

**Town of East Hampton**

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March 15, 2021

Department of Energy & Environmental Protection  
Lake Pocotopaug Watershed Water Quality Improvements

Project # - 17-07b

Project Manager - Jeremy Hall



Town of  
**EAST HAMPTON**  
Connecticut

Department of Energy & Environmental Protection:

The above noted grant project focused on remediation efforts from 7 locations considered moderate to high priority locations as identified in the towns 319 9-point watershed plan. These locations are Skyline Estates, Seven Hill Estates, Sears Place, Hawthorne Road, Wangonk South and North Beach and Sears Park.

For the past decade Lake Pocotopaug, a fresh water 500-acre lake located in the heart of East Hampton has been experiencing seasonal algae blooms during the months of July, August and September each year. As part of an ongoing effort the town partnered with North East Aquatics Research to develop a 9-point plan to help fix the lakes watershed area to reduce or eliminate the amount of nutrient loading within the watershed. Following the 9-point watershed plan the town submitted and received a grant to start low impact development or BMP projects around the lake. The first grant was received in the amount of \$99,025.00. this grant allowed for funding of an engineer to design LID projects (**Task #a phase 1 grant**) within the watershed and implement construction to 5 site locations consisting of Clark Hill, Mott Hill, Mohican Trail, Old Marlborough Road and Sears Park as well as the current projects identified in phase two of the grant which released funding of \$137,675.00 earmarked for the locations listed below.

Each location presented its own set of environmental problems pertaining to storm water management, here is a break down of the problems at each location and the solution for each site.

The Following projects pertain to (**Task #1.a.iii.**)

1. **Sears Park:** prior to the BMP's being installed Sears park featured very little sediment control measures and the result of storm water events allowed water to flow from SE in a NW direction of the park eventually draining directly into Lake Pocotopaug at a high rate of velocity. BMP's installed: Construction of a bioswale at the bottom of the new parking lot which will intercept overland flows from the pavement. At the north and south ends of the bioswale, we constructed a grass swale to direct any runoff going to the lake to pass into the bioswale for infiltration. At the entrance we constructed PVC pavers with pea gravel over a gravel base to direct runoff and infiltrate into the underlying swales. Modifications were made to the existing swale near the property line of 64 North Main Street to provide better removal of suspended solids, and the uptake of dissolved nutrients by vegetation. We also modified the existing rain garden to more efficiently manage the runoff from the tennis courts. This included a parking lot regrade to better direct runoff to one of the two existing catch basins and retention systems from Task 1.b.iii.1. Finally, we paved the parking area and constructed a final bioretention system at the base of the fill slope to the north of the parking area. Runoff from the paved parking area and driveway will be directed to this system.
2. **Skyline Estates:** The former property consisted of a shallow bioretention system that was not adequate for holding water and infiltration of nutrients prior to its discharge into nearby

storm drain which inevitably identified high levels of TP and TN from this site as a result of the large housing development on site. We constructed a wet swale with riprap that includes reconstruction a forebay, swale and level spreader system to optimize the function and slow down the flow of water to allow for infiltration prior to it reaching the storm drains.

3. **Seven Hills Estates:** As is the case with Skyline Estates this particular BMP operated relatively the same with an open detention pond that did not allow for the necessary contact time for adequate infiltration which resulted in TP and TN entering the storm drains at a higher rate thus adding more nutrient loading into Lake Pocotopaug. This property which is responsible for a 120-housing development is the prime location for storm drain discharge. Due to the amount of storm water discharge we felt it necessary to construct and retrofit a dry detention basin by adding earthen berms to increase the flow path and increase the depth of the retention pond.
4. **Hawthorne Road:** At this location we identified a catch basin which assumes a majority of storm drains which meet up at one location prior to discharging into Lake Pocotopaug. The runoff from the surrounding catch basins is coming from Route 66 and surrounding properties of the Town Hall building and multi-unit housing developments. This location was sited a few times in previous years with fine course sediments reaching the lake front. As a result, we isolated this storm drain to create a retrofit that consisted of a weir like structure inside the catch basin that consisted of Filter Sox built up 4 feet in length. Once the water reaches this catch basin the attempt is to pond the water for a short duration and filter all nutrients through the filter sox eliminating a large amount of TP and TN prior to it reaching the waterfront.
5. **Sears Place Beach Association:** The current location at the end of Sears Place provided little to no BMP's for collecting nutrients prior to its discharge of storm water in the lake. The existing topography shows a 5% grade from the North Main Street entrance down the long stretch of road (approximately 100 feet) where it was intercepted at the bottom of the road by a paved curbing, the paved curbing proved to be unsuccessful at redirecting the water to the side lot on the south end of the Beach Association property where it could infiltrate into dense vegetation. As a result we manipulated the paved curbing and increase the height to 6" rather than 4" and redirected the water to the south side of the beach property where we constructed a rip rap swale with a series of check dams every 6' apart. This allowed for the concentration of storm water to slow down the velocity before reaching the lake front and infiltration of sediment was controlled by the rip rap and check dams.
6. **Wangonk South and North Beach:** the preexisting conditions prior to BMP's had no way of controlling storm water runoff prior to it reaching Lake Pocotopaug. The land on South beach was the final stop for storm water as the road to the beach saw a rapid decline in topography with no BMP's prior to collection into storm drain and the eventual discharge to Lake

Pocotopaug. The same is true with the North Beach as water collected from several storm drains from adjacent streets and collected in one final storm draining before discharging at the beach location into lake Pocotopaug. Each discharge point had a paved culvert which provided no infiltration at each site location. The project consisted of rip rap swales at each location at the point of discharge to infiltrate storm water following discharge from the primary catch basin. Additionally, seed was added to help with the overflow of storm drains and normal run off at each property location.

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The remediation efforts that took place this spring and summer took months to develop, the town partnered with **Steven D. Trinkaus, PE Trinkaus Engineering, LLC**. Steven is a well-respected Low Impact Development engineer throughout the country and has done seminars abroad as it pertains to LID. Steve was the designer of these systems and continues to be an Interquel part of the 9-point plan for Lake Pocotopaug. **North East Aquatic Research (NEAR)** represents the town as the Limnologist and provides monthly sampling of lake water to test for turbidity, dissolved oxygen, clarity, nutrient loading, temperature and cyanobacteria. NEAR is also credited with the creation of the 9-point watershed plan that is the basis for how we determine what projects to complete and at what priority level they are classified at, they keep up with the everchanging watershed to ensure we are current with the necessary projects we establish. The town appointed **Conservation Lake Commission** has been involved in the process of acquiring the town a Limnologist and identifying ways to help make the lake healthy again. Their task is to be the liaison to the **Town Council** and to identify a budget for annual Lake improvement projects to continue improving our watershed and in lake treatment. The Lake Commission and Town Council are invested in supporting the town financially with future projects. In addition to the grant funding from the state the Town continues to invest upwards of \$100,000 a year to go toward the health of the lake, these projects include work on town roads, in lake treatment and educating the public on safe practices in the watershed.

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The results of these projects have proven successful in the short term, you can view the TP and TN levels indicated on the GRTS forms with this final report (**Task 1.c.**). Additionally, we have received one large storm on August 24<sup>th</sup> that accumulated 4.5" of heavy rainfall in a 2.5-hour time frame, this is the equivalent of a 15-year storm. Each of the above LID projects held up to this amount of rainfall and quickly infiltrated into the ground. We will continue to monitor these locations during an active rainfall to gain more insight into the success of these projects.

#### **Task 1.a.ii**

The last year has presented Lake Pocotopaug with great success as it pertains to LID work around the watershed. We have completed 20 projects at 12 locations throughout town that will help with remediation at these locations. As we look forward to the next year we have 8 sites we will be

looking to expand on and develop new LID measures three of these sites are high priority sites on the 9 point watershed plan which includes, Christopher Brook, West Point and Old Marlborough rd. The other 5 sites feed the contributories of Hales Brook, Fawn Brook and Christopher Brook.

Currently, we are in the design phase and working with private landowners to acquire easements from several properties. Conversations have already started, and verbal consents has been given to start the formalized easement process. This will likely continue into the spring months as we prepare to start constructing during the summer months of 2021. These projects will be funding from the 319 grant program through DEP and the town of East Hampton Capital improvement projects account.

**(Task #1.c.): See attached GRTS sheet.**

The Finished product of these projects have seen a tremendous improvement in a small amount of time. Although we can not contribute 100% of the success of Lake Pocotopaug not shutting down this past summer as a result of high Cyanobacteria counts and visible algae blooms, we do know the projects completed helped reduce the phosphorus loading at these locations. Although we do not have calculated numbers to show the correlation between the two, we feel both in lake treatment and watershed treatment have helped us control blooms this year. This data will still continue to be analyzed and comparisons will be made in the coming years.

These projects presented us with many challenges throughout the course of the spring and summer months. Sears Park was most definitely our largest challenge, during construction we unearthed electrical conduit, sewer pipes and an old abandon well. Changing the topography was most certainly a struggle as we took out 3' in some areas of material. Pertaining to the bio retention systems we had to overcome a one-day storm that dropped 2" of rainfall on us and washed out the lower basin and part of the upper basin prior to seed germination. Sears Place started out as a Vegetative Swale but the velocity coming off Sears Place proved to much and even with seed germination washout was prevalent. The end result was a changeover to Rip Rap Swale instead of a vegetative swale. In the end the projects were completed, and additional LID measures were established to help reinforce the initial plan.

**Town of East Hampton**

**Task 1.a.ii**

- Sears Park: Lat 41.5911 Long -72.5076







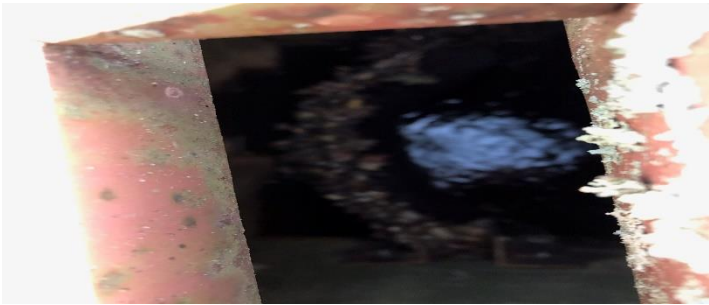
- Skyline Estates: Lat 41.5957 Long -72.5200



- Seven Hills Estates Lat 41.6042 Long -72.5055



- Hawthorne Road Lat 41.5946 Long -72.4935



- Sears Place Lat 41.5889 Long -72.5058









- Wangonk South Beach Lat 41.5982 Long -72.4919



- Wangonk North Beach Lat 41.6027 Long -72.4919











