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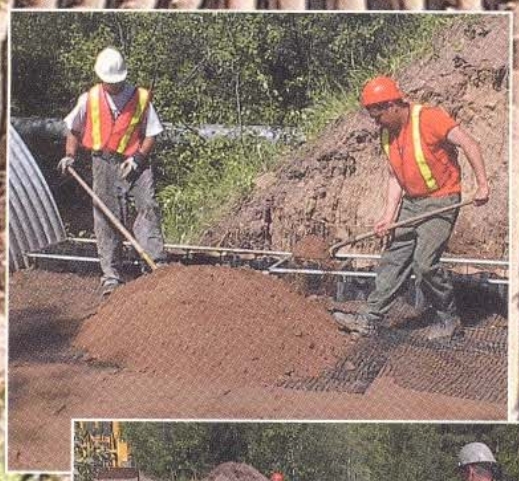
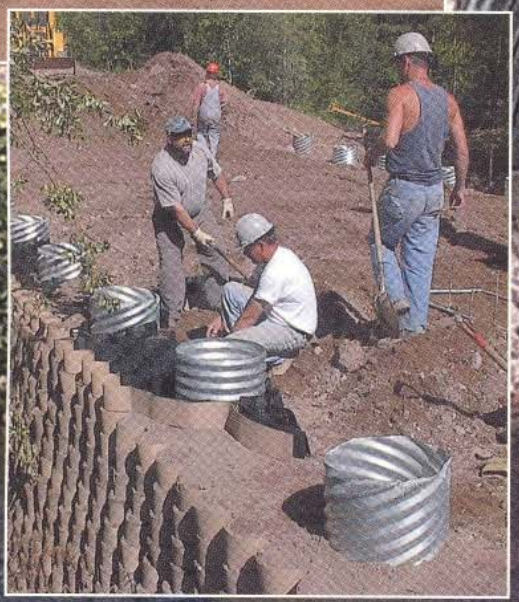
20th Anniversary

# GFR

Engineering Solutions

for Roads, Soil, Water and Waste





# Geocells and geogrids

## save bridge to a remote Canadian town

Geotextiles cap corrosive sludge pond

Hydroelectric pond lining

*GFR*'s 10-year article index

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By Jim McGeary and Doug Lowry

# The bridge to Uranium

In the province of Saskatchewan, Canada, Highway 962 services the remote northern community of Uranium City. Uranium City is located in the extreme northwestern corner of Saskatchewan, north of Lake Athabasca, 30 mi. (48.3 km) south of the border of the Northwest Territories. The city was developed and named as a result of a significant uranium deposit that was first explored in 1946.

At one point, Highway 962 crosses the Fredette River. The wood bridge deck and abutments that had been in service some 40 years were in serious distress. The north abutment was sliding to the south and the deck required complete replacement. Ground access to Highway 962 is limited and very expensive, as there are no permanent roads linking the highway with the rest of Canada. Ice roads are available during winter, or materials may be hauled via barge in the early summer.

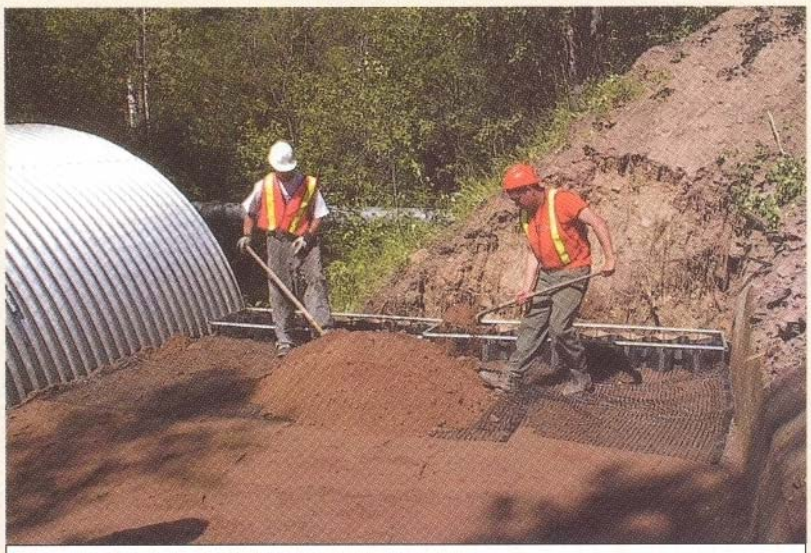

***Photo 1:*** A stretched frame was used to align and hold the geocell product at the proper size until it was partially filled. Geogrid reinforcement was placed under the geocell before filling.

***Photo 2:*** Embedded corrugated steel pipe was installed to facilitate installation of the guardrail posts. The geocell was cut to fit over the steel pipes.

A number of replacement options were considered for the bridge. A conventional girder-on-abutment bridge would have required that heavy construction equipment, such as pile drivers, remain on site for twelve months. This requirement made that option prohibitively expensive.

The Saskatoon branch of Armtec Construction Products was approached regarding an alternative solution. Jim McGeary, the company's Saskatchewan supervisor, was invited to visit the site, along with Department of Highways personnel to discuss possible corrugated steel pipe solutions. Due to environmental and hydraulic concerns, a full-periphery corrugated steel structure was ruled out.

Following a comprehensive site meeting, it was determined that a single radius arch manufactured from structural plate corrugated steel pipe seated on footings would be a viable solution. Existing 3-ft.$^2$ (0.28m$^2$) concrete pilasters that capped wooden piles would serve as the footings. A Geoweb® retaining wall reinforced with uniaxial polyester geogrids would be employed for the headwalls.

Tenders were called requesting the supply and installation of a 5180-mm (17-ft.) span structural plate arch, mounted to the existing pilasters, and associated retaining walls.

Normally a supplier, Armtec chose to bid the project as a contractor.

The scope included:

- demolition, detours, temporary crossing and environmental protection;
- supply and assembly of the arch;
- supply and installation of the retaining walls;
- backfilling and compaction of the arch and retaining walls;

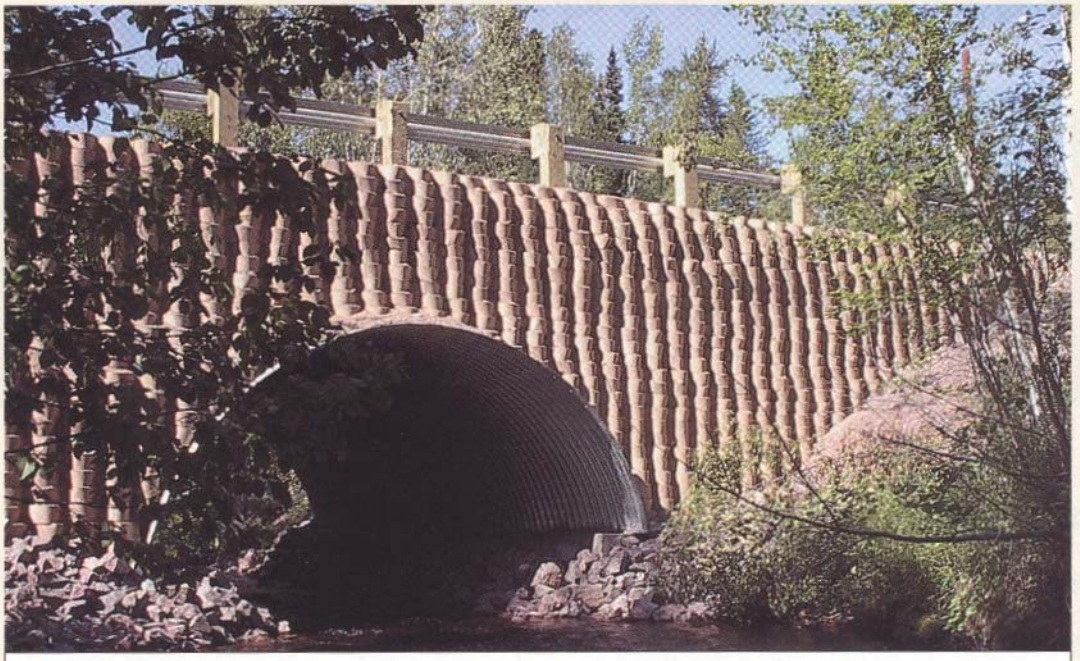

***Photo 3:*** A view of the finished bridge looking upstream. The footings and toe of the wall were riprapped to protect them from erosion.

• supply and installation of the guardrail system.

The contract was awarded in December 2000. All construction materials were shipped to site via the winter ice road. Demolition of the existing bridge started the following June. The project was completed in early August 2001.

The success of this project was due to a number of factors. Both the steel arch and the headwall components were light in weight compared to alternative solutions. The arch was shipped as a series of nested plates, while the geocellular fascia material was shipped in a collapsed and folded form on pallets. The geogrid was provided in roll form. The compact shipping volume and the relatively low weight of the primary bridge and wall components translated into significant savings in the cost of freight.

Both the corrugated steel arch and the geocell/geogrid retaining walls were constructed using simple construction techniques. This feature allowed local labor, inexperienced with these products, to complete the project on time and under budget without the use of large, expensive and specialized construction equipment. **GFR**

**Project Information**

**Geocell manufacturer**: Presto Products Co.
**Geogrid manufacturer:** TC Mirafi

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