

VERDURA®

Fully Plantable Retaining Wall System



TORY



SOIL RETENTION

Plantable concrete systems®



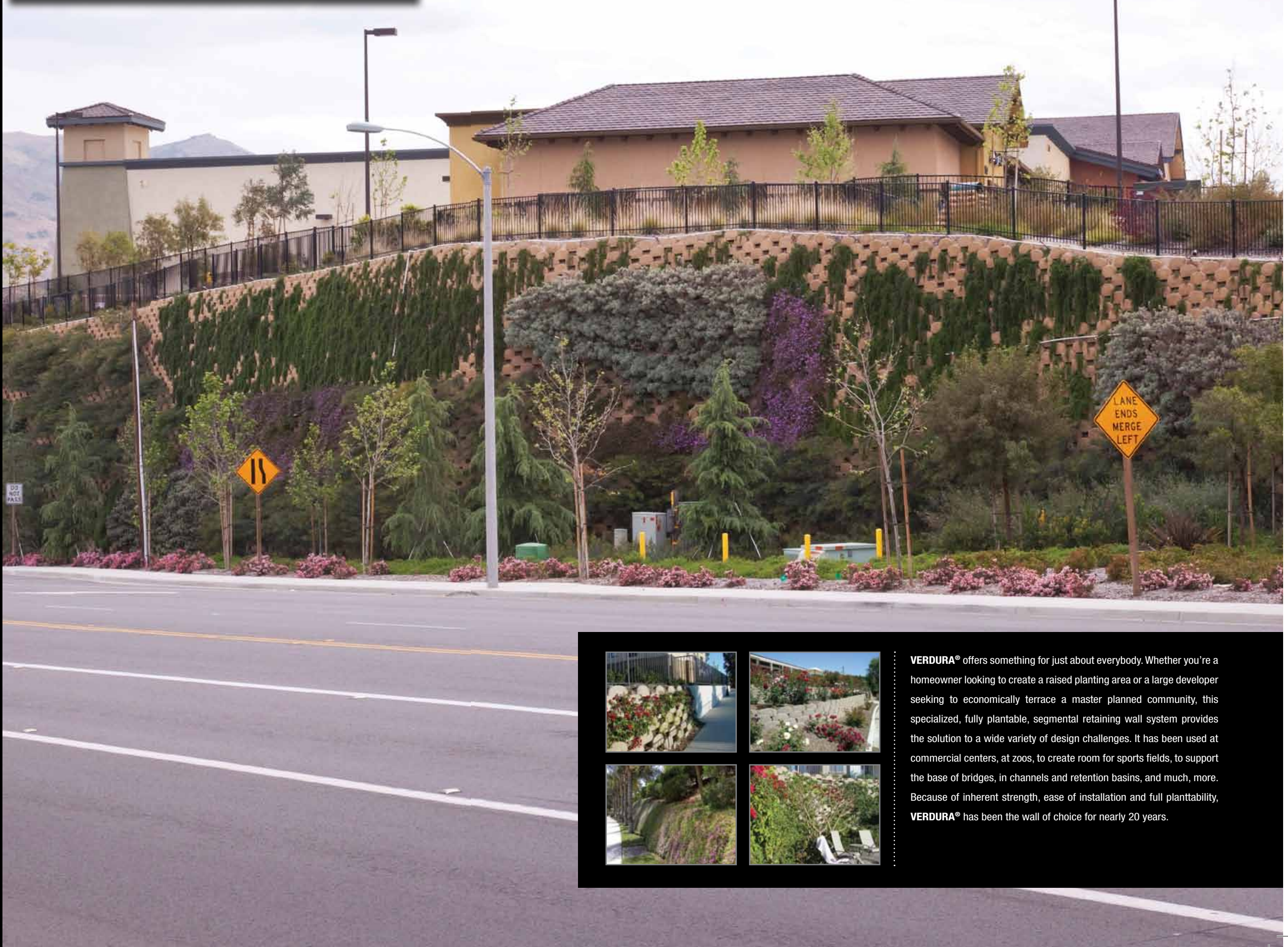
**Nothing beats VERDURA®
for strength, versatility
and plantability!**

The VERDURA® retaining wall system is the most plantable, versatile, and strongest Mechanically Stabilized Earth (MSE) retaining wall on the market today. The name VERDURA® comes from “verde” meaning green and “dura” meaning durable. The VERDURA® wall can be used for a wide range of projects ranging from small homeowner projects to large scale developments. Single tier VERDURA® walls have been constructed up to 50’ and tiered walls have been constructed up to 80’. The system offers a fully plantable face that provides an opportunity to soften the visual impact of large retaining structures. The VERDURA® wall transforms a grade transition into a vegetated “steepened slope” instead of a concrete scar across a hillside. Engineered hillsides meeting development needs while maintaining the aesthetics of our natural environment.

From big to little and everything in-between!

- Backyard Walls
- Raised Planters
- Tiered Walls
- Tree Rings
- Channel Walls
- Detention Basin Walls
- Head Walls
- Screen Walls
- Sound Walls
- Bridge Abutments
- Top, Bottom and Mid-Slope Walls

The Shops at Sycamore Creek 2010 HNA AWARD for Commercial Retaining Walls (10 - 50,000 sq. ft.)



VERDURA® offers something for just about everybody. Whether you're a homeowner looking to create a raised planting area or a large developer seeking to economically terrace a master planned community, this specialized, fully plantable, segmental retaining wall system provides the solution to a wide variety of design challenges. It has been used at commercial centers, at zoos, to create room for sports fields, to support the base of bridges, in channels and retention basins, and much, more. Because of inherent strength, ease of installation and full plantability, **VERDURA®** has been the wall of choice for nearly 20 years.

“There was nothing else available that had the same look or performed the same way as VERDURA®” –

Executive, The Irvine Company



Grading design for hillside development relies upon walls within the slopes to increase lot size and provide panoramic views, which maximizes lot value. Walls can also be used to balance the cut/fill earthwork for sites to preserve natural canyon areas. Mid-slope walls act to provide a buffer between the residential lots and public right-of-way while not losing the valuable horizontal space a graded slope requires.



MASTER PLANNED COMMUNITIES

Newport Coast, CA
 Alberhill Ranch, Lake Elsinore, CA
 Ladera Ranch, CA
 Talega, San Clemente, CA
 Coto de Caza, CA
 Lake Sherwood, CA
 Promontory, Signal Hill, CA
 Crosby Estates, San Diego, CA

BUILDERS/ DEVELOPERS

The Irvine Company
 Standard Pacific Homes
 Brookfield Homes
 Centex
 DR Horton
 HQT
 Trammel Crow
 KB Homes
 Lennar Homes
 Pardee Homes
 Comstock
 Sares Regis

EDUCATIONAL FACILITIES

Carey High School, Las Vegas, NV
 Dana Middle School, San Diego, CA
 Golden Hill Elementary, San Diego, CA
 Riverside Community College, Riverside, CA
 UCI, Orange County, CA
 UCSD, San Diego, CA
 Oak Hill High School, Hesperia, CA
 Los Angeles Science Center, Los Angeles, CA
 Sage Hill Elementary, Newport Coast, CA

RESIDENTIAL DEVELOPMENTS

Crosby Estates, San Diego, CA
 Vista de Oro, Aliso Viejo, CA
 University Heights, Fullerton, CA
 Biscaynne, Placentia, CA
 Pacific Highlands Ranch
 Lake Forest, Orange County, CA
 Amerige Heights, Fullerton, CA
 The Colony at Calabasas, Calabasas, CA
 La Vina Development, Alta Dena, CA
 Vantage Point, Diamond Bar, CA
 Rosetta Canyon, Lake Elsinore, CA

**Enhance your
commercial
development
with VERDURA®**

COMMERCIAL

Cabazon Center, Cabazon
Colonies Crossroads, Upland
Costco, Inglewood
Costco, Laguna Nigel
Costco, San Marcos
Del Mar Plaza, Del Mar
Home Depot, Apple Valley
Kaiser Permanente, Chula Vista
Kaiser Permanente, Pinole
Pacific Life Corp. Headquarters, Aliso Viejo
Palomar Pomerado Hospital, Escondido
Silver Hawk, Temecula
Sycamore Creek, Corona
Target, Mission Viejo
Target, Plaza, Vista
Target, San Clemente
Westlake Landmark, Westlake

RESORTS

Green Valley Ranch, Las Vegas
Renaissance, Westlake Village
St. Regis Resort, Dana Point

CASINOS

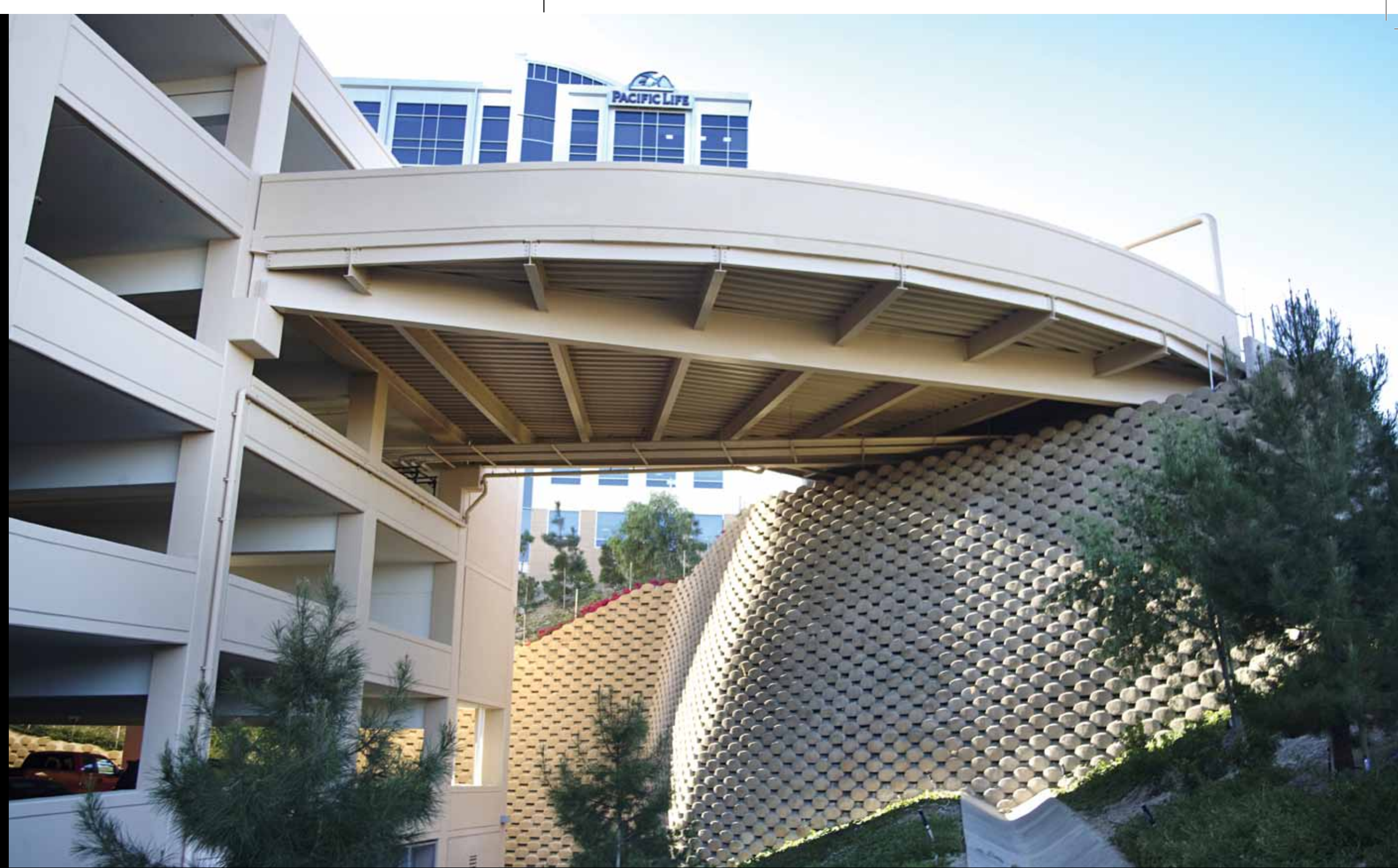
Sycuan Casino, San Diego
Venetian, Las Vegas

GOLF COURSES

Alta Vista, Placentia
Coto de Caza, Orange County
Los Verdes, Rancho Palos Verdes
Pelican Hills, Newport Beach
Shady Canyon, Irvine
The Crosby, San Diego

ZOOS AND PARKS

San Diego Zoo, San Diego
Sea World, San Diego
Wild Animal Park, San Diego



• VERDURA® is CALTRANS Approved!



Strong enough to hold up roads and bridges.

Transportation projects always have to work. People count on roads and bridges to allow movement in their daily lives. At the same time, commerce depends on the ability to transport goods and services from place to place. With its enduring strength, dependability and rapid rate of installation, **VERDURA®** provides a backbone support for transportation design, offering structural quality and cost effectiveness. When installed, instead of a conventional slope, **VERDURA®** reduces the impact of bridge or roadway development on adjacent space, minimizing environmental mitigation requirements or the taking of additional land.





**VERDURA®
accommodates
high and low
velocity hydraulic
flows!**



The **VERDURA®** wall system can be utilized in a variety of channel and stream bank stabilization applications. **VERDURA®** retaining walls can be installed in a channel or stream that has flow velocities of up to 25 fps when built in a closed face configuration. The closed face construction is typically done below the high water line in high velocity situations, while up above the high water line the wall can be built with an open face configuration to allow planting. The strength and versatility of the **VERDURA®** retaining wall system make it the ideal choice for vegetated channels. **VERDURA®** walls have been used in the low flow velocity Venice canals to the flash flood plain in Indio, California.

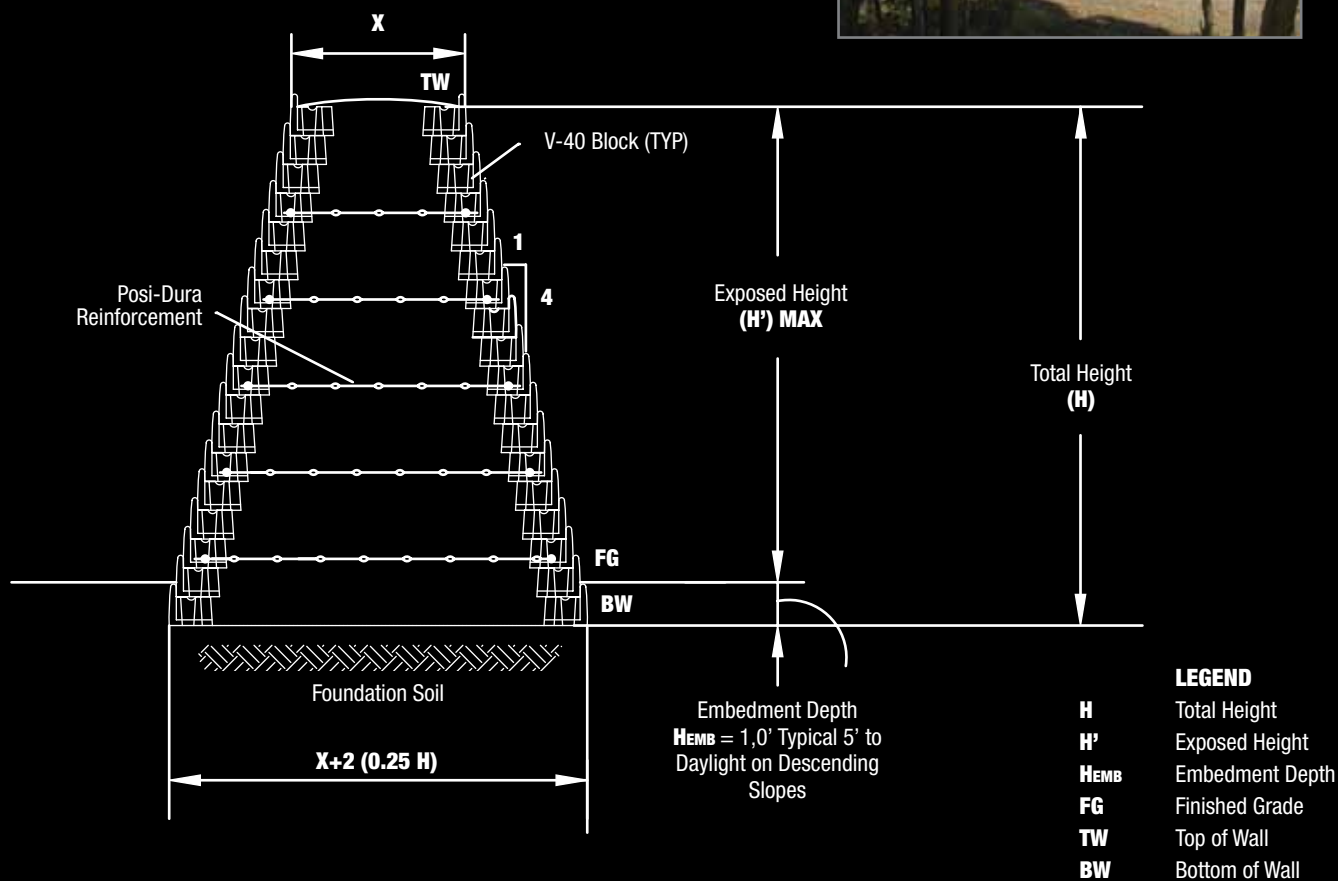
APPLICATIONS

Bioswales
Channels and Canals
Detention Basins
Stream Bank Protection
Water Quality Basins

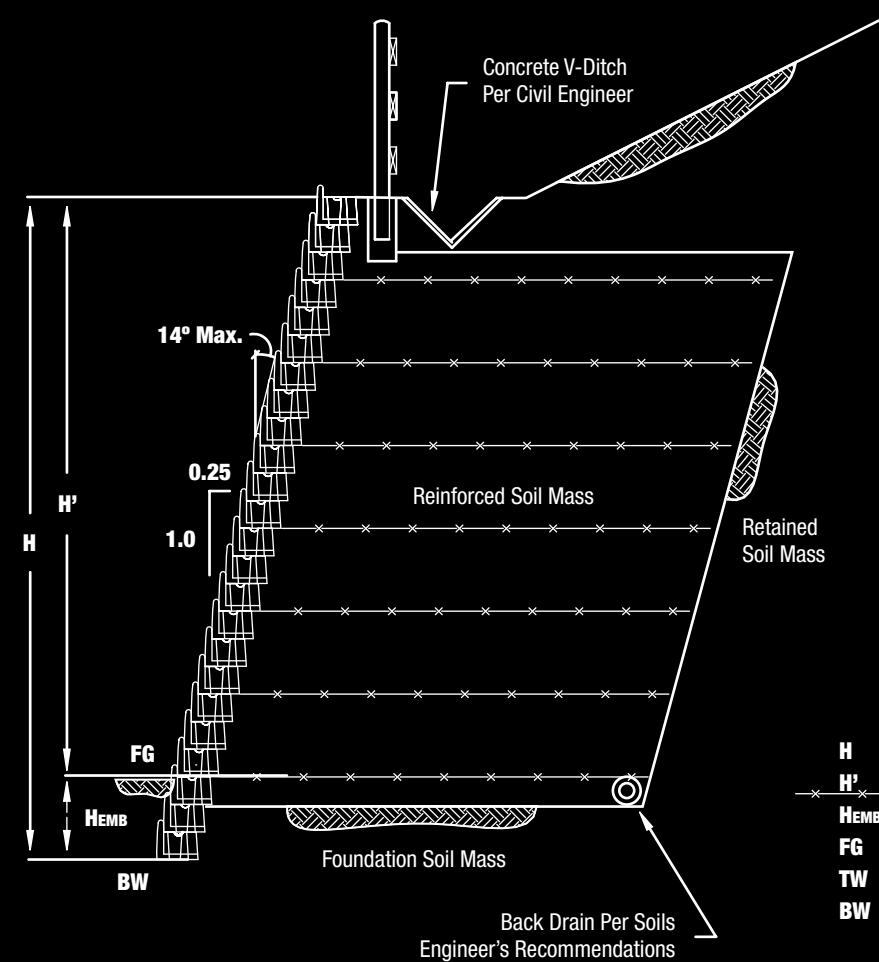


VERDURA® Screen / Sound Wall Typical Cross Section

By installing VERDURA® back to back you achieve a free standing, fully plantable sound wall!



VERDURA® 40 Cross Section - Segmental Retaining Wall



VERDURA® walls are cost effective alternatives to the traditional reinforced concrete or gravity-type walls.

The VERDURA® retaining wall system provides value by taking advantage of the following:

BENEFITS	COMPETITIVE ADVANTAGES
<ul style="list-style-type: none"> • Create Steepened Slopes • Gain More Useable Land • No Poured Concrete Footing • No Rebar or Grouting 	<ul style="list-style-type: none"> • Full Plantability • Easy to Curve • Low Impact • No Graffiti • Low Porosity Concrete • Mechanical Connection • High Shear Strength • Backfill With Scrapers • No Sleeving For Fence Posts • High Wall Approvals • Lasts a Lifetime

The VERDURA® retaining wall system is the most plantable, versatile, and strongest Mechanically Stabilized Earth (MSE) retaining wall on the market today. The name VERDURA® comes from VERdant (green with vegetation) combined with DURAbility. VERDURA® offers the opportunity to create "living walls"; providing the strength and function of a standard retaining wall plus the added ability to sustain live plantings.

The VERDURA® retaining wall system is designed with a "positive mechanical connection" between the block and the geosynthetic reinforcement. This mechanical connection provides a uniform distribution of tensional strength that does not rely solely upon frictional forces generated from a stack-height of the block-units or point load from pins or clips. Combined with the high shear strength from the lip of the block, VERDURA® allows for soil compaction directly behind the block units facilitating the use of heavy construction equipment within close proximity to the wall face. Larger walls are built concurrently with grading and backfill is placed with scrapers.

The series of VERDURA® wall blocks can be used for a wide range of construction projects ranging from small residential projects to large scale developments. The VERDURA® wall transforms a grade transition into a vegetated "steepened slope" instead of a concrete scar across a hillside.

VERDURA® offers something for just about everybody. Whether you're a homeowner looking to create a vertical garden or a large developer seeking to economically terrace a master planned community, this specialized, fully plantable, segmental retaining wall system provides the solution to a wide variety of design challenges. Because of its inherent strength, ease of installation and ability to be completely planted, VERDURA® has been the wall of choice for nearly 20 years.

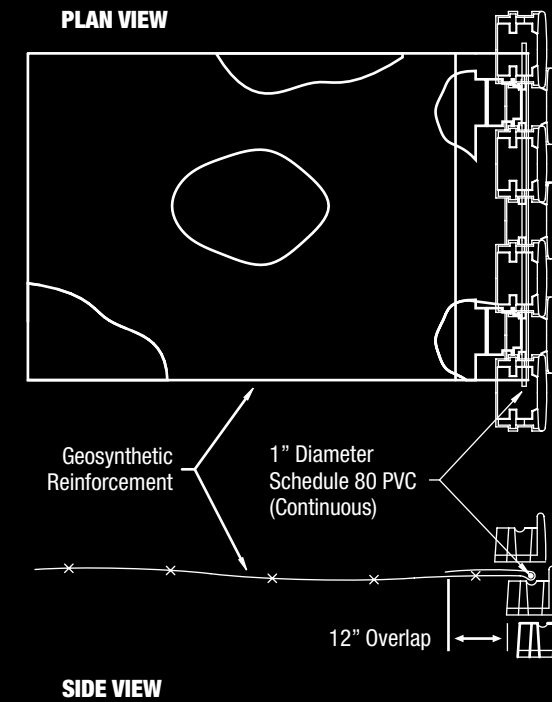


**Build it high!
Build it fast!
Build it right!
Build it VERDURA®**

Who says you can't build really high segmental walls using heavy equipment to speed production and expect them to hold up over the long run? With VERDURA® it's done all the time! The patented design of VERDURA® and specialized installation techniques allow walls up to 50 ft in one tier to be built with the aid of scrapers for backfill, road graders for spreading and heavy duty sheep's foot equipment for compaction. The result is a wall system that goes in on schedule, on budget and can be counted on to be around for a long, long time. If you want high, fast and right, you want VERDURA®.



Geogrid Connection Detail



VERDURA® block units are designed with a "positive connection" for the geosynthetic reinforcement elements. This mechanical connection provides a uniform distribution of tensile strength that does not rely solely upon frictional forces generated from overburden stress derived from a stack-height of the block-units. Coupled with the high shear strength from the lip of the block, VERDURA® allows for soil compaction directly behind the block units facilitating the use of heavy construction equipment within close proximity to the wall face. This is called "form capacity;" the ability of the wall system to resist construction-related lateral loading without creating excessive lateral deformations. The "positive connection" and "form capacity" of VERDURA® allows for the maximum heights to be reached and provides the safest and strongest wall system on the market.

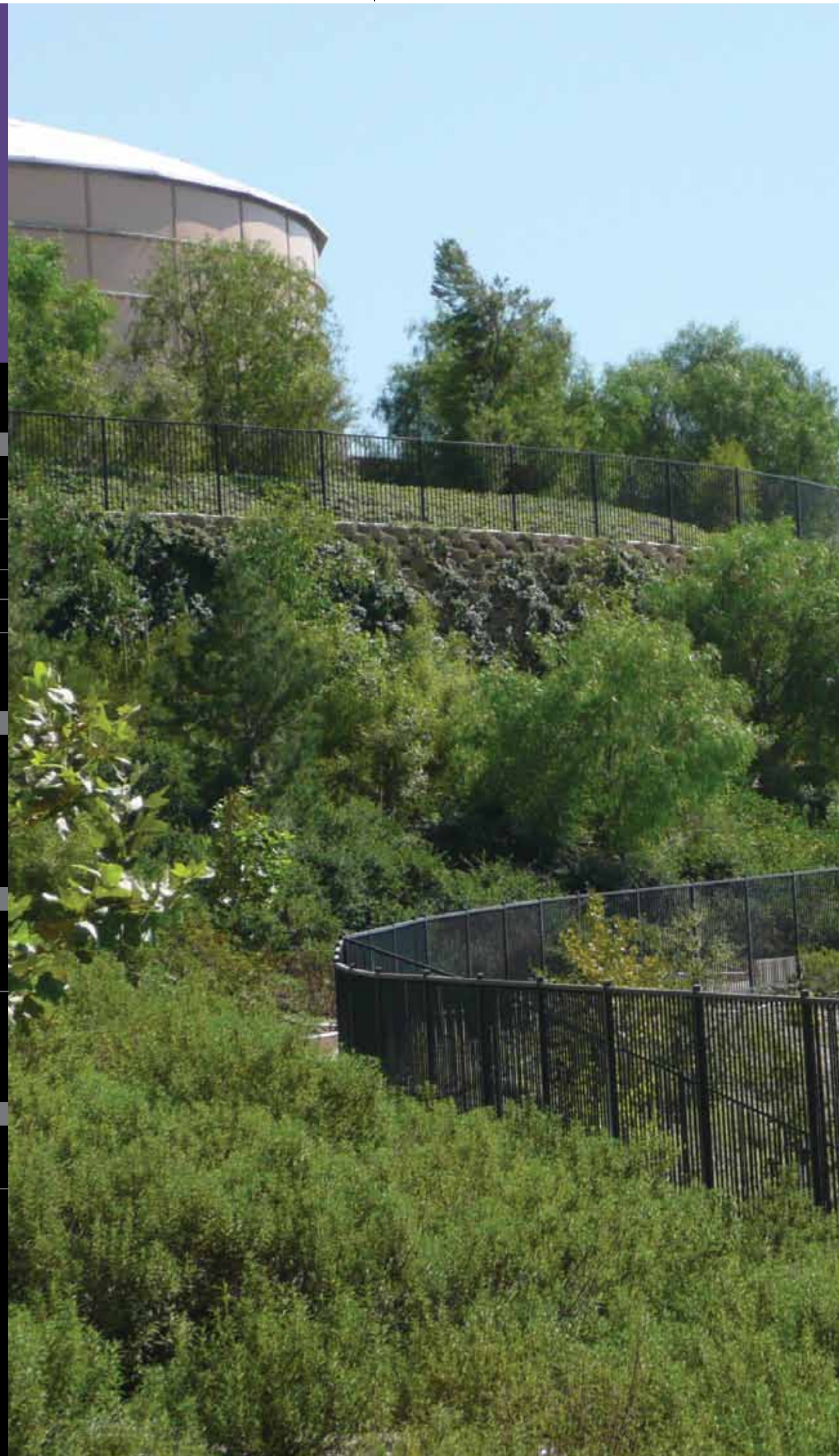
LEED Credits and Potential Point Contributions



Section	Intent/Application	Example Use	Credit	Points
Sustainable Sites				
Site Development	Restore/Protect Habitat	Limit development footprint. Plant native vegetation in wall.	5.1	1
Site Development	Maximize Open Space	Gain land to allow for open space. Vegetated wall creates open space.	5.2	1
Storm Water Design	Quantity Control	Steepened Detention Basin	6.1	1
Storm Water Design	Quality Control	Erosion Control	6.2	1
Heat Island Effect	Non-Roof	The VERDURA ® wall will result in a cooler grade transition. Materials can be specified to have high albedo.	7.1	1
Water Efficiency				
Water Efficient Landscaping	Reduce by 50% or No Potable Water Use or Irrigation	Use with drip irrigation for native plant landscaping Create rooted landscaping that doesn't require permanent irrigation	1	2-4
Materials and Resources				
Recycled Content	10% / 20% (Post-Consumer +1/2 Pre-Consumer)	45% cement replacement with fly ash in concrete mix	4	1-2
Regional Materials	10% / 20% Extracted Processed and Manufactured Regionally	We currently manufacture in several states. Please contact us for locations.	5	1-2
Innovation & Design Process				
Innovation in Design			1	1-5

Low Impact Development

A concept gaining popularity among land planners and civil engineers is "soft engineering" and Low Impact Development (LID). This evolving design practice integrates the built environment into the natural ecology of the land and/or watershed by using conservation-based techniques. Practical, economical, yet attractive and sustainable are at the core of soft engineering strategies and tactics. **VERDURA**® offers the opportunity to create "living walls"; a wall system that provides the strength and function of a standard retaining wall plus the added ability to sustain live plantings.



VERDURA® 10

Lightweight (23lb) block available through our distributors. Rails on block are set back to allow for a butted up 3' radius. Applications include: edging, planter beds, and small retaining walls.



VERDURA® 30

Heavier (70lb) block available through our distributors. Standard designs accommodate walls up to 8' high using Posi-Dura® reinforcement where required. Walls up to 22' can be engineered.



VERDURA® 40

Commercial (90lb) block with a wall inclination of .25:1 used for walls up to 60' high, and tested for high velocity streambank use.



VERDURA® 50

Commercial (119lb) block with a wall inclination of .36:1 used for walls up to 60' high. This block is typically used in combination with the **VERDURA**® 30 for high walls. As a deeper block, **VERDURA**® 60 can be inclined at a flatter angle than **VERDURA**® 40.



VERDURA® 60

Commercial (132lb) block with a wall inclination of .25:1 used for walls up to 60' high. This block is used in combination with the **VERDURA**® 40 block for high walls. As a deeper block, **VERDURA**® 60 can be inclined at a flatter angle than **VERDURA**® 40.



VERDURA® 60W

Commercial (132lb) block with a wall inclination of .25:1 used for walls up to 60' high and tested for high velocity streambank use. **VERDURA**® 60 is intended to be butted up in high velocity flows as rails are set back to allow for a convex curve. The **VERDURA**® 40 block is typically used in the freeboard where full plantability is required.





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