

# DESIGN UPDATE

## **Cleaning Lobster Holding Tanks**

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**ISLAND**

# OVERVIEW



REQUIREMENTS



PROJECT STATUS  
UPDATE



FINAL DESIGN  
DESCRIPTION



BILL OF  
MATERIALS &  
FABRICATION



TESTING  
PROCEDURE



TESTING RESULTS  
& ANALYSIS



DESIGN UPDATES



NEXT STEPS

# REQUIREMENTS

- The design shall remove at least 90% of particulate from the tanks.
- The design shall not increase the facility's current water consumption of 2.5 million gallons a week.
- The system shall be capable of cleaning both the lobster holding tanks and outdoor tanks
- The design shall not take any longer to clean a tank than the current system
- The design should not introduce any particulate into the water that could be harmful to the aquatic life.
- The design must be waterproof as the system will be filtering particulate out of water and will be exposed to submersion and splashing.



# PROJECT STATUS

## Current Status

- Developed separator prototype
- Performed testing & analysis
- Adding modifications to original separator design
- Continuing to build slope insert

## Successes

- Functional prototype
- Met requirement meeting 90% efficiency through testing
- Happy client

## Setbacks

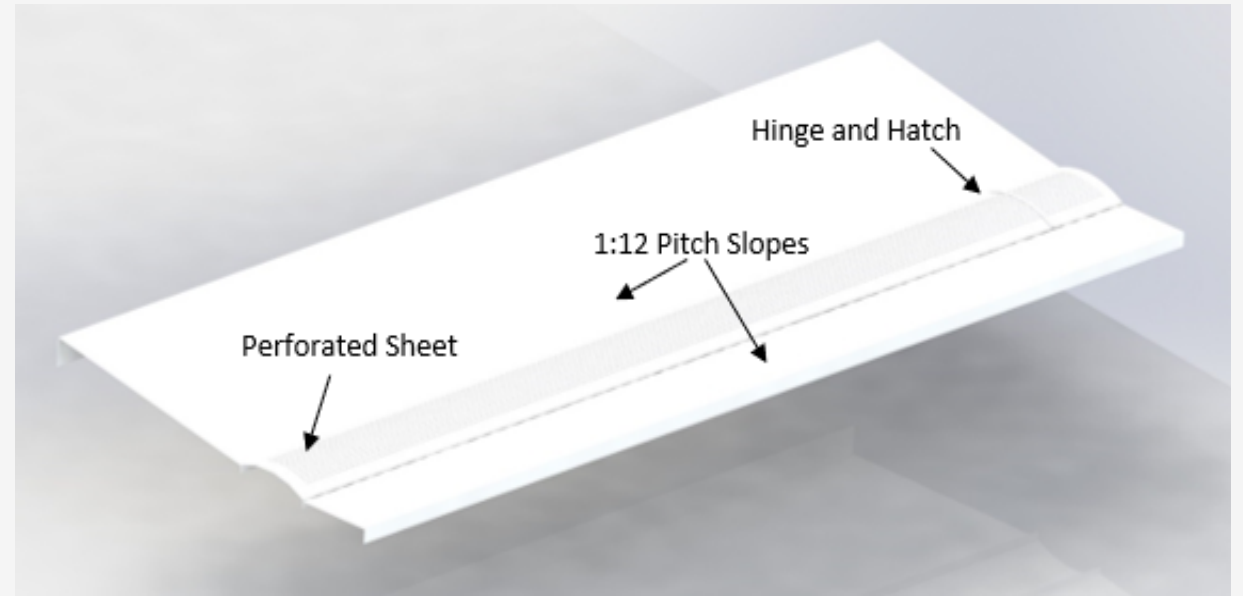
- Minor setbacks for sizing of fittings
- Eliminated slope insert test
- Mitigation techniques prevented any major setbacks



# FINAL DESIGN DESCRIPTION

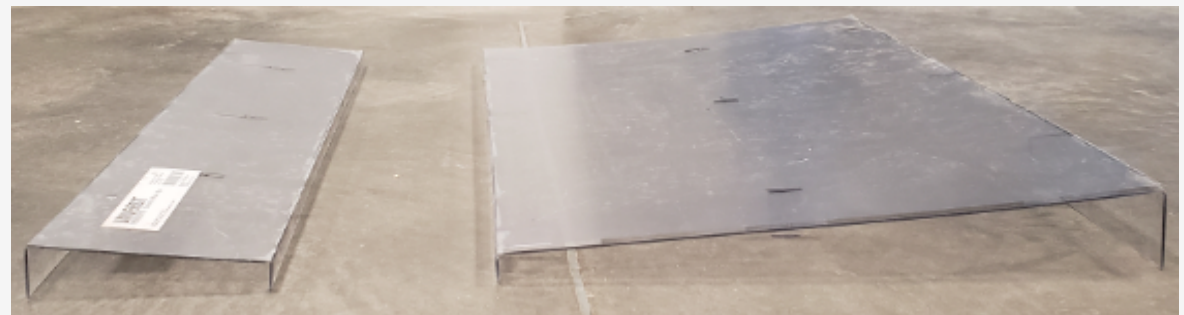
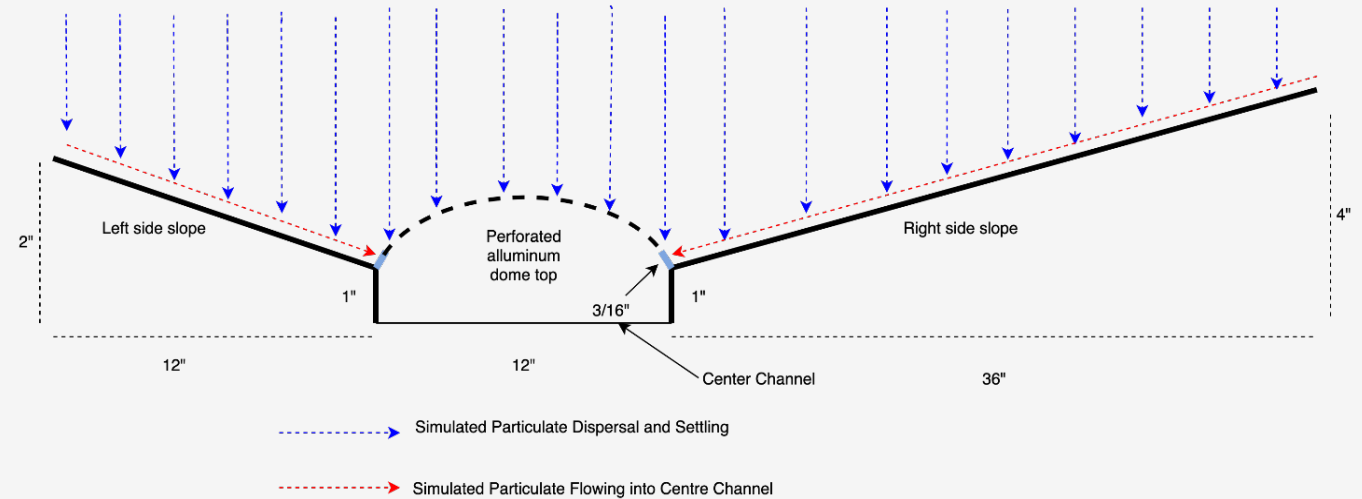
## Sloped bottom insert

- Moving Debris into the Center Channel
- 1/12" Pitch Slopes
- Perforated Dome cover
- Hinge and Hatch opening.



# FINAL DESIGN DESCRIPTION

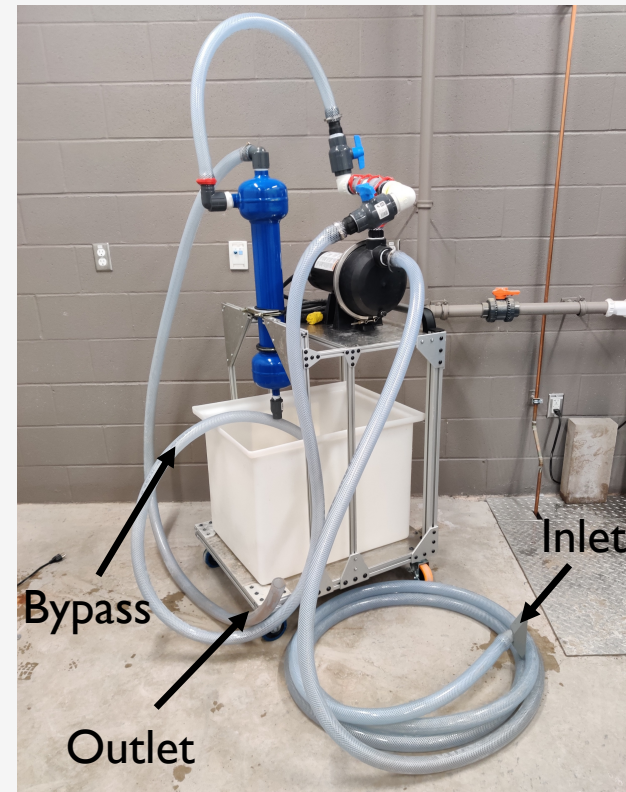
- Particulate guided into the center channel.
- Sloped sides made of Lexan
- Perforated Aluminum dome cover.



# FINAL DESIGN DESCRIPTION

## Portable Cyclone Liquid-Solid Separator

- Aluminum frame mounted on casters
- Cyclone Liquid-Solid Separator (ILB-0125)
- 20 Amp, 67gpm pump
- 30 gallon debris tank
- 3D printed hose ends
- Valve to control water flow



Requirements

Project  
Status

Final  
Design

BOM &  
Fabrication

Testing  
Procedure

Results &  
Analysis

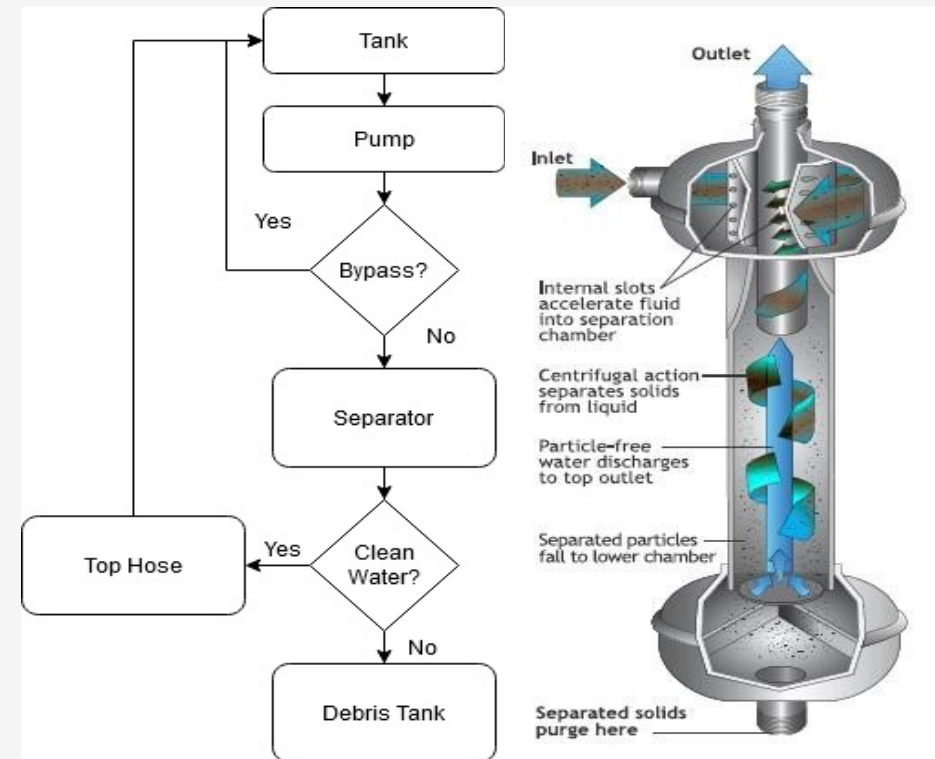
Design  
Updates

Moving  
Forward

# FINAL DESIGN DESCRIPTION

## Portable Cyclone Liquid-Solid Separator

- 2 sets of valve to control the flow
- Separates the particulate from the water using centrifugal forces
- Completely modular



Requirements

Project Status

Final Design

BOM & Fabrication

Testing Procedure

Results & Analysis

Design Updates

Moving Forward



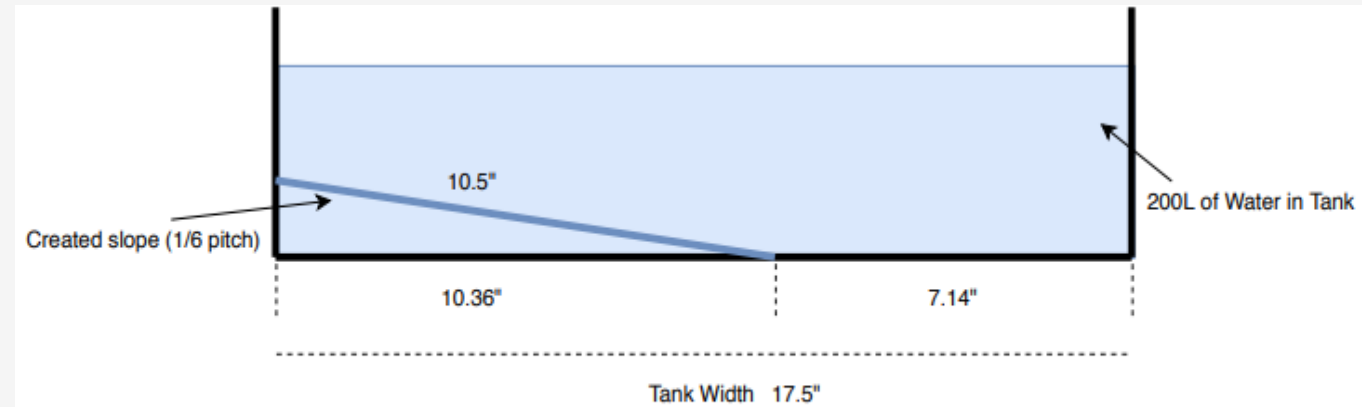
# BILL OF MATERIALS & FABRICATION

Material	Cost (CAD\$)
Aluminum & Brackets	\$919.13
Cyclone Liquid-Solid Separator	\$1,180.65
Pump	\$517.70
Hoses and Plumbing Fittings	\$377.22
Casters	\$29.83
Debris Tank	\$323.90
Lexan Sheets	\$625.60
Other Fastening Materials	\$92.51
<b>Total Material Costs</b>	<b>\$4,066.54</b>

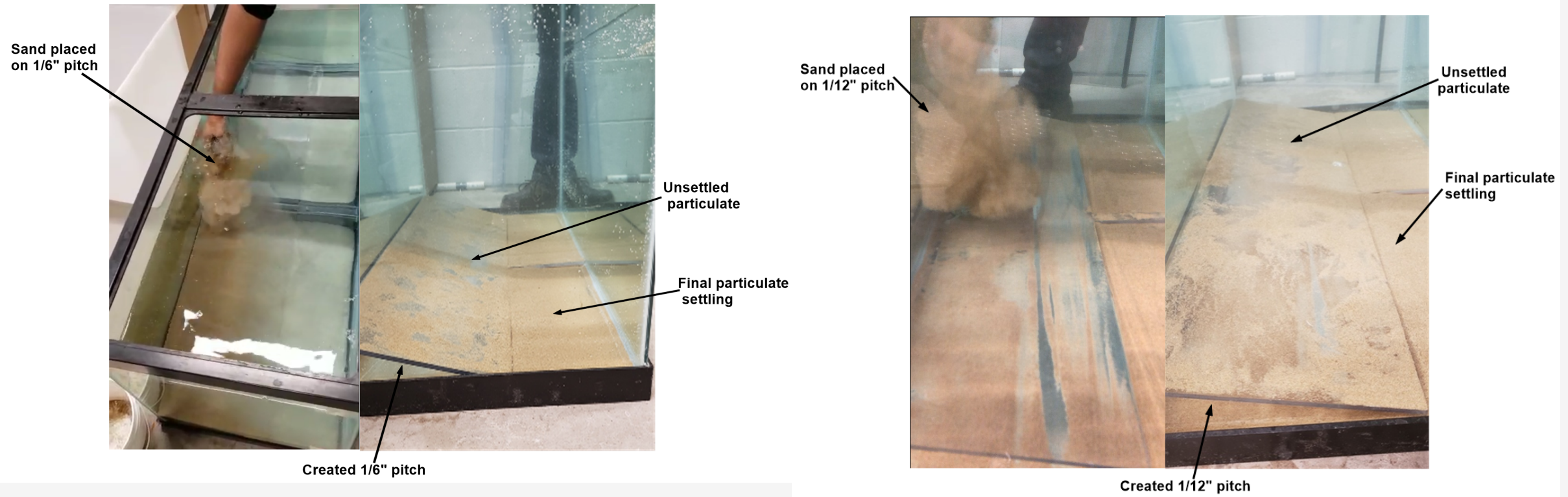


# SLOPE EFFECTIVENESS TESTING PROCEDURE

- Purpose- To determine the effectiveness of the assigned slope at moving debris in to the centre Channel.
- Procedure:
  - Create the desired slooppe in the test tank.
  - Spread 500mls of sand over the side slope
  - Mimic typical water and lobster movement for 10 minutes
  - Empirically assess how much particulate settled in mock channel .



# SLOPE EFFECTIVENESS TEST RESULTS & ANALYSIS



# TESTING PROCEDURE

## System Effectiveness and Speed Test

- Purpose: To validate the major requirements and ensure the prototype was functional
- Procedure:
  - Fill tank with 200L and add particulate
  - Run system and move head in S shape for specified time
  - Flush the system using clean water
  - Measure the volume of removed particulate



Requirements

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Procedure

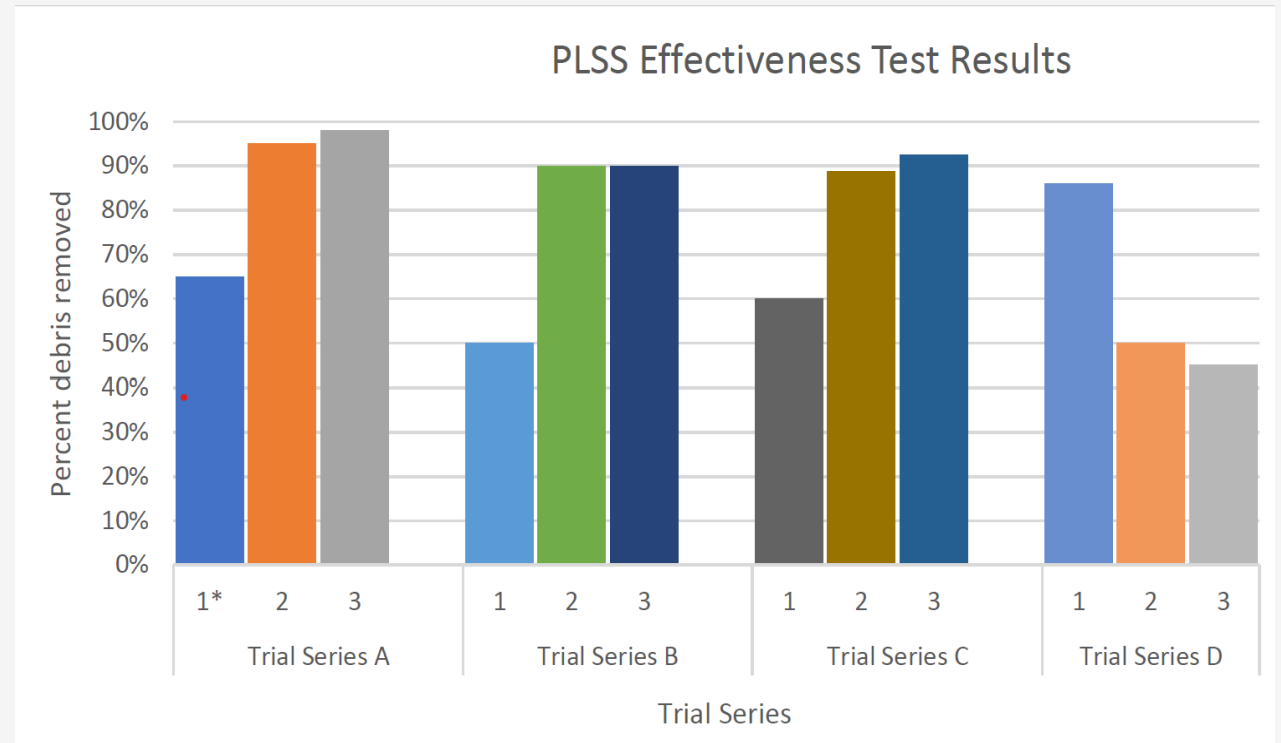
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# TESTING RESULTS & ANALYSIS

Trial Number	Initial Debris Concentration (200L Tank)	Total Time Cleaning (min)	Removed Debris Volume (ml)
A1*	1:400 Sand	1 minute	325
A2	1:400 Sand	2 minutes	475
A3	1:200 Sand	3 minutes	490
B1	1:200 Sand	1 minute	500
B2	1:200 Sand	2 minutes	900
B3	1:200 Sand	3 minutes	900
C1	1:100 Sand	1 minute	1200
C2	1:100 Sand	2 minutes	1775
C3	1:100 Sand	3 minutes	1850
D1	1:500 Sand, 1:2000 Mud	2 minutes	430
D2	1:250 Sand, 1:1000 Mud	2 minutes	500
D3	1:125 Sand, 1:500 Mud	2 minutes	900



# DESIGN UPDATES

- Changed the hose head from flat head to 45-degree angle.
- Addition of stiff plastic pipe at the end of the inlet hose.
- Installation of priming valve will remove the need for a sump pump.



# MOVING FORWARD

- Adding of Hose hanger to the cart.
- Modification in geometry of hose head.
- Installation of power switch for the pump.
- Addition of drain near the base of the debris tank.
- Switching all the hose joints with the PVC material.



THANK YOU, QUESTIONS?