

TERRAMESH WATERFALL IN PRESTIGIOUS DEVELOPMENT CHESAPEAKE, VIRGINIA USA

ARCHITECTURE

Product: Gabions and Terramesh™

Problem

The owner of a high value prestigious housing community in Chesapeake, VA, wanted to create a marquee entrance to the development. The owner wanted to achieve a waterfall and water cascades.

Solution

Project engineer, Dennis Clark of Millennium Engineers Inc. suggested integrating the storm-water retention ponds with the waterfalls to add a practical application to the architectural enhancement of the site. Two ponds were to be dug into the flat site and the excavated material used to form a 'hill' from which the water would cascade in two directions adding visual interest. The water would fall into one pond over a 27' high vertical waterfall, and in the opposite direction the water would flow over a cascade and drop structures, into a second pond. The water would be re-circulated by pumps within the structures, maintaining the water flow. An overflow system would provide relief under excessive storm-water conditions.

As the onsite material is a silty-sand, it is very porous. Any water within the ponds would soon drain away. Therefore, the entire pond areas, waterfall, cascades and drop structures were lined with a membrane liner.

In spring 2004, Millennium Engineers approached Maccaferri for assistance in designing the structural heart of the waterfall and cascade structures.

Waterfall and Pond 1

Building a 27' tall vertical faced waterfall would require a massive gabion or similar concrete structure. Aware of this, Maccaferri proposed reusing the on-site material as structural backfill to a Terramesh™ MSE (mechanically stabilized earth) structure. Terramesh™ consists of a gabion facing unit with an integral soil reinforcing 'tail' element. This tail is compacted within the structural backfill embankment material, reinforcing it, and forming the MSE structure.

Client:

PRIVATE DEVELOPER

Main contractor:

PRECON CONTRACTING, CHESAPEAKE, VA

Designer:

MILLENNIUM ENGINEERS INC. VA

Products used:

390 CY TERRAMESH, 550 CY GABIONS

Date of construction

JULY 2004 - JAN 2005



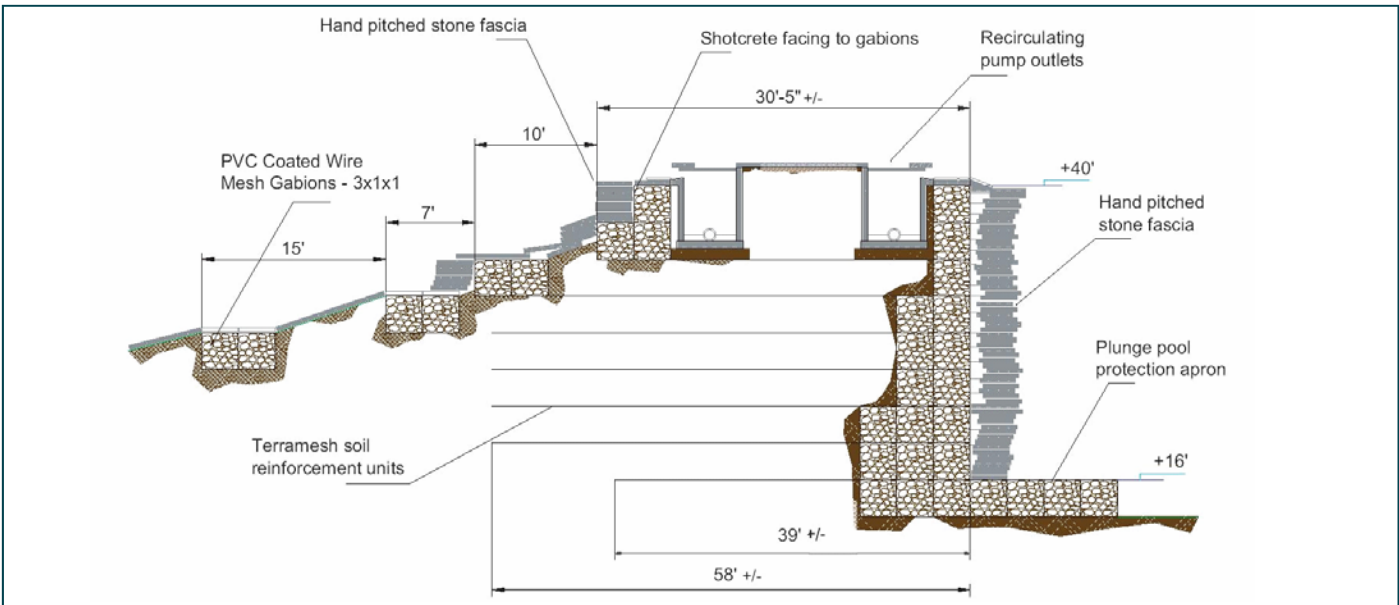
Terramesh™ waterfall under construction



Terramesh™ waterfall under construction



Gabion drop structures under construction (looking upstream)



Project section

Terramesh™ offers the same benefits of a gabion structure (flexibility, durability and simple to construct) but for less cost, due to the reduction of gabion stone fill.

A scour protection apron in the plunge pool beneath the waterfall was constructed from gabions. A concrete cap was cast on top of this apron due to the 27' water drop.

Cascade, Drop structures and Pond 2

A cascade and eight drop structures were designed to carry water from the new artificial hill into the second pond.

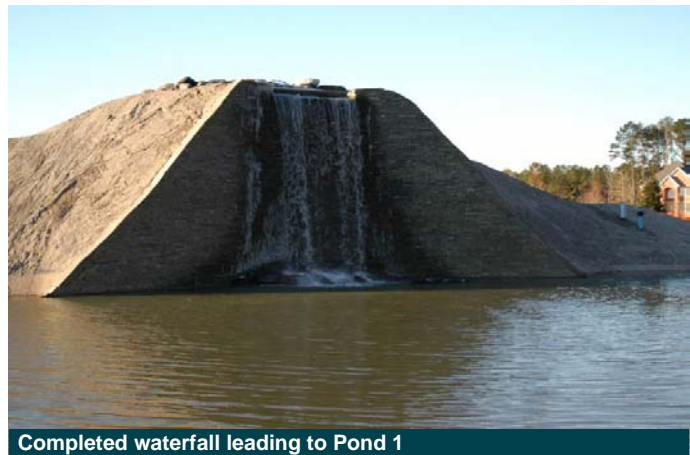
Gabions were used as the foundation to the cascade. Local stone was then used to line the cascade and 'naturalize' the structure.

The drop structures were designed to allow the water flow to back-up at each level. This formed a series of terraced ponds on the slope, all of which, including the drop structures, were constructed from gabions.

Large pumps recirculate the water from the retention ponds, through underground pipework, back to the top of the artificial hill.

The Terramesh™ waterfall was shotcreted and a hand-placed stone facing was applied. The robust, durable, porous face to the Terramesh structure provided an excellent surface for the shotcrete to adhere to.

Contractor, Precon Inc, displayed great workmanship to ensure the gabions and Terramesh™ were installed accurately. This was essential to achieve the desired appearance in this demanding architectural solution.



Completed waterfall leading to Pond 1



Completed cascade leading to drop structures and Pond 2

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