Detailed Scopes of Services

Task 1 – Project Management

The following tasks will be completed to organize the team and project:

- Task 1.1 Odell Dam Team Meetings

Project meetings will be held weekly with the Odell Dam Team, and will serve as a time to review the work done, distribute and discuss new work, and resolve project issues.

- Task 1.2 Technical Adviser Meetings and Communication

Meetings will be held with the technical advisers, on a weekly basis, to overcome current obstacles, to ask for additional or alternative resources, and to ask for guidance on the project as a whole.

- Task 1.3 Client Meetings and Communication
Meetings with the client will be held when necessary to discuss the current accomplished goals, unaccomplished goals, and completed work.

- Task 1.4 Communication with the Owners of Pinewood Country Club

Communication between the project lead and the owner of the Odell Dam, Pinewood Country Club, will be continued to establish permission to conduct surveying and geotechnical analysis on their property as well as coordinating with the surrounding residences to insure full disclosure of the project.

Task 2 – Literature Review

Literature review is the use of scholarly articles, technical journals, and past documentation to conduct research and gather helpful resources to be used in the employment of this project. The literature review will help the team gain a comprehensive understanding of each analysis to be completed for the entire project.

- Task 2.1 Past Dam Failures

The team will research the Odell Dam and its past failures. This will help our team establish a baseline of most probable dam failure methods of the Odell Dam.

- Task 2.2 State and Federal Dam Safety References

Research will be performed on state and federal dam risk analysis procedures. Listed below are different organizations that will be researched for current dam risk analysis procedures and past files on Odell Dam.

a. Federal Emergency Management Agency (FEMA)
b. Arizona Department of Water Resources (ADWR)
c. United States Army Corp of Engineers (USACE)
d. United States Geological Survey (USGS)
    - To see if any soil reports within the area are available.
    - To establish a control point for surveying once out in the field.

The team will examine government databases to determine all relevant data to the project, such as; soil properties, existing conditions, and background information on the Odell Dam.

Task 3 – Surveying

The Odell Dam team will take an inventory of all pertinent cross sections, identify key safety deficiencies, and gather all necessary geometric data of the Odell Dam and Lake. With this data Hydrologic analysis can be started.

- Task 3.1 Survey Existing Infrastructure

Surveying data will be collected through a site visit after the permission from the owner of the dam has been established. Basic cross sections and geometric data will be generated for this site as well as key safety deficiencies if present, such as embankment cracks, erosion, breaching, unusual or uncontrolled seepage, slope instability and/or inadequate spillway capacity.

Task 4 – Geotechnical Sampling

Geotechnical sampling will be conducted on the project site to gain basic knowledge of the soil properties of the area.

- Task 4.1 Soil Sampling

Soil samples within the watershed and the Lake area will be taken to determine the soil properties, and classification of soil.

Task 5 – Hydrological Analysis

Watershed analysis will be conducted on the project to attain an understanding of how the water flows to our dam. From the inflow an estimated outflow can be established.

- Task 5.1 Determine Watershed

Determining the watershed will be pertinent to any analysis done for the dam risk analysis. The watershed will help determine the amount of water which needs to be contained by the dam in the event of a storm.

- Task 5.2 Determine Storm Recurrence Intervals (5, 10, 50, 100, 500, 1000 year)

Storm recurrence intervals will help determine the type and frequency of storm that will contribute to the Odell Dam.

a. National Stream Flow Systems (NSS)
   - NSS will be used to determine an estimation of the watersheds runoff intensity. This number will be used as a check for other intensity methods.

b. National Oceanic and Atmospheric Administration (NOAA)
   - NOAA will be researched and its information implemented to help determine the different possible scenarios of storm duration and rainfall intensity. Many different situations will be accounted for in order to estimate possible storm conditions.

- Task 5.3 Post Burn Discussion

A post burn theory will be discussed, when the watershed does burn this will cause a huge increase in rainfall runoff to which will inherently change the recurrence interval at which the dam will fail.

Task 6– RocScience Slide Modeling

Dam failure analysis is a primary objective of the Odell Dam Team. The failure analysis can help rectify the dam's current safety status (high hazard) and aid in future improvements of the dam.

- Task 6.1 Slope Stability Analysis

Side slope stability will be analyzed to see if the dam's water table raises to the point before overtopping the side slopes do not fail. This will be evaluated in the form of its factor of safety, and would need to be above 1.5 which is the standard value of practice.

Task 7 – Bentley's PondPack Modeling

The modeling will help to show how the failure will affect areas downstream of the dam. In addition a brief summary of post-burn terrain effect will be included.

- Task 7.1 Hydraulic Failure Analysis

Hydraulic failures that will be analyzed will include overtopping, spillway capacity, and overall discharge. These calculations will be done until failure is found, thus establishing the recurrence interval at which the dam fails at.

Task 8 – Final Reporting

Final reporting of the Odell Dam Safety Analysis project will be done to prepare a report, presentation, and website for the client.

- Task 8.1 Comprehensive Report

A comprehensive report will be developed once all the analysis for the dam risk assessment has been completed. In addition a standard emergency action plan will be added to the report. This will serve as the final deliverable for the class.

- Task 8.2 Client Presentation/UGrads.

After the final recommendation is completed, a PowerPoint presentation will be generated, followed by a UGRADs poster. The poster will give all pertinent information about the capstone project.

- Task 8.3 Website

Through the course of the project, a website will be developed and maintained. The website will have all the information about the capstone project as well as a comprehensive listing of all team members and their contributions to the project.