

ACEC/MaineDOT Bridge Design Subcommittee

MEETING MINUTES

September 13, 2016

Attendees:		Location: MDOT Conf. Rm. 317 A&B
Jeff Folsom	MaineDOT	Time: 1:00 to 2:30 PM
Leanne Timberlake	MaineDOT	
Michelle Boone	MaineDOT	
Keith Donington	PB	
Tim Merritt	Stantec	
Mike St. Pierre	SW Cole	
Jack Burgess	Becker	
Tim Cote	HNTB	Notes Taken By: Tim Cote

This was the third quarter ACEC/MaineDOT Bridge Design Subcommittee meeting for 2016.

➤ Introductions

- Jack announced that this would be Keith Donington's last meeting on the subcommittee and thanked him for his participation and for sharing his knowledge.
- Jack welcomed Tim Cote to the subcommittee.
- The June 7th Meeting Minutes were accepted without revision.
- Jeff noted that Michelle Boone, a PM in the Bridge Program focusing on preservation projects, was joining the meeting to contribute her thoughts regarding bridge preservation topics.

➤ Information from MaineDOT (Jeff Folsom)

- MaineDOT continues to delegate assignments to consultants and are working to keep the work distribution reasonably balanced. Out of the consultants with a bridge GCA all but 1 have an active contract.
- At this point most of the projects in the 2018 workplan have been assigned.
- MaineDOT is 2/3 of the way through developing the next workplan.
 - The last workplan had a value of \$105 million including:
 - 66% of funds allocated to replacement projects
 - 19% rehabilitation
 - 14% preservation
 - 1% other projects

- The value of the new workplan is expected to be \$105 million. So far \$89 million worth of new projects have been identified. So far the plan includes
 - 68% of funds allocated to replacement projects
 - 18% rehabilitation
 - 12% preservation
 - 1.5% other projects

For reference, the 12% of funds for preservation equals 1/3 of the projects.
- The preservation projects will likely be bundled to streamline project delivery and construction inspection. Jeff noted the Department has been getting good pricing on bridge painting projects lately, especially when bundled.
- The Bridge group has the following staffing changes:
 - Ahmed Shkara – New Assistant Engineer.
 - Jim Leavitt – New Technician in team south.
 - David Sullivan – David Sullivan has moved into a new role in the Contracts section
 - Kendra Zarella –Administrative Assistant

➤ **Designers Meetings (Jeff Folsom)**

Jeff highlighted key items from the Designer Meetings held on July 6th, August 3rd and August 17th

Partial depth deck panels (07/06/2016)

- Guy Hews led a discussion regarding potential reductions in deck design life where partial depth deck panels are used in place of a full depth deck slab. There's no firm information regarding whether partial depth deck panels affect the design life of a deck slab. No decision or outcome was reached as a result of the discussion. This is something MaineDOT will continue to monitor over time.

NTPEP Standards (07/06/2016)

- Joe Stilwell gave a general update on NTPEP. A new certification program is being developed for plain and steel reinforced elastomeric bearings.

Accident Data (07/06/2016)

- The group discussed accident data in general and what the CRF factor is. Additional information is in the minutes. It's important to go through the accident reports to understand the nature of the accidents reported, minor accidents can skew the CRF factor.
 - Tim C. asked what amount of accident data should be included in the preliminary design reports. Jeff indicated just the CRF summary data is

required, full accident reports aren't required. If MaineDOT wants more information they can locate it.

LiDAR Data (08/03/2016)

- Garrett gave an update on LiDAR survey. MaineDOT is starting to develop string labels for LiDAR data in a way that reasonably replicates existing survey string labels. MaineDOT is open to suggestions the consultant community may have.

Standard Notes (08/03/2016)

- Garrett gave an update regarding standard notes. Currently they're scattered amongst several sources. MaineDOT is working to compile them into a single word document that will be posted on MaineDOT's website. This remains a work in progress.

Headwater Elevations (08/03/2016)

- Plans should include headwater elevations for the proposed structure, not the existing. The Contractor can review the hydraulic report to understand existing conditions if necessary.

Estimating of GFRP (08/03/2016)

- Should be measured and paid by the foot with no distinction for bar size. GFRP is mostly used in decks so available unit pricing is fairly uniform. Unit pricing information may need to be increased for larger bars or bent bars.

Biddeford Somesville Bridge Lessons Learned (08/03/2016)

- On this project the design included the use of a symmetric span configuration although there was a nearby ledge outcrop. This pushed the pier off the ledge shelf. In hindsight this made construction more difficult and it would have been better to develop an asymmetric design.

Camber & BOS Elevations (08/03/2016)

- The group discussed the use of different camber diagrams for interior and exterior girder. The decision was made to use uniform camber for all girders. Load distribution of diaphragms help even out dead load. Fluid load deflections even themselves out. Try to make beams consistent when comes to camber diagram. Assume uniform distribution for BDL. Some exceptions to the rule apply.

Protective Coatings for Concrete Surfaces (08/17/2016)

- The designer group discussed where protective coatings for concrete surfaces should be applied. Some felt it should be applied everywhere while others thought a more targeted approach was preferable. The consensus of the group was that this should be looked into on a project by project basis.

Scour Countermeasures (08/17/2016)

- MaineDOT has evaluated the performance of existing scour countermeasures. Quite a few failures have been observed. In some cases the failures are attributed to improper

construction such as not fastening mats together as specified, not using enough clamps, etc. In other cases design issues such as under predicting flow velocities, undersizing scour counter measures, etc. has contributed to failure. MaineDOT is now looking at different countermeasures – moving away from cable mat and toward the use of riprap. Cable mats are fast, cheap and require no dredge. However, care is needed in areas with high velocity. Thankfully the scour countermeasure projects and repairs are coming to a close.

➤ **Discussion Topics**

Noise Attenuation During Pile Driving

Question: How are other DOTs addressing pile driving noise thresholds in waterways? U.S. Fish and Wildlife has created criteria that are difficult to monitor. MaineDOT is finding that methods used to calculate noise monitoring values are not always yielding accurate results. In some cases, test results are not available for 3 to 4 days after pile driving operations are completed. This can put the Department in the position of learning that they are not in compliance days after the fact. Limiting the number of hammer strikes per day is driving up the cost of H-Piles. The group discussed drilled foundations, micropiles and longer bridge spans as a way to avoid in-stream pile driving.

- Jeff: MaineDOT has been hiring UNH to do noise monitoring, they've been very cost effective. Only a limited number of firms are prequalified to do the work.
- Jeff: MaineDOT has been trying to avoid monitoring completely. Noise monitoring requires specialized staff and equipment and presents challenges during construction.
- Tim M: Talked with Stantec's internal environmental staff from across the country to get lessons learned from projects both inside and outside the transportation sector. He created a bullet list of findings which was distributed to group (attached to these minutes). The group reviewed the items. Tim M. offered that, where Section 7 applies, the project design team is being pushed to pin down construction timing and operations more than in the past. Many of these get carried into permitting and end up limiting construction. The design team should be cautious in early commitments, especially with respect to temporary works. The restrictions can be very open ended and result in significant impacts to contractor operations.
- Tim C offered that, on a recent project for MaineDOT, the environmental team shared that offering bid alternates to the Contractor likely would not be acceptable since the agencies would require the use of the least-impact method. He also offered that the design team needs to give consideration to temporary works and trestles. Even if the bridge doesn't require piles driven in the water, the temporary works and trestles can still put the project through Section 7 consultation.
- Mike said that one way to attenuate noise from pile driving is to use a double pile system – essentially driving the primary pile within a larger temporary pipe pile. Mike forwarded a few papers to the group regarding various applications and installations. A copy of Washington State DOT research report WA-RD 849.1, titled "Underwater Noise Reduction of Marine Pile Driving Using a Double Pile", was

discussed and is available for free download at the following we address:

<http://www.wsdot.wa.gov/research/reports/fullreports/849.1.pdf>

- Keith offered that vibrating piles and micropile drilling is OK, it would subject the project to Section 7 consultation. However, up-front discussions with the agencies is important to understand what will be accepted and required.
- Jeff said that MaineDOT has considered fish deterrent systems. However, USFWS was not particularly happy with scaring fish away.
- Jeff mentioned that it's the cumulative noise during pile driving that needs to be focused on, not the peak noise. However, the Contractor's don't have a clear understanding of what the noise limitations will mean for their work; it's difficult for them to bid the work.
- Some agencies are beginning to look at hoe ramming more and more since it results in less cumulative noise impact during construction.

Joints Systems on Preservation Projects

Jeff stated that, internally, MaineDOT isn't yet sure what works best for joint rehab and replacement. However, they'd like to bring some clarity to issue – what's been working well and what hasn't.

- Elastomeric concrete header repair – This has been done over past few years with mixed results. When the elastomeric concrete goes bad, it really goes bad.
 - MaineDOT specified joint rehabs with elastomeric concrete headers in Pittsfield last year. On that project, and on others, MaineDOT is finding that backwalls on high volume roadways tend to be soft and it's hard to get a good bond between the elastomeric concrete and the substrate.
 - Large thin concrete patches that just rely on bond don't hold up well. Even if surface is prepped and prepared properly there are issues and large delaminations result.
 - Designers need to be very judicious about where this material is used and should think twice about using it on high speed, high volume roadways. Look first at completing backwall repairs ~1-2 feet deep and bringing the concrete to roadway surface. The goal is to get in, complete the work, get out and stay out. Going back in is expensive.
 - MaineDOT is more comfortable using elastomeric concrete in town on low speed roadways.
- Elastomeric concrete is self-leveling in nature. Doesn't like to hold a slope which can affect the finished roadway profile.
- Some elastomeric concrete mixes hold up better than others. The better mixes are more expensive and, as such, are the materials the contractors usually don't utilize from the qualified products list. MaineDOT may supply materials to contractors to work around this.

- Consultants should discuss the use of elastomeric concrete on a project-by-project basis. Engage bridge maintenance, Michelle Boone & Devin Anderson. The preferred approach will evolve over time so regular check-ins with MaineDOT are necessary to ensure latest direction is incorporated.

Joint Replacements

The group discussed the current joint replacement details used by the Department:

- Armored Joint Systems: MaineDOT has three levels of armored joint replacement details – good, better and best.
 - The standard details are the middle of the road and have a life expectancy of 10-15 years.
 - Bridge maintenance has developed a “joint armor on steroids” detail. It’s expensive but will probably last longer than the remaining deck life (>15 years). For new decks consultants should consider this detail – consult with MaineDOT.
 - Em-Seal joints are used where a shorter-term band-aid repair is needed to extend service life by ~5 years.
 - A decision on which joint detail to select should be made based on the life expectancy of the deck.
 - When joint system failures occur it’s the result of armor failure about half the time and seal failure the other half of the time. Many of MaineDOT’s preservation projects are addressing loose rattling joints that need to be secured in place.
- Asphaltic Plug Joint Systems: MaineDOT likes them but life expectancy is limited.
 - Some good applications such as rehabilitation of lower skew, short span length bridges. Great in locations with no movement (e.g at abutments with fixed bearings).
 - Tim C noted that the designer may need to specify the installation of weep drains on the high side of the joint since the joint binder material will serve as a hydraulic stop.
 - Michelle noted that it’s important that a manufacturer’s representative is on site during installation. She also noted that MaineDOT has specifications on QC qualifications for various inspectors but none currently exist for asphaltic plug joint systems. MaineDOT may look into tightening up the requirement for staff qualifications.
 - Tim M noted that NHDOT’s asphaltic plug joint detail is a bit different and requires a structural support on both sides of the joint opening. He said that without structural support on both sides some settlement can occur which results in uneven support of the bridging plate. A copy of the NHDOT detail is attached.

- Michelle said MaineDOT has been running into challenges on wearing surface projects, they all seem to have at least one surprise: variations in pavement depth from what was expected and issues with contractors milling into concrete are the most common. She said field verification of pavement depth during design would help prevent these issues. She said the added up front expense is worth it to validate assumptions, especially on bridges with heavily rutted pavement.
- Michelle also said that traffic control is another hot topic. Lots of joint repairs are happening on the interstate where the desire to minimize traffic impacts is significant. However, the goal of minimizing traffic impact and goal to build a good quality joint system are oftentimes mutually exclusive. This should be discussed with MaineDOT on a project-by-project basis.

Corrosion Resistant Reinforcing

Jeff handed out several sheets from the BDG. Wayne and Jeff have been talking about decks and the use of reinforcing.

- General update on direction and philosophy:
 - Currently there isn't a lot of consistency on the type of corrosion resistant reinforcing used, or whether it's used at all. He noted that the Bridge Design Guide provides lots of different options but isn't specific.
 - MaineDOT's goal is to narrow down the options for corrosion resistant rebar for everything, but particularly for deck systems.
 - MaineDOT has a goal of trying to get new bridge decks to last the full life of the bridge. To accomplish this they've been looking at stainless steel bar and GFRP. The prices for XM28 stainless steel (the lower grade) have been good – in the \$2.50-\$2.60/lb range fabricated and delivered. They calculate the cost premium for a 30' x 100' deck is about \$50k.
 - Even with stainless or GFRP reinforcement in the deck MaineDOT may still opt to use membrane and pavement. However, in cases where stainless steel and GFRP reinforcement are used, the design guidance on the use of bare concrete decks may be opened up.
 - VTrans is also trying to simplify their direction on corrosion resistant rebar. VirginiaDOT is going to 100% alloy bars and stainless steel.
 - MaineDOT is open to input from consultants – what has worked and what's the cost.
- Specifying bent GFRP can be expensive and unforgiving with respect to fabrication tolerances. Instead, the suggested practice is to use straight bar GFRP and stainless bent bars.
- MaineDOT is currently assessing a value engineering proposal from a contractor that involves using a bare deck with corrosion resistant reinforcing instead of a membraned and paved deck with black bar. Jeff noted that

grooving the bridge decks can cost almost as much as pavement and membrane.

- Jeff said he felt stainless clad will go away and MaineDOT rarely uses galvanized. They tried Z-Bar once but had lead time issues and it required special handling similar to epoxy coated bar.
 - Virginia has two tiers of corrosion resistance reinforcing – Class I and Class II. Class I allows the use of MMFX and lower grade stainless. Class II requires the use of higher grade stainless.
 - Tim C noted that Rich Myers has recently been requesting that the thickness of cover to bottom mat of reinforcing steel be increased to at least 1.5” since spalls often occur over time with only 1” of cover and reduced cover at the drip notch in deck overhangs. Tim also suggested detailing the hooked bars in the overhangs to provide 3” cover to the bottom mat of reinforcing since fabrication tolerances can often reduce the actual cover.
 - Jeff noted that consultants should talk with the MaineDOT PM about type of rebar to be used on a project-by-project basis

➤ **Training Agenda**

Topics for consideration include:

- Drilled Shaft/Micropile Design. Doesn’t have to be NHI course. Hayward Baker offers a course.
- Bluebeam comment and review software

➤ **Subcommittee Rotation for Consultants**

(2-year rotations for new members joining 2014 and later)

- | | |
|----------------------------------|----------------------|
| a. Jack Burgess | Q2 2015 thru Q1 2017 |
| b. Tim Merritt | Q1 2016 thru Q4 2017 |
| c. Mike St. Pierre (Geotech Rep) | Q1 2016 thru Q4 2017 |
| d. Tim Cote | Q3 2016 thru Q2 2018 |
| e. Jim Wentworth | Q4 2016 thru Q3 2018 |

➤ **Next Meeting Date**

- Tuesday December 13, 2016 from 1:00 to 2:30 pm.

➤ **Topics for Next Meeting**

- Design of integral abutments on micropiles. AASHTO doesn't cover micropile design very thoroughly. How should challenges associated with jointed casing be addressed – significant reductions in strength are specified.

➤ **Attachments**

- Designer Meeting Minutes from July 6th, August 3rd and August 17th
- Joint repair details from Frank J. Wood Bridge & Fairbanks Bridge
- In-Stream Noise Monitoring Lessons Learned Summary
- NHDOT Asphaltic Plug Joint Details

I have attempted to summarize discussions held during this meeting as accurately as possible. If there are any items discussed herein that are misrepresented in any way, please contact me within ten working days. In the absence of any corrections or clarifications, it will be understood that these minutes accurately summarize the discussions at the meeting.

Respectfully Submitted,

Tim Cote, P.E.

Designers Meeting Minutes

Wednesday, 6 July 2016

Conference Room 317 A&B

1:00-2:00 PM

Attendees: Nate Sherwood, Mark Parlin, Roger Naous, Kendra Nash, Mark Gray, Brandon Slaven, Garrett Gustafson, Devan Eaton, Tyler Hjelm, Joe Stilwell, Tyler Turcotte, Josh Hasbrouck, Andrew Lathe, Tony Pirruccello

1. Full CIP Decks vs. Partial Depth Precast Panels w/ Concrete Overlay

Guy Hews/Group Discussion

- Guy Hews brought up the question of whether partial depth precast panels are really equivalent to a full cast-in-place deck and whether we should treat them differently in design plans and specifications.
- Little information on whether any difference in overall deck life.
- In locations where we think it will be an issue, use of panels already disallowed on a per project basis.
- Having bid information to differentiate the cost of the two options would be nice, but add more paperwork to a large number of projects for possibly not very much useful information.
- Contractors do use them on most projects that have a long, straight bridge section, which speeds up the construction process significantly and should be giving us a definite cost savings, even if we don't know exactly how much it is.
- Chloride penetration on bottom of deck usually not an issue (exception: overpasses).
- On single span bridges, crack opening not an issue since deck is in compression. For long continuous spans, could be a concern in negative moment region.
- Precast panels provide better quality control of bottom cover and concrete strength than cast-in-place decks.
- Partial depth panels have been in use for approximately 25 years?
- No known recent studies on the subject.
- No issues with long term performance of partial depth panels have been reported by Bridge Maintenance to our knowledge, indicating they are fine structurally.

- Overall, possible issues seem to be balanced out by estimated cost savings. If future bridge condition reports or research indicate issues are more significant than we are aware of, we would need to revisit.

2. NTPEP Update

Joe Stilwell

- MaineDOT already subscribes to NTPEP for some other materials.
- NTPEP certifies that manufacturers meet certain testing requirements, reducing the amount of testing needing to be done by individual DOTs.
- The certification program for reinforcing steel is being expanded to other types of coated rebar such as epoxy and galvanized. MaineDOT does not currently use NTPEP for reinforcing steel.
- A new certification program is being started for plain and steel reinforced elastomeric bearings. The program includes an independent audit of the manufacturers including destructive material tests twice a year.
- "Workplans" for the reinforcing steel and elastomeric bearings are attached.

3. Accident Data

Andrew Lathe/Ben Bartlett/Group Discussion

- Questions about what exactly the CRF number meant and how to evaluate accident data had come up on a recent project. Andrew Lathe suggested that it be brought up at a Designers Meeting for the benefit of any newer engineers that had not dealt with it much yet.
- Ben Bartlett did some research and prepared a summary handout (attached).
- CRF is the ratio of actual accidents to expected accidents at the site, so a CRF > 1 means the number is higher than it should be.
- Everyone agreed that the most important thing was to check the police reports at the end of the accident data since they reveal whether an accident was actually at the bridge or just nearby and whether road geometry was a factor in the crash. Many sites, the accidents are primarily due to animal collisions, not road alignment.
- Chapter 11 of the Highway Design Guide has more information on evaluating crash rates when designing projects.

From: Hews, Guy F
To: Bartlett, Benjamin J
Subject: RE: Designer's Meeting 6/22/16
Date: Tuesday, June 21, 2016 8:54:06 AM

Many plans are detailed with a full CIP deck. However, we usually have a note allowing Partial Depth precast panels, with a concrete overlay as an equal acceptable alternative.

Who, Where and When has a study been done recently to prove that a Partial depth panel with CIP overlay deck is just as good as a full CIP deck considering the following aspects:

Cost to produce, Longevity, Structural integrity, ability to resist chloride penetrations, numerous cold joints with panels, lack of full bond between layers, Integral continuity of the deck as a whole, differential flexural properties of the two layers, cracking of CIP overlay above panel seams, Shear connection with a grouted panel vs full CIP deck, Spalling, many more.

I have read a few studies from the 70's and 80's suggesting issues with all of the above mentioned aspects with Partial precast panels, but very few as they would relate to a full CIP deck. Are there any more recent updated studies proving the two methods are equal considering the aspects listed above.

I do not believe the two are equal in all ways so, we need to ask ourselves several questions:

- If they are not exactly equal in all aspects, why do we allow it as an equal alternative-When offered the two options, what percentage of the time is the Partial precast panel option used? Has anyone asked the Contractors why?
- It costs them less money and takes less time in most cases, so they are always going to choose that.
- Should we consider allowing a little more time on some projects if the CIP option is chosen, to encourage them using the better product.
- Should we consider having separate Bid items for the two options, with separate prices so we can see what the differences are coming in at?
- When we use two separate pay items, MDOT should then have the option to decide which one they want to choose, after award.

From: Bartlett, Benjamin J

Sent: Tuesday, June 21, 2016 7:12 AM

To: Anderson, Devin; Auger, John; Bartlett, Benjamin J; Bodge, Stephen; Brown, Peter; Bulger, Robert; Chessa, Sue; Colburn, William; Cole, Alecia; Crawford, Richard; Damren, Dana; DeVoe, Troy; Doucette, David; Doukas, William; Dubois, Denis; Eaton, Devan C; Folsom, Jeff; Foster, Ben; Frankhauser Jr, Wayne; Glenn, Dan; Gray, Mark; Green, Christian; Gustafson, Garrett A; Hamel, Travis W; Hasbrouck, Joshua P; Hebert, Timothy; Hews, Guy F; Hjelm, Tyler J; Hodgkins, Bill; Hurd, Craig; Kersbergen, Mackenzie A; Kittredge, Joel; Krusinski, Laura; Lachance, Michael R; Lanpher, Robbin; Lathe, Andrew W; Marquis, Brian; Mettey, Catherine; Myers, Richard E; Naous, Roger; Nash, Kendra; Nichols, Brian J; Parlin, Mark; Peabody, Carlton D; Pelletier, Michael; Philbrook, Glenn; Pirruccello, Anthony; Poulin, Mark; Pulver, William; Redmond, Michael; Richardson, Cynthia; Roberts, Phil; Rohman, William T; Rudolph, Eric D; Shaw, David; Shepherd, Eric; Sherwood, Nate; Slaven, Brandon; Snowden, Brent; Stetson, Jason B; Stilwell, Joseph R; Sullivan, David; Taylor, Joyce; Taylor, Ron; Thompson, Candace; Timberlake, Leanne; Turner, Deanna L; Veilleux, Joel R; Walz, Benjamin D; Weisner, Dana; White, Kayla E; Wight, Michael; Williams, Coy

Subject: Designer's Meeting 6/22/16

Good Morning,

The next designer's meeting is scheduled for tomorrow Wednesday June 22nd. If you have any topics for discussion let me know.

Thanks,

Ben Bartlett

Assistant Engineer

Maine Department of Transportation

Bridge Program – Team North

207-624-3322

Designers Meeting Minutes

Wednesday, 03 August 2016

Conference Room 317 A&B

1:00-2:00 PM

Attendees: Mark Parlin, Roger Naous, Kendra Nash, Mark Gray, Garrett Gustafson, Devan Eaton, Tyler Hjelm, Joe Stilwell, Ben Bartlett, Brian Nichols, Rich Myers, Dana Damren, Jeff Folsom

1. LiDAR Survey

Garrett Gustafson

- Survey now has the capability to use LiDAR to capture superstructure elements and is currently in the process of creating LiDAR Microstation levels (L_*)
- Bridge has been asked to provide a list of superstructure elements that should be added to this list of levels.
- Please consider what elements you would like to see located in the future
 - Consider what data would have been useful on past projects.
- Please return your comments to Garrett by 9-14-16.

2. Standard Notes

Garrett Gustafson

- All of the Standard Notes have been compiled into one document for use as the "Master List" as discussed at the 3-16-16 Designers Meeting.
- The current Standard Notes, with some proposed revisions/changes incorporated (see Track Changes), can be found at the link below:
 - <\\oit-teaqfsemc11.som.w2k.state.me.us\dot-swap\Garrett Gustafson\Standard Notes>
- This Fall, individual sections will be designated for review between Designers Meetings.
- Please contact Garrett with comments and suggested revisions.

3. Bridge Rail Materials

Garrett Gustafson

- Recent projects have allowed Grade 36 steel for both the anchor plate (cast into the curb) and the base plate (welded to the bridge rail post)
- Information on the materials used in the NETC crash tests have not been obtained to date.
- For the time being, please be sure to review bridge rail shop drawings for anchor and base plate material.

- Grade 36 may be used for the anchor plate.
- The base plate should be Grade 50 until further guidance is provided.

4. Headwater Elevations

Garrett Gustafson

- Headwater Elevations reported on the Title Sheet should be for the proposed bridge, final condition.
- There was some question as to whether additional Headwater Elevations should be presented on the Title Sheet in cases where the project will significantly change the Headwater Elevations; Specifically, for the Contractor to establish cofferdam elevations.
- No change is proposed as Headwater Elevations for the existing conditions will be available in the Hydraulic Report.

5. GFRP Estimating

Garrett Gustafson

- Cost estimating for GFRP should account for bar size and additional cost for bent bars
- Fabricators quote GFRP projects based on the length of each bar size and number of bends required before rolling the quote into one cost per linear foot to fit our bid items.
- See Garrett for more information

6. Saco-Biddeford, Somesville Bridge Lessons Learned

Garrett Gustafson

- Locating the pier better on the small island in the middle of the river would have reduced the complexity of the cofferdam construction. It also would have made the pier easier to inspect and may have kept the bridge off the dive inspection list.
- Make sure bridge rail shop drawings include vertical and horizontal curves
- When specifying a guardrail tangent end treatment, be sure to contact the suppliers. In this case, the suppliers were not willing to install a tangent end.

7. Camber/Bottom of Slab Calculations

Rich Myers/Group Discussion

- There have been a couple recent projects that showed two camber diagrams on the plans. The fabrication group has asked if there needs to be two diagrams.
- This was discussed by the group. Depending on how the slab is distributed to the beams/girders, there might be a difference in bottom of slab elevations and camber for the interior vs. exterior girders. Using tributary area vs. equally distributing the load will result in different solutions.

- Another reason why there might be different cambers is due to large skews, which would result in the girders being different. Another reason is the profile. If there is superelevation, the girders will be different.
- In certain cases, especially when there is a short overhang and tributary area is used to calculate distribution of the slab, it might seem like the exterior girders won't deflect as much as the interior girders and you could end up with a big difference between the two. Realistically, the cross frames or diaphragms will hold all the girders together and the difference in deflection between girders won't be as drastic as calculated.
- As a rough guideline, if the interior and exterior camber diagrams are within $1/16''$ to $1/8''$ of each other, use one diagram. Anything bigger than $1/8''$ use two.

Designers Meeting Minutes

Wednesday, 17 August 2016

Conference Room 317 A&B

1:00-2:00 PM

Attendees: Nate Sherwood, Mark Parlin, Roger Naous, Kendra Nash, Mark Gray, Garrett Gustafson, Devan Eaton, Tyler Hjelm, Joe Stilwell, Josh Hasbrouck, Andrew Lathe, Ben Bartlett, Brian Nichols, Joel Kittredge, Rich Myers

1. **Protective Coating for Concrete Surfaces**

Guy Hews/Group Discussion

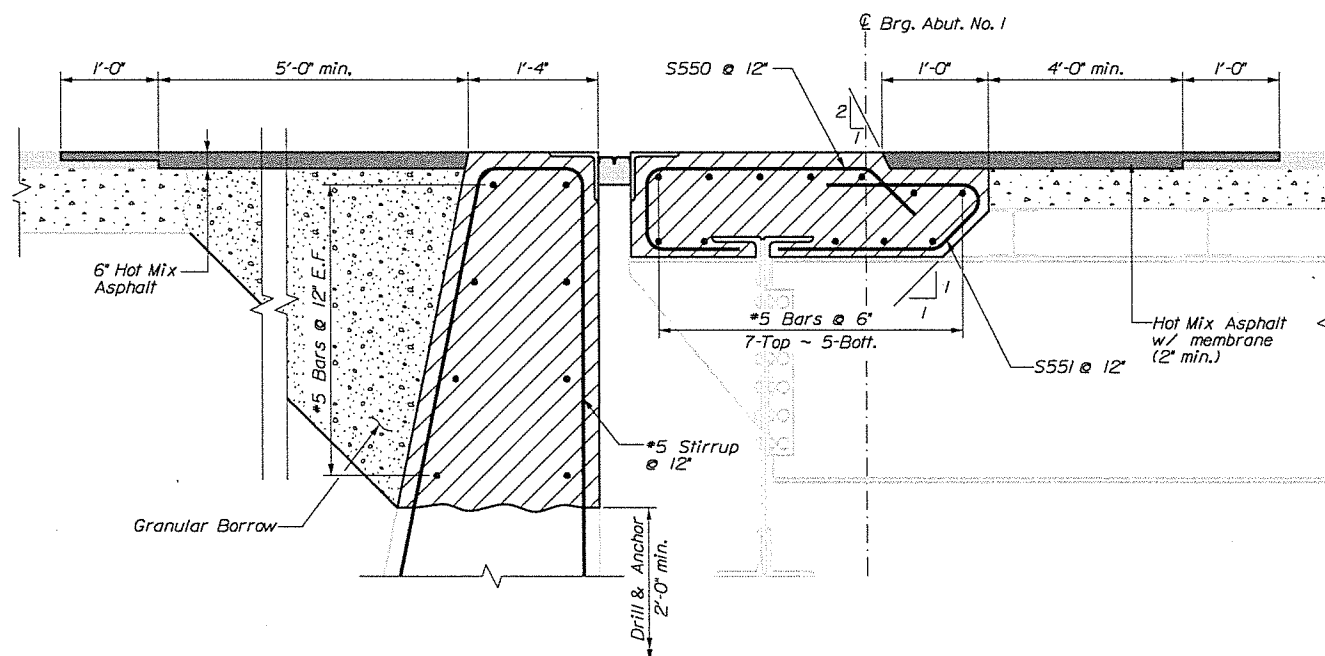
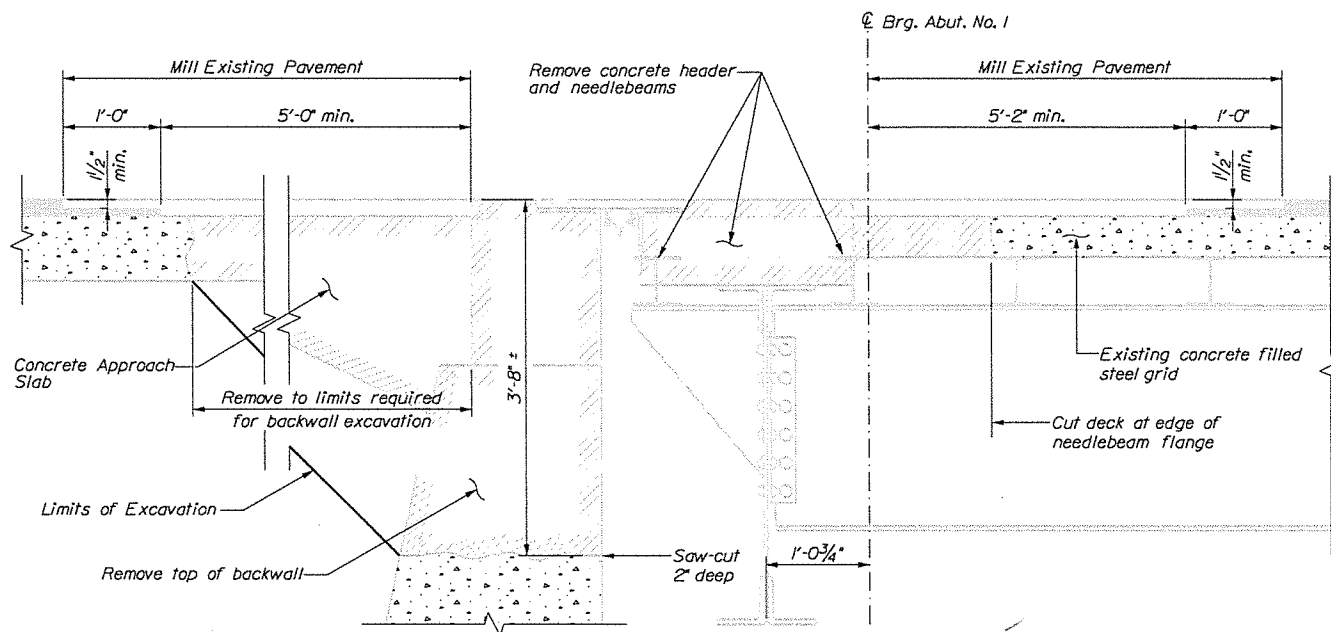
- Guy Hews brought up the fact that most projects use Silane for protective coating on concrete surfaces, and it is a very effective water proofer. It is typically applied with a hand pump garden sprayer, and he believes it is an easy way to apply the coating and could easily be applied to all exposed concrete surfaces.
- He recommends changing the current note to read "Protective Coating for Concrete Surfaces shall be applied to all exposed concrete surfaces." He also recommends making this a Lump Sum item and not by area measure.
- Current note specifies coating:
 - All exposed surfaces of concrete curbs and sidewalks,
 - Fascias down to the drip notch,
 - All exposed surfaces of Concrete Transition Barriers,
 - Concrete wearing surfaces,
 - Concrete barrier railing,
 - Top of abutment backwalls and to one foot below the top of backwalls on the back side.
- This was discussed amongst those present. The group thought that normally, in-house projects are put out to bid with this item as Lump Sum.
- Most opinions were that the note should stay as is, some recommended adding top of wing walls to the list in the note. Changing note to say "apply to all exposed concrete" could cover more areas than needed. Specifically, bottom of the deck and other hard to reach areas that don't necessarily need water proofing.
- Some thought that applying to the face of wings and abutments would be beneficial. Consensus was that this should be looked into on a project by project basis.

2.

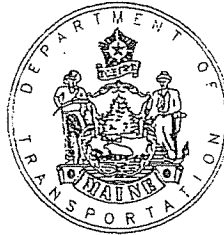
Scour Countermeasures

Mark Gray/Group Discussion

- Mark Gray had some questions and concerns about scour, specifically what we use for countermeasures, on rehabilitation projects as well as on new construction. The topic was discussed amongst the group, discussing what we use, how we design for scour, and some new ideas.
- Currently, most jobs that involve scour countermeasures are using concrete block mats. This product has been fine in the past, but recently a few jobs have had issues and the mats have failed. The concern is why they are failing and what can be done or changed to ensure they won't fail on future projects. Basically, we have to go back and examine all projects that used block mats. The question has been raised whether it's poor construction.
- An examination of a recent failure in Houlton suggests that poor construction may have been what caused the failure. There were missing clamps, big gaps between blocks, uneven blocks, and the contractor worked in the wet.
- Some possible solutions were discussed. It was asked if there could be more grouting, other than at the abutments/piers or solid immovable objects. In the specifications it states that any gap bigger than 2" needs to be grouted. We could enforce working in the dry with no wet work. It was also asked if we could use a different fastener that might be easier to install and be more durable. These were discussed but nothing specific was decided.
- Until there is a definite answer or solution, engineers are encouraged to use the bigger sized blocks that have bigger cables, and look into the use of duckbill anchors.
- Rich Myers discussed an idea he had for countermeasures instead of placing block mats across entire stream. He suggested using block mats at each abutment, coming out a certain distance (10' +/-), and in the middle where they toe in, placing rip rap. This idea would mostly be for short span bridges (30'-40'), where excavating for riprap at abutments isn't viable, but could be applicable to all scour jobs.
- Mark Gray discussed his idea of placing sheet piles at the toe of slope at each abutment. This could prevent the scour from getting under the toe and causing the riprap to slump.
- Normally when designing for scour, the bridge is designed to withstand scour and the road approaches are allowed to wash out. In both this case and in Mark's idea, the bridge would be protected but could lead to roadway wash out.
- This topic will be discussed more in the future.

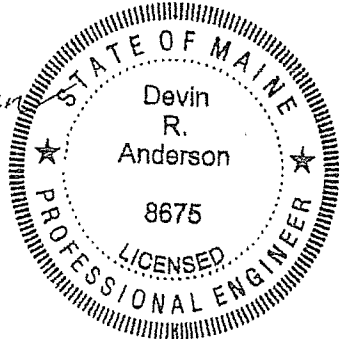


STATE OF MAINE DEPARTMENT OF TRANSPORTATION



FARMINGTON FRANKLIN COUNTY FAIRBANKS BRIDGE OVER SANDY RIVER ROUTE 4

PROJECT LENGTH 0.063 mile
WEARING SURFACE REPLACEMENT
BRIDGE NO. 2271

SIGNATURE <i>Devin Anderson</i> P.E. NUMBER 8675 DATE 2/24/16		STATE OF MAINE DEPARTMENT OF TRANSPORTATION 		STATE OF MAINE DEPARTMENT OF TRANSPORTATION	
		APPROVED <i>Sam Wass</i> COMMISSIONER:		DATE 3/4/16	
		DEPUTY CHIEF ENGINEER: <i>W. A. R.</i>		3/3/16	
STATE OF MAINE DEPARTMENT OF TRANSPORTATION		FARMINGTON FAIBANKS BRIDGE			SHEET NUMBER 1
WIN 018987.00		TITLE SHEET			1 OF 11

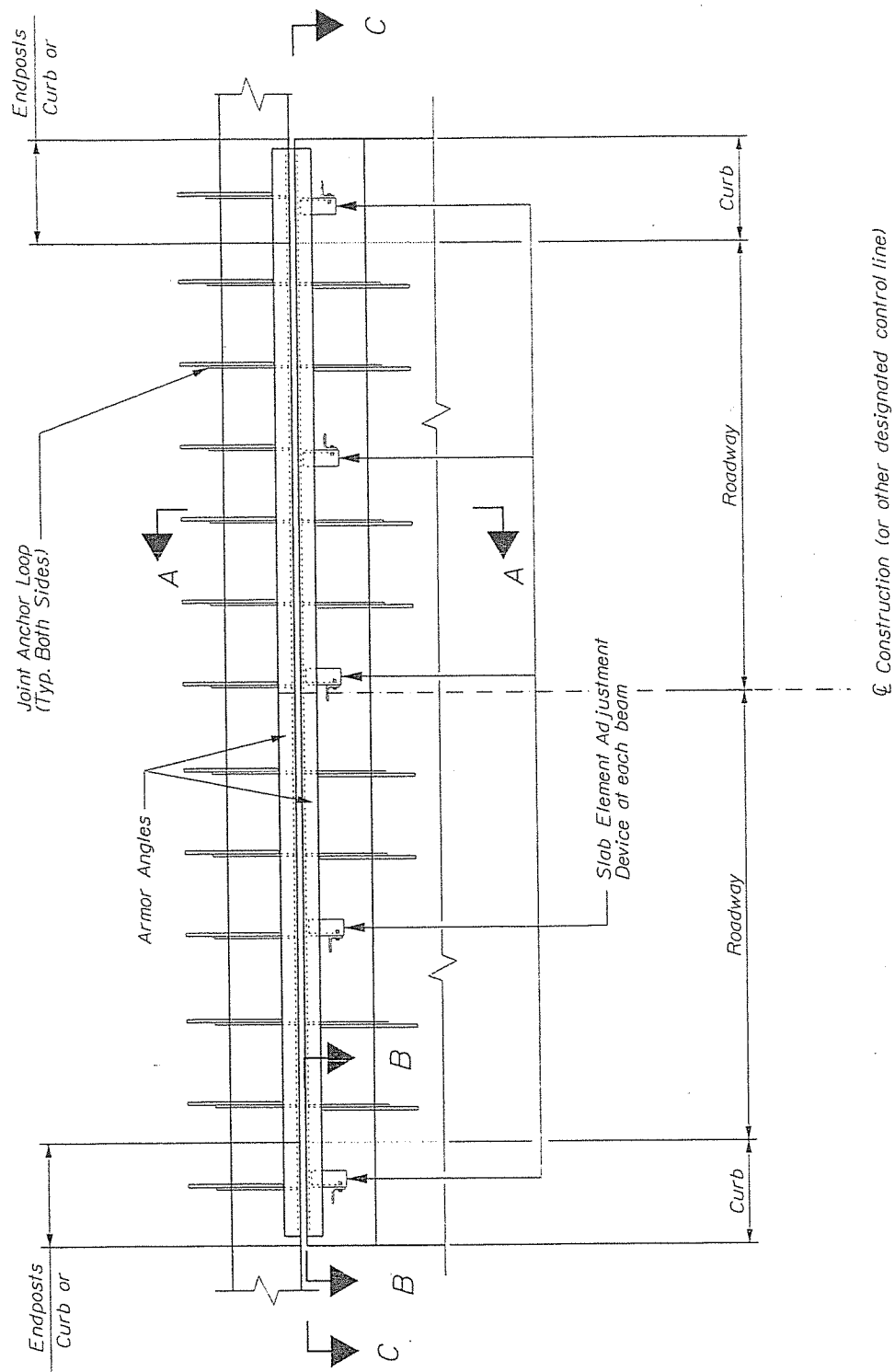
MATERIALS

Reinforcing Steel.....ASTM A 615/A 615M, Grade 60
Concrete.....Class "LP"
Structural Steel.....AASHTO M 270, Grade 36

GENERAL CONSTRUCTION NOTES

1. Place loam 2 inches deep on all new or reconstructed sideslopes or as directed by the Resident.
2. Erosion Control Mix may be substituted in those areas normally receiving loam and seed as directed by the Resident. Placement shall be in accordance with Standard Specifications Section 619, Mulch. Payment will be made under Item No. 619.1401, Erosion Control Mix.
3. Place a 24-in. wide strip of Temporary Erosion Control Blanket on the sideslopes along the top of the riprap and behind the wingwalls.
4. Extended-use Erosion Control Blanket, seeded gutters, riprap downspouts, and other gutters lined with Stone Ditch Protection shall be constructed after paving and shoulder work is completed, where it is apparent that runoff will cause continual erosion. Payment will be made under the appropriate Contract items.
5. Protective Coating for Concrete Surfaces shall be applied to the following areas:
 - All exposed surfaces of concrete curbs and sidewalks,
 - Fascias down to the drip notch,
 - All exposed surfaces of Concrete Transition Barriers,
 - Concrete wearing surfaces,
 - Concrete barrier railing,
 - Top of abutment backwalls and to one foot below the top of backwalls on the back side.
6. Project information referred to below may be accessed at the following MaineDOT web address:
<http://www.maine.gov/mdot/contractors/>.
7. The existing bridge plans may be accessed at the MaineDOT web address. The plans are reproductions of the original drawings as prepared for the construction of the bridge. It is very unlikely that the plans will show any construction field changes or any alterations which may have been made to the bridge during its life span.
8. Quantities included for pay items measured and paid for by Lump Sum are estimated quantities and are provided by MaineDOT for informational purposes only. Lump Sum pay items will be paid for at the Contract Bid amount, with no addition or reduction in payment to the Contractor if the actual final quantities are different from the MaineDOT provided estimated quantities, except as follows:
 - a. If a Lump Sum pay item is eliminated, the requirements of Standard Specifications Section 109.2, Elimination of Items, will take precedence.
 - b. If other Contract Documents specifically allow a change in payment for a Lump Sum pay item, those requirements will be followed.
 - c. If a design change results in changes to estimated quantities for Lump Sum pay items, price adjustments will be made in accordance with Standard Specifications Section 109.7, Equitable Adjustments to Compensation.
9. The steel portions of the existing bridge may be coated with a lead-based paint system. The Contractor is responsible for the containment, proper management and disposal of all lead-contaminated hazardous waste generated by the process of replacing the joint. The Contractor is responsible for implementing appropriate OSHA mandated personal protection standards related to this process. The Contractor is solely responsible for the care, custody and control of any hazardous waste generated including lead-coated steel. The Contractor shall recycle or reuse the steel in accordance with the Maine Department of Environmental Protection's "Maine Hazardous Waste Management Regulations," Chapter 850. A copy of this regulation is available at MaineDOT's offices on Child Street in Augusta. Payment for all labor, materials, equipment and other costs required will be considered incidental to the contract.

STATE OF MAINE DEPARTMENT OF TRANSPORTATION	FAIRBANKS BRIDGE over SANDY RIVER FARMINGTONFRANKLIN	SHEET NUMBER 2
018987.002271	HEAVY DUTY JOINT DETAILS	2 OF 11



PLAN

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

FAIRBANKS BRIDGE
over SANDY RIVER
FARMINGTON FRANKLIN

SHEET NUMBER

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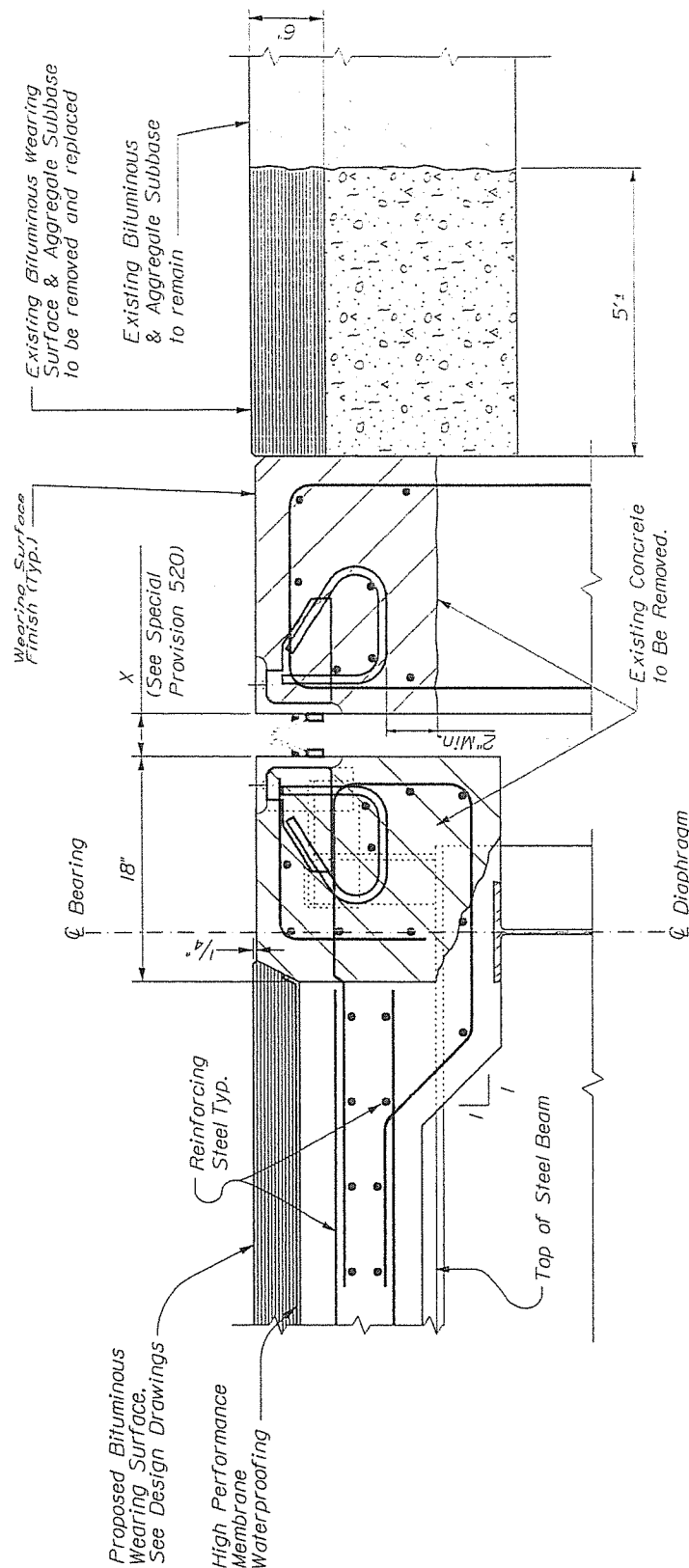
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018987.00

2271

HEAVY DUTY JOINT DETAILS



NOTE

Base pavement shall be matched to the existing pavement/bridge header elevation. The top 1 1/2" of HMA shall be removed and replaced as part of the 1 1/2" mill and 1 1/2" HMA overlay under the 020369.00 project.

SECTION A-A

JOINT OPENING

The Expansion Device shall be set to an opening of "X" inches in the fabrication shop. The joint opening shall be adjusted for temperature in the field at the time of installation using the following formula:

$$0.00008 \times "D" \times "ΔT" = \text{Adjustment (in inches)}$$

"D" is the distance in feet between the backwall and the nearest fixed bearing (for joints at abutments) or between the fixed bearings at either side of the expansion joint (for joints at piers).

"ΔT" is the difference between the temperature of the bridge girders and 45°F. A structure temperature above 45°F will result in a smaller joint opening.

The Movement Rating for Bridge No. 2271 - 2 1/4"

CONCRETE HEADER NOTES

1. Do not damage existing reinforcing steel during concrete removal.
2. All reinforcing steel shall be #5 bar unless noted otherwise.
3. All rebar splices shall be 20" min.
4. All adjustment angles shall be welded after final position adjustments are made.
5. Welding to reinforcing steel is allowed in the top of the abutment backwall above the black-out joint.
6. Concrete removal limits depend on the existing bridge and may not match what is shown here. Refer to existing bridge plans and field measurements. Limits may be reduced with the approval of the Resident.

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FAIRBANKS BRIDGE
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FARMINGTON FRANKLIN

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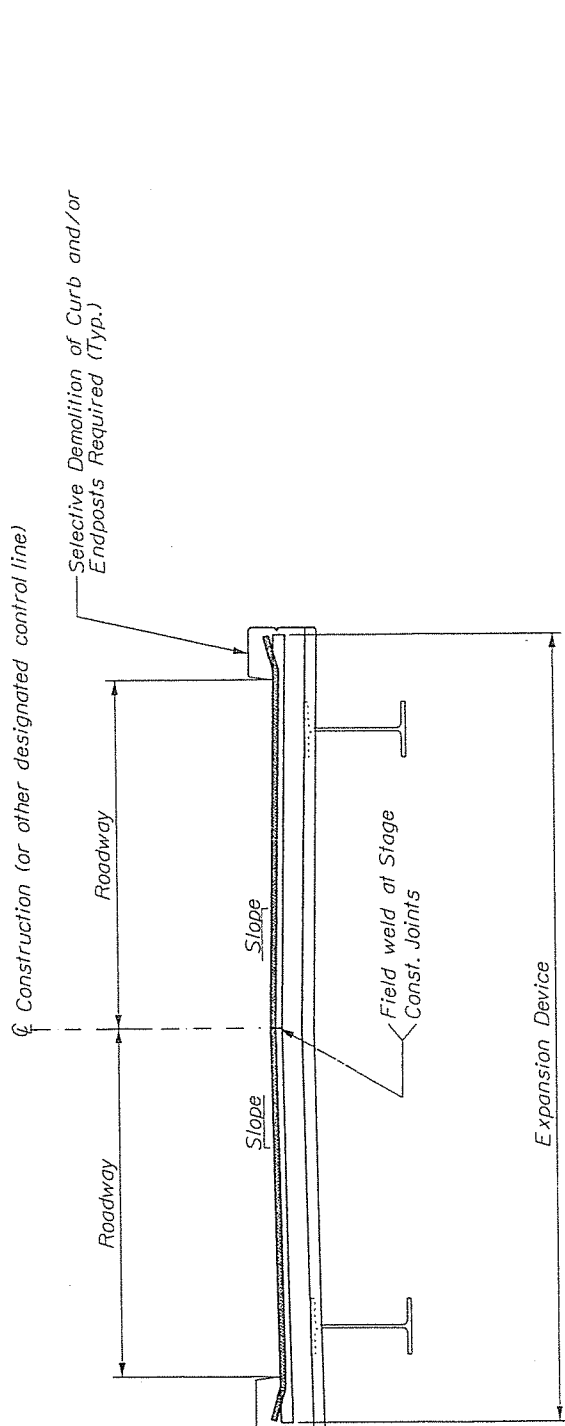
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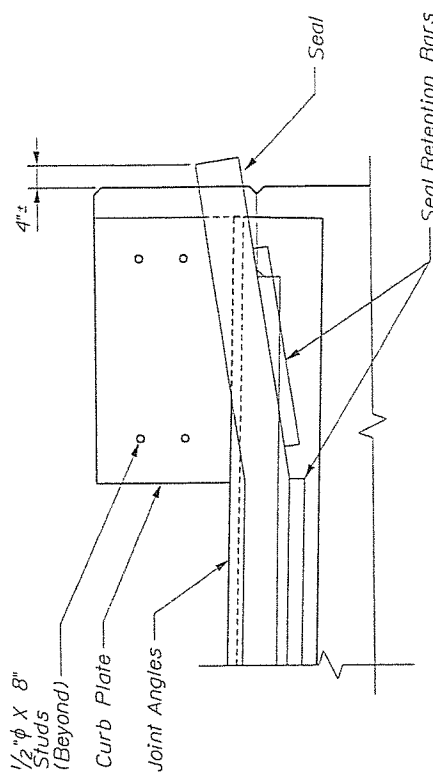
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HEAVY DUTY JOINT DETAILS



SECTION C-C



SECTION B-B

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

FAIRBANKS BRIDGE
over SANDY RIVER
FARMINGTON FRANKLIN

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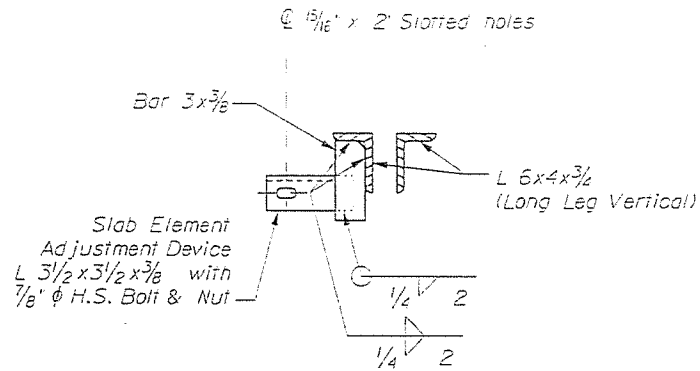
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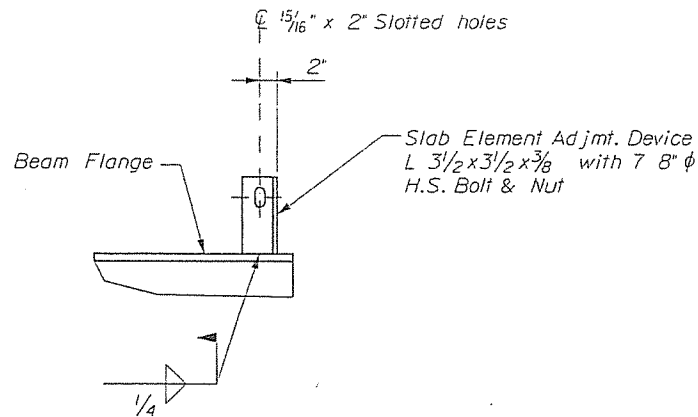
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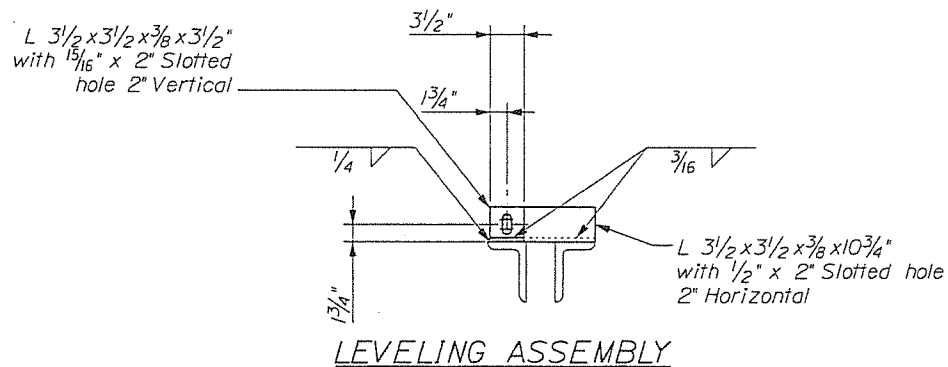
HEAVY DUTY JOINT DETAILS



SLAB ELEMENT ADJUSTMENT DEVICE



SLAB ADJUSTMENT DEVICE ATTACHMENT



LEVELING ASSEMBLY

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

FAIRBANKS BRIDGE
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FARMINGTON FRANKLIN

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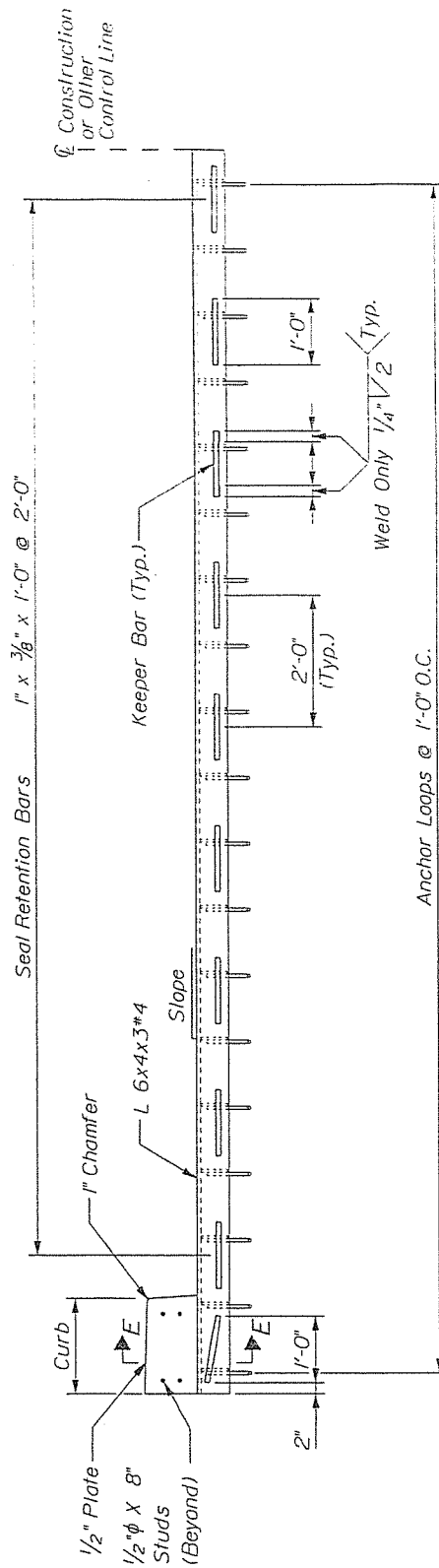
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HEAVY DUTY JOINT DETAILS



HEAVY DUTY JOINT DETAILS



SECTION D-D
HEAVY DUTY BRIDGE JOINT

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

FAIRBANKS BRIDGE
over SANDY RIVER
FARMINGTON FRANKLIN

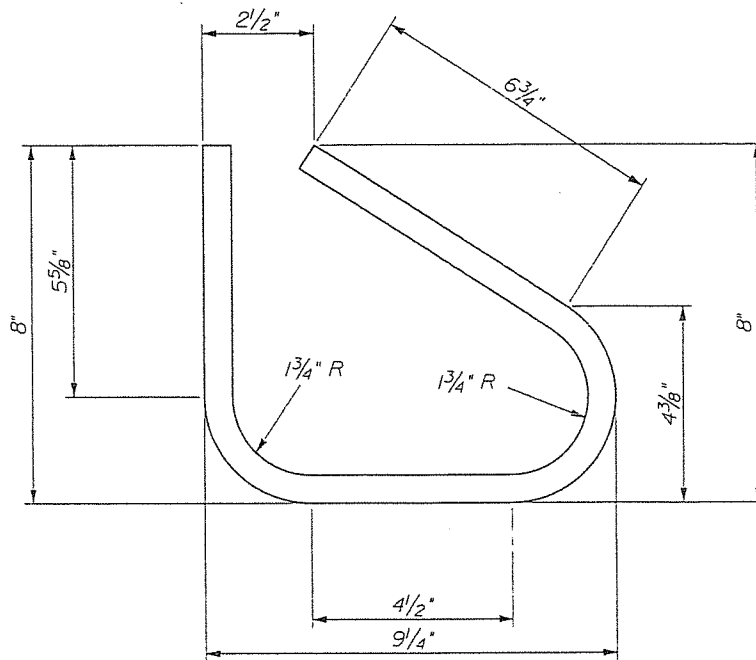
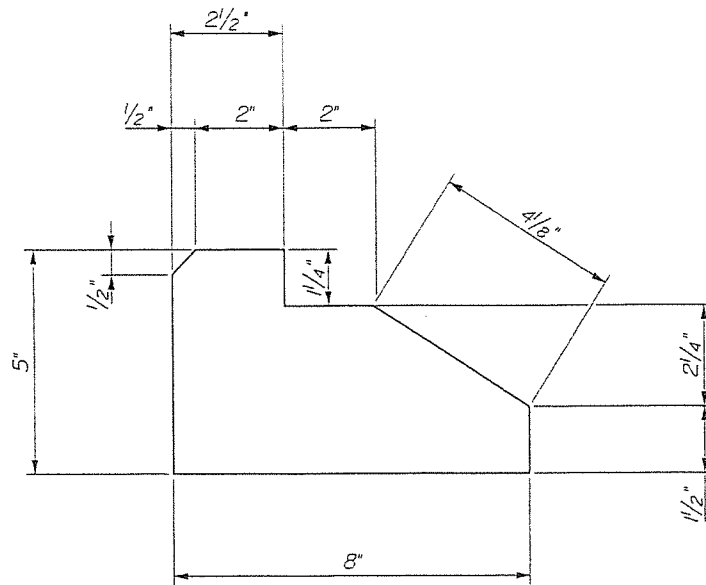
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HEAVY DUTY JOINT DETAILS



JOINT ANCHOR LOOP DETAILS

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FAIRBANKS BRIDGE
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FARMINGTON FRANKLIN

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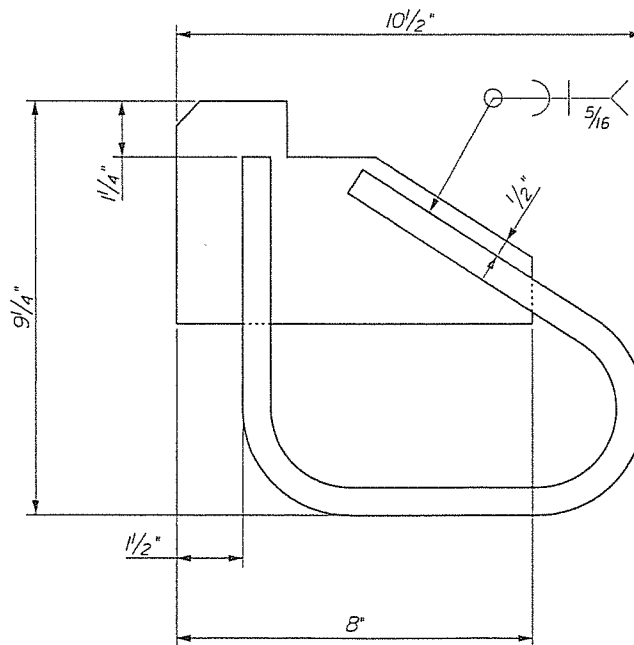
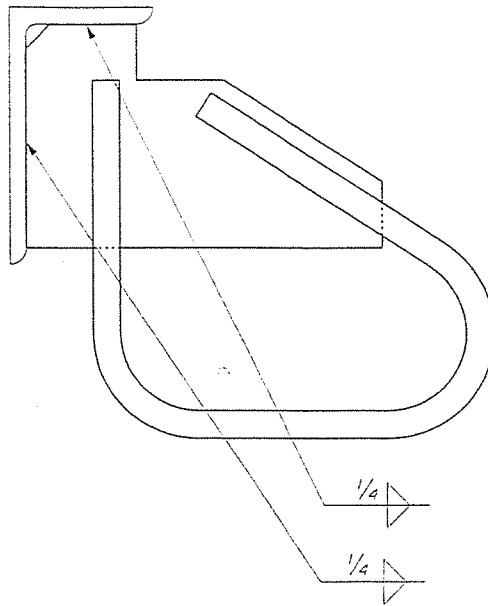
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HEAVY DUTY JOINT DETAILS



JOINT ANCHOR LOOP DETAILS

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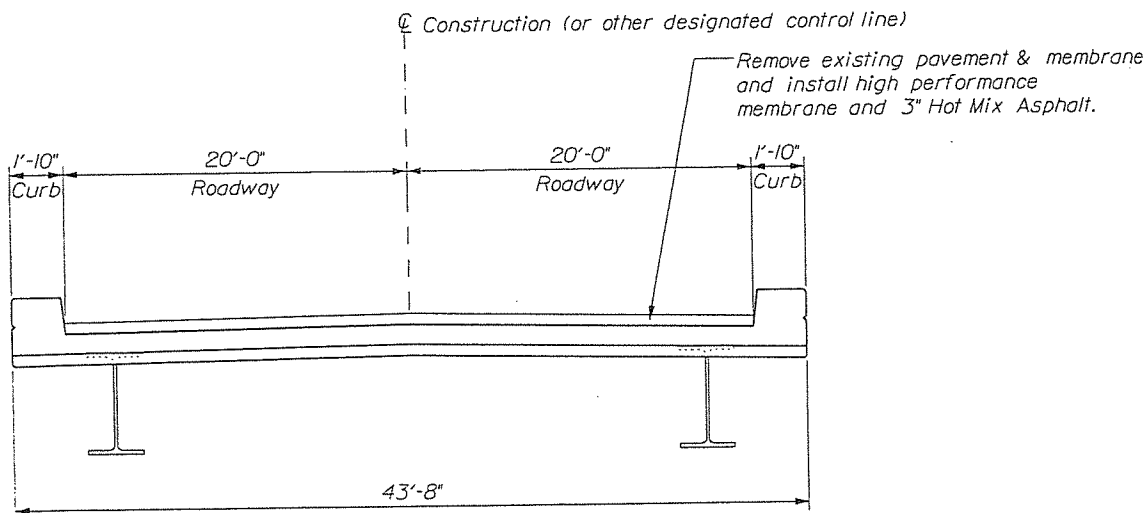
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HEAVY DUTY JOINT DETAILS

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HEAVY DUTY JOINT NOTES

1. The Contractor shall field measure the existing deck and joint, and adjust the joint shop drawings accordingly. The curb plates shall be flush or slightly recessed from the concrete faces to avoid catching plows.
2. The Expansion Device shall be fabricated to be installed normal to grade.
3. The joint armor shall be furnished and installed un-galvanized.
4. Use a seal from the approved list in Special Provision 520 Expansion Devices - Non-Modular (Heavy Duty Joint) and sized for the required opening. Submit the selected seal to the Department with the shop drawings.
5. Prior to the installation of the seal the steel surfaces to receive the adhesive shall be blast cleaned and solvent washed per the seal manufacturer's instructions.
6. Heavy Duty Bridge Joint shall be paid for under Pay Item No. 520.245, Bridge Joint Modification Type 5.



EXISTING TYPICAL SECTION

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HEAVY DUTY JOINT DETAILS

In-Stream Noise Monitoring Lessons Learned

Design & permitting phase

- Design stage mitigation – do everything you can during the design phase to mitigate the need for noise monitoring in the first place
- Limit in-water work as much as possible
- Limit rock excavation during design, eliminate the need for blasting as much as possible
- Allow sloping ledge as foundation with the use of drilled dowels as needed rather than forcing benching or 4:1 and flatter
- Avoid driven piles, promote use of drilled foundations such as drilled shafts or micropiles and recognize the extra cost up front
- Work proactively and collaboratively with environmental regulatory agencies early on, many of their staff don't understand the monitoring requirements or the implications of them – work with them to educate them
- Figure out in-stream work window vs. construction schedule early
- Negotiate for time of year windows where monitoring is not required and align construction schedule to allow contractor to use that to their advantage
- Clean up drafts of early environmental documents to avoid confusion that may lead to overly restrictive permit requirements. Make sure to clarify bank full width is perpendicular to the channel and not along the bridge span on a skewed bridge.
- Perform a careful review of language used in environmental documents and permits to ensure intended meaning is clear – 'monitoring' programs are quite different to 'sound verification' programs, with the latter involving a far reduced scope. Often, a sound verification program is all that is required.

Construction phase

- Be explicit on what type of monitoring and testing setup is wanted, which are the relevant species, and how that relates to permit requirements – different types of equipment, style of program and verification methods may be required
- Bubble curtains, particularly unenclosed, are not very effective in currents and effectiveness also varies with subsurface conditions – noise vibrations can bypass the curtain via the substrate

- Noise attenuation mitigation measures as well as thresholds and methods for assessing effects are all changing rapidly – stay up to speed on new technology, latest scientific recommendations and research
- Use reputable experienced acoustic monitoring firm – insist on QBS type selection, follow up on client references
- Hire an environmental consultant and acoustic monitoring subcontractor team that has worked together in the past – it will streamline monitoring set up, execution, and compliance monitoring. Environmental consultants can assist in translating technical language provided by acoustic subcontractors and aid in negotiations with regulatory agencies.

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



BUREAU OF BRIDGE DESIGN

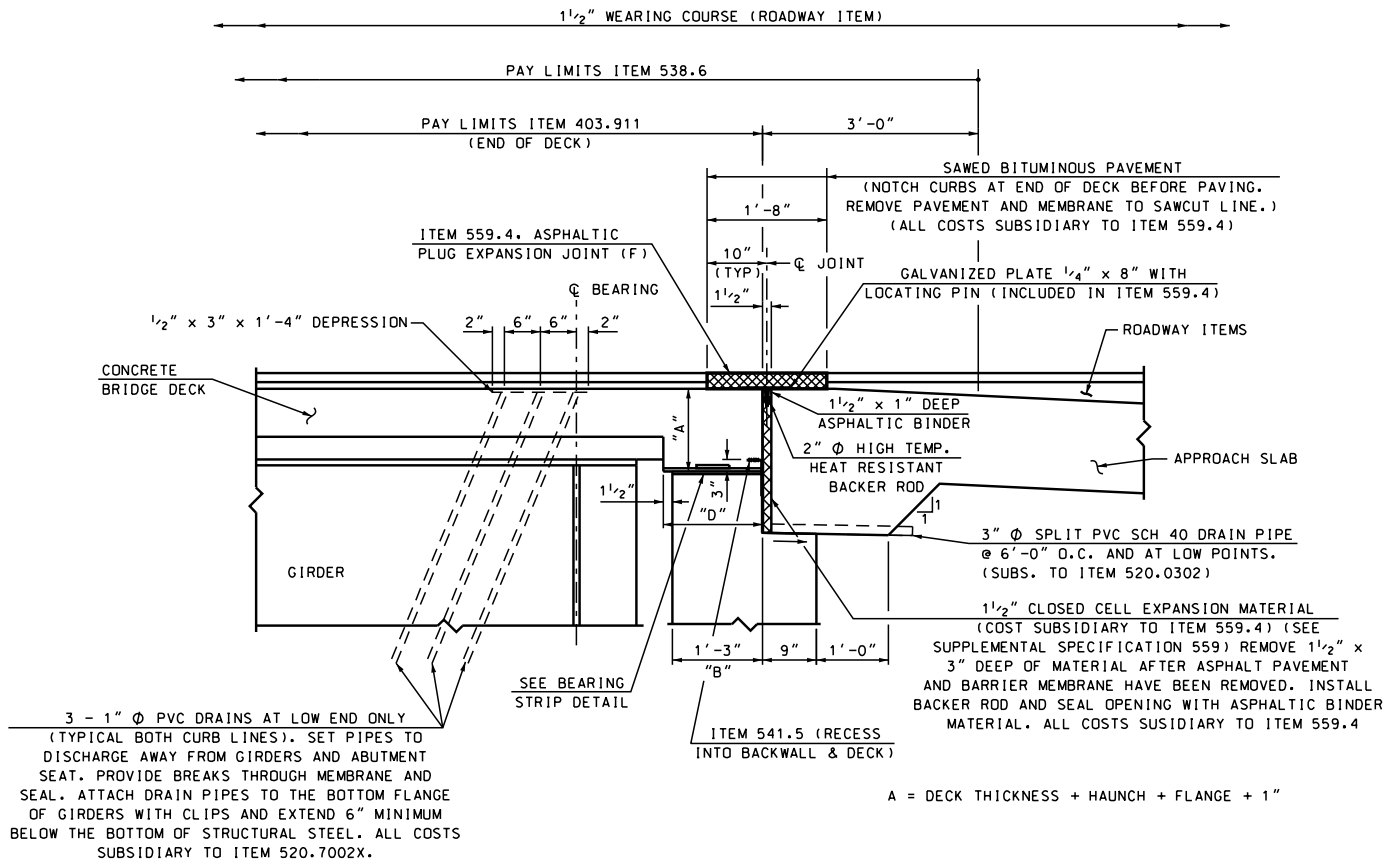


DESCRIPTION:

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JOINT - STEEL GIRDER

DATE REVISED:

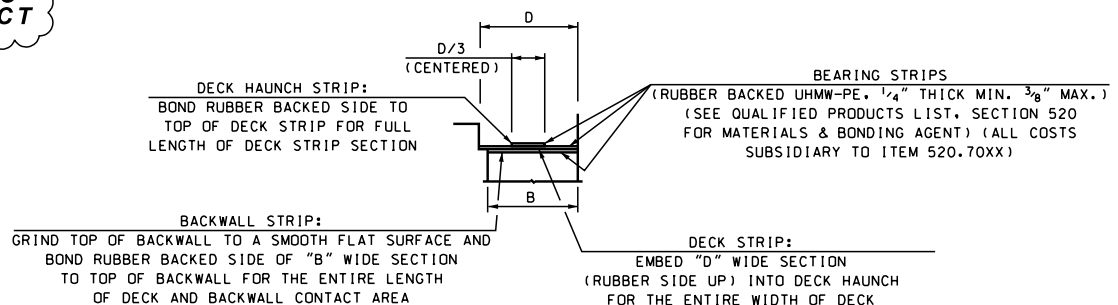
2/8/16



ASPHALTIC PLUG EXPANSION JOINT (APPROACH SLAB - EXPANSION END)

NOT TO SCALE

MODIFY TO
FIT PROJECT



BEARING STRIP DETAIL

NOT TO SCALE

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



BUREAU OF BRIDGE DESIGN

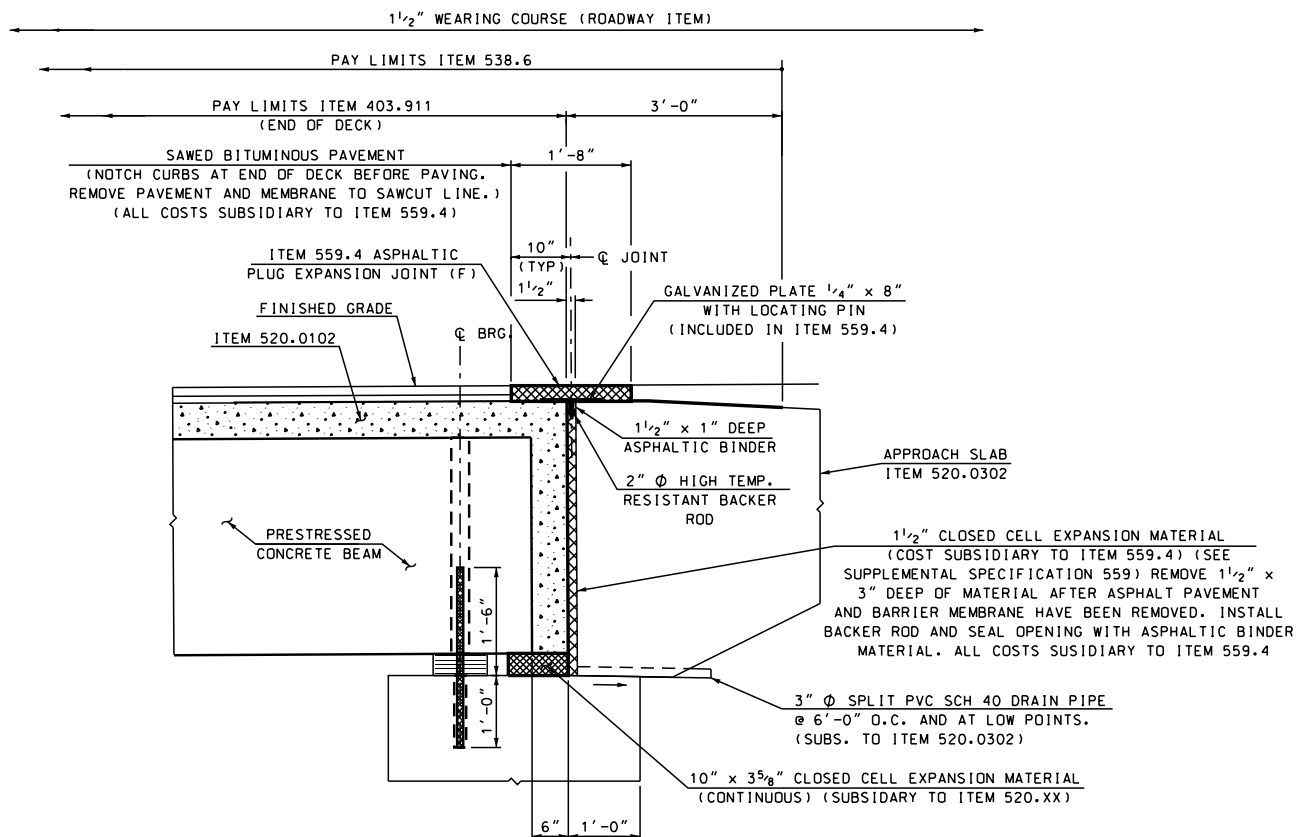


DESCRIPTION:

ASPHALTIC PLUG EXP.
JOINT - CONCRETE GIRDER

DATE REVISED:

2/8/16



ASPHALTIC PLUG EXPANSION JOINT
(APPROACH SLAB - EXPANSION END)

**MODIFY TO
FIT PROJECT**

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



BUREAU OF BRIDGE DESIGN

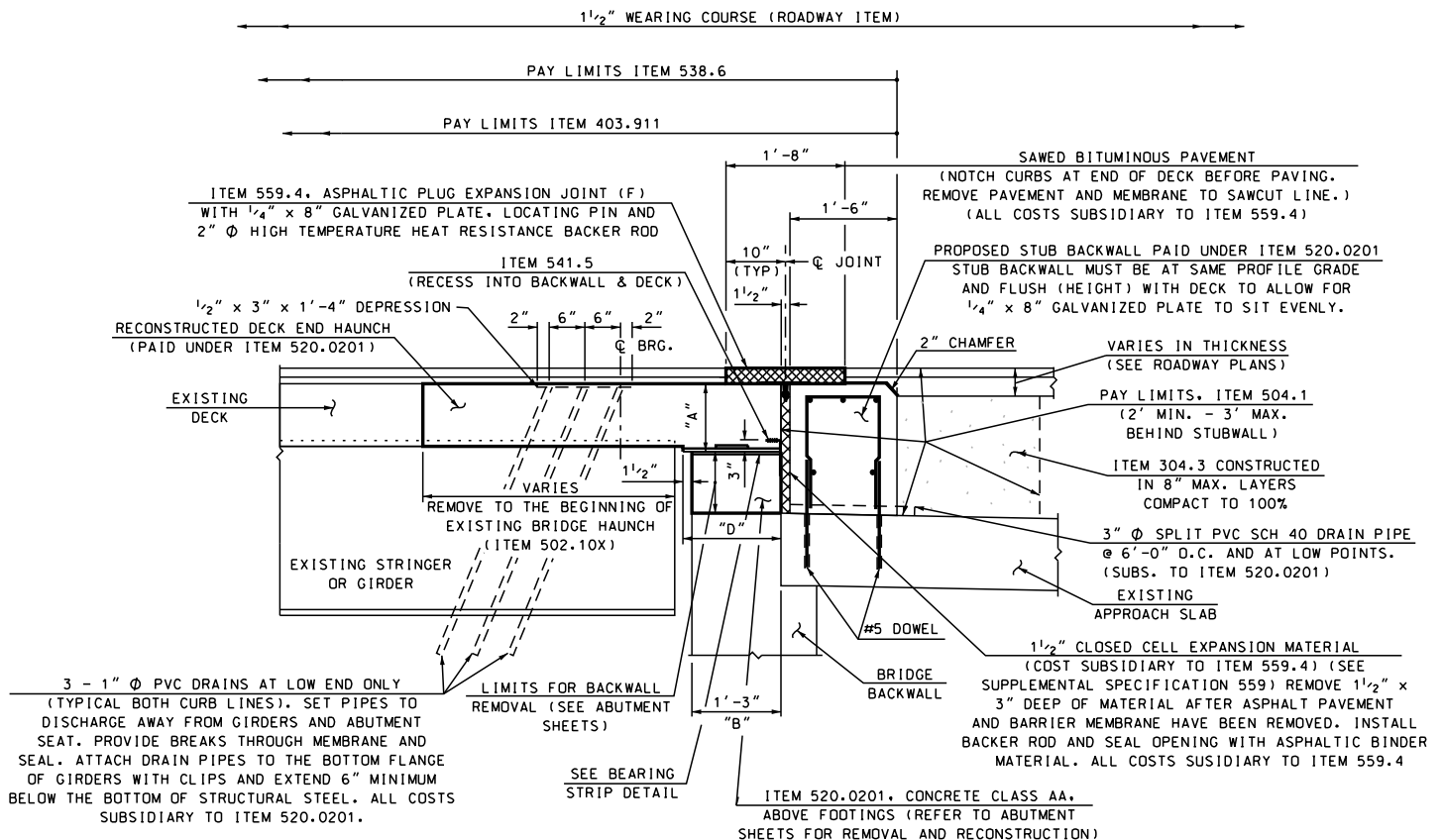


DESCRIPTION:

ASPHALTIC PLUG EXP. JOINT - JOINT REHAB

DATE REVISED:

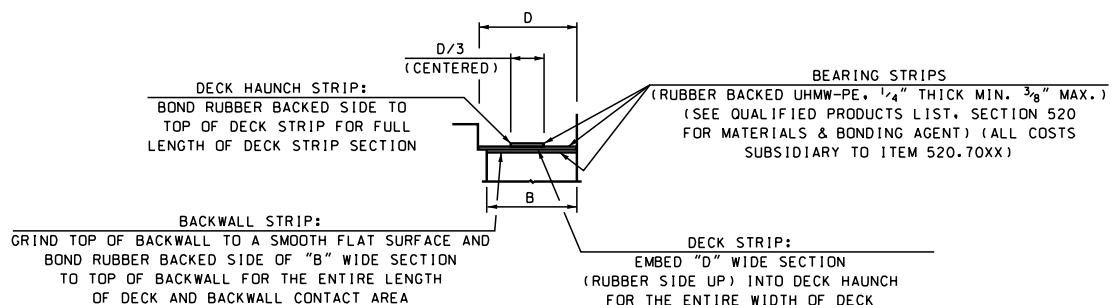
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$$A = \text{DECK THICKNESS} + \text{HAUNCH} + \text{FLANGE} + 1"$$

MODIFY TO
FIT PROJECT

ASPHALTIC PLUG EXPANSION JOINT (STUB WALL- EXPANSION END)



BEARING STRIP DETAIL

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



BUREAU OF BRIDGE DESIGN

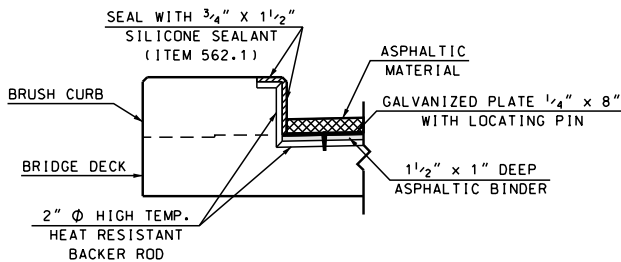
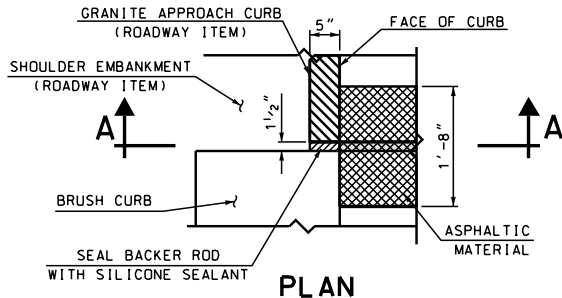


DESCRIPTION:

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JOINT - CURB DETAIL

DATE REVISED:

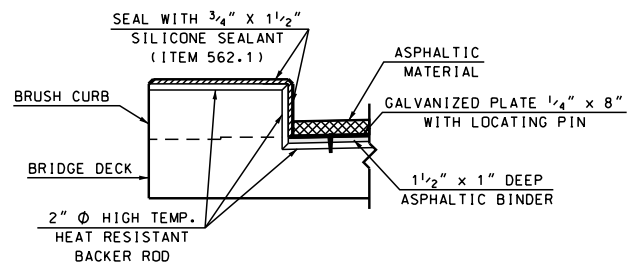
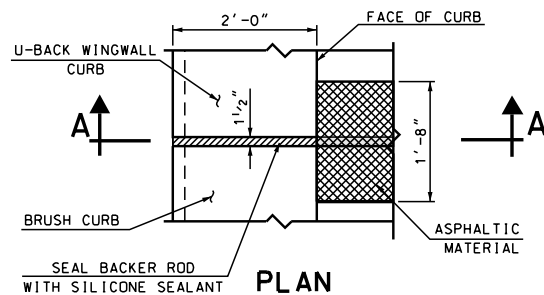
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SECTION A-A

ASPHALTIC PLUG EXPANSION JOINT (F)
ITEM 559.4 (CURB DETAIL)

MODIFY TO
FIT PROJECT



SECTION A-A

ASPHALTIC PLUG EXPANSION JOINT (F)
ITEM 559.4 (U-BACK WINGWALL
CURB DETAIL)