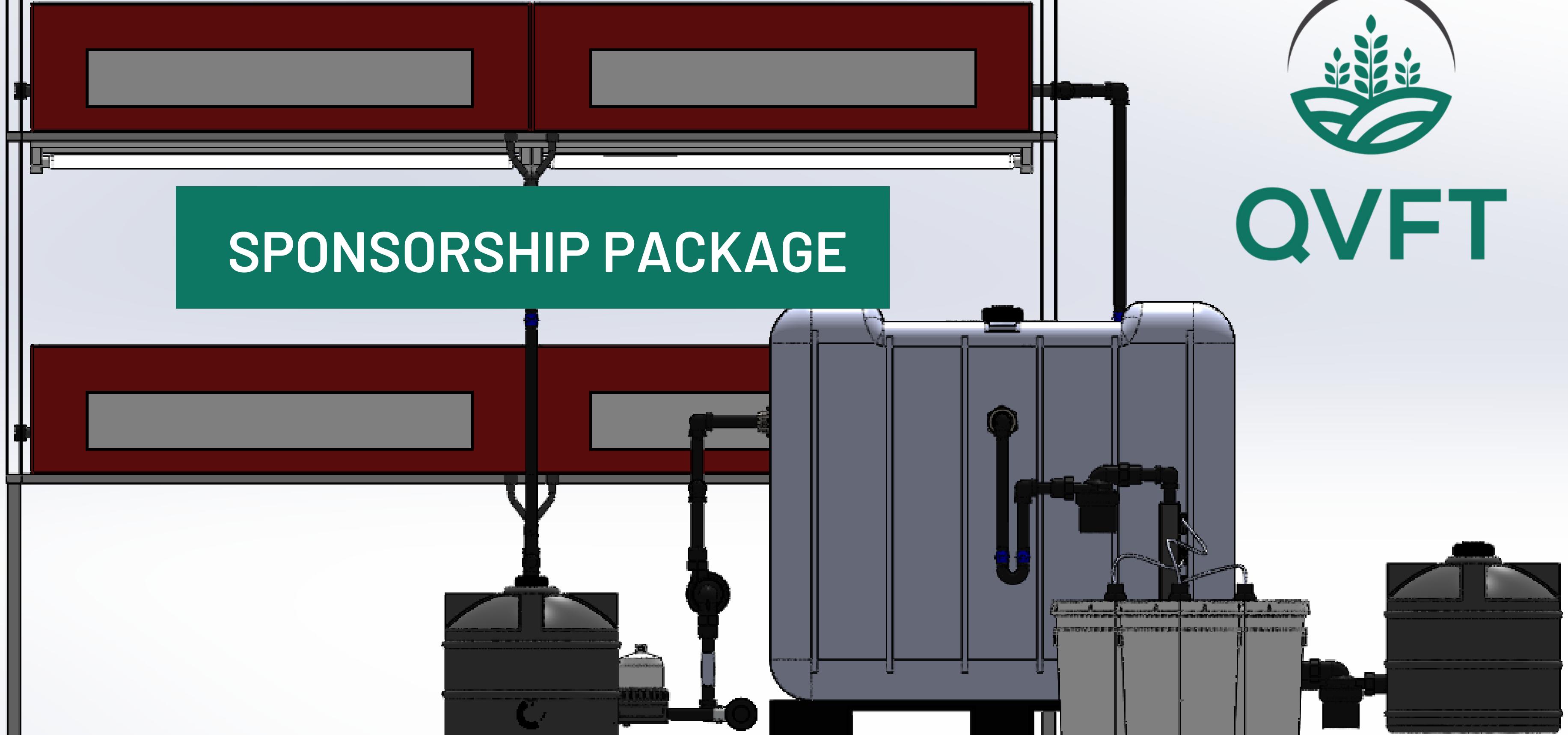




QVFT

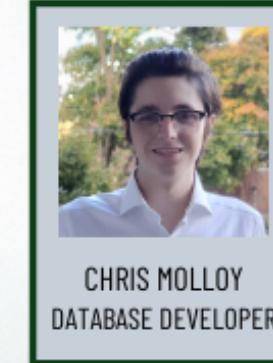
SPONSORSHIP PACKAGE



ABOUT US

OUR MISSION

- Founded in Sep. 2019, QVFT is Canada's first student-led undergraduate vertical farming design team
- We are designing and building a functional, software-automated aeroponic vertical farm on Queen's University campus
- The majority of existing research in this field is conducted by private companies and is thus inaccessible to the public; through its open-source approach, QVFT aims to democratize vertical farming knowledge and research
- Our fundraising goal for 2021-22 is \$5,500, which will be used to manufacture our first physical prototype



WHY VERTICAL FARMING?

THE PROBLEM

- A global trend of increasing concern is the diminishing supply of arable land per capita
- Due to trends such as climate change, freshwater depletion, and soil degradation, arable land per capita will fall to one-third of the amount available in 1970 by 2050
- The unsustainable practices of conventional agriculture exacerbate the problem
- The world population is also expected to increase from 7.7 billion (2019) to 9.7 billion (2050)
- The intersection of these climate and population challenges means that global food security depends on our ability to adapt to increased demand and develop better farming techniques





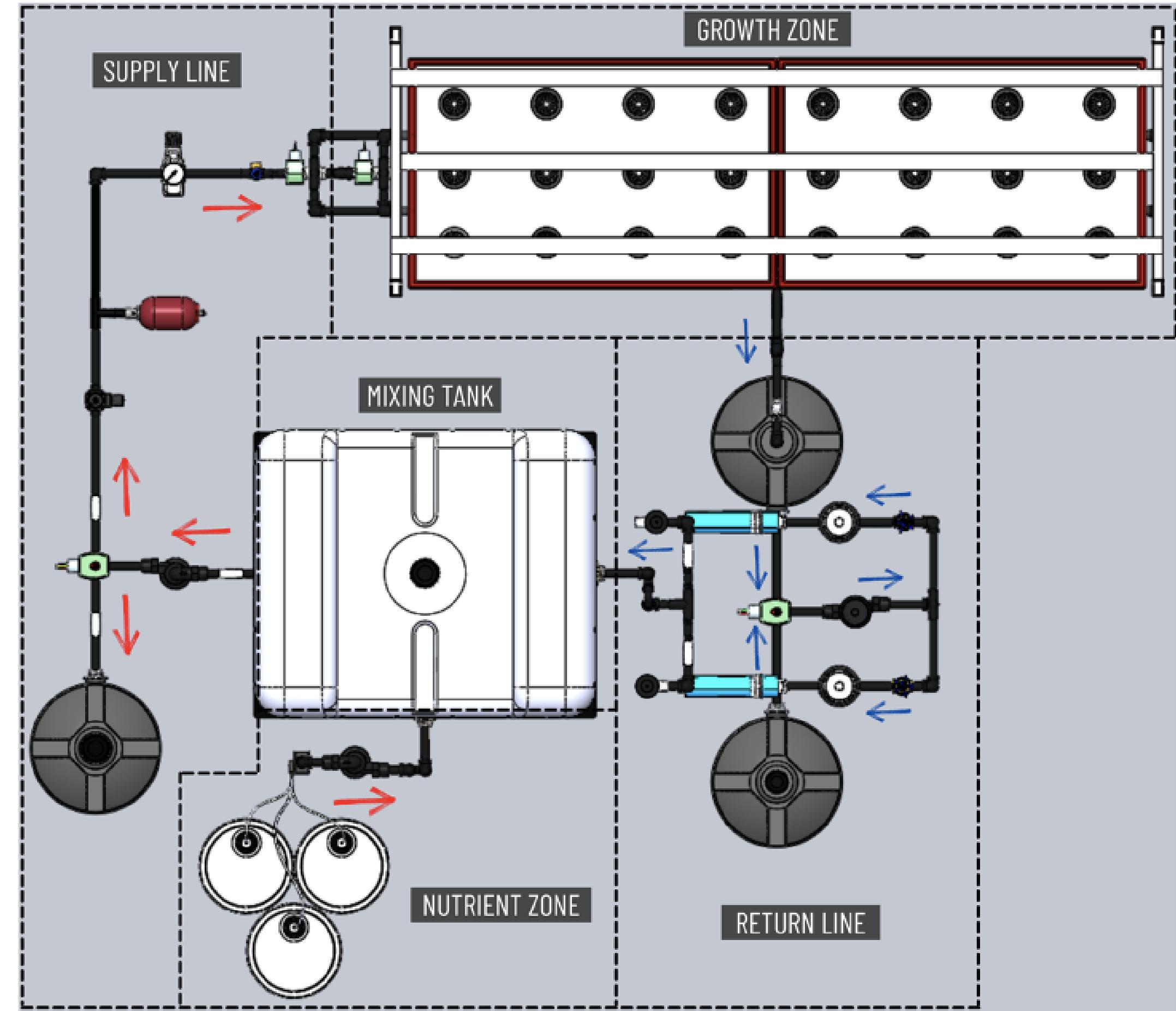
THE SOLUTION

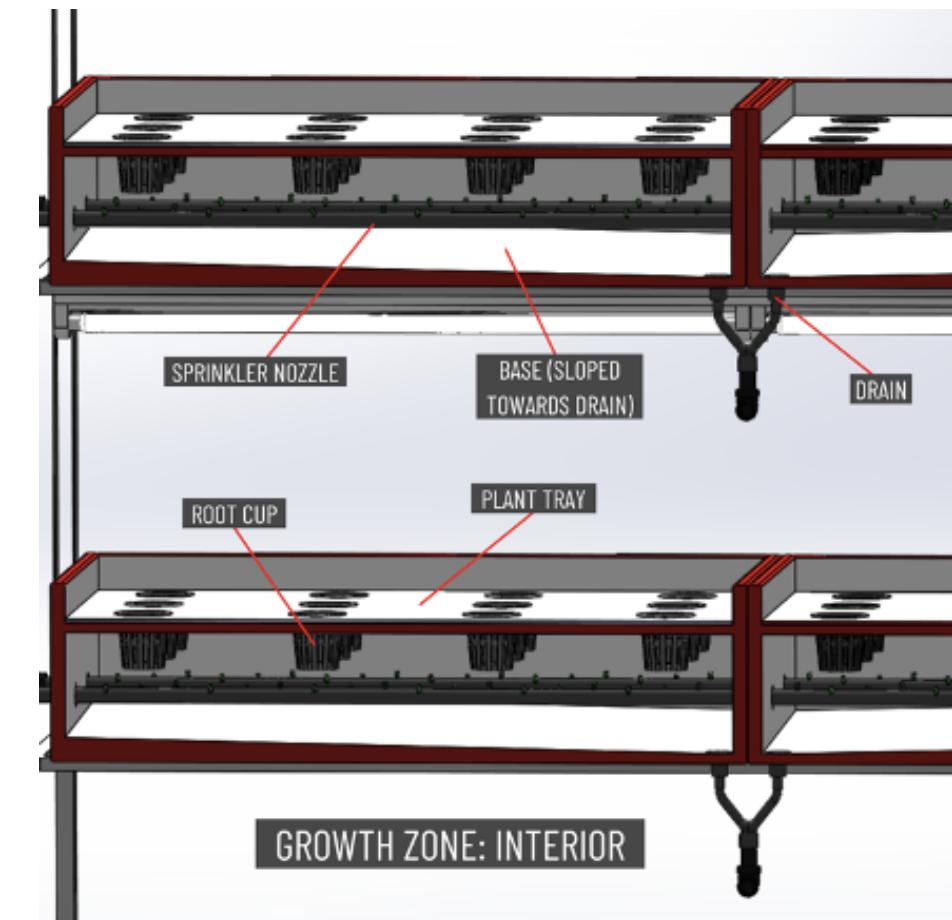
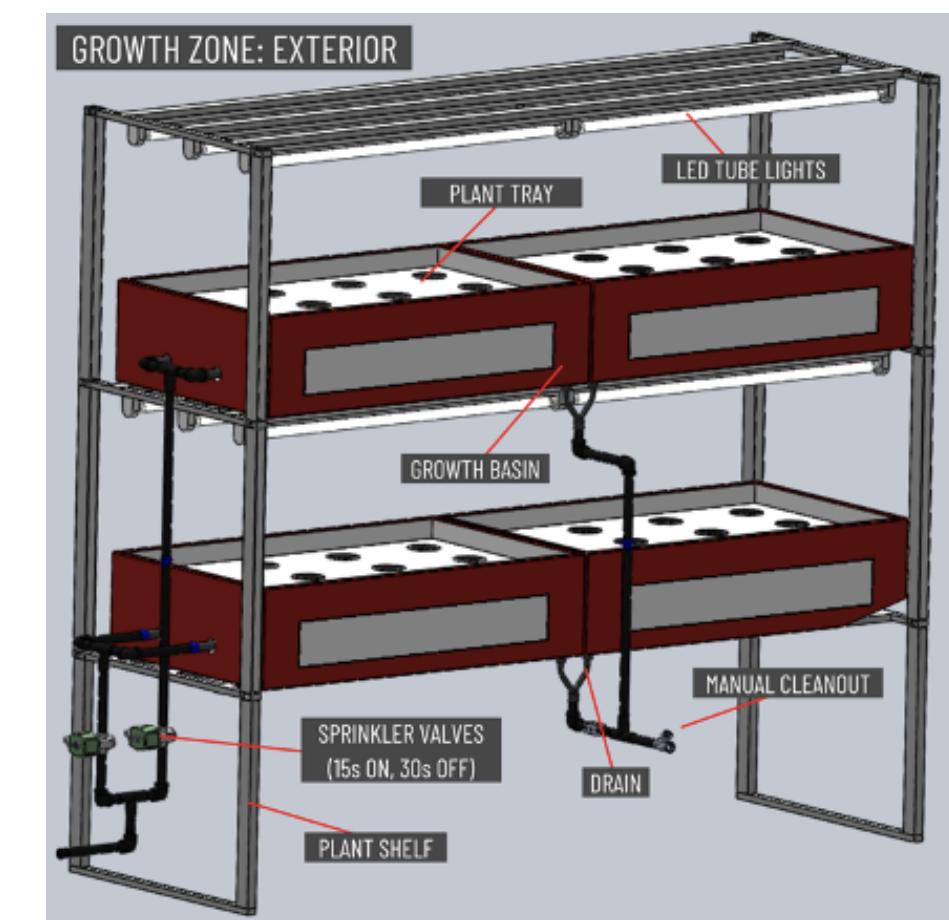
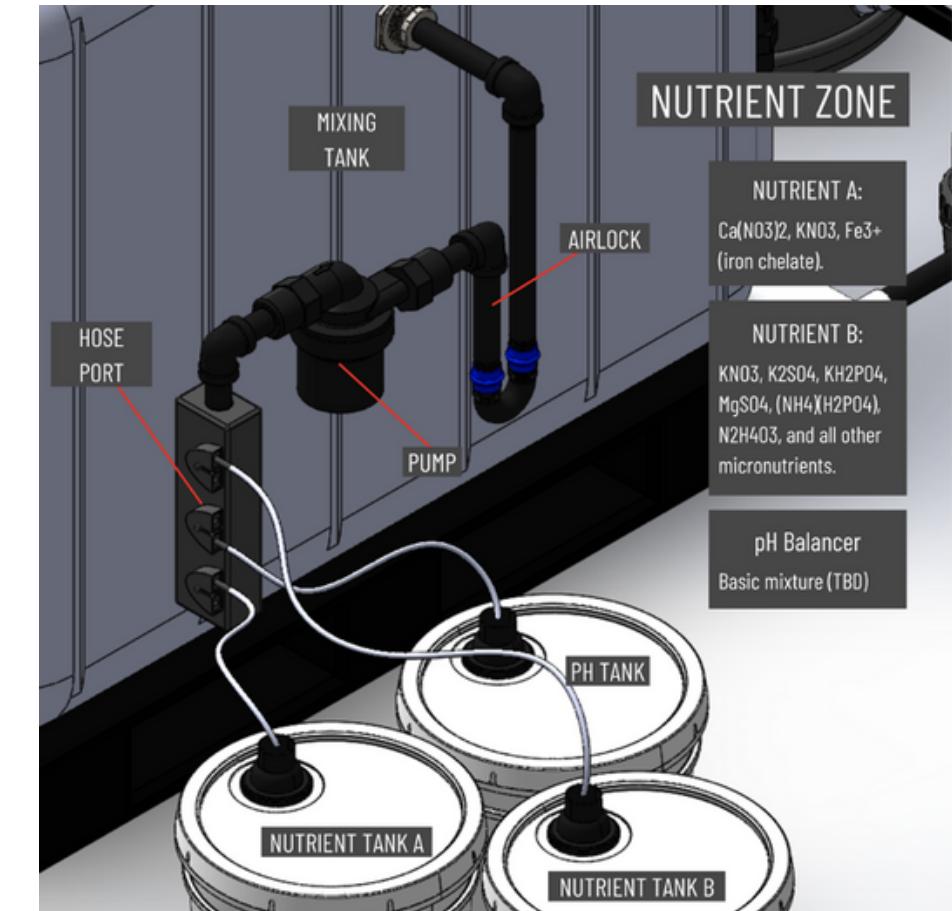
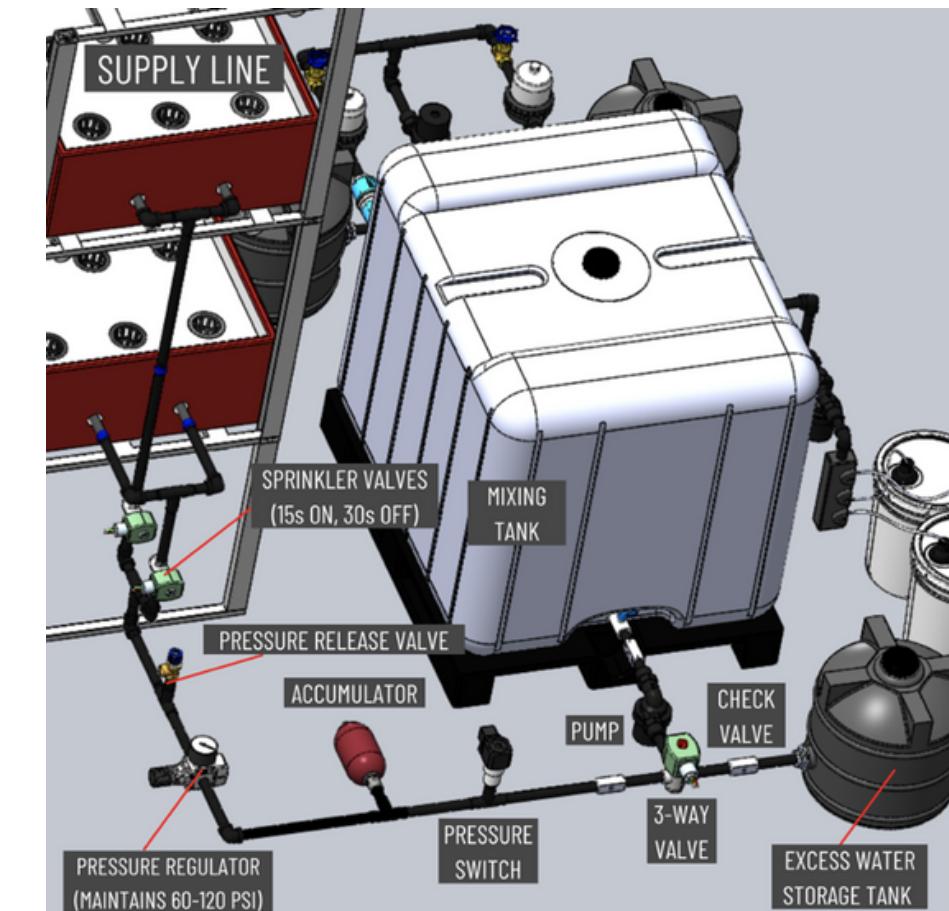
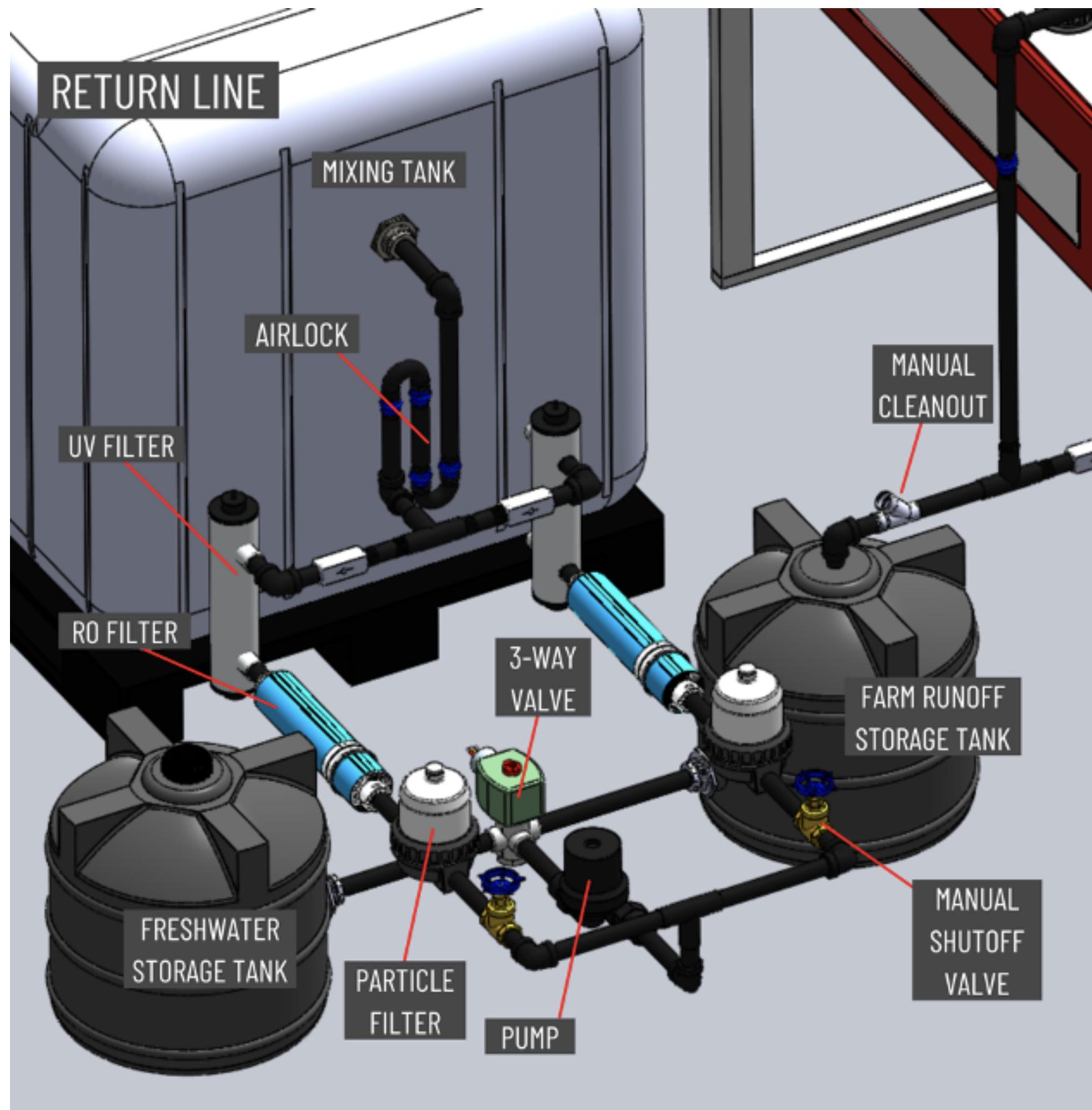
- Vertical farming is a cultivation practice in which crops are grown in an indoor, climate-controlled facility
- This approach is associated with dramatically reduced water consumption (~95%), minimal transportation costs, and massive improvements in per-acre land productivity
- Vertical farming can grow nutritious, organic produce in any location, at any time of year
- Given these advantages, this technology is projected to become a major contributor to global food production in the coming decades
- The vertical farming industry's global market value is projected to grow from \$2.23 billion in 2018 to \$12.77 billion by 2026, representing a compounded annual growth rate of 24.6%

WHAT WE DO

AEROPONIC SYSTEM

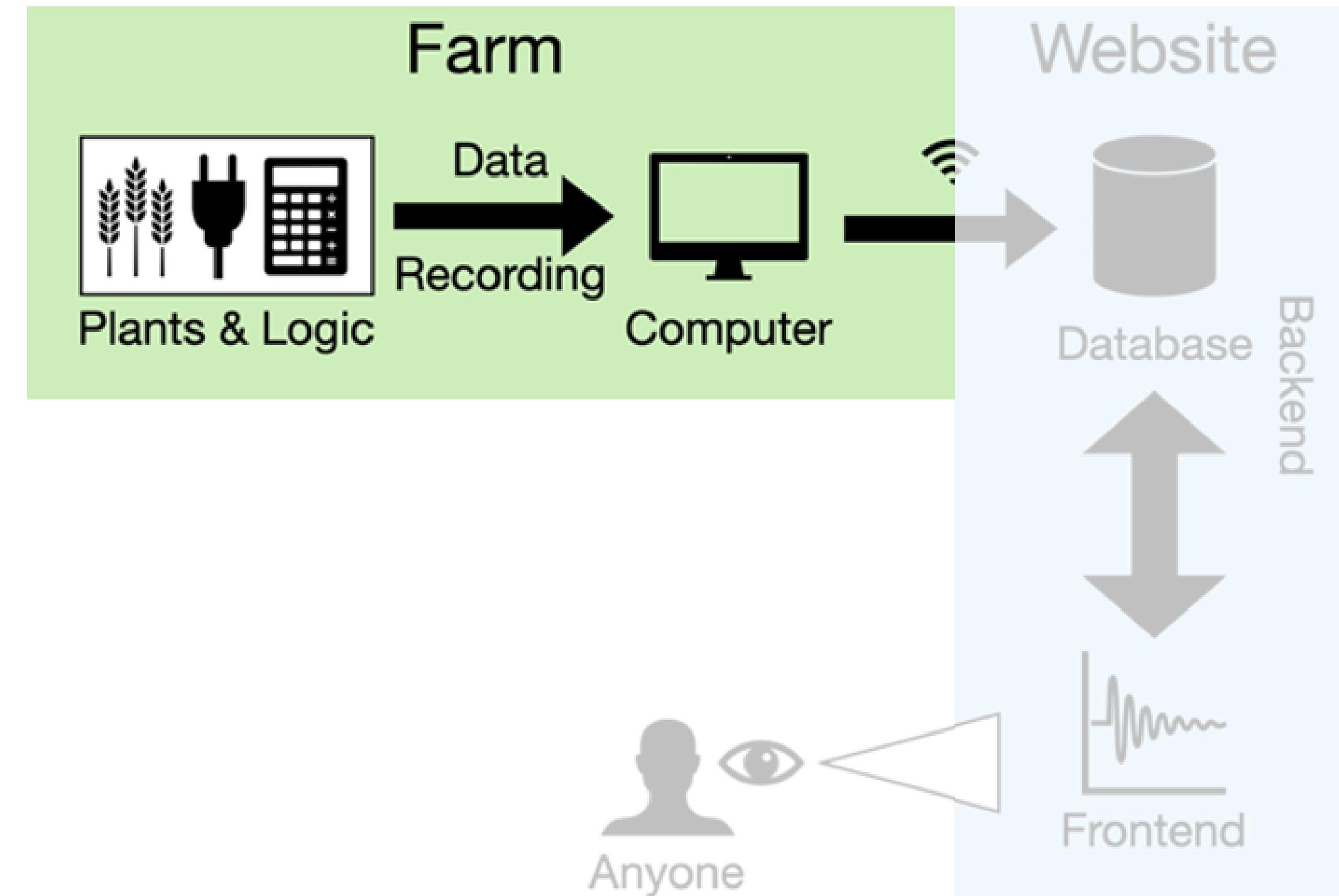
- QVFT employs an aeroponic cultivation method, in which plants grow without soil and are fed by a nutrient-enriched mist
- Crops rest in thin, slotted plastic root cups, through which their roots hang into a basin below
- Aeroponics lend well to automation and can allow for near-complete control over the plant growth environment
- The system is broadly divided into five zones: mixing tank, nutrient zone, supply line, growth zone, and return line

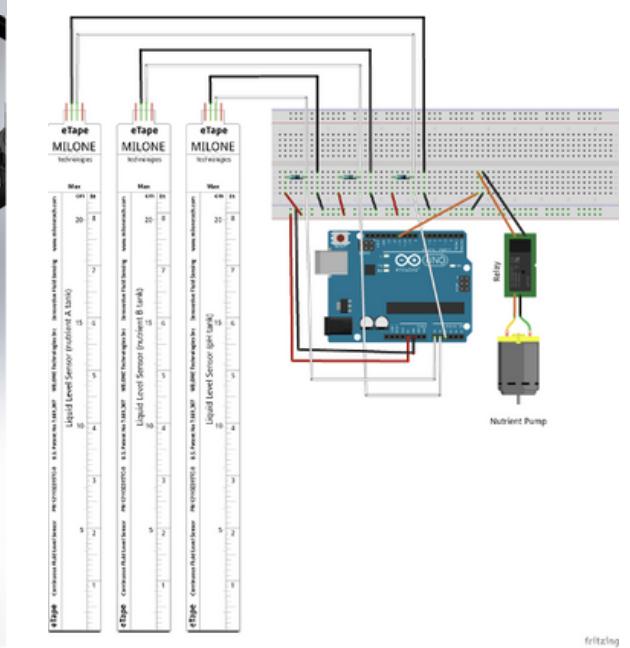
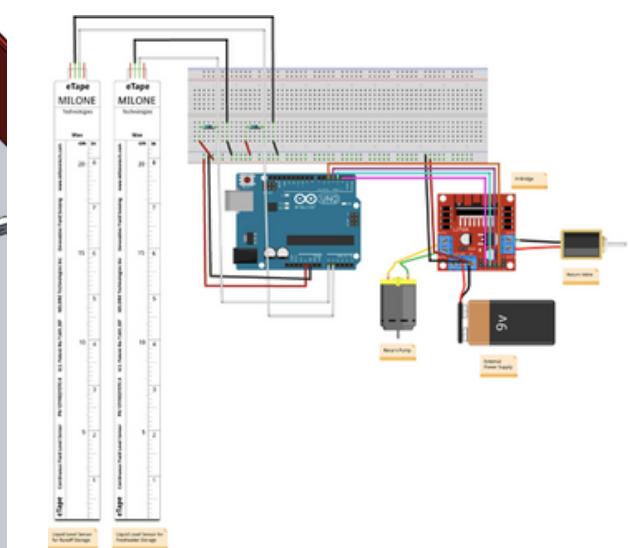
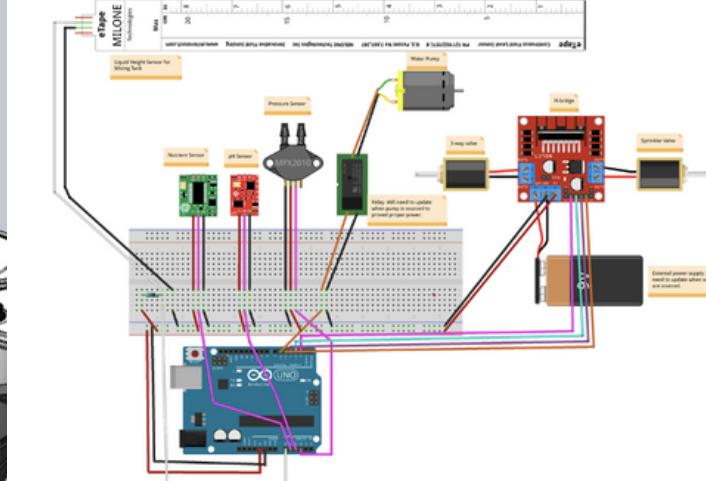
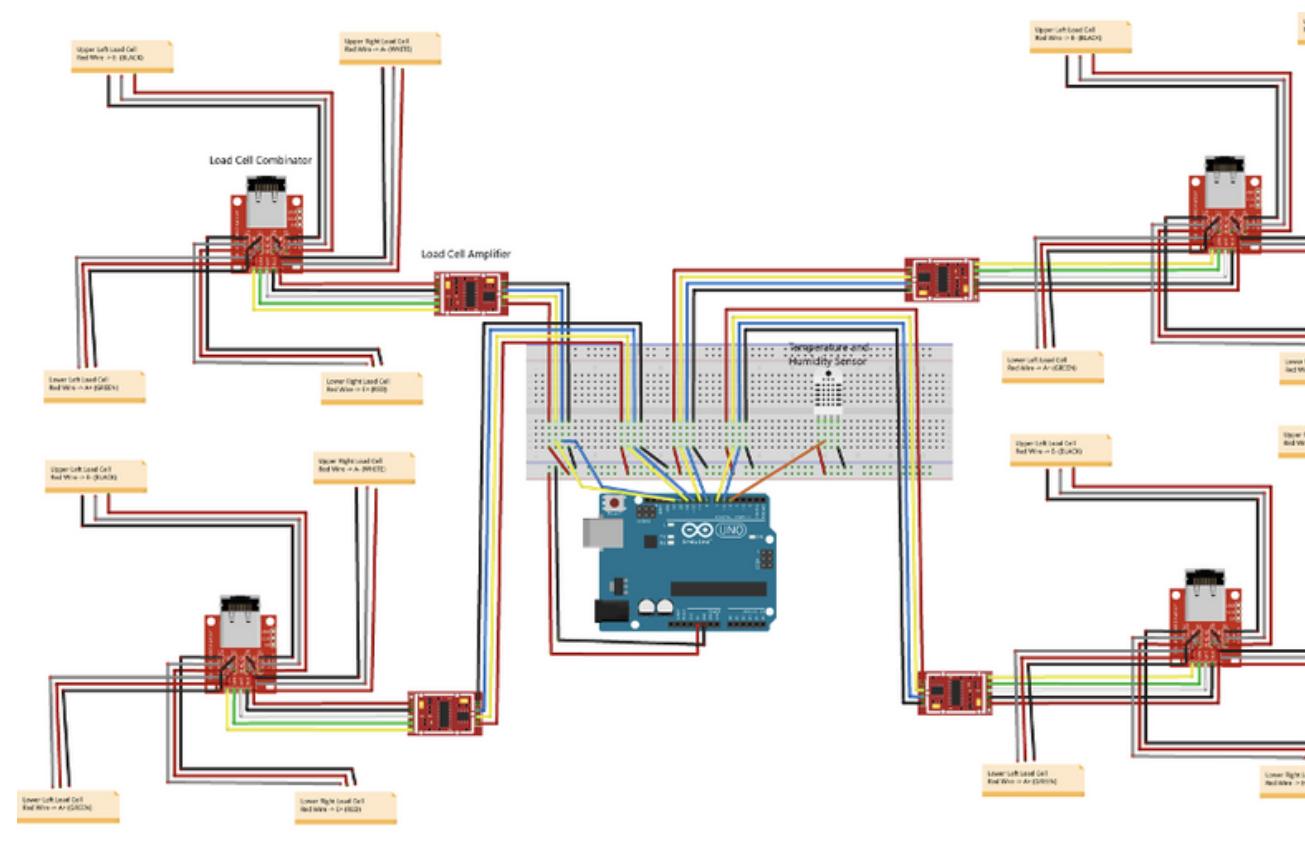
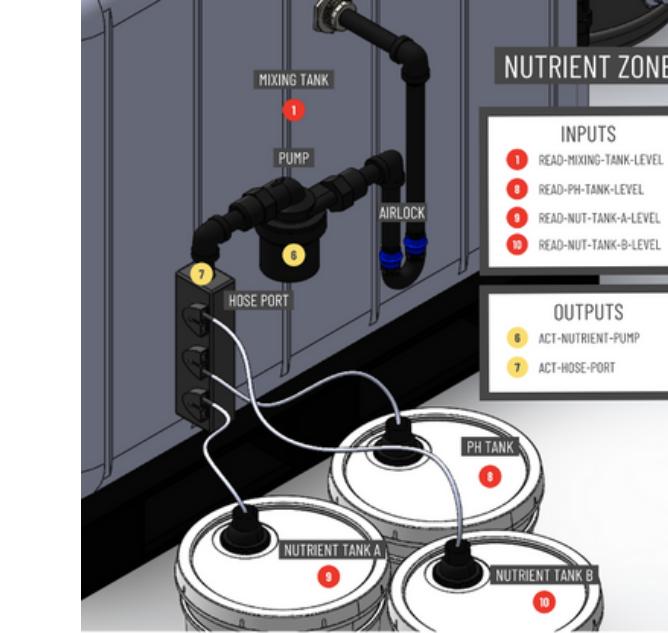
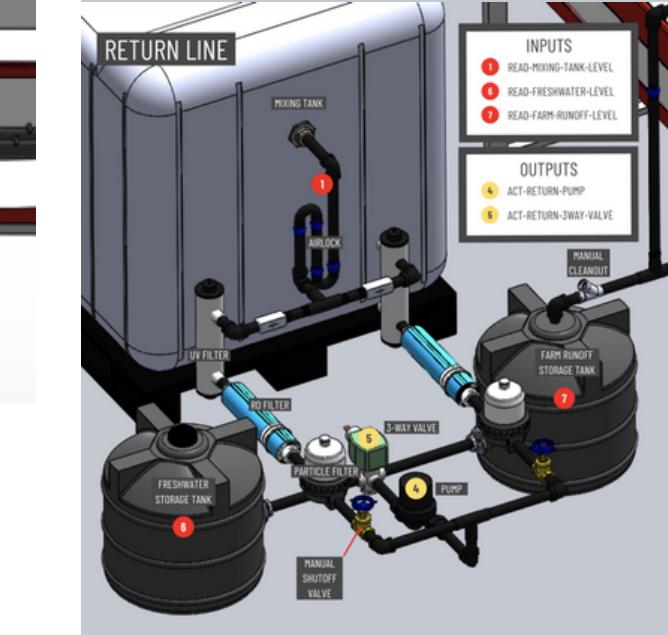
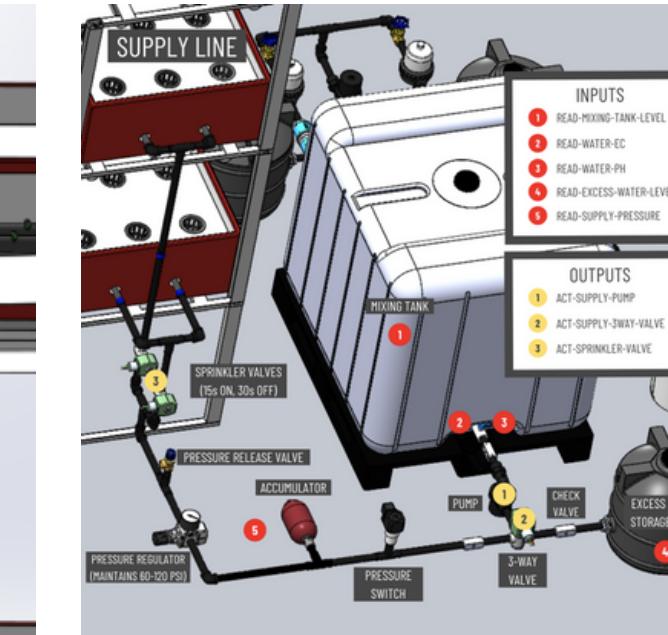
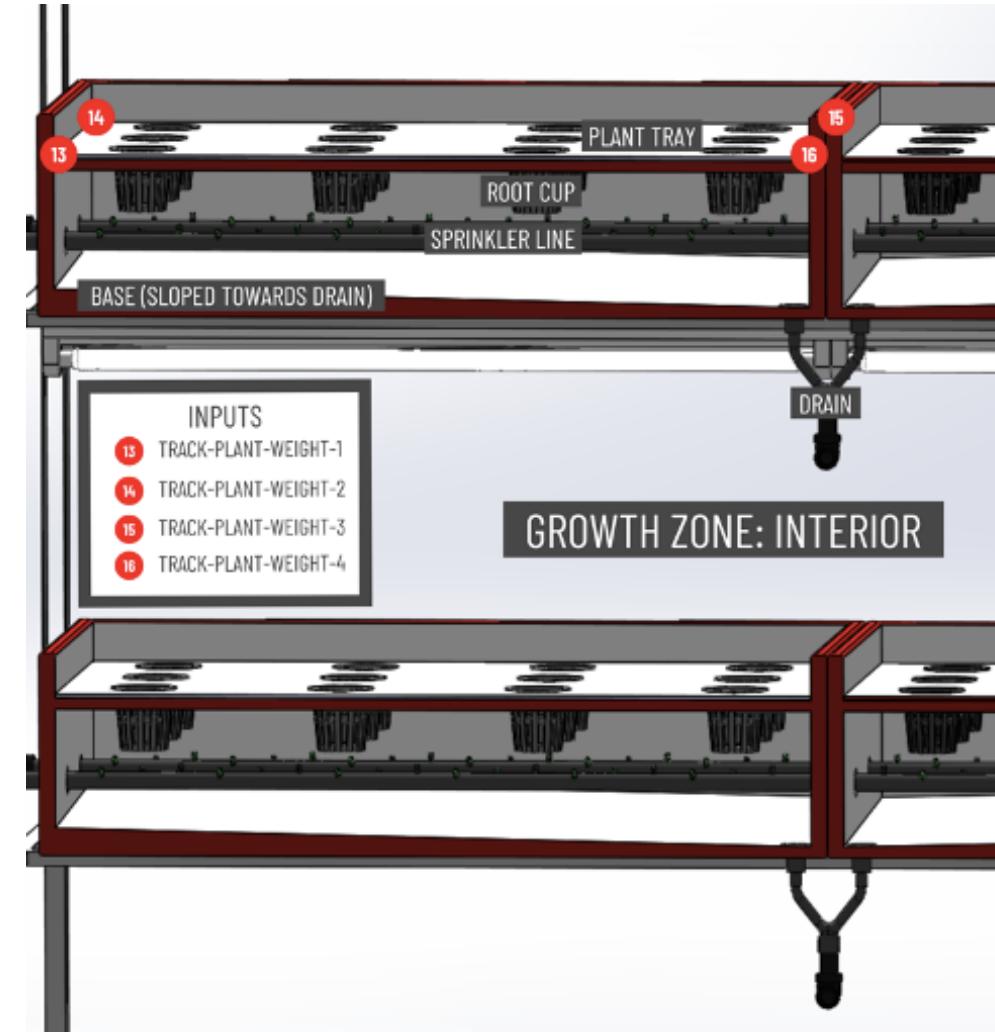
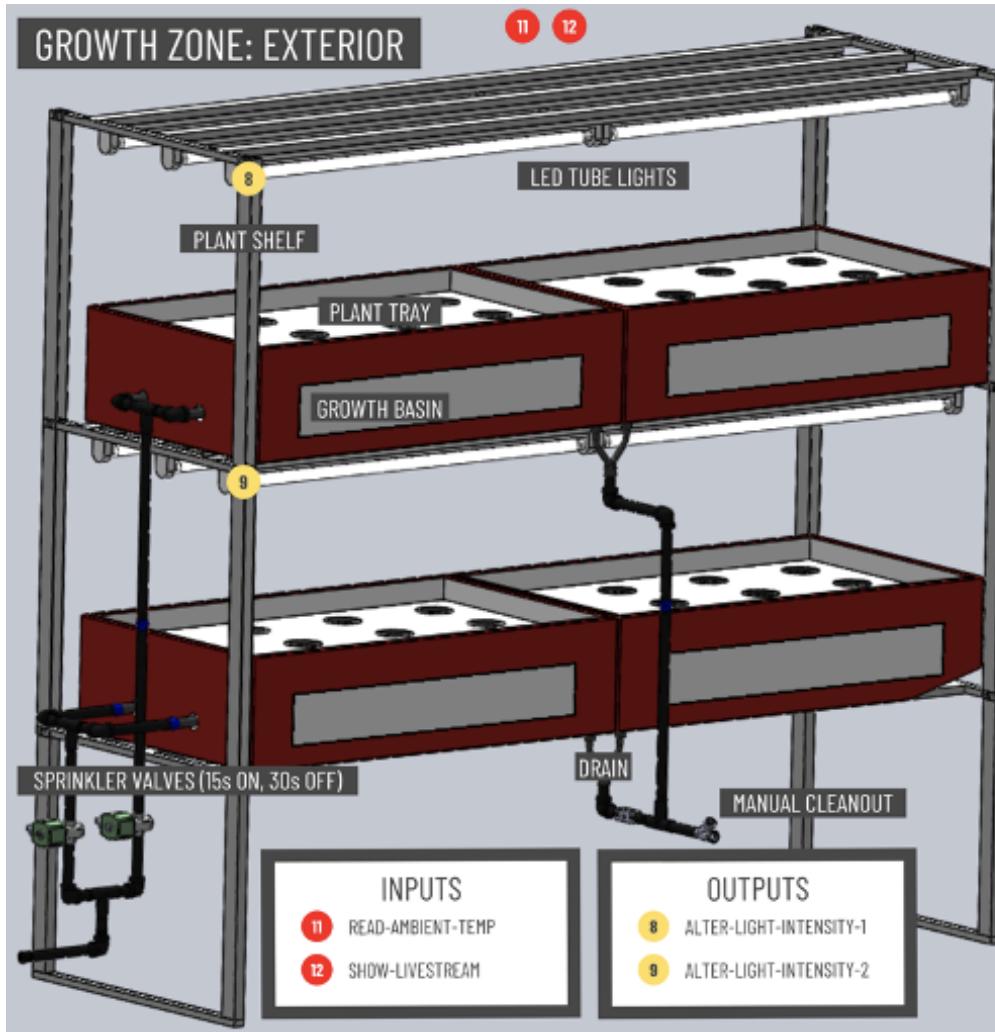




AUTOMATION SUBSYSTEM ("FARM")

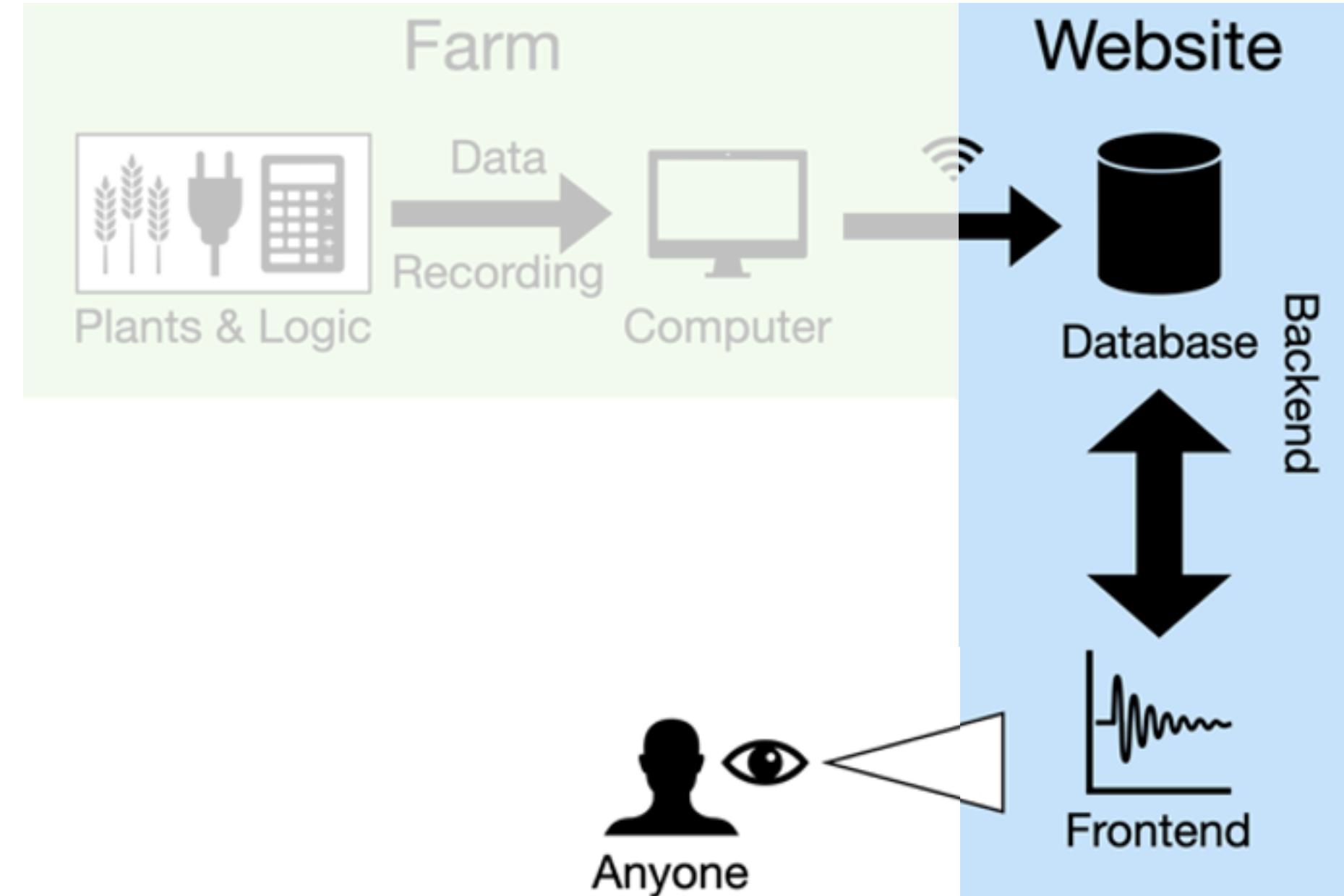
- An electromechanical feedback control system that automatically maintains optimal growth conditions using interconnected sensors and actuators, which interact through a logical framework programmed into their Arduino micro-controllers
- Sensor readings are simultaneously logged by a computer and then uploaded to the website via Ethernet





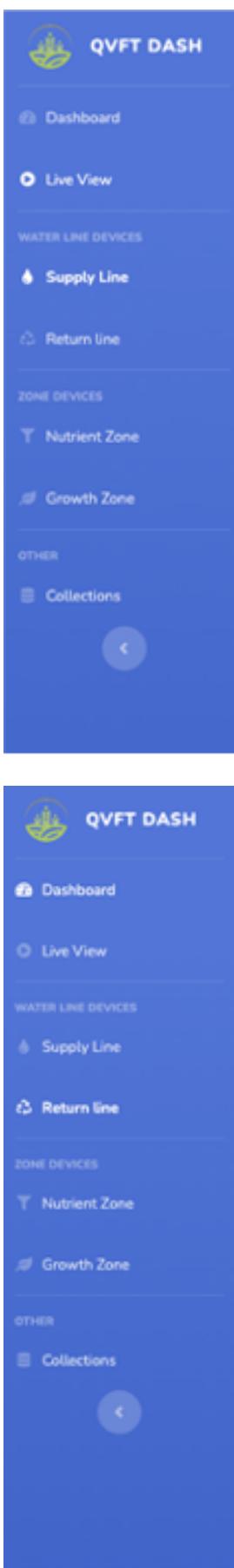
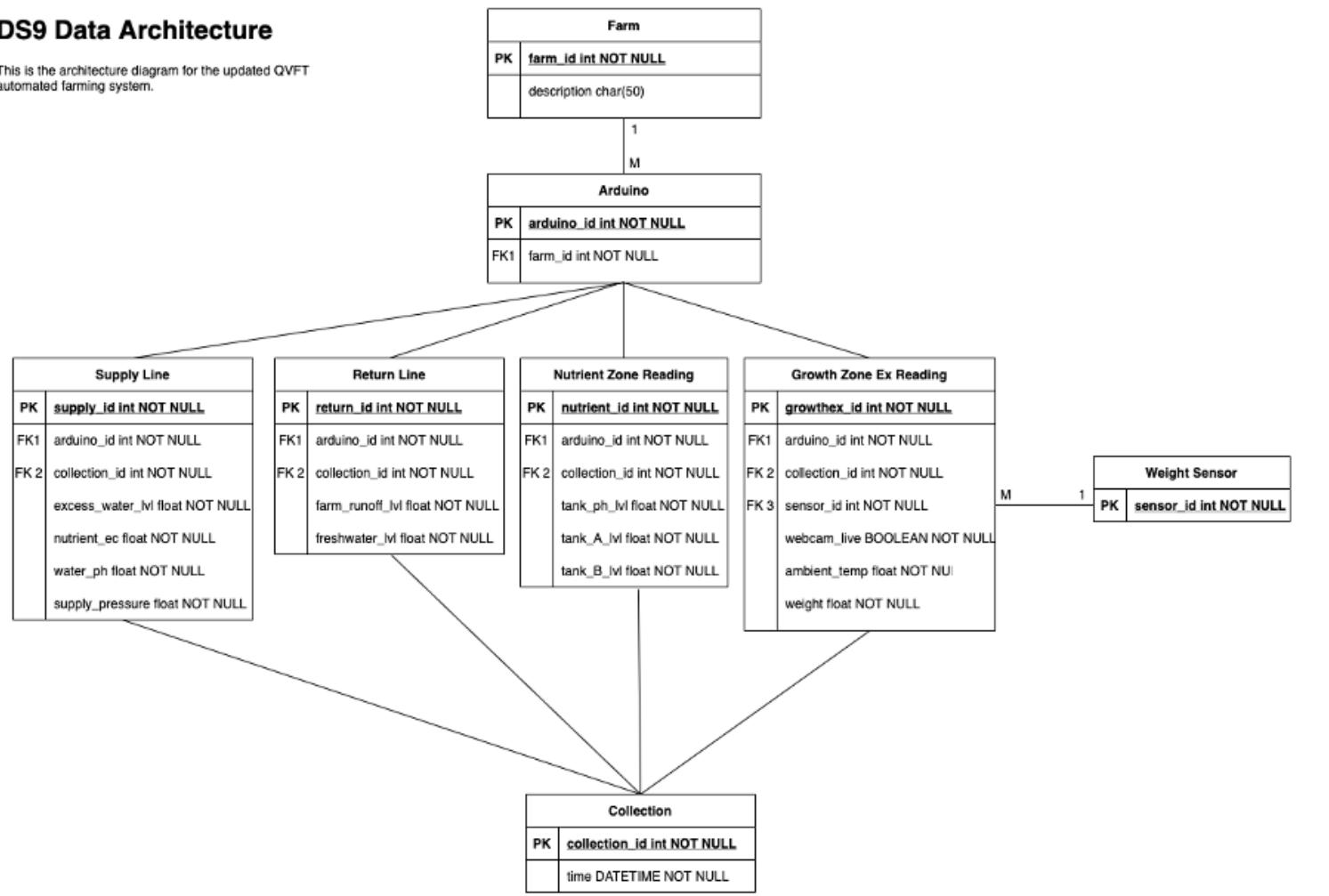
SOFTWARE STACK ("WEBSITE")

- Entails the database, back-end, and front-end and ultimately aims to provide a publicly accessible repository of real-time vertical farming data
- This repository achieves three objectives:
 - Allows technicians to remotely monitor farm equipment, which improves operations and resource allocation efficiency
 - Provides a record for future tuning and improvement of the farm by comparing data to commercial vertical farms and conventional producers
 - Creates a public knowledge base to assist other groups with vertical farming research

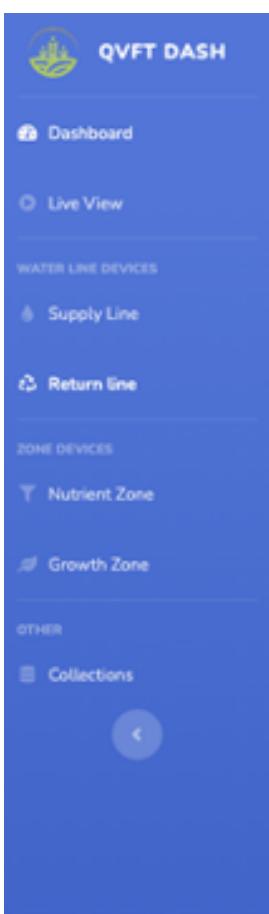
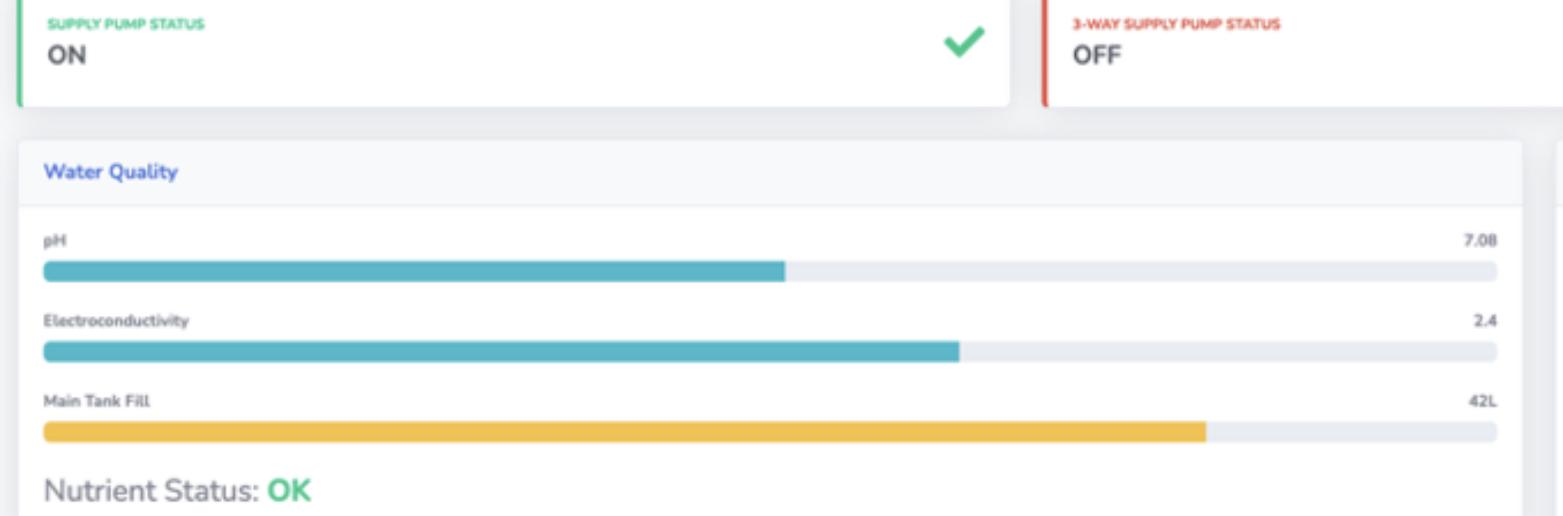


DS9 Data Architecture

This is the architecture diagram for the updated QVFT automated farming system.



Supply Line Overview



Return Line Overview



SPONSORSHIP TIERS

Bronze

\$100+

- Display logo on website
- Print logo on team apparel
- Place logo on promotional materials
- [Non-financial mentorship partnerships are considered bronze]

Silver

\$500+

- Display logo on website
- Print logo on team apparel
- Place logo on promotional materials
- Provide social media coverage throughout the year

Gold

\$1,000+

- Display logo on website
- Print logo on team apparel
- Place logo on promotional materials
- Provide social media coverage throughout the year
- Imprint logo on completed system

CURRENT PARTNERS

Bronze



Silver



SIMBL



FACULTY OF
ARTS AND SCIENCE

Gold



Dunin-Deshpande
Queen's INNOVATION CENTRE



PROMOTIONAL OPPORTUNITIES

Conferences: Prior to COVID-19, we attended the Queen's Water Environment Conference (QWEC), the Commerce and Engineering Environmental Conference (CEEC), and the Queen's Healthcare and Business Conference (QHBC) where we distributed materials, recruited students and informed attendees to the benefits of vertical farming.

Online Presence: QVFT has a website and several hundred followers on LinkedIn and Facebook.



BUDGET

HISTORICAL (2019-21)

LINE #	ITEM	Specifics	Unit Price	Qty.	Sub-total	Budget	
Revenue							
Sponsorship, Donations, and Grants							
00001	SIMBL Business Enablement	External donation	\$ 500.00	1	\$ 500.00	\$ 500.00	
00002	Faculty of Arts and Science Student Initiatives Fund	University grant	\$ 900.00	1	\$ 900.00	\$ 900.00	
00003	DDQIC	Fall sponsorship [Funds not yet accepted]	\$ 1,000.00	1	\$ 1,000.00	\$ 1,000.00	
Total Sponsorships, Donations, and Grants						\$ 1,400.00	
Internal Reimbursements from Members							
00004	Team Sweaters	Member reimbursement for Standard Sweater	\$ 35.00	7	\$ 245.00	\$ 245.00	
00005	Team Sweaters	Member reimbursement for Embroidered Sweater	\$ 41.00	5	\$ 205.00	\$ 205.00	
00006	Loan	Loan from Patrick to help pay for sweaters (repaid when ArtSci grants arrived)	\$ 40.00	1	\$ 40.00	\$ 40.00	
00007	RBC	Reversed service fee	\$ 5.00	1	\$ 5.00	\$ 5.00	
00008	RBC	Reversed service fee	\$ 4.50	1	\$ 4.50	\$ 4.50	
Total Internal Reimbursements from Members						\$ 499.50	
TOTAL REVENUE						\$ 1,899.50	
Expenses							
Business Operations							
00009	Shoppers Drug Mart	Postage stamps for mailing sponsorship package to potential sponsor	\$ 3.38	1	\$ 3.38	\$ 3.38	
00010	RBC	Paper statement with images fee	\$ 4.50	3	\$ 13.50	\$ 13.50	
00011	RBC	Monthly banking fee	\$ 5.00	3	\$ 15.00	\$ 15.00	
00012	AMS Publishing	3 name tags for use at CEEC trade show, printed at P&CC	\$ 8.76	1	\$ 8.76	\$ 8.76	
00013	AMS Publishing	Colour prints of QVFT proposal from P&CC	\$ 14.47	1	\$ 14.47	\$ 14.47	
00014	Namecheap.com	Cost of QVFT's domain name (11.98/year, with rates increasing after year 1). Netfny server is linked to this:	\$ 16.35	1	\$ 16.35	\$ 16.35	
00015	AMS Publishing	Colour prints of QVFT proposal from P&CC	\$ 17.94	1	\$ 17.94	\$ 17.94	
00016	Michelle Ye	Headshots	\$ 10.00	9	\$ 90.00	\$ 90.00	
00017	AMS Publishing	Posters and other promotional material for CEEC trade show, printed at P&CC	\$ 21.75	1	\$ 21.75	\$ 21.75	
00018	AMS Publishing	Colour prints of sponsorship package booklets from P&CC	\$ 29.50	1	\$ 29.50	\$ 29.50	
00019	Michelle Ye	Headshots (discounted rate: 30/bur people)	\$ 7.50	4	\$ 30.00	\$ 30.00	
00020	Team Sweaters	Sweater money sent back to Spencer	\$ 35.00	1	\$ 35.00	\$ 35.00	
00021	Milan Parmar @ Upwork	QVFT logo made through Upwork.com	\$ 50.10	1	\$ 50.10	\$ 50.10	
00022	Refreshments for Team Social	24 tall cans of Smirnoff Ice	\$ 6.00	1	\$ 6.00	\$ 6.00	
00023	Service Ontario BSA	Registration of Varsity Greens as a business	\$ 60.00	1	\$ 60.00	\$ 60.00	
00024	Refreshments for Team Social	24 tall cans of Hey Y'all	\$ 68.40	1	\$ 68.40	\$ 68.40	
00025	Campus Equipment Outfitters	Embroidered sweaters	\$ 41.00	5	\$ 205.00	\$ 205.00	
00026	Campus Equipment Outfitters	Unembroidered sweaters	\$ 35.00	8	\$ 280.00	\$ 280.00	
Total Business Operations						\$ 1,015.15	
Aeroponic System							
00027	Root cups	FREE	-24		\$ -		
Total Aeroponic System						\$ -	
Automation System & Software Stack							
00028	Qkits	Tax	\$ 0.62	1	\$ 0.62	\$ 0.62	
00029		Qkits - 10 cm MF jumper cable	\$ 2.26	1	\$ 2.26	\$ 2.26	
00030		Qkits - 20 cm MM jumper cable	\$ 2.52	1	\$ 2.52	\$ 2.52	
00031		Qkits - 20 cm MF jumper cable	\$ 2.52	1	\$ 2.52	\$ 2.52	
00032		Qkits - 10 cm MM jumper cable	\$ 1.94	2	\$ 3.88	\$ 3.88	
00033		General parts and supplies	\$ 4.50	1	\$ 4.50	\$ 4.50	
00034		Qkits - DPT-ON-OFF-ON 15A/125V AC	\$ 5.48	1	\$ 5.48	\$ 5.48	
00035		Qkits - Mini LED board	\$ 2.95	2	\$ 5.90	\$ 5.90	
00036		Breadboard	RobotShop - Full-Size Bare Breadboard (830 Tie Point)	\$ 7.93	1	\$ 7.93	\$ 7.93
00037		Load cell	RobotShop - 5 kg Micro Load Cell	\$ 9.35	1	\$ 9.35	\$ 9.35
00038		Temp/humidity sensor	Qkits - DHT22	\$ 10.26	1	\$ 10.26	\$ 10.26
00039		Load cell amplifier	RobotShop - KKT711	\$ 13.31	1	\$ 13.31	\$ 13.31
00040		Assorted resistors (100 ohms to 100K ohms)	Qkits - Set of 610 Resistors (E-12 Series)	\$ 15.42	1	\$ 15.42	\$ 15.42
00041		RobotShop	HST	\$ 15.68	1	\$ 15.68	\$ 15.68
00042		Qkits	Tax	\$ 16.28	1	\$ 16.28	\$ 16.28
00043		Analog TDS (EC/nutrient) sensor	RobotShop - Gravity Analog TDS Sensor/Meter for Arduino	\$ 18.20	1	\$ 18.20	\$ 18.20
00044		Breadboard	Qkits - 1260 Point Bread Board	\$ 23.16	1	\$ 23.16	\$ 23.16
00045		Arduino Nano	RobotShop - Arduino Nano 33 IOT Microcontroller with Headers	\$ 32.43	1	\$ 32.43	\$ 32.43
00046		pH meter	RobotShop - Gravity Analog pH Meter Kit	\$ 39.33	1	\$ 39.33	\$ 39.33
00047		Multimeter	Qkits - 3 1/2 Digit Multi Meter 20A	\$ 54.12	1	\$ 54.12	\$ 54.12
Total Automation System & Software Stack						\$ 281.15	
Plant Science Research							
00048	Custom Hydro Nutrients	Magnesium sulfate 1lb	\$ 4.62	1	\$ 4.62	\$ 4.62	
00049	Custom Hydro Nutrients	Calcium nitrate 1lb	\$ 6.60	1	\$ 6.60	\$ 6.60	
00050	Custom Hydro Nutrients	Soluble trace element mix 8oz	\$ 7.52	1	\$ 7.52	\$ 7.52	
00051	Custom Hydro Nutrients	Potassium chloride 1lb	\$ 10.23	1	\$ 10.23	\$ 10.23	
00052	Custom Hydro Nutrients	KCL peak MKP 1lb	\$ 11.88	1	\$ 11.88	\$ 11.88	
00053	Custom Hydro Nutrients	Shipping	\$ 45.13	1	\$ 45.13	\$ 45.13	
Total Plant Science						\$ 85.98	
TOTAL EXPENSES						\$ 1,384.28	
SUMMARY							
Total Revenue						\$ -	
Total Expenses						\$ 4,006.15	
Net Surplus						-\$4,006.15	

FUTURE (2021-22)*

*Estimated; excludes tax

LINE #	ITEM	Specifics	Unit Price	Qty.	Sub-total	Budget
Revenue						
Sponsorship, Donations, and Grants						
Total Sponsorship, Donations, and Grants						\$ -
TOTAL REVENUE						
Expenses						
Business Operations						
00001	1/2" clear tubing	USA Sealing Tubing,Clear,1/2 in Inside Dia.	\$ 3.28	3	\$ 9.84	\$ 9.84
00002	1/8" ID rubber tubing	length	\$ 14.60	1	\$ 14.60	\$ 14.60
00003	2-way solenoid valve + actuators	Alcon 05EZ009A2-1JIA Solenoid Valve	\$ 48.12	2	\$ 96.24	\$ 96.24
00004	2" pipe coupling (rough estimate of qty.)	Eastman 2 in x 2 in. PVC DWV Flexible Coupling	\$ 4.67	10	\$ 46.70	\$ 46.70
00005	2" PVC elbow joint	Home Depot Charlotte Pipe 2 in. PVC Schedule 40 90-Degree S x S Elbow Fitting	\$ 3.53	22	\$ 77.66	\$ 77.66
00006	2" PVC piping (384" altogether in CAD model)	Xirtec white PVC SCH40 plain.end pipe, 2 in. x 10 ft	\$ 25.99	4	\$ 103.96	\$ 103.96
00007	2" PVC U-bend	Waterwau PVC U-Bend - 2" Slip x 2" Slip	\$ 14.19	2	\$ 28.38	\$ 28.38
00008	3-way solenoid valve	Tameson TP-DA 1/4" 3/2 Way NC Brass FKM 0-bar 12V DC	\$ 55.10	2	\$ 110.20	\$ 110.20
00009	3/4" PVC piping (384" of sprinkler line in CAD model)	Xirtec white PVC SCH40 plain.end pipe, 3/4 in. x 10 ft.	\$ 13.99	4	\$ 55.96	\$ 55.96
00010	30 gallon plastic drum	Very rough estimate	\$ 88.00	3	\$ 264.00	\$ 264.00
00011	Accumulator tank	SEAFLO Pre-Pressurized Accumulator Tank SFAT-075-125-01	\$ 65.01	1	\$ 65.01	\$ 65.01
00012	Analog pressure gauge	Baker 421AVND-300 Pressure Gauge, 0-300 PSI	\$ 37.40	1	\$ 37.40	\$ 37

CONTACT US

Patrick Singal (Manager)
director.qvft@engsoc.queensu.ca

