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Masterson Construction Corporation Completes Demanding Site Work for Salem Cluster Housing

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Masterson Construction Corp.

Finishes Earth Moving and Rock Blasting in Relatively Small Area to Follow Natural Contours of Hilly Terrain



Working to clear blasted rock, from left to right, are: a CAT 330C Excavator, a Sandvik QJ341 Crusher, Akerman and Volvo excavators.

By Paul Fournier

Site work on the latest phase of one of the largest single-family housing developments on Massachusetts' North Shore presents some difficult logistics to the contractor.

"We're moving a lot of materials in a relatively small area," said Bill Peach, P.E., Project Manager for Masterson Construction Corp., site contractor for the 160 acre Strongwater Crossing housing subdivision under development by DiBiase Corporation in Salem, Massachusetts.

"In addition, the site is very hilly," Peach continued, "it has some steep slopes, and the earth is characterized by many large boulders and substantial amounts of ledge."

The uneven character of the project's original terrain ruled out the use of high-volume pan scrapers to move an estimated 15,000 cubic yards of earth cut and fill and 5000 cubic yards of rock. The plan and profile of a proposed new 50 foot wide roadway (Amanda Way) illustrates what the site contractor faced: At Station 5+0 for example, where the roadway slopes down from north to south at three percent grade, elevations ranged from 89 at the left existing sideline to 107 at the right existing sideline, with the proposed road centerline at 103. In

other words, there are about 14 feet of fill on the left side and four feet of cut on the right side of the proposed roadway.

Just 200 feet further south to Station 3+0, the existing side elevations run from about 96 left to 105 right, with the proposed centerline at 97 – mostly in cut.

A little further south, at Station 1+0, where the road slopes upward at one percent, the existing sideline elevations run from approximately 73 left to 77 right, with the proposed roadway centerline at 95 – up to 22 feet of fill.

These conditions prompted the con-

tractor to rely on a fleet of excavators, loaders, dozers and off-highway trucks to bring the site to specification grades.

Natural Setting for Cluster Homes

The project was designed to be undertaken in 10 phases over a period of up



A Volvo excavator loads blasted rock into an off-highway hauler.

to eight years. With an ultimate goal of delivering 130 house lots, Strongwater Crossing is currently in Phase 2-B, slated for the fall 2013 delivery of 13 homes. There are five home designs, with prices starting at just under \$500,000. A prior phase of the development, comprising 36 lots, was already sold out when phase 2-B construction began.

DiBiase received a special permit from the Salem Planning Board for cluster residential housing that exempts the subdivision from lot area and frontage requirements of the city's standard zoning ordinance. Under Massachusetts law, municipalities can create such flexible zoning, also called open space residential design, cluster, planned unit development, or conservation subdivision. Each municipality adopts a cluster housing plan unique to its own standard zoning ordinance.

Salem adopted a cluster plan for the purposes of "promoting the more efficient use of land in harmony with its natural features and with the general intent of the Zoning Ordinance and to protect and promote the health, safety, convenience and general welfare of the inhabitants."



A Cat 345C Excavator places Michie arch culvert section.

Construction of Natural Gas and Electric Lines are Handled Differently From Other Utilities.



An Akerman EC450 feeds blasted rock to Sandvik QJ341 Mobile Crusher while a Cat 950 Loader works to remove crushed material.



Overburden is removed by a Cat excavator as Furukawa HCR900 Track Drill bores holes for explosives.

As part of the city's cluster requirements, the developer's plan, as much as possible, must follow the natural contours of the terrain and respect the natural features of the site. In addition, there is a formula the developer must adhere to for cluster housing that defines how much space has to be devoted to open land. Strongwater Crossing covers about 160 acres and has more than 90 acres of open land in its natural state of wetlands, meadows and woods, with more than a mile of walking trails on hilly terrain.

A Demanding Task

Eastern Land Survey of Peabody prepared the plans and specifications for the aesthetic and environmentally sensitive subdivision site. Constructing roads and underground utilities for the ever-increasing number of house lots, while maintaining the area's natural setting and protecting homeowner's properties, is a demanding task for the site contractor.

Masterson's general approach to performing this project was outlined by Bill Peach: "We have spent a good deal of time with the owner to phase and sequence the project, working around existing home owners, and accommodating some changes such as substituting arch culverts for originally planned concrete bridges," said Peach. He said designers anticipate the substitution to lead to lower lifetime maintenance costs.

Masterson's contract calls for building as much as 1,000 linear feet of road-

ways. The 50 foot wide roadways are to be paved with 4 inches of bituminous concrete over 12 inches of gravel base. (Asphalt materials supplier and paving contractor had not been selected as this report went to press.) Rock blasting for both roadways and underground utilities is conducted by Construction Drilling Services of Franklin, Massachusetts, under separate contract with DiBiase. Blasted rock is taken to Baystate Crushing's on-site Sandvick Crusher. The crusher is reducing an estimated 10,000 tons of rock to minus 6 inch material for reuse on site under road pavements and to build some walls. Large boulders and oversize blasted rock are broken up by a Gorilla hydraulic demolition hammer wielded by a Volvo 360 Excavator.

Masterson is also excavating and installing approximately 1,100 feet of PVC gravity sewer pipe and 900 feet of cement-lined ductile iron water main supplied by EJ Prescott, and about 700 feet of reinforced concrete storm water pipe supplied by Scituate Concrete Pipe. Phoenix Precast is providing drain and sewer manholes. Most sewers are installed between 10 and 12 feet below grade. Despite the depth, little groundwater was encountered in trenches, and any water penetrating trenches was readily removed using generators and 2 and 3 inch pumps.

Construction of natural gas and electric lines are handled differently from other utilities. Masterson is excavating and installing PVC conduit piping in which

electric cables will be inserted by the local electric company. For natural gas lines, Masterson performs the excavation but the gas company installs the pipe.

Replicating More Wetlands than Lost

In addition to excavating and installing underground utilities, the contractor is excavating wetland replication resources, installing two 75 foot long Michie arch culvert road crossings, and building retaining walls up to 25 feet tall using Redi-Rock supplied by Carroll Concrete.

Preserving the extent of wetland resources at the site was of great concern to city planners, since some 4,600 square feet would be lost to construction. The city required that the wetlands be replicated elsewhere in the subdivision at a minimum of 1:1 ratio. DiBiase hired wetland scientist Epsilon Associates to investigate the area and determine a suitable site for wetlands replication. As part of their responsibility, the scientists also prepared a vegetation planting scheme and agreed to monitor wetlands construction. The replication site amounts to more than 6,300 square feet – well over the mandated 1:1 ratio.

Tall Walls and Large Storm Water Storage

With so much deviation in land elevations, a number of retaining walls are required in the subdivision – some of them exceptionally tall. Masterson is installing about 6,000 square feet of Redi-Rock Cobblestoned face retaining

wall blocks. About 1,000 of the one-ton blocks are involved. Manufactured of 4,000 psi wet cast concrete, the heavy blocks can be stacked without any geogrid reinforcement to form a 25 foot tall gravity retaining wall, according to Casey Scavone, a representative of Redi-Rock of New England. Masterson is employing a Cat 345C Excavator to place the blocks, which have a self-aligning knob-and-groove design.

Due to the hilly terrain, the need to control, treat and temporarily store storm water runoff is vitally important to the subdivision. To this end, Masterson is excavating and installing a Stormceptor supplied by Rinker Materials. This structure removes fine sediment, oil, floating and sinking debris from storm water. To prevent flash flooding in a heavy rainstorm, designers called for the installation of a substantial underground storm water storage bed consisting of up to ten, 40 foot long lengths of Lane 48 inch HDPE pipe supplied by Vellano Brothers Inc.

Pleased with Job Progress

Masterson Project Manager, Peach, said he is very satisfied with progress at the site, attributing it to the longtime experience of his crew and close coordination of the work with Paul DiBiase, President of DiBiase Corp. "This is our first project with DiBiase, a well respected local builder, and we're pleased for the opportunity. This project is a great fit for our company." 🍌