BACKGROUND
Detention basins have been installed in neighborhoods with the hope of controlling the runoff from larger storm events. They accomplish this by temporarily holding the water in a large basin; this reduces local flooding and allows the water to enter the storm sewers over a longer period of time. Detention basins also prevent soil erosion with rocks to slow down rushing water and concrete channels to allow the water to flow while protecting the topsoil. Unfortunately, detention basins do nothing for water quality and ground water recharge.

OBJECTIVES & GOALS
The Township of Hillsborough in New Jersey has many detention basins. They have requested less maintenance costs for their detention basins, and a target site was chosen. The Barish Group plans to retrofit the existing basin with modern advanced stormwater practices known as best management practices (BMPs). The following goals were set by the Barish Group:
1. Less cost in maintenance to the Township.
2. Reduce pollutants leaving the basin.
3. Increase ground water infiltration.
4. Minimize impact on neighborhood residences.

DESIGN APPROACH
Focusing on the planet, the goals of reducing pollutants exiting the basin and increasing infiltration into local aquifers will also benefit local residents by providing cleaner water to surface water bodies. These goals will be accomplished through retrofitting an existing detention basin with BMPs and other innovative solutions. This will in turn lower the maintenance required to keep the detention basin functional. Our proposed design utilizes rain gardens to treat stormwater influent into the basin from various sources such as roadways, homeowner properties (roofs, driveways, lawns), and wooded areas. Additionally, the current concrete low flow channel will be removed and naturalized to allow for infiltration into the ground. One section of the naturalized flow channel will be meandered to further increase infiltration. The remaining portions of the detention basin will be naturalized to improve stormwater quality and reduce the amount of maintenance required to keep the detention basin functional and aesthetically pleasing. The added landscaping to the basin will increase the
beauty of the neighborhood and may increase local property values, as well. When combined with reduced maintenance costs to the town, this will increase the prosperity of the people of Hillsborough. The project is designed with local residents in mind, abstaining from intruding onto homeowner properties, and preventing water from pooling to avoid mosquito growth. The design was accomplished while keeping the spirit of the P3 competition in mind.

DESIGN CONCLUSIONS
There are several sources of runoff in the area surrounding Westcott Road in Hillsborough, NJ, including rooftops, driveways, lawns, roads, and wooded areas. This runoff carries suspended solids and other contaminants such as nitrogen, phosphorus, organic pollutants, bacteria, and metals. The New Jersey Department of Environmental Protection recommends engineered BMPs to treat the water quality storm, which is defined as 1.25” of rain during a two-hour time span. Treatment of the water quality storm accounts for treatment of approximately 90% of New Jersey’s rainstorms. To allow for greater infiltration and subsequently greater water treatment, the Barish Group decided to implement the BMP of rain gardens/bioretention basins. The rain gardens capture the water from the water quality storm and allow it to infiltrate completely into the subsurface, while also decreasing the area that needs to be mowed. While not technically BMPs, the team also chose other innovative design solutions including removing the existing concrete low flow channel and replacing it with a meandered naturalized flow channel which works to increase the time of concentration and subsequently increases the rate of infiltration. Additionally, the remaining area will be naturalized with native plants. Naturalizing the area increases the rates of infiltration and allows for decreased maintenance of the area by eliminating the need for mowing altogether. The retrofitting of the detention basin with the more advanced BMPs can easily be reproduced in other detention basins, thereby increasing the total benefit to local people, local prosperity, and the planet.

REFERENCES

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