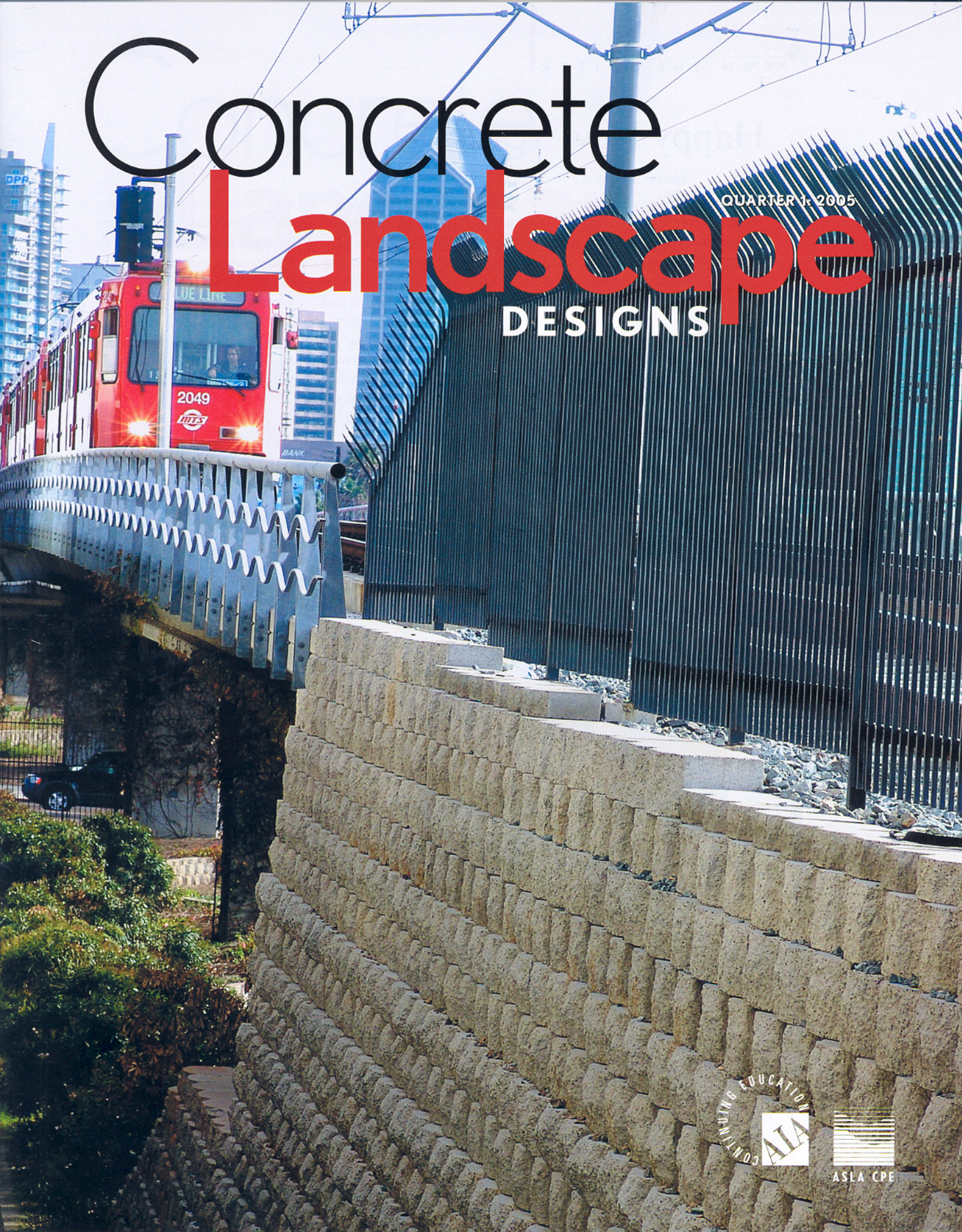


Concrete Landscape

DESIGNS

QUARTER 1, 2005

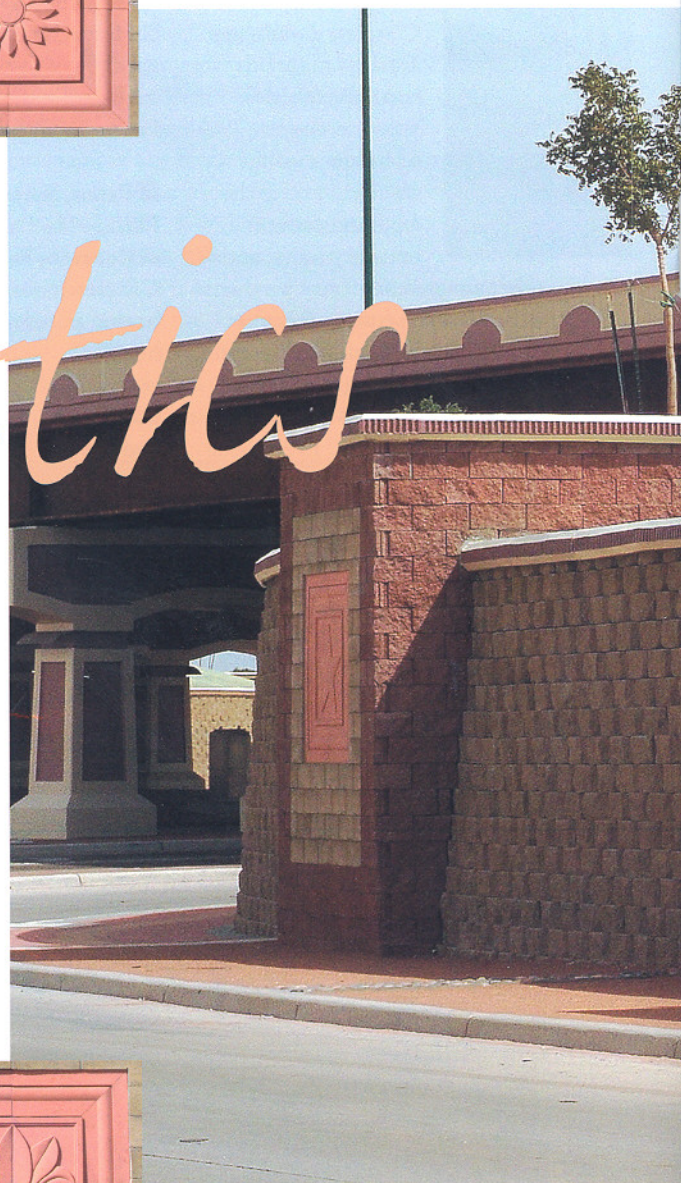


ASLA CPE



Aesthetics *in* MASTER PLANNING

East El Paso, Texas, is witnessing an explosion of growth. Once an arid desert, the only area available for expansion around the city of El Paso is witnessing a bloom of industrial, business, residential, education and entertainment construction. Making this area accessible to the west is the Texas Department of Transportation's (TXDOT) construction of the major corridor of Loop 375, a \$90 million project extending 12 miles (19 kilometers) through East El Paso and located 25 miles (40 kilometers) east of El Paso International Airport. When complete, the project will add seven new highway overpasses and a non-stop three-level



By Ed Olivera





**AIA/ASLA Learning
Objective**

After reading this article
you will understand:
Design considerations for
segmental retaining walls.



With the first contract complete and two ongoing contracts underway the entire project is currently at 45 percent completion and SRWs have played a large part in the timely completion of construction.

interchange. Perhaps the most visually arresting aspect of this multi-contract project is its use of segmental retaining walls (SRW) that highlight the system to be efficient, practical, cost-effective, timely and beautiful. With the first contract complete and two ongoing contracts underway the entire project is currently at 45 percent completion and SRWs have played a large part in the timeliness of construction.

TXDOT has strived for consistency in the appearance of their SRWs, which give these projects their striking look with bold textures, colors and

architectural accents. Jorge Gomez, TXDOT's Project Design Architect for this project, speaks frequently about Loop 375's "aesthetic master plan," a plan where the flexibility of SRWs easily adapt to both structural and decorative uses. SRWs are used principally as retaining walls for Loop 375, but below a 5-foot (1.5-m) height they are easily adapted as terraced walls for landscaping. These terraced walls are treated under separate specification. Taller retaining walls were designed for a live load of 250 psf (12kPa). TXDOT specifications for SRWs are a modification of American Association of State Highway and Transportation officials design methodology.

Design and construction of SRWs create far less disturbance to staging areas than with conventional footing/stem wall construction, since massive footings and steps are not required to deal with changes in wall height. SRWs rest on a concrete leveling pad set above compacted fill, and block courses are arranged above the pad. Although there are some basic design differences, SRWs do compete with cast-in-place concrete construction and can handle earth retention at heights of 30 feet (9 m) and more.

SRWs also have to their advantage ease and speed of construction. As Gomez notes, prefabrication of SRWs can speed inspection in the field: "Time of inspection in the field was decreased due to standardization and quality control at the fabrication sites." The difference in cost in terms of materials and manpower can be as much as 60 percent of cast-in-place concrete structures, according to Miller. Additionally, the time lag created by curing schedules for cast-in-place concrete before backfilling operations can be achieved is eliminated with





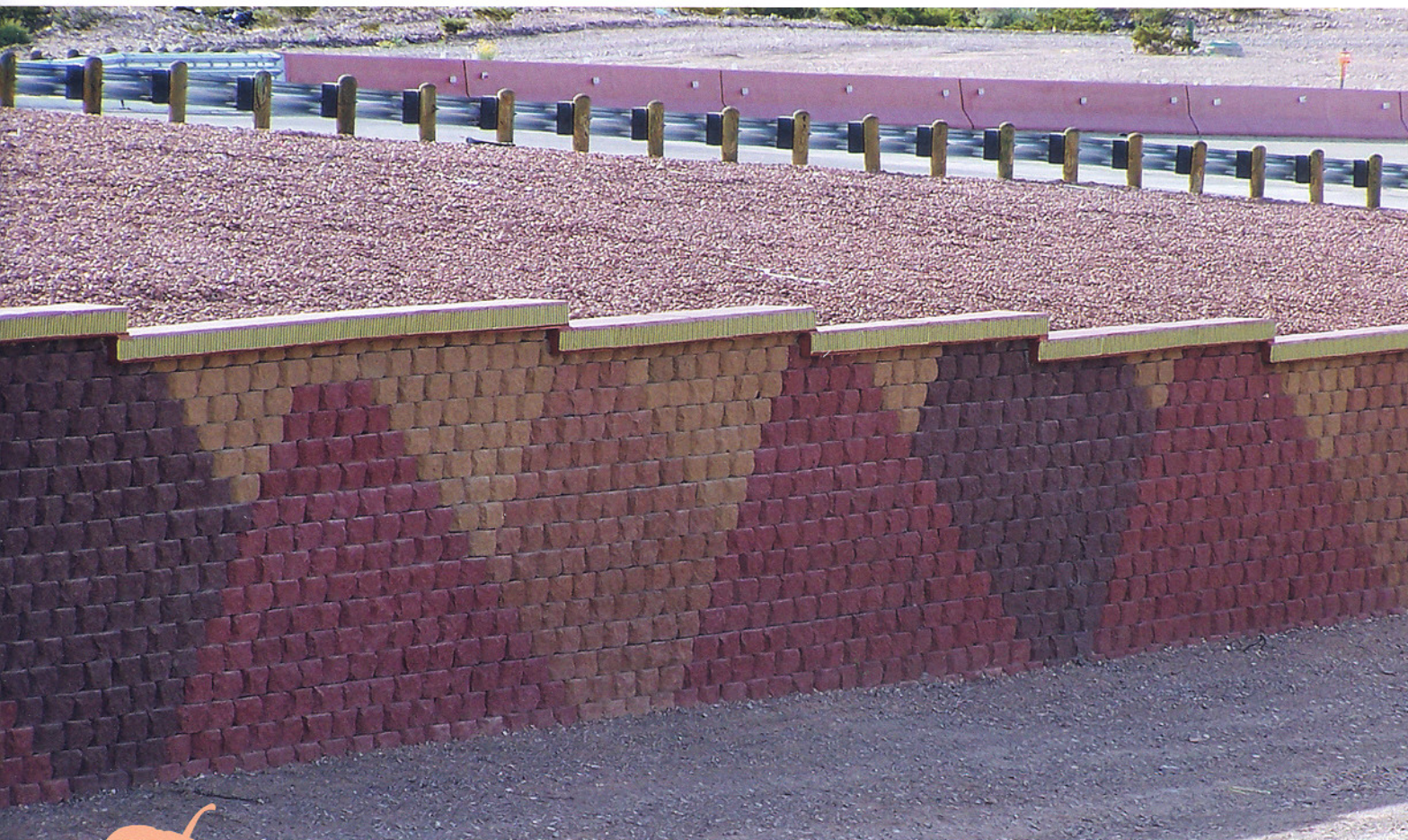
SRWs since the backfill is essentially part of the wall system.

Finally, aesthetic options that open up for SRWs are almost endless, as TXDOT made very evident in their stunning design, obviating the monotonous appearance of concrete walls. SRWs lend themselves more readily than cast-in-place walls to all manner of curved or straight shapes.

SRWs are constructed with a geosynthetic reinforcement behind the wall to form a reinforced coherent mass comprised of the SRW reinforced fill and geosynthetic. Geosynthetic reinforcement is placed in vertical lifts between 8 inches (203 mm) and 2 feet (0.6 m); the reinforcement is placed between SRW units and extends horizontally into the fill. Compacted drainage fill is placed directly behind the block. Miller explains that, "The combination of compacted granular fill and the geogrid work together to form a cohesive mass similar to that of concrete reinforcing steel in a concrete earth dam. Except in the case of SRWs the geogrid acts as the tensile element and the compacted granular fill acts as the compressive element."

Drainage is an integral part of SRWs. In addition to the drainage fill and the general porous nature of the mortarless block wall, a swale is built in back of the coping above the wall that sends water into a down drain. Water also collects under slope rip-rap and a PVC downspout behind the wall drains down to the roadway drainage systems.

The block selected for use on Loop 375 was an 8-inch (203 mm) split-faced block, measuring 8 ×



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17 × 21 inches (203 × 431 × 533 mm). Three colors were chosen for the project that act with great compatibility with the surrounding desert landscape. Perhaps the most dramatic part of the design is the use of buttress-like planters which emerge perpendicular to the wall at regular intervals. The planters rise to the top of the wall and extend slightly forward from the face of wall. Set into the face of the planters are medallions measuring five by five feet, displaying local flora and fauna. The medallions were prefabricated from lightweight concrete in four pieces with embedded anchor bolts secured into the face of the planter vault with an adhesive.

With the completion of the first contract, some 20,650 ft² (1918 m²) of SRW is already in place. Bands of alternating clay red, ocher and sand colors give the project an integrated look with the landscape. Decorative canopy trees and hanging shrubs will grace the massive planters, producing an effect of both variety and consistency of design. Artfully conceived, largely from the use of SRWs and their unlimited versatility of design, Loop 375 is a model of aesthetic master planning. ■