

**University of Ottawa**

**GNG 1103B: Engineering Design**

**Project Deliverable E:**

Group members:

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**1. Introduction**

In this deliverable, we brainstormed together possible methods of measuring specific gravity, and possible subsystems for a final solution. We picked our top three potential solutions with their subsystems and presented the pro’s and con’s of each solution.

**2. Design**

**Materials**

Arduino Uno:

<https://www.canadarobotix.com/products/60?variant=14423510712369&currency=CAD&utm_medium=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic>

$27.99+tax

Arduino Uno wires:

<https://www.amazon.ca/breadboard-Breadboard-Protoboard-Solderless-Electronic/dp/B07YQ1XBC1/ref=asc_df_B07YQ1XBC1/?tag=googleshopc0c-20&linkCode=df0&hvadid=578878818136&hvpos=&hvnetw=g&hvrand=9510217638965796175&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=1002161&hvtargid=pla-1717987946317&psc=1>

$8.09+tax

Breadboard:

<https://www.robotshop.com/ca/en/white-solderless-prototype-pcb-board-breadboard-400-tie-points-83x55mm.html?gclid=Cj0KCQjwqc6aBhC4ARIsAN06NmNgiNlvMAEygUQtDNZSfO1FlCwBWMtTnx5CiR3Q30X0krGR2RUEKsIaAm_aEALw_wcB>

$2.71+tax

Pressure sensor:

<https://www.digikey.ca/en/products/detail/te-connectivity-measurement-specialties/MS583730BA01-50/5629502>

$22.50+tax

<https://www.digikey.ca/en/products/detail/seeed-technology-co.,-ltd/114991178/7387419?utm_adgroup=General&utm_source=google&utm_medium=cpc&utm_campaign=PMax:%20Smart%20Shopping_Product_Zombie%20SKUS&utm_term=&productid=7387419&gclid=CjwKCAjwzNOaBhAcEiwAD7Tb6Lcg8-mSaljz4UvRGicMFkumqwOMl2U6ER4cS6sUqxYGKbghg_Et9RoCm7IQAvD_BwE>

$22.32+tax

<https://www.electromaker.io/shop/product/gravity-analog-water-pressure-sensor?srsltid=AR5OiO2fRTVZt20R4X-1Qw40YlcaMwRjoQqoyRJdt74fzefkQP5ZsVLZKo8>

$21.32+tax

<https://digitalzakka.com/product/150psi-pressure-transducer-sensor-for-oil-fuel-diesel-gas-air-water/?srsltid=AR5OiO18oCbTOYfDdD87dKaH9FCwd-UcAE8CUiBt5tMbCQ3u6yoFMZiAVqc>

$34.08+tax

<https://www.alibaba.com/pla/0-10v-4-20ma-digital-melt-pressure-sensor_1600086314754.html?mark=google_shopping&biz=pla&searchText=pressure+transmitters&product_id=1600086314754&language=en>

$50.47+tax

Serial Wifi Module:

<https://www.canadarobotix.com/products/1788?variant=14423771185201&currency=CAD&utm_medium=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic>

$7.59+tax

[1Set UNO R3 Official Box ATMEGA16U2 / UNO+WiFi R3 MEGA328P Chip CH340G For Arduino UNO R3 Development Board WeMos ESP8266](https://www.aliexpress.us/item/32848546164.html?spm=a2g0o.productlist.0.0.343e21a7BjjFTP&algo_pvid=4d32069f-cced-48df-b6d8-18eec9eb7503&algo_exp_id=4d32069f-cced-48df-b6d8-18eec9eb7503-26&pdp_ext_f=%7B%22sku_id%22%3A%2212000022881268343%22%7D&pdp_npi=2%40dis%21CAD%2114.44%2111.26%21%21%215.15%21%21%402103143616659488953107598e2487%2112000022881268343%21sea&curPageLogUid=NEFixwdjDEoq)

$10.03+tax

Wireless Bluetooth Module:

<https://www.canadarobotix.com/collections/communication/products/1258>

$11.99+tax

[NEW HC-05 HC 05 hc-06 HC 06 RF Wireless Bluetooth Transceiver Slave Module RS232 / TTL to UART converter and adapter](https://www.aliexpress.us/item/1005002168332848.html?spm=a2g0o.productlist.0.0.343e21a7BjjFTP&algo_pvid=4d32069f-cced-48df-b6d8-18eec9eb7503&algo_exp_id=4d32069f-cced-48df-b6d8-18eec9eb7503-1&pdp_ext_f=%7B%22sku_id%22%3A%2212000018925700214%22%7D&pdp_npi=2%40dis%21CAD%213.44%212.75%21%21%211.46%21%21%402103143616659488953107598e2487%2112000018925700214%21sea&curPageLogUid=51yLxdJgnSfF)

$3.44+tax

LoRa radio:

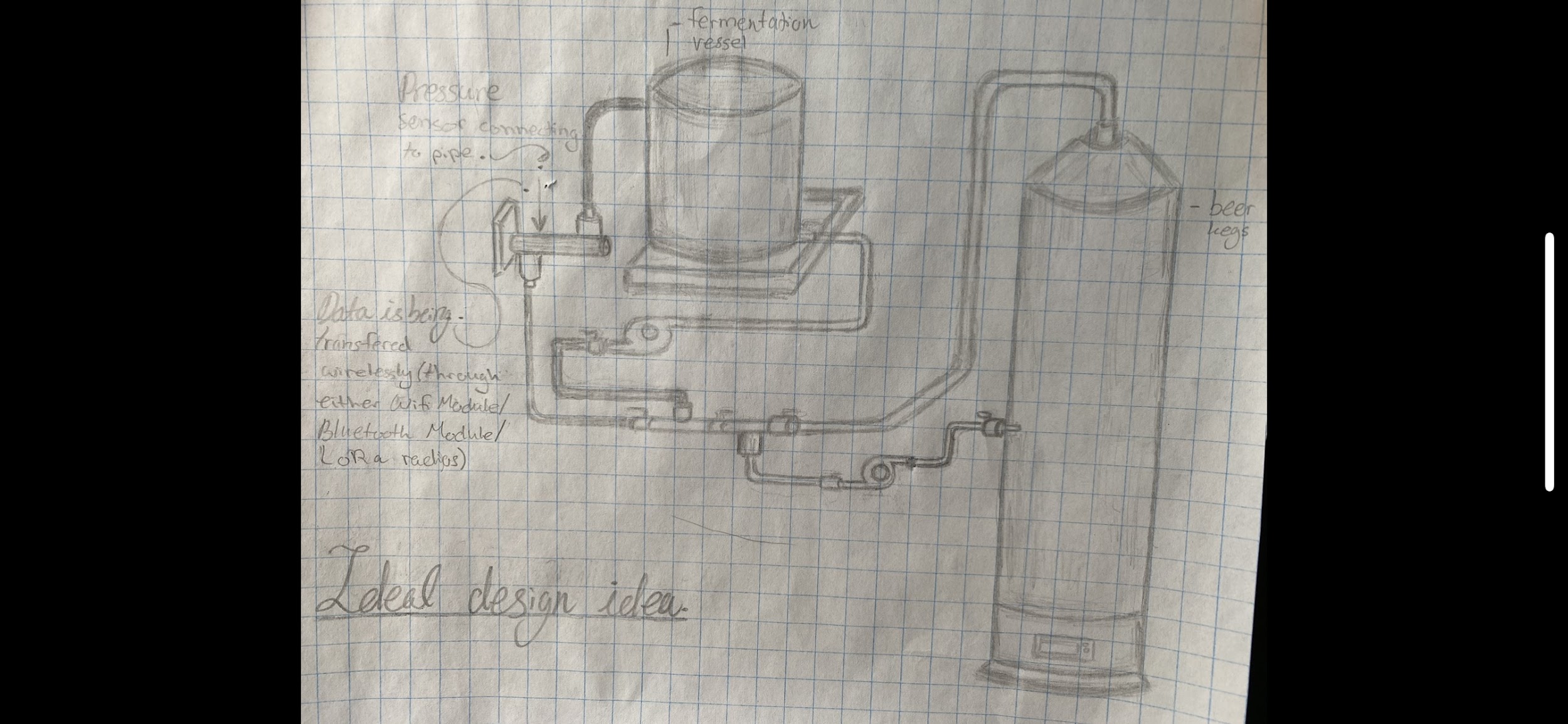
<https://www.digikey.ca/en/products/detail/seeed-technology-co.,-ltd/113060006/6596881?utm_adgroup=General&utm_source=google&utm_medium=cpc&utm_campaign=PMax:%20Smart%20Shopping_Product_Zombie%20SKUS&utm_term=&productid=6596881&gclid=CjwKCAjwzNOaBhAcEiwAD7Tb6JK0eCaEWUQGdSh5S58XylSc0q4920LehMH-q_L7ddHxV_oYvvGdeRoCveIQAvD_BwE>

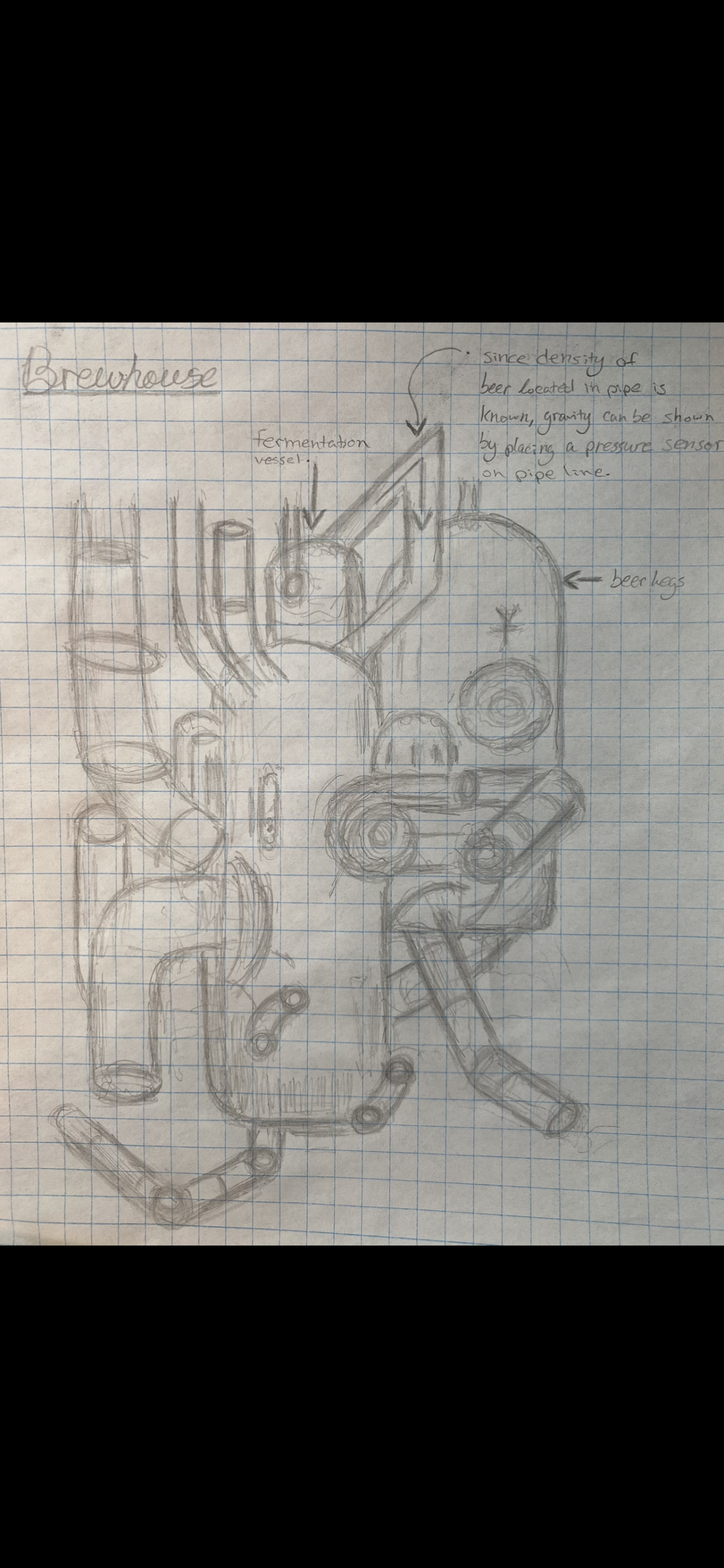
$29.44+tax

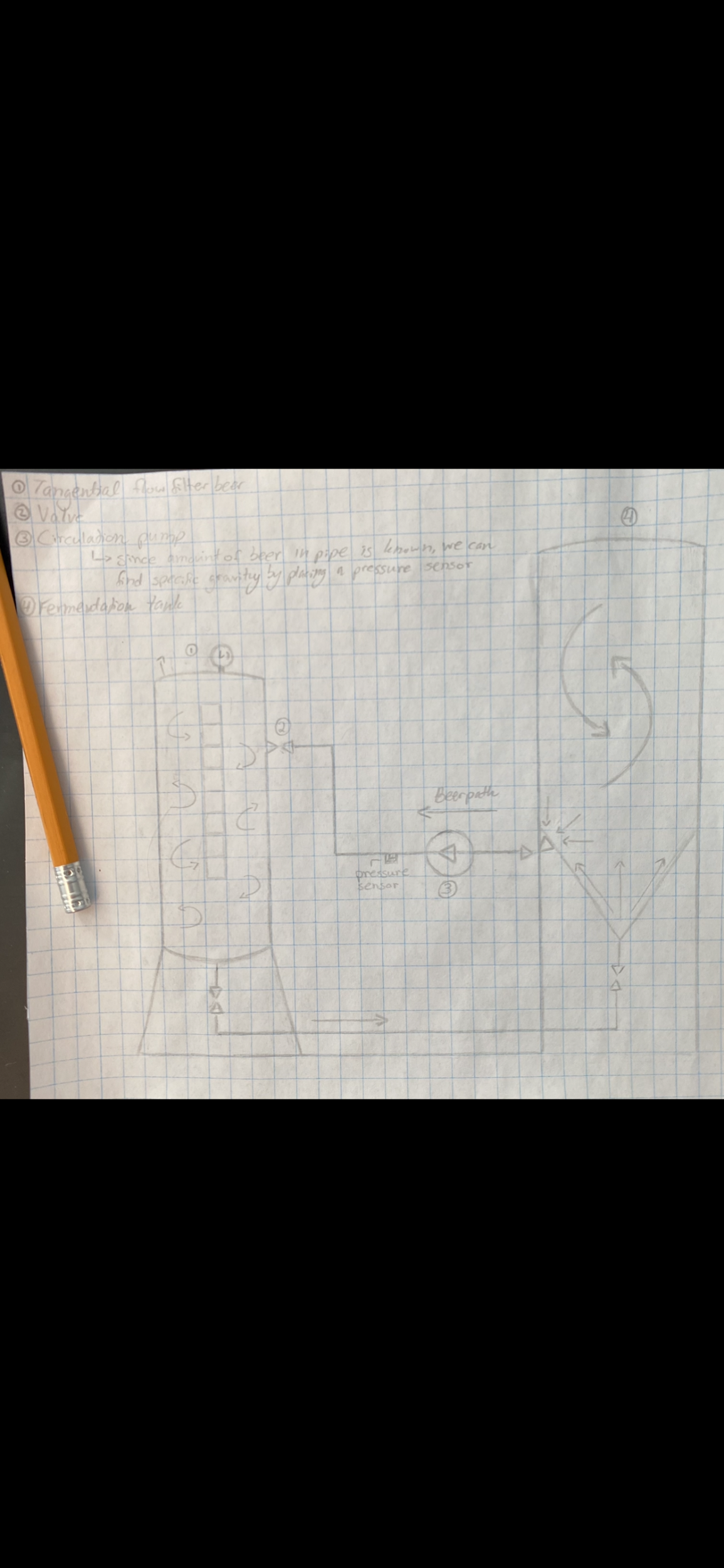
**4. Conclusion**

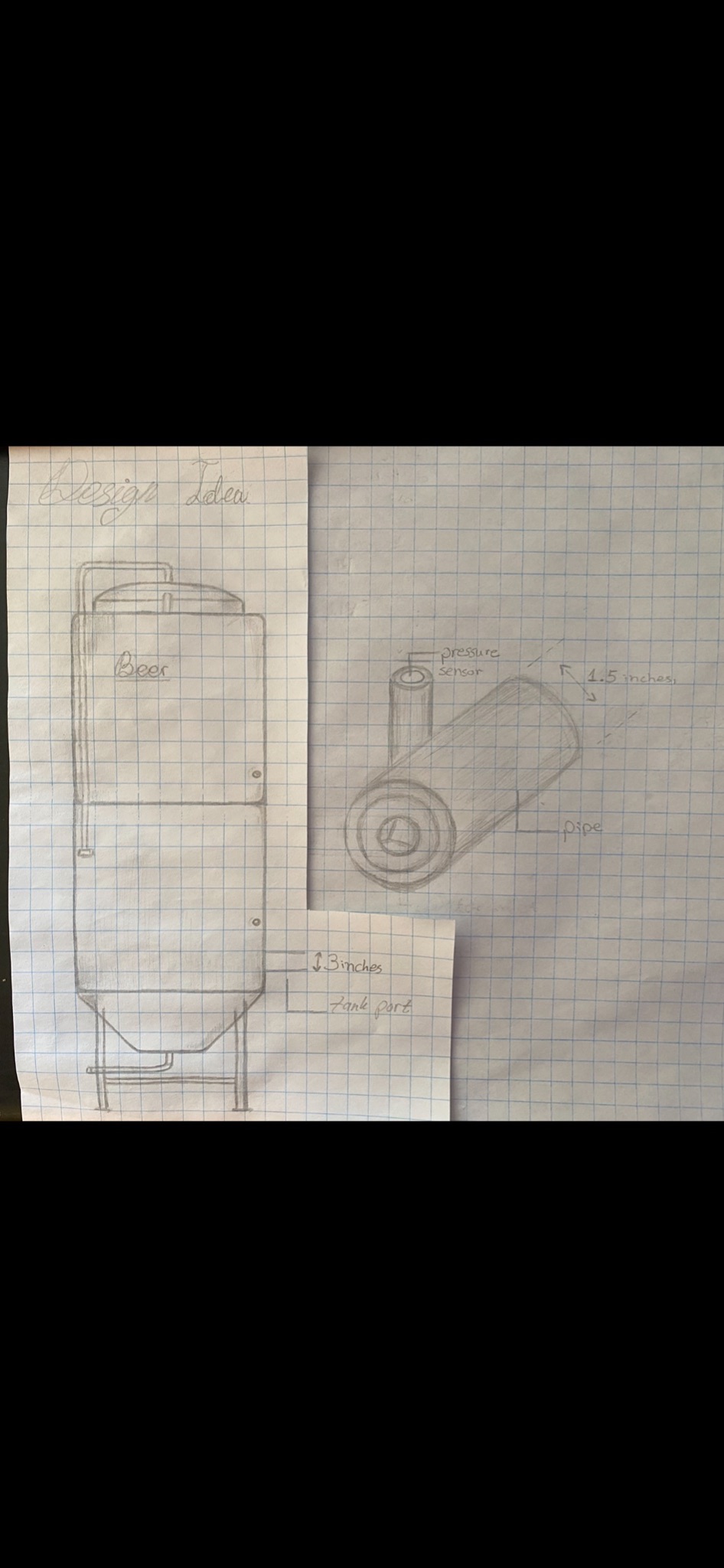
In conclusion we have an ideal solution with its pros and cons. With accurate diagrams and price tags for all major components.

**5. Sketch**



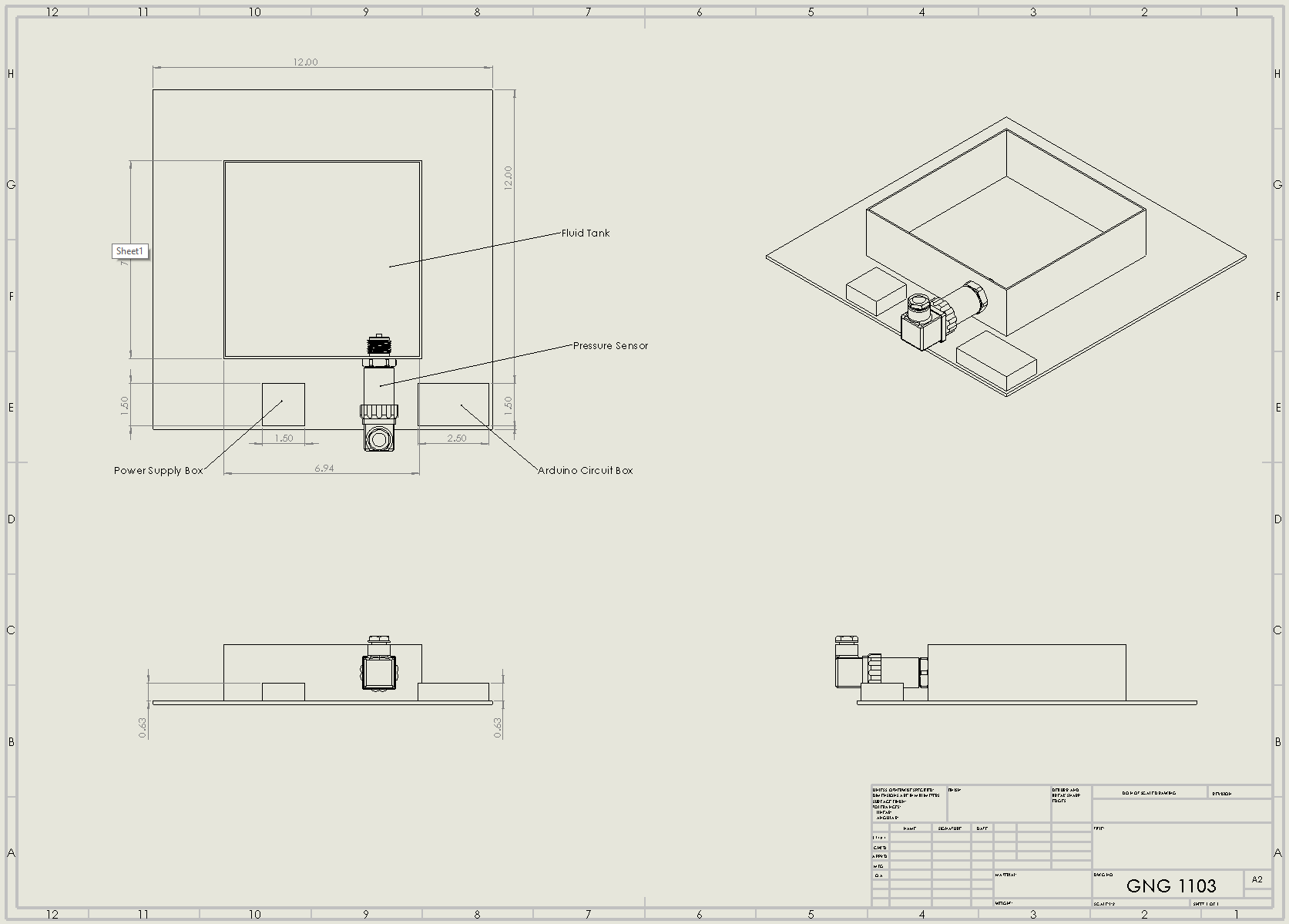






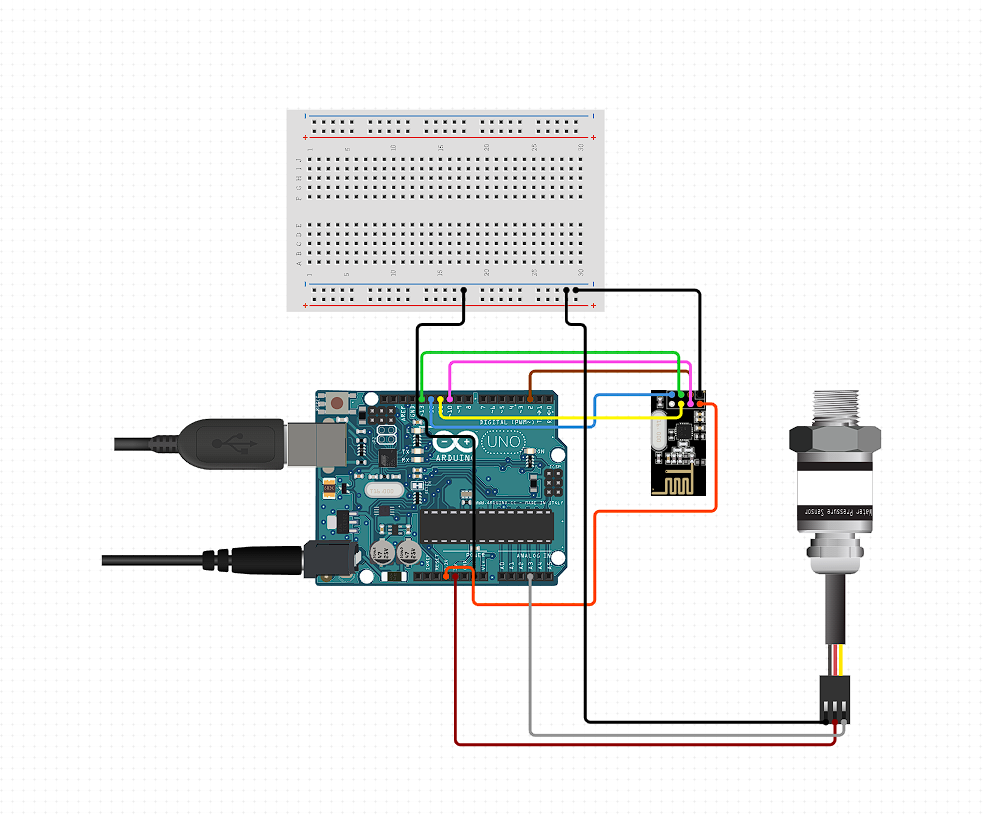
**6. Prototype Detailed Drawing**

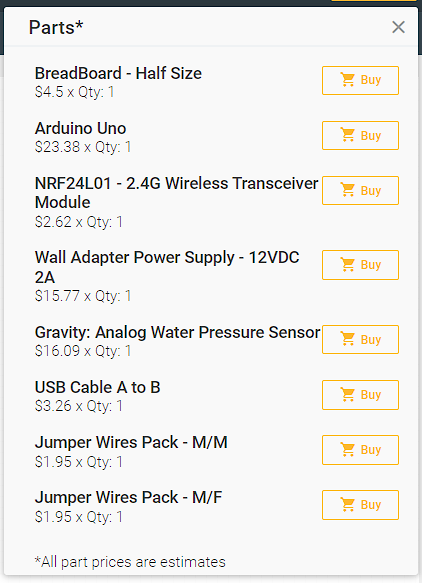
The detailed drawing of the prototype features the liquid tank, the base, the pressure sensor, the power supply holder and the arduino circuit holder.

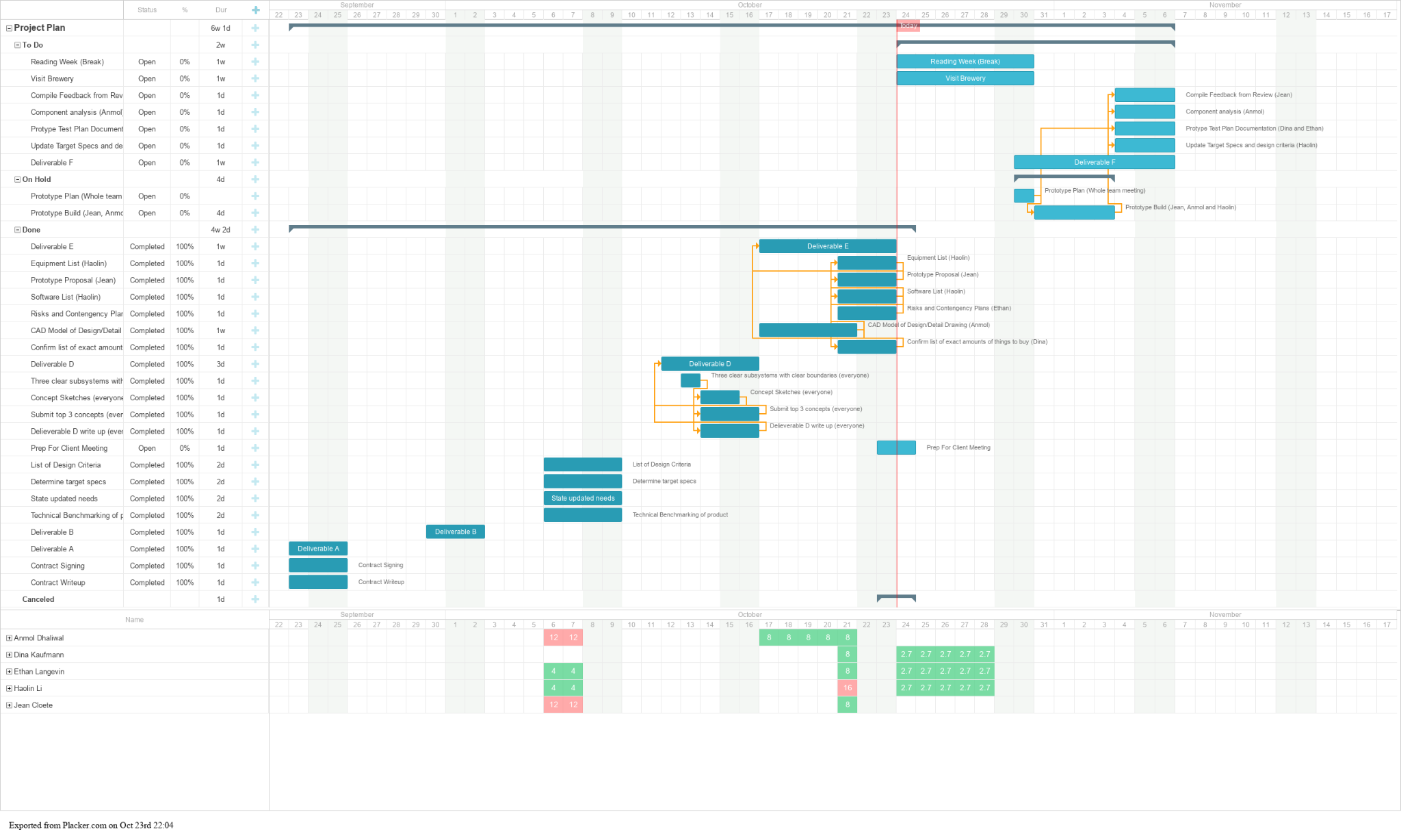


**7. Wiring Diagram**

The wiring diagram of the prototype features the WI-FI connectivity module and the pressure sensor as well as a power stand alone power supply. There is also a part list.



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**8. Gantt Chart**

**9. Bill of Materials**

| **Name** | **Price** |
| --- | --- |
| Arduino Uno | $23.38/27.99+tax |
| Arduino Uno wires | $8.09+tax |
| Breadboard | $2.71+tax |
| Breadboard - Half Size | $4.50+tax |
| Pressure sensor | $22.50/22.32/21.32/34.08/50.47+tax |
| Serial Wifi Module | $7.59/10.03+tax |
| Wireless Bluetooth Module | $11.59/3.44+tax |
| LoRa radio | $29.44+tax |
| NRF24L01 - 2.4G Wireless Transceiver Module | $2.62+tax |
| Wall Adapter Power Supply - 12VDC2A | $15.77+tax |
| Gravity: Analog Water Pressure Sensor | $16.09+tax |
| USB Cable A to B | $3.26+tax |
| Jumper Wires Pack - M/M | $1.95+tax |
| Jumper Wires Pack - M/F | $1.95+tax |

\* All part prices are estimates