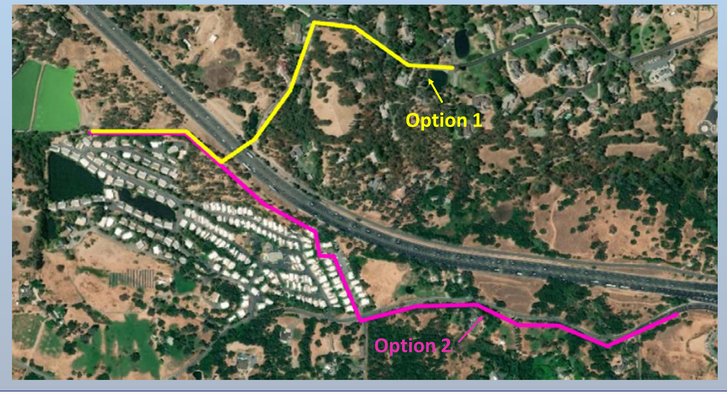
The difference in costs was largely due to the boring under I-80 required in Option 1, costing an estimated $300,000.

Proposed Pipe Alignments

Option 1: Highlights include crossing beneath I-80, cresting two hills, and replacing both a lift station and a force main.

Option 2: Highlights include following Newcastle Road and climbing a long hill.

Both options connect into the city's existing 8" sewer line.



Recommendations and Conclusions

- Implement **Option 2**
- Perform an inflow and infiltration study
- Record and/or obtain updated flow data from both the mobile home park and the city