Deliverable E - Project Plan and Cost Estimate

Cameron Caza - 300418236

Ben Krzymien - 300405599

Ethan Foley – 300232875

Qingyuan Ge - 300063712

James Davidson – 300436785

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Abstract

This document includes a project plan and cost estimate for the chosen design following the second client meeting. A comprehensive drawing is included to showcase the team's design. A plan is then listed for tasks which will need to be completed in the design process, with a list of significant risks and a contingency plan. This is followed by a prototyping schedule, with a list of tests scheduled for the following weeks until the final concept must be shown to the client. This schedule also includes stopping criterion and the objectives of tests. Additionally, three screenshots of the Trello task plan are included at the end of this document.

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1 Introduction

This document presents a detailed project plan and cost estimate for the proposed design, incorporating insights from the client meeting. It outlines the key phases of development, including task assignments, risk management strategies, and a structured prototyping schedule. Additionally, it includes test plans with defined stopping criteria to ensure that each stage of development meets performance expectations. By providing a clear roadmap, this document ensures that the team can efficiently execute the project while managing potential challenges.

2 Schedule for Prototyping and Testing

Event	Date	Description	Stopping Criterion
Test 1 - Parts	Feb 28	Test the power of motors, ensure controllers work and ensure the scraper material can scratch the pipe.	Motors produce enough torque, controllers work with Arduino, and scraping material can scratch material off the pipe.
Prototype 1 Drive System	Feb 17 – Mar 1		
Test 2 – Drive System	Mar 1	How well drive system can move through pipe	Drive system successfully goes through the whole tube
Prototype 2 Collection System and Response	Mar 2 – Mar 8		
Test 3 - Collection	Mar 8	Test the collection system and its accuracy.	The collection system consistently takes 0.3-0.8 grams of a sample
Test 4 – Operator Response	Mar 15	Test the operator response system combined with the rest of the prototype.	Response system successfully updates when changing tasks
Prototype 3 Full device	Mar 9 – Mar 23		
Test 5 – Full Device	Mar 23	Test the whole device to see if it can complete the task	The device goes through the entire process of collecting a sample

3 Project Risks

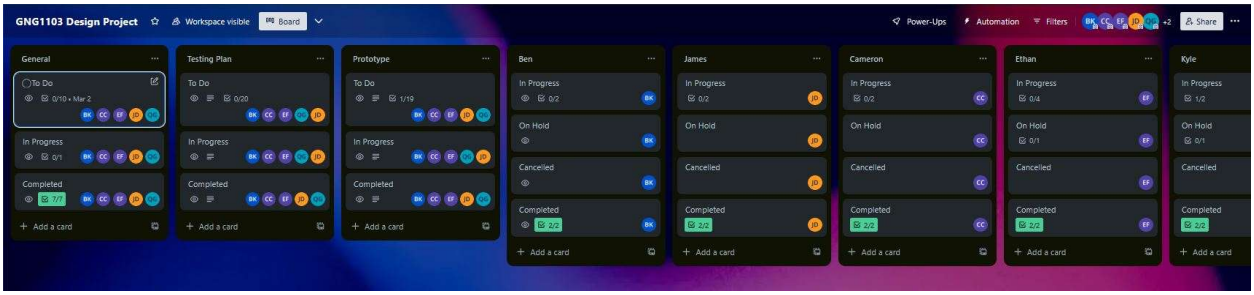
Risk	Contingency Plan
Motor Failure	Buy extra motors /tether to manually pull device out

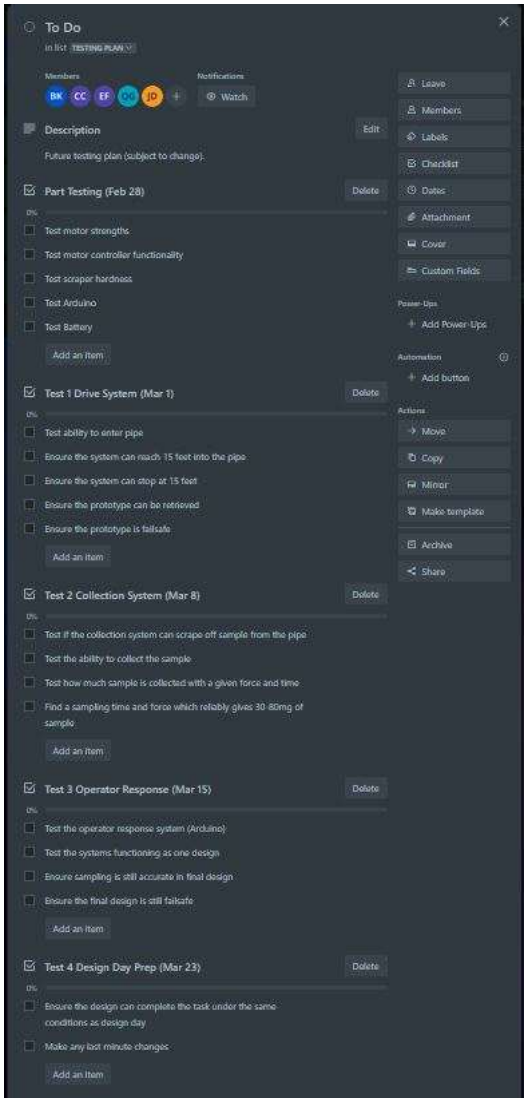
Wheel Slippage	Tether preventing device from travelling over 15 feet
Late Part Delivery	Order parts as soon as possible
Battery failure	Use batteries with more duration and higher quality
Incorrect Sample Size Collected	Further testing into how much material each scrape gets
Purchased components do not work	Buy the best quality parts possible within our price range
Computer battery dies	Ensure computer is at full battery/bring charger
Device not finished by deadline	Set dates to make sure to finish each portion of the design
Wire Sawdering Failure	Practice sawdering wires/ ask for help from someone with experience
Sampling tool snaps	Sampling tool must be harder than pipe

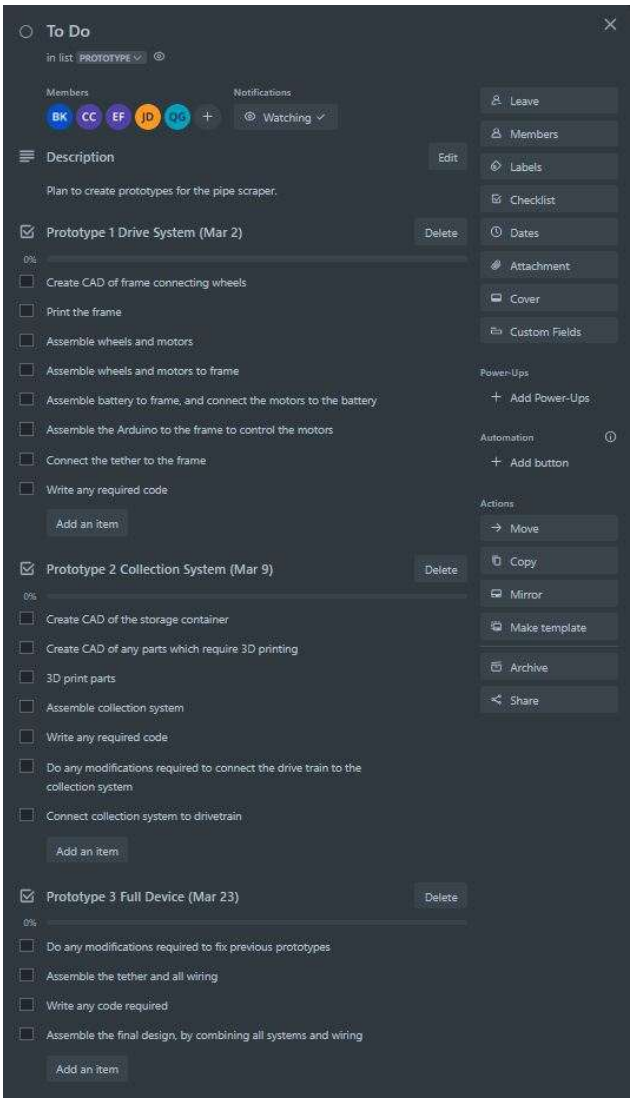
4 Conclusions and Recommendations

The outlined project plan and cost estimate provide a structured approach to developing the proposed design, ensuring efficiency and feasibility. By identifying key milestones, potential risks, and contingency measures, the team can proactively address challenges and maintain project momentum. The scheduled prototype tests will validate the design's functionality, allowing for iterative improvements before the next presentation to the client.

5 Trello


GNG1103 Design Project
Workspace visible
Board
Power-Ups
Automation
Filters
Share
General
To Do
In Progress
Completed
Add a card
Testing Plan
To Do
In Progress
Completed
Add a card
Prototype
To Do
In Progress
Completed
Add a card
Ben
In Progress
On Hold
Cancelled
Completed
Add a card
James
In Progress
On Hold
Cancelled
Completed
Add a card
Cameron
In Progress
On Hold
Cancelled
Completed
Add a card
Ethan
In Progress
On Hold
Cancelled
Completed
Add a card
Kyle
In Progress
On Hold
Cancelled
Completed
Add a card


To Do
in list TESTING PLAN
Members
Notifications
Watch
Description
Edit
Future testing plan (subject to change).
Part Testing (Feb 28)
Delete
Test motor strengths
Test motor controller functionality
Test scraper hardness
Test Arduino
Test Battery
Add an item
Test 1 Drive System (Mar 1)
Test ability to enter pipe
Ensure the system can reach 15 feet into the pipe
Ensure the system can stop at 15 feet
Ensure the prototype can be retrieved
Ensure the prototype is failsafe
Add an item
Test 2 Collection System (Mar 8)
Test if the collection system can scrape off sample from the pipe
Test the ability to collect the sample
Test how much sample is collected with a given force and time
Find a sampling time and force which reliably gives 30-80mg of sample
Add an item
Test 3 Operator Response (Mar 15)
Test the operator response system (Arduino)
Test the systems functioning as one design
Ensure sampling is still accurate in final design
Ensure the final design is still failsafe
Add an item
Test 4 Design Day Prep (Mar 23)
Ensure the design can complete the task under the same conditions as design day
Make any last minute changes
Add an item
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Mirror
Make template
Archive
Share


To Do
in list PROTOTYPE
Members
Notifications
Watching
Description
Edit
Plan to create prototypes for the pipe scraper.
Prototype 1 Drive System (Mar 2)
Delete
Create CAD of frame connecting wheels
Print the frame
Assemble wheels and motors
Assemble wheels and motors to frame
Assemble battery to frame, and connect the motors to the battery
Assemble the Arduino to the frame to control the motors
Connect the tether to the frame
Write any required code
Add an item
Prototype 2 Collection System (Mar 9)
Create CAD of the storage container
Create CAD of any parts which require 3D printing
3D print parts
Assemble collection system
Write any required code
Do any modifications required to connect the drive train to the collection system
Connect collection system to drivetrain
Add an item
Prototype 3 Full Device (Mar 23)
Do any modifications required to fix previous prototypes
Assemble the tether and all wiring
Write any code required
Assemble the final design, by combining all systems and wiring
Add an item
Leave
Members
Labels
Checklist
Dates
Attachment
Cover
Custom Fields
Power-Ups
Add Power-Ups
Automation
Add button
Actions
Move
Copy
Mirror
Make template
Archive
Share