Public Release
January 31, 2018

Town of Aurora
Additional Items to
Environmental Advisory Committee
Meeting Agenda

Thursday, February 1, 2018
7 p.m., Holland Room

- **Delegation (a) Anu Bidani, STEM MINDs Corp., and Team STEMbotics**
  Re: Smart Rainwater Harvesting Project

Legislative Services
905-727-3123
Clerks@aurora.ca
Town of Aurora
100 John West Way, Box 1000
Aurora, ON L4G 6J1

Delegation Request

This Delegation Request form and any written submissions or background information for consideration by either Council or Committees of Council must be submitted to the Clerk's office by the following deadline:

4:30 p.m. Two (2) Days Prior to the Requested Meeting Date

Council/Committee/Advisory Committee Meeting Date:
Feb 1st @ 7:00pm

Subject:
Presentation by team Stembotics on "Smart Rainwater Harvesting" Project

Name of Spokesperson:
Anu Bidani

Name of Group or Person(s) being Represented (if applicable):
Team mentors: Anu Bidani and Toni Sagardia
Team members: Rik Bidani, Brendan Ireland, Dylan Ireland, Matthew Comsa, Luke Ivic, Charley Leiti, Denis Barabanova, Eric Xia, Kenny Huang

Brief Summary of Issue or Purpose of Delegation:
The team would like to present their idea " Smart Rainwater Harvesting" to the council to get feedback on the viability of the solution and if in their opinion this product has merit for commercialization with the proper support infrastructure.

The team won an Eco-Friendly Award at the Aurora Youth Innovation fair and also at the First Lego Leago Provincial Championship competition in January. They have been invited to compete with 18 other teams on Feb 25th at the Ontario Innovation Celebrations. The team consisst of 9 students between the ages of 10-13 and this would be a great experience for them to get feedback from key stakeholders in the community.

Please complete the following:

Have you been in contact with a Town staff or Council member regarding your matter of interest? Yes ☑ No ☐

If yes, with whom?
ChristinA Nagy-Oh

Date:
Jan 29, 2018

☑ I acknowledge that the Procedure By-law permits five (5) minutes for Delegations.

Team Info Sheet

FLL Team Number: 30993
Team Name: STEMbotics
Team Members: Denis, Dylan, Brendan, Kenny, Charley, Rik, Eric, Matthew, Luke
Coaches: Anu Bidani, Toni Sagardia
Team Picture:

Project Executive Summary:

Our company is a not-for-profit called EnviroRain and we have an innovative product suite that can save the community of York Region $6Million dollars in savings through community focused Rain Water Harvesting.

Our innovation is a Smart Rainwater Harvesting Home Kit that includes two main components:

- ***Qbiq sensors that allow to convert rain barrels and patio umbrellas into smart devices***
- ***Design of a reversible Patio Umbrella that allows collection of rain water and distribution through automation***

There is also a potential of using Qbiq as a Smart Meter to capture rain water harvesting statistics that will be beneficial to municipalities

We estimate $6 Million savings for the York Region community alone (please see appendix A for Facts and Figures)

Our Customer: Home Owners and Municipalities

What problem are we solving?

- People are using a significant quantity of potable, expensive water for gardening and other outdoor use.
- Municipalities sometimes have difficulties meeting the water demands.
- Since 1940's, the population has doubled but the amount of water consumption has quadrupled.
- Rapid urbanization has drastically decreased recharging of groundwater.

Rainwater Harvesting is a technique used for collecting, storing and using rainwater to water gardens, lawns, etc.

Why we chose this problem	**Benefits of Rainwater Harvesting**
• York Region has 370,000 households • Only 3.5% of households have rain barrels • We did our own survey and found 88% homeowners did not know benefits of rainwater harvesting or rain barrels • We also did a walk of one street with 100 homes. Only 2 houses had rain barrels but everyone had patio umbrellas • We reviewed 6 Journal articles, a thesis paper and many website all supporting our findings • We did calculations to confirm savings	• It is simple, economical and eco-friendly • Saves money for both the town and each household • Helps the environment by reducing electricity use and greenhouse gas • emissions required in the treatment of water • Alleviates strain on public water system during summer months • Reduces storm water runoff and sewage system overload • Reduces topsoil erosion

Our thought is that…

1. If people are not using rain barrels due to inconvenience… what if we made rainwater harvesting fully automated.
2. If almost every home has a patio umbrella… what if everyone also used a patio umbrella for harvesting rainwater?

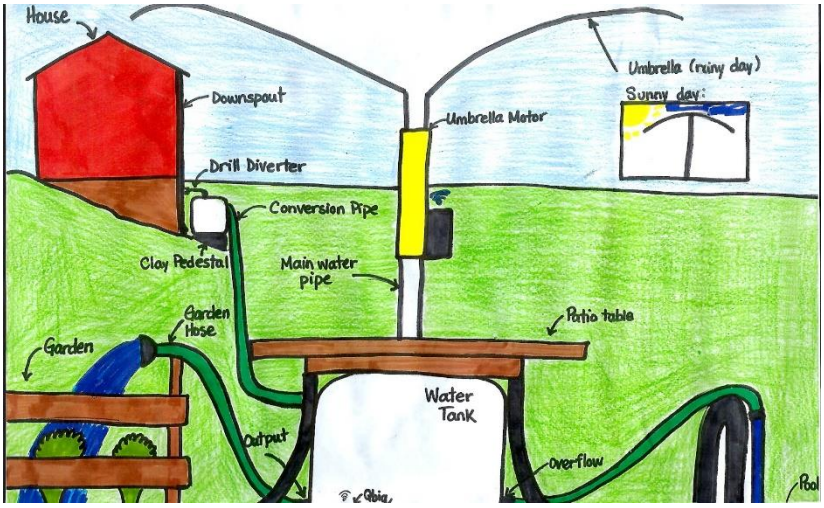
We have solved the problem by making our solution:

- Convenient to use
- Aesthetically pleasing
- Fully automated with the use of Smart Home technology

This is how we will do it!

- Turn rain barrels into SMART rain barrels with use of Qbiq sensors (refer to Appendix B for details) and an accompanying App RainTech for setup and monitoring
- Design a patio umbrella that is reversible and sturdy to collect water in rain and provides shade during sunny days. Inspired by HedgeHog Umbrellas (Appendix C)
- Use cutting edge Qbiq sensors to recognize conditions like fullness of the rain barrel, temperature and moisture (IOT & IFTTT) to automate rainwater harvesting
- Use automated hose valves to release rainwater when conditions are met
- Ability to send home use data to the Town for gathering statistics and using the information to improve conservation programs

- The potential with Qbiq is unlimited as it can potentially be used as a Smart Meter for measuring rain water collected and potential savings for the Home Owner and the Town. There is so much that can done with this technology.
- The potential of working with interior designers to create custom tanks in different shapes and sizes is possible so outdoor becomes indoor.
- The potential of working with HedegeHog Umbrellas to create custom patterns and designs on the umbrella are also possible



The Home Kit can be purchased as a:
Starter Pack for $500
Ultimate Pack for $600
A La Carte selection of components based on needs (Appendix D for details).

All the components in the Kit have an over 5 year shelf life. The Reversible Umbrella itself which is $200 has a 2 year shelf life but replacement parts will be available so the most wear and tear components are easily replaceable hence increasing the shelf life of the kit and generating cost savings for the owners. The Qbiq batteries last 6 months and can be recharged with a USB port.

Experts we have spoken to:

- James Daigle - the inventor of Qbiq and founder of Ubiqweus,
- Dana Eldon - from Simcoe Water Conservation,
- Lauren Stephanoff - from York Region water education,
- Kevin Truong - CEO of Hedgehog Umbrellas,

Recognition:

- Won the most Eco-Friendly Project: Aurora Youth Innovation Fair (Nov/17)
- Invited to Aurora Town Hall Council meeting to receive award from Mayor Dawe
- Won Innovation Award: Ontario East Provincial Championship (Jan/18)

Appendix A

FACTS AND FIGURES: COMMUNITY EFFORT

100 11ft Patio Umbrellas VS 2 Rain Barrels

(* based on our review of one street with 100 homes; Every home had a patio umbrella)

AMOUNT OF WATER COLLECTED

584,471 Litres vs 264,800 Litres
54% More water collected with Patio Umbrellas

AMOUNT OF WATER SAVED

467,577 Litres vs 26,480 Litres
94% More water savings with Patio Umbrellas

AMOUNT OF DOLLARS SAVING

$1,694 vs $95.92
$15,000 ($150 per house) = Storm Water Tax savings
94% More Dollar savings with Patio Umbrellas

Savings that Municipalities can achieve by not processing this water have not been calculated and could add to additional benefits!

YORK REGION SAVINGS AS A COMMUNITY

1 Home
Save: $16.94 + $150 Taxes

100 Homes
Save: $1,694 Annually + $15,000 Taxes

375,000 Homes
$6.32 Million Dollars in savings Annually

USING ENVIRORAIN HOME KIT

PATIO UMBRELLA AND RAIN BARREL

AMOUNT OF DOLLARS PER HOUSEHOLD

SAVING: **$16.94 + $47.96 + $150 = $214.90**

COST: **$600**

Recover cost in 2.8 years for a Home Owner

Appendix B
Qbiq

Qbiq is an Internet of Things device developed by Ubiqweus that is currently on Kickstarter. Internet of Things is a network of regular devices such as vehicles and home appliances with built in electronics (sensors, software, actuators, etc.).

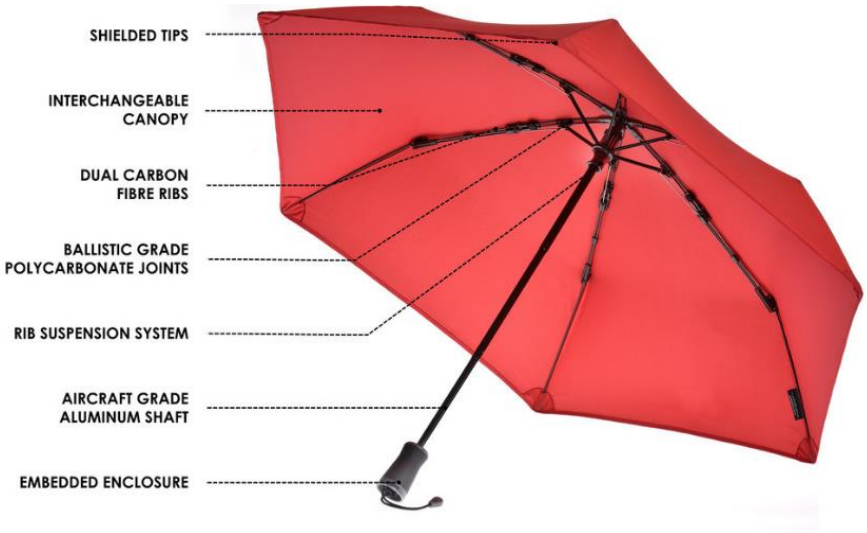
Qbiq devices measure data and execute tasks according to that data. In our product, we have three installments of the Qbiq. We have a temperature sensor, a moisture sensor and a pressure sensor. The temperature sensor will be installed anywhere in your yard and measure the overall temperature outside. The moisture sensor will be in your garden and will measure the level of moisture in the soil. Finally, the pressure sensor will be inside your rain barrel and see how full the rain barrel is. After it collects this data, it will figure out the exact right time to water your garden or fill your pool. For example, if it is very hot outside, the soil is really dry and the rain barrel is full, it will automatically water your garden or fill your pool or send you a notification telling you to water your garden. The Qbiq sends a signal to the Wise Orchard Hose Valve (a product already on the market), and it lets the water through.

In our Rain Tech app, you can let the Qbiq automatically water your garden or fill your pool or you can make sure that it sends you a notification so that you can do the same with the press of a button. Also, you can set the level of temperature, moisture and pressure that the Qbiq will either automatically let out the water or will send you a notification so that you can do it manually. Lastly, in our Rain Tech app, you can set an automatic schedule for the Qbiq to let out the water.

This is James Daigle - the founder of Ubiqweus - holding a Qbiq.

Appendix C
Hedgehog Umbrellas

Hedgehog Umbrellas is a company based in Vancouver. They manufacture strong and small handheld umbrellas with custom designs. These designs are easily changeable and you can have any design of your choice.



Frame Architecture - To ensure lifetime durability, we had to reinvent the traditional rib structure and created the most efficient design possible. We redefined every component, from the metal springs down to the individual rivets. The dual carbon fibre constructed members joined by ballistic grade polycarbonate hinges, delivers the strongest strength-to-weight ratio structure ever assembled to an umbrella. This frame architecture sets an all new standard in premium umbrellas.

Rib Suspension System - Inspired from the automotive industry, we've developed a wind resistant technology featuring the patented Umbrella Rib Suspension System. At high winds, this Suspension System increases flexibility to the canopy structure while maintaining a constant overall hemispherical shape. This extra degree of flexibility prevents the canopy from flipping inside out even against the most chaotic winds. This innovation makes the Hedgehog Umbrella the first and only umbrella with a wind resistant suspension system.

This is Kevin Truong, the founder of Hedgehog.

Appendix D **Cost Analysis**				
Product Item	**Actual Cost**	**Retail Cost**	**Selling Price**	**Profit**
Ultimate Pack Includes				
Motorized Rain Harvesting Umbrella	$200	$260	***$600***	***$146***
Water Tank + Qbiq Pressure Sensor	$60	$78		
Qbiq Sensors (Moisture, Temperature)	$40	$52		
Hose	$20	$26		
Wise Orchard Wifi Enabled hose valve	$54	$70		
Downspout Diverter	$20	$26		
Rain Barrel + Pressure Sensor	$60	$78		
Total	**$454**	**$590**		
Starter Pack				
Motorized Rain Harvesting Umbrella	$200	$260	***$500***	***$126***
Water Tank + Qbiq Pressure Sensor	$60	$78		
Qbiq Sensors (Moisture, Temperature)	$40	$52		
Hose	$20	$26		
Wise Orchard Wifi Enabled hose valve	$54	$70		
Total	**$374**	**$486**		
A la Carte Items				
Replacable shell for Rain Umbrella	$50	$80		
Motorized Rain Harvesting Umbrella	$200	$260		***$60***
Water Tank + Qbiq Pressure Sensor	$60	$78		***$18***
Rain Barrel + Qbiq Pressure Sensor	$60	$78		***$18***
Qbiq Moisture Sensor	$20	$26		***$6***
Qbiq Temperature Sensor	$20	$26		***$6***
Hose	$20	$26		***$6***
Hose Connectors	$10	$13		***$3***
Wise Orchard Wifi Enabled hose valve	$54	$70		***$16***
Rain Barrel Conversion Kit including pressue sensor (if you already have a rain barrel)	$20	$26		***$6***
Installation: Clay Pedestal	$20	$26		***$6***
Total Price	**$484**	**$629**		***$145***