

BETTA-TRAP

OVERFLOW PREVENTING & EASILY MAINTAINED
INLET STORMDRAIN FILTER

BACKGROUND

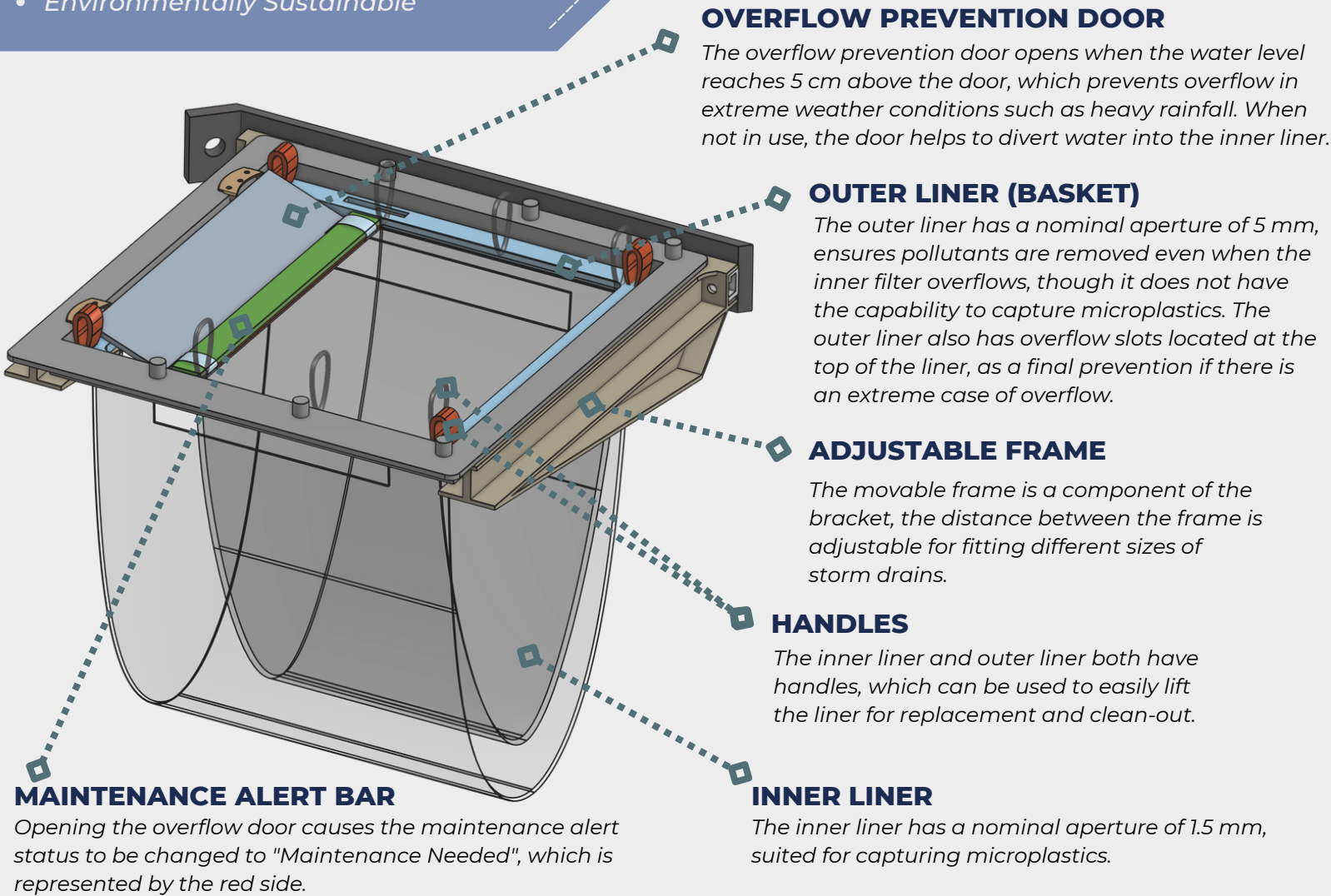
The Great Lakes Plastic Cleanup is a project by Pollution Probe to cleanup plastic in the Great Lakes. One method is by prevention; collecting plastics at entry points into the drainage system.

DESIGN OBJECTIVES

- High Effectiveness In All Weather Conditions, including heavy snow, rainfall, and extreme cold conditions
- Less Frequent & Simpler Maintenance, based on the frequency of maintenance, number of steps, and time taken
- Safe for public and workers, and minimizes damage to the storm drain
- Environmentally Sustainable

OPPORTUNITY

To prevent the entry of microplastics into the Great Lakes from storm sewers



OVERFLOW PREVENTION DOOR

The overflow prevention door opens when the water level reaches 5 cm above the door, which prevents overflow in extreme weather conditions such as heavy rainfall. When not in use, the door helps to divert water into the inner liner.

OUTER LINER (BASKET)

The outer liner has a nominal aperture of 5 mm, ensures pollutants are removed even when the inner filter overflows, though it does not have the capability to capture microplastics. The outer liner also has overflow slots located at the top of the liner, as a final prevention if there is an extreme case of overflow.

ADJUSTABLE FRAME

The movable frame is a component of the bracket, the distance between the frame is adjustable for fitting different sizes of storm drains.

HANDLES

The inner liner and outer liner both have handles, which can be used to easily lift the liner for replacement and clean-out.

INNER LINER

The inner liner has a nominal aperture of 1.5 mm, suited for capturing microplastics.

MAINTENANCE ALERT BAR

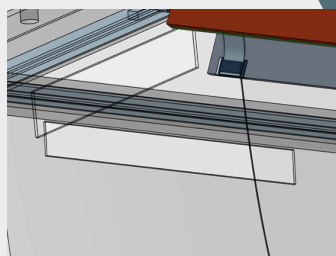
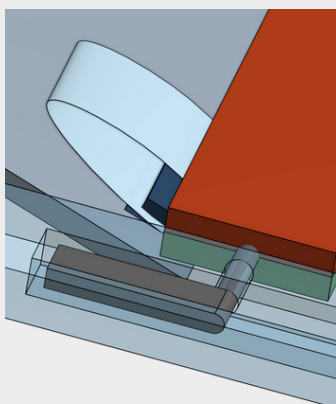
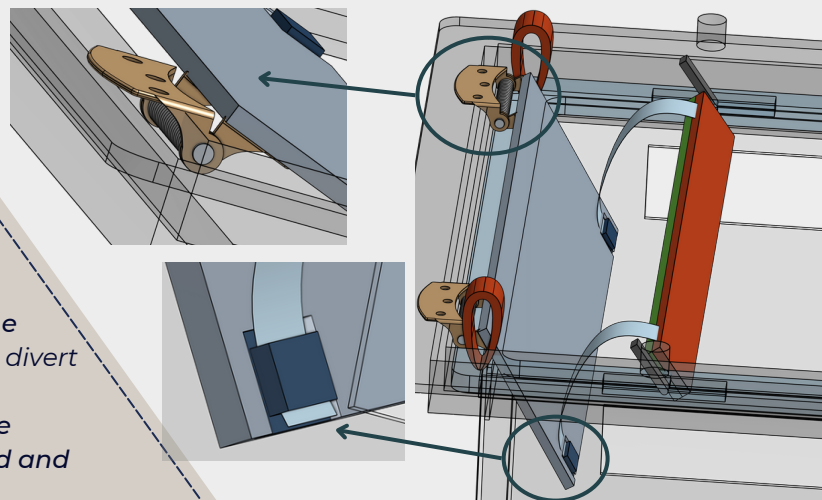
Opening the overflow door causes the maintenance alert status to be changed to "Maintenance Needed", which is represented by the red side.

MAINTENANCE ALERT & OVERFLOW MECHANISM

During the installation or maintenance process, the overflow prevention door will be **connected manually** to the maintenance alert bar by a strap, and the door's front end will be **pinned under the bar** as a result of positioning the frame of the outer liner in the correct spot.

When overflow occurs, the **water level reaches 5cm above the door**, the door will open downwards due to the pressure, and divert water through the outer liner. As the door opens, the strap connection causes the **maintenance alert bar to flip from the green side to the red side**, symbolizing overflow has occurred and **clean-up is needed for the inner liner**.

If the outer liner is also filled with water, which is the worst case scenario, the **overflow slots at the top of the liner**, which are similar to the ones found on the LittaTrap™, will prevent further overflow.



SPRING CONNECTION

The spring connection supports the overflow prevention door, and it will be activated when the force of the water reaches 17 N (5 cm), and will keep being pressed down if the force enlarges, until 60° where it will be stopped by the strap.

THE MAINTENANCE ALERT BAR

The flipping bar has one side red to symbolize "Maintenance Required" and one side green to symbolize "No Maintenance Required", it is built into the outer liner bracket, and the rotating angle will be restricted to 180° by a built-in lock.

CLIP FOR THE DOOR & STRAP

The clip has been designed to easily connect the strap to the door. The door and strap need to be manually attached in the installation or maintenance process.

EVALUATION & IMPROVEMENTS

Compare to the LittaTrap™ the BettaTrap...

- Has a maintenance alert system, can alert maintainer to do the clean-up when overflow happened
- Largely increase the removal efficiency of waste > 5 mm during heavy rainfall or overflow situations
- Easier maintenance as only the inner liner needs to be cleaned for regular maintenance

FUTURE PLAN

1. TESTING

- Test the removal efficiency of microplastics with the actual liner materials used by the LittaTrap™

2. RESEARCH & DIVERGE

- Consider implementation of electronic components such as sensors to detect when the trap is full or when to open the overflow doors
- Discuss and calculate the most common waste and pollutants found in different areas (eg. urban area, suburb area), and modify the filter accordingly
- Discuss how to add elements that can aid in sorting captured waste