

Engineering Project Proposal

Flood Prevention for Livestock Farms in North Carolina
to be presented on *November 19, 2018*

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This proposal is submitted to the North Carolina State government

Someone?

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1. INTRODUCTION

North Carolina is one of the leading suppliers of the meat seen in supermarkets across the country (Peach, 2014). They have a high quantity of both small-scale and factory livestock farms that function as a partial foundation to the country's food industry. A reality of the reliance on these farms is that natural disasters yield mass damage on the economy when they strike, in addition to the environment. Therefore, as climate change persists, these farms are at a higher risk of damage, which therefore puts the state and country at risk. As observed in the most recent hurricane, an influx of water results in farm flooding, as many of North Carolina's livestock farms are positioned on relatively steep inclines (U.S. Department of Agriculture). When the water falls over the inclines, the farms flood. Floods yield negative impacts everywhere, but the effects are especially detrimental on farms. Mass livestock deaths occur when flood waters accumulate on farms. This is because farmers do not prepare their livestock prior to evacuating. This creates loss of money for the farmers, damages the nation's meat industry, and harms the local ecosystems.

well composed

A drainage and pipeline system would feasibly reduce the harmful impacts of flooding in North Carolina farmland. Water would be directed away from the farms and drained through the pipeline underground. Before the benefits of a state-wide pipeline can be seen, a test is required. This proposal aims to acquire the necessary funding for and access to a specific test-site in the state to examine the feasibility of this innovation.

1.1 PROBLEM STATEMENT

Duplin County, North Carolina ~~has~~ endured mass flooding during hurricane Florence, with livestock farms feeling large-scale effects. When massive natural disasters such as hurricanes strike, extreme flooding leads to mass mortality on livestock farms. Beyond a massive economic hit, nearby residents also experience foul odors and health deficiencies. Water contamination also is an issue, with residents told ^{being} to boil their water before consumption, (Mufson, Fears, & Dennis, 2018). With flooding becoming ^{to} more of a reality, a system of mitigating the farm-related issues is necessary.

a nice way of saying things.

watch punctuation location!

1.2 BACKGROUND

Good Currently, North Carolina has a technical approach that deals directly with dead animals. The North Carolina Department of Environmental Quality offers a mass mortality management plan for livestock. In the case of mass mortality due to excessive flooding, the farmers are required to bury the animals. (North Carolina Department of Agriculture, 2016). The proposed technical approach will eliminate the need for mortality management plans and any measures taken after the damage has already taken place.

given that it's mass mortality. that is a lot of burials and a lot of land

1.3 NEEDS STATEMENT

There are virtually no means of flood prevention in place for farms of North Carolina. When major environmental disasters strike, the farmers and their families leave their plots and animals behind. As such, the land itself is damaged and mass quantities of livestock are killed. Not only does this pose a major financial setback, it also incurs potential health dangers, as the bacteria from the dead animals combines with the streamflow and can seep into the ground, harming human populations. The state is in major need of a flood prevention, to stop these gruesome impacts of flooding, which only grow more observable as climate change persists.

1.4 OBJECTIVE

good (The objective of this proposal is to request funding for access to a test site to examine the realistic feasibility of the drainage and pipeline system.) The drainage and pipeline system will undeniably impact the ecosystems of the surrounding area, with implications that could reach civilian population. This test site is crucial to the success of the pipeline and benefit to the state and country.

The objective of the team of engineers is to implement a drainage system that redirects the flood water away from farmlands. The team also wants to create a change in the state legislature. The technology to better enhance the environment *Word choice:* exits and task-driven individuals need to cooperate to create a better environment for the future generations.

2. PROPOSED TECHNICAL APPROACH

The proposed prevention plan is to install a water diversion pipeline. The pipeline will require a system of drains and pipes traveling from livestock farms in central North Carolina to a site along or possibly farther than the coast. The design of the system is specifically to relocate the water to prevent flooding. (Before a full-scale water reroute system can be placed, a test project must first be completed. The test project will serve as a beginning step to the full project. If the test fails, then resources will not be wasted on the intricate pipeline.) The test will require a 3.03 mile by 2.65-mile area in Duplin County, North Carolina. The land must be analyzed before any intrusive work begins. The general topography and geology of North Carolina have already been taken into consideration, but the analyzation will give specific data about the chosen test site. A few members from the designated team of engineers will travel to the test site and gather all necessary data. This includes taking measurements and recording elements of the geography. With this information, the civil and environmental engineers will create a suitable design. To decrease the amount of time needed for design requires the use of the software AutoCad.

2.1 REQUIREMENTS

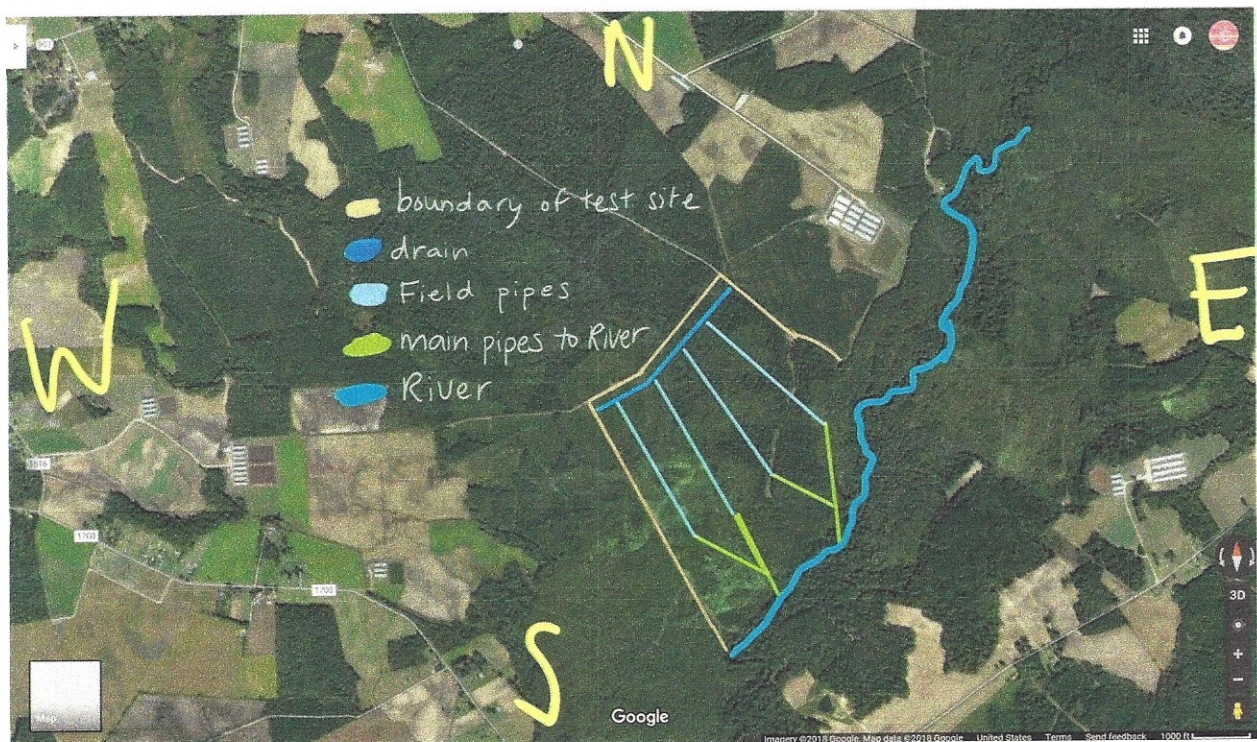
Once the construction of the test project is finished, select members from the team of engineers will report to the site for a final inspection. Environmental engineers will then record data from the test site during the rainy season of North Carolina. It is important to test during the rainy season so that a large number of data samples can be collected. The measurements will be recorded with the installed sensors at the inlets and outlets of the pipes. These sensors will inform the engineers of the discharge and velocity of the water. This information will be inputted into a software Ansys and then assessed. Using the software, simulations can be ran for different conditions (volume of water, velocity of water) which will help determine if any modifications need to be applied.

2.2 ARCHITECTURE DESIGN

The basic topography in eastern North Carolina follows a gradient. From West to East the slope of the ground decreases. (This simple fact eliminates the need to have pumps to move the water. Gravity will do all the work; the pipes will provide a bounded route for the water to flow.) The design of the pipeline will require an open drainage pipe that runs from north to south to intercept the floodwater and lead it to the underground pipeline. then, a series of transportation field pipes will be connected to the interception drain positioned west to east. These pipes will meet a larger set of drains in the same placement to ensure proper rate of drainage. The bounds of the test site in Duplin county will then lead the pipes to the Northeast Cape Fear River where the water will be naturally transported downstream.

*good
consideration
here!*

This sketch shows where the drainage and pipes will be placed in Duplin County.

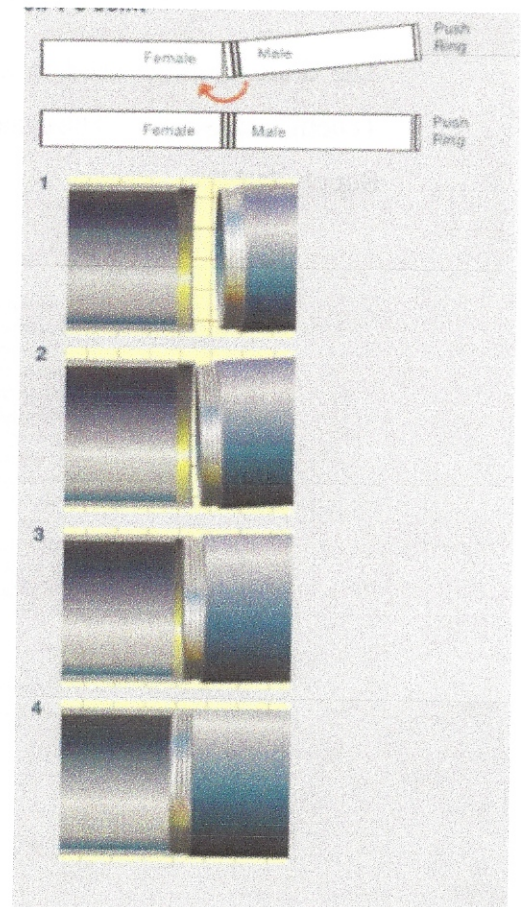
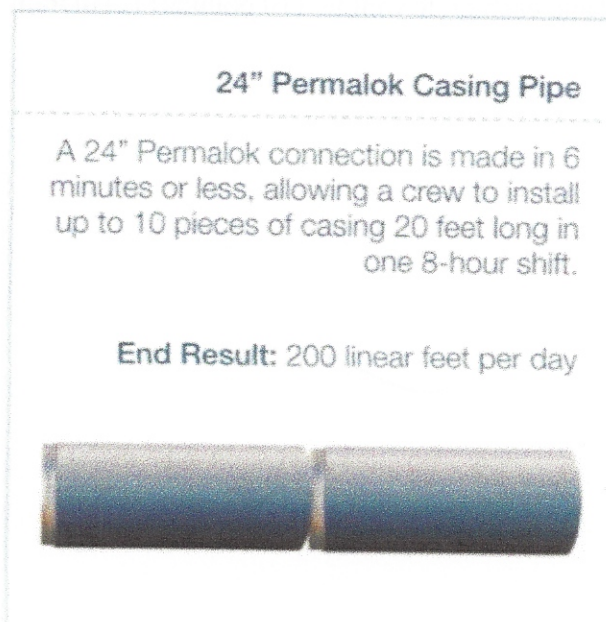


*nice
here*

2.3 Technical Description

Permalok Pipes

The pipes for this project will be supplied by a Northwest Pipe Company, these pipes are used in transporting waste and water. The Permalok steel casing pipes will be used because of their time and money saving nature, they eliminate the need for field butt welding. The pipes are simply connected by joints. The joints are labeled male and female and are connected by their corresponding mates. The pipes are available in any size and length but for this project 24" diameter pipes will be used. This diameter will be large enough to sustain the flood waters. Permalok provides the following information on their website: Bitumastic coating is made from coal tars and blends of resins such as epoxy. A trade name often associated with long-term protection from water penetration, Bitumastic is an economical, heavy-duty material which protects piping subjected to water immersion (2018).

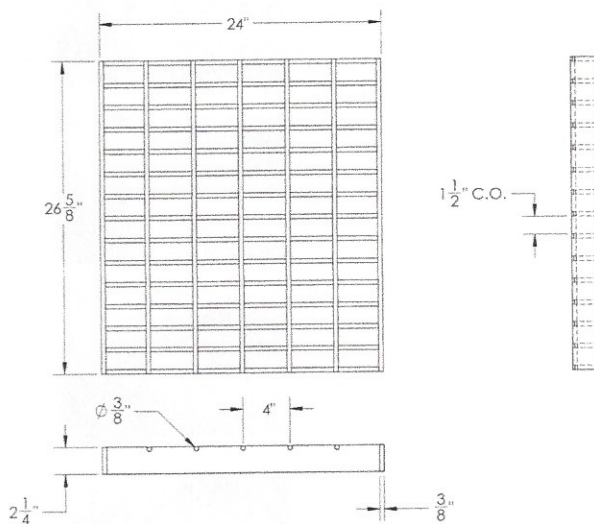


* 3 Images are directly from (A Northwest Piping Company,2018)



TechDrain Supply Drainage Grating

The drain gratings used to allow the water to flow to the underground pipes are supplied by TechDrain Supply. The grates are made from steel and each grate weighs 110 pounds (TechDrain Supply, 2011).



(TechDrain Supply, 2011)

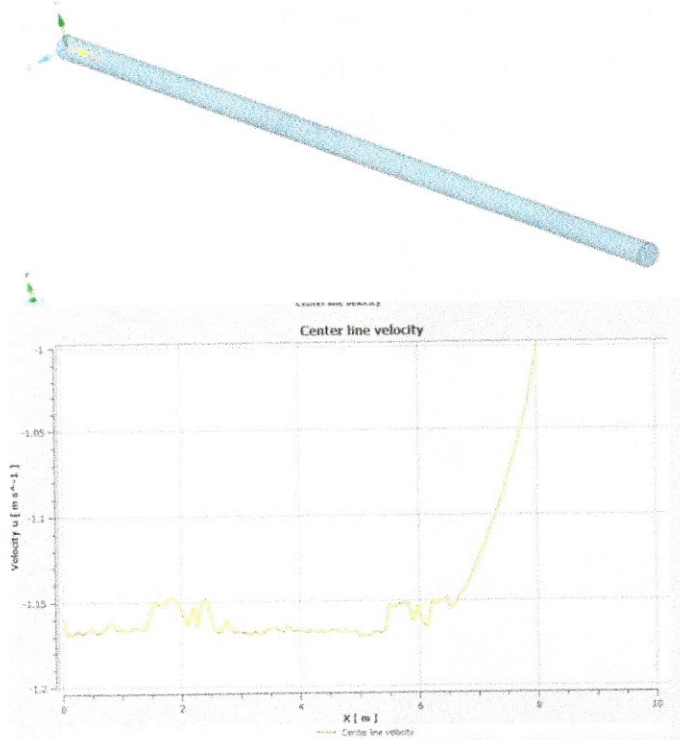
Global Water Flow Probe

Two flow probes will be used at the inlet and outlet of the pipes for measurements and analysis purposes. The Global Water Flow Probe will be used due to its high accuracy, rain proof computer, and its Civil Engineer certification. The display on the probe uses LCD and is glare proof with UV protection. It has 30 spaces for memory meaning it can store up to 30 samples. The details it provides include minimum, maximum, and average velocity. It can ^{withstand} ~~with stand~~ a temperature range between -4 to 158 degrees Fahrenheit and operates on a lithium battery. Its lifetime is approximately 5 years with typical use but is not replaceable (Global Water Probe, 2015).

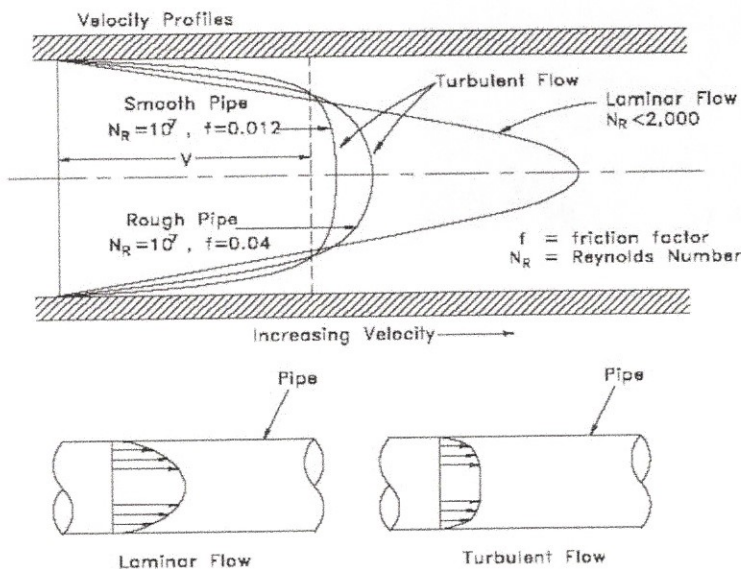


(Global Water Probe, 2015)

The software needed to complete the design and analyze results after placement will include AutoCad and ANSYS. The engineers on the team have these softwares installed on their work laptops. The purpose of AutoCad is to assist in building a detailed blueprint. ANSYS will be used to analyze the flow of flood waters and help build simulations for various discharge and velocities of the floodwater.



(ANSYS, 2018)



2.4 IMPLEMENTATION DESIGN

To install the water drainage and reroute system, the construction crew will need to travel to the test site with the required materials. This involves the materials needed for the pipes and the machinery needed for installation. The crew will need to take inventory and check all the materials for damage. From there the crew will need to dig the corresponding area for the drains and pipes to be placed. Once the area is cleared for installation, the design layout will be followed for placement of the materials. The pipes are then installed and will be covered.

3. Quality Assurance Plan

To ensure the quality of the drainage and pipeline system being tested, it is necessary to first articulate the potential risks at hand, so as to develop ways to mitigate them. If the risks are properly minimized, the drainage system can be applied on a statewide scale, yielding great economic and environmental benefits.

3.1 Risks

The potential risks involved with this system are as follows:

1. A risk that comes with the implementation of any drainage system is that of backup. Often seen in cities, points of drainage can sputter or overflow during periods of intense water flow. This is also an issue of ensuring that pipe quality does not degrade over time. If the drainage points in the farm system overflow, the problem which the device is aiming to mitigate would worsen. This potential risk can be controlled by a routine inspection and maintenance of the system.
2. While unlikely, the diversion system holds potential of water contamination. Should the water flows inundate the animal waste lagoons and integrity of the drainage system lacks, the stream flows could carry contaminated water throughout its path, potentially entering the ocean or seeping into the soil.

So as you work, you will deal w/ and document issues as they arise
so you know how to deal w/ them if this were to go statewide?

ew. please avoid

good

3.2 Risk Mitigation Measures

1. To ensure that the drainage system does not overflow, the integrity of the infrastructure must be properly maintained. Therefore, the drainage system will be regularly inspected, followed-up with maintenance if necessary. An inspection will occur on the first Monday of each month during hurricane season, and the first Monday of every two months during the regular seasons. The inspection pertains to:

- a. Drain covers
- b. Drain holes and space for water
- c. Integrity and rot of internal stone materials
- d. Rust of internal pipes

The results of the inspection will be submitted to the state government and a maintenance will be scheduled with the accredited construction company that installs the system, if necessary. This will ensure that the drainage system is functioning properly and will be able to accommodate the maximum amount of water in an emergency.

3. The water contamination component is in part why the test site is so crucial. An expert of fluid mechanics was hired to plan where and how the water is deposited. The test will tell if a despot site is necessary, and what would be the best means of creating one.

3.3 Considerations in testing

The money and permission granted would allow for testing the actual competency of the system. Using mathematical analyses, we will be able to predict the ecological impact of the system.

3.4 Expected Project Results

An immediate expected result of the drainage and pipeline system is the mitigation of flooding during periods of intense rain. During the rainy test season, water will run down the hill, and some will fall into the drains in passing, other flows will be diverted away from the stream. If

this result is observed, the system can be installed on a greater scale, which would yield the following results:

Legislative Implications

very good here

If the test site returns the desired results, making it evident that a pipeline is useful to prevent farm flooding, the system would be applied to farms throughout the state. To ensure that all farmers implement the immensely crucial flooding preventatives, the pipeline would be mandated via legislature for the state. This would also help to subsidize the system and offer financial assistance to those who need the pipeline, which would be factored into a secondary assessment of cost.

✓

If farms install this infrastructure on a state-wide scale, damage to land and livestock would be significantly reduced. This would save money for both local farmers and the state government, as they would have to distribute less post-disaster aid than they would to farms without the flooding prevention.

If the pipeline is to be installed on a greater scale, it is anticipated that the coasts of North Carolina would require reinforcements to accommodate the inevitable erosion resulting from increased streamflow. The redirected water would hit the coast, and would most likely erode sand that lines the beaches. Since the longevity of the coasts is already at risk due to climate change, installation of the pipeline would require either the addition of sand to, or a redesigning of, the coast entirely.

Now this is interesting

The pipeline, if found to be successful in the tests, could yield mass improvements for the economy and ecology of the state of North Carolina as a whole. This includes, but is not limited to:

1. Reduction of flooding in general North Carolina farmland
 2. Reduction of livestock death that occurs during floods
 3. Money saved from not having to replace dead livestock
 4. Better quality of land
- ✓

5. Greater sustainability and resistance of land.
6. Increased productivity of the farmland in supplying healthy products.
7. Greater supply and therefore lower price in consumer markets.

4. QUALIFICATIONS

Our team is composed of four Environmental Engineers: Courtni Holness, Erin Wengerter, Trent Strachan, and Caroline Schwab.

Courtni Holness majors in Environmental Engineering, with a concentration in energy. She has a special interest in climate change and makes lifestyle choices to adapt to the needs of the environment. Her focus is to engineer methods that provide sustainability and functionality. She hopes to communicate the necessary lifestyle changes to the public. Some of her technical skills include C++ and Rstudio programming, and Ansys computational fluid dynamics.

Erin Wengerter obtained her bachelor's Degree in Earth System Sciences and Environmental Engineering within the City College of New York. Considering her concentration is within water, she possesses a lot of knowledge and training when it comes to projects centered around water. Furthermore, she has experience in MatLAB, CAD, and ArcGIS which allows her to develop, analyze, and model the system being implemented and tested. Understanding the complex and crucial relationship the living things on this planet have with water, she hopes to aid in overcoming the major problems that come along with it.

Trent Strachan is seeking a Bachelor of Engineering (B.E.) in Earth System Science and Environmental Engineering at the City College of New York and his intended concentration is energy. In addition, he has a strong affinity towards waste to energy conversion and wise use of resources and as a result, he will converse with the team on ways the waste from the lagoons can be broken down into simpler components to prevent further environmental degradation. Lastly, he will hold conversations with the neighboring homeowners on the proposed methods of pollution prevention.

Caroline Schwab is an environmental engineer with a focus in water resources and sustainability. She is pursuing a Bachelor of Engineering in Earth Systems Science and Environmental Engineering at the City College of New York in the Macaulay honors program. She intends to specialize in water resources paired with a focus in policy, so as to affect sustainability in the real-world. She is fluent in R programming and SQL data analysis.

5. SCHEDULE

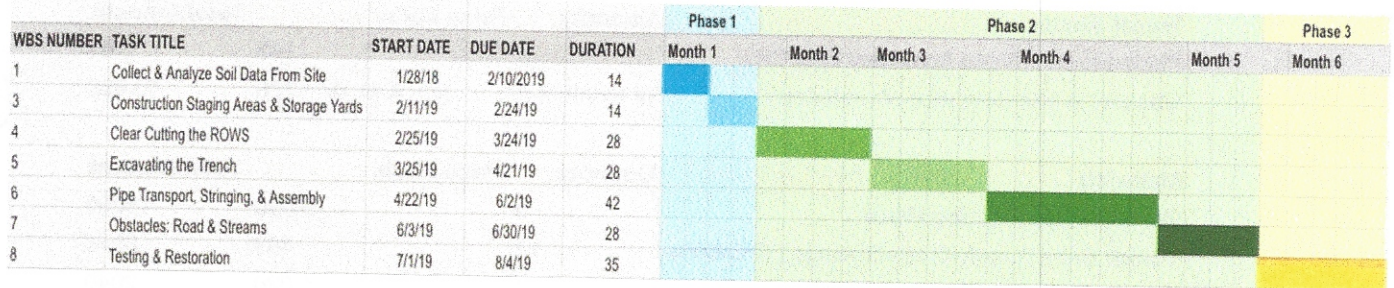


Table 1. Gantt Chart Schedule of the eight-step project split between three phases within six months (Oil and Gas Pipeline Construction: Step-By-Step Visual Guide, n.d.).

6. BUDGET

Through a thorough cost analysis taking into consideration both the direct and indirect expenses, we were able to calculate the final direct costs of the project to be approximately \$ 456,272.23 and the final indirect expenses to be \$56,796.6939.

I am surprised that the number is so low. Then again, it is just one site.

6.1 DIRECT COSTS

Salaries	Quantity	Price Each	Total Amount
Environmental Engineer	4	40,000	160000
Civil Engineer	1	40,000	40000
General Contractor	1	29,000	29000
Truck Driver	2	4,200	8400
Fluid Mechanics Specialist	1	40,000	40000
Fringe Benefits of Program Personnel	Quantity	Price Each	Total Amount
Team/Company car (Intermediate SUV)	2	6,520.66	13041.32
Team/Company credit card	2	4,000.00	8000
Travel Costs	Quantity	Price Each	Total Amount
Plane tickets (to and from New York City)	8	143	1144
Gas (car & transportation of materials)	(# months) 6	(car & truck) 1776	10,656
Materials	Quantity	Price Each	Total Amount
Permalok Steel Casing Pipes	9	5,000	45000
Trench Drain Supply Drain Gratings (TPC-600)	14	489	6846
Global Water Flow Probe (BB1110)	2	1,020	2040
Trucks for pipe & drainage transportation	3	(5 month rental) 9000	27000
Small Crane	1	(40 hours rental) 11800	11800
AutoCad	1	1,575	1575
ANSYS	1	10,000	10000
Excavator (medium sized)	2	36,000	72000
Supplies	Quantity	Price Each	Total Amount
Spray Paint	9	5	45
Tape measure	3	13.97	41.91
Wheelbarrows	7	169	1183

Table 2. The evaluation and breakdown of all the direct financial requirements in order to complete the project successfully.

Upon the direct budget research and evaluation, the total cost of the Salaries is \$277,400.00, Fringe Benefits of Program Personnel Total is \$21,041.32, Travel Costs is \$11,800.00, Materials is \$176,261.00, and Supplies Total is \$1,269.91 (Anastasios, 2018). This leaves the final direct budget at \$456,272.23.

Still a small number in comparison to other projects

6.2 INDIRECT COSTS

The calculation of these indirect costs is based upon the fact that there are financial burdens that are likely to come into play during the project without necessarily being a part of the project itself. For instance, there could be a change in the fixed contract multiple times throughout the project. Therefore, legal advice is considered a necessity. As there is a possibility of the same process happening during ^{the} design, it is clear to understand why hiring a consultant could end up being a necessity. Additionally, because it is common knowledge that dangerous situations exist ^{at} in construction sites, insurance should be another aspect considered during the project. Furthermore, if any regulations and legislations are misconducted or not followed properly, a legal team would have to be hired (Consulting fee rates | Consultant fees, 2017). This came to a total financial breakdown of \$200,000 of total indirect costs.

very nice work here as well

Financial Consideration	Price
Engineering Consultant	40,000
Contracts	10,000
Legislation & Regulation	50,000
Insurance	100,000



Table 3. The evaluation and breakdown of all the indirect financial requirements in order to complete the project successfully.

7. Conclusion

Testing the drainage and pipeline system would allow the exploration of a new and feasible way of reducing flood damage in North Carolina farmland. As climate change worsens, natural disasters such as hurricanes will be observed more frequently. Therefore, it lies in governments and citizens to fortify their protection and resources. Access to a test site would help yield sustainable solutions for the state of North Carolina, as well as the potential to help areas with similar landscapes and problems throughout the country. This is an immensely necessary endeavor in fixing a small portion of environmental challenges.

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AUDIENCE PROFILE SHEET

Reader's Name:

1. North Carolina Governor Roy Cooper
 2. North Carolina Secretary of Department of Environmental Quality Michael Regan
 3. Agriculture Commissioner of North Carolina Steve Troxler
- 

Reader's Job Title:

1. Governor
2. Secretary of Department of Environmental Quality
3. Agriculture Commissioner of North Carolina

Education:

1. Law Degree UNC(University of NC)
2. Bachelor Degree in Earth & Environmental Science from NC Agricultural and Technical State University, Masters Degree in Public Administration from George Washington University
3. Bachelor of Science in conservation from North Carolina State University- with a concentration in environmental studies

Professional Experience:

1. 3 decades in public service, service in legislature
2. Served on several boards and commissions focused on the environment, 18 years of professional experience focuses on overcoming complex challenges through environmental advocacy and regulation.
3. Founded a tobacco and wheat farm, public servant

Job Responsibilities:

1. Protect families and communities, keep North Carolina residents safe and informed. Balance state budgets
2. To protect North Carolina's environment and natural resources
3. Focus on developing new markets for NC farm products, preserve working farms, protecting state's food supply

Personal Characteristics: Busy, but they understand that the proposal would solve the problem of flooding. As a result, they are absorbed in reading it

Cultural Characteristics: Roy Cooper, Michael Regan and Steve Troxler grew up in the North Carolina community and are active members of their community.

Attitude Toward the Writer: Concerned because the team is young.

✓ greet point

Attitude Toward the Subject: Interested since if the test goes well, they will seek to have the system used throughout North Carolina

1. Governor Roy Cooper would be interested in our flood prevention test/project because he recently signed Hurricane Florence Relief Legislation into law. Governor Roy Cooper is also working with federal and state agencies to devote a sum of money for the special purpose of Hurricane Florence recovery. Roy cooper was born and raised in North Carolina so he has a natural inclination to help the state... animals, civilians, economy etc.
2. Michael Regan would be concerned with the environmental aspects of the project. Including: water contamination, the spread of pathogens (from mass mortality), saving livestock
3. Steve Troxler would be concerned with the mass mortality of livestock on farms in North Carolina.

Expectations About the Subject:

1. Roy Cooper would expect this document to benefit the state. Roy cooper is expecting an official document breaking down what the plan and outcomes should be.
2. Michael Regan expects environmental relief/benefit
3. Steve Troxler hopes that farmers would not be affected negatively by installing the system

Expectations About the Document: They seek answers to how this will affect the state, the environment, and public servants.

Reasons for Reading the Document:

1. Roy Cooper would read the document because it interferes with the North Carolina residents. He needs to have knowledge about invasive projects.
2. Michael Regan would read this document because he needs to ensure that this project does not damage the environment negatively and the quality of the environment is maintained.
3. Steve Troxler would read this document because the system would be implemented at farms. The team does seek to reduce livestock deaths.

Ways of Reading the Document:

Skim it x Study It x Read a portion of it x Which portion? The abstract, procedure, and results.

Modify it and submit it to another reader x

Attempt to implement recommendations x Use it to perform a task or carry out a procedure

 x

Use it to create another document

Other Explain

Reading Skills: All intended audiences have acquired the necessary reading skills given their level of education

Reader's Physical Environment: In their office, in their leisure time at their homes



AUDIENCE PROFILE SHEET

Reader's Name: Elwood Garner

Reader's Job Title: Co-owns and manages Garner Hog Farm and E & J Farms LLC, Duplin County Farm Bureau Board of Directors, Member of Kenansville Fire Department

Education: B.A. degree in Criminal Justice from the University of North Carolina at Willimington

Professional Experience: Serves on the Duplin County Farm Bureau Board of Directors and farm manager at Dail Farms, Serves on District 4- North Carolina Pork Council

Job Responsibilities: Directs and coordinates worker activities, organize maintenance/repair of farm property, equipment and machinery

Personal Characteristics: Good communication skills

Cultural Characteristics: Religious. He attends Grove Presbyterian Church. He also is caring and seeks the farmers' interest.

Attitude Toward the Writer: Trusting. The team of engineers seek to improve conditions of the farm

Attitude Toward the Subject: Approving. Elwood Garner agrees with the installation of the drainage system.

Expectations About the Subject: Addresses farmers' concerns during natural disasters

Expectations About the Document: Provides valuable insight into details of the implementation of the drainage systems and if it will affect farmers' livestock and land space negatively.

Reasons for Reading the Document: To know how farmers' needs are going to be met.

Ways of Reading the Document: *(Elwood Garner will spread a portion of it. He is a farmer and a member of the community so a general idea of the ongoing work occurring will be necessary.)

Skim it ____ Study It ____ Read a portion of it ____ Which portion?

Modify it and submit it to another reader ____ (No, but any concerns he can contact the environmental engineering team)

Attempt to implement recommendations ____ (Yes, he will relay a general idea of the given proposal to his fellow farmers)

Use it to perform a task or carry out a procedure ____ (His wife, Jill, may also read the proposal *me* since she is a farmer in the community.)

Use it to create another document ____ (N/A)

Other ____ Explain

Reading Skills: Adept in the English language and his level of education maintains that he is a very good reader.

Reader's Physical Environment: At his home, in farm office

AUDIENCE PROFILE SHEET

Reader's Name: Kathy Johnson

Reader's Job Title: Teacher at local elementary school

Education: B.S. in Psychology; Masters in Early Childhood Education

Professional Experience: 25 years in local elementary school

Job Responsibilities: Supervises and teaches the young children

Personal Characteristics: Friendly, caring

Cultural Characteristics: Lived in community for decades, so is passionate about it.

Attitude Toward the Writer: Critical because concerned about town

Attitude Toward the Subject: Negative and skeptical because does not want to be affected by infrastructure even if that means protection from floods

Expectations About the Subject: Will not like what the topic discusses

Expectations About the Document: To be informative and professional

Reasons for Reading the Document: to find out about potential infrastructure near town, and to prepare resistance

Ways of Reading the Document:

Skim it ____ Study It ____ Read a portion of it x ____ Which portion? Needs and quality assurance plan

Modify it and submit it to another reader ____

Attempt to implement recommendations ____

Use it to perform a task or carry out a procedure ____

Use it to create another document ____

Other ____ Explain

Reading Skills: Proficient – college educated teacher

Reader's Physical Environment: Quiet, alone at home

Slides:

Flood Free Farms

Courtnei Holness
Caroline Schwab
Trent Strachan
Erin Wengerter

What is going to be talked about:

• greetings

"Flood Free Farms!"

Qualifications of the Team

• introduction of each member

- major (ESE)

- concentration (water and/or energy)

- skills and/or experience

(ALL)

Introduction



- Flooding of farmland
- Loss of livestock
- Weak structures
- Water contamination occurs affecting health of residents

(Trent)

• explanation of major flooding throughout North Carolina from Hurricane Florence (especially in Duplin County)

• explanation of damages/dangers associated

Drainage System

What is needed?

- Source of funding
- Test site

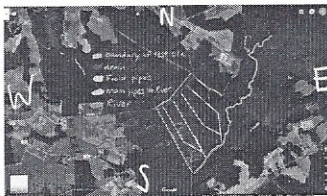
(Trent)

• explanation that we propose to build an efficient drainage system

• emphasize what we are asking for

Technical Approach

- 3.03 by 2.65 mile area in Duplin County North Carolina.
- System of drains and pipes traveling from livestock farms to a designated discharge space.
- Topography
- For the test the discharge area is the Northeast Cape Fear River



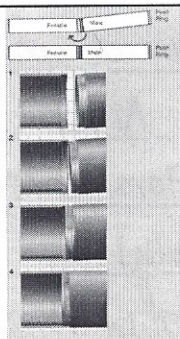
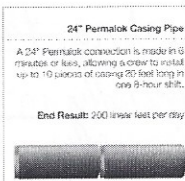
(Courtini)

• explanation of the layout of the blueprint to reroute flood waters

- length and area
- gravity is mechanism of movement
- topography of N.C. follows gradient from W to E

Technical Description

- Permalok Steel Casing Pipes
- No field butt welding required
- Connected with Male/Female joints
- (A Northwest Piping Company, 2018)
- High efficiency saves time & money



(Courtini)

• explanation of pipe description

• emphasize:

- reduces cost b/c efficiency
- can handle various loading conditions
- quick/easy installation
- leak proof under considerable groundwater pressure
- can withstand large temperature range

Technical Description

- TechDrain Supply Drainage grate
- 110 pounds each
- (TechDrain Supply, 2011)

(Courtnei)

- explanation of drain description
- include:
 - made from steel
 - allows water to travel to underground pipeline system

Technical Description

- Global Water Probe flow probe
- 30 memory spaces, each stores a minimum, maximum, average velocity.
- Water proof
- (Global Water Probe, 2015)

ANSYS computational Fluid Dynamics program

- Input data from flow probes
- Useful for simulation
- (ANSYS, 2018)

(Courtnei)

- explanation of water flow probe description
- include:
 - high accuracy
 - ANSYS simulation can help us to create disastrous scenarios w/ different conditions
 - simulations can provide information for any adjustments that may be needed

Quality Assurance Plan

Risks	Prevention
1. System Integrity	1. Routine pipe inspection
a. Overflow	2. Fluid mechanics
b. Weathering	
c. Damage	
2. Water contamination	

(Caroline)

- explanation of ^{risk} ~~risk~~ and prevention factors to counteract them
- focus on main components that could degrade pipe or cause instability in the system

Expected Project Results

If test is successful, and rainy season does not inundate land, and the system is applied across the state

1. Reduction of farmland flooding
2. Reduction of livestock death
3. Economic benefit for farms
4. Better quality, sustainability of land

(Caroline)

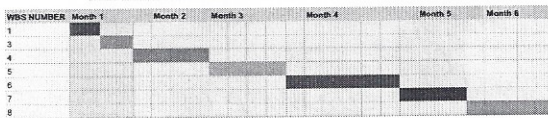
• explanation of next steps after success of project/implementation

• include (emphasize):

- reduction of farmland flooding leads to better land and ~~less~~ livestock deaths
- economic benefits

Schedule

WBS NUMBER	TASK TITLE	START DATE	DUE DATE	DURATION
1	Collect & Analyze Soil Data From Site	1/28/18	2/10/2019	14
3	Construction Staging Areas & Storage Yards	2/11/19	2/24/19	14
4	Clear Cutting the ROWS	2/25/19	3/24/19	28
5	Excavating the Trench	3/25/19	4/21/19	28
6	Pipe Transport, Stringing, & Assembly	4/22/19	6/2/19	42
7	Obstacles: Road & Streams	6/3/19	6/30/19	28
8	Testing & Restoration	7/1/19	8/4/19	35



Gantt Chart Schedule of the 8 step project split between 3 phases in 6 months (Oil and Gas Pipeline Construction: Step-By-Step Visual Guide, n.d.).

(Erin)

• explanation of gantt chart and quick, concise explanation/reasoning behind each of the eight steps

Budget (Direct Costs)

Salaries Total = \$277,400.00

Fringe Benefits of Program

Personnel Total = \$21,041.32

Travel Costs Total = \$11,800.00

Materials Total = \$176,261.00

Supplies Total = \$1,269.91

Overall Total = \$456,272.23

Salaries	Quantity	Price Each	Total Amount
Environmental Engineer	4	49,000	196,000
Civil Engineer	1	48,000	48,000
General Contractor	1	24,000	24,000
Truck Driver	2	4,700	9,400
Plant Maintenance Specialist	1	49,000	49,000
Fringe Benefits of Program/Personnel	Quantity	Price Each	Total Amount
Health/Conceivability (see instructions 2019)	2	8,520.66	17,041.32
Health/Conceivability (see instructions 2019)	2	4,000.00	8,000.00
Travel Costs	Quantity	Price Each	Total Amount
Phone, Books, 20 and from New York City	8	143	1,144
Gas (car & transportation of personnel)	19 barrels @ 5	600 & 600	11,800
Materials	Quantity	Price Each	Total Amount
Permanently Sealed Casing Pipe	9	5,200	46,800
Trench Open Endless Open Casing (TPC-600)	14	400	5,600
Global Water Flow Probe (B01102)	2	5,200	10,400
Trucks for pipe & storage transportation	2	8,000 (total)	16,000
Small Crane	1	140,000 (total)	140,000
Handrail	1	1,000	1,000
ASDYS	1	10,000	10,000
Excavator (medium sized)	2	38,000	76,000
Supplies	Quantity	Price Each	Total Amount
Survey Pins	5	5	25
Tag material	3	15.97	47.91
Wheelbarrows	7	169	1,183

The budget breakdown in their respective sections (Anastasios, 2018).

(Erin)

• quick explanation of some components (don't list them all) and their importance

• review of overall direct costs total (\$456,272.23)

Budget (Indirect Costs)

The calculation is based upon the fact that there are financial burdens that are likely to come into play during the project without necessarily being a part of the project itself.

Financial Consideration	Price
Engineering Consultant	40,000
Contracts	10,000
Legislation & Regulation	50,000
Insurance	100,000

Overall Total = \$200,000

(Erin)

- explanation of how calculations are derived from costs that aren't necessarily part of the project completion themselves
- changes could happen that bring these about

Conclusion

What are we asking for?

1. To receive funding from the state of North Carolina on this project
2. To receive the test site proposed or a possible alternative with similar topography/qualities

Thank you!

(Erin)

- EMPHASIZE what we are asking for (purpose of proposal)

"Thank You for Listening!"

References

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- Trench Drain Supply. (2011). *24" Wide Trench Drain Steel Grate*. Retrieved from <https://www.trenchdrainsupply.com/prodimages/submittals/EJ2NCR11-0775%20Grate.pdf>

- APA format citations for credibility

Civil Engineer with specialization in fluid mechanics

Job Summary:

We are a team of engineers collaborating to create a solution to extreme flooding in natural disasters. Our goal is to prevent flooding from occurring on livestock farms in North Carolina. Livestock farms face mass mortality, and the local water is subject to contamination. Our hope is that our solution will first be applied on farms in North Carolina and extend ^{ed} to other areas threatened by extreme floods. We are seeking a committed, innovative, civil engineer to offer assistance in designing a pipeline. You will act as a consultant, giving guidance in materials, placement, and route of the system. You will be expected to arrange travel if necessary.

Job Responsibilities and Duties:

- Assist in designing blueprint for pipeline
- Perform field report writing
- Conduct on-site assessments in North Carolina
- Collaborate with the executives and team members to complete the project
- Follow schedule accordingly for timely completion
- Install the desired system within the given budget constraints

Qualifications and Skills:

- Minimum education of a Bachelor's Degree in Civil Engineering
- Specialization in fluid mechanics
- Knowledge of underground gas and power lines in North Carolina
- Minimum of 3 - 4 years of related work experience
- Knowledgeable of geography of North Carolina
- Proficient in AutoCAD
- Familiar with ArcGIS
- Extremely efficient in Microsoft Office applications
- Excellent interpersonal and analytical skills

Salary: \$41,770 in a 6 month timeframe

→ this isn't low?
then again, it is 6 mos...

Caroline Schwab – Reflection

Through this assignment, I was able to work on the course learning outcome of developing and engaging in the collaborative and social aspects of writing processes. The project was rooted in groupwork from the creation of our idea to the finalizing of our paper. Our first collaborative challenge was to ensure that each group member had the same accurate understanding of what we were trying to produce. This required us to actually sit down in the NAC library and discuss the issues with our concept – similarly to how actual engineers work together! There were obstacles with our concept, but brainstorming as a group allowed us to work through them. For example, our original focus was tied to the waste lagoons seen on farms, but upon realizing how difficult that issue is to solve, we went for something more accessible that also had the potential for great benefit – draining flood waters. Just as in the real world of engineering, working together was completely integral to this project, not only because of the need to need to delegate work on a complex paper, but mostly because of the need to collaborate when the idea faces obstacles. (Engineers' ideas will always face challenges, so I can now understand the immense importance of teamwork in engineering.) Great

The audience for this proposal would have a range of experience and education, but we determined the primary audience to be the North Carolina state government, and the secondary audience would be a concerned local citizen or farmer. The reason for these divisions is that the local government would most certainly read the proposal because we would be hypothetically sending this proposal directly to the office. The secondary audience of citizens would only read it if they have a strong interest in their town and environment; the proposal is intended for the government but would certainly reach North Carolina's citizens. Keeping this in mind, the technical description explains the system thoroughly enough such that a government official or citizen would understand the product, but there is not so much detail that the reader must navigate unnecessary information.

The purpose of this lab was to propose an environmental solution that results in being granted funding and access to a government-owned test site. While our proposal was persuasive, it was not comparative, so it simply articulated the benefits of our environmental solution. This was not only to convince the state government to grant funding and a test site, but also to convince the local residents to support our proposal. The persuasive purpose applies to all our audiences.

The stance of this proposal was in favor of the drainage system, but with a focus on issues experienced in the state. The language of our proposal aims to promote our project and its benefits without having too intense a slant. For example, we discuss its benefits, but we do not use words like "fantastic" or "amazing," because that would not be typical of a professional proposal. Sections like the quality assurance plan emphasized the widespread benefits of the drainage system without ~~being~~ excessively promoting it. Rather, the mere discussion of the benefits of our proposal help to craft the stance in favor of our product, without being overbearing. The proposal required that we convince the reader of the system's benefits without doing so in a commercial manner.

This report met the genre conventions of proposal. It contained all the correct components, and maintained a professionally persuasive manner. The objective is explicitly stated so as to optimize how the reader uses our document. Additionally, the product is thoroughly explained with an emphasis on the quality assurance, so has to be persuasive but professional. Similarly, our language used promotes our environmental solution without using intense connotations.

This assignment was the most multi-modal one yet. We had to design as a group the blackboard post, the paper itself, and the PowerPoint. Each component aided the construction of the other. The blackboard post allowed us to organize our thoughts and, upon receiving feedback from our peers, write a cohesive and organized paper. Following this, the paper allowed us to articulate our ideas for the PowerPoint; each slide took a summary of the points addressed in the corresponding section of the paper. The PowerPoint is also the most persuasive, as we are able to connect to and convince the audience using components other than language like visuals, body language, and actual tone of the presenters.

The exigence of this lab derives from the rise in disasters caused by climate change. This proposal would be written following hurricane Florence, after seeing the mass damage incurred throughout the state, particularly felt by farms. A team of environmental engineers would see the loss of livestock and money, and work to find a solution. However, in order to make a real impact, they would have to test the idea, which would require money and a test site. Therefore, this proposal would come after the engineers feel satisfied with the competency and importance of their idea. This proposal would be written to acquire the funding and test site necessary to advance their innovation.

Very well done
here

Erin Wengerter
Professor Danielle Carr
ENGL 210 - Writing for Engineers
November 19, 2018

Proposal Project Reflection Paper

Engineering is not in any way a clean cut, boring profession in which you're confined to a solitary office all day. People don't always realize the potential it has for creativity, especially when switching between different projects with their own individual needs and requests. When working in these projects, engineers generally collaborate in teams. The completion and success of their project is not only based upon their expertise, but also how well they work together. In a creative industry, teamwork is vital because a larger cumulative pool of knowledge can be created if all members cross-share the knowledge they possess from their individual skills and expertise. Additionally, collaboration teaches team members how to effectively critically analyze the work and work habits of themselves and other people across different fields. The benefits that can be gained from effectively combining different people from their different fields can be monumental when working on any project that is too big or complex for one person.

Within the project, my role was to write the budget section (direct & indirect), the schedule of the project, my qualifications, the project outline, and finalize the powerpoint. This budget and schedule section especially came with its own hefty set of research and evaluation as none of us had any prior knowledge of what goes into a project such as this. Additionally, in the beginning of the project I made sure as to delegate sections to people within the group and finalize our posts on blackboard.

Trent's role within the project was to write the problem statement, background, need statement, objective, his qualifications and one audience analysis. Courtnei's role within the project was to write the proposed technical approach, requirements, implementation design, her qualifications, and one audience analysis. Caroline's role within the project was to write the quality assurance plan, expected project results, conclusion, her qualifications, and one audience analysis. We all did a shared amount of planning and organization as a group when it came to meeting up to work on the proposal, creating the powerpoint, and communicating effectively with one another about our concerns and comments.

There are two main purposes to creating this proposal. The first, is to gain funding in the form of financial support and/or a labor force from the North Carolina state government. The second, is to be granted permission to install the proposed water pipeline and drains on a test site in the month preceding and during the rainy season of North Carolina.

Audience?

Catastrophic and destructive events will always take place throughout human history. As there is no way to prevent them in our current day and age, the best thing we can do is prepare for them and buffer the negative effects that they bring about. For North Carolina, one of the biggest problems they face after hurricanes is mass livestock death in flood waters and the contamination that is created and carried. This what we hope the drainage system and pipeline we propose will work towards solving. In essence, this is the exigence of our proposal.

My stance is one of concern and determination. Knowing that not only the agricultural economy of America but the lives of MILLIONS of animals is affected by a project like this had made me want to do it the utmost justice.

As indicated by the title, the genre of this assignment is a proposal which is an argument, submitted within a group/organization, for going through with a project that will benefit the group/organization. We completed this within the assignment through submitting and oral presenting an offer of going through with our intended project. Within the submission and oral presentation we made sure that our argument was clear though emphasizing what our project would solve and accomplish for the state of North Carolina (the organization), and we clarified what specifically would be required for this project from this organization.

Within Media and Design, print through the typed proposal was the main source of sharing our message with our audience in this assignment. Additionally, a digital form of media was used when posting on Blackboard and interacting with other groups on ours and their projects. Furthermore, visuals in terms of graphics and text on the powerpoint as well as oral speech will be used to further share our proposal with our classmates.

Throughout the assignment, the second course learning outcome was consistently worked upon as our group members were constantly critiquing, fixing, and commenting on each other's work in the proposal, powerpoint, etc. The third course learning outcome was also met as we made sure to modify our writing to be tailored for the intended audience. The organization of our mediums of communication were also modified to the conventions of proposals. This also blends into the eighth and sixth course learning outcomes. We had to convey the importance and concern within our proposal as well as the conventions of APA citations and formatting as it related to proposals both within the written form and the presentation. Finally, as this was a group project which required the most collaboration thus far, the fourth course learning outcome was met as we effectively evaluated each others' work to make consistent improvements and progress on the project as a whole.

Flood Free Farms
Trent, Caitlin, Erin, Caroline

Group Presentation Rubric

Category	0-2	3-5	6-8	9-10	Score
Preparedness	Presentation is very unorganized, completely lacks cohesion, and does not have a direction	Presentation was not very well prepared, there was not a strong, coherent argument and presentation does not have a good flow	Presentation was mostly well prepared, presenters made a coherent argument, for the most part, presentation flowed rather smoothly	Presentation was well prepared, presenters made a coherent argument, presentation flowed smoothly	10
Content	Group shows no comprehension of the topic	Group shows some comprehension of the topic	Group shows good comprehension	Group shows full comprehension of the topic	10
Creativity -powerpoint display	Group shows no creativity in presentation, powerpoint riddled with issues	Group shows little creativity in presentation, some/ quite a few issues with powerpoint	Group shows some creativity in presentation, almost no issues with powerpoint	Group has very creative presentation, no issues with powerpoint	10
Time	6 min or less or exceeded 15 min	7-9 min	10-12 min	13-15 min	8
Collaboration	No evidence of collaboration	Little evidence that group collaborated with each other, group showed weak communication, understanding, and knowledge between members	Somewhat apparent that group collaborated with each other, showed good communication, understanding and knowledge between members	Apparent that group collaborated with each other, showed strong communication understanding, and knowledge between members	10

APA style method correctly composed? Yes ☒ No ☐ N/A ☐ *look spot on!*
 Attention to online work on Blackboard? Yes ☒ No ☐

Final Score 48/50

Paper 47/50

95

What was the purpose of the presentation? Was the effectively conveyed? Did the media help with this? Or would this have been better presented in another media?

Obtain Funding

Obtain a Test Site

Very clear

Based on the presentation, if you had the authority to approve decisions/funds allocation, would you approve this proposal? Why or why not?

Absolutely

Farm Tree Floods,

Excellent work here.

Well composed, considered and analyzed.

Specific attention to even the most minor detail both in the PPT & the proposal.

Balanced Speaking, competent, confident, passionate
(Definitely did your homework)

The Gantt chart was a great choice, great work on the budget.

Not enough good things can be said about the project. You all should definitely be proud of yourselves. And it looks like you had a great experience and learned a lot!

An interesting thing that shows a shift in diversity/inclusion in Engineering

- the group dynamic was 3 women, 1 man it's usually the other way, and split 2 persons of color.

Everyone was well represented. That was not done on purpose