



**AWWA New Jersey**

American Water Works Association

# Student Filter Building Competition

***Do you think you have what it takes to build a water filter from scratch?***

Find out at the **5<sup>th</sup> Annual AWWA NJ Student Filter Building Competition!**

**College and High School Students Welcome  
Great resume-builder & networking opportunity**

**1st Prize \$300  
2nd Prize \$200  
3rd Prize \$150**

Additionally, hotel accommodations will be provided for 1st, 2nd, and 3rd place teams to participate in the AWWA NJ Section Annual Conference Student Research Poster Competition on March 20, 2019.\*\*

**Registration Deadline: Friday, February 1, 2019  
Competition Date: Saturday, February 23, 2019**

***Register on the AWWA NJ Website***  
<http://www.njawwa.org/page/studentfiltercomp>

**Location: Middlesex Water Company, Carl J. Olsen Water Treatment Plant  
100 Fairview Avenue, Edison, NJ 08817**



\*\*Hotel accommodations shall be defined as one (1) hotel room, for one (1) night at the Borgata Casino Hotel in Atlantic City, NJ from March 19th, 2018 to March 20th, 2019. Rooms shall be used for a maximum of three (3) team members and their chaperone(s). All participants will be required to sign a release form in order to attend and/or participate. Any participants under the age of eighteen (18) will be required have a chaperone in attendance with them at all times. Team members attending will be asked to present their posters during lunch on March 20th, 2019. Students will be able to participate in AWWA NJ Section conference events during their stay.



## STUDENT FILTER BUILDING COMPETITION

Saturday, February 23, 2019

CJO Water Treatment Plant | 100 Fairview Avenue, Edison, NJ 08817

### SCHEDULE

9:00 - 9:30 am	Registration & Team Setup
9:30 - 9:40 am	Opening Remarks & Safety Procedures
9:45 am - 12:00 pm	Competition Judging & Plant Tours
12:00 - 1:00 pm	Lunch + Meet & Greet with Water Industry Professionals
12:15 - 12:45 pm	Special Guest Speaker Presentation
1:00 - 1:30 pm	Additional Competition Judging & Plant Tours (if needed)
1:30 - 2:00 pm	Award Presentations
2:00 pm	Wrap Up

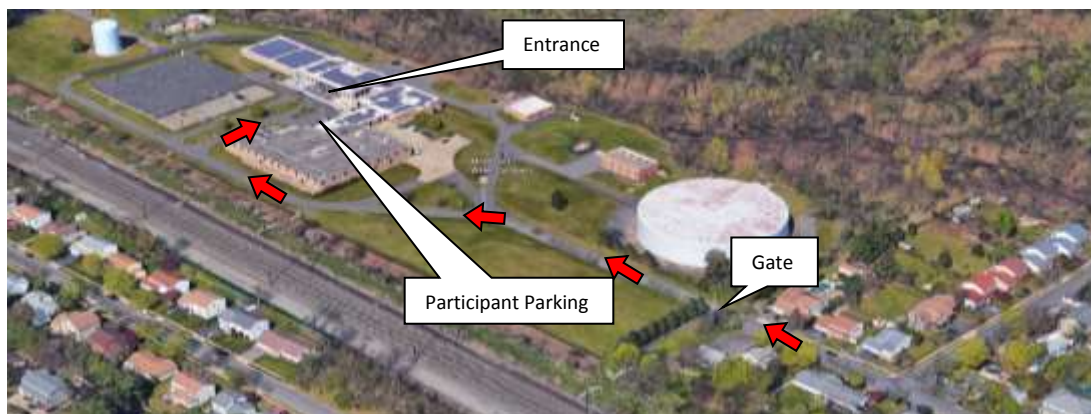
### IMPORTANT NOTE:

Please note that the competition hosts are under a strict schedule; therefore, no late registrants will be allowed on site. Please plan your travels accordingly, taking into consideration weather, time and traffic. Should you need assistance on the day of the competition, please call Brandon Goldfine at (732) 579-6771.

### DIRECTIONS

Enter the following information into GPS: 100 Fairview Avenue, Edison, NJ 08817

At the end of Fairview Avenue, there is a gate. Enter through the gate and keep left on the road. The entrance to the CJO Water Treatment Plant will be on the right. Park in any available spots. The front entrance of the plant is on the railroad side of the building.





## RELEASE AND WAIVER OF LIABILITY FORM

I, the undersigned, do hereby acknowledge and agree that I intend to participate in the AWWA NJ Section Student Filter Building Competition at Middlesex Water Company's CJO Water Treatment Plant, located in Edison, NJ on Saturday, February 23, 2019 from 9:00 AM – 2:00 PM.

I also understand that Middlesex Water Company and the American Water Works Association New Jersey Section are not responsible for any expense and liability incurred as a result of my participation in this event, including any medical expenses due to sickness or injury incurred as a result.

I understand that I am not permitted to use any photographic or videographic equipment during this event.

By signing below, I express my understanding and intent to enter into this Release and Waiver of Liability willingly and voluntarily.

Please print clearly. Please submit during registration.

Name: \_\_\_\_\_

Complete address: \_\_\_\_\_

\_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Parent/guardian signature if participant is under 18 years old:

\_\_\_\_\_ Date: \_\_\_\_\_

**TECHNICAL GUIDELINES**

**1. RAW WATER**

1.A. THE RAW WATER USED WILL BE FINISHED (CLEAN) WATER CONTAMINATED WITH SOIL FROM THE AREA AROUND THE WATER TREATMENT PLANT. GENERALLY THERE WILL BE A MIX OF SANDS, SILTS AND CLAYS WITH A PARTICLE SIZE NO GREATER THAN 0.25”.

**2. FLOW:** DESIRED RANGE:  $\geq 0.5$  GPM

2.A. THE FLOW RATE OF A FILTER IS A MEASURE OF EFFICIENCY WHEN COMPARED TO REMOVAL RATES. FLOW RATE IS TYPICALLY A FUNCTION OF THE GRANULAR PROPERTIES OF THE FILTER MEDIA, AND AVAILABLE AREA.

2.B. FILTERS SHALL BE FLUSHED WITH FINISHED (CLEAN) WATER PRIOR TO JUDGING. AFTER INITIAL FLUSHING, FILTER MUST BE COMPLETELY DRAINED PRIOR TO THE ADDITION OF RAW WATER.

2.C. FLOW RATE SHALL BE MEASURED BY VOLUME OF WATER DISCHARGED PER MINUTE, WHEN UP TO TEN (10) GALLONS OF RAW WATER IS ADDED INTO FILTER. TEAM MEMBERS SHALL BE RESPONSIBLE FOR ADDING RAW WATER TO FILTER. RAW WATER WILL BE PROVIDED ON SITE. FLOW SCORE SHALL BE MEASURED AFTER WATER QUALITY DATA HAS BEEN COLLECTED FROM FILTER EFFLUENT. PROJECT MANAGER SHALL ELECT WHEN TO BEGIN JUDGING. SCORE IS CALCULATED BY EFFLUENT FLOW RATE IN GPM.

**3. WEIGHT:** DESIRED RANGE: 65LB - 50LB

3.A. THE WEIGHT OF A FILTER CAN HELP DETERMINE PLANT STRUCTURAL LIMITATIONS AND DESIGN FACTORS. WEIGHT IS DIRECTLY CORRELATED TO THE DENSITY OF FILTER MEDIA, THEREFORE AN EFFECTIVE DESIGN WILL BALANCE WEIGHT LIMITATIONS AGAINST FLOW RATES AND SOLIDS REMOVAL.

3.B. FILTER WEIGHT SHALL BE MEASURED AFTER FILTERS ARE FLUSHED.

**4. TURBIDITY REMOVAL:** DESIRED RESULT: <10 NTU

4.A. TURBIDITY IS THE CLOUDINESS OR HAZINESS OF A FLUID CAUSED BY LARGE NUMBERS OF INDIVIDUAL PARTICLES THAT ARE GENERALLY INVISIBLE TO THE NAKED EYE, SIMILAR TO SMOKE IN AIR. TURBIDITY IS A KEY FACTOR IN HOW CONSUMERS INTERPRET TAP WATER QUALITY.

4.B. TURBIDITY REMOVAL SHALL BE MEASURED PRIOR TO FLOW RATE, AND SHALL BE SCORED AS THE DIFFERENCE BETWEEN INFLUENT WATER TURBIDITY AND EFFLUENT WATER TURBIDITY.

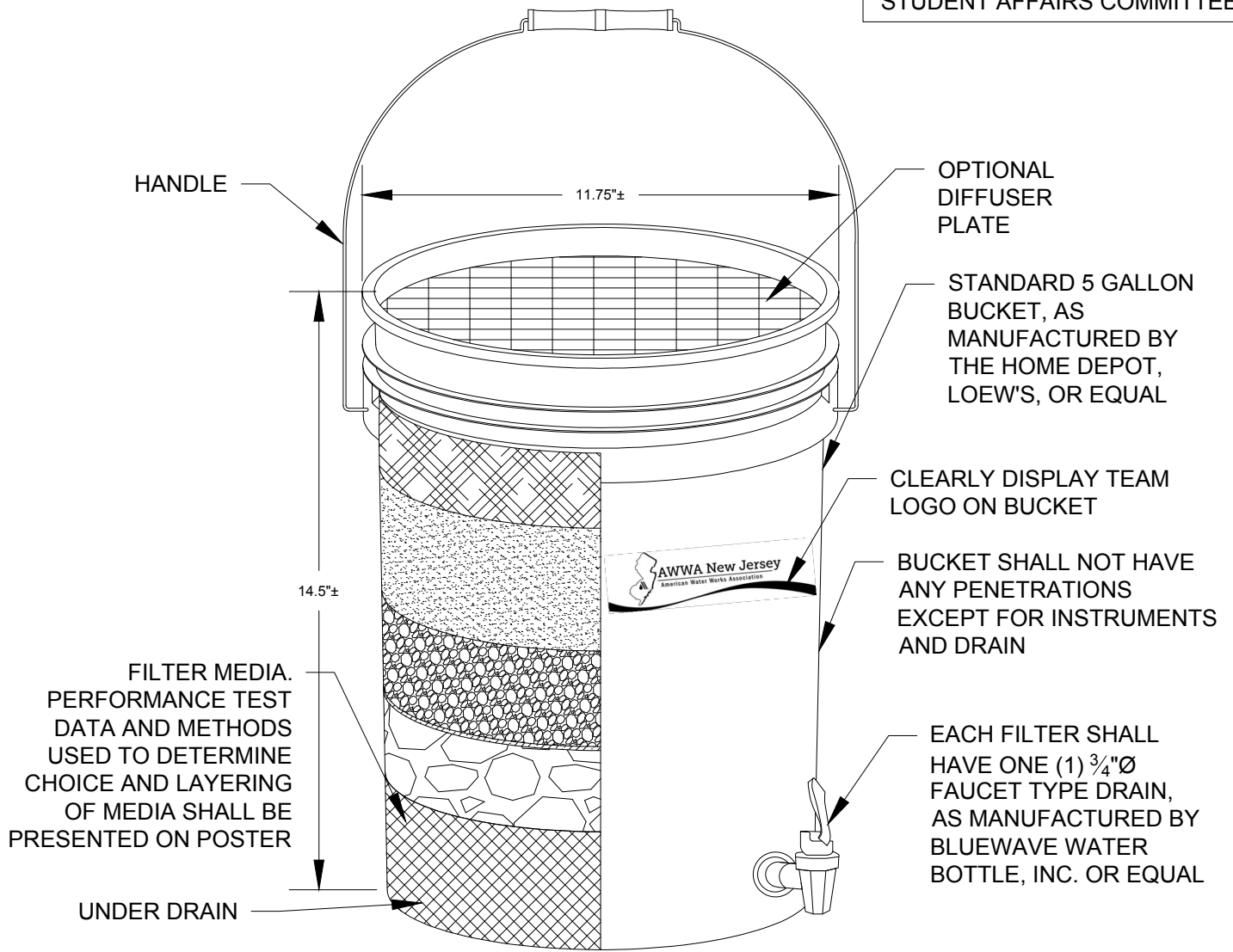
**5. SUSTAINABILITY:** DESIRED RANGE: 20% - 100% RECYCLED MATERIALS

5.A. TREATMENT PLANTS WILL TYPICALLY UPGRADE, REHABILITATE, AND REPLACE FILTERS BETWEEN 10 AND 30 YEARS AFTER THEY ARE CONSTRUCTED. WHEN MORE MATERIALS CAN BE RECYCLED FROM A FILTER, MORE SPACE CAN BE SAVED IN LANDFILLS AND THERE WILL BE A LOWER ENVIRONMENTAL IMPACT.

5.B. TEAMS SHALL PREPARE A SHORT CALCULATION TO BE PRESENTED ON POSTER BOARD EXPLAINING FILTER SUSTAINABILITY, MEASURED AS A PERCENTAGE OF MATERIALS WHICH CAN BE RECYCLED.

**6. POSTER AND PRESENTATION:**

6.A. PRESENTERS ARE EXPECTED TO BE ABLE TO DISCUSS PROJECT RESEARCH AND DETAILS CLEARLY, SHOWING A FULL UNDERSTANDING OF THE DESIGN. PRESENTERS ARE EXPECTED TO USE VISUAL AIDS SUCH AS CHARTS, PICTURES, AND/OR AUTOCAD DETAILS TO EXPLAIN ITEMS SUCH AS DESIGN CRITERIA, COST ANALYSIS, AND ANY OTHER FILTER INFORMATION. POSTERS SHALL MEASURE 22" X 34", AND BE MOUNTED TO POSTER BOARD.



## FILTER BUILDING COMPETITION DETAILS

### NOTES:

1. NO PRE-FABRICATED OR MECHANICAL (ELECTRONICALLY OPERATED) FILTRATION SYSTEMS WILL BE PERMITTED. DESIGNS CAN EMPLOY STANDARD FILTRATION METHODS, BUT MUST BE PRE-CONSTRUCTED BY TEAM MEMBERS, PRIOR TO EVENT DATE.
2. FILTERS SHALL BE JUDGED ON THE FOLLOWING CRITERIA: FLOW, WEIGHT, TURBIDITY REMOVAL, SUSTAINABILITY, CREATIVITY, COST, AND OVERALL POSTER PRESENTATION QUALITY AS OUTLINED ON SHEET NO. 2.
3. DETAILS FOR CHOICE AND LAYERING OF FILTER MEDIA, UNDER DRAIN, ALONG WITH TEST DATA, SHALL BE PRESENTED ON POSTER.
4. PARTICIPANTS SHALL TREAT THIS EVENT AS A PROFESSIONAL FUNCTION, BUSINESS CASUAL.
5. A MAXIMUM OF TWO TEAM MEMBERS SHALL BE REQUIRED FOR POSTER PRESENTATION.
6. A PROJECT MANAGER SHALL BE DESIGNATED FOR EACH TEAM.
7. ANY PARTICIPANTS UNDER THE AGE OF 18 MUST BE ACCOMPANIED BY A CHAPERONE.
8. RANGES PROVIDED ON SHEET NO. 2 ARE ESTIMATED VALUES, AND WILL BE CALIBRATED BASED ON ACTUAL COMPETITION RESULTS.