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Rural Municipality Controls Flood Waters with an Allan Block Dike Project

The rural municipality of East St Paul of Manitoba Canada lies along the Red River just north of Winnipeg. The Red River is notorious for catastrophic flooding and backing up into Bottomley Creek, resulting in property damage and disrupted living for the residents. To provide flood protection, East St. Paul proposed a \$2 million, 650 ft (200 m) long dike project between the Bottomley Creek banks and the residences. This dike may prevent flooding for 6 properties, but the impacts affect over 60 properties, one of which is a school.

Plan

The municipality reached out to Stantec to come up with ideas for the project. Stantec then investigated multiple design options, which included filling Bottomley Creek and adding a culvert, but due to the impact on the environment they ruled it out. Another option was to design and install a water control structure to stop the flow from Red River, but the “high flow volume from uplands made pumping impractical” according to Thomas Crilly, an engineer with Stantec. A final option that they considered was the use of a dike. The original thought was to use steel sheet piles to create the dike, but that would require the removal of all the existing trees. During this time, Lee Hotas with Expocrete, Allan Block’s local manufacturer, visited with Stantec to discuss options using Allan Block for the dike. Stantec decided on an Allan Block segmental retaining wall system, because it was cost effective, environmentally sensitive, and visually acceptable to the homeowners. “In Winnipeg, Allan Block is known as the Flood Protection Block” stated Lee.

Before any of the design and construction could start, approval from the homeowners was needed on block and color, along with acquiring easements for the land needed for the dike and for construction access.

Project Information

Name: Red River Dike

Location: East St Paul, MB - Canada

Products: AB Stones

Size: 3700 ft² (345 m²)

Contractor: JD Penner Ltd, Winnipeg, MB

Designer: Stantec, Winnipeg, MB

Allan Block Manufacturer:

Expocrete – an OldCastle Company
Winnipeg, MB



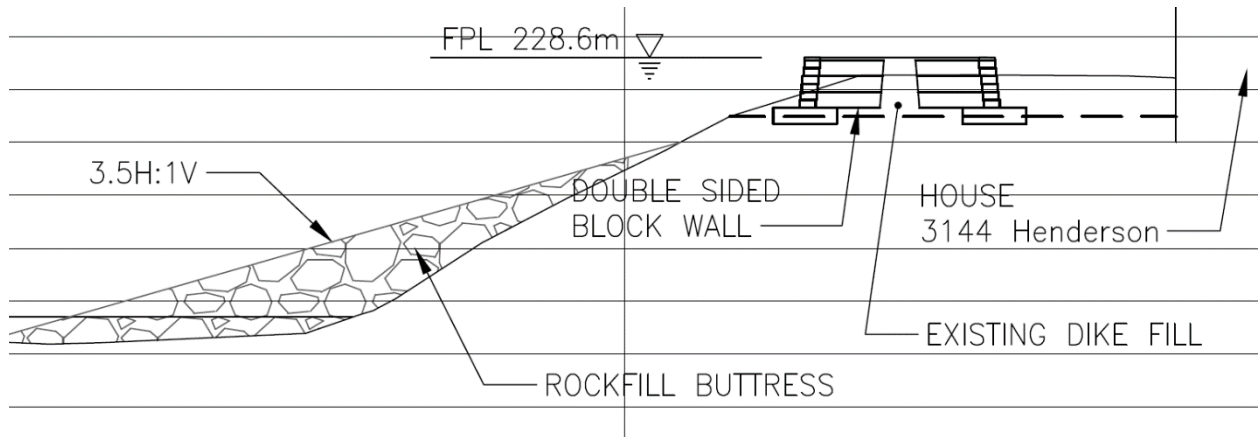
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Design



Once the general plan was determined Stantec created a design that would serve as flood protection while being visually appealing to the homeowners. To satisfy the initial purpose of the dike, the height of the retaining walls was set to 2 ft (0.6 m) taller than the high-water level from previous floods. This resulted in the need for retaining walls to be placed back to back at the top of the creek banks with a clay center to keep water from passing through the walls.

Water is always moving during a flood, which adds another element that needs to be considered. To prevent the moving water from undermining the walls and washing away the creek banks, slope stabilization was utilized. The use of rip rap and matting to promote vegetation was used as a method to prevent scouring of the creek banks.

Due to the close proximity of the houses to Bottomley Creek, the design of the dike had to take into account the tight working conditions and the need for easements. With these tight constraints, the retaining walls that face the houses needed to be aesthetically pleasing to the homeowners. To satisfy this requirement, Stantec designed portions of the wall in a terraced application, where space allowed, to provide access and meet homeowners' preferences. Allan Block, with its "flexible construction and stable configuration," made it an easy choice.





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Build

Borland Construction, the general contractor for the project, contracted JD Penner Ltd, an Allan Block Certified Wall Installer to install the dike. Since the design was narrow, the installation required special steps to be taken. With the walls designed in a back to back configuration with a clay core, the installation of the core happened simultaneously with the walls. Due to the tight constraints, large compaction equipment was not an option for installing the clay core; only small machines were used.



The riverbank provided its own challenges. To prevent excessive environmental damage to the riverbank, all of the construction and access was from the residence side. The use of silt fence during construction, as well as riverbank restoration after construction, had satisfied the environmental damage concerns.

“Allan Block was the perfect style of block for this wall because of its versatility for stairs and terraces that are not available in other options,” said Ben Green, project manager for JD Penner. Ben drives by this project multiple times a week and says that the finished product “still looks great” with the continued vegetation growth.



Allan Block could not agree more with Ben, this is a perfect application to show the functionality and versatility of Segmental Retaining Walls (SRW's) to satisfy any site requirements and appeal to homeowners. This project is a good example of the Plan, Design, Build process working at its best to ensure the project runs smoothly from start to finish.