

**PRAIRIE VIEW A&M UNIVERSITY
ROY G. PERRY COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING
1102 INTRODUCTION TO CIVIL ENGINEERING LAB
FALL 2021**

- I. COURSE DESCRIPTION IN ABET FORMAT**
- II ASSESSMENT RESULTS FOR CURRENT AND PAST PERIOD(S)**
 - Program Outcomes Assessed in Course**
 - Assessment Summary of Class Semester Averages for Outcomes**
 - End of Semester Course Outcomes Assessment Reports**
- II. TESTS**
 - Summary of Topics covered by Test**
 - Original Test Questions**
 - (Summary of topics can be a separate page or include on the assignment itself)
 - Above Average (Graded original work)
 - Average (Graded original work)
 - Below Average (Graded original work)
- III. HOMEWORK ASSIGNMENTS**
 - Summary of Topics covered by Homework**
 - Original Homework Questions**
 - Above Average (Graded original work)
 - Average (Graded original work)
 - Below Average (Graded original work)
- IV. TERM PROJECT**
 - Summary of Topics Covered by Project**
 - Project Problem Statement**
 - Above Average (Graded original work)
 - Average (Graded original work)
 - Below Average (Graded original work)

**One or Two Page Course Description
in ABET Format**

Department of Civil & Environmental Engineering

CVEG 1102 – Introduction to Civil Engineering Lab

CREDIT HOURS	1
CONTACT HOURS	3
INSTRUCTOR/ COURSE COORDINATOR	Dr. Iftekhar Ahmed, PE, Civil Engineering
TEXTBOOK	None
SUPPLEMENTAL MATERIALS	Class handouts, instructional videos, faculty presentations and lectures on specific areas of Civil Engineering, lab tours and demonstration of lab experiments on you tube, hand calculations
CATALOG DESCRIPTION	The course consists of an introduction to civil and environmental engineering issues and concerns. Students will become familiar with the many sub-fields of the civil and environmental engineering profession; ethical responsibilities; and concepts of design.
PREREQUISITES	None
CO-REQUISITES	CVEG 1101
DESIGNATION	Required
COURSE LEARNING OUTCOMES/GOALS	(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies
TOPICS COVERED	I. Introduction to the Course/Curriculum and Weekly Schedule II. Introduction to Civil Engineering (Depth and Breadth of CE) III. Intro to Water Resources Engineering IV. Intro to Environmental Engineering V. Intro to Transportation Engineering VI. Intro to Structural Engineering VII. Intro to Geotechnical Engineering VIII. Term Project

II ASSESSMENT RESULTS FOR CURRENT AND PAST FOUR ASSESSMENT PERIODS

Program New ABET Outcomes Assessed in this course

NONE

Assessment Summary of Class Semester Averages for Outcomes: Fall 2019-2021

Outcomes	N/A	N/A
Semester		
Fall 2021		
Fall 2020		
Fall 2019		
Comments on Data		

*Expected Class Average = 70%

End of Semester Course Assessment Reports Fall 2021 and Last Assessment Period

Each summary contains the following Information

Not Applicable

This Course is not Assessed for any SLO

INTRO TO CIVIL ENGINEERING LAB FALL 2021

Title of Assignment: TEST 1 or Midterm

TOPICS COVERED IN TEST 1 or Midterm

Test 1 covered the following topics:

1. Introduction to Sub-Disciplines of Civil Engineering
2. Area specific topics
3. Ethics

The Midterm test was a Multiple Choice format.
Student samples were not kept because this
course is not assessed for any ABET SLOs.

CVEG 1102: Introduction to Civil Engineering Lab
In-Class Midterm Exam: CLOSED NOTES (3-4 PM; October 11, 2021)

Name: _____

1. All of the following are recognized areas of Civil Engineering *except*:
 - a. Construction Science
 - b. Water Resources Engineering
 - c. Structural Engineering
 - d. Environmental Engineering
 - e. Geotechnical Engineering

2. The CEE department at Prairie View A&M University offers which degree to undergraduates:
 - a. B.S. in Civil Engineering
 - b. B.S. in Architectural Engineering
 - c. B.S. in Construction Engineering

3. *P.E.* stands for:
 - a. Physical Education
 - b. Physical Exercise
 - c. Professional Engagement
 - d. Professional Engineer
 - e. All of the above

4. Before you can sit for the P.E. examination, what certification is required:
 - a. E.I.T.
 - b. C.E.
 - c. CPESC
 - d. BCEE
 - e. F.ASCE

5. You are a water resources engineer tasked to provide drainage solution at a roadway crossing. During the course of the project, you will most likely come in contact with:
 - a. Transportation engineer
 - b. Structural engineer
 - c. Geotechnical engineer
 - d. Land surveyor
 - e. Environmental engineer
 - f. All of the above

6. Nationwide stewardship (oversight) for the Civil Engineering profession is provided by:

- a. ASCE
- b. FAA
- c. USACE
- d. USBOR
- e. TxDOT

7. **Waters of the U.S.** are managed by

- a. US Army Corps of Engineers
- b. US Bureau of Reclamation
- c. Harris County Flood Control District

8. Structural design materials for buildings may be:

- a. Steel
- b. Wood
- c. Concrete
- d. Tree Logs for log cabins
- e. All of the above

9. Design of components of all civil engineering areas are done according to specifications and guidelines set by the:

- a. Local government
- b. Federal government
- c. Both 'a' and 'b'

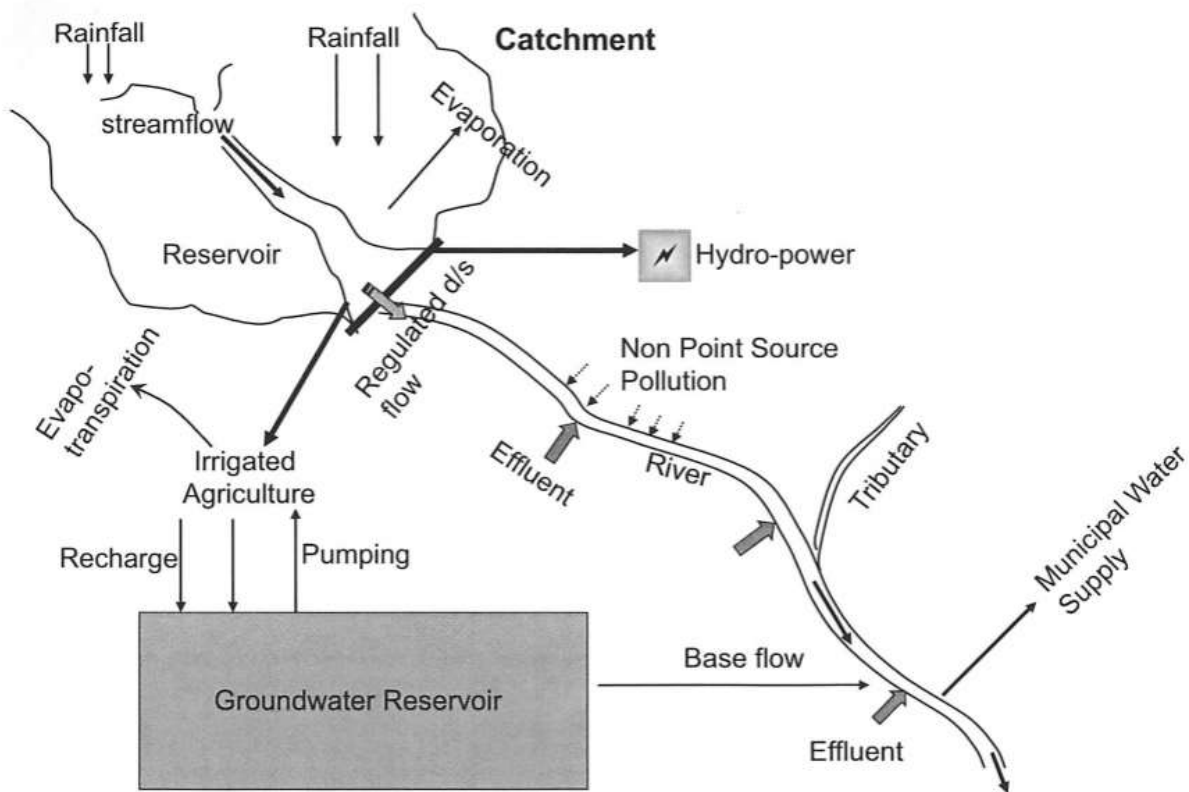
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- a. YES
- b. NO

11. Groundwater resource in a community is polluted and many have been diagnosed with cancer. Would it be ethical to call in some of the affected individuals to the court to testify during a trial against a battery manufacturing company that is *suspected* of polluting the ground with disposal of highly toxic chemicals on the land?
- a. YES
 - b. NO
 - c. Not without consent of the individuals
12. When ethical question arises in civil engineering work place and you have *no one to talk to or trust*, who can you, as a civil engineer, call:
- a. ASCE Committee on Ethics
 - b. Your immediate supervisor
13. Post rain storm, after all abstractions of rainwater, the remaining water *on* a watershed is best described as:
- a. Runoff
 - b. Diversion
 - c. Evapotranspiration

14. The water flow volume in the River *below* the 'Tributary' in the figure is 1000 units. If the 'Municipal Water Supply Diversion' is 100 units and the 'Effluent' inflow volume (*below* the tributary) is 10 units, what is the River flow downstream of the municipal water supply diversion location?

- a. 1000 units
- b. 900 units
- c. 910 units
- d. 100 units
- e. 10 units



Typical Water Resource System

15. Which of the following agencies provide *stewardship* (or oversees the regulations) in *post-flood* recovery projects?
- a. FHWA (Federal Highway Administration)
 - b. TxDOT (Texas Dept. of Transportation)
 - c. FEMA (Federal Emergency Management Agency)
 - d. None of the above
16. Consider the Cloverleaf interchange shown. For a westbound vehicle on the Interstate to go South on the surface street, which leaf must the vehicle take to get *off* the Interstate. The four leaves are numbered for you to choose from. People drive on the right hand side of the road in the USA. **(BONUS: 5 Points for correct answer)**



- a. Leaf #3
- b. Leaf #4
- c. Leaf #1
- d. Leaf #2

17. Canons of ethics are (**BONUS: 2 Points for correct answer**)

- a. Guidelines
- b. Laws
- c. Concepts
- d. None of the above

18. Flood is best defined by (**BONUS: 3 Points for correct answer**)

- a. The situation when waters of the rivers or bayous leave the main channel
- b. The situation when waters of the rivers or bayous stay in the channel but runs fast
- c. None of the above

ABOVE AVERAGE

$\frac{76}{100}$

+3

 $= \frac{79}{100}$

CVEG 1102: Introduction to Civil Engineering Lab
In-Class Midterm Exam: CLOSED NOTES (3-4 PM; October 11, 2021)

Name: Rabim Ejilasisi

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 - ☒ b. C.E.
 - c. CPESC
 - d. BCEE
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5. You are a water resources engineer tasked to provide drainage solution at a roadway crossing. During the course of the project, you will most likely come in contact with:

- a. Transportation engineer
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- d. Land surveyor
- e. Environmental engineer
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- b. FAA
- c. USACE
- d. USBOR
- e. TxDOT

7. **Waters of the U.S.** are managed by

- ☐ a. US Army Corps of Engineers
- ☒ b. US Bureau of Reclamation
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8. Structural design materials for buildings may be:

- a. Steel
- b. Wood
- c. Concrete
- d. Tree Logs for log cabins
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9. Design of components of all civil engineering areas are done according to specifications and guidelines set by the:

- a. Local government
- b. Federal government
- ☒ c. Both 'a' and 'b'

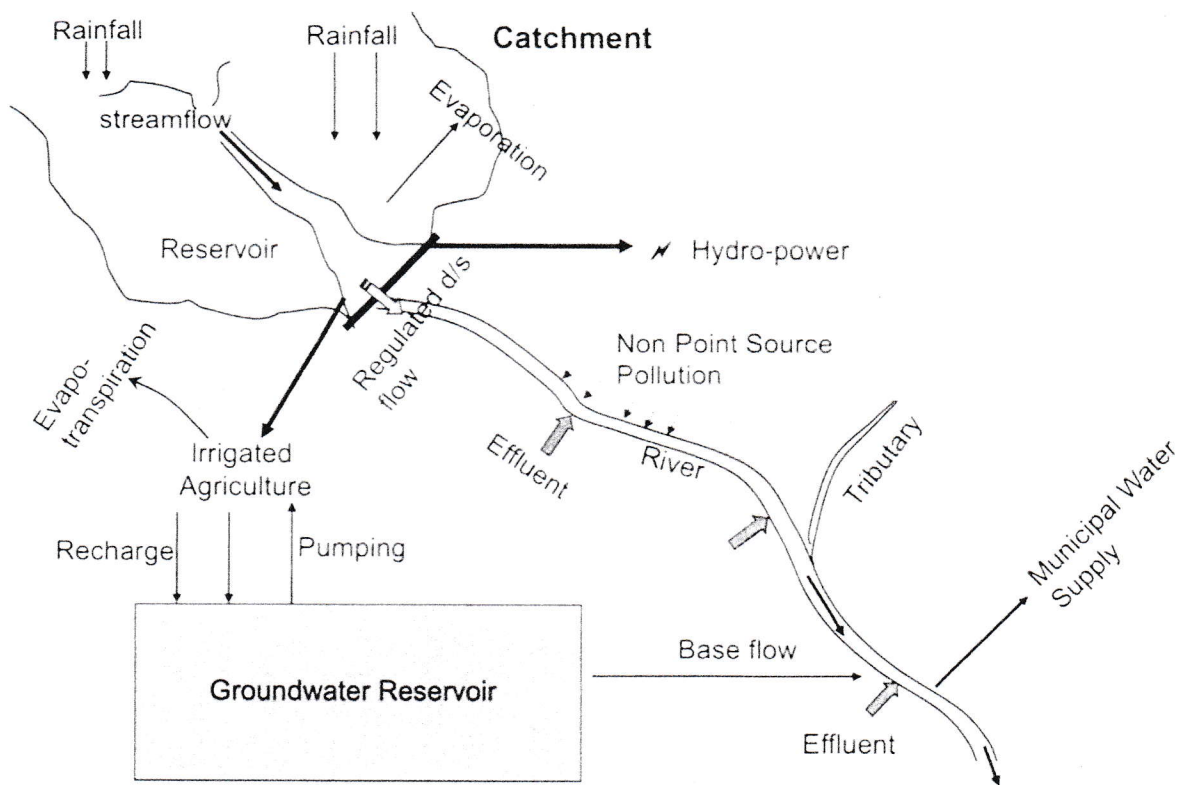
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- a. YES
- ☒ b. NO

11. Groundwater resource in a community is polluted and many have been diagnosed with cancer. Would it be ethical to call in some of the affected individuals to the court to testify during a trial against a battery manufacturing company that is *suspected* of polluting the ground with disposal of highly toxic chemicals on the land?
- a. YES
 - b. NO
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12. When ethical question arises in civil engineering work place and you have *no one to talk to or trust*, who can you, as a civil engineer, call:
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14. The water flow volume in the River *below* the 'Tributary' in the figure is 1000 units. If the 'Municipal Water Supply Diversion' is 100 units and the 'Effluent' inflow volume (*below* the tributary) is 10 units, what is the River flow downstream of the municipal water supply diversion location?

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Typical Water Resource System

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AVERAGE

$\frac{64}{100}$

+8

 $= \frac{72}{100}$

CVEG 1102: Introduction to Civil Engineering Lab
In-Class Midterm Exam: CLOSED NOTES (3-4 PM; October 11, 2021)

Name: Miguel Febrer

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Apart of the 4
Engineering

2. The CEE department at Prairie View A&M University offers which degree to undergraduates:

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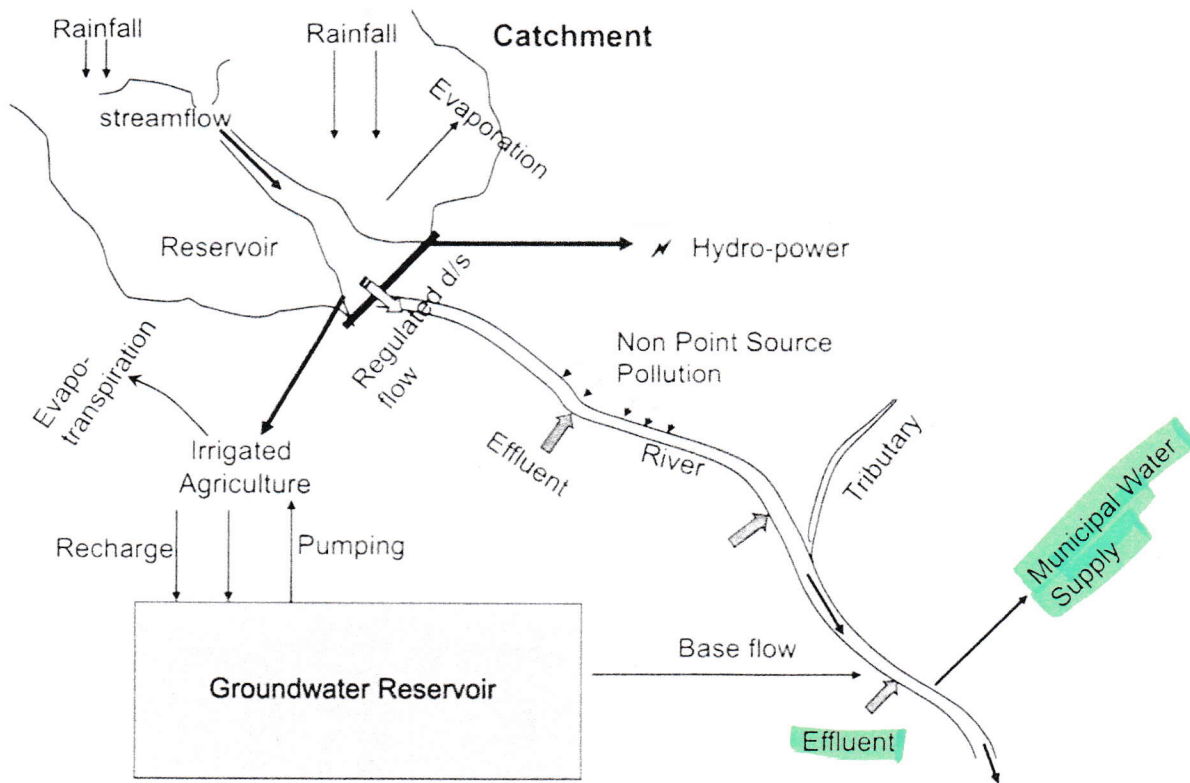
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$$\text{Total} = 1000$$

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BELOW AVERAGE

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In-Class Midterm Exam: CLOSED NOTES (3-4 PM; October 11, 2021)

Name: Treveonta Jackson

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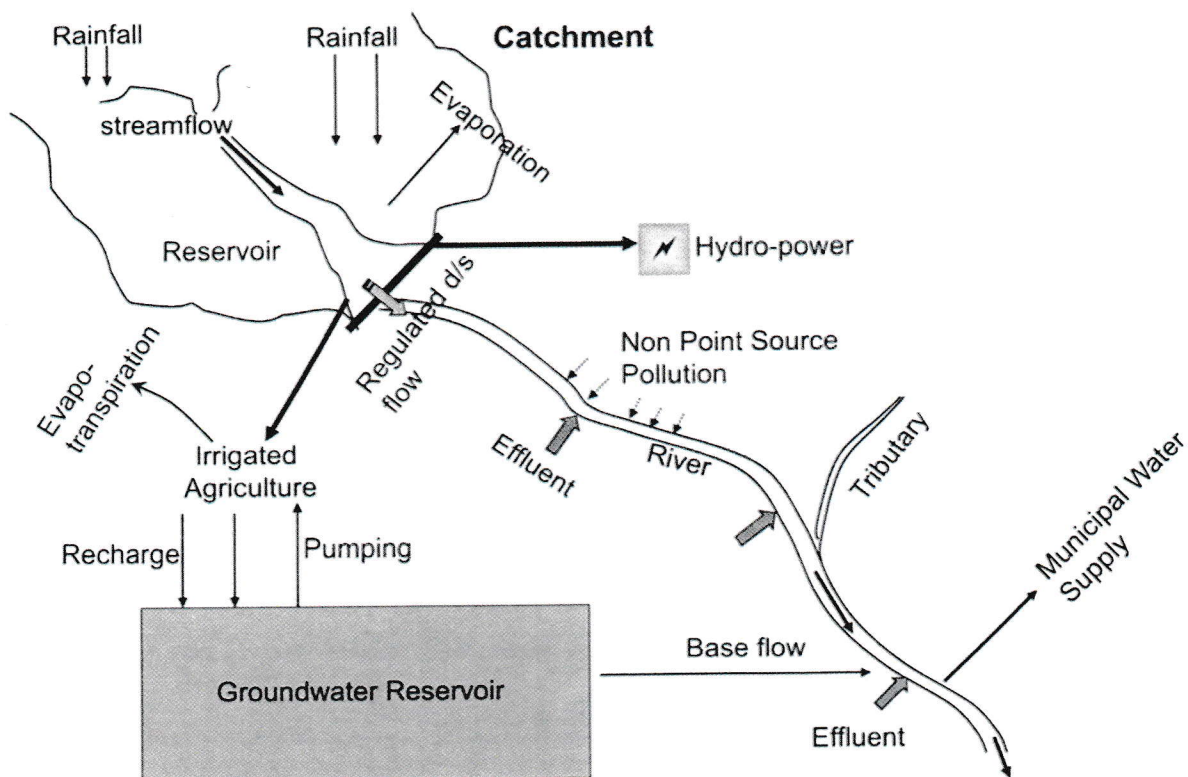
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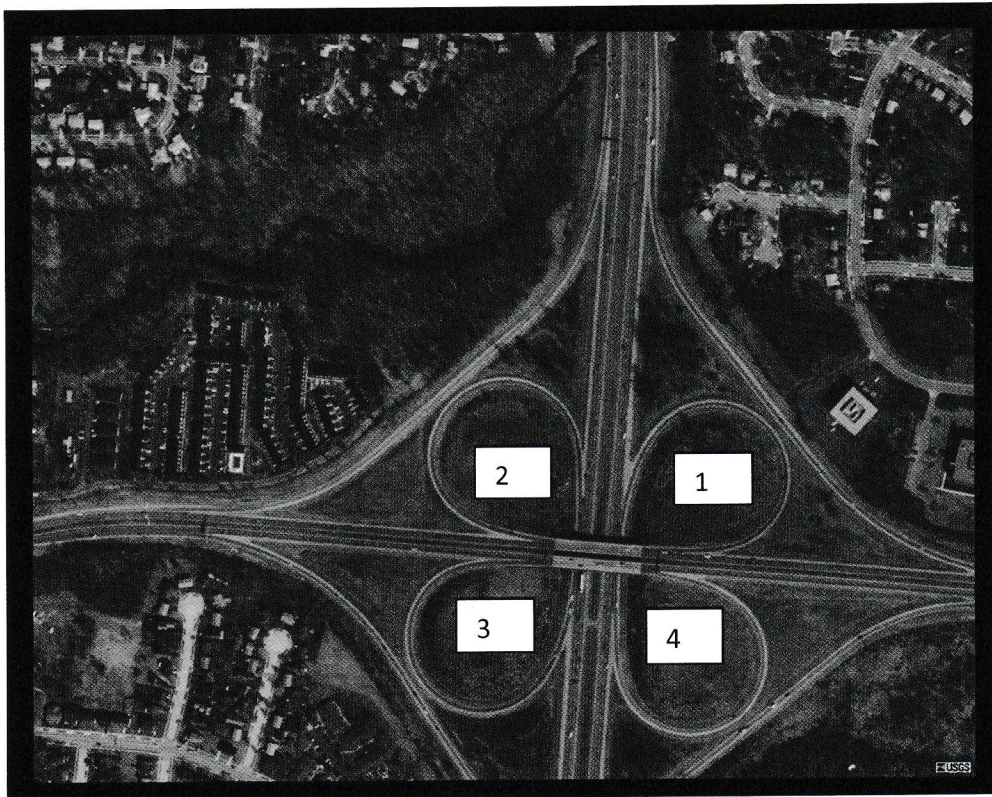


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- ☒ a. Leaf #3
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**INTRO TO CIVIL ENGINEERING LAB
FALL 2021**

Title of Assignment: FINAL EXAM

TOPICS COVERED IN FINAL EXAM

Final Exam covered the following topics:

1. Area Specific Civil Engineering Topics

CVEG 1102: INTRODUCTION TO CIVIL ENGINEERING LAB
Final Exam: CLOSED NOTES/E-Devices (2:30pm – 4:30pm; December 6, 2021)

25 QUESTIONS (4 points each)

Name: _____

1. The five areas of Civil Engineering are:

- a. Water Resources
- b. Transportation
- c. Structural
- d. Environmental
- e. Geotechnical
- f. All of the above

2. Passing which exam will get you the EIT certificate?

- a. FE (Fundamentals of Engineering) Exam
- b. PE (Professional Engineer) Exam

3. One *disadvantage* of a Cantilever Bridge is that it **cannot** be:

- a. Too long
- b. Too short
- c. Too high
- d. Too low

4. The structural component that provides *lateral support* to an Arch Bridge is called:

- a. Cantilever
- b. Lateral
- c. Buttress
- d. None of the above

5. In a Cable Stayed Bridge, the columns (or piers):

- a. Do nothing
- b. Transfer compressive load to the foundation
- c. Transfer tensile load to the cables

6. In a Continuous Beam Bridge, the bridge deck segments are

- a. Arch supported
- b. Cantilever supported
- c. Simply supported

7. In a Suspension Bridge:

- a. Continuous cables are used from end to end of the bridge
- b. Groups of cables are used at multiple columns (or piers)
- c. Cables are not used

8. A standard BOD-5 test uses a flask of what volume?

- a. 400 mL
- b. 300 mL
- c. 350 mL

9. DO stands for

- a. Diluted Oxygen
- b. Dissolved Oxygen
- c. D-Oxygen

10. The estimated BOD-5 is directly proportional to:

- a. The difference of initial and final DOs, in that order
- b. The difference of final and initial DOs, in that order
- c. The solution fraction

11. Roundabout intersections are used to channelize heavy traffic in a short time

- a. True
- b. False

12. A four-way interchange can have minimum how many left turn pockets?

- a. 4
- b. 2
- c. None

13. Yield signs are needed when:

- a. High volume traffic meets low volume traffic
- b. Traffic goes over a flyover
- c. Low volume traffic meets high volume traffic

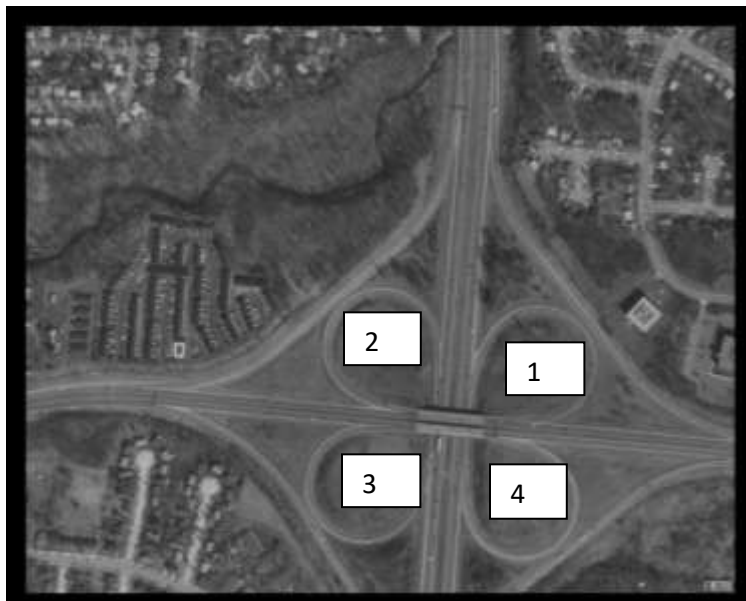
14. Consider the Trumpet interchange shown. How many purposes does the ‘trumpet’s circle’ on top of the figure serve the traffic, in terms of its use to get on and off the two freeways with the bridges? People drive on the right hand side of the road in the USA.



Ill. A. Macdonald Parkway in Ottawa, Ontario. 45°41'38.0"N 75°33'27.8"W

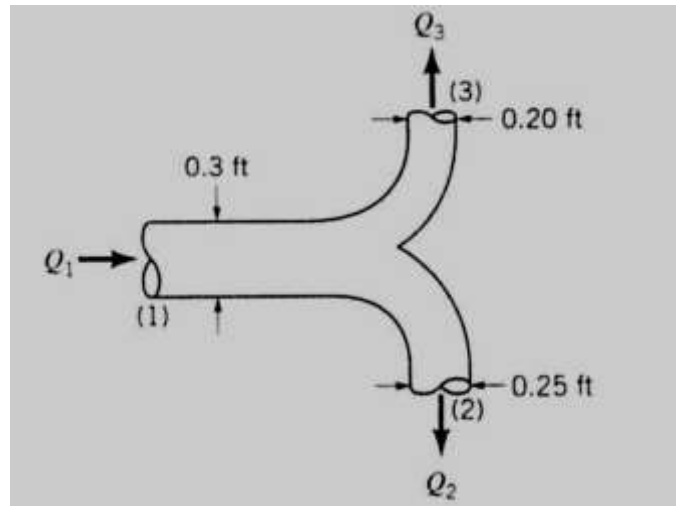
- a. one
- b. two
- c. three
- d. four

15. Consider the Cloverleaf interchange shown. For an eastbound vehicle on the Interstate to go North on the surface street, which leaf must the vehicle take to get *off* the Interstate. The four leaves are numbered for you to choose from. People drive on the right hand side of the road in the USA.



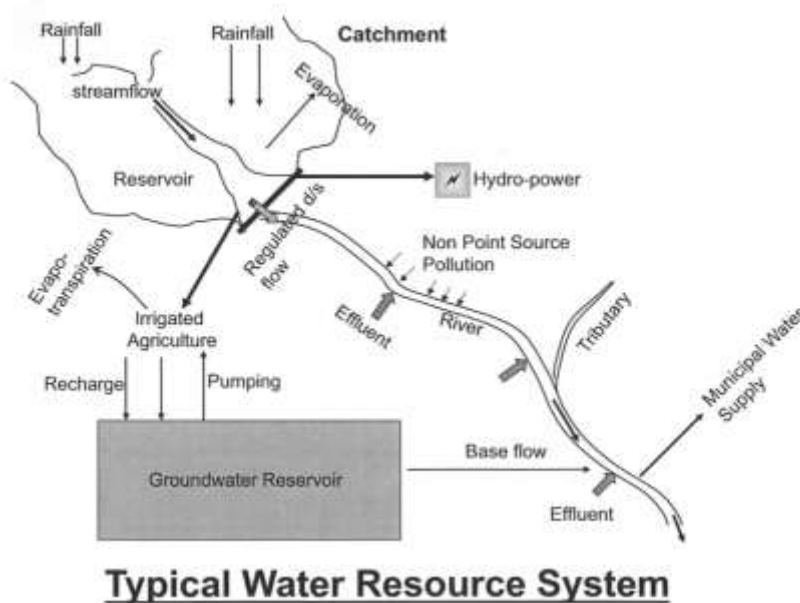
- a. Leaf 1
- b. Leaf 4

16. If Q is the flow volume at the inlet and the two outlets, the continuity (mass balance) equation that best describes the pipe system flow shown in the figure is: **(BONUS 5 Points for correct answer)**



- a. $Q_2 - Q_1 = Q_3$
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17. Effluents in the system diagram best describes:

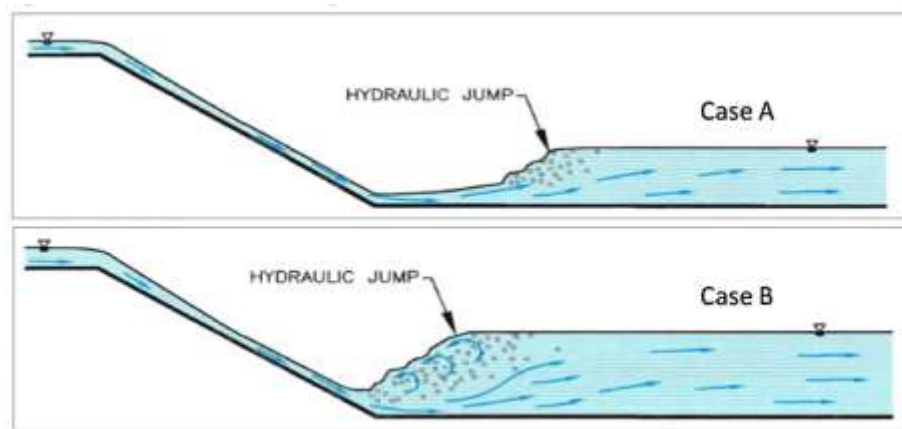


- a. Treated wastewater from WWTPs
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18. A bypass channel:

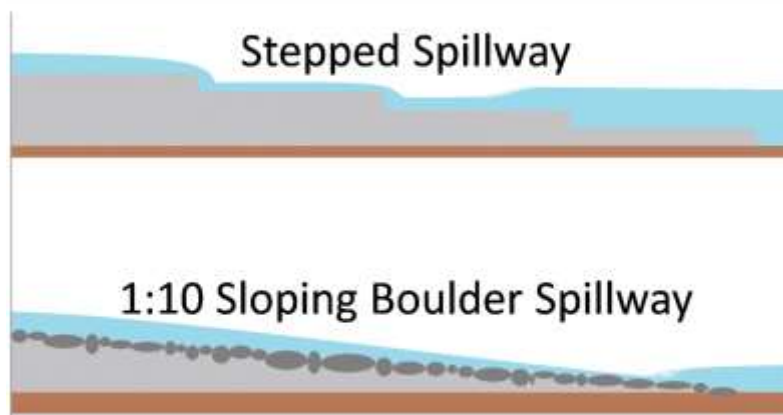
- a. Adds water into the main channel of a river like a tributary
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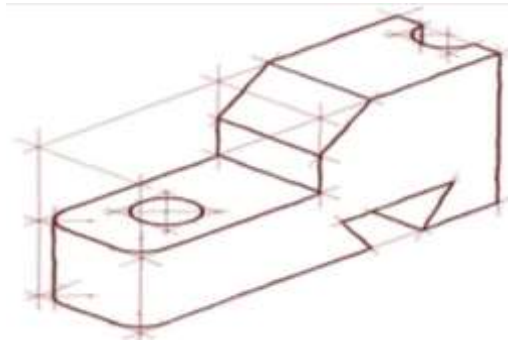
- a. Case A jump
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20. The use of the spillways (drop structures) shown in the figure is to:



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- d. None of the above

21. In the 3-D figure shown, how many *hollow* (open) locations are there requiring hidden lines if you were to draw the orthographic projections?



- a. Three
- b. Two
- c. One
- d. None of the above

22. In a Soil Gradation Curve, ' $D_{50} = 2 \text{ mm}$ ' means:

- a. 50% of the soil sample's grains is coarser than 2 mm
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23. The cumulative mass passing at No. 20 sieve is 250 grams. Mass retained in a No. 60 sieve is 210 grams. The cumulative mass passing the No. 60 sieve is:

- a. 10 grams
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- c. 50 grams
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- a. Dry sieve test
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25. The organization that provides stewardship to the Civil Engineering profession is:

- a. ASCE
- b. ASME
- c. FHWA
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ABOVE AVERAGE



CVEG 1102: INTRODUCTION TO CIVIL ENGINEERING LAB
Final Exam: CLOSED NOTES/E-Devices (2:30pm – 4:30pm; December 6, 2021)

25 QUESTIONS (4 points each)

+5

Name: SANA FATIMA

1. The five areas of Civil Engineering are:

- a. Water Resources
- b. Transportation
- c. Structural
- d. Environmental
- e. Geotechnical
- ☒ f. All of the above

2. Passing which exam will get you the EIT certificate?

- ☒ a. FE (Fundamentals of Engineering) Exam
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3. One *disadvantage* of a Cantilever Bridge is that it **cannot** be:

- ~~a. Too long~~
- ☒ ~~b. Too short~~
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4. The structural component that provides *lateral support* to an Arch Bridge is called:

- a. Cantilever
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6. In a Continuous Beam Bridge, the bridge deck segments are

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8. A standard BOD-5 test uses a flask of what volume?

- a. 400 mL
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9. DO stands for

- a. Diluted Oxygen
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- ☒ a. The difference of initial and final DOs, in that order
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- c. The solution fraction

11. Roundabout intersections are used to channelize heavy traffic in a short time

- ☒ a. True
- b. False

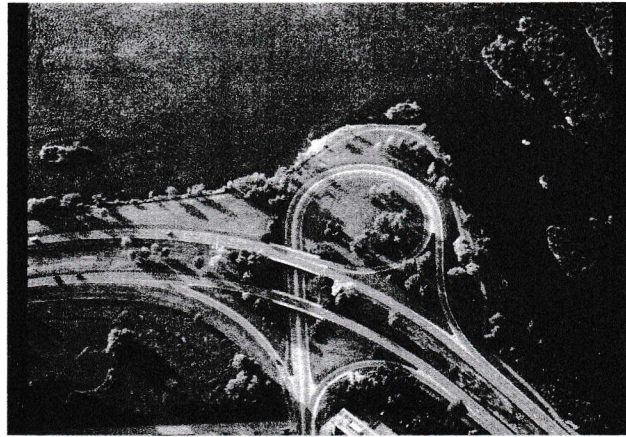
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14. Consider the Trumpet interchange shown. How many purposes does the 'trumpet's circle' on top of the figure serve the traffic, in terms of its use to get on and off the two freeways with the bridges? People drive on the right hand side of the road in the USA.



John A. Macdonald Parkway in Ottawa, Ontario. 45.411389°N 75.735278°W

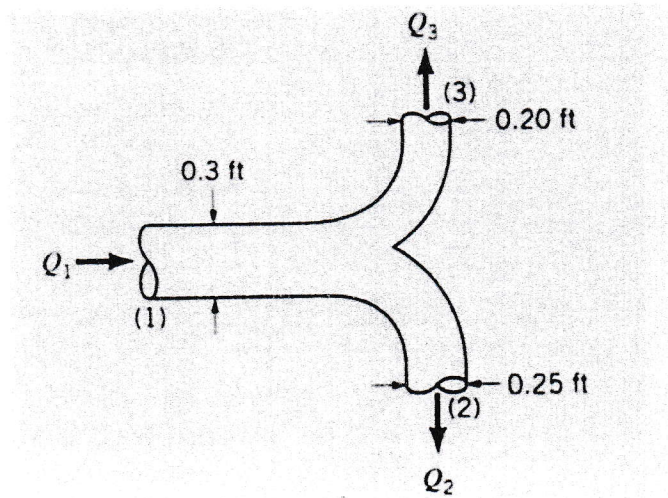
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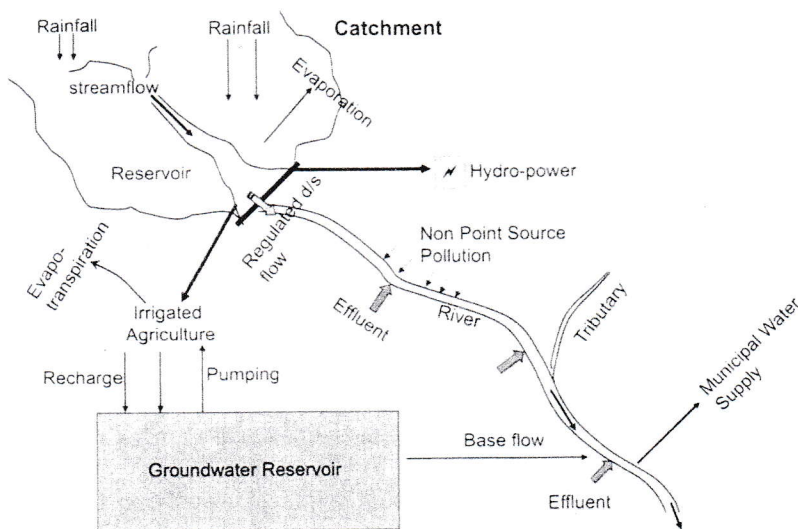
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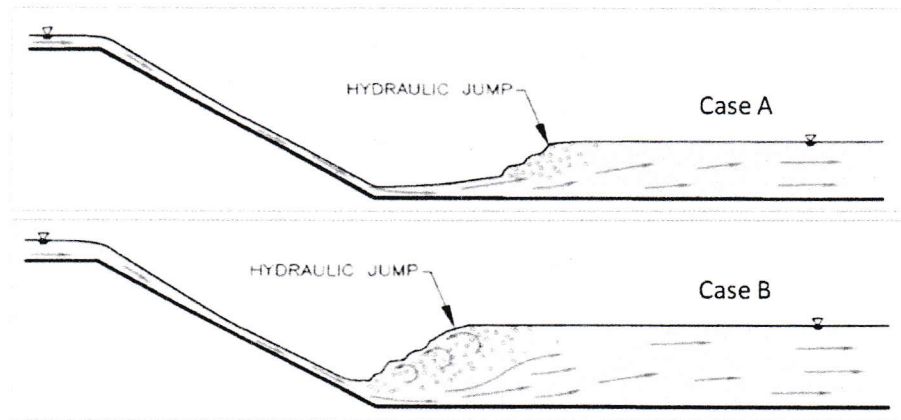
Typical Water Resource System

- a. Treated wastewater from WWTPs
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- c. Direct pollutant liquid discharge from river-side factories

18. A bypass channel:

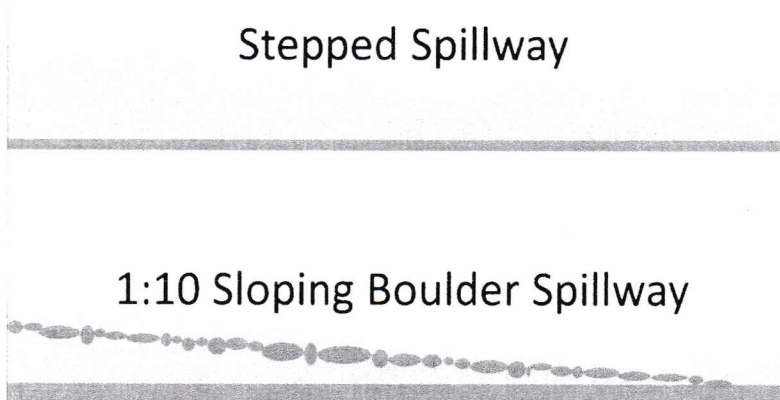
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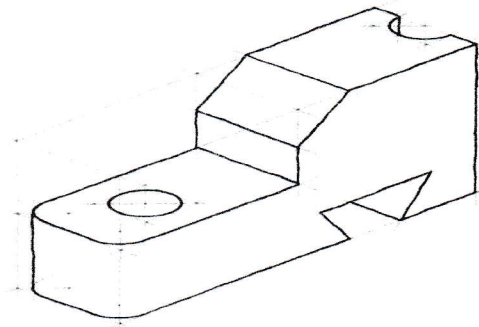
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- c. FHWA
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AVERAGE

76
100

15

CVEG 1102: INTRODUCTION TO CIVIL ENGINEERING LAB
Final Exam: CLOSED NOTES/E-Devices (2:30pm – 4:30pm; December 6, 2021)

25 QUESTIONS (4 points each)

Name: Cameron Sanders

1. The five areas of Civil Engineering are:

- a. Water Resources
- b. Transportation
- c. Structural
- d. Environmental
- e. Geotechnical
- ☒ f. All of the above

2. Passing which exam will get you the EIT certificate?

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- b. PE (Professional Engineer) Exam

3. One *disadvantage* of a Cantilever Bridge is that it **cannot** be:

- ☒ a. Too long
- b. Too short ✓
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- d. Too low ✓

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✓ 11. Roundabout intersections are used to channelize heavy traffic in a short time

- ☒ a. True
- b. False

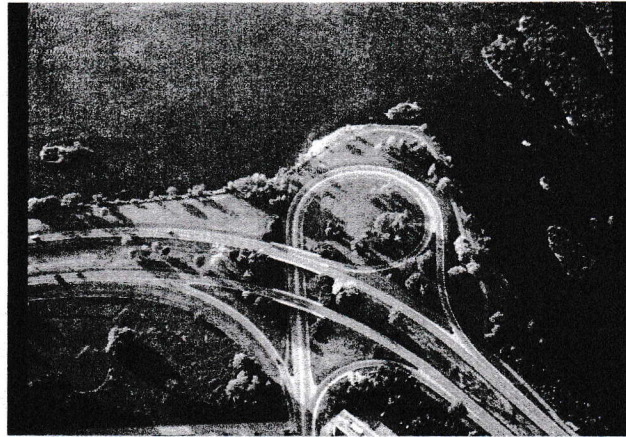
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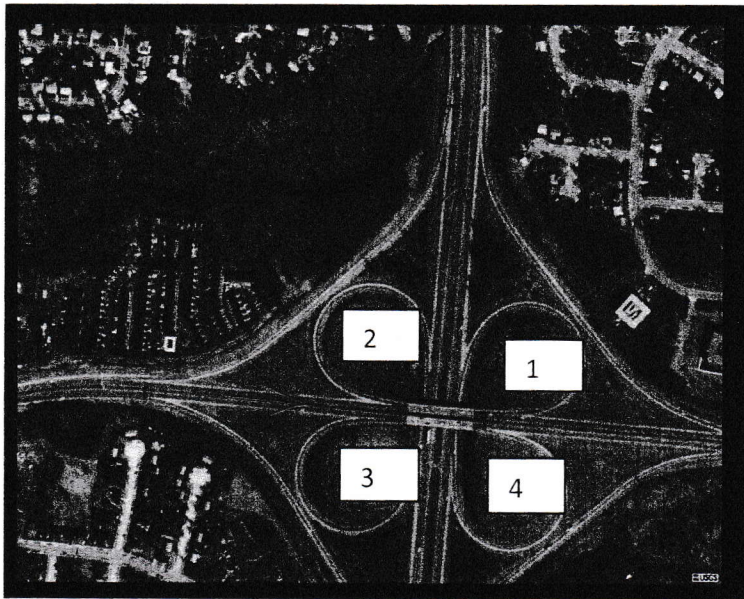
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John A. Macdonald Parkway in Ottawa, Ontario. 45.411389°N 75.735278°W

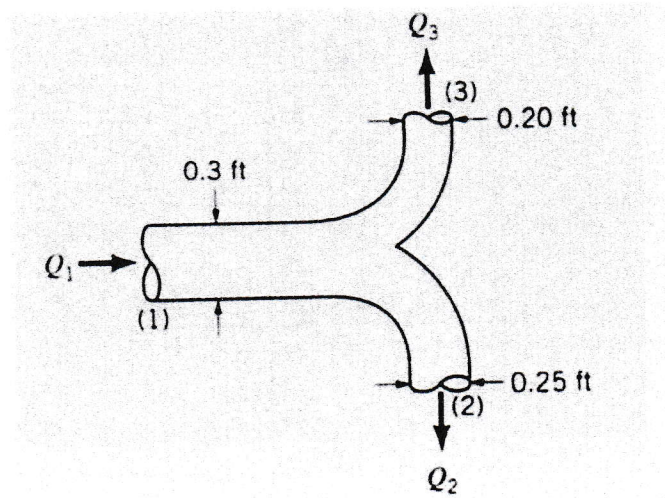
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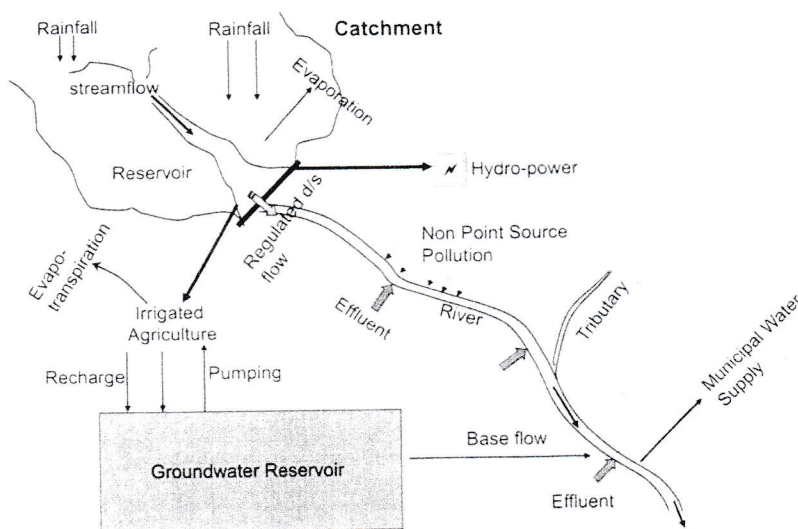
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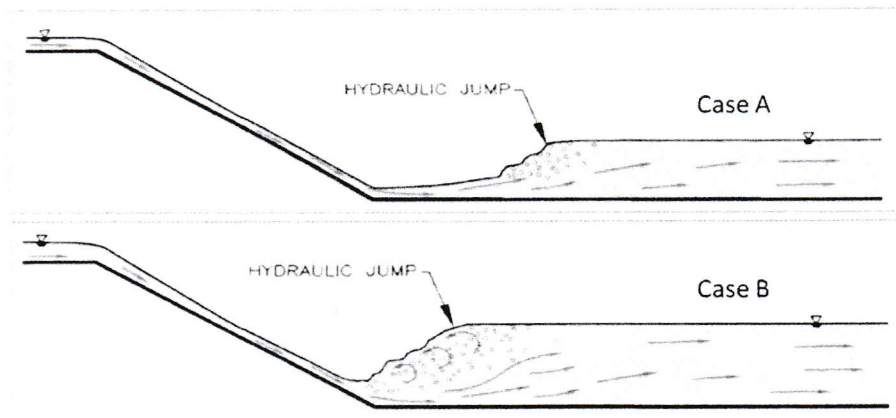
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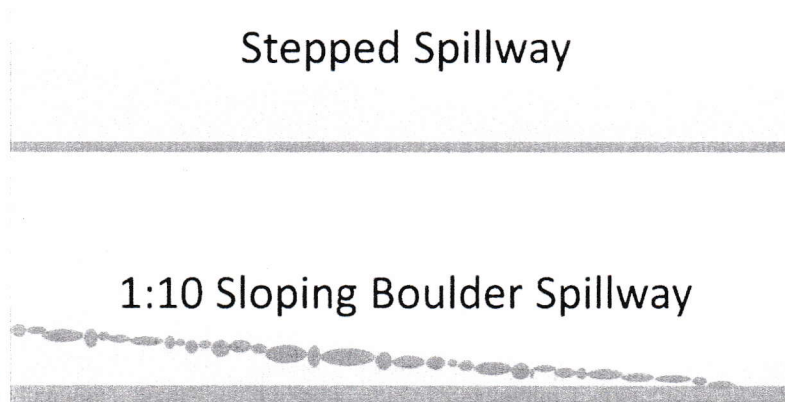
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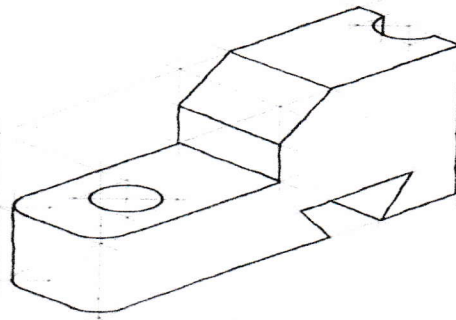
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BELOW AVERAGE

CVEG 1102: INTRODUCTION TO CIVIL ENGINEERING LAB
Final Exam: CLOSED NOTES/E-Devices (2:30pm – 4:30pm; December 6, 2021)

25 QUESTIONS (4 points each)

Name: Treveonta Jackson

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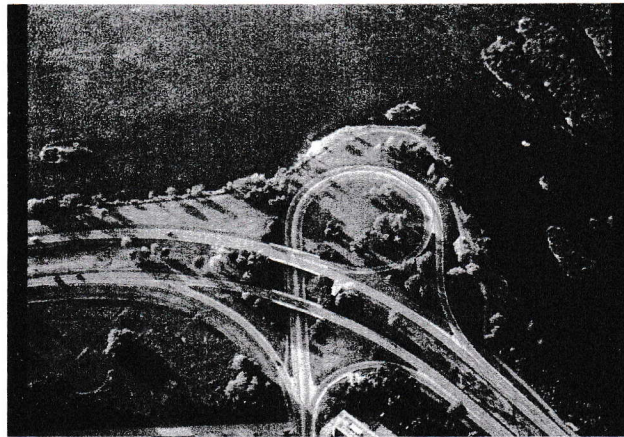
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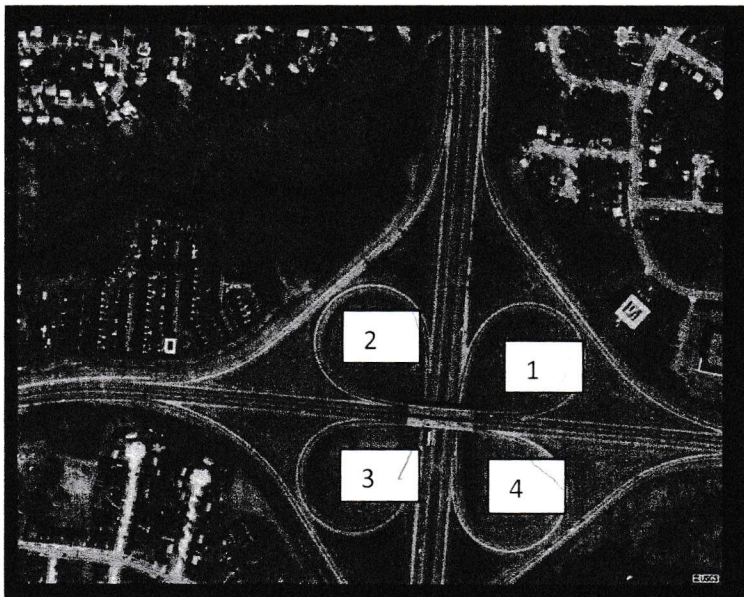
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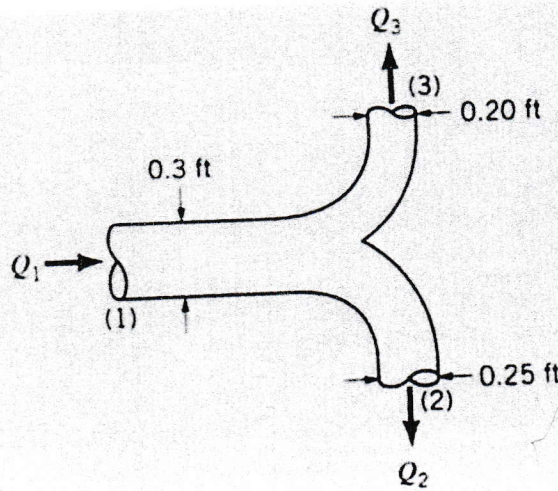
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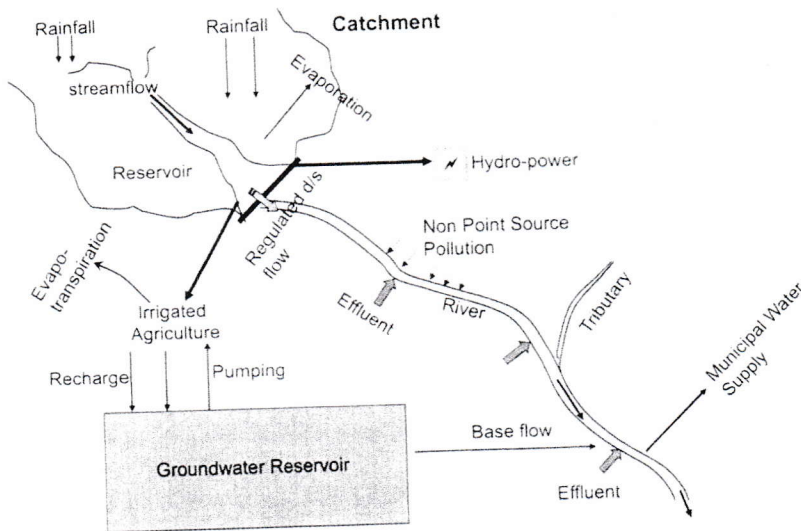
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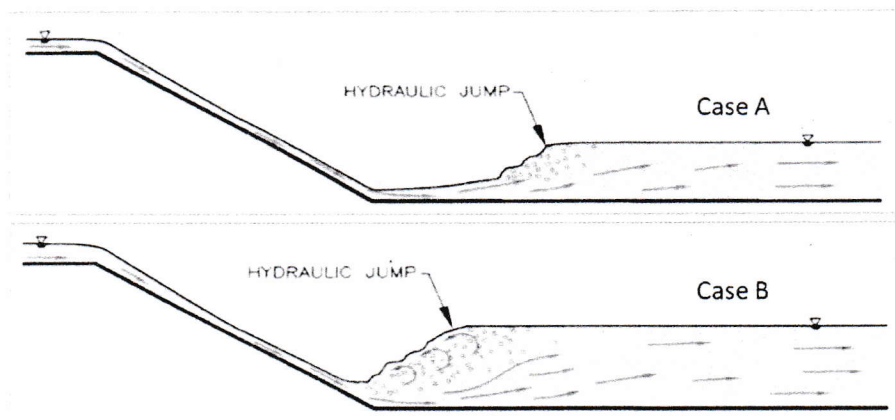
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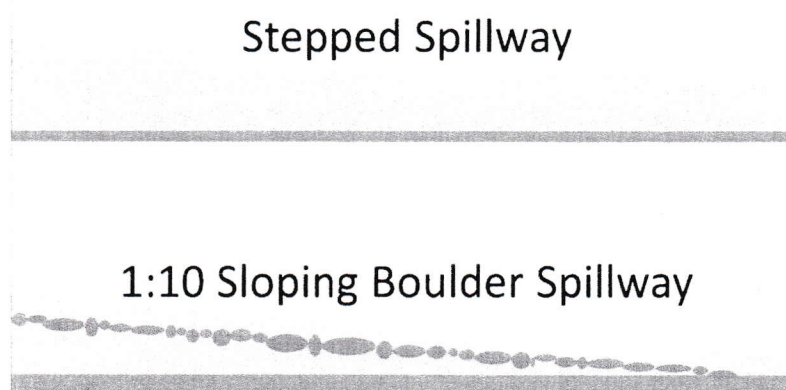
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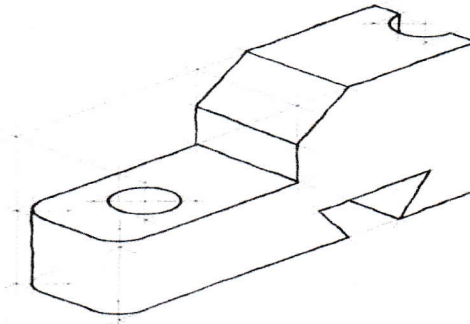
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**INTRO TO CIVIL ENGINEERING LAB
FALL 2021**

HOMEWORK 1

TOPICS COVERED IN HOMEWORK 1

- 1. Prepare weekly class and study schedule in MS Excel**

AVERAGE

**All Submissions Received Full
Marks (25 Points)**

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8:00	Breakfast	ENGL 0111	Breakfast	ENGL 0111	Breakfast	Breakfast	Breakfast
9:00	Review	MATH 1314	Breakfast	MATH 1314	Homework	Gym	Study
10:00	Review	MATH 1314	Review	MATH 1314	Homework	Gym	Study
11:00	Free time	Walk to CVEG	Free time	Walk to CVEG	Errands	Freetime	Notes
Noon	Walk to MATH 0135	CVEG 2304	Walk to MATH 0135	CVEG 2304	Errands	Study	Notes
1:00	MATH 0135	CVEG 2304	MATH 0135	CVEG 2304	Errands	Lunch	Errands
2:00	Going to CVEG	CVEG 2304	CVEG 1101	CVEG 2304	Free time	Sleep	Errands
3:00	CVEG 1102	Homework	CVEG 1101	Homework	Free time	Freetime	Freetime
4:00	CVEG 1102	Homework	Walk to GNEG 1010	Homework	Lunch	Freetime	Freetime
5:00	CVEG 1102	Lunch/Dinner	GNEG 1010	Lunch/Dinner	Gym	Freetime	Dinner
6:00	CVEG 1102	Study	GNEG 1010	Study	Gym	Reading	Freetime
7:00	Lunch/Dinner	Study	Lunch/Dinner	Study	Free time	Freetime	Freetime
8:00	Homework	Free time	Homework	Free time	Free time	Freetime	Freetime
9:00	Free time	Free time	Homework	Free time	Free time	Freetime	Sleep
10:00	Late Night Read	Late Night Read	Sleep	Sleep	Free time	Freetime	Sleep
Bedtime	Sleep	Sleep	Sleep	Sleep	Sleep	Sleep	Sleep



Na'Layah Rooks
Weekly Schedule

CVEG 1102

8/23/2021

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8:00							
9:00	STUDY		STUDY				
10:00	STUDY		STUDY		STUDY		
11:00	MATH 1115		STUDY	MATH 1115	STUDY	WORK	WORK
12:00	MATH 1115			MATH 1115		WORK	WORK
1:00	HIST 1302	MATH 1115	HIST 1302	MATH 1115	HIST 1302	WORK	WORK
2:00	HIST 1302	MATH 1115	HIST 1302	MATH 1115	HIST 1302	WORK	WORK
3:00	CVEG 1102					WORK	WORK
4:00	CVEG 1102				STUDY	WORK	WORK
5:00	CVEG 1102		ELEG 1303	ELEG 1303	STUDY	WORK	WORK
6:00	CVEG 1102		ELEG 1303	ELEG 1303	STUDY		
7:00			ELEG 1303	ELEG 1303			STUDY
8:00							STUDY
9:00							
10:00							
11:00							
12:00							

**INTRO TO CIVIL ENGINEERING LAB
FALL 2021**

HOMEWORK 2

TOPICS COVERED IN HOMEWORK 2

- 1. 500 Word essay in MS Word on the U.S. Bureau of Reclamation**

CVEG 1102 (P01): INTRODUCTION TO CIVIL ENGINEERING LAB

Fall 2021; Dr. Ahmed

“INDIVIDUAL” ASSIGNMENT #2 (Avoid Plagiarism or copying other’s work)

Assigned: September 20, 2021 (Via CANVAS/Announcements after Class Discussion)
Due: Monday September 27, 2021 (3pm , hard copy in class; Late assignments will not be accepted). No E-mail submissions unless you have **proof** of COVID or other illness related issues.

Read Instructions below carefully:

Watch the you tube video (link below) on the **missions and activities** of the U.S. Bureau of Reclamation (USBOR), the manager of the water resources of 17 western States. **Then write a 500-word essay on the USBOR, its mission and activities in your own words.** You may want to watch the video multiple times to **organize your thoughts** on a scratch paper first.

<https://www.youtube.com/watch?v=IIYrQWFvdSo>

Essay Format:

Use Microsoft Word with the following formats:

Style: Times New Roman

Font: 12

Double spaced

Left justified

1-inch margin all around

AVOID long paragraphs. Organize your words and sub-topics of discussion in short paragraphs. No headers or sub-headers please.

Note: You can do a word count from the tool bar under “Review” or look at “Words:” at the bottom left corner of your MS Word screen. Write complete sentences and run a Grammar check. Avoid words like “You,” “I,” “We” etc.

Start early!

ABOVE AVERAGE

85
100

Leo Richardson Jr
CVEG 1102
Dr Ahmed
9/26/21

The Agency of Reclamation was created soon after President Theodore Roosevelt signed the Reclamation Act on June 17, 1902 but the organization was founded by Ethan Hitchcock. The law was intended to address water shortage and the absence of settlement in far western states by further developing water stockpiling and transmission frameworks for water system projects. The organization's previous name was the "U.S. Reclamation Service" but that name changed soon after. Through its initial twenty years, the Reclamation Service was perpetually in monetary waterways. Intended to be generally self-financing, its tasks ended up being unfruitful. The destinations picked for the water system in states like Nevada and Arizona were too minimal climatically to deliver plentiful yields and draw in huge quantities of ranchers. The Bureau of Reclamation's fortunes possibly started to turn in 1928 when it was an outfit to California by the Colorado River Storage Project, which gave water to the Imperial Valley agribusiness and power to more prominent Los Angeles. Development started in 1931. Then, at that point, the Great Depression hit and it was very devastating to most of the U.S. With ranchers battling with falling yield costs and dry spells, installments for water conveyances fell definitely. In 1932, the Bureau noticed that its long-range development reserve was wavering, the absolute pay to the asset from all sources was about \$5,400,000, or almost \$5,000,000 not exactly in the earlier year, and around one-half of the yearly financial plan arranged in 1927". The New Deal switched the Bureau's monetary circumstance, dropping oneself financing necessity and siphoning in a huge number of dollars. In its next yearly report, through June 30, 1934, the Bureau pronounced: "With \$103,535,000 apportioned by the Public Works Administration, development exercises took on a new impetus. There was significantly more uplifting news a year after the fact. The Bureau currently is occupied with the biggest development program in its set of experiences. The program makes up the best preservation crusade at this point attempted by a solitary organization

Use Black
ink.

Break
Paragraphs
into
small
ones to
make your
points:

of the United States Government. New Deal subsidizing was utilized for the Bureau's development exercises at Boulder Canyon, the All-American Canal, Grand Coulee Dam, the Ogden River Project, the Rio Grande Project, the Milk River Project, and numerous different areas around the West. By 1941, the Bureau was providing water and hydroelectric capacity to 4.7 million Americans. The Bureau worked with other New Deal organizations, too. For instance, the Civilian Conservation Corps fabricated and helped streets along the trenches, supplanted breaking down wood structures with substantial designs, developed little supplies and feeder waterways, and that's only the tip of the iceberg. It works today and oversees more than 337 repositories, supplies 140,000 western ranchers with water system water, and drinking water to millions, and oversees 289 amusement destinations at its supplies. It is the second-biggest maker of hydropower in America and power deals, not water, are the Bureau's principal wellspring of income.

AVERAGE

Amaya Johnson

Dr. I. Ahmed

CVEG 1102

September 23, 2021

80/100

85/100

to
Appropriate Header → 'USBOR'
Delivering Water and Power to the West

The U.S Bureau of Reclamation is an agency that was created in 1902. The purpose of the creation was to deliver water and power to the 17 Western states. As well as irrigating and making the west productive with their needs. The U.S Bureau of Reclamation mission is to manage, develop, and protect water and related resources in an environmentally and electronically sound manner in the interest of the American people.

No mention of Powell. President Roosevelt.
The way the U.S Bureau of Reclamation has helped the west is by designing and building dams, reservoirs and canals. All of these resources bring in water and power for the 17 western states. These resources also make maintenance easier because they control the amount of water that the American people are using.

Without dams and other water resources the 17 western states would not be as developed as they are today. The reason being because they wouldn't have enough water to really live as comfortably as they do today. The US Bureau of Reclamation helped develop the western states into productive and resourceful states.

The US Bureau of Reclamation is the nation's largest water supplier. They operate 348 reservoirs. They also deliver 10 trillion gallons of water to 32 million people per year. They are also the 2nd largest hydroelectric power in the US, sending over 6 million homes per year.

The reclamation provides irrigation water for 10 million acres of farmland which produces 60% of vegetables and 25% of fruit and nut crops.

needed more text.

Because of The US Bureau of Reclamation we have irrigated agriculture, abundant food supply, renewable hydropower and a booming population. So with the creation of the US Bureau of Reclamation in 1902 the 17 Western American states now have access to food, water, and energy.

BELOW AVERAGE

Taran Powers

010
100

Asked to write an essay
on USBOR.

Not on general Water Resources!

HW#2 CVEG1102

The developing and maintaining water resources. Sustainable groundwater supply includes changing rates or spatial patterns of groundwater pump age, increasing water systems. The water resources of a region are developed to respond to the basic hydrologic parameters of a river basin shared in a country or between countries; within or between states of a nation; and within or between river basins. Sustainable water governance is vital to counteract the impacts of population increase and climate change. Managing the world's water resources such as groundwater, is sustainable and prevents over-abstraction.

Major problems and water management issues. When a flood occurs, that's when the water gets overfilled. The water gets out and starts to damage things near it. Flood causes heavy loss to agriculture, livestock, and property. It messes up deforestation, mining, industrialization, and global warming. Bad water management can mess up the whole community because water is one of the most important things on earth. Ingredients that contain water are more than 80%. And there's a drought when landfills have a lack of water. Things also mess things up because they wouldn't be able to operate the correct way. A soil is said to be waterlogged when it is completely saturated with water, which is caused by water stagnation on flat land and low lying areas. It occurs due to excess rainfall, floods, seepage high water table, obstruction to natural drainage, over irrigation.

Why is water important? It is contained in our everyday life such as drinking, bathing, gas oil, and etc. Water resources are sources of water that are useful or potentially useful to humans. It is

important because it is needed for life to exist. Many uses of water include agricultural, industrial, household, recreational and environmental activities. Virtually all of these human uses require fresh water. Without water there wouldn't be any climate change. Humans can't live without water.

Why is it important to protect the water resources? Water protection safeguards public health by ensuring the quality and quantity of source water used for drinking- water. Protecting the water saves the environment and makes the world a better place. Everyone needs water to survive. The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner. They have to measure, transport water to the places it needs to be. Reclamation manages water in the west. Water use is expected to increase by 45% in the next 30 years. Protecting our water sources brings a wealth of benefits. Drinking water has to go through a lot of steps before being sold because it comes from lakes, rivers, groundwater, etc so it's protected from contamination. Your drinking water can become polluted with animal waste, fertilizer, pesticides, herbicides, motor oil, gasoline, and other substances as they get carried to the source by runoff pollution. All public water systems have identified potential sources of contamination and are working on source water protection plans. You can get involved in protecting your drinking water too by contacting your water provider.

**INTRO TO CIVIL ENGINEERING LAB
FALL 2021**

HOMEWORK 3

TOPICS COVERED IN HOMEWORK 3

1. ASCE Canons of Ethics and Case Study

CVEG 1102: Introduction to Civil Engineering Lab
Fall 2021/Dr. I. Ahmed
Homework Assignment # 3

Ethics in Civil Engineering

Assigned: Monday, September 27, 2021 (CANVAS)

Due: Monday, October 4, 2021

(3 PM In Class, This HW will be collected by 3:10 PM)

AVOID SIMPLE YES/NO ANSWERS; EXPAND AND EXPLAIN YOUR CLAIM USING THE APPROPRIATE ASCE CANONS OF ETHICS; Write out the canon(s) violated completely and then mention why and how you think it (they) is (are) violated or not!

SITUATION: You are a lead engineer with the XYZ structural design firm and have been working with this company for some time. Mike is the owner of XYZ and has successfully operated the business for over twenty years. You respect Mike and hope to move up in the company as your relationship grows.

In order to improve access to government contracts XYZ often uses subcontractors from minority-owned firms. Most large public works projects include monies set aside specifically for employment of such companies, and applicants must satisfy the requirement to employ them in order to compete effectively.

Recently, Mike has strongly encouraged you and others in your company to rely heavily upon the services of the PV Design Group, a minority-owned firm which has done only minor work for you in the past. Although a typical procedure would be to offer up sub-contracting jobs for competing bids, if a company is willing to do the work for a reasonable price, you can save considerable time and energy by just offering them the job directly. Mike insists that PV Design Group is more than willing to work within your budget constraints. Upon contacting PV Design, you realize that your boss' (Mike's) daughter Ms. Kay is the firm's vice president. Kay states that she purchased partial ownership in the company using a loan from her father.

1. Does Kay's ownership in the firm represent a "conflict of interest" for you in hiring PV? If so, *Explain* how you view the conflict in the case study with respect to appropriate ASCE Canon(s) of ethics.
2. Is it ethical to offer any jobs to PV Design without taking competing bids? *Explain* your answer using appropriate ASCE Canon(s) of ethics.

Offer an in-depth discussion on the situation based on your independent answers to the above questions using your knowledge of the ASCE Canons of Ethics *as discussed in class.*

Plagiarism is a Unethical.

ABOVE AVERAGE

Aaliyha Fuller

Dr. I. Ahmed

CVEG LAB 1102 P01

10/04/2021

90
100

HW #3

Avoid simple yes/no answers; Expand and explain your claim using the appropriate ASCE

Canons of Ethics; Write out the canon(s) violated completely and then mention why and how you think it (they) is (are) violated or not!

Q1: Does Kay's ownership in the firm represent a "conflict of interest" for you in hiring PV? If so explain how you view the conflict in the case study with respect to appropriate ASCE Canon(s) of ethics.

A1: Kay's ownership in the firm does represent a "conflict of interest." According to the ASCE Code of ethics, he violated D, which states, "Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest." Mike should not be working with "conflicts of interests" such as his daughter. Plus, Kay's ownership in the company represented a conflict of interest. According to ASCE, he violated code F, which states, "Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption." Engineers should enhance their honor and not become affected by bribery, fraud,

why? how? explain!

and corruption, Mike's involvement with the loan he gave to his daughter. Mike is not holding his integrity by working ^{under} with conflict of interest.

Q2: Is it ethical to offer any jobs to PV Design without taking competing bids? Explain your answer using appropriate ASCE Canon(s) of ethics.

A2: It is not ethical to offer jobs to PV Design without taking competing bids. According to the ASCE Code of ethics, he violates code, E which states, "Engineers shall build their professional reputation on the merit of their service and shall not compete unfairly with others." Mike didn't follow the procedure by offering the job to other sub-contracting companies. The procedure is to offer the job to multiple sub-contractors and see which company would be willing to do the job for a reasonable price. Him choosing PV Design without doing that can hinder his professional reputation. Plus, this same company has done minor work for me in the past, making this company look unreliable. Also, according to the ASCE, Mike violated the code, G, which states, "Engineers shall continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision." Mike should be providing opportunities for engineers under their supervision; he has obstructed opportunities for me by partnering with a company that has done minor work.

AVERAGE

Amaya Johnson

Dr. I. Ahmed

CVEG 1102

September 30, 2021

85
100

Ethics in Civil Engineering

1. Does Kay's ownership in the firm represent a "conflict of interest" for you in hiring PV? If so, Explain how you view the conflict in the case study with respect to appropriate ASCE Canon(s) of ethics.

I do believe that this is a conflict of interest. The ASCE Canon(s) of ethics states that Engineers shall act in professional matters for each employer or client as faithful agents or trustees and shall avoid conflicts of interest. "Being that Mike is Kay's Father and he gave her the money to become a partial owner I believe that this creates a conflict of interest."

2. Is it ethical to offer any jobs to PV Design without taking competing bids. Explain your answer using appropriate ASCE Canon(s) of ethics.

It is not ethical to offer jobs to the PV Designs, because The ASCE Canon(s) of ethics states that

Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others. "This also can correlate with the ethic above, because there is a relationship with Mike and Kay, Others might think that they lost a chance because Mike is related to a partial owner of PV Designs."

how? explain a bit

BELOW AVERAGE

Mubashwir Choudhury

CVEG 1102

Dr. Ahmed

2 September, 2021

Code of Ethics

70
100

how? explain!

The ownership of Mrs. Kay at PV firm represents conflict of interest because Mike makes a decision that has personal benefits attached with tax funded projects. "Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest." The ASCE strictly prohibits conflict of interest. Mike highly recommending PV firm where his daughter has partial ownership shows lack of integrity and personal benefit over public. "Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption." The practice of nepotism in this case breaks all the core ethical laws and fraudulent work like this prevents a fair bidding process. Mike recommends PV design will do the work within budget and he also tells his employees to heavily rely on PV design.

potential could of engineering
Missing "merit of service" canon --- "unfair competition."

**INTRO TO CIVIL ENGINEERING LAB
FALL 2021**

HOMEWORK 4

TOPICS COVERED IN HOMEWORK 4

1. Dry Sieve Analysis

NAME:

**CVEG 1021: Introduction to Civil Engineering Lab
Fall 2021**

Assignment #4: Due on Monday October 11, 2021 at 3 PM Sharp In Class (Hard Copy)

For ALL

Dry Sieve Analysis Calculations

A partial dry sieve analysis table is shown on the next page. Please complete per the You Tube video you watched in the class (link below):

https://www.youtube.com/watch?v=rL_NDLwe4vk

Fill up the table. Show sample hand calculations on this page or on a separate page with *staple pin*.

**DO NOT CREATE YOUR OWN TABLE. IT
WILL NOT BE ACCEPTED.**

CVEG 1021 (Fall 2021)

Dry Sieve Analysis Calculations

NAME:

Total Aggregate Mass = 1200 grams

Sieve Size	Mass Retained in Each Sieve (g)	Cumulative Mass Passed (g)	Total Percent Passed (%)
¾ in.	204		
5/8 in.	-		
½ in.	140		
3/8 in.	-		
¼ in.	200		
No. 4	75		
No. 10	160		
No. 20	180		
No. 40	-		
No. 60	195		
No. 100	31		
No. 200	12		
Pan	3		

ABOVE AVERAGE

CVEG 1021 (Fall 2021)

Dry Sieve Analysis Calculations

NAME: Christopher Bolden

Total Aggregate Mass = 1200 grams

Sieve Size	Mass Retained in Each Sieve (g)	Cumulative Mass Passed (g)	Total Percent Passed (%)
3/4 in.	204	996	83%
5/8 in.	-	-	-
1/2 in.	140	856	71.3%
3/8 in.	-	-	-
1/4 in.	200	656	54.7%
No. 4	75	581	48.4%
No. 10	160	421	35.1%
No. 20	180	241	20.1%
No. 40	-	-	-
No. 60	195	46	3.83%
No. 100	31	15	1.25%
No. 200	12	3	0.25%
Pan	3	0	0%

Cumulative Mass Passed: $1200 - 204 = 996$, $996 - 140 = 856$, $856 - 200 = 656$, $656 - 75 = 581$, $581 - 160 = 421$, $421 - 180 = 241$, $241 - 195 = 46$, $46 - 31 = 15$, $15 - 12 = 3$, $3 - 3 = 0$

Total Percent Passed: $996/1200 \times 100 = 83\%$, $856/1200 \times 100 = 71.3\%$, $656/1200 \times 100 = 54.7\%$, $581/1200 \times 100 = 48.4\%$, $421/1200 \times 100 = 35.1\%$, $241/1200 \times 100 = 20.1\%$, $46/1200 \times 100 = 3.83\%$, $15/1200 \times 100 = 1.25\%$, $3/1200 \times 100 = 0.25\%$, $0/1200 \times 100 = 0\%$

AVERAGE

Stamon Briggs 1102

Total Aggregate Mass = 1200 grams

Sieve Size	Mass Retained in Each Sieve (g)	Cumulative Mass Passed (g)	Total Percent Passed (%)
3/4 in.	204	996	83%
5/8 in.	-	856	71.3%
1/2 in.	140	656	
3/8 in.	-		
1/4 in.	200		54.6%
No. 4	75	581	48.4%
No. 10	160	421	35%
No. 20	180	241	20%
No. 40	-		
No. 60	195	46	3.8%
No. 100	31	15	1.2%
No. 200	12	3	.2%
Pan	3	0	0%

Stamon Bragg

10/10/21

90
100

cumulative mass calculation

$$\begin{array}{r} 11 \\ 0 \times 1200 \\ - 204 \\ \hline 996 \end{array}$$

$$\begin{array}{r} 15 \\ 996 \\ - 140 \\ \hline 856 \end{array}$$

$$\begin{array}{r} 15 \\ 856 \\ - 200 \\ \hline 656 \end{array}$$

$$\begin{array}{r} 15 \\ 656 \\ - 75 \\ \hline 581 \end{array}$$

$$\begin{array}{r} 12 \\ 581 \\ - 160 \\ \hline 421 \end{array}$$

$$\begin{array}{r} 12 \\ 421 \\ - 180 \\ \hline 241 \end{array}$$

$$\begin{array}{r} 13 \\ 241 \\ - 195 \\ \hline 46 \end{array}$$

$$\begin{array}{r} 13 \\ 46 \\ - 31 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 13 \\ 15 \\ - 12 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 13 \\ 3 \\ - 3 \\ \hline 0 \end{array}$$

% calculation

$$996/1200 = .83 \times 100 = 83\% \quad 856/1200 = .713 \times 100 = 71.3\%$$

$$656/1200 = .546 \times 100 = 54.6\%$$

$$581/1200 = .484 = 48.4\%$$

$$421/1200 = .35 = 35\%$$

$$241/1200 = .20 = 20\%$$

$$46/1200 = .038 = 3.8\%$$

$$15/1200 = .012 = 1.2\%$$

$$3/1200 = .002 = .2\%$$

$$0/1200 = 0 = 0\%$$

$$\begin{array}{r} .83 \\ 1200 \overline{) 996.00} \\ - 960 \downarrow \\ \hline 3600 \\ - 3600 \\ \hline 0 \end{array}$$

BELOW AVERAGE

NAME: Omar HAJO

025
100

CVEG 1021: Introduction to Civil Engineering Lab
Fall 2021

Assignment #4: Due on Monday October 11, 2021 at 3 PM Sharp In Class (Hard Copy)

For ALL

Dry Sieve Analysis Calculations

A partial dry sieve analysis table is shown on the next page. Please complete per the You Tube video you watched in the class (link below):

https://www.youtube.com/watch?v=rL_NDLwe4vk

Fill up the table. Show sample hand calculations on this page or on a separate page with *staple pin*.

**DO NOT CREATE YOUR OWN TABLE. IT
WILL NOT BE ACCEPTED.**

CVEG 1021 (Fall 2021)

Dry Sieve Analysis Calculations

NAME:

$$\frac{\text{Cumulative Mass}}{\text{Total Agg Mass}} \times 100$$

Total Aggregate Mass = 1200 grams

Sieve Size	Mass Retained in Each Sieve (g)	Cumulative Mass Passed (g)	Total Percent Passed (%)
3/4 in.	204	204	17
5/8 in.	-		
1/2 in.	140	344	28.7
3/8 in.	-		
1/4 in.	200	544	45.3
No. 4	75	619	51.58
No. 10	160	779	64.92
No. 20	180	959	79.92
No. 40	-		
No. 60	195	1154	96.2
No. 100	31	1185	98.75
No. 200	12	1197	99.75
Pan	3	1200	100

Calculations

Cumulative mass

$$140 + 204$$

$$344 + 200$$

$$544 + 75$$

$$619 + 160$$

$$779 + 180$$

$$959 + 195$$

$$1154 + 31$$

$$1185 + 12$$

$$1197 + 3$$

$$\frac{204}{1200} \times 100$$

$$\frac{344}{1200} \times 100$$

$$\frac{544}{1200} \times 100$$

$$\frac{619}{1200} \times 100$$

$$\frac{779}{1200} \times 100$$

$$\frac{959}{1200} \times 100$$

$$\frac{1154}{1200} \times 100$$

$$\frac{1185}{1200} \times 100$$

$$\frac{1197}{1200} \times 100$$

$$\frac{1200}{1200} \times 100$$

**INTRO TO CIVIL ENGINEERING LAB
FALL 2020**

HOMEWORK 5

TOPICS COVERED IN HOMEWORK 5

- 1. BOD-5 Test Method (Theory and Estimation: Technical Note)**

CVEG 1102: Introduction to Civil Engineering Lab
Fall 2021

Assignment #5: Due on Monday November 8, 2021 at 3:00 PM (In Class)

ONLY For SELECTED STUDENTS who attended Lecture on 11/01/2021

Submit Clean Hard Copy

BOD-5

Based on your class notes, and the video you have watched, write a **Technical Note** on BOD-5 Test of a wastewater sample. The technical note should include:

- Definition of BOD-5 in layman words including any chemical reaction (be sure to define all chemicals in any reaction you show;
- Mathematical model (equations) used to measure BOD-5 with definition of all variables in the equation(s) with relevant units. Use a clean, labeled figure to help the reader understand how the test is done; Describe the Figure with a figure caption at the bottom of the figure;
- Provide an example calculation using the equation to measure BOD-5. List the given information and what to calculate. Be detailed.

Everything must be in typed form using MS Word with following guidelines:

Style: Times New Roman

Font: 12

Line spacing: 1.5

Short paragraphs with explanations are requested. Do not place words directly from the video.

Write in your own words based on class notes you might have taken. Avoid, "I," "We," "You."

Video link:

<https://www.youtube.com/watch?v=WeKnLGI3RBk>

ABOVE AVERAGE

Aaliyha Fuller
Prof. Dr. Ahmed
CVEG LAB 1102 P01
11/08/2021

85
100

Assignment #5:

The following information was conducted for a seeded 5-day BOD test on a wastewater sample. The was added directly into a 300mL BOD incubation bottle. The initial DO the blank sample was 8 mg/L and the final DO after 5 days was 5 mg/L. The initial DO of the diluted sample A was 6 mg/L and the final DO after 5 days was 4 mg/L. And lastly, the initial DO of the diluted sample B was 4 mg/L and the final DO was 3 mg/L.

Table 1. Change in dissolved oxygen

	Initial DO, mg/L	Final DO, mg/L	BOD
Blank	8	5	179.64072
Dilution A	6	4	119.76048
Dilution B	4	3	59.88024

$$BOD = \frac{D_i - D_f}{P} \quad P = \frac{5}{300} = 0.0167$$

show calcs separately in another section
define all variables below the eqn

Example:

$$BOD = \frac{(8)-(5)}{(0.0167)} = 179.64072$$

BOD values range 1mg per liter for natural waters to about 300 mg per liter for domestic sewage.

When BOD is 300 mg/L and above sewage is said to be strong, so in samples Blank and A they are considered strong. Since Sample B is below 100mg/L the sewage is considered weak. The goal of sewage treatment is to balance the organic matter and change it into an emission of acceptable standard of freshness and dispose it safely.

AVERAGE

BOD-5

$$\frac{70 \times 5}{100} = 3.5$$
$$\frac{75}{100}$$

Definition:

Biochemical Oxygen Demand (BOD) the amount of oxygen absorbed by a sample of sewage during a period (5 days), at a specific temperature (20°C) for the aerobic destruction or use of organic matter.

Formulas:

$$BOD = \frac{D_i - D_f}{P}$$

D_i = Initial Dissolved Oxygen (mg/L)

D_f = Final or 5-day Concentration

O_2 = Oxygen

P = Volumetric Fraction of Water waste

Figure ??

The BOD-5 Test is to determine to see how much bacteria is in the water. So, the "BOD" represents the amount of oxygen consumed by the bacteria. It also stabilizes the organic matter, convert it into an effluent of acceptable standard of purity and dispose it safely.

If given a data that told us that, 5 ml wastewater was added to a 300 ml BOD flask. So, then

would use the BOD formula which is $\frac{D_i - D_f}{P}$, then we would plug in the information into the

formula. Then would plug in 5 ml to find for P , which would be $P = \frac{5 \text{ mL}}{300 \text{ mL}} = 0.0167$. All I did was

$5 \div 300 = 0.0167$. Since I found the number for P , now we can plug in for ($D_i = 8 \text{ mg/L}$), ($D_f = 2$

mg/L). Now, do $\frac{8-2}{0.0167} = 359.28 \text{ mg/L}$, so I did $8-2=7$, then $7 \div 0.0167 = 359.28 \text{ mg/L}$ for the

BOD. The 359.28 mg/L is telling me that the sewage is strong, since the 359.28 mg/L is over 300 mg/L.

Show formula in a separate line; then define all variables below it.

Do not continue showing numbers and calc. in text.

BELOW AVERAGE

70
100

BOD-5 (Biochemical Oxygen Demand)

Imagine you have a bowl of wastewater with bacteria. This water comes from the kitchen, restaurants, toilets.

This water has oxygen. The bacteria are going to take the oxygen of the water.

BACTERIA + O₂ = CO₂ + BIOLOGICAL GROWTHS.

China is the highest production of CO₂ in the world.

The demand of oxygen by bacteria is called Biochemical Oxygen Demand (BOD).

BOD5 is a test to determine how strong the wastewater is in 5 days.

Calculation:

$$BOD = \frac{D_i + D_f}{P}$$

D_i = initial dissolved O₂ concentration. (mg/L).

D_f = final dissolved O₂ concentration. (mg/L).

P = volumetric fraction of wastewater.

Figures??
example?

**INTRO TO CIVIL ENGINEERING LAB
FALL 2021**

TERM PROJECT

TOPICS COVERED IN TERM PROJECT

- 1. Cut & Fill Calculations using an Averaging Technique**

CVEG 1102: INTRODUCTION TO CIVIL ENGINEERING LAB
PRARIE VIEW A&M UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING
Dr. Ahmed/FALL 2021 (11/15/2021)

***INDIVIDUAL* TERM PROJECT**

DUE: Monday, November 29, 2021; Hard Copies at 3pm In Class

If you wish to submit before Thanksgiving: November 22, 2021 In Class

LATE ASSIGNMENTS WILL NOT BE ACCEPTED

**“EARTHWORK CUT & FILL CALCULATIONS and COST ESTIMATION
USING AN AVERAGING METHOD”**

Purpose: To calculate cut and fill volumes and cost estimations for land surface grading using the *Averaging Method*. **The proposed site elevation is 101 feet.**

Given:

1. Existing Land Surface Elevation Data (by Cells; see table below)
2. Example calculation sheet (class handout)
3. Excel “How To Plot” sheet (class handout)

Deliverables: All organized printouts as instructed in class from MS WORD and MS EXCEL:

1. Labeled Excel plots of the EXISTING and the PROPOSED Land Surface
2. **Full set** of CUT/FILL calculations (follow the partial example on e-courses)
3. **Full set** of Cost calculations (follow the partial example on e-courses)

Table 1. Existing Condition Land Surface Elevation Data

	1	2	3	4	5
1	106	107	104	103	103
2	104	104	103	102	102
3	101	101	102	101	100
4	101	100	101	100	100
5	101	100	99	98	98

All elevations in Feet

ABOVE AVERAGE

85
100

~~88
100~~

Leo Richardson Jr
CVEG 1102
Dr Ahmed
11/29/21

Table 1: Existing Condition Land Surface Elevation Data

	1	2	3	4	5
1	106	107	104	103	103
2	104	104	103	102	102
3	101	101	102	101	100
4	101	100	101	100	100
5	101	100	99	99	98

All elevations in feet

Table 2 Proposed Elevation

	1	2	3	4	5
1	101	101	101	101	101
2	101	101	101	101	101
3	101	101	101	101	101
4	101	101	101	101	101
5	101	101	101	101	101

All elevations in feet

Table 3

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 4

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 5

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-1.00

Table 6

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 7

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 8

	1	2	3	4	5
1	5.00	6.00		2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 9

	1	2	3	4	5
1	5.00	6.00	1.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 10

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	-1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 11

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 12

	1	2	3	4	5
1	5.00	6.00		2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 13

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-3.00

Table 14

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00		1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 15

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	2.00	2.00	2.00	1	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 16

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 17

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-1.00

Table 18

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Table 19

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-1.00	-1.00

Table 20

	1	2	3	4
1	98.3	81.01	46.29	34.72
2	34.7	34.7	23.15	5.78
3	-23.15	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.2963

Total of this cut is 158.8

Table 21 Total Fill Calculations

	1	2	3	4
1	98.3	81.01	46.29	34.72
2	34.7	34.7	23.15	5.78
3	-23.15	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.2963

On-site calculation
\$2.50yd³

Each chart
Calculation chart follows

Term Project Chart Calculations

Table 4	Volume = $\frac{(5+6+3+3)ft}{4}(625ft^2=2,656.2ft^3 = 98.37yd^3$
Table 5	Volume = $\frac{(6+3+3+2)ft}{4}(625ft^2=2,187.5ft^3 = 81.02yd^3$
Table 6	Volume = $\frac{(2+2+1+1)ft}{4}(625ft^2=1,250ft^3 = 46.30yd^3$
Table 7	Volume = $\frac{(2+2+3+3)ft}{4}(625ft^2=937.5ft^3 = 34.72yd^3$
Table 8	Volume = $\frac{(3+3+0+0)ft}{4}(625ft^2=937.5ft^3 = 34.72yd^3$
Table 9	Volume = $\frac{(3+2+1+0)ft}{4}(625ft^2=937.5ft^3 = 34.72yd^3$
Table 10	Volume = $\frac{(2+1+1+0)ft}{4}(625ft^2=625ft^3 = 23.15yd^3$
Table 11	Volume = $\frac{(1+1+0-1)ft}{4}(625ft^2=156.25ft^3 = 5.79yd^3$
Table 12	Volume = $\frac{(0+0+0-1)ft}{4}(625ft^2=156.25ft^3 = 5.79yd^3$
Table 13	Volume = $\frac{(0+1-1+0)ft}{4}(625ft^2=0ft^3 = 0yd^3$
Table 14	Volume = $\frac{(1+0+0-1)ft}{4}(625ft^2=0ft^3 = 0yd^3$
Table 15	Volume = $\frac{(0-1-1-1)ft}{4}(625ft^2=468.75ft^3 = 17.36yd^3$
Table 16	Volume = $\frac{(0+0-1-1)ft}{4}(625ft^2=-312.5ft^3 = -11.57yd^3$
Table 17	Volume = $\frac{(-1-1+0-2)ft}{4}(625ft^2=-625ft^3 = -23.15yd^3$
Table 18	Volume = $\frac{(0-1-2-3)ft}{4}(625ft^2=-937.5ft^3 = 34.72yd^3$
Table 19	Volume = $\frac{(-1-1-3-3)ft}{4}(625ft^2=1,250ft^3 = -46.30yd^3$

AVERAGE

Name: Haneen Kureshi

Due on: 11/29/2021

Professor : Dr. Ahmed

Subject : CVEG 1102

75/100

Term project

Table 1: existing condition Land surface Elevation data

	1	2	3	4	5
1	106	107	104	103	103
2	104	104	103	102	102
3	101	101	102	101	100
4	101	100	101	100	100
5	101	100	99	98	98

All elevation in feet

Table2: Proposed Elevation

	1	2	3	4	5
1	101	101	101	101	101
2	101	101	101	101	101
3	101	101	101	101	101
4	101	101	101	101	101
5	101	101	101	101	101

All elevation in feet

Table 3 ~~Cut and Fill calculation~~

changes in elevation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(5+6+3+3)}{4} \cdot 625 \text{ ft}^2 = 2656.25 \text{ ft}^3 = 98.38 \text{ yd}^3$$

Table 4 Cut and Fill calculation

show conversion (-5)

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(6 + 3 + 3 + 2)}{4} 625 \text{ ft}^2 = 2187.5 \text{ ft}^3 = 81.02 \text{ yd}^3$$

Table 5 Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(3 + 2 + 2 + 1)}{4} 625 \text{ ft}^2 = \frac{1250}{4} \text{ ft}^2 = 312.5 \text{ ft}^2 = 11.57 \text{ yd}^2$$

Table 6 Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(2 + 2 + 1 + 1)}{4} 625 \text{ ft}^2 = 937.5 \text{ ft}^2 = 34.72 \text{ yd}^2$$

Table 7 Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(3 + 3 + 0 + 0)}{4} 625 \text{ ft}^2 = 937.5 \text{ ft}^3 = 34.72 \text{ yd}^3$$

Table 8 Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(3 + 2 + 0 + 1)}{4} 625 \text{ ft}^2 = 937.5 \text{ ft}^3 = 34.72 \text{ yd}^3$$

Table 9 Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(2 + 1 + 1 + 0)}{4} 625 \text{ ft}^2 = 625 \text{ ft}^3 = 23.15 \text{ yd}^3$$

Table Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \left(\frac{0+0+0-1}{4} \right) 625 \text{ ft}^2 = -156.25 \text{ ft}^3 = -5.79 \text{ yd}^3$$

Table Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \left(\frac{0+1-1+0}{4} \right) 625 \text{ ft}^2 = 0 \text{ ft}^3 = 0 \text{ yd}^3$$

Table Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \left(\frac{1+0+0-1}{4} \right) 625 \text{ ft}^2 = 0 \text{ ft}^3 = 0 \text{ yd}^3$$

Table Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(0 + -1 - 1 - 1)}{4} 625 \text{ ft}^2 = -468.75 \text{ ft}^3 = -17.36 \text{ yd}^3$$

Table Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(0 - 1 + 0 - 1)}{4} 625 \text{ ft}^2 = -312.5 \text{ ft}^3 = -11.57 \text{ yd}^3$$

Table Cut and Fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \frac{(-1 + 0 - 1 - 2)}{4} 625 \text{ ft}^2 = -625 \text{ ft}^3 = -23.15 \text{ yd}^3$$

Cut and fill calculation

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \left(\frac{0 - 1 - 2 - 3}{4} \right) 625 \text{ ft}^2 = -937.5 \text{ ft}^3 = 34.72 \text{ yd}^3$$

	1	2	3	4	5
1	5.00	6.00	3.00	2.00	2.00
2	3.00	3.00	2.00	1.00	1.00
3	0.00	0.00	1.00	0.00	-1.00
4	0.00	-1.00	0.00	-1.00	-1.00
5	0.00	-1.00	-2.00	-3.00	-3.00

Calculation

$$\text{Volume} = \left(\frac{-1 - 1 - 3 - 3}{4} \right) 625 \text{ ft}^2 = 625 \text{ ft}^3 = 46.30 \text{ yd}^3$$

Table Cut and Fill calculation

The resulting cut and fill volume (yd³) for each cell in the entire grid is

	1	2	3	4
1	98.38 ①	81.02 ②	46.30 ③	34.72 ④
2	34.72	34.72	23.15	5.79
3	-5.79 ✓	0 ✓	0 ✓	-17.36
4	-11.57	-23.15	-34.72	-46.30

A sited model with a 5x5 grid contains 4x4

Cut and fill calculation

The total cut-and-fill for this site may be estimated by summing the cut-and-fill volumes for each cell

	1	2	3	4
1	98.38	81.02	46.30	34.72
2	34.72	34.72	23.15	5.79
3	-5.79	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.30

The total is

219.91

show full calculation. (5)

Cut and fill calculation

— The total cut this site may be estimated by summing the positive (+) cut-and-fill volumes for each cell

	1	2	3	4
1	98.38	81.02	46.30	34.72
2	34.72	34.72	23.15	5.79
3	-5.79	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.30

The total is = 358.8

Cut and Fill Calculation

The total fill this site may be estimated by summing the negative (-) cut-and-fill volumes for each cell

	1	2	3	4
1	98.38	81.02	46.30	34.72
2	34.72	34.72	23.15	5.79
3	-5.79	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.30

The total is = 138.89 *show full calc. (-5)*

Cut and Fill Calculation

Estimate of the cost of cut-and-fill for the entire site can be made by considering:

On-site cost (\$2.50/yd.³) for total cut-and-fill volume:

$$\text{On-site} = \left(\frac{\$2.50}{\text{yd}^3} \right) (\text{Cut} - \text{Fill}) = \left(\frac{2.50}{\text{yd}^3} \right) (358.8 - (-138.89)) \text{ yd}^3$$

$$\text{Onsite} = \$1244.225$$

Cut and fill Calculation

Off-site cost: \$5/yd.³ for fill and \$3/yd.³ for cut)

$$\text{Offsite} = \left[\frac{\text{cost}}{\text{yd}^3} \right] (\text{Cut} + \text{Fill}) = \left(\frac{\text{cost}}{\text{yd}^3} \right) (358.8 - 138.89) \text{ yd}^3$$

$$\text{Off site} = \left(\frac{\$3}{\text{yd}^3} \right) |219.91| = \$659.73$$

$$\text{Total cost} = \$1244.225 + 659.73$$

$$= \$1903.955$$

$$\approx \$1904$$

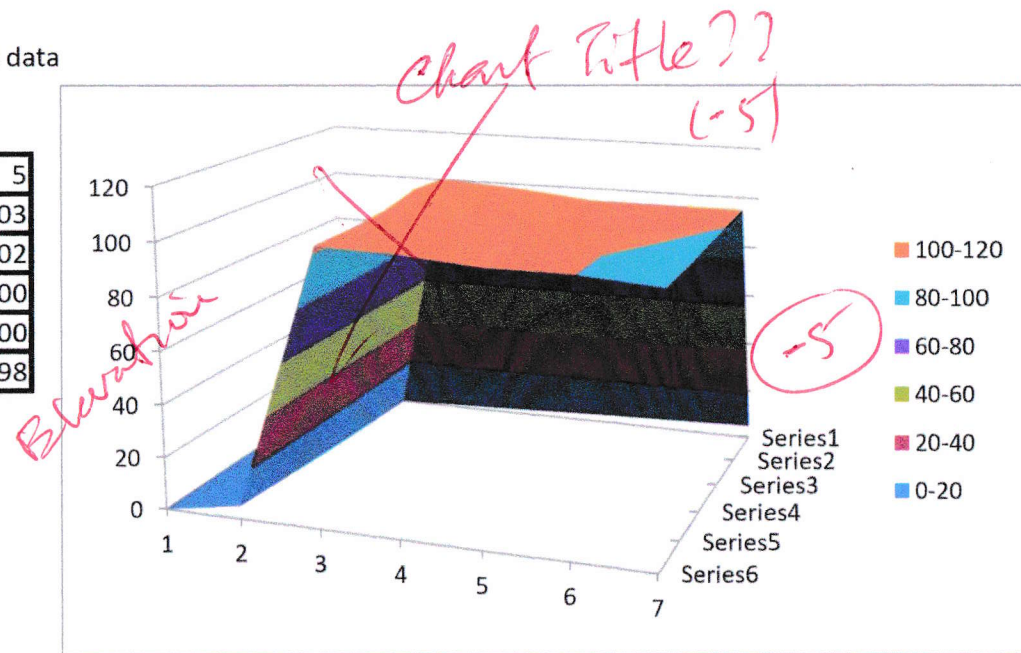
close

Haneen Kureshi

Existing condition Land surface Elevation data

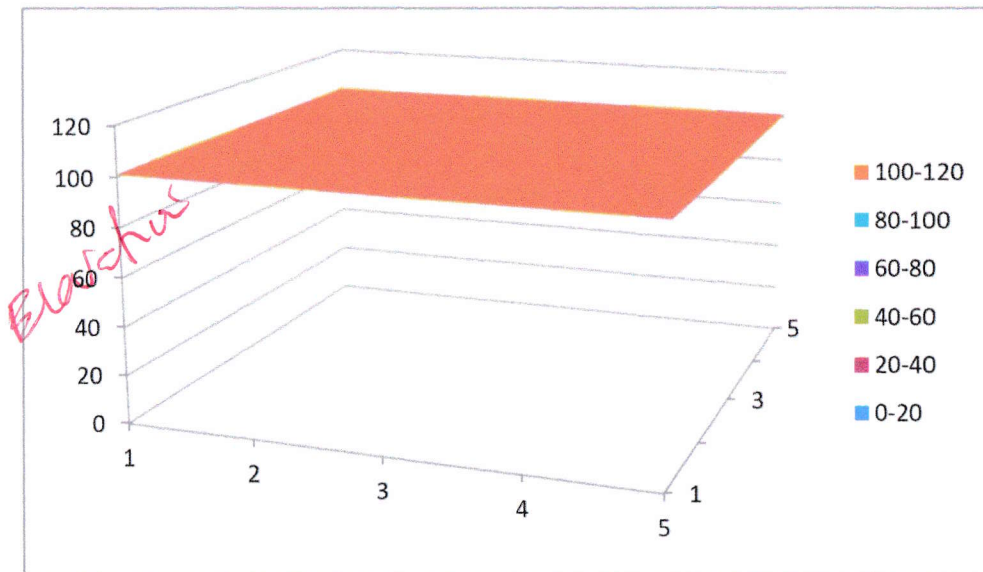
Table 1: existing condition Land surface Elevation data

	1	2	3	4	5
1	106	107	104	103	103
2	104	104	103	102	102
3	101	101	102	101	100
4	101	100	101	100	100
5	101	100	99	98	98



Proposed Elevation

	1	2	3	4	5
1	101	101	101	101	101
2	101	101	101	101	101
3	101	101	101	101	101
4	101	101	101	101	101
5	101	101	101	101	101



BELOW AVERAGE

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 CVEG 1102 P01: Surface Plot for Land Surface Earth Volume Work
 Dr. Ahmed
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65
 100

Table 1. Existing Condition Land Surface Elevation Data

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	106	107	104	103	103
<u>2</u>	104	104	103	102	102
<u>3</u>	101	101	102	101	100
<u>4</u>	101	100	101	100	100
<u>5</u>	101	100	99	98	98

All Elevations in Feet

Table 2. Proposed Elevation

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	101	101	101	101	101
<u>2</u>	101	101	101	101	101
<u>3</u>	101	101	101	101	101
<u>4</u>	101	101	101	101	101
<u>5</u>	101	101	101	101	101

All Elevations in Feet

Table 3. Starting Cut and Fill Calculations

changes in elevation
 (-5)

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

Table 4. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(5+6+3+3)}{4} (625\text{ft}^2) = 2656.25\text{ft}^3 = 98.38\text{yd}^3$$

↪ show conversion (-5)

Table 5. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(6+3+3+2)}{4} (625\text{ft}^2) = 2187.5\text{ft}^3 = 81.02\text{yd}^3$$

Table 6. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(3+2+2+1)}{4} (625\text{ft}^2) = 1250\text{ft}^3 = 46.30\text{yd}^3$$

Table 7. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(2+2+1+0)}{4} (625\text{ft}^2) = 937.5\text{ft}^3 = \mathbf{34.72\text{yd}^3}$$

Table 8. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(3+3+0+0)}{4} (625\text{ft}^2) = 937.5\text{ft}^3 = \mathbf{34.72\text{yd}^3}$$

Table 9. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(3+2+0+1)}{4} (625\text{ft}^2) = 937.5\text{ft}^3 = \mathbf{34.72\text{yd}^3}$$

Table 10. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(2+1+1+0)}{4} (625\text{ft}^2) = 625\text{ft}^3 = \mathbf{23.15\text{yd}^3}$$

Table 11. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(1+1+0-1)}{4} (625\text{ft}^2) = 156.3\text{ft}^3 = \mathbf{5.79\text{yd}^3}$$

Table 12. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(0+0+0-1)}{4} (625\text{ft}^2) = -156.3\text{ft}^3 = \mathbf{-5.79\text{yd}^3}$$

Table 13. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(0+1-1+0)}{4} (625\text{ft}^2) = 0\text{ft}^3 = \mathbf{0yd^3}$$

Table 14. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(1+0+0-1)}{4} (625\text{ft}^2) = 0\text{ft}^3 = \mathbf{0yd^3}$$

Table 15. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(0-1-1-1-1)}{4} (625\text{ft}^2) = -468.8\text{ft}^3 = \mathbf{-17.36yd^3}$$

Table 16. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(0-1+0-1)}{4} (625\text{ft}^2) = 312.5\text{ft}^3 = \mathbf{11.57\text{yd}^3}$$

Table 17. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(-1+0-1-2)}{4} (625\text{ft}^2) = -625\text{ft}^3 = \mathbf{-23.15\text{yd}^3}$$

Table 18. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(0-1-2-3)}{4} (625\text{ft}^2) = -937.5\text{ft}^3 = \mathbf{-34.72\text{yd}^3}$$

Table 19. Cut and Fill Calculations

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>1</u>	5	6	3	2	2
<u>2</u>	3	3	2	1	1
<u>3</u>	0	0	1	0	-1
<u>4</u>	0	-1	0	-1	-1
<u>5</u>	0	-1	-2	-3	-3

$$\text{Volume} = \frac{(-1-1-3-3)}{4} (625\text{ft}^2) = -1250\text{ft}^3 = -46.30\text{yd}^3$$

Table 20. Total Cut Calculation :

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1	98.38	81.02	46.3	34.72
2	34.72	34.72	23.15	5.79
3	-5.79	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.3

Total Cut on this Site: 93.38 + 81.02 + 46.3 + 34.72 + 34.72 + 34.72 + 23.15 + 5.79 + 0
+ 0 = 358.8

Table 21. Total Fill Calculation:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1	98.38	81.02	46.3	34.72
2	34.72	34.72	23.15	5.79
3	-5.79	0	0	-17.36
4	-11.57	-23.15	-34.72	-46.3

Total Fill on this Site: -5.79 - 11.57 - 23.15 - 34.72 - 17.36 - 46.3 = -138.89

On-site Calculations:

\$2.50yd³

$$\$2.5(358.8 - (-138.89)) = \$1244.225$$

Off-site Calculations:

(\$3yd³) | 219 . 91 yd³ |

$$\$3(218.91) = \$656.73$$

Total Calculations:

$$\text{Total Cost} = \$1,244 + \$659.73 = \$1,903.95$$

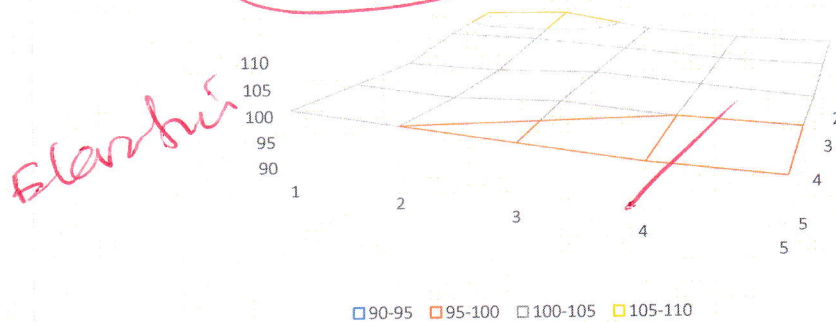
$$\text{Total Cost} = \$1,903.95$$

*show as descriptive
formula (-10)*

All Elevations in Feet

	1	2	3	4	5
1	106	107	104	103	103
2	104	104	103	102	102
3	101	101	102	101	100
4	101	100	101	100	100
5	101	100	99	98	98

Existing Land Condition ✓



All Elevations in Feet

	2	3	4	5
1	101	101	101	101
2	101	101	101	101
3	101	101	101	101
4	101	101	101	101
5	101	101	101	101

Chart Title

