



# SOLVING SITE PROBLEMS WITH LANE STRUCTURAL PLATE PRODUCTS





## ABOUT LANE

Lane Enterprises specializes in partnering with customers from consultation to installation to provide highly engineered products for every storm sewer, stormwater management, road culvert, water quality and small bridge application.

For more than 75 years, Lane has partnered with contractors, engineers and municipalities to supply reliable products that provide the highest service life, strength, versatility and economy. Our focus on quality products, responsive customer service and technical expertise has afforded us a long history of successful partnerships within the industries we serve.

*Call upon the experts at Lane during the design phase to ensure an application and specification completely suited to your project needs.*

## FULL RANGE OF SOLUTIONS

Lane manufactures both steel and aluminum structural plate so that engineers, developers and contractors have a choice. Our comprehensive line of structural plate solutions can be used in a variety of applications and situations where other pipe products will not meet the requirements. Structural plate sheds the shipment limitations associated with large conventional pipe and boasts increased thicknesses and stiffer corrugations – resulting in maximum efficiency and durability for your next project.

### LANE FABRICATORS / A Lane Division

A division of Lane dedicated to the assembly of structural plates into their final formation. Whether you need someone to get you started, supervise your crew, or manage the entire assembly, Lane can provide the expertise that will get your structure standing and ready for backfill. Lane Fabricators supplies all the experience to properly and securely erect your structure when time is of the essence.

### LONG SPAN BRIDGE & CULVERT (LSBC) / Pages 4 and 5

A division of Lane equipped to support your project from conceptual design through installation, including stamped engineering drawings for the entire structure, foundation and retaining walls. LSBC provides all the benefits of a manufacturer, an engineering consultant and a construction inspector rolled into a one-stop shop.

### STEEL STRUCTURAL PLATE / Pages 8 through 13

A 6"x 2" corrugation, a 3 oz. per square foot galvanized coating, nine thickness options from 0.111" to 0.380", and the complete range of shapes and sizes to suit your application, with all the strength, versatility and cost benefits afforded by steel.

### ALUMINUM STRUCTURAL PLATE / Pages 14 through 19

A 9"x 2½" corrugation, a solid aluminum alloy (Alloy 5052), six thickness options from 0.125" to 0.250", and the complete range of shapes and sizes to suit your application, with all the lightweight and durability advantages of aluminum.



## LONG SPAN BRIDGE & CULVERT



Lane's Long Span Bridge & Culvert (LSBC) Division provides the nation's civil engineers and land developers with the most economical and versatile bridge and culvert construction systems in the industry, including the complete design, supply, assembly and installation of structural plate bridge and culvert structures.

By combining a design-build service with our plate products, LSBC is uniquely equipped to deliver a final product with all the expertise, efficiency, and assurance characterized by Lane. From consultation to planning, design to manufacture, delivery to assembly, and shape monitoring to required cover depth, LSBC can provide you with the highest level of engineering support and assistance in the industry.



### ENGINEERING SERVICES

- Initial project consultation
- Conceptual site plan layouts
- Footing and foundation designs
- Headwall designs and end treatment options
- Hydraulic modeling and scour analysis

### INSTALLATION SERVICES

- Plate delivery and assembly
- Complete installation specification development
- Installation supervision and documentation
- Shape, backfill and compaction monitoring

## LSBC MISSION STATEMENT

Furnish the highest quality engineering and field services associated with the design, construction, and use of Lane structural plate structures while minimizing overall costs and impact to the jobsite environment by providing engineering consultation and certified design services to facilitate regulatory approvals, incorporating headwall or end treatment options that aesthetically blend the structure into the environs, recommending a construction sequence conducive to site characteristics, and by providing assembly and construction monitoring to assure long-term sound structure performance.

### 1.0 SITE EVALUATION

- 1.1 Evaluate design flow and finished grade to determine structure geometry
- 1.2 Review soils report to determine footing and foundation design
- 1.3 Perform final hydraulic analysis to ensure capacity and scour protection



### 2.0 ENGINEERING DRAWINGS

- 2.1 Support preliminary and final site plan development
- 2.2 Incorporate material and installation specifications into project plans
- 2.3 Provide shop, fabrication and assembly drawings



### 3.0 MATERIAL DELIVERY

- 3.1 Coordinate material delivery and drop off location with site contractor
- 3.2 Ensure plate is properly marked and organized at the drop off location
- 3.3 Verify components, ample hardware and appurtenances



### 4.0 STRUCTURE ASSEMBLY

- 4.1 Furnish a trained and experienced assembly crew (or representative)
- 4.2 Assemble plates on prepared foundation in accordance with shop drawings
- 4.3 Tighten all bolts in the proper sequence and specified torque
- 4.4 Ensure all seams are tightly joined, smooth and symmetric
- 4.5 Secure circumferential stiffeners per shop drawing schedule (when applicable)



### 5.0 BACKFILL AND SHAPE MONITORING

- 5.1 Provide full-time monitor at the site during backfilling operation
- 5.2 Document the specified backfill material is used
- 5.3 Record density, moisture content, and lift thickness measurements
- 5.4 Continuously measure shape deflection and symmetry during backfilling
- 5.5 Ensure proper construction of longitudinal stiffeners (when applicable)



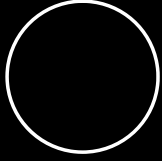
**Structure Selection** / *Selecting the best structure for your site requires a number of factors be considered... economics, hydraulics, structural, environmental. Our knowledgeable engineers are available to assist you in selection of the structure shape, size and end treatment that best matches the jobsite conditions and allows for optimum appearance and performance.*

# STRUCTURAL PLATE PRODUCTS

SHAPE

STEEL

ALUMINUM

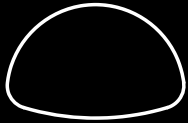


5'-0" to 26'-0"  
diameters

5'-0" to 21'-0"  
diameters

**ROUND STRUCTURAL PLATE**

Round structural plate is the more commonly used shape for buried structures and better supports the deeper fill heights. Diameters for structural plate pipe are available in six inch increments within the defined range. The pipe bottom can also be filled with earth to create a natural streambed.



6'-1" x 4'-7"  
to  
20'-7" x 13'-2"

6'-7" x 5'-8"  
to  
21'-11" x 14'-11"

**STRUCTURAL PLATE PIPE-ARCH**

Pipe-arches are the most economical choice for culvert and small bridge applications where cover height is limited and afford increased hydraulic capacities at low flow conditions. Minimum and maximum covers are typically governed by the soil bearing pressures that radiate from the pipe-arch corners, being inversely proportional to the corner radius.



5'-0" x 1'-9½"  
to  
26'-0" x 13'

5'-0" x 1'-9"  
to  
23'-0" x 11'-11"

**STRUCTURAL PLATE ARCH**

Structural plate arches are ideal for maximizing flow capacity in low cover applications but are also appropriate for a wide range of burial depths. With a strategically selected modular block headwall and a natural streambed, the structural plate arch provides the look and feel of a stone arch bridge. Multiple side-by-side arch structures are an attractive and cost effective option for spanning large areas.

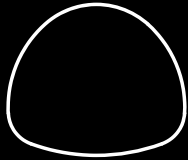


9'-8" x 2'-7"  
to  
20'-9" x 10'-2"

8'-9" x 2'-6"  
to  
35'-3" x 13'-7"

**STRUCTURAL PLATE BOX CULVERT**

Structural plate box culverts are composite-reinforced rib plate structures since they are relatively flat across the top and require a large flexural capacity due to the extreme geometry and shallow depths of cover (1.4 to 5 feet). Structural plate box culverts provide a cost-effective bridge solution due to the shape's low, wide profile. The ability to provide a wide span for shallow installations provides for optimum waterway area.

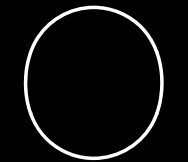


5'-8" x 5'-9"  
to  
20'-4" x 17'-9"

6'-1" x 5'-9"  
to  
20'-5" x 17'-9"

**STRUCTURAL PLATE UNDERPASS**

Underpasses are intended for use where a greater vertical clearance is required and the bottom needs to be relatively flat. Underpasses are especially useful for auto, truck, railroad, golf cart, pedestrian and animal traffic. Like the pipe-arch, the underpass requires good soil bearing capacities in the corner regions for proper support.

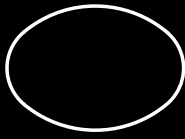


4'-8" x 5'-2"  
to  
25'-0" x 27'-8"

4'-8" x 5'-2"  
to  
20'-1" x 22'-3"

**STRUCTURAL PLATE VERTICAL ELLIPSE**

The vertical ellipse is commonly used for vehicular, railroad and pedestrian underpasses. Without the relatively flat bottom afforded by the underpass shapes the vertical ellipse would require additional filling along the bottom, but with the absence of sharp corner regions the vertical ellipse would not be subject to bearing capacity limitations in those areas, and therefore would enjoy greater heights of cover. Industrial applications such as equipment enclosures for aggregate conveyor tunnels are also appropriate.

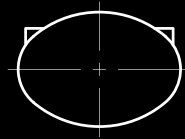
**SHAPE****STEEL****ALUMINUM**

7'-4" x 5'-6"  
to  
14'-11" x 11'-2"

9'-2" x 6'-8"  
to  
14'-11" x 11'-2"

**STRUCTURAL PLATE HORIZONTAL ELLIPSE**

By eliminating the need for concrete footings, this shape can often provide the lowest overall installed cost of any structure. If a natural stream bottom is desired, the invert of the ellipse may be buried and filled with native streambed material. Buried ellipses also make for an excellent vehicle, pedestrian or wildlife underpass.

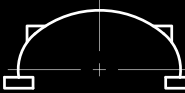


19'-4" x 12'-9"  
to  
40'-0" x 29'-7"

19'-4" x 12'-9"  
to  
37'-3" x 22'-2"

**LONG SPAN HORIZONTAL ELLIPSE**

Long span designs for the horizontal ellipse shape are accommodated by the inclusion of longitudinal stiffeners along the top arc corners. In those instances Lane's Long Span Bridge & Culvert division becomes a valuable consideration for the design team.

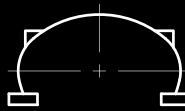


19'-5" x 6'-9"  
to  
51'-7" x 24'-2"

19'-5" x 6'-9"  
to  
38'-8" x 15'-9"

**LONG SPAN LOW PROFILE ARCH**

These wide-span, low-rise structures allow large open-end areas at relatively low covers. Low profile arches are most commonly used for stream and wetland crossings where spanning requirements exceed that attainable with the box culvert. Long span designs are accommodated by the inclusion of longitudinal stiffeners along the top arc corners, making Lane's Long Span Bridge & Culvert division a valuable addition to the design team.



20'-1" x 9'-1"  
to  
38'-0" x 23'-6"

20'-1" x 9'-1"  
to  
35'-5" x 20'-0"

**LONG SPAN HIGH PROFILE ARCH**

The high profile arch shape is ideal for crossing wide areas when higher heights of cover are encountered and additional hydraulic capacity is needed. These shapes often require smaller footings and can reduce the overall structure width as compared to the low rise shapes. As with the horizontal ellipse and the low profile arch, long span designs are accommodated by the inclusion of longitudinal stiffeners along the top arc corners, making Lane's Long Span Bridge & Culvert division a valuable addition to the design team.

**STRUCTURAL PLATE MATERIAL STANDARDS**

ASTM A761	Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches and Arches
ASTM A964	Corrugated Steel Box Culverts
ASTM B746	Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM B864	Corrugated Aluminum Box Culverts
AASHTO M167	Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches and Arches
AASHTO M219	Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches

**STRUCTURAL PLATE INSTALLATION STANDARDS**

ASTM A807	Practice for Installing Corrugated Steel Structural Plate Pipe for Sewers
ASTM B789	Practice for Installing Corrugated Aluminum Structural Plate Pipe for Culverts and Sewers
AASHTO	LRFD Bridge Construction Specifications, Section 26, Metal Culverts

**STRUCTURAL PLATE DESIGN STANDARDS**

ASTM A796	Practice for Structural Design of Corrugated Steel Pipe, Pipe-Arches and Arches
ASTM B790	Practice for Structural Design of Corrugated Aluminum Pipe, Pipe-Arches and Arches
AASHTO	LRFD Bridge Design Specifications, Section 12, Buried Structures and Tunnel Liners
AREMA	Manual for Railway Engineering, Section 4, Culverts

Shapes identified as "Long Span" take the designation from AASHTO for certain structural plate structures that require shape monitoring measures during the backfill operation. The designation is not to be confused with Lane's Long Span Bridge & Culvert division (Pages 4 and 5), which is not limited to these shapes or services.