



WATER CHAMPIONS CASE STUDY



Anthony Rossi Elementary School

Business Partner: Larry's II Restaurant

Anthony Rossi Elementary School participated in the Water Champions Program in the spring of 2021. Because of COVID-19, the program was converted to a mostly virtual format. The engaged elementary school students were able to conduct the home and school audits to determine where water saving practices could best be implemented, but due to the pandemic, the business audit was completed by their teacher. Retrofits were conducted at the high school and one business, Larry's II Restaurant. 40 water saving bathroom fixtures were installed across the participating school and business. These retrofits are estimated to result in an *annual* reduction of 81,500 gallons of water used, \$420 saved, and a greenhouse gas reduction of 0.21 MTCO₂e across the two locations. Throughout the duration of the case study project period (2021-2023), this has amounted to a *total* estimate of nearly 100,000 gallons of water reduced, \$500 saved, and a greenhouse gas reduction of 0.26 MTCO₂e across the two participating sites.

Background

Anthony Rossi Elementary School in Vineland, NJ was the second school in the Delaware Bayshore region to be recruited under the 2016-2023 Water Champions grant. The program was initially set to begin in 2020; however, its implementation was delayed due to COVID-19. The American Littoral Society's (ALS) Conservation Coordinator worked to convert the program to a primarily virtual format so it could continue to be implemented. Once converted, ALS partnered with 4th grade teacher Amber Egorov's "PowerSave" club to implement the Delaware Bayshore Water Champions Program in Spring of 2021. The students received 10 sessions of virtual water conservation education presented by ALS in which they learned about the impact of aquifer withdrawal on the streams feeding into the Delaware Bay, responsible water management, and were trained to conduct water audits. Because the Anthony Rossi students were younger than those who participated in the program through other schools, the content of the lessons was simplified to be more accessible, although core lessons stayed the same.

With the help of their teacher, the students were tasked with researching technological and behavioral water usage habits in their homes, school, and local businesses before conducting audits at each of these locations. The goal of the audits was to identify old and wasteful fixtures such as faucets or toilets that could be replaced with high efficiency WaterSense or WaterSense equivalent models in order to conserve water across their community.

Case Study Highlights

- **Location:** Vineland, NJ
- **Retrofitted Sites:** Anthony Rossi Elementary School and Larry's II Restaurant
- **Case Study Project Period:** 2021-2023
- **Devices Replaced:** 40 devices (15 toilets, 15 bathroom sinks, and 10 urinals) across two locations
- **Project Period Water Savings:** An estimated 100,000 gallons across two locations
- **Project Period Cost Savings:** An estimated \$500 across two locations
- **Project Period GHG Emission Reduction:** An estimated 0.26 MTCO₂e across two locations

These products are certified to use at least 20 percent less water than regular models, which results in cost and energy savings once installed. By conserving water, these devices reduce the amount of energy used to pump, treat, deliver, and heat water, which reduces greenhouse gas (GHG) emissions. The reduced water use also results in a lower water and electric bill. Thus, the upgrades to fixtures identified through the audits save water, reduce costs, and indirectly save energy.

Water Audits

In order to complete the home audit, students were tasked with identifying the water use of their home showers, toilets, sinks, and washing machines. Virtual learning meant that ALS needed to be creative with how they taught students to conduct these; ALS instructor Zach Nickerson adapted by carrying his laptop around his house to show the students where to look in their own homes.

The Anthony Rossi Elementary students also conducted audits of the staff and student restrooms in their building. Given their limited in person schedule due to the pandemic, they only had one day to complete the in-school audit. This was a challenge, but they were able to successfully complete the audit. The students measured the gallons per minute of each fixture and compared that with water-saving standards. Based on the findings of the audits, they determined that the sinks, urinals, and toilets were not up to par, and as such, the school received grant funding to replace bathroom fixtures with high efficiency devices in the identified restrooms.



Participating 4th grade students conducting a water audit of one of the school's restrooms.

Due to COVID-19, the students were unable to conduct the business audits in person. Instead, their teacher worked with ALS to audit two businesses and collected data to bring back to the students for analysis. Doing the math for the audits was a fitting lesson for the fourth graders as they had just learned how to multiply and divide with two-digit numbers. The audits allowed them to get a real-world application of that skill. Ultimately one business was chosen to receive funding for retrofits, Larry's II Restaurant.



Anthony Rossi Elementary School restroom with newly installed high efficiency toilet and urinals.

School Installations & Measurable Results

After receiving Water Champions grant funding, Anthony Rossi School Elementary School completed its retrofits in early 2023. The school chose to upgrade the two restrooms closest to the cafeteria, which had been identified through the audit as being the most used. 26 new devices were installed, including nine toilets, ten bathroom sinks, and seven urinals. The students calculated that these retrofits would result in around 63,400 gallons of water saved per year. Using the EPA's 2022 Pollution Prevention (P2) Cost and Greenhouse Gas Calculators, the DEP estimates that this water use reduction could save the school approximately \$325 per year and reduce their greenhouse gas footprint by 0.17 metric tons of carbon dioxide equivalent (MTCO_{2e}) annually.

In order to better understand the true water savings achieved by the program, Anthony Rossi Elementary School water bills were collected from before and after the retrofits were installed. Comparing submitted water bills from 2022 and 2023, the DEP found that there was an estimated 22,000 annual gallon reduction, which is below the students' annual estimate of 63,400 gallons. However, this calculation is based on limited data that does not fully account for confounding variables such as seasonal or multi-year variability and may include data from additional locations or water meters that are beyond the scope of the project. Therefore, these values should still be considered estimates. The collection of additional water usage data would result in a more accurate and robust measure of the program's impact on water savings.

Larry's II Restaurant Installations & Measurable Results

Larry's II was identified as a possible audit location by a contact of ALS. The restaurant owner expressed an interest in the Water Champions Program, and the audit was conducted in May of 2021. Although the students were unable to join the in-person audit due to the pandemic, the data was collected by their teacher and ALS, and the students did the math in a later classroom lesson.

The Larry's II staff had already been planning to redo their bathrooms, so receiving water efficient fixtures at this time fit well with their plans. The restaurant received funding to replace all 14 devices in their two restrooms, including six toilets, three urinals, and five sinks, with **WaterSense** high efficiency models. The new devices are estimated to save the restaurant around 18,000 gallons of water a year, and using the P2 Calculators, could save the business approximately \$90 a year and result in a greenhouse gas reduction of 0.05 MTCO₂e annually. Since the installation of the device in 2022, the restaurant is estimated to have saved an estimated 36,000 gallons of water, \$190, and has had a GHG reduction of 0.094 MTCO₂e.

In order to better understand the true water savings achieved by the program, Larry's II Restaurant water bills were collected from before and after the retrofits were installed. Comparing 6 months of water bills each from 2022 and 2023, the DEP found that there was an estimated 10,000 annual gallon reduction, which is below the students' annual estimate of 18,000 gallons. However, this calculation is based on limited data that does not fully account for confounding variables such as seasonal or multi-year variability and may be influenced by sources of water that are beyond the scope of the project. Therefore, these values should still be considered estimates. The collection of additional water usage data would result in a more accurate and robust measure of the program's impact on water savings.

During discussions with the DEP, Larry's II Restaurant owner Bob Middleton indicated that he plans to explore additional green practices that can be implemented in the restaurant to continue the betterment of the establishment and the overall community. He outlined the additional steps he would like to take in the future, and the challenges he would face trying to implement them. One step he had taken outside of the scope of the Water Champions project was installing solar panels on the roof of his business. He had also hoped to convert some of the appliances in the kitchen into power saving devices, although there were some logistical hurdles to overcome before those renovations could be implemented.



Larry's II Restaurant bathroom with newly installed WaterSense sinks, toilets, and urinals.

Conclusion

In summary, it is estimated that throughout the duration of the Anthony Rossi Elementary School Water Champions grant project period, from the 2022-23 retrofit installations to the project period end in 2023, there has been a cumulative total of over 100,000 gallons of water reduced, \$500 saved, and a GHG reduction of 0.26 MTCO₂e across the two participating sites. These outcomes are the result of the hard work of the Anthony Rossi Elementary School Water Champions students and their community partners.

“What a wonderful job done by all involved, especially the students who conducted the hands-on audits and calculated the numbers needed to get this grant going!”

- Amber Egorov, Anthony Rossi Elementary School Teacher

Acknowledgements

The New Jersey Department of Environmental Protection would like to thank the U.S. Environmental Protection Agency and the American Littoral Society for their partnership, as well as Anthony Rossi Elementary School and Larry's II Restaurant for participating in the Water Champions Program.

Grant recipient work products may not have been formally reviewed by the U.S. Environmental Protection Agency (EPA) and may not reflect the views and policies of the EPA. The EPA does not endorse trade names or recommend the use of commercial products mentioned in these documents.



NJ Department of Environmental Protection
Division of Water Supply & Geoscience

August 2023

For More Information:

dep.nj.gov/conserves-water/nj-water-champions/
watersupply@dep.nj.gov
609-292-7219