Stream Smart Structure Options

The Golden Rule:
Let the stream act like a stream (or else!)
Stream Smart Options

1) **Avoid** creating a crossing

2) **Remove** the crossing

3) **Open bottom** structure > channel width
   - Abutments for temporary bridge
   - Bridge or 3-sided box culvert
   - Arch culvert

4) **Embedded** culvert
Replace crossing with permanent abutments, temporary portable decks.
Permanent abutments temporary portable decks
Structure Choice

Box Culvert Shell Cross Section

<table>
<thead>
<tr>
<th>Structure #</th>
<th>R_1</th>
<th>R_h</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-39</td>
<td>297.50&quot;</td>
<td>90.250&quot;</td>
</tr>
<tr>
<td>40-67</td>
<td>258.75&quot;</td>
<td>37.375&quot;</td>
</tr>
<tr>
<td>88-143</td>
<td>310.75&quot;</td>
<td>43.625&quot;</td>
</tr>
</tbody>
</table>
Open-Bottom Arch

pre-restoration

2009 site

post-restoration

New channel cross section

20'

Photo by K. Mueller
Small bridge on low volume road

Before

After
Large bridge on low volume road

Before

After
Bridge concrete abutments and deck, steel girders
Bridge concrete abutments and deck, steel girders
Concrete bridge deck

Before

After
3-Sided Box Culvert

Before

After
Concrete Arch Culvert

Before

After
Embedded Box Culvert

Before

After
Embedded Pipe Arch Culvert

Before

After
Rules of Thumb (4 S’s)

Span the stream
Set elevation right
Slope and skew match stream
Substrate in the crossing

The Golden Rule:
Let the stream act like a stream