Detention Pond Project

➤ The University of Memphis is seeking to build a detention pond near the Engineering buildings in the Summer of 2024 and would like to invite initial bid proposals for design and construction.

➤ There are four available sites on University property appropriate for the project.

➤ The bid/proposal must include an analysis of each assigned site with several alternative designs for the detention pond.

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Detention Pond Project

➤ From this analysis, one detention pond design for construction is recommended. All construction must be complete before August 1, 2025.

➤ The final packet submitted for the bid/proposal is due no later than April 29, 2025, and must include the following:

   ➤ A technical report that includes:
      ➤ An analysis of each site
      ➤ A recommended design
      ➤ An estimated budget for the completion
      ➤ Appendix (additional tables, charts, graphs)

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Detention Pond Project

➤ Please address all questions, comments, and correspondence to:

   Dr. Claudio Meier, Project Director
   Department of Civil Engineering
   The University of Memphis
   Memphis, TN 38152

➤ Each team should prepare a full formal technical report with a poster presentation supported by recent and relevant research

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Detention Pond Project

Detention Pond Project Description

➤ The objective of this project is to design a stormwater detention pond on the site assigned to your group in the lab.

➤ The detention pond must provide a maximum storage of 50,000 gallons, meet all design criteria, and minimize the project's total cost.

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Detention Pond Project

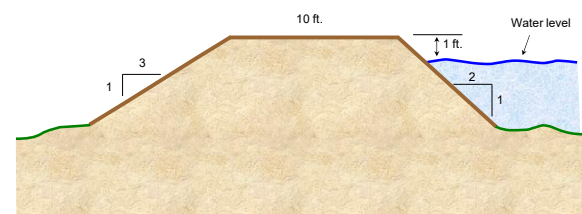**Detention Pond Project Description**

The pond design criteria are:

   ➤ The side slope on the inside of the pond embankment cannot be greater than 1:2

   ➤ The side slope on the outside of the pond embankment cannot be greater than 1:3

   ➤ The crest of the pond embankment should be 10 ft. wide to accommodate a vehicle.

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Detention Pond Project

Detention Pond Project Description

The pond design criteria are:

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Detention Pond Project

Detention Pond Project Description

The pond design criteria are:

➢ The soil used to construct the pond embankment must be compacted.

➢ The cut or loose soil volume is reduced by 15% when compacted.

➢ The pond embankment must have a spillway that is not placed on compacted material (if possible).

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Detention Pond Project

Detention Pond Project Description

The pond design criteria are:

➢ Side slopes of the pond embankment must be protected from erosion.

➢ The water level must be at least 1 ft. below the crest of the pond embankment.

➢ Minimum width of the spillway is 10 ft.

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Detention Pond Project

Detention Pond Project Description

Typical Costs are:

➢ On-site cut and fill: $ 2.50/yd.^{3}
➢ Off-site fill: $ 5.00/yd.^{3}
➢ Off-site cut: $ 3.00/yd.^{3}
➢ Concrete (delivery and labor): $100/yd.^{3}
➢ Pond embankment protection:
         vegetation $2.50/ 10 ft.^{2}
         stone $1/ft.^{2}
         concrete $2/ft.^{2}

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Detention Pond Project

Detention Pond Project Description

These cost estimates are ***preliminary***.

➢ Over time, as additional cost items are required, a current list of costs will be posted on the class web page.

➢ Please regularly check the web page on the project's status.

➢ In addition, all supplemental information posted on the web page will be announced in class.

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Detention Pond Project

Detention Pond Project Description

The detention pond project poses several challenges to each group:

➢ Developing an accurate topographic survey of the site
➢ Designing the detention pond to meet criteria
➢ Locating the detention pond on the site such that cut-and-fill is minimized
➢ Developing a sound engineering solution that meets the design criteria while minimizing the project cost

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Detention Pond Project

Detention Pond Project Description

The analysis skills required in this project are:

➢ Topographic computations for contour maps
➢ Traverse computations for estimating areas
➢ Estimating cut-and-fill for the pond and the embankment
➢ The configuration of the pond spillway

➢ Develop spreadsheets to compute information for topographic maps, traverse areas, and the minimization of cut-and-fill

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Detention Pond Project

The detention pond project schedule:

Date	Activity
April 15-17	Traverse and topographic survey and contour map of site
April 22-24	Cut-and-fill calculations
April 29	Detention pond design bid package and poster presentation - 1:00 p.m.

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Detention Pond Project

Exaggerated scale in the z-direction

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Detention Pond Project

Exaggerated scale in the z-direction
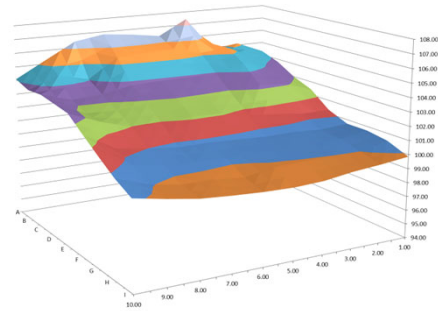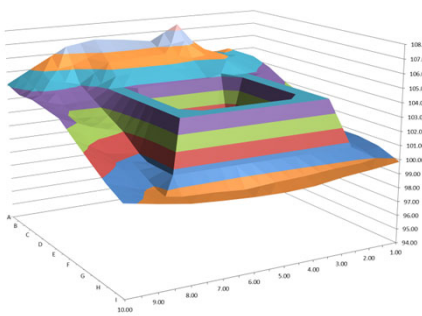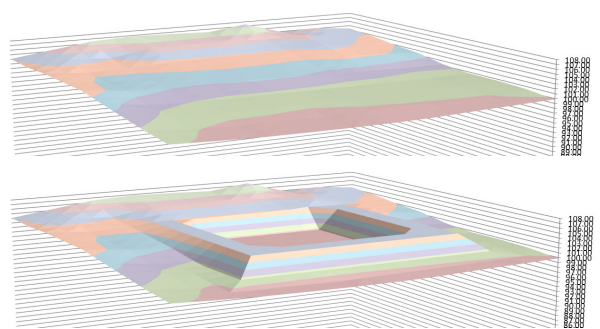
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Detention Pond Project

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Detention Pond Project

Any questions?

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