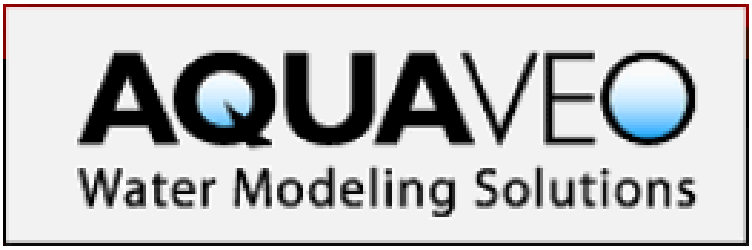
# Water Distribution Network Modeling

Request for Proposals


**Aquaveo, LLC**

Brigham Young University

Civil and Environmental Engineering

Capstone Design Project

## Introduction/Background Information

The City of Bluffdale is a city in Utah about 20 miles south of Salt Lake City. The population is around 8,000 people. It has various water needs throughout the city and currently has a water distribution and pressurized irrigation network in place.[1]

Aquaveo, LLC is a water resources engineering consulting firm. We take any water resource engineering or hydrology project, even the most difficult, and help you compute and visualize what will happen in the environment surrounding the project. They also create state of the art environmental modeling software specializing in ground water, watershed, and surface water modeling. Their software is being used by over 12,000 consulting firms, universities, and government agencies in over 120 countries.[2]

This project entails the development of an EPA NET model of the City of Bluffdale's existing water distribution network.

## Project Description and Scope of Services

The City of Bluffdale has contracted with Aquaveo to create a digital inventory of their water distribution network. This work also involves the development of an EPA NET model of the existing water distribution network. Aquaveo would be interested in using the capstone program to develop the numerical models of the water distribution system. This would require a basic understanding of hydraulic design principles. Data collection and system mapping for the project commenced on 18 Aug 2014. Although the numerical modeling was set to begin on 25 Nov 2014 and end on 23 Dec 2014, this will be adjusted to fit the constraints of the capstone course.

Available data for this project include a geodatabase of system pipes and nodes that is currently being constructed by the Aquaveo staff that will be provided to the team prior to the modeling effort. A new EPA NET module is currently being added to the Watershed Modeling System (WMS) software to allow for easy importing of the pipe network and attributes and exporting to the EPA NET program. This tool will also be available to the project team prior to the modeling effort.

## General Task Outline

- Determine pressure gradient throughout the City of Bluffdale
- A geodatabase of system pipes and nodes, which contains attributes of various system features, will be populated with output from the EPA NET model runs
- Determine the maximum flow rate in the pipes and nodes for the system
- Determine the maximum pressure computed at each node

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[1] "Bluffdale, Utah." *Wikipedia*. Wikimedia Foundation, 27 Sept. 2014. Web. 29 Sept. 2014.

[2] "About Us." *Aquaveo*. Aquaveo, n.d. Web. 29 Sept. 2014.

- Develop man-hours cost estimate based on required deliverables
- Produce Final Report for Aquaveo and the City of Bluffdale (outlined further in Deliverables section)
- Produce deliverables according to the requirements in this RFP

## Outcome and Performance Standards

Teams will provide the work "as is" meaning that there is no engineering stamp certifying the work.

## Deliverables

The deliverables are:

- A geodatabase with model results that can be provided to BioWest to be uploaded online
- A final report with design alternatives for the project that include economic and environmental considerations
    - Document the modeling process, including all assumptions and model results, will be given to Aquaveo, to be ultimately given to the City of Bluffdale
    - It should also include feedback on how the EPA NET module worked inside of WMS since it will be a new module inside of WMS
    - It should also consider how this modeling will help the community in the future
- A poster reflecting a summary of your design project
- A presentation summarizing your design project to Aquaveo and the City of Bluffdale, location TBD
- All deliverables are due Friday, April 1, 2014.

During the week of April 4th both a presentation to sponsors and poster session for students, faculty and other interested people will be organized.

## Term of Contract

A contract for design services during the Winter Semester will be negotiated with the winning team.

Undergraduate students are to work during winter semester, eight hours/week/student with at least 3 hours working together. Any class time or time spent on class assignments counts towards the eight hours.

## Payments, Incentives, and Penalties

Much of the capstone work is graded by graduate student mentors, that include evaluations of the following components:

- Team process (how well you work together to accomplish the goals)
- Project proposal
- Project Management Plan (PMP)
- 50% complete status report
- Final report, poster, and presentation
- Overall satisfaction of the client in meeting specific deliverables

The sponsor, Clark Barlow, expects project updates at 50% completion, 90% completion, and final completion. These comprise the 50% report, 90% report, and Final report.

## Contractual Terms and Conditions

There will be no monetary compensation with respect to the work completed, and all work is completed and delivered on a "best effort" basis.

Aside: Each member of the undergraduate team will be asked to sign a non-disclosure agreement that simply states the work you do belongs to the project sponsor.

## Evaluation and Award Process

3 different graduate students will evaluate proposals blindly, and the average of their scores will be the grade you are given on the proposal and used for granting awards where there is competition. They will be evaluating you from the exact rubric listed below.

| | |
|---|---|
| **Timeliness** - 1 pt off per full hour late, up to 5. | 5 |
| **Grammar/Spelling** - 1 pt off per blatant error, up to 10. | 10 |
| **Cover Page** - Title, Data, Sponsor, Team Name, Team Members, Department of Civil & Environmental Engineering, Ira A. Fulton College of Engineering and Technology, Brigham Young University - 1 pt per piece of information included. | 8 |
| **Cover Letter** - brief letter of introduction that 1) states your intent to propose and 2) how you may be contact - 4 pts per piece completed. | 8 |
| **Executive Summary** (3/4 to 1 page that summarizes the contents of your proposal) - 7 points for completion, helpfulness - 3 pts max. | 10 |
| **Team Abilities** (Adjust the SOQ to make it relevant to the project) - Summary AS A TEAM of 1) relevant courses and experience, and 3) abilities to complete the work on time and in a professional manner, 4) including use of specific engineering tools/software. Include résumés. 2 pts for including résumés, 6 more points max, 2 per piece completed. | 8 |
| **Key Personnel** - 1) Identify which individuals will focus on which pieces of your potential tasks, and 2) some kind of organizational chart or visual describing how you will work together as a team. 5pts max per piece. | 10 |
| **Project Understanding** - 1) Did they address specific items mentioned in the RFP? 2) Do they repeat basic background in somewhat new terms to *demonstrate their understanding* of the project? 3) Do they mention key deliverables they may need to provide? 4) Did they articulate a *specific* approach for developing design alternatives and deliverables? 4 pts max per piece. | 16 |
| **Formatting** - Does it look professional? Consistent? Yes or no, 5 pts each. | 10 |
| **Concise vs. Wordy**, Meaningful vs. Fluffy, repetitive wording. 8 pts means concise, and accurate, and specific. 1 pt means often confusing, wordy, or vague. | 8 |
| **Clear and professional** flow of writing and style. 7 pts means that you would feel comfortable handing this in if it were your own; it is easy to read and understand; feels professional; 1 pt means it feels like it was cut-pasted, rushed, and done with little thought; hard to read; feels like a high school essay. | 7 |
| **Video Interview** - Message is clear and consistent with proposal, each member participates, professional but catches your attention. Leniency on video/audio quality will be given with a focus on the content and overall organization. | 20 |
| Total | 120 |

## Process Schedule

October 21, 4:00 pm - Request for Proposals will be available online: http://cecapstone.groups.et.byu.net/content/winter-2015-projects

October 27, 4:50 pm - Question and Answer period with respect to the proposal and submission procedures. The period where you can register your intent to propose on a project will begin. Each team will need to identify the primary target of their proposal and three other alternatives (no proposal necessary). Public knowledge of an intent to propose should help distribute proposals more evenly.

*November 17, 4:00 pm - Three copies of the proposal must be submitted at the beginning of class. Team video interviews should be made available online or on disc and referenced in the proposal.

December 1 - Award notification.

*The review committee reserves the right to reject any proposal or presentation that is not submitted in a timely fashion or in accordance with the instructions given in this RFP.

## Contacts

### Graduate Mentor

Justin Relitz

justin.relitz@gmail.com

(559) 681-9365

Responsibilities: Give direction to team, update sponsor on progress of project, evaluate team and project progress

### Faculty Advisor

Wood Miller

wood_miller@byu.edu

(801) 422-6331

## Submittal Requirements for the Proposal

Turn in three copies of the proposal that should include

- Cover letter
- Executive summary, 1 page or less (by itself)
- Work plan that outlines the approach to solving the problem, how the team will work together (including weekly work schedule that shows the hours each team member will work and the time block the team will be together, this is a necessary requirement).

- Necessary tools, data, equipment, etc. A couple of paragraphs or a bullet list with one sentence explanation for each item.
- Schedule indicating important milestones.
- Engineering Design Budget. This is an estimate of the design phase cost.
- Outcome and Performance Standards. Provide the following statement: "Teams will provide the work "as is" meaning that there is no engineering stamp certifying the work."
- Statement of qualifications that outlines the background, experience, education, and organizational structure of the team. Include some discussion of how you plan to become a "high functioning" team in the course of completing the project.
- Outside consultants (professors or others) that are necessary to "make this work."
- Appendices:
    - Appendix A: 1 page resume for each member of the team
    - Appendix B: (if necessary)