ABC – UTC Webinar 2-15-18
Rochester, VT Bridges #15 & #16
Joe Carrara - J.P. Carrara & Sons, Inc.
Middlebury, VT
## 1 – Precast Components

### Rochester Bridges

<table>
<thead>
<tr>
<th>VT 73 Bridge No. 15 &amp; VT 73 Bridge No. 16</th>
<th>Rochester, Vermont</th>
</tr>
</thead>
<tbody>
<tr>
<td>GC: W.M. Schultz Construction, Inc.</td>
<td>Project 23419-013</td>
</tr>
<tr>
<td>Engineer: VTrans/VHB</td>
<td>28-May-15</td>
</tr>
<tr>
<td></td>
<td>Rev. 0</td>
</tr>
</tbody>
</table>

### Product Summary

<table>
<thead>
<tr>
<th>Bridge No.</th>
<th>Product Type</th>
<th>Quantity</th>
<th>Max Length (ft.)</th>
<th>Max Width (ft.)</th>
<th>Max Height/Thickness (ft./in.)</th>
<th>Max Weight (kips)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Approach Slab</td>
<td>7</td>
<td>16'6&quot;</td>
<td>13'3&quot;</td>
<td>15&quot;</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Wingwall</td>
<td>4</td>
<td>10'11&quot;</td>
<td>8'8&quot;</td>
<td>18&quot;</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Abutment</td>
<td>4</td>
<td>23'4&quot;</td>
<td>4’0”</td>
<td>11'5&quot;</td>
<td>93.0</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>NEXT 28D Beam w-CW</td>
<td>4</td>
<td>74'3&quot; w-CW 12'2&quot;</td>
<td>28D</td>
<td>w/integral precast curtain walls &amp; precast railings on fascia beams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Approach Slab</td>
<td>6</td>
<td>24'6&quot;</td>
<td>11'0&quot;</td>
<td>15&quot;</td>
<td>36.4</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Wingwall</td>
<td>4</td>
<td>10'3&quot;</td>
<td>8'6&quot;</td>
<td>18&quot;</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Abutment</td>
<td>4</td>
<td>25'3&quot;</td>
<td>4'0&quot;</td>
<td>10'9&quot;</td>
<td>92.2</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>NEXT 28D Beam w-CW</td>
<td>3</td>
<td>72'1&quot; w-CW 11'3&quot;</td>
<td>28D</td>
<td>w/integral precast curtain walls &amp; curbs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


2 - Bid Considerations

Sizing of Abutment Components (footings, abutments, wing walls, approach slabs)

• Max weight - consideration of fabricator & jobsite limitations
• Max height (12’-2”), width (12’) & length to accommodate fabrication and shipping limitations

NEXT Beam Considerations

• Handling/GC Coordination: sling angle & vertical lift requirements
• Beam + Dolly + Tractor = Superload? (L > 100’, Wt > 150,000 lbs)
• Shipping Route

Schedule

• Project Bridge Closure Period (BCP)
• Current workload
• Shop drawing development/approvals
• Material lead times
• Fabrication
• Component approvals for shipping (prior to BCP)
3 – Component Cost

• **Abutment Components:** $800 - $1,800/cy F.O.B. Jobsite

• **NEXT F Beams:** $40 - $55/sf F.O.B. Jobsite

• **NEXT D Beams:** $75 - $95/sf F.O.B. Jobsite

Cost Comparison

• **NEXT F Beams vs Box Beams:** 50% less (Box Beams: grouting & PT required; NEXT F: CIP deck required)

• **NEXT D Beams vs Box Beams:** similar (Box Beams: grouting & PT required, CIP deck may be required)
4 – Design Considerations

NEXT Beam Design

Adhere to PCINE Standards
- Strand patterns
- Stem geometries

Customizable
- Variable flange width & thickness
- Skewed ends (30 degrees max recommended)
- Curved & flared flanges

Camber Monitoring & Control Program
- Tolerances: Design Camber = +/- ¾”   Differential Camber = +/- ¾”
- Producer verified cambers for release, erection & long term time steps
- Calculated modulus of elasticity (AASHTO LRFD formula vs ACI 363R-10 formula)
- Producer measured modulus of elasticity for 6, 8 & 10 ksi mixes (Compressometer-Extensometer per ASTM C469) is generally lower than calculated per AASHTO LRFD formula

Abutment Component Design
- Lifting design can be challenging with complex geometries (cheekwalls, pile pipe sleeves)
- Coordination of component connections (rebar & splicer covers)
5 – Fabrication (Abutments – Match Cast)
6 – Fabrication (Abutments)
7 – Fabrication (Wing Walls)
8 – Fabrication (Approach Slabs)
9 – NEXT Beam Fabrication
10 – NEXT Beam Fabrication
11 – NEXT Beam Fabrication
12 – NEXT Beam Fabrication
13 – NEXT Beam Fabrication (Curtainwall)
14 – NEXT Beam Fabrication (CW & Parapet)
15 – NEXT Beam Fabrication (Parapet)
16 – NEXT Beam Fabrication (SB Keyway Finish)
17 – Shipping (Quad Equipment Trailer)
18 – Shipping (Triaxle Drop Deck Trailer)
19 – Shipping (Triaxle Equipment Trailer)
20 – Shipping
21 – Shipping (Quad Dolly + Dual Jeep Trailer)
22 – Shipping (Quad Dolly + Dual Jeep Trailer)
23 – Shipping
24 – Shipping
25 – Erection