EnWood Structures

MANUFACTURER OF ENGINEERED WOOD PRODUCTS

LAMINATED Wood Shelters

Shelter Details on Page 18

800.777.8648

ENWOOD STRUCTURES
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

THE ENWOOD STRUCTURES TRADITION

EnWood Structures' history extends to over 60 years of design and manufacturing superior quality laminated wood products. EnWood's continued commitment to precision manufacturing has earned EnWood a solid and distinguished reputation in the laminated wood market.

Because each project has special and unique needs, EnWood offers the option of selecting from the EnWood Design Collection, customizing the EnWood Designs Collection with a variety of options, or developing a unique Custom Design for a special project.

Over the years EnWood has received industry wide recognition for design innovation and precision manufacturing, including the prestigious *Merit Award from the National Timber Bridge Association.*

RECREATIONAL SHELTERS, PAVILIONS, ARENAS, STAGE COVERS, AMPHITHEATERS

The EnWood Design Collection includes a wide selection of pre-engineered, pre-fabricated shelter packages. The shelter packages can be customized with a selection of options which include powder coated steel columns, metal roofs, staining, rails, benches, and much more. Shelters packages are shipped complete, including all hardware required for proper installation.

EnWood's Custom Design division is an industry leader for custom shelter and riding arena designs. EnWood's ability to work closely with designers, engineers, and architects has earned EnWood Structures an outstanding reputation. Understanding the client's unique specifications and individual needs, and delivering a product surpassing expectations, is the benchmark for EnWood Structures.

PEDESTRIAN, LIGHT VEHICULAR and GOLF BRIDGES

EnWood is well known in the bridge industry for its ability to design and engineer exceptional quality clear-span laminated wood bridges. Standard girder style bridges can clear-span 100', while arch suspension bridges can exceed a clear span of over 200'. For projects requiring greater lengths, EnWood will design and engineer the bridge in specified segments, thus, the total length of the bridge is unlimited.

HIGHWAY BRIDGES

An EnWood highway bridge, engineered for full vehicular traffic, blends softly with nature. Built for beauty and utility, EnWood's highway bridges are the perfect companions for park and greenway settings as well as for golf and residential communities where aesthetics are of importance. EnWood's ability to work closely with regulating authorities gives the customer the assurance of a successful project.

The team at EnWood Structures looks forward to working with you, and to assure you the service and support you expect for a successful project. Like you, we put our reputation on the line each day. And, also like you, our reputation is our most valued asset.

EnWood Structures is a certified member of The American Institute of Timber Construction, AITC, who has the highest manufacturing standards of the industry. Manufacturing and quality control conform to the Standard Specifications for Glued Laminated Timber, AITC 117.

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION
AITC
QUALIFIED LICENSEE

Post Office Box 2002 • 5724 McCrimmon Parkway Morrisville, North Carolina 27560
Tel. 919.467.6155 • Fax 919.469.2536 • E-mail: info@enwood.com
General Information: 800.777.8648 • Website: www.enwood.com

The Raleigh & The Raleigh II

The Raleigh and Raleigh II shelters are distinguished by their appealing laminated wood curved beams and interior tongue and groove wood decking. The Raleigh has laminated wood columns spaced 8’ on center, while the Raleigh II has laminated columns spaced 10’ on center. The Raleigh II utilizes EnWood Structures’ MultiSpan Deck System to increase spacing of structural laminated members. Both shelters combine versatility with economy.

The Raleigh Sizes Available

12’ x 12’	16’ x 16’	20’ x 20’	24’ x 20’
12’ x 16’	16’ x 20’	20’ x 28’	24’ x 28’
12’ x 20’	16’ x 28’	20’ x 36’	24’ x 36’
12’ x 28’	16’ x 36’	20’ x 44’	24’ x 44’
12’ x 36’	16’ x 44’	20’ x 52’	24’ x 52’
12’ x 44’	16’ x 52’	20’ x 60’	24’ x 60’

30’ x 36’	40’ x 44’	50’ x 52’	60’ x 60’
30’ x 44’	40’ x 52’	50’ x 60’	60’ x 68’
30’ x 52’	40’ x 60’	50’ x 68’	60’ x 76’
30’ x 60’	40’ x 68’	50’ x 76’	60’ x 84’
30’ x 68’	40’ x 76’	50’ x 84’	60’ x 92’
30’ x 76’	40’ x 84’	50’ x 92’	60’ x 100’
30’ x 84’	40’ x 92’	50’ x 100’	60’ x 108’
30’ x 92’	40’ x 100’	50’ x 108’	60’ x 116’
30’ x 100’	40’ x 108’	50’ x 116’	60’ x 124’

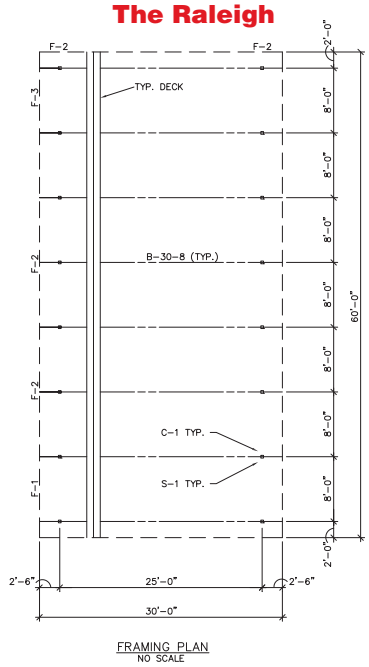
Custom Sizes Available

The Raleigh II Sizes Available

16’ x 25’	20’ x 25’	30’ x 35’	40’ x 45’	50’ x 55’
16’ x 35’	20’ x 35’	30’ x 45’	40’ x 55’	50’ x 65’
16’ x 45’	20’ x 45’	30’ x 55’	40’ x 65’	50’ x 75’
16’ x 55’	20’ x 55’	30’ x 65’	40’ x 75’	50’ x 85’
16’ x 65’	20’ x 65’	30’ x 75’	40’ x 85’	50’ x 95’
			40’ x 95’	50’ x 105’
			40’ x 105’	50’ x 115’

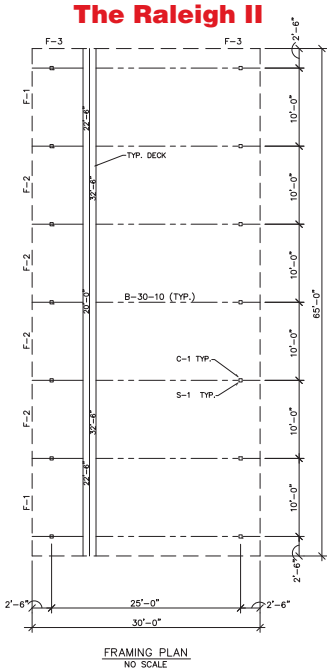
Custom Sizes Available

The Raleigh



FRAMING PLAN
NO SCALE

The Raleigh II



FRAMING PLAN
NO SCALE

Modified ***Raleigh*** *and* ***Raleigh II*** *shelters*

This Raleigh II shelter measures 50'x95'. Customer selected the optional 5:12 roof pitch and added the EZ-Loc Standing Seam metal roof for color impact.

Custom sized at 26'x100', this Raleigh utilizes side header beams to accommodate additional spacing between the steel tube columns. Installation contractor added the decorative stone features for both visual and practical applications.

Both the Raleigh and Raleigh II shelters, whether large or small are easily adaptable to facilitate enclosures for restrooms, concession space, storage, and administrative offices. Enclosure materials are furnished by your contractor.

Hickory, North Carolina is home to this 50'x105' Raleigh II structure. Their insight for visual impact combined with functional enclosed space in their soccer park area is highly complemented by all who frequent this park.

The visual impact of this Raleigh shelter is characterized by its dramatic 6:12 roof pitch. Normal roof pitch for the Raleigh and Raleigh II is 3:12, however EnWood offers the customer the optional 4:12, 5:12, or 6:12 roof pitch.

All sizes of the Raleigh and Raleigh II shelters are offered with EnWood's optional Bar-B-Q roof design. This design has been engineered to facilitate updraft for ventilation.

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The Springwood

EnWood Structures has taken the concept of enclosing the Raleigh shelter to the next level. The two shelters featured here utilize the larger Raleigh design with a smaller Raleigh intersecting the center to act as a breezeway. Most any size combinations are available. Call the Salesteam at EnWood for additional information.

The Raleigh Dutch Hip

Once again EnWood has combined design engineering with functionality to give customers structures perfectly suited for their venue. The Dutch Hip roof, combined with a higher roof pitch adds beauty both on the outside of the structure as well as from the interior. These options are available for most sizes of the Raleigh and Raleigh II models.

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The Caroline

The Caroline shelter design, with its laminated curved roof beams and hexagon shape, blends beautifully into any setting. The smaller Caroline is ideal for private residences, developments, and golf courses; while the larger Caroline lends a spectacular visual appeal where more shelter space is required.

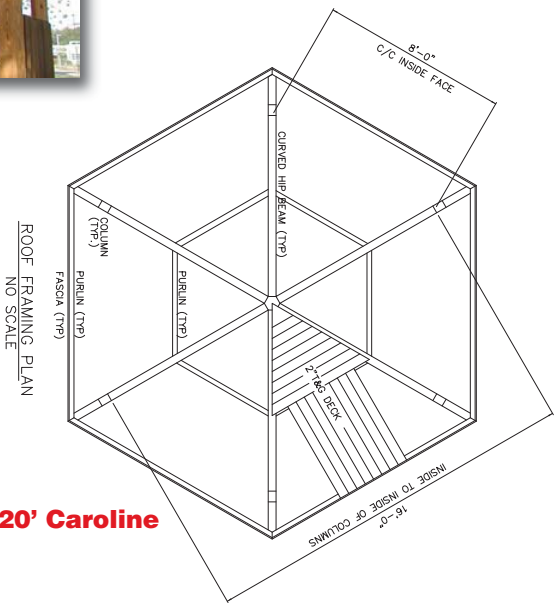
Available options include:

- rails
- wood deck floor
- benches
- cedar shake shingles
- cupola

The Caroline Sizes Available

14’	30’
16’	35‘
20’	40’
25’	45’

Custom Sizes Available



20’ Caroline

The Winston

The Winston features ten sides and is one of the newest additions to the EnWood Design Collection. It takes its cue from the Caroline, as the Winston also features laminated curved roof beams to accentuate the roof line. The artist rendering as displayed here, depicts the drama of the extended roof.

Available options include:

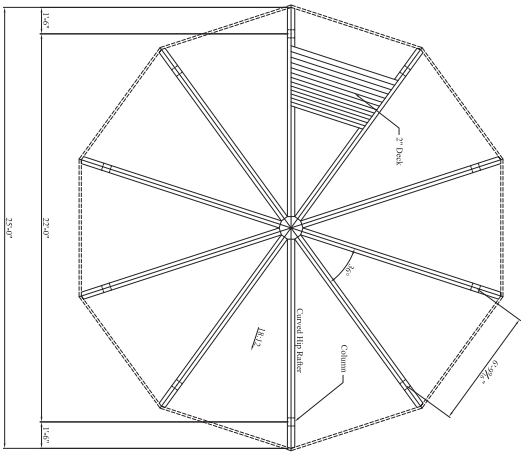
- rails
- benches
- cedar shake shingles

The Winston
Sizes Available

20’
25’
30’

Custom Sizes Available

25’ Winston



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The Columbia

The eight sided Columbia shelter has the added design features of a 6:12 roof pitch, and the extended column height of 10’. The precision engineering of this structure allows for sizes up through 70’ with no center support. Popular options suitable for the Columbia include custom handcrafted benches and rails.

The Columbia and The Seaside Sizes Available

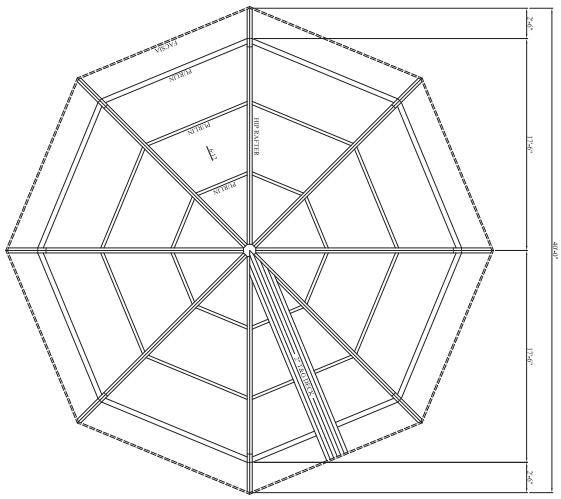
20’	45’
25’	50’
30’	55’
35’	60’
40’	70’

Custom Sizes Available

The Seaside

The Seaside shelter as shown here in our artist’s rendering is the newest addition to the EnWood Design Collection. Like the Columbia, the Seaside also features a 6:12 roof pitch and the extended column height of 10’. The split roof design lends high visual appeal while serving as a functional element for circulation. Popular options for the Seaside include custom handcrafted benches and rails.

40’ Columbia



The Magnolia

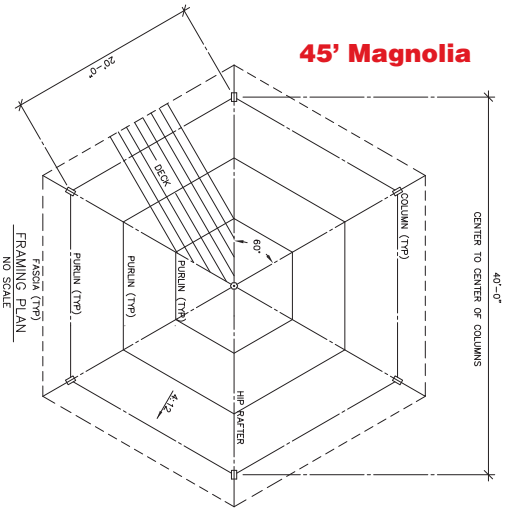
The Magnolia shelter is a hexagon design, and features a 4:12 pitch roof system which gently rises toward a peak at its center. This special structural design eliminates the need for a center support column, even in models up through 60'.

The Magnolia Sizes Available

20'	40'
25'	45'
30'	50'
35'	60'

Custom Sizes Available

45' Magnolia



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The Louisville

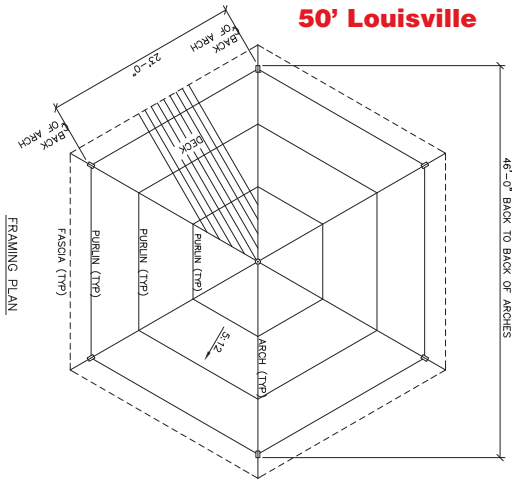
The Louisville shelter's hexagon design utilizes laminated arches and purlins of Southern Yellow Pine, making it one of most the attractive wood shelters in the industry. With its high-pitched, 5:12 roof design, and interior wood roof decking, the Louisville has a charming character, both from the outside as well as from the view underneath.

The Louisville Sizes Available

20'	50'
30'	60'
40'	70'

Custom Sizes Available

50' Louisville



The Timberland

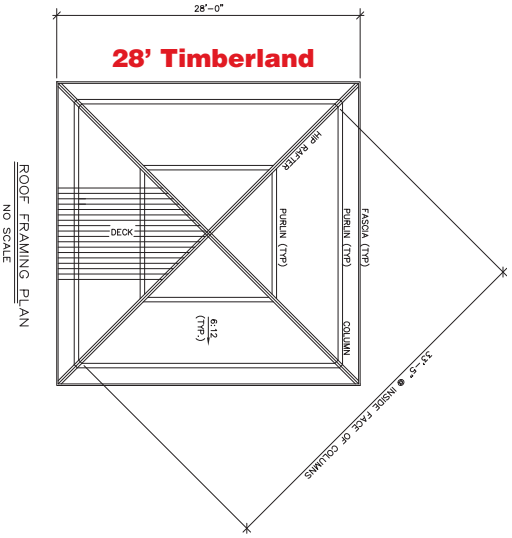
The simplicity of the Timberland shelter design makes it economical as well as attractive. With its broad open sides, and no need for a center support post, the Timberland easily facilitates multi-function gatherings, and blends harmoniously into any area.

Like the Magnolia, The Timberland is often sold in clusters with several large and small shelters placed in close proximity for facilitating both large and small groups in the same recreational area.

The Timberland Sizes Available

12’	20’	28’
15’	24’	36’

Custom Sizes Available



EnWood Structures' Design Collection Shelters combine the beauty of laminated wood with the economy of a pre-fabricated engineered package. EnWood's shelters are durable and economical and require very little maintenance. These pre-fabricated shelter packages are shipped to the jobsite ready for fast, easy installation. Packages include engineered shop drawings, roofing materials, and all connecting hardware and nails required for proper installation.

Numerous options, as listed on page 13, are also offered for the standard Design Collection shelter packages. These options include metal roofs, powder coated steel columns, benches, rails, cupolas, and more. The Salesteam at EnWood is always available to assist with customer questions and requests.

Built for beauty … designed for durability & economy

Below are standard specifications for the Design Collection Shelter packages. Specifications individually written for each model can be obtained either by calling the Salesteam at EnWood or via www.enwood.com.

Manufacture
Manufacture of the structural glued laminated wood components shall conform to the manufacturing requirements of the American Institute of Timber Construction Standards and Standard Specifications for Glued Laminated Timber, AITC 117.

Quality Control
Quality Control shall be provided in accordance with ANSI/AITC A190.1-latest edition, American National Standard for Wood Products – Structural Glued Laminated Timber, and the American Institute of Timber Construction Inspection Manual AITC-200.

Lumber
Laminating lumber shall be kiln-dried Southern Pine graded to meet the requirements of Standard Specifications for Structural Glued Laminated Timber, AITC 117. Lumber combination shall be determined by the design requirements for each component and designated on the fabricator's shop drawings.

Adhesives
Adhesives shall be wet-use (waterproof) complying with ANSI/AITC A190.1-latest edition.

Columns & Arches
Standard shelters to have embedded glued laminated wood columns *. Glulam columns to be pressure treated in accordance with American Wood Preservers Association Standards.
**Some shelter designs specify pressure treated glued laminated wood arches.*

Roof Deck
Two inch (nominal) #1 Grade, single tongue and groove with V-joint bottom face, kiln-dried Southern Pine.

Fascia
2" x 6" fascia, Southern Pine, #1 SPIB Grade, pressure-treated in accordance with American Wood Preservers' Association Standards.

Roofing
Class A fire rated fiberglass shingles (25 Year Warranty) with one layer of #30 felt. Standard shelter to have medium brown color shingles. Optional dimensional shingles or wood shakes are available. A metal roof system is available upon inquiry.

Hardware
All steel and hardware for beam and column connections plus nails for installation of decking and roofing material are included. Steel connections to be prime painted with rust inhibitor paint. Optional hot dipped galvanizing is available for steel and hardware.

Design
The structural systems are designed to sustain actual dead load in conjunction with 30 PSF live load or 20 PSF wind load, whichever combination is critical. The rigidity offered by embedment of the laminated columns provides overall lateral stability. However, temporary bracing may be required to meet conditions during installation.

Drawings
The fabricator will furnish complete shop drawings for contractor/architect's approval. Installation instructions are available upon request.

Appearance Grades
Appearance Grade shall be Architectural unless otherwise specified.

Finish
Exposed faces of glulam members to receive one coat of factory-applied clear penetrating sealer. Staining of laminated members and roof decking is available.

Protection
Members shall be individually wrapped.

Storage and Erection
The general contractor is responsible for protection of the materials after arrival at destination. If stored temporarily, members should be placed on blocks well off the ground and separated with wood strips so that air can circulate around each member. Cover top and bottom with moisture-resistant paper. Use non-marring slings when handling.

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Metal Roofs

24 gauge EZ-LOC has a standing seam rib of 1 ¾" high, and the premium Kynar 500 finish.

White | Black | Colonial Red | Ruby Red

Dark Bronze | Medium Bronze | Sandstone | Sahara Tan

Stone Gray | Hilton Head Green | Beaufort Blue ***PREM*** | Acrylic Coated Galvalume

Classic Copper ***PREM*** | Patina

29 gauge RIB-LOC has a ¾" high rib and the Valspar Siliconized-Polyester finish.

White | Black | Sunrise Red | Scarlet Red ***PREM***

Teak | Sand Dune | Sun Tan

Marsh Gray | Deep Green | Gulfstream Blue ***PREM*** | G-90 Galvanized

Both of the above metal roofs are approved by the Florida Department of Building Codes
PREM denotes, PREMIUM COLOR
Colors are represented as closely as the printing process allows.

Powder Coating Color Chart

RAL9016 | RAL9004 | RAL3009 | RAL8004 | RAL3000 | RAL7032 | RAL7023 ***PREM***

RAL8028 | RAL7008 | RAL9002 ***PREM*** | RAL1013 | RAL1019 | RAL1011 ***PREM*** | RAL6021

PREM denotes, PREMIUM COLOR
Powder coating colors may not match metal roof colors
Colors are represented as closely as the printing process allows.

Cupolas

S-400 Cupola is square in shape and fits most shelter roof lines.

H-600 Cupola is hexagon in shape and fits most shelter roof lines.

O-800 Cupola is octagon in shape and is designed for the Columbia and Seaside shelter models which are also octagon in shape

All cupolas are hand crafted in quality cedar lumber.

The louvers are screened on the inside, and shipped with mounting brackets.

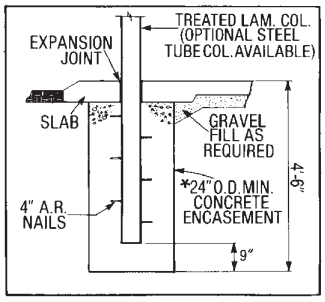
Cupolas are offered with either shingles, aluminum roof, or the distinctive look of a copper roof.

Each model is available in two sizes:
24"x28" tall or 35"x35" tall

Shelter Option Chart

PAGE		METAL ROOF	STEEL COLUMNS	BENCHES	RAILS	FLOOR	CUPOLAS	STAINING
3,4	***Raleigh***	X	X		X		X	X
3,4	***Raleigh II***	X	X		X		X	X
5	***Springwood***	X	X					X
6	***Caroline***		X	X	X	X	X	X
7	***Winston***		X	X	X		X	X
8	***Columbia***	X	X	X	X		X	X
8	***Seaside***	X	X	X	X		X	X
9	***Magnolia***	X	X	X	X	X	X	X
10	***Louisville***	X					X	X
11	***Timberland***	X	X				X	X
14	***Dobson***	X	X					x
14	***Pinehurst***	X	X					X
15	***Charleston***		X					X
15	***Brandywine***	X						X
16	***Apex Series***	X						X
17	***Camden Series***	X						X
18	***Mills***		X					X
18	***Wilmington***	X					X	X

Suggested Column Embedment



**30" O.D. Concrete for some larger sizes.*

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The Dobson

The Dobson shelter's design is simple and clean. The design utilized for this structure is multifunctional, and easily re-sized for bleacher covers, driving range covers, bus stop stations. As well, it is adaptable for partial enclosures, as pictured here with a back wall supplied by the contractor.

The Dobson Sizes Available

8' x 20' | 8' x 24' | 8' x 34'

Custom Sizes Available

The Pinehurst

The Pinehurst Mini-Picnic shelter is designed specifically for a small group's picnic and recreational needs and is ideal for remote park areas, trails, playground, and camping sites. The Pinehurst shelter utilizes solid sawn cedar for the table and benches, and #1 grade Southern Yellow Pine for all other components.

The Pinehurst Sizes Available

8' x 8'

Custom Sizes Available

The structural design of the Pinehurst can be modified to a sign and bulletin shelter for park entrances and recreational areas. Please inquire with our Salesteam for more specifics.

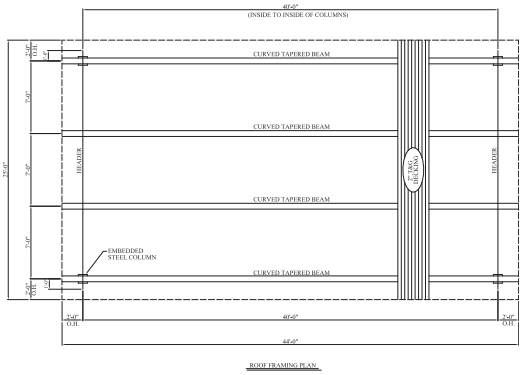
The Charleston

The Charleston is one of the most attractive band shelters in the industry. The soft and graceful roof design utilizes laminated beams and purlins of Southern Yellow Pine. The Charleston is strong on aesthetics as well as on acoustics. The Charleston is spacious and has immense versatility. The size of the Charleston will determine column engineering: either laminated wood or steel.

The Charleston Sizes Available

36' x 25'	52' x 32'
36' x 32'	52' x 39'
44' x 25'	60' x 39'
44' x 32'	

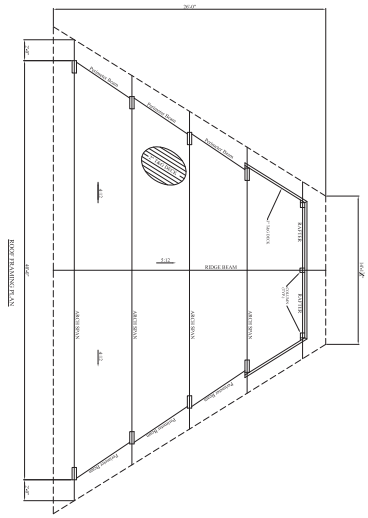
Custom Sizes Available



44' x 25' Charleston

The Brandywine

40' x 26' Brandywine



The Brandywine has intrigue with a unique and spacious arch design. As a newer addition to the EnWood Structures' Entertainment Design Series, the Brandywine can be sized for your specific project requirements. Call for details.

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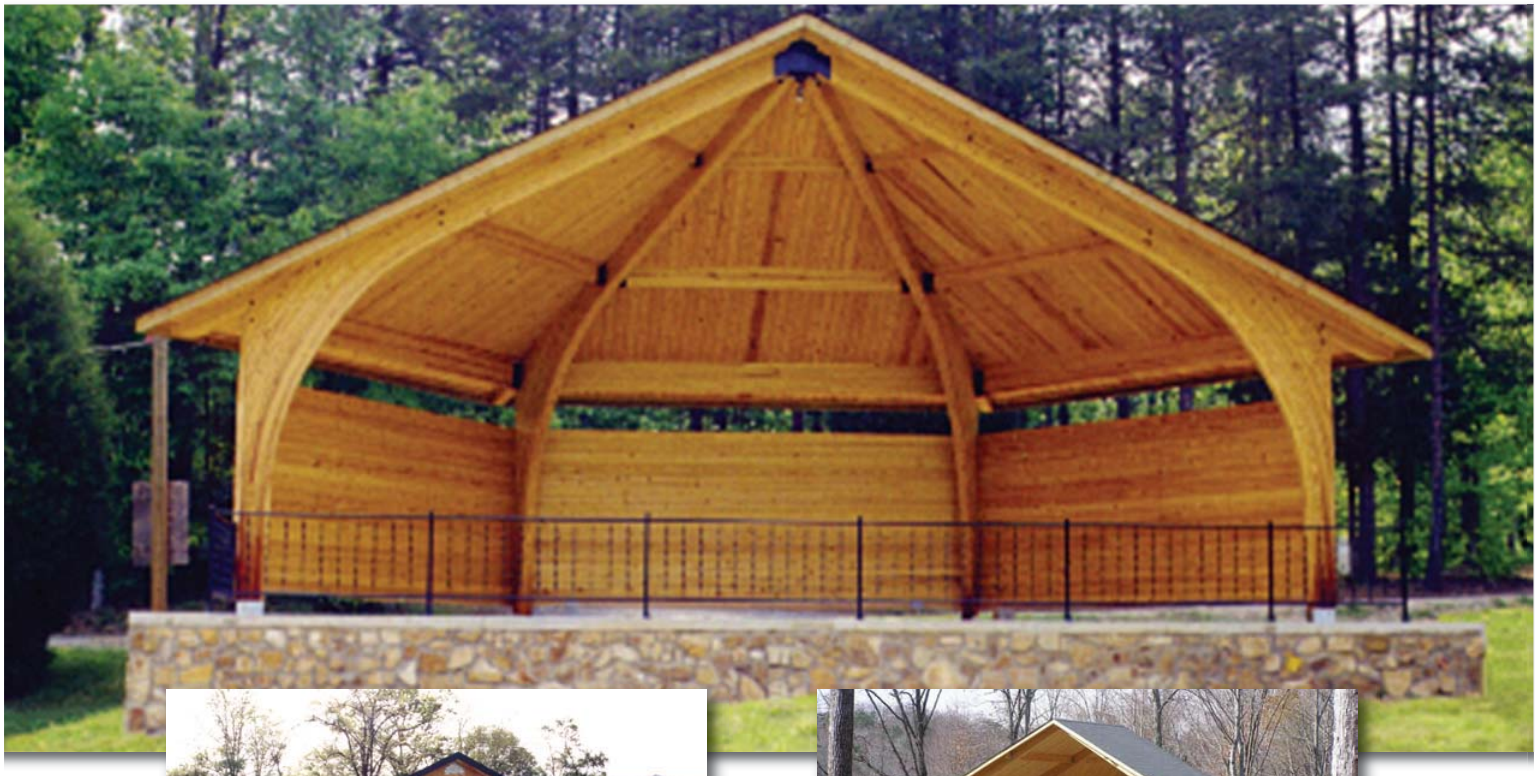
The Apex Series



The **Apex II**

The **Apex** with Front Bay

The Apex Amphitheater Design Series utilizes laminated arches and purlins of Southern Yellow Pine. The amphitheater design is strong on aesthetics as well as on acoustics as the natural acoustical property of wood allows for quality sound.

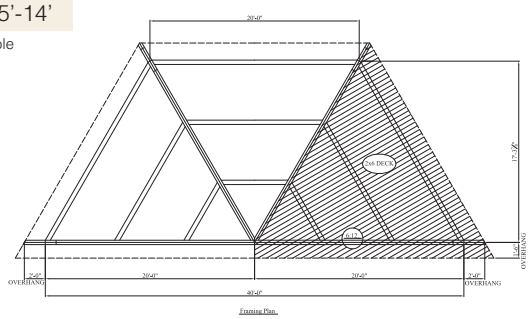
The Apex is engineered with side walls.
The Apex II is engineered without side walls.
Both are offered with arch leg heights of either 10’ or 14’ and facilitate up to 3 front bays for additional coverage. Call the Salesteam at EnWood for additional details.

The Apex & Apex II Sizes Available

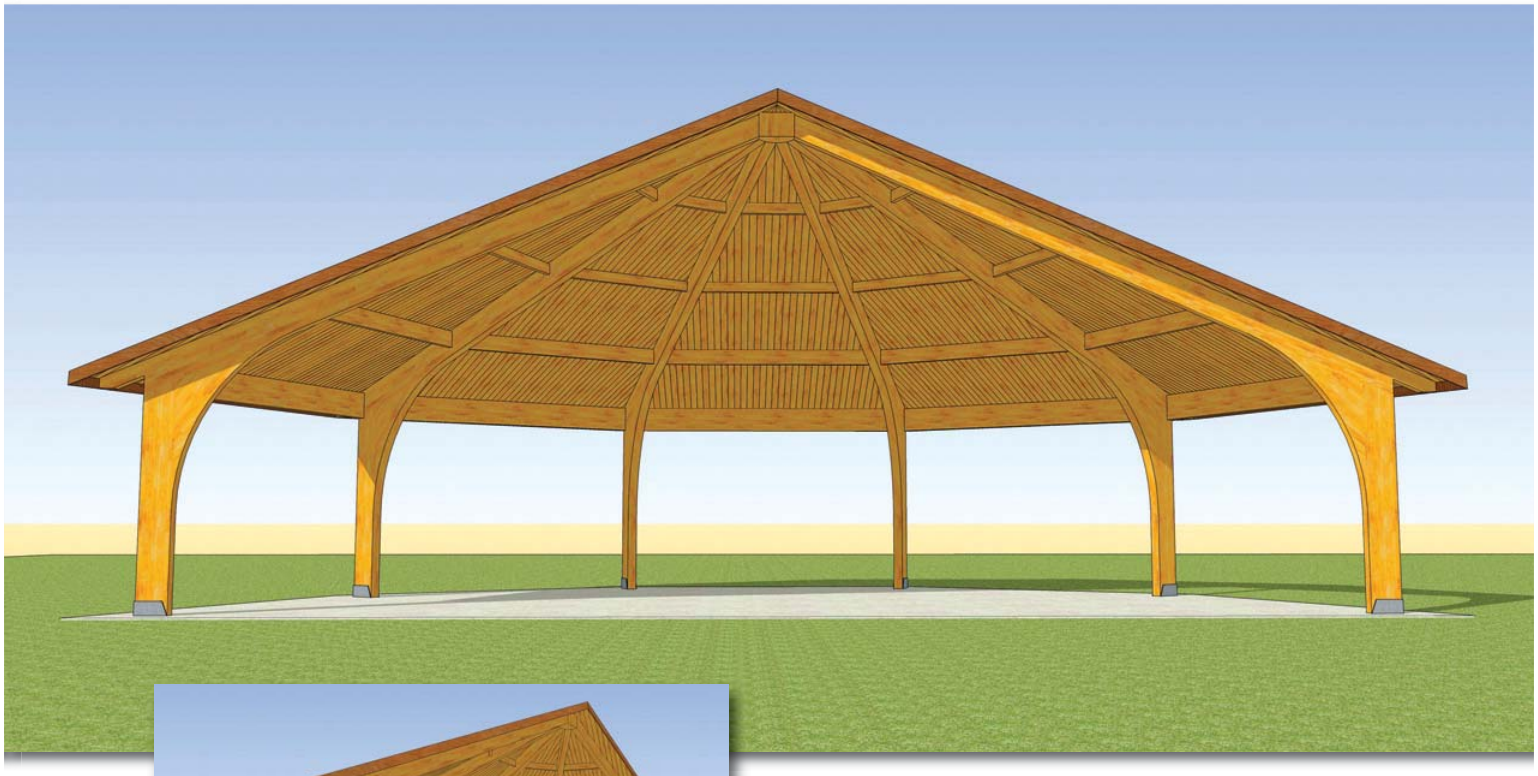
30’-10’	40’-10’
30’-14’	40’-14’
35’-10’	45’-10’
35’-14’	45’-14’

Custom Sizes Available

40’ Apex



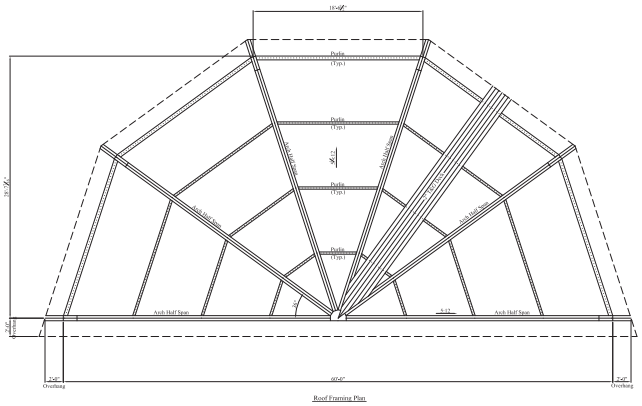
The Camden Series



The Camden Design Series was added to our shelter collection specifically for projects requiring additional covered space. Like the Apex, it utilizes laminated arches and purlins of Southern Yellow Pine, however it features a five segmented design for the added space, allowing sizing to 65'.

The Camden is engineered with side walls.
The Camden II is engineered without side walls, as featured by our artist rendering.
And both are engineered to facilitate up to 3 front bays for additional coverage. Call the Salesteam at EnWood for details.

60' Camden



Roof Framing Plan

The Camden Sizes Available

50'	60'
55'	65'

Custom Sizes Available

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The Mills

The Mills design features the most dramatic laminated wood curved beams of any shelter in the industry. The original structure as pictured here, measures 58' wide by 49' deep. The Mills can be re-sized to specifically meet the requirements of your project.

EnWood Structures graciously thanks those who shared their expertise and foresight in the development of this project: specifically, Gary Mills Parks & Recreation Director for Kannapolis, Site Solutions of Charlotte, Gantt Huberman Architects of Charlotte, and the entire community of Kannapolis, NC.

The Wilmington

The Wilmington is characterized by its surface mounted open-knee arches that are spaced 8' on center and has a 5:12 roof pitch. Open and spacious, this shelter design is ideal for any venue. The Wilmington is available with selected options as the metal roof pictured here.

The Wilmington Sizes Available

24' x 20'	30' x 36'	40' x 44'
24' x 28'	30' x 44'	40' x 52'
24' x 36'	30' x 52'	40' x 60'
24' x 44'	30' x 60'	40' x 68'
24' x 52'	30' x 68'	40' x 76'
24' x 60'	30' x 76'	40' x 84'
	30' x 84'	40' x 92'
	30' x 92'	40' x 100'

Custom Sizes Available

EnWood Structures
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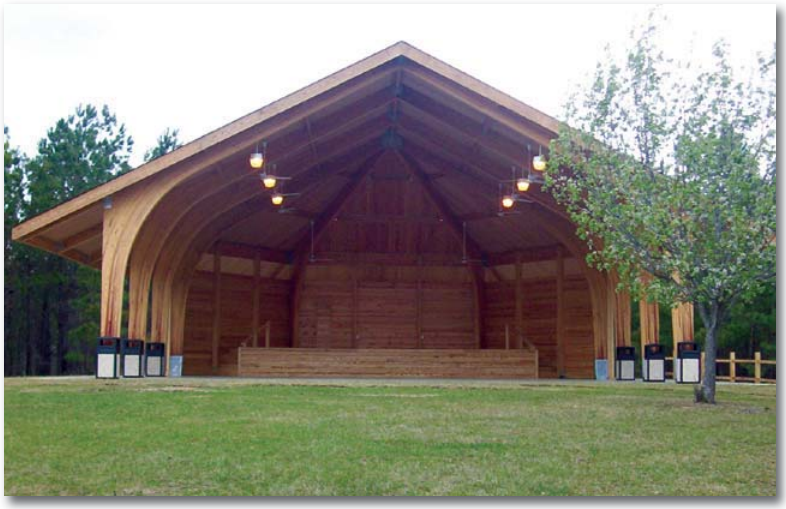
Custom Designs



Pages 19, 20 and 21 feature a collection of Custom Designed shelters and pavilions we have worked for a wide variety of clients and venues. We thank our clients for allowing EnWood Structures to work with them on some truly inspiring projects. We also thank the professionals in the engineering and design industry who shared their talents and expertise with these custom projects.

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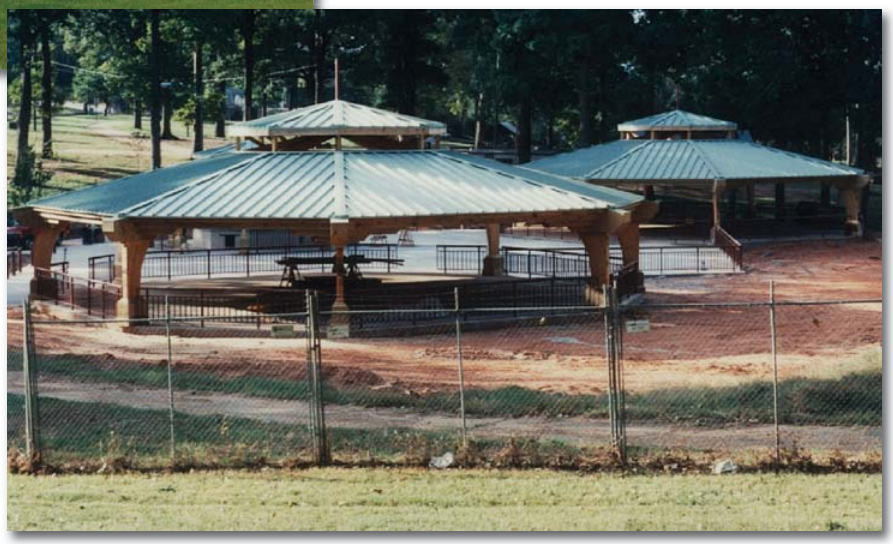
Custom Designs

The Custom Design Shelter Division at EnWood Structures has the expertise and capacity to develop unique and challenging projects. Equestrian and riding arenas, orchestra and stage covers, wedding pavilions and community recreation centers are just a few. The staff at EnWood is highly experienced and can assist you with every stage of your project.

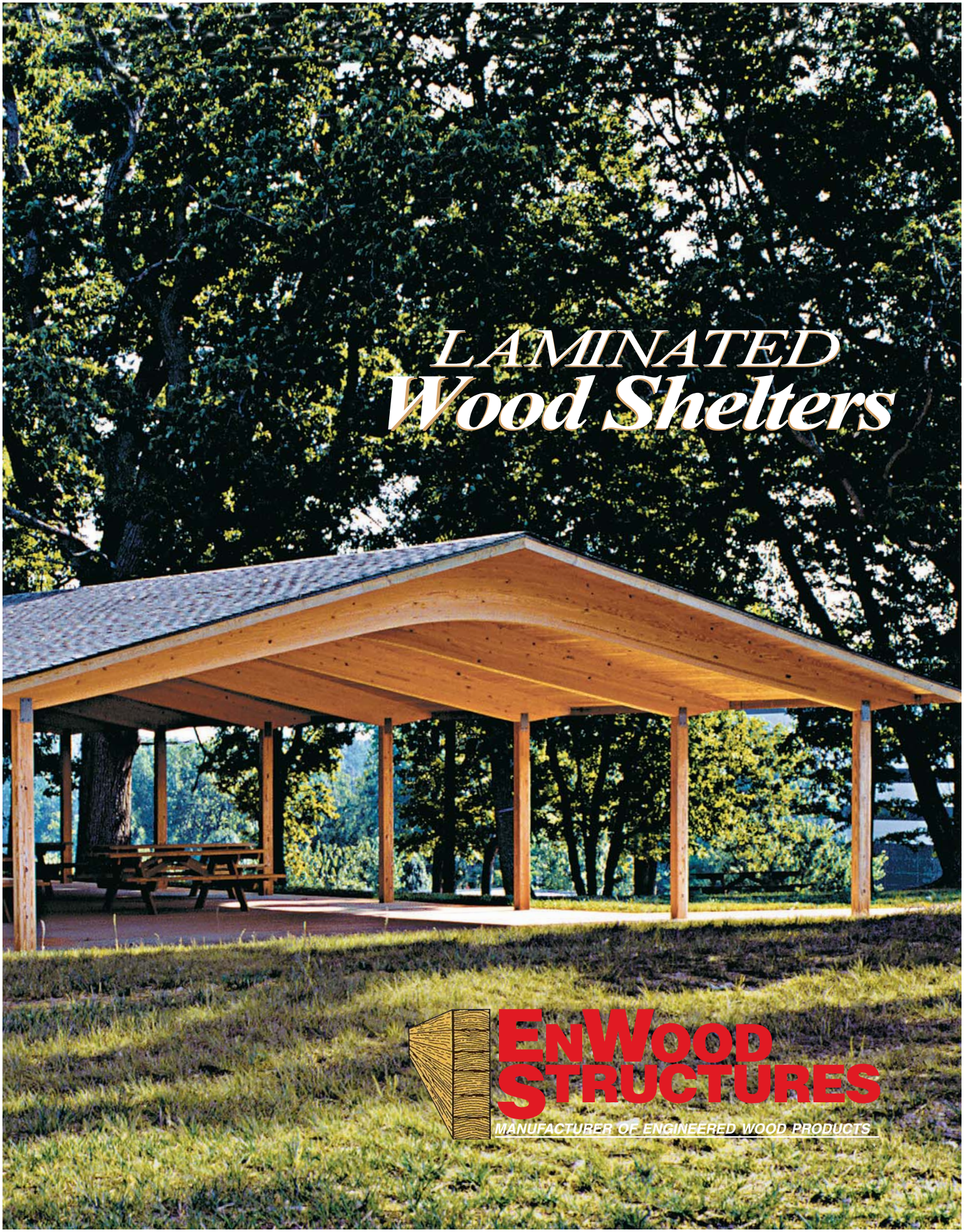


Design Engineering Manufacturing

EnWood Structures
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

Custom **Designs**

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION
AITC
QUALIFIED LICENSEE


LAMINATED
Wood Shelters
EnWood Structures
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

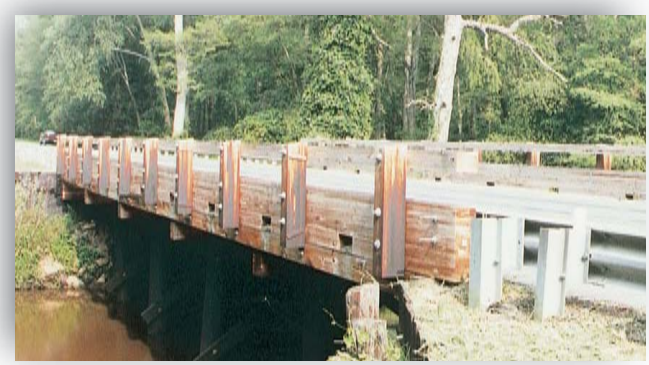
EnWood Structures
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

Bridge Division

Vehicular ***Bridges***

EnWood Structures vehicular bridges offer a viable alternative to steel and concrete structures because of ease of installation due to prefabrication, minimal maintenance, extended service life, and aesthetic quality. Standard design configurations for HS20 loading with spans ranging from 16’ to 80’ are available for single and multi-lane bridges.

Larger spans are possible with truss or deck arch bridge designs. Designs are in accordance with AASHTO specifications.



Vehicular Bridges

Scope

All structural glued-laminated timbers shall be furnished as shown detailed on plans and specified herein. Complete shop drawings shall be furnished by the fabricator and shall be approved prior to fabrication.

Design

Design loads shall conform to standard highway design procedures for state, governmental land, or territories that govern. “Standard Specifications for Highway Bridges” adopted by AASHTO, latest edition, shall be used as the design reference source when specified.

Quality Assurance

Material standards to comply with “Structural Glued Laminated Timber” ANSI/AITC A190.1 - latest edition. Manufacturer to provide factory-glued timber units, produced by an AITC licensed firm, qualified to issue the AITC “Quality Inspected” mark.

Materials

Laminating lumber shall comply with ANSI/AITC A190.1 and applicable lumber association standards cited therein for grades required to achieve glued laminated timber requirements for allowable stress, appearance, fabrication limitations and species. Manufacturing adhesives shall be wet-use (waterproof) complying with ANSI/AITC A190.01.

Laminated materials to be AITC industrial appearance grade. Steel and hardware shall be furnished by fabricator as specified herein and shown on drawings. Fabricated steel shapes and hardware shall conform to ASTM-A36 and ASTM-A307, respectively, unless otherwise specified. All steel and hardware to be hot-dipped galvanized.

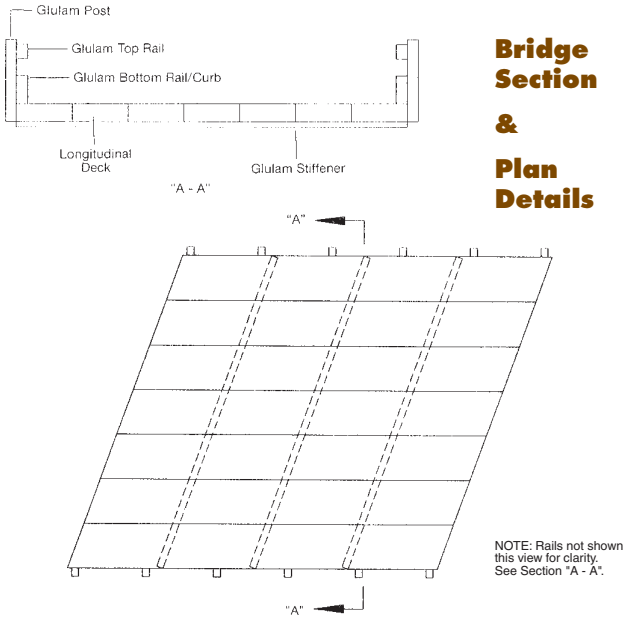
Preservative Treatment

Preservative treatment of materials shall be in accordance with AITC 109 - latest edition and AWPA standards C1, C2, C14, and C28 – latest edition.

Handling, Storage & Installation

Shall be in accordance with manufacturer’s recommendations as well as AITC and AASHTO standards.

Longitudinal *Systems*

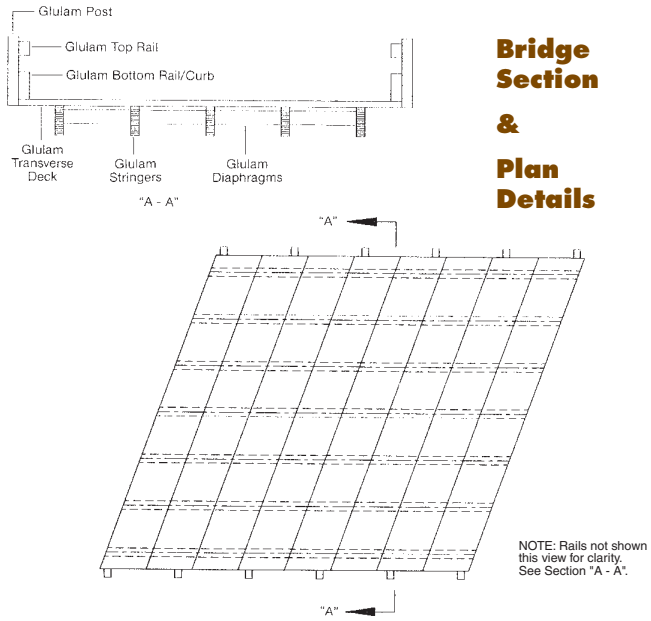


Bridge Section & Plan Details

Longitudinal Deck

Longitudinal glulam deck designs offer low profile structures which are typically used for short spans ranging from 16' to 36' where clearance below bridge deck is limited. Designs consist of deck panels spanning from abutment to abutment. Glulam stiffener beams are used to tie panels together and to distribute wheel loads. Panel thickness varies from 6.75" to 18.25" depending on span and load conditions. Panel lengths up to 80' are available for multi-span decks.

Transverse *Systems*



Bridge Section & Plan Details

Stringer & Transverse Deck

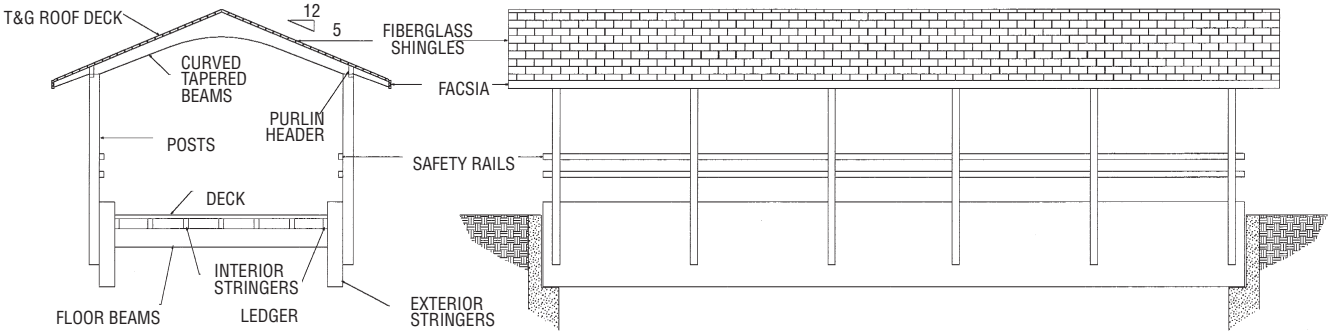
This system utilizes a series of transverse glulam deck panels or solid sawn timbers supported by straight or slightly curved stringers. Glulam or steel diaphragms are used for transverse bracing. This system is most economical for clear spans ranging from 20' to 80'.

Covered Bridges

EnWood Structures' covered bridges offer visual impact and practical solutions to numerous venues. The covered roof system can be either a full coverage or a partial coverage, and are ideal for golf courses, greenways, community areas, and residential developments,

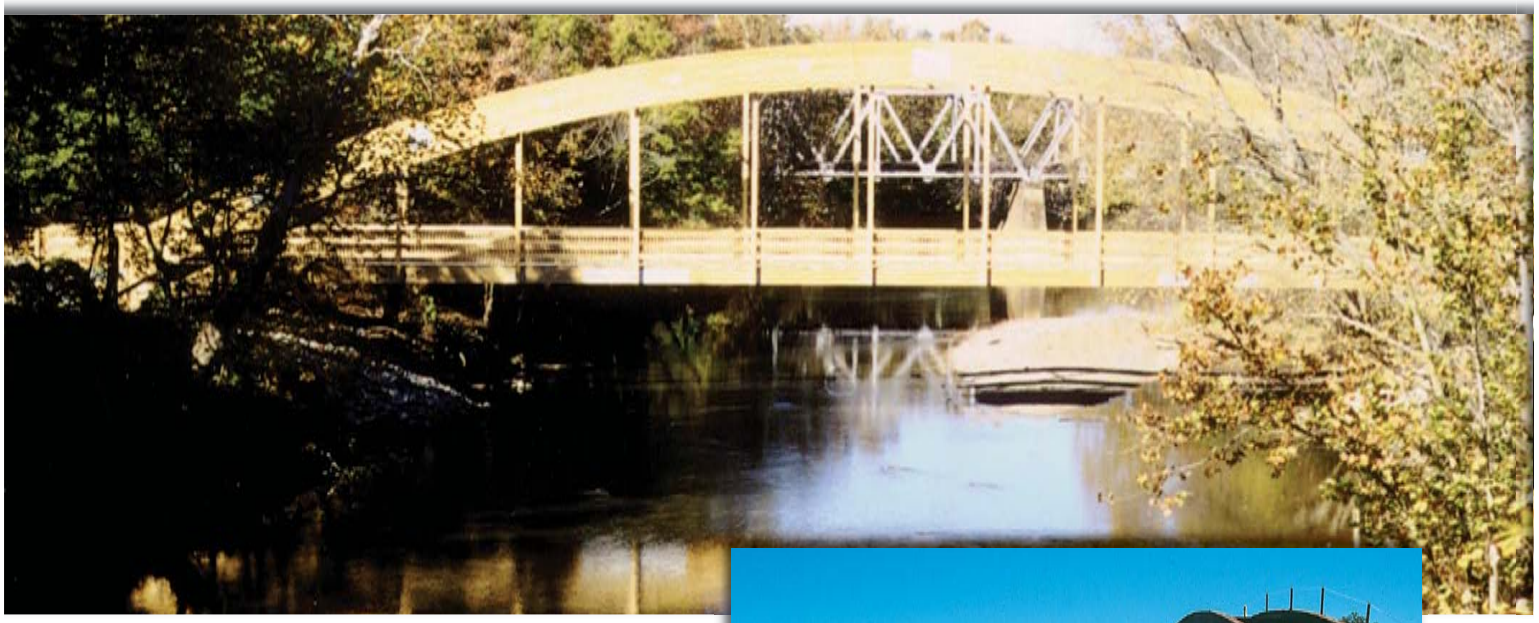
Both the Woodland and the Fairway bridge models can accommodate a full or partial roof system. Roof system designs utilize laminated wood posts and beams, and tongue and groove roof decking.

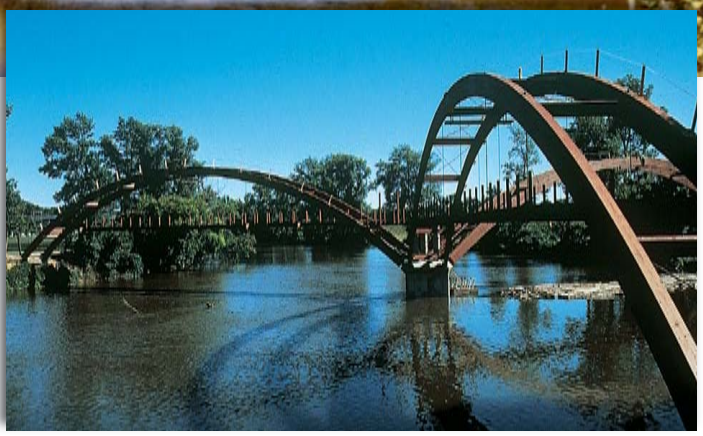
For additional specifications and pricing, call the Salesteam at EnWood Structures 800.777.8648.



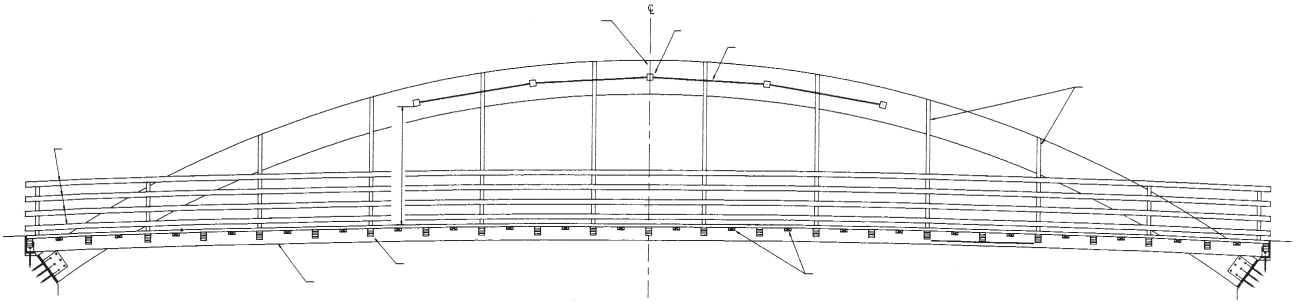
Cross Section **Longitudinal Section**

Arch Suspension ***Bridges***





Arch suspension bridges offer an aesthetically pleasing solution for longer span applications. Clear spans for a typical arch suspension bridge can be up to 220', as pictured with EnWood's national award winning arch suspension bridge in the top photograph. This bridge at Rocky Mount, NC measures 14' x 220', and won the National Timber Bridge Merit Award.

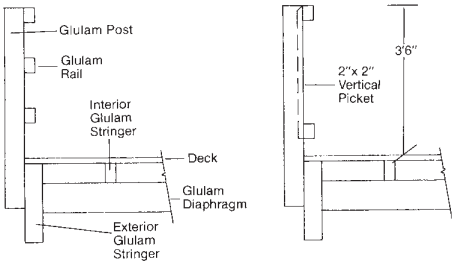


EnWood Structures is a certified member of The American Institute of Timber Construction, AITC, who has the highest manufacturing standards of the industry. Manufacturing and quality control conform to the Standard Specifications for Glued Laminated Timber, AITC 117.

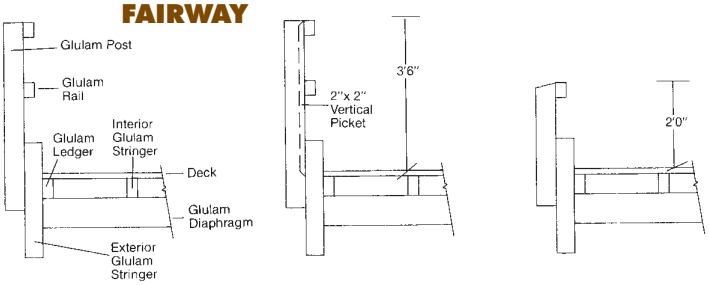
Standard Specifications

Typical Rail Details

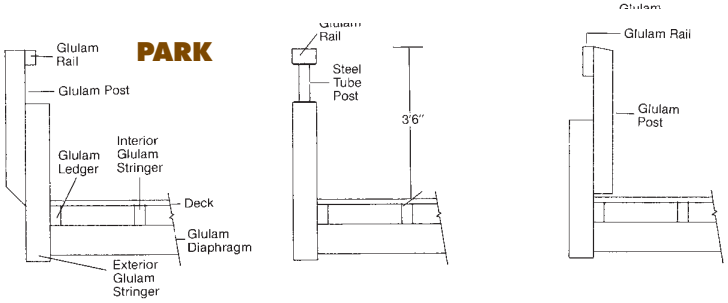
WOODLAND



FAIRWAY



PARK

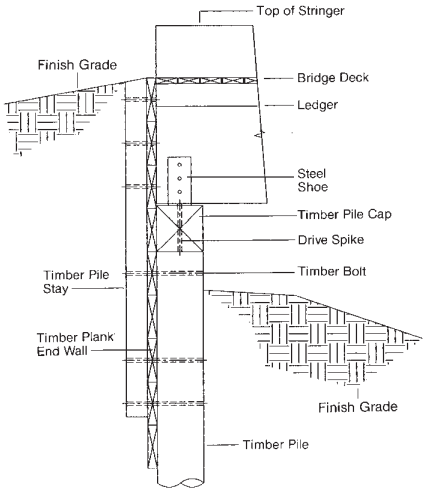


Bridge Curvature

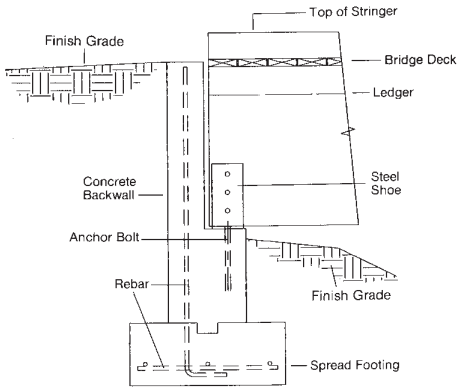
	SPAN (ft.)																
BRIDGE PROFILE	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Low Profile Camber (in.)	3/8"	9/16"	7/8"	1 1/8"	1 1/2"	1 7/8"	2 3/8"	2 13/16"	3 3/8"	3 15/16"	4 5/8"	5 1/4"	6"	6 3/4"	7 5/8"	8 7/16"	9 3/8"
High Profile Camber (in.)	5"	6 1/4"	7 1/2"	8 3/4"	10"	11 1/4"	1'1/2"	1'1 3/4"	1'3"	1'4 1/4"	1'5 1/2"	1'6 3/4"	1'8"	1'9 1/4"	1'10 1/2"	1'11 3/4"	2'1"

Typical Footing Details

Typical Timber Pile End Wall



Typical Concrete Abutment



Standard Specifications

Pedestrian & Light Vehicular Bridges

General

Specifications are for a fully engineered clear span bridge for glulam construction and shall be regarded as minimum standards of design and construction. Bridge(s) shall be designed and manufactured by:

EnWood Structures, LLC
Post Office Box 2002
5724 McCrimmon Parkway
Morrisville, North Carolina 27560
Tel: 919.467.6155
800.777.8648
Fax: 919.469.2536

Bridge Design

Bridge design shall be the _____
(WOODLAND, FAIRWAY, PARK)

Length and Width

Bridge Length (straight line out-to-out dimension) shall be:
Length: _____ Feet-_____ Inches
Bridge Width shall be: Deck Width: _____ Feet-_____ Inches
Width Between Rails: _____ Feet-_____ Inches

Engineering

Uniform Live Load shall be: _____ PSF (LL)
Vehicular Loading required: _____ LB GVW
Steel Rod X-Bracing Required for lateral stability.

Geometry

Profile or Curvature Factor: _____ (low or high)
Rail Configuration: (See page 9 for typical rail details)
Railing Height: _____ Inches (42" Pedestrian; 54" Bike)
Camber: Low Profile Design – 1600' Radius to offset long term dead load deflection
High Profile Design – 2.1% of total span resulting in a deck slope of 8.3%

Shop Drawings

A complete set of shop drawings shall be furnished by the fabricator detailing all member sizes and connections. If required, shop drawings shall be sealed by a registered professional engineer.

Materials

Laminating lumber shall be Southern Pine Kiln Dried and graded to meet the requirements of standard specifications for structural glued laminated timber, AITC 117. Lumber combination shall be determined by the design requirements for each component and designated on the fabricator's shop drawings. AITC quality marks shall be used for identification.

Lamintated components shall be per AITC architectural appearance grade.

Miscellaneous solid sawn lumber for decking shall be Southern Pine graded in accordance with SPIB. Preservative treatment for glulam components shall consist of pressure treated laminated lumber (**treated prior to gluing**) with pentachlorophenol type C in accordance with AITC 109 and AWPA C28. Exterior stringers shall be .6pcf retention and all other glulam components shall be .3pcf retention. Solid sawn decking shall be pressure treated in accordance with C2 for above ground use.

Adhesives shall be wet-use (waterproof) complying with ANSI/AITC A190.1 – latest edition.

All connecting steel and hardware shall be furnished by the manufacturer. Material shall be hot dipped galvanized.

Note: Anchor bolts, setting plates, or items welded to structural steel are supplied by others.

All glulam materials to receive one factory applied coat of clear penetrating sealer. Optional factory staining is available.

Manufacture and Quality Assurance

Manufacture of structural glued laminated timber shall conform to the manufacturing requirements of AITC 117. Quality control shall be provided in accordance with ANSI/AITC A190.1 – latest edition and AITC inspection manual, AITC 200. An AITC certificate of conformance shall be furnished upon request.

Foundations

The purchaser shall secure all necessary information about the site and soil conditions. Information as to bridge support reactions, anchor bolt location and placement will be supplied by bridge manufacturer. Actual design and construction of the bridge supporting foundation (abutment, pier or footing) shall be the responsibility of the purchaser.

EnWood Structures can provide foundation designs as an option if supplied all pertinent soils data.

Storage and Erection

The client or installer is responsible for protection of materials after arrival at destination. If materials are stored temporarily, they should be placed on blocks well off the ground and separated with wood strips so that air can circulate between members. Cover top and bottom with moisture resistant paper. Use non-marring slings when handling the material.

ENWOOD STRUCTURES
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

Production & Shipping

The benchmark for the manufacturing of an EnWood Structures bridge is quality. EnWood uses kiln dried, #1 grade Southern Yellow Pine. Lumber is pressure treated prior to lamination to give extended protection to all laminated bridge components. Interior stringers and diaphragms are also laminated components for additional strength and stability. All steel and hardware is hot-dipped galvanized. As well, steel is fabricated by EnWood's on-site steel shop to assure proper fit.

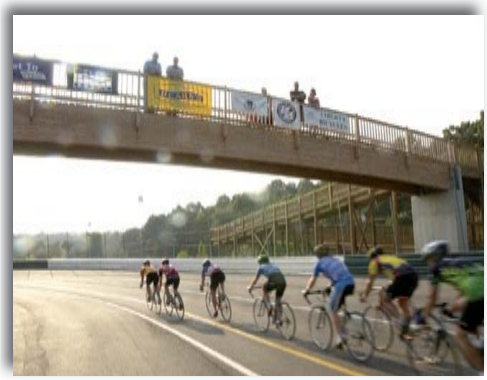
The shipping department at EnWood Structures has years of expertise with coordinating the transportation of oversized bridges and extended length bridge components. Expediting permits and escorts for oversized shipments is just part of the quality customer service the EnWood customer relies upon.

EnWood Structures
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

Custom Modifications

EnWood Structures' standard designs are frequently altered to enhance the bridge appearance without creating a custom engineered structure. Variations in rail details as illustrated by the adjacent photographs add flexibility to these designs.

For golf course applications, low profile structures are usually preferred. Modifications to the Fairway design such as removing the rail system and utilizing a 6" to 8" curb or by using a single top rail at approximately 24" above the deck, can create a streamline design.



In addition to rail modifications, standard configurations have been altered to accommodate covered roofs, multiple span systems, cantilevered bridge sections, and side extensions for pedestrian seating.

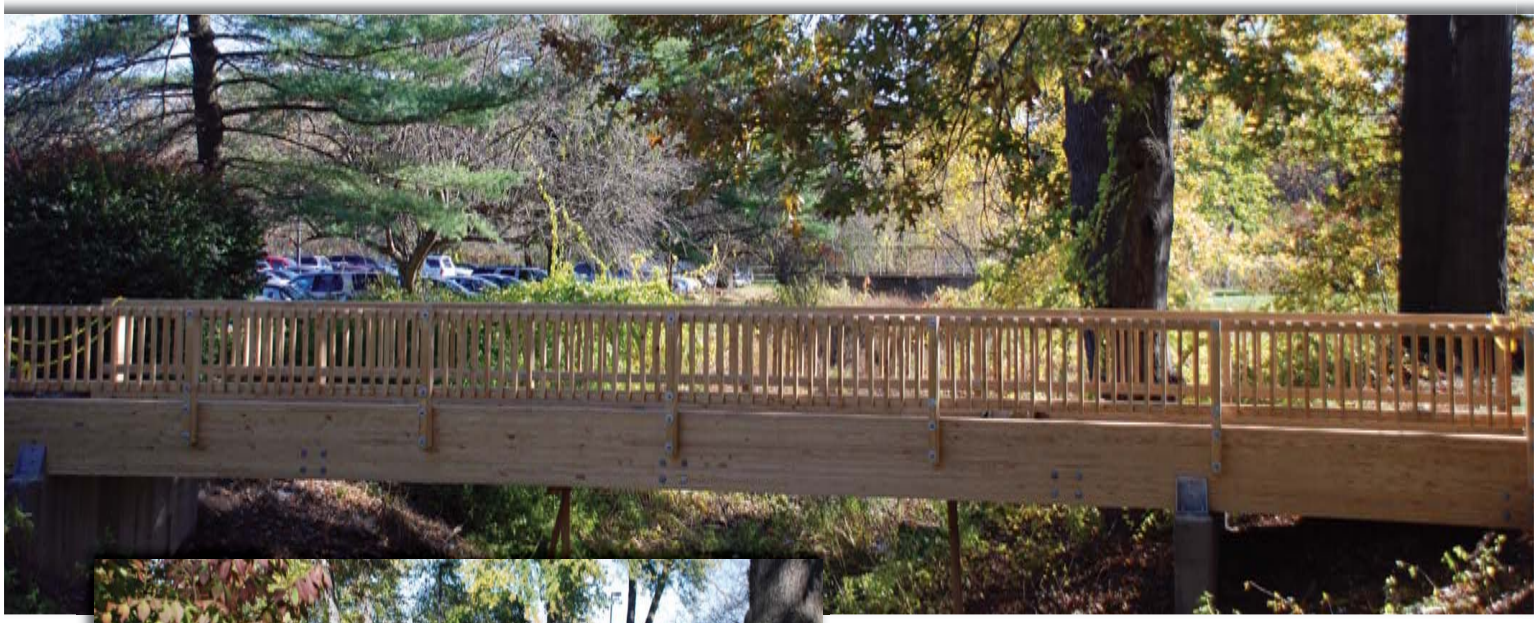
Park & Greenway Bridges

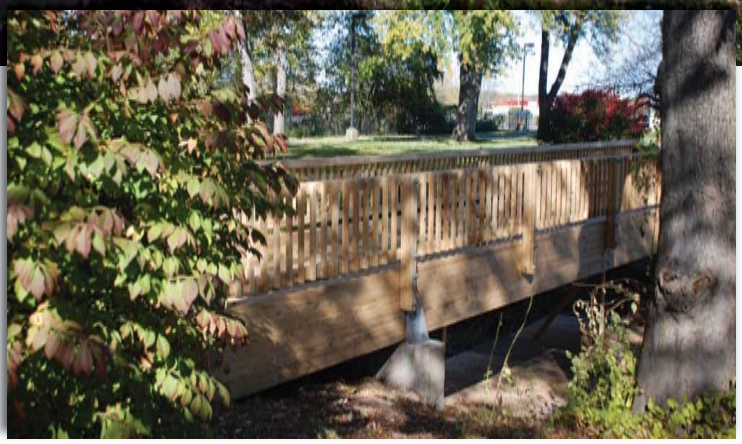
deflection or with a higher degree of curvature to accent the curved glulam appearance. High profile bridges are fabricated with a camber of approximately 2.1% of the total span. This produces a localized deck slope of 1 to 12 or 8.3% which is the maximum allowed for handicap access. See page 9 for specific bridge camber. Non-standard cambers per client specifications are available at no additional cost.

EnWood Structures' standard pedestrian bridges are designed for a live load of 85 PSF and a live load deflection limited to L/300 of the total span. Alternate live loads of 60 PSF and 100 PSF are used per client specifications and are justified by the interpretation of the various building codes of pedestrian applications. Light vehicular loads are also possible with standard design configurations by altering interior framing member sizes as well as deck thickness. Typical light vehicular loads range from 2,000 lbs. to 12,000 lbs. EnWood Structures' client will be responsible for specifying the maximum vehicular load requirement used for design.

EnWood Structures
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

Laminated Wood





EnWood Structures' pedestrian and light vehicular bridges are typically found in parks, golf courses, and greenway trails. Glulam bridges are used for these applications primarily due to their architectural design, low maintenance, and long term cost.

EnWood Structures offers three standard prefabricated designs which are known as the Woodland, Fairway, and Park models. Standard configurations are available in 4', 6', 8' and 10' widths with spans ranging from 20' to 100'. Standard designs are generally limited to a span-to-width ratio of 12:1; however, ratios as high as 15:1 are possible. Bridges up to 10' wide and 65' in length can be shipped assembled if roadway and jobsite access allows.

Standard girder type bridges can be manufactured with a minimum curvature or camber to offset long term dead load

Golf Bridges

Utilizing wood as a structural material has numerous advantages. For example, the sound and thermal insulation properties of wood produce lower traffic noise and reduce the problem of "bridge freezing before road." Timber bridges have excellent impact load characteristics and are surprisingly fire resistant. Another distinct advantage for using wood in vehicular bridges is its high resistance to deicing chemicals which cause deterioration to both steel and concrete bridges.

Design Capabilities

Standard designs have been developed for both vehicular and pedestrian bridges utilizing CADD (Computer Aided Drafting and Design) capabilities. These designs have been developed by registered professional engineers who also are equipped to handle custom designs.

Typical Glulam Design Configurations	
Pedestrian/Light Vehicular	*Highway / Vehicular*
• Girder Type	• Stringer and Transverse Deck
• Bowstring Truss	• Longitudinal Deck
• Parallel Chord Truss	• Bowstring Truss
• Hinged Arch	• Parallel Chord Truss

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EnWood Structures
MANUFACTURER OF ENGINEERED WOOD PRODUCTS

Laminated Wood

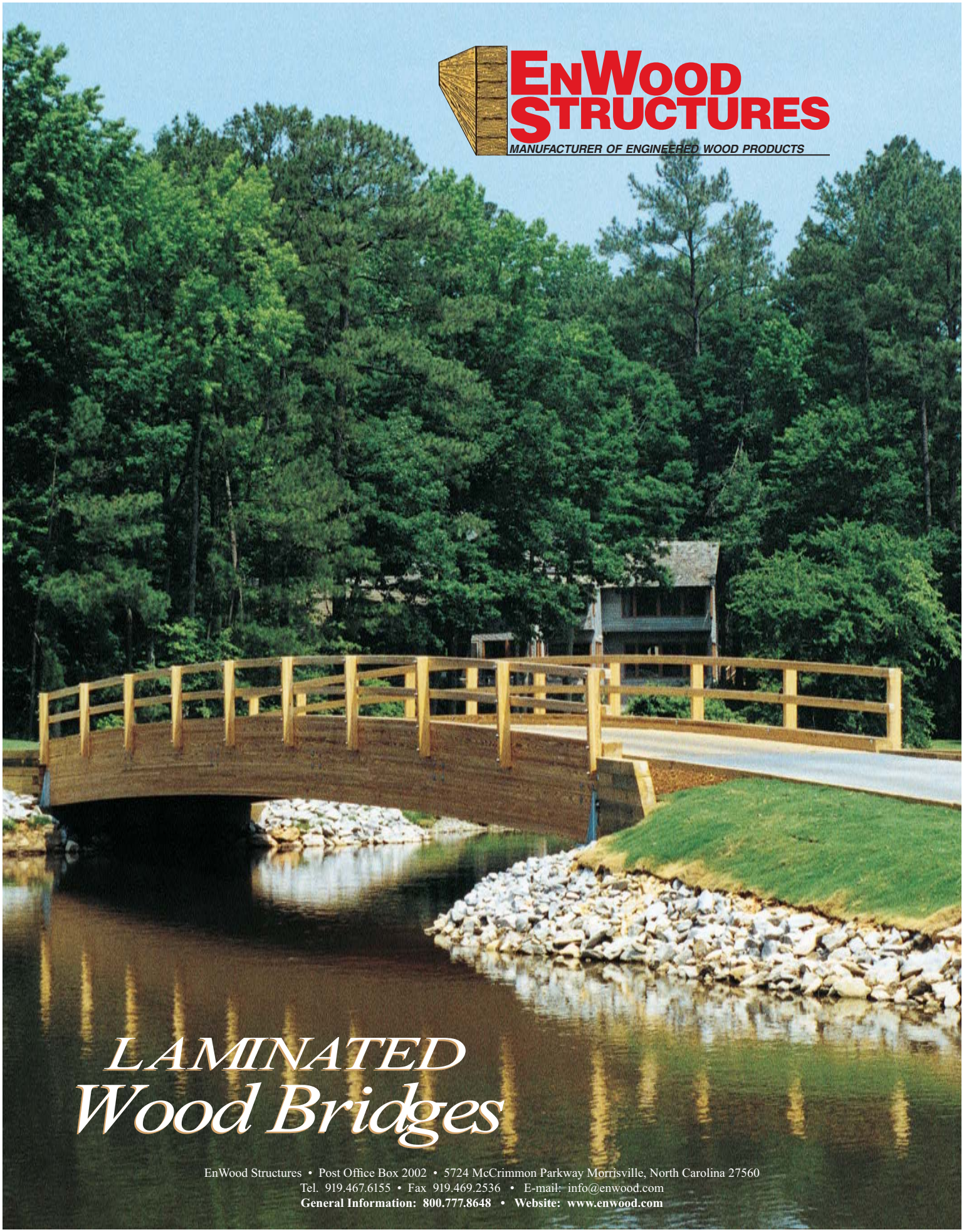
For over sixty years EnWood Structures has been designing and manufacturing vehicular and pedestrian bridges utilizing pressure treated glulam. Designs range from standard pedestrian bridge configurations to custom vehicular bridges per AASHTO specifications. EnWood Structures bridge systems are ideal for use in parks, golf courses, planned developments, as well as state and county road systems. These structures combine the inherent beauty of glulam with the advantages of modern pressure treated technology to increase wood's versatility and service life.

Advantages of EnWood Structures' Bridges

In addition to the aesthetic value of an EnWood Structures bridge, there are numerous other advantages to consider. EnWood Structures' bridge packages are prefabricated prior to shipping in order to expedite on-site construction and reduce labor cost. Pedestrian and light vehicular bridges are frequently shipped fully or partially assembled if roadway and jobsite access allows, thus utilizing smaller installation crews to further reduce costs.

Built for beauty

engineered for utility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Wood Bridges
EnWood Structures • Post Office Box 2002 • 5724 McCrimmon Parkway Morrisville, North Carolina 27560
Tel. 919.467.6155 • Fax 919.469.2536 • E-mail: info@enwood.com
General Information: 800.777.8648 • Website: www.enwood.com