

## Berrett Hill On30 Foot Wide Sectional Guidelines

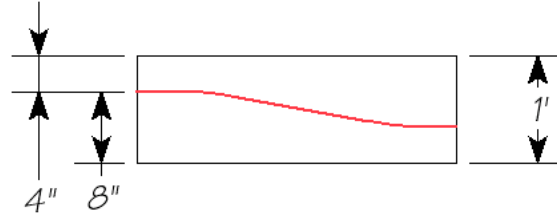
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Kevin Hunter, February 5, 2009  
www.berretthill.com

*This version of the guidelines is an interim update, and should be superceded by March 2009.  
Look for updates at: [http://www.berretthill.com/trains/pdfs/berrett\\_hill\\_sectional\\_guideline.pdf](http://www.berretthill.com/trains/pdfs/berrett_hill_sectional_guideline.pdf)*

### The Guidelines

*Two track locations and modified rules for curve placement allow tighter layout plans and more natural curve arrangements.*



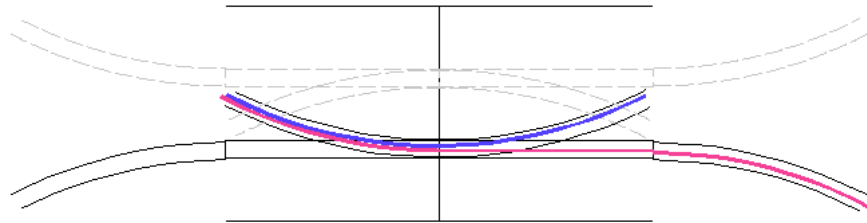
- Section ends are **at least 12" wide. Sections may be wider at the end, or broaden with a taper.\***
- Tracks may be centered 4" from the left or right of the nominal 12 inch end.
- Curves may begin at section end if turning towards section centerline.
- Curves may begin 12" from end if turning away from section centerline.
- End plates to template drilled for precisely placed alignment pins.
- Track runs to the section end with no bridge rails.
- **Rail should be installed so the last 1/4" of rail end should accept a joiner if needed.**

\* Items in red are part of the 2009 guideline revisions.

Other rules, such as electrical, DCC, color, etc. follow the Mid-Atlantic On30 standard.

### How It Works

*Appreciating the continuous curve.*



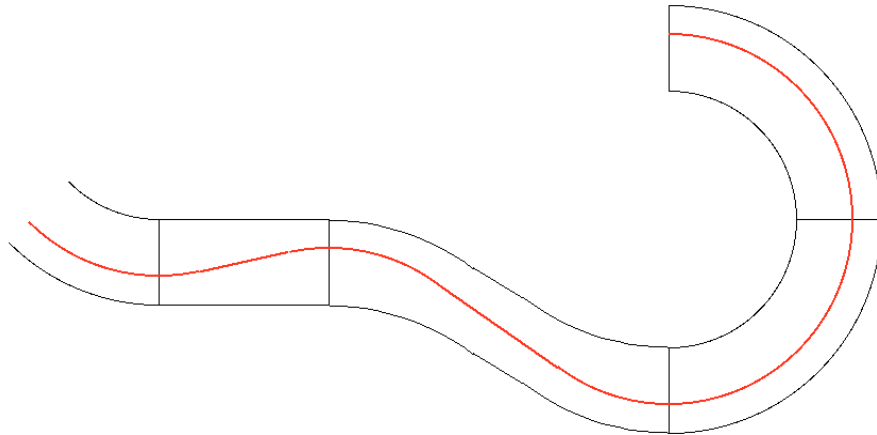
This plan shows the various routes allowed under the guidelines. Notice although continuous curves are now possible, that it is not possible to create the dreaded back-to-back "S" curve when assembling sections built to this guideline

Above, the blue route describes a continuous curve. The red route describes an "S" turn with a 12" tangent between the curves.

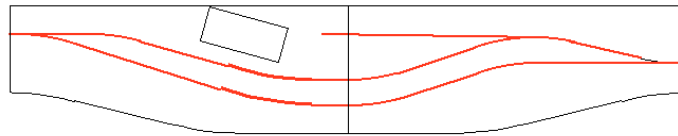
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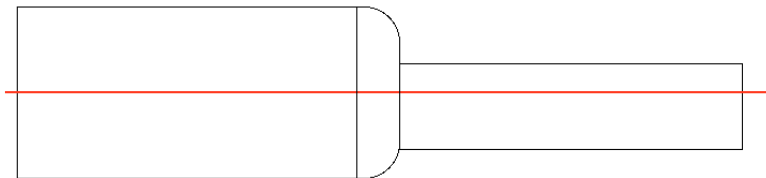


Applied to several sections, this example shows the flexibility and natural curves possible under the guidelines.



Paired sections can make room for stations and yards

### Adapter Section



A 6" wide adapter section provides a fully compliant connection with 24" Mid-Atlantic On30 standard modules, while providing a cosmetically continuous fascia appearance. Similar sections could interface with other standards.

### Section Ends

A 4" by 12" - 34" Birch plywood end plate is used at each joining section end. **Wider end plates may be used, but should be painted and presented as fascia wrapped around to the 12" mating section for proper appearance when meeting narrow modules. In over width modules, a nominal center must be planned for the purposes of track placement.**

Track is laid to terminate 2" to the left or right of the center of the 12" wide section and perpendicular to the end plate.

The rails are solidly supported at the section end. Details of methods are at the end of this document.

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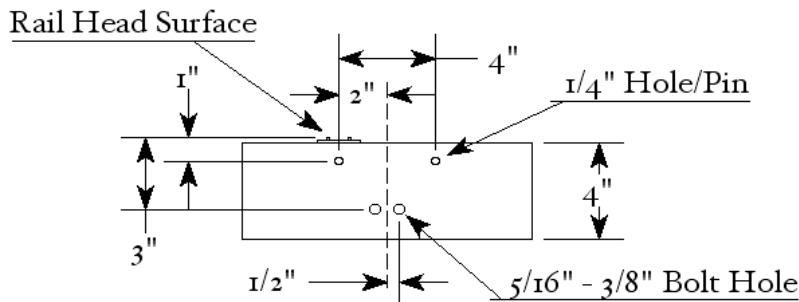
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A 1/4 inch length of rail must be left unsupported at the end of the module to accept rail joiners if needed to mate with alternate standards. See the details for a clear image of this practice. Track must *ALWAYS* be installed before drilling the end plate.

After the track is finally installed, rails are trimmed flush to the end of the section.

### End Plate



The end plates of sections are drilled using an extremely exact template. After the track is laid, a **one-quarter inch** hole is drilled centered on the track and **1 inch** below the railhead. A second quarter-inch hole is drilled level and four inches on center, as shown above - under the alternate track location. Each alignment “pin” is a 1-1/4” length of aluminum rod, with an approximately 1/16” bevel ground around each end.

A pin is press-fit installed in the right hand side hole – facing the end plate. The left hand side hole should be opened by gently rotating the bit in a hand drill in a conical motion to create a slight funnel shape of the hole. This reduces the amount of force and frustration required in set-up.

Properly installed this should provide alignment to one or two thousandths of an inch, for a precise track alignment. Since the holes are measured from the railhead, the rail tops should be level, even between different ballast thicknesses and different heights of rail!

Two small holes are drilled near the center of the end plate to accommodate 1/4” bolts and tee nuts. A tee nut is installed from behind the end plate, on the right side as you face the end plate. These nut/bolt arrangements are optional in setup, and usually only one bolt is required. Common assembly with clamps is possible if the bolts are not used.

### Proven Technology

This approach, including the alignment pins, and running rail to the section end with end rail supports, has been used for many years by the North Carolina Sipping and Switching Society. This approach might not have been considered if not for their demonstration of simple setup and nearly flawless operation.

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For more references and inspirations see  
<http://www.berretthill.com/trains/on30sectional.html>

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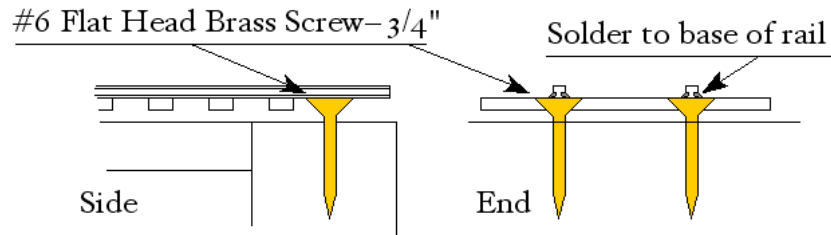
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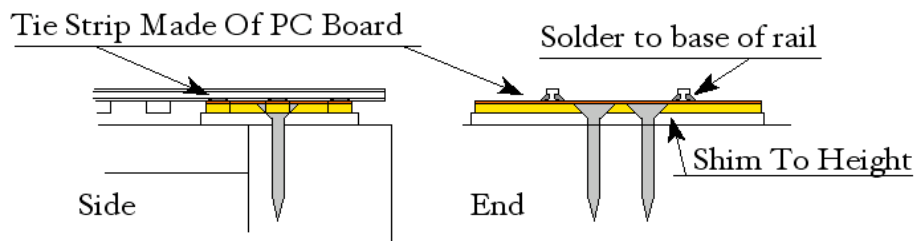
### Rail Supports

Most commonly a one of several support methods is used;

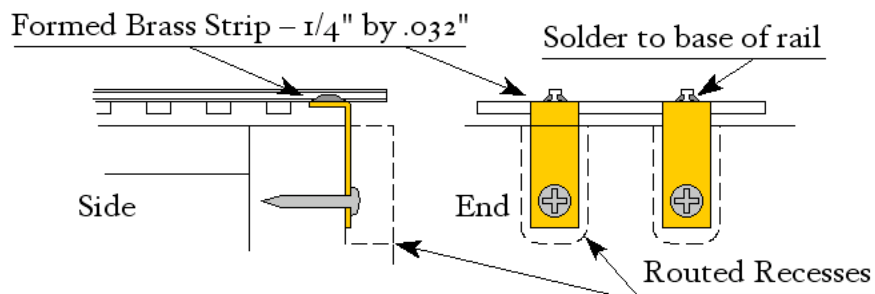
1. Centered under each rail, a screw is driven into the end plate and height adjusted to just touch the bottom flange of the rail. After double-checking the track location, perpendicular alignment, and gauge, the rails are soldered to the screw heads.



2. A similar approach is to replace the last few ties with printed circuit board ties, and soldered to the rails. Support of the PC board to exactly the correct height requires careful planning or shimming.



3. A more detailed, but flexible approach is to bend a 1/4" wide by 3/64" thick by 1-1/8" long strip of brass over about 3/16" at the one end, and a 3/16" hole drilled in the other. The strip is placed in a 3/16" deep notch router cut into the plywood end plate beneath each rail. Once the strip has been soldered to the bottom of the rail, a hole is drilled and a #6 by 3/4" screw is driven to attach it.



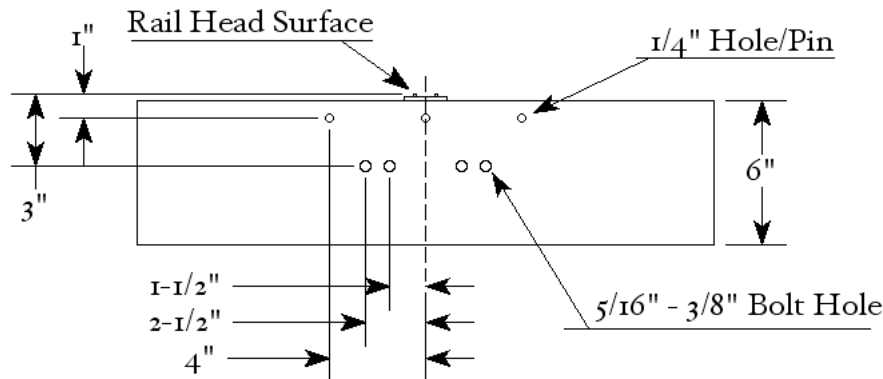
The intent of these methods is to provide a secure and stable attachment. Improvements and modifications are welcome.

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## Application Of The Berrett Hill End Plate Holes To The Mid-Atlantic Standard End Plate

It has been suggested that the Mid-Atlantic On30 end plate pattern include an option to drill for bolt attachments and alignment pins. A direct overlay of the Berrett Hill hole pattern (drilled to either side of the track) would be as shown.

Note that all measurements are down from the rail head top surface; *Lay all track before drilling.*



### Attachment Bolts

The bolt holes for attachment of modules would be of great assistance for quick setup. A 1/4-20 by 2" machine screw with a Phillips head makes a handy fastener. It can be spun in with a screw gun if there is available room.

A 1/4" Tee nut should be installed behind each right hand hole to eliminate loose nuts and washers. A typical 1/4" tee nut slides snugly into a 5/16" hole. Tee nuts should be loose, or fastened with caulk or similar adhesives. When modules are drilled slightly off standard, it may be necessary to loosen them for a slightly crooked screw installation; impossible when tee nuts are epoxied in place. The left hand hole may be drilled out to 3/8" to accommodate even greater variation in hole pattern.

### Alignment Pins

Pins and holes should be prepared as previously discussed in the Berrett Hill standards. The holes for the 1/4-inch alignment pins must be drilled at a precise location and perpendicular to the plate surface. This work may be done with hand tools only with an accurate template. Berrett Hill has such a template and will offer it to any who wish to add these alignment holes. Additional templates may be ordered, or advice and assistance will be offered to those who wish to create their own.

It is good to note that both holes are optional. Traditional end plates may be joined as they are currently, with clamps and visual alignment. The bolt holes are not too critical in placement, and general use should speed assembly enough to gain common acceptance. The use of alignment pins may prove to be of great help, or not, but nothing is lost if they are drilled and not used.

### Rail Ends Flush With End Plate

Rail ends may be run flush to the end of each module, as shown in previous page. 1/4" of rail must extend beyond the supports to allow a rail joiner and a 1" rail length to connect to modules with a 1" setback. This method requires some extra work, and may be more than some wish to attempt. This method is *definitely* optional.

## Experience Learned

Here I lay out some of the more subtle details that can make a project like this more (or less) durable and/or painful. These are mostly observations, and my own views on how to deal with minor troubles. Please assail me with insults at [kevin@berretthill.com](mailto:kevin@berretthill.com)

Discussions include:

### Expansion

*How things are forever changing shape, and what to do about it.*

[ Soon to Come ]

### Structure

*What needs to be rigid, and what needs to remain flexible, and how, and why.*

[ Soon to Come ]

### Electrical Fun

*Good and bad ideas for traveling electrical systems.*

[ Ready for a good update ]

[www.berretthill.com/trains/rants/electricalconnections.html](http://www.berretthill.com/trains/rants/electricalconnections.html)

### Turnout Wiring

*How I wrestled with the turnout demons.*

[ A discussion of fixing Peco turnouts. Notes on Micro Engineering soon to come... ]

[www.berretthill.com/trains/rants/turnoutwiring.html](http://www.berretthill.com/trains/rants/turnoutwiring.html)

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February 5, 2009

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