ENGINEERING ASSESSMENT REPORT

Westchester Lake Dam (NYS DEC File No. 213-0412)
Town of Cortlandt
Westchester County, New York

October 16, 2015

EXECUTIVE SUMMARY

SCHNABEL ENGINEERING OF NEW YORK (Schnabel) was retained by the Town of Cortlandt (Town), New York, to perform an Engineering Assessment (EA) of Westchester Lake Dam (Dam) and develop an Emergency Action Plan (EAP) as required by New York Code, Rules, and Regulation (NYCRR) Part 673. The purpose of the EA is to provide the Town with a comprehensive assessment of the dam for submittal to New York State Department of Environmental Conservation (NYS DEC) for review and comment. The purpose of the EAP is to provide the dam owner and public safety officials information to reduce the potential impacts of a dam failure.

The Dam is a 134-ft long gravity dam comprised of laid-up masonry stone with a concrete cap and a maximum height of 10 ft. The dam is constructed across Annsville Creek, which continues approximately 1.5-miles downstream to its confluence with the Hudson River. The dam is owned by the Westchester Lake Homes Association and the lake is currently used for recreation. The reservoir impounded by the dam is known as Wallace Pond.

The 2015 dam safety inspection revealed significant seepage, erosion, and vegetation along the left abutment, the entire downstream face, and the foundation/toe area of the dam. Based on comparisons with previous inspections, the seepage appears to have significantly increased as a result of ongoing deterioration of the masonry structure. Low level outlets, once capable of draining the dam for maintenance or to mitigate emergencies are inoperable and/or broken.

The Dam is currently regulated as a Class B, intermediate hazard structure. NYS DEC recently issued DOW TOGS 3.1.5 – Guidance for Dam Hazard Classification which defines specific criteria for determining a dam's hazard class. Based on this guidance and detailed dam breach modeling, the dam is more appropriately classified as a Class C – High Hazard Dam due to potential impacts to US Route 9, a Principal Arterial roadway. This classification is not associated with the condition of the dam, rather it is based on the potential impacts due to its failure.

Detailed engineering analyses were performed to assess the Dam's ability to pass the regulated spillway design flow and meet required factors of safety for stability. The regulated spillway design flood (SDF) varies based on the regulated hazard classification. Hydrologic modeling results predict that the Dam would overtop by 3.2 ft during the SDF associated with the current Class B hazard designation, and by 6.0 ft during the SDF associated with the recommended Class C hazard designation. Therefore the existing spillway capacity is deemed inadequate. The stability of the structure was evaluated for four loading conditions as required by the *New York State Guidelines for the Design of Dams*. Based on the results of the analysis, the Dam does not meet requirements for overturning stability for the ice loading and flood surcharge conditions. The Dam also does not meet the required minimum factors of safety against sliding per the NYS Guidelines for all load cases.

Based on the dam safety inspection and engineering analyses, we consider the Dam to be in very poor condition. The Dam is experiencing significant seepage which appears to be increasing based on prior observations indicative of a deteriorating condition of the masonry. The Dam does not have a functional LLO and does not meet the required spillway capacity or factors of safety for stability for most load cases. Therefore, we recommend that Westchester Lake Dam be completely rehabilitated, replaced with a new dam or be removed to alleviate the deficiencies exhibited by the existing dam structure, and brought into compliance with NYS DEC regulations.

Replacement of the Dam would involve removal of the existing structure and construction of a new concrete gravity dam at or near the current dam location. Our screening level engineer's opinion of probable construction cost to replace Westchester Lake Dam with a new, concrete gravity dam and spillway sited at or adjacent to the existing dam is $1,600,000 with an accuracy range of -50% to +100% ($800,000 – $3,200,000).

From a construction point of view, the removal of Westchester Lake Dam is less complicated than rehabilitation or replacement; however, the permitting requirements are more intensive. To support the permitting of its removal, three additional studies would be required. The first would be a delineation of any wetlands (and an assessment of the impact), the second study would be a hydrologic and hydraulic analysis to quantify any impacts on downstream flooding that could result from removal of the dam. The third study would involve verification that impounded sediments are not contaminated. Sediment sampling would be performed in the vicinity of the spillway, and environmental testing would be performed to evaluate the presence of metals, pesticides, etc., that exceed allowable levels. Assuming it is permissible, our screening level engineer's opinion of probable construction cost for the dam removal is $430,000 with an accuracy range of -50% to +100% ($230,000 – $860,000).

The EAP was due in August 2011 and the EA was due in August 2015. Both documents should be submitted to NYS DEC as soon as possible. Once submitted, the NYS DEC will likely accept the EAP, make a judgment on Dam's hazard classification, and request that the dam owner initiate remedial measures and submit a compliance schedule for its replacement or removal.

WESTCHESTER LAKE DAM PHOTOGRAPHS

134 foot long gravity dam comprised of laid-up masonry stone and concrete cap.
Maximum height of 10 feet

Photo 1: Dam Spillway

Photo 2: Wallace Pond / Westchester Lake Side

Photos Taken by Town of Cortlandt – Department of Technical Services

Photo 3: Front of Dam (Seepage through face of dam. Temporary piping installed to drawdown water level of the dam.

Photo 4: Front view of dam during sunny day conditions

Photos Taken by Town of Cortlandt – Department of Technical Services