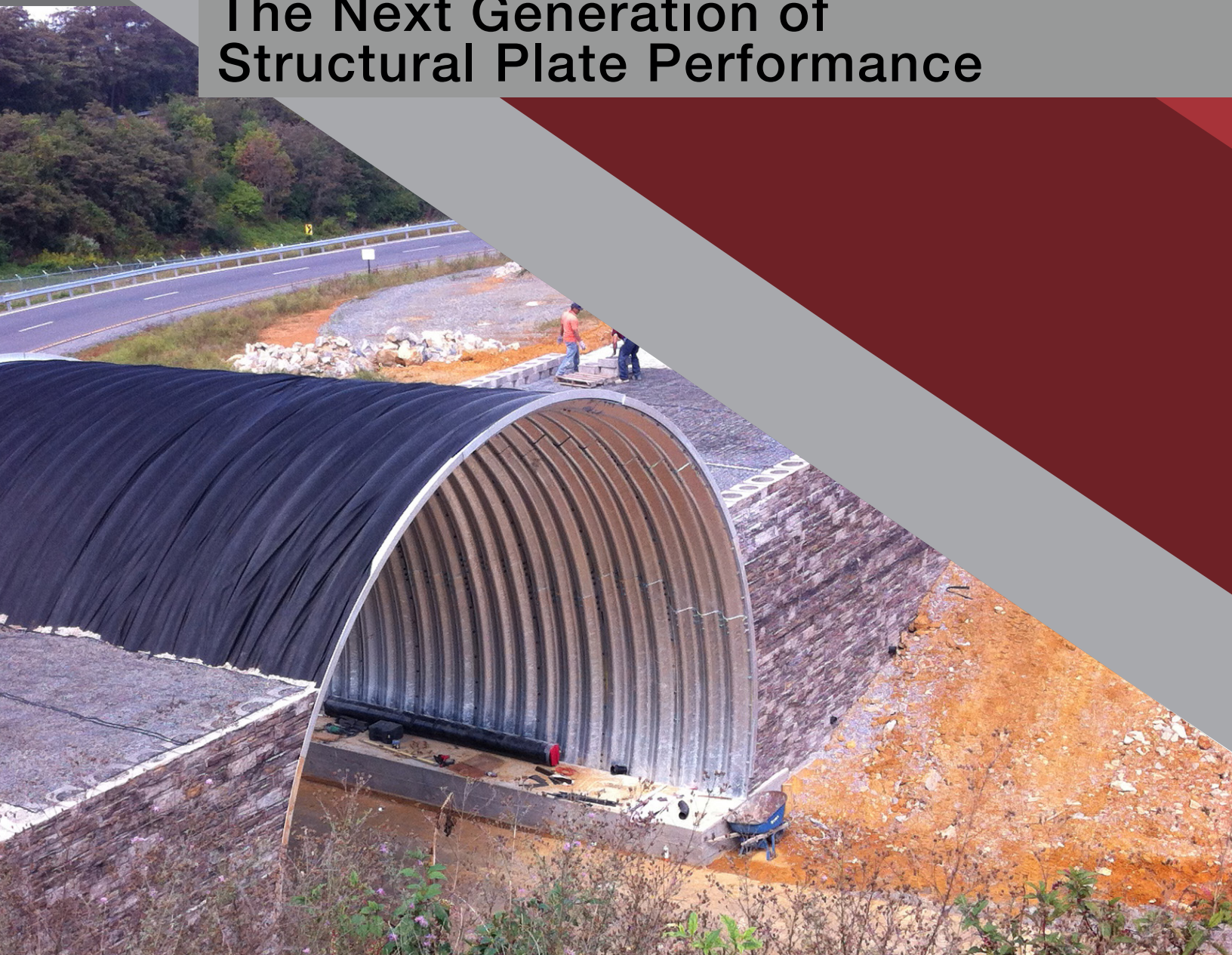
LANE

DeepCorr Plate

The Next Generation of Structural Plate Performance



ABOUT LANE

As a full-line manufacturer of corrugated metal and plastic drainage products, Lane Enterprises operates plants throughout the United States producing various types of buried structures for the construction industry.

For more than 90 years Lane has partnered with contractors and engineers to supply reliable products. Our focus on quality, responsiveness, and technical expertise has established a long history of successful partnerships within the industries we serve.

LANE'S PLATE HISTORY

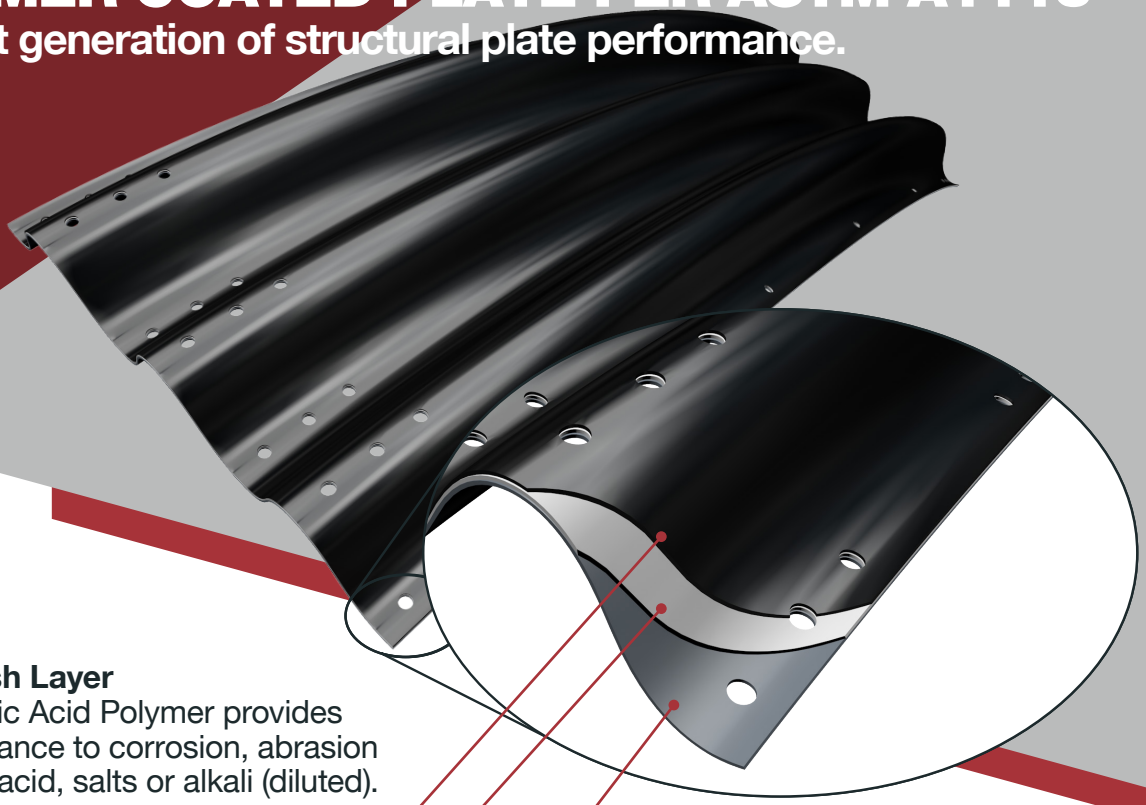
Lane entered the structural plate market in 1973 as a manufacturer of 6"x 2" corrugated steel plate, and in 2006 began making 9"x 2½" corrugated aluminum plate. In 2020 Lane added polymer coated steel plate for extended service life in the more aggressive environments.

With the arrival of DeepCorr Lane is now positioned to help meet the needs of a growing market span with a stronger, stiffer, and more readily assembled and installed plate product.

Corrugated Metal Pipe Since 1934
Structural Plate Since 1973
Technical Coatings Since..... 1979
Gabions Since 1990
Corrugated Plastic Pipe Since 1994
Stormwater Chambers Since 2015

POLYMER COATED PLATE PER ASTM A1113

The next generation of structural plate performance.



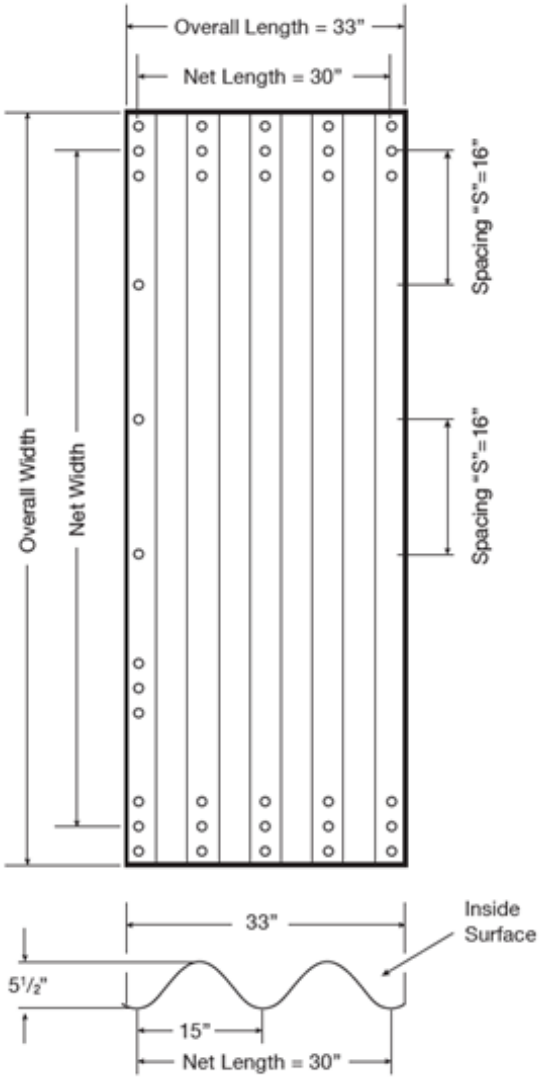
Polymer Finish Layer
Ethylene Acrylic Acid Polymer provides superior resistance to corrosion, abrasion and inorganic acid, salts or alkali (diluted).

Zinc-Rich Based Layer
Provides excellent corrosion resistance and barrier protection.

Steel Plate

DeepCorr

All the traditional benefits from the modular field-bolted plate system but with expanded applications due to stronger, deeper corrugations. Available in the traditional galvanized coating or with the newly developed polymer coating.



DeepCorr
BURIED BRIDGES

DeepCorr is especially suited for the short and medium-span bridge market, providing a major option to the conventional beam bridge.

Buried bridges are a relatively new and inexpensive form of highway bridge. Having demonstrated long-term performance, the efficiency and affordability make buried bridges a smart alternative to conventional bridges.

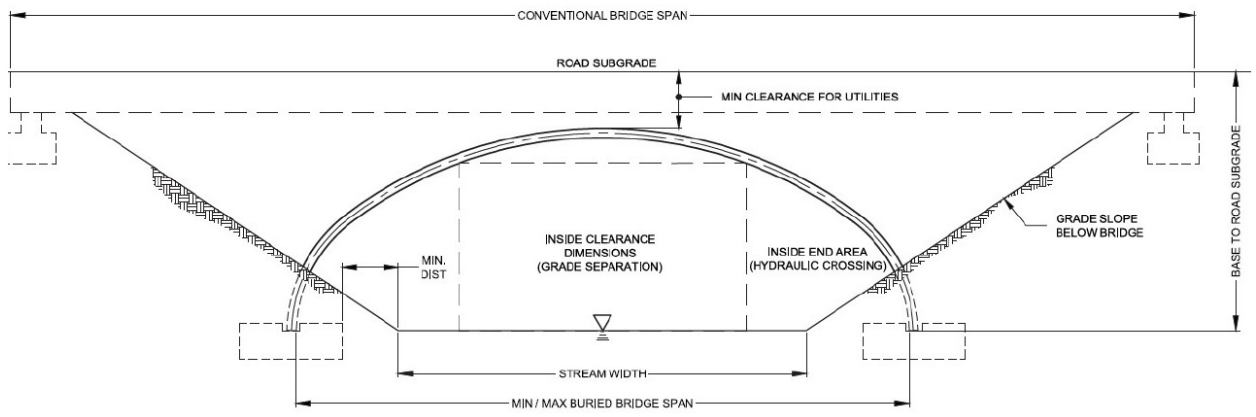
Long-term performance.
Quick designs.
Accelerated construction.
A smart choice.

Conventional bridges span from bank to bank at the road grade. A buried bridge need only maintain the minimum distance allowed between the footing and stream, better preserving the natural environs.

Reduced spans.
Reduced footprints.
Natural aesthetics.
The responsible choice.

Buried bridges allow for standard roadway construction and maintenance. Buried bridges are naturally insulated and not prone to early or overnight freezing.

No bridge decks.
No joints.
No abutments.
The natural choice.



TIMELY APPLICATIONS

Deficient Highway Bridges

With the accumulating numbers of deficient bridges, constrained highway budgets, and escalating construction costs, the stage is set for the ultimate alternative to conventional bridges.

Rehabilitating Railway Bridges

Uncounted stone arch bridges have reached the end of their service life, and the railways prefer to rehabilitate these structures in place while rail transport seamlessly continues.

Fish Passage Culverts

Thousands of highway culverts require replacement with short-span bridges to address needed improvements to waterways that impede fish passage.

Wildlife Crossings

Safe crossways over major thruways are fast becoming a standard in the emerging field of road ecology.

AASHTO Paves the Way

The American highway community (AASHTO) has paved the way for broader use of structural plate buried bridges by supporting the research leading to design and installation standards for deep corrugated plate.

Structural design is performed via FEA (Finite Element Analysis) where the structure-soil interaction can be modeled to match the installation using the corrugation section properties along with the arch geometry.

CANDE (Culvert Analysis and Design) is widely used and is available as a free download at candeforculverts.com courtesy of FHWA, AASHTO, TRB and industry partners.

AASHTO LRFD Bridge Design Specifications
Section 12.8.9 Long-Span Deep Corrugated Plate Structure

DeepCorr Section Properties (44 KSI STEEL)

Gage	Thickness	A	I	S	Z	Mp
	in	in^2/in	in4/in	in^3/in	in^3/in	lb-in/in
8	0.168	0.2302	0.8746	0.2883	0.4013	17,658
7	0.188	0.2573	0.9786	0.3217	0.4489	19,753
5	0.218	0.3003	1.1436	0.3741	0.5244	23,073
3	0.249	0.3431	1.3084	0.4260	0.5997	26,387
1	0.280	0.3861	1.4742	0.4776	0.6754	29,718
5/16	0.318	0.4375	1.6730	0.5390	0.7661	33,707
3/8	0.380	0.5250	2.0128	0.6423	0.9209	40,520

Round Pipe

Standard Diameters: ..... 20 to 50’

Single-Radius Arch

Standard Spans: ..... 20 to 50’
Arch Radius: ..... 10 to 28’
Typical Span to Rise Ratio: ..... 2 to 4

DESIGN YOUR SHAPE

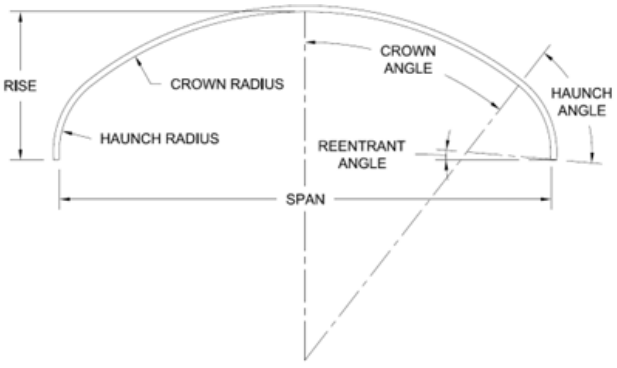
All shapes will utilize a structural arch. Round and single-radius structures provide for the simpler approaches. However, in many applications the span is considerably larger than the rise.

Most DeepCorr designs will involve a small bridge application with shallow cover and low, wide waterway openings.

Designing an open-bottom arch structure with a large crown radius and smaller haunch radius develops the geometry needed in most situations.

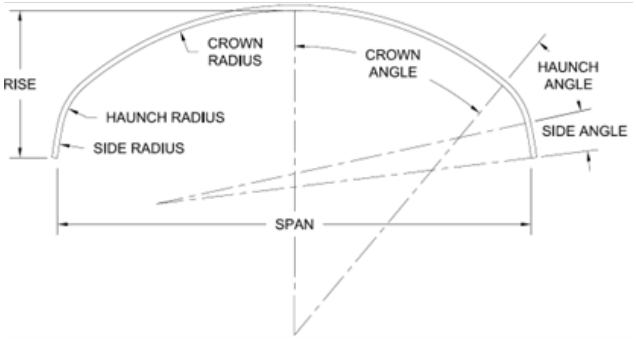
With a few guidelines the design engineer would be able to develop a unique structure for each application.

Two-Radius Reentrant Arch
aka Low Profile Arch



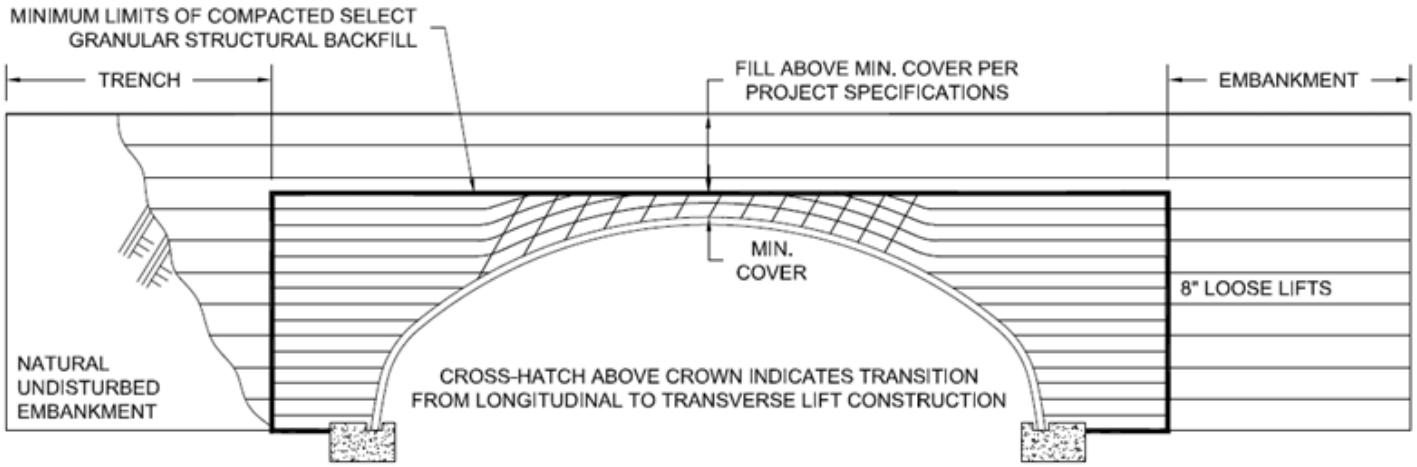
Standard Spans: *... 20 to 50’*
Crown Radius: *..... 14 to 38’*
Crown Angle: *..... 35° to 40°*
Haunch Angle: *..... 50° to 55°*
Crown radius to Haunch radius ratio: *4 to 5*

Three-Radius (Non-Reentrant) Arch
aka Box Culvert



Standard Spans: *..... 20 to 40’*
Crown radius: *..... 14 to 30’*
Crown Angle: *..... 25° to 35°*
Haunch Angle: *..... 50° to 70°*
Side Angle: *..... 1° to 15°*
Side Radius = Crown Radius
Crown radius to Haunch radius ratio: *4 to 9*

Above guidelines are not limits but are offered as a starting point in developing your own geometry.



DESIGN YOUR INSTALLATION

Select Granular Backfill Structural Envelope

Structure geometry and the installation method play a role in determining the minimum structural envelope. The structural envelope limit above the structure is generally taken as the minimum fill height specified for the structure (see below).

Minimum Depth of Fill

While maximum burial depths for DeepCorr structures can be quite deep (over 20’ in many cases), typical applications will involve shallower installations. As a guide, when the final grade is expected to be less than 3’ above the structure, a minimum cover check becomes the critical design feature.

Although the minimum cover in all cases shall not be less than that determined by culvert-soil interaction analysis1, AASHTO LRFD BDS 12.8.9.4 provides the following design guides2:

Minimum cover = 1.5’ for spans ≤ 25’-5”
Minimum cover = 2.0’ for spans > 25’-5”

[1]Results of the project specific finite element analysis (FEA).
[2]Specified when the crown radius to haunch radius ratio exceeds 5.0 but may be conservatively used for all multiple radius arches.

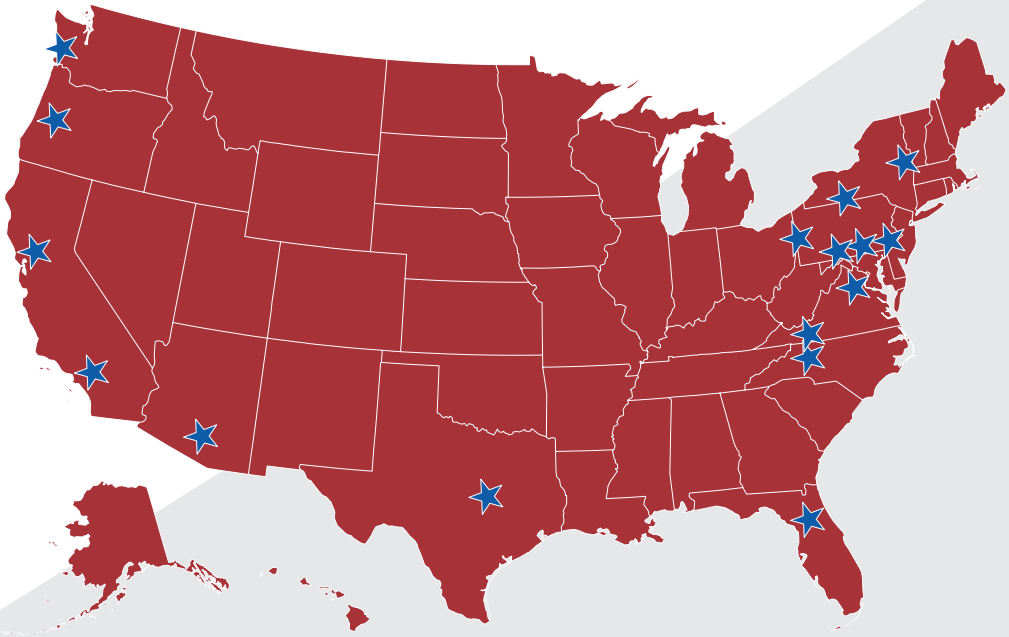
Structural Backfill Minimum Width

The minimum structural envelope width extending from each side of the structure is as shown in the table below:

Crown Radius to Haunch Radius Ratio ≤ 5		
Installation Method	**Natural Embankment**	**Minimum Width**
Trench	Stiff as select	8’
Trench	Not as stiff	one-third span but not less than 10’ or more than 17’
Embankment	n/a	one-third span but not less than 10’ or more than 17’

Crown Radius to Haunch Radius Ratio > 5		
Design Span	**Cover Height**	**Minimum Width**
Spans ≤ 25’-5”	less than 5’	3.5’
Spans ≤ 25’-5”	5’ or more	one-fifth span but not less than 5’ or more than 17’
Spans ≤ 25’-5”	all depths	one-fifth span but not less than 5’ or more than 17’

Table is an adaptation of AASHTO LRFD BDS 12.8.9.2



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A Subsidiary of Lane Enterprises Holdings, Inc.

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Lane Enterprises is a 100% employee-owned, U.S manufacturer of stormwater drainage and other related construction products with a 90+ year history of providing quality manufacturing and superior customer service. With the addition of Pacific Corrugated Pipe Company in 2021, we service customers nationally. Our success has been built around a commitment to integrity, loyalty, and reliability.

Lane steel structural plate products complies with the requirements of the Build America, Buy America (BABA) Act.

An Employee-Owned Company

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