

A P P L I C A T I O N S

Hold it together



Cellular-confinement system protects salmon stream

Building a bridge over a sensitive stream is always delicate business. It's particularly difficult when the bridge needs to go through a deep valley and over a cold-water trout stream (in this case, Silver Creek), that also happens to be the spawning ground for salmon from Lake Ontario. This is the dilemma for the town of Halton Hills, Ontario, Canada, which is in the process of building a bridge to link a newly developed residential area to Highway 401 and Highway 7. Because the bridge is in the bottom of a deep valley, a cellular-confinement system (CCS), manufactured by Presto Products Co., Appleton, Wis., was used to stabilize the steep slopes. The town's construction plans, however, have to satisfy more than the residents.

"That stream means we've got the Federal Fisheries Act, the Ministry of the Environment and Engineering and the Credit Valley Conservation Authority involved," says Doug Inouye, Halton Hill's manager of construction services. "It was important to stabilize the slopes and restore them to as natural a state as possible."

"We're building at a slope of 1.5H to 1 V, a practice against my better judgment," says the project's engineer Lyle Malcolm, McCormick Rankin and Associates, Mississauga, Ontario, Canada. "That's the reason for using the Geoweb material; we're trying to minimize the footprint on the valley. It's one of the most memorable projects I can recall-not because of the size of the bridge but because of the sophistication of the approach fills."

The CCS selected is custom-sized (100-mm-deep cells) and reinforced with tendons. It is installed in a series of benched sections. As each embankment lift is constructed, the CCS is extended 2.5 m down the slope to abut the CCS sections below. It is anchored by a 2.5-m-



long horizontal runout section, which is then covered by the next embankment lift, as shown in the smaller photo. Each panel uses three equally spaced polyester tendons. As explained by Eric Jashewski, Armtec Construction Products, Guelph, Ontario, Canada, and Presto's representative, "The polyester tendons provide the structural mechanism to secure the soil system from sliding on steeper than typical slopes. The textured walls of the CCS provide additional soil/cell interface friction."

Because of the project's timing (work was interrupted during the winter months), bioengineering efforts typically done in the spring and fall were not possible. Instead, mass plantings will be used for additional stabilization. The large-cell system allows crews to plant shrubs and trees within the cells. The project is expected to be completed by October.

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