Volume 75 Number 1 • JANUARY 2011

ACP
Associated Construction Publications

New England Construction

Edition

Serving Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont Since 1936

INSIDE

CONNECTICUT CAPITOL GROUNDS ARE "GREENED"

Pervious concrete sidewalks, porous asphalt parking lots and rainwater recycling system are installed at National Historic Landmark

By Paul Fournier

Laydon Industries workers place pervious concrete from Tilcon's Oshkosh truck for Capitols Green Project at Connecticut Capitol in Hartford.

The landscape surrounding Connecticut's towering capitol building in Hartford is being "greened" under a one million dollar project funded by federal and state grants.

Laydon Industries of New Haven has a contract with the Metropolitan District Commission (MDC) to dramatically overhaul the grounds surrounding the imposing building, an Eastlake Style architectural structure with a 26-story tower and a massive exterior comprised of Connecticut marble and Rhode Island granite.

Architect Richard M. Upjohn designed the stately building, which was built over a period of seven years by contractor James G. Batterson and officially opened for the Connecticut General Assembly session in 1879. Its original cost estimate (though the actual outlays more than doubled that) was about one million dollars, roughly the same as the cost of the current grounds project.

Contractor Jeffrey Laydon said that to the best of his knowledge, this grounds project is the first installation of its kind funded by the MDC. He described the project simply as "replacing existing sidewalks and parking lots surfaces with pervious materials to catch rainwater. That water is then piped to a detention system and used for irrigation."

But this description understates the complexity of the project.

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2011: Better, Worse or More of the Same?

January 2011... hope, anticipation, concern, fear, trepidation and worry are some of the words I've heard when digging for information about what to expect over the next 12 months. I didn't hear anyone saying great, fantastic, exceptional or the like. Optimists are projecting a gain while pessimists are saying flat or even "double dip."

However, with the recent announcement of the extension of the Bush-era tax cuts, our U.S. economic outlook for 2011 has improved. The result of this policy decision should be increased consumer spending, business investment, corporate profits and GDP growth.

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Connecticut Capitol Grounds Are "GREENED"

Owner: Metropolitan District Commission
General Contractor: Laydon Industries

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Wet Weather Management

According to contract documents these pervious installations are designed to reduce stormwater runoff, control local flooding, recharge groundwater and eliminate ponding. They are also intended to filter pollutants for biodegradation. To achieve these environmentally beneficial goals, the finished surfaces must allow at least five gallons of water per minute to infiltrate directly through without causing the formation of large puddles or surface runoff.

As designed by the Wethersfield, Conn., office of Camp Dresser & McKee Inc. (CDM), the green project includes extensive wet weather management features. These entail removing existing bituminous concrete from parking lots and replacing this material with 2,500 sq. yds. of porous asphalt (bituminous concrete) pavement; demolishing existing sidewalks and replacing them with some 2,400 sq. yds. of pervious concrete; and installing approximately 300 sq. yds. of permeable concrete pavers.

Complex Specifications

Laydon had to remove existing sub-base materials and replace them with precisely engineered materials for the recharge bed, and install new HDPE underdrains. This was a labor-intensive, time-consuming process.

For example, after crews excavated existing bituminous concrete and base material, they placed an uncompacted subgrade, a bed bottom filter fabric, a 12-inch layer of clean graded coarse aggregate, a four-inch-thick layer of smaller, filter, aggregate, and finally a four-inch-thick layer of porous bituminous concrete.

An equally precise but slightly different recharge bed was constructed for the pervious concrete sidewalks. For these, following excavation of existing sidewalks, crews installed an uncompacted subgrade, a bed bottom filter fabric, a minimum of 16 inches of base course aggregate, and a six-inch layer of pervious concrete.

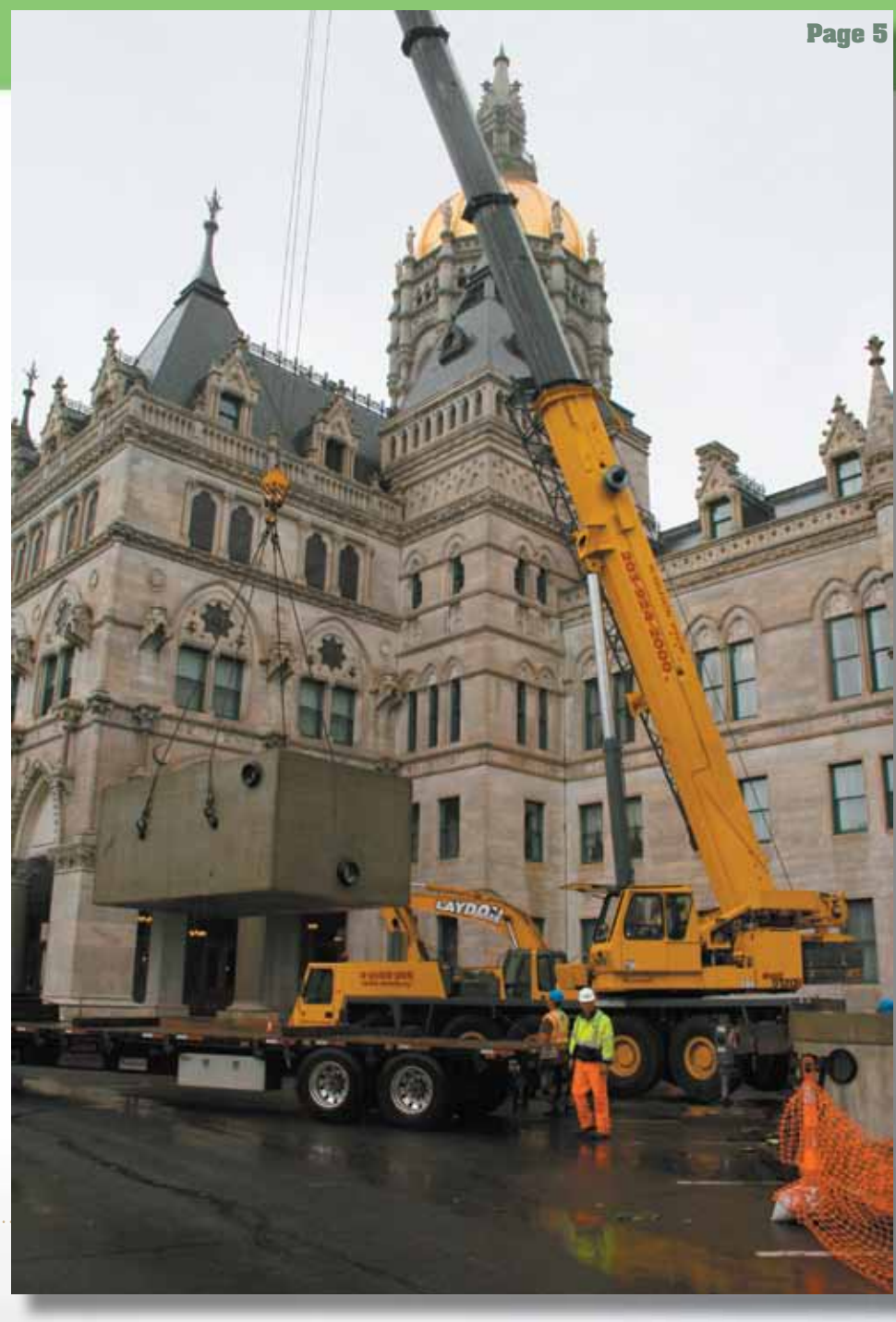
For the permeable pavers sections, the meticulous specifications called for the subgrade to be compacted, this to be followed with the placement of filter fabric, eight inches of subbase aggregate, eight inches of a smaller, base aggregate, a two-inch layer of filtration sand as a setting bed for the pavers, then the 3-⅛-inch thick pavers.

All ready mixed concrete and bituminous concrete, both regular and porous materials, were supplied by Tilcon, while the permeable pavers were provided by IDEAL Concrete Block Company Inc.

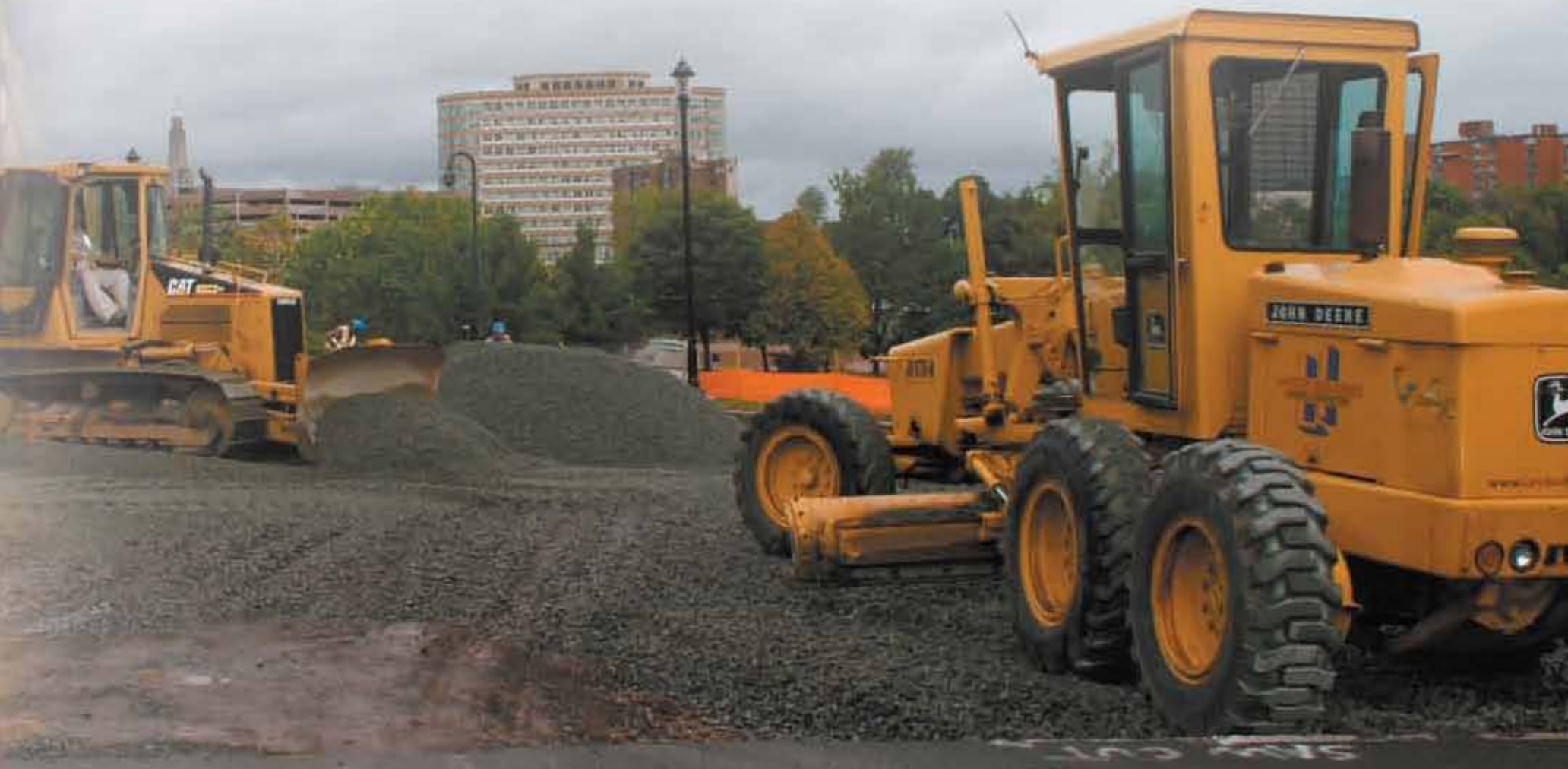
Equipment and Precautions

The contractor's principal digging and aggregate placement and handling equipment for the project included a John Deere 270C LC tracked excavator, a John Deere 210C W rubber-tired excavator, a CAT D5 dozer, and a John Deere 570-A motor grader. Paving was accomplished using an Ingersoll Rand Blaw Knox PF4410 paver, with HAMM and Ingersoll Rand double steel drum rollers providing compaction where required.

In line with the paving operation, specifications disallowed cold joints, requiring them to be heated to 170-degrees Fahrenheit. Laydon chose a Ray-Tech infrared heater to accomplish this, but took a precautionary measure to prevent the narrow wheels of the dolly-mounted heater from exerting too much concentrated pressure on the porous asphalt. Excessive pressure could consolidate the porous asphalt in the wheel tracks, reducing voids and thus surface permeability.



Flanked by Capitol tower, Grove GMK 5120B crane provided by A Quick Pick Crane Service offloads 18-ton cistern from flatbed truck.



A CAT D5 dozer spreads crushed stone for recharge bed while John Deere 570-A grader finegrades material.

Left: A Grove Crane, supplied by A Quick Pick Crane Service, lowers Arrow Concrete Products rainwater cistern in trench supported by Icon Slide Rail System.

John Deere 210CW excavator supports Ray-Tech heater used to heat paving joints, as Ingersoll Rand roller compacts pavement in background.

Below: Ray-Tech infrared heater is suspended by chain attached to excavator bucket to keep dolly wheels off porous asphalt.

The contractor precluded this possibility by positioning the smaller John Deere excavator off to the side of the paved surface and suspending the heater slightly above the surface with a chain slung from the excavator's boom.

Rainwater Harvesting and Green Roofs

Other major aspects of the green project are the construction of vegetative roofing to replace existing ballasted roofs at ground-level grade, and the installation of a rain harvesting system.

Engineers called for the vegetated roof as a means of capturing rainwater, much of which through natural evapotranspiration is returned to the atmosphere. This reduces runoff into storm drains and lowers heating and cooling costs for the building.

Construction of the rainwater harvesting system included the excavation of a 20-ft.-deep hole and the installation of a precast concrete circular pump chamber and a rectangular 6,000-gallon-capacity cistern for storing rainwater. Roof leaders from buildings will convey rainwater to the cistern for storage, while the pump will be used to feed rainwater to the grounds irrigation system.

Laydon employed the JD 270 excavator to dig the hole and to install an ICON Slide Rail System to support the sides of the excavation.

VIP Products supplied the precast concrete structures, which were manufactured by Arrow Concrete Products. A Grove GMK 5120B hydraulic crane provided by A Quick Pick Crane Service placed the 18-ton cistern and the smaller structure in the trench.

All site work was self-performed by Laydon Industries, with the exception of landscaping, which was subcontracted to Edi Landscape LLC of Southington, Conn.

Finishing the Job

Laydon started work on this unique project in late August 2010, and had essentially finished the project well before its specified completion date of December 26, according to Jeffrey Laydon. He added that the target date had been extended to May 2011 to finish punch list items and incidental extra work.