COMPUTER-AIDED COMPLIANCE

Modeling programs promote a speedy raceway design

By Perrine Parrod

The New Jersey Motorsports Park in Millville, N.J., will be a three-phase, multifaceted complex with a 4.01-mile raceway as its focal point. Phase I of the project, which is essentially about creating a motorsports resort, will have design features and characteristics similar to those of the legendary Virginia International Raceway.

The project has received all municipal, county and state approvals. A portion of the property is presently owned by the Delaware River and Bay Authority as part of Millville Airport. Sale of this property to New Jersey Motorsports Park requires Federal Aviation Administration (FAA) approval in the form of a land release.

Engineering of Phase I is complete. It encompasses 507 acres and will require the movement of approximately 400,000 cu yd of material as part of the creation of six infiltration basins. Storm water management facilities have been designed and approved by the New Jersey Department of Environmental Protection (NJDEP) in accordance with the Stormwater Management Rule (N.J.A.C. 7:8), following guidelines as outlined in the *New Jersey Stormwater Best Management Practices* (BMPs) *Manual*.

In addition to the basins, the project employs the use of nonstructural low-impact development storm water management measures for pretreatment of runoff prior to it reaching the basins. As there is no curbing proposed for the project, impervious areas are disconnected from storm sewers, allowing filtration and removal of pollutants by surface vegetation. Dedicated/deed-restricted filter strips along the proposed track will ensure that these areas remain vegetated.

The biggest challenge was the proper sizing of the six infiltration basins to accommodate runoff from approximately 1,450 acres within the 507-acre property without impacting the race track. In addition, in order to be able to construct what will be one of the longest road courses in the U.S., it will be necessary to pipe a large drainage ditch that traverses nearly the entire width of property. The drainage ditch conveys 108 acres of runoff from the airport and necessitated 1,760 ln ft of 84-in. culvert.

Software Solutions

StormCAD was utilized to size approximately 16,000 ln ft of storm pipe, the design of six infiltration basins was performed using PondPack and HEC-Ras and FlowMaster were utilized to design the culvert to pipe and existing drainage ditch.

The physical challenges of the site were complicated by the need to satisfy a myriad of sometimes conflicting NJDEP and FAA requirements. To meet the groundwater recharge requirement of NJDEP, storm water needs to remain on site and slowly percolate into the ground. On the contrary, the FAA's requirement for storm water basins is that they must completely drain within 48 hours to deter waterfowl from congregating.

Detailed infiltration calculations were required for the project to demonstrate that the requirements of both regulatory agencies were met. PondPack enabled these calculations to be performed with ease and efficiency.

"Throughout the design process, I found the Bentley software to be an enormous asset," said Rebecca L. Koze, P.E., project engineer at Paulus, Sokolowski & Sartor LLC. "In particular, the ease with which PondPack enabled the infiltration calculations of the six storm water basins to be performed is far superior to all the other programs I have used."

StormCAD was utilized in the design of the site's storm pipe. The most significant benefit of using StormCAD for storm pipe calculations is the ease with which revisions can be made. By performing the project's required storm pipe design revisions in the program, a significant amount of time was saved. It enables tracking and updating of design information and provides unique coordination between calculation, plan view drawings and profiles.

A major aspect of the project design consisted of the piping of an existing drainage ditch with the 1,760 ln ft of 84-in. culvert pipe. PondPack was again utilized to calculate the runoff volume to the ditch. Prior to modeling the ditch in its existing and proposed conditions in HEC-Ras, FlowMaster was used to calculate the culvert size required.

It was estimated that project costs for Phase I will be $40 million and for all phases will be $100 million. At its completion, the New Jersey Motorsports Park will be a powerful magnet and catalyst for smart growth throughout the Millville and Cumberland County, N.J., region. SWS

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