



**EXPERIENCE** | Transportation

**Date:** June 3, 2013, 1:00 PM  
**Purpose:** GPTQ Structures Committee Meeting  
**Location:** Bridge Design Conference Room  
**Prepared By:** John McWhorter

**Attending:**

John McWhorter	TranSystems	<a href="mailto:jkmcwhorter@transystems.com">jkmcwhorter@transystems.com</a>
Doug Franks	GDOT	<a href="mailto:dfranks@dot.ga.gov">dfranks@dot.ga.gov</a>
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**Attached:** Meeting Agenda, LRFD Comment Matrix & GDOT responses to LRFD Comment Matrix

Ben opened with Introductions

Ben discussed the current push to require bridge engineers to pass the 16 hour SE exam.

- Organization pushing it has hired a lobbyist to help put it to code
- GDOT has its' own lobbyist
- Maybe require only complex bridges be sealed by an SE
- Maybe allow bridges and buildings under four stories to be sealed by a PE
- Do we as a group want a take a stand
- Remain an open agenda item for this committee

**Agenda Item #1**

Doug Franks led the discussion on the comments to the draft LRFD Manual. Each comment was touched on and the few that were expanded upon are detailed below:

No. 4

- Al asked if it would be best to have the “Structure Type Study” during the concept phase.
- Ben stated that VE during concept was not effective since the engineer has not had time to develop the approach.
- Al asked if Bridge Design would determine the need for a “Structure Type Study” during the scoping phase.
- Ben stated that the need for a “Structure Type Study” needed to be determined during contracting.
- Ben explained that internal they schedule resources to determine if a project will be designed in-house or by a consultant.
- Bill added that the scope is developed prior to knowing internal vs consultant.
- Al explained that the concept phase requires that the construction cost estimate be so close that a lot of design work has to be done in concept.
- Ben stated that once the Chief Engineer signs off on the concept, a revision is a formality and the Bridge Office has already had their chance to influence the concept report.

No. 8

- Bill stated that AASHTO will allow the use of LFD for a bridge widening but that the Bridge Office has decided to move on with LRFD. There may be exceptions.
- Ben added that unless there is something in writing stating otherwise, bridge widenings will be designed using LRFD.
- Tahir asked about how this issue may effect load ratings.
- Ben stated that once the bridge is built and in maintenance he would not be worried about small percentage changes.

No.10

- Al asked if barrier protection was not acceptable.
- Doug stated that all columns are to be considered vulnerable.
- Doug added that as more knowledge is gained in this area, things may change.
- Doug stated that they were trying to avoid dictating roadway geometry.
- Ben stated that will continue to consider impact for column design.

No. 13

- Doug stated that the Bridge Office is getting familiar with the LEAP software and this this topic will continue to evolve but that they will continue to use BRGEOM for the foreseeable future.

- Al asked the Bridge Office would allow something else.
- Bill said yes but if there are questions about the geometry, they are going to want to see the BRGEOM results.

No. 17

- Doug explained that during the development of the new slab charts they decided that the number of charts was getting too large and that they would release their MathCad program for use.
- Greg pointed out the NCDOT has charts
- Doug was aware of this but the current stance is to release the MathCad file.

No. 18

- Doug stated that this item was not really quantified yet.

No. 25

- Bill stated that direction on this topic is being added to the drainage manual.
- Ben stated that MS4 is not an issue everywhere.

No. 26

- Ben stated that FHWA may question the use of a proprietary product.
- Lyn added that there better actually be an "equivalent".
- Al asked if we should look for other drains.
- Ben stated they would be open to options.
- Greg asked if details could specify dimensions that would essentially force a specific drain.
- Ted stated that this could be a patent issue.
- Greg added that notes could place requirements that the product would have to meet with regard to size and capacity.
- Bill stated that they did not want to do that out of concern that the contractor would violate something.
- Al closed the discussion stating that we would look for solutions on this.

No. 27

- Steve stated that there will be additional notes for this.
- Al asked if the Lab is confirming the pile driver.

- Steve stated Yes and Bill added that there will be coordination with Geotech for the loads and that consultants can discuss this with the Bridge Design Office.

No. 33

- Steve stated that 2 should be used for coastal sites and 1 everywhere else.

No. 35

- Lyn stated that the point of the wall standards is not to require a WFI.
- Lyn added that the standards are based on poor soils.
- Ben stated that internally, they get soil survey data for ditches, etc.
- Al added that from the consultant side, the Geotechs are only going to do what they are being paid to do.
- Ben stated that he was concerned about Geotech overdoing it and trying to get a WFI everywhere.

No. 36

- Al stated that Geotechs are saying that the engineer needs to determine the allowable bearing pressure.
- Doug closed the discussion stating that this is an ongoing issue.

No. 39

- Doug stated that they have bumped up the strength and diameter.

Bill closed the overall discussion on the LRFD Manual by saying that the Bridge Office was ready to post the Manual for use. They are considering adding the old manual to the appendix of the new one.

**Agenda Item #2**

- Al stated that there are new faces and a new way of doing things in the Bridge Office and that the consultant community needed advance notice of preference changes.
- Ben stated that if there are problems/conflicts in the manual that they would correct them.
- Ben added that since the department owns the contract and the structure that the front office would control how things are done.
- Greg asked if current plans could be provided as go-bys for the current preference.

- Ted said they could.

### **Agenda Item #3**

- Ben stated that this is an environmental issue driven by MS4.
- Bill stated that this topic is being added to the drainage manual and a draft is expected in June.
- Bill stated that currently with a 12 ft lane, the gutter spread cannot encroach on the 10 ft travelway.
- Ben added that this highlights the importance of keeping the roadway low point as far away from the bridge and approach slab as possible and try to intercept the water before the bridge.

### **Agenda Item #4**

- Ben stated that a Bridge Maintenance Manual exists.
- Al asked if it included guidance on fiber wrap.
- Ben stated that he was not supportive of fiber wrapping since it made it difficult to inspect and determine if the shear cracking was being controlled.
- Ben added that they would not widen a bridge with bad shear, would want to replace.

### **Agenda Item #5**

- Bill stated that the topic of pedestrian bridges was being added to the drainage manual.
- Steve stated that the Bridge Design Manual refers to LRFD manual.

### **Agenda Item #6**

- John stated that there are crash tested temporary barriers that could be used over beams.
- Bill stated that they did not want to have filled holes over the beams out of concern for chlorides seeping through and damaging the beam.
- Ben added that this could be a proprietary product issue as well.

### **Agenda Item #7**

- John asked if there can be exceptions to the 2 ft minimum cover over pile footing due to the concern for stream migration/widening and the additional scour and debris issues an exposed footing would create.
- Ted stated that it could be lowered with good reason.
- Bill and John agreed that a caisson foundation is an option.
- Ben stated that setback should be addressing this.
- Greg and John stated that there are cases where the practical maximum span length is reached and a comfortable setback (greater than 10 ft) cannot be achieved.
- Bill stated that they did not want footings to be located below the scour line.
- John added that 2 ft below the existing stream bed would be an improvement.
- Lyn stated that the amount of seal concrete and pile embedment needed to be considered.

#### **Agenda Item #8**

- John asked if would be in the best interest of the Department to have the hydraulic study approved prior to awarding design-build contracts.
- Ben stated in most cases no. Risk goes to the contractors.

#### **Agenda Item #9**

- Ben stated that it is a federal requirement to have an independent cost estimate and they would be continuing to do this.

#### **Agenda Item #10**

- Bill stated no consideration will be given to having beams at the edge of deck to eliminate overhangs.
- Greg asked about the use of steel diaphragms.
- Ben stated that they would want them to be added when the beams are set.
- Greg stated issues with Evazote joints not sticking.
- Ben stated that this is often a contractor issue during installation and that the department is looking at neoprene alternates to evazote.
- Greg asked if the current overlay weight could be reduced.
- Bill stated that he prefers to have this safety factor down the road.
- Ben also prefers to leave it as it helps with load rating in the future.
- Ben stated that they are looking at methods of accelerated bridge construction for small local bridges (box beams and precast deck panels-full depth).
- Lyn stated that the screeding question is best suited for construction to answer.



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Ben and Al closed the meeting stating that there may be a future joint meeting with the Lab.





10. Miscellaneous topics that may help improve Georgia bridges and/or lower costs such as:

- beams at the edge of deck to eliminate overhangs
- Revisit Construction details (steel diaphragms, approach slabs at bridge ends, endwall detail)
- Revisit joints (evazote, silicone)
- reducing the overlay weight
- Accelerated bridge construction ideas
- Shugart screeding decks >60 feet
- Open discussion as time permits

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**GDOT DRAFT LRFD Design Manual  
QUESTION / COMMENT MATRIX  
FEBRUARY 1, 2013**

No.	Section Reference	Question / Comment Requested for Clarification	Rationale for the Question/Comment Requested for Clarification (INTERNAL INFORMATION ONLY)
1	Bridges in a curved roadway alignment	Generally, curve any bridge located in a curved roadway location to fit the curved roadway alignment. However, where the degree of curvature is slight and the bridge length provides only a small maximum offset, consider using a straight bridge. Perform a complete analysis of each curved roadway location before recommending a straight bridge, taking into consideration bridge length, degree of curvature, maximum offset, approach grade profiles, etc. Position the structure to provide the minimum required horizontal clearances. The maximum allowable widening to accommodate a straight bridge in a curved roadway section is 15 inches.	The bridges located on curved alignments generally cost more to design and construct than straight bridges. This is a question that comes up more often than not during design and/or construction phase; and if a consistent/clear policy is adopted then it would make it more time/cost efficient both during design and construction phases.
2	PSC Beams - General	When the beam length measured along the grade differs from the beam length measured horizontally by more than 3/8", all affected dimensions measured along the length of the beam should be clearly labeled so that the fabricator can make the necessary allowances in the shop drawings. When detailing beam elevations, dimension the locations of all inserts, hold-downs, etc. to the ends of the beam rather than the centerlines of bearings.	In order to prevent fabrication mistakes for beam length, the fact that the longitudinal grade has on dimensions measured along a beam's length should be addressed in the plans.
3	viii, ix	The text shown in section 5.1, 5.2, etc. are in small caps and is not consistent with the rest of table of contents which is shown as all large caps.	

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No.	Section Reference	Question / Comment Requested for Clarification	Rationale for the Question/Comment Requested for Clarification (INTERNAL INFORMATION ONLY)
4	1.5.1.2	Should reference when a Structure Type Study is needed.	For complex or large bridges where multiple options are possible, a structure type study should be performed during the concept phase to determine the best structure for Preliminary plans. These studies are also very helpful to VE teams.
5	1.5.2.3	Should give an approximate time prior to PFR when Preliminary Layouts/Hydro Study should be submitted.	Needed to assure that Layouts are submitted in time to be reviewed.
6	Appendix 1A	State Construction Engineer should be changed to Jeff Baker.	Recent Change.
7	Appendix 1A	Suggest adding email addresses to this list.	Email is more useful than phone numbers these days.
8	2.2.2.2	Why should the widening portion be designed in accordance with LRFD if the original design of the existing bridge was based on LFD? Is it due to the possibility that the original bridge portion might get replaces as well, using LRFD design?	What is the philosophy in mixing two different design codes for the same bridge? e.g. the original portion designed for HS20 and the widening portion designed for HL93.
9	2.2.2.3	Suggest adding statement that allows for design of truck load in lieu of S/W where sidewalk is removable.	Assures that future controlling load is accommodated.

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10	2.3.3.2	Consider adding notes that talk about the appropriate use of concrete barriers to protect columns besides guardrails.	This section talks about the use of guardrail to protect columns and specifies a minimum of 5 feet from face of columns to face of guard rails. In cases where you are not able to provide for the 5' minimum clearance, it would be nice to have some guidance that a concrete barrier is acceptable and the type of barrier to use. Also we have cases on interstates separated by a median barrier where the inside shoulder under the bridge is less than the inside shoulder away from the bridge because of the size of the columns. We have seen where a concrete barrier is placed in front of the column and also cases where the column is exposed to traffic to give additional/minimum shoulder width under the bridge. Some guidance on this specific issue may be helpful.
11	2.5.1	Suggest that definition be provided to determine what defines "substantial" shoring.	Subjective statements can lead to varying results.
12	2.8	Consider defining some required structural design software? (If dependence on a software company is a concern, why not define some recommended software?)	Without recommended software, GDOT and consultants may have a hard time finding common ground. With recommended software, there would be an opportunity for more efficient and consistent designs.

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13	2.8	Consider including LEAP Geomath software as an alternative to BRGEOM?	<p>Geomath reports have all of the input &amp; output information given by BRGEOM. The interface is also user friendly and efficient. Furthermore, Geomath has additional capabilities.</p> <p>Reports can be generated for:</p> <ul style="list-style-type: none"> <li>▪ Required End Span Lengths.</li> <li>▪ Curved alignment of Feature Intersected.</li> <li>▪ 'D' dimension.</li> <li>▪ Cap Elevations.</li> <li>▪ Station &amp; Offset of Survey Points. (Use for Existing Structures &amp; Bench Marks.)</li> </ul>
14	2.9.2.2d	Typo with "minimum."	
15	2.9.4.2	Is this section still valid?	Most contractors redesign RCDG's to Type I mods in recent history.
16	2.10.2	Appears that commas are used in the quantity table in the detail sheet to represent the thousandth place. If so this should be stated as such.	
17	Chapter 3	Are there plans to add slab design tables like in the current design manual?	It would keep slab designs consistent.
18	3.2.3.2	Regarding Overhang slab design – suggest designing overhang slab for max load on barrier; "Ft" value in table.	Guidance from NHI suggests that by designing overhang slab for barrier capacity results in overdesigned slabs.
19	3.3.2.2.1	Parapets have in the past been paid as superstructure concrete. This is not real obvious, so might be good to mention this.	

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No.	Section Reference	Question / Comment Requested for Clarification	Rationale for the Question/Comment Requested for Clarification (INTERNAL INFORMATION ONLY)
20	3.2.2.4.3	Suggest changing #4 top distribution bars to #4 top temp/shrink.	#4 bars in top of deck are temperature/shrinkage reinforcement.
21	3.3.6.2	Suggest adding a minimum distance between the edge of flange and bolt hole for barrier	Perhaps 3" would give enough clearance?
22	3.4.1.1.3	Suggest allowing stresses above 200 psi as long as mild steel is provided.	Use provisions in LRFD table 5.9.4.1.2-1
23	3.6.5.7	Consider allowing the use of bolted splice on I-girder sections.	
24	3.13.2.3	There is a missing reference error on page 3-39	
25	3.15	Consider having something in the deck drainage section that talks about the process of when direct discharge into the stream is not permitted.	
26	3.15	Consider adding "standard" or preferred details for guidance.	Since deck drainage is going to become more common, having standard details would help GDOT get the drainage system it wants.
27	Chapter 4	Manual is silent on how to present foundation design information in LRFD format on plans.	It will be important to present factored design loads, resistance factors for the foundations, and required ultimate foundation capacities.
28	4.1.4.1	Please verify minimum footing thickness	2' -3" works by calculation.
29	4.1.5.1	Please verify minimum footing thicknesses	3'-3" for H-Piles and 3'-6" for PSC works by calculation.
30	4.1.5.4	Suggest adding check of punching shear when using pile larger than 14x73 with grade 50 steel.	Standard clearances to the edge of footing may be insufficient.

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No.	Section Reference	Question / Comment Requested for Clarification	Rationale for the Question/Comment Requested for Clarification (INTERNAL INFORMATION ONLY)
31	4.2 and 4.3	Please add guidance regarding concrete structures in coastal counties.	Shall the provisions of LRFD 5.12.3 apply? This would make the minimum cover on an end bent cap in McIntosh county 3".
32	4.3.2.3	Suggest adding guidance regarding the vehicular collision force (LRFD 3.6.5).	The collision force is a significant load and will lead to increased bridge costs. Several states modify this requirement based on "site conditions" as allowed in the code.
33	4.3.2.2.4	Suggest adding some guidance on the exposure factor, $\gamma$ , used for distribution reinforcement calculations.	The LRFD Code leaves it to the "authority" to decide where Class 1 or Class 2 exposure should be applied.
34	Chapter 5	Are there plans to check / update the wall standards for LRFD?	
35	5.5.2	Suggest adding that designer must verify soil properties when using standard walls 4948B, 4948C, and PW-1.	Required soil bearing strengths are not always present at every site.
36	5.5.3	Suggest adding some guidance regarding allowable bearing under wall for staging.	LRFD suggests that this is the wall designers responsibility, but they are not Geotechnical engineers.
37	Chapter 6	Are there plans to check / update the culvert standards for LRFD?	
38	7.4	Suggest adding guidance on allowable sound wall heights when attached to Barriers, retaining walls, MSE Coping, and Bridge barriers.	These values are in the "standard" drawings, but it is not explicitly clear.
39	9.3	Please add guidance for lateral restraint between superstructure and substructure in seismic zones.	1 1/4" diameter smooth dowel may not be sufficient.
40			

The following responses correspond to the Question/Comment Matrix numbers on the document dated February 1, 2013.

1. Bridges in a curved roadway alignment: The use of straight bridges to accommodate slight roadway curvatures will continue to be evaluated during the preliminary design phase. No parameters will be outlined in the manual as consideration of such alternates is on a case by case basis.
2. PSC Beams (dimensioning): Georgia Standard Specification 507.1 addresses this item and will continue to guide our practices.
3. Formatting issue: This issue was resolved.
4. Structure Type Study: A reference to Section 2.9.5 "Bridge Type Study" was added to Section 1.5.1.2.
5. PFPR Submittal Timeline: Submittal of PFPR shall be controlled by the Project Schedule and will not be included in the manual. Similarly FFPR schedule references were removed from the manual.
6. Jeff Baker: Jeff Baker is not the State Construction Engineer. He is the Director of Construction.
7. E-mails: We will not be providing e-mail addresses in the manual. The contacts list was removed entirely.
8. LRFD Widening: It is our understanding that federal funding guidelines require to use the current code for design. However, Subsection 2.2.2 was modified slightly to include a statement allowing the Bridge Office to approve exceptions it feels appropriate.
9. S/W Loading: The GDOT manual references LRFD 3.6.1.6 which addresses this issue.
10. Horizontal Pier Protection: Section 2.3.3.2 was revised to remove specifics and encourage coordination with the GDOT Project Manager.
11. "Substantial Shoring": Shoring elements in a project will be evaluated on a case by case basis, therefore no definitions will be added to the manual.
12. Design Software: Software guidance or requirements may be added at a later date as experience with various packages is gained.
13. BRGEOM: The GDOT geometry program "BRGEOM" will continue to be required.
14. Typographical Error: This error was resolved.
15. RCDG Design: The use of Reinforced Concrete Deck Girders is still a very cost effective design for many cases. Therefore this section will remain in the manual.
16. Use of Commas in Quantities: Section 14.3.3.6 of the GDOT Bridge Detailing Guidelines mirrors what is shown in Section 2.10.2 of the LRFD Design Manual.
17. Slab Design Tables: Because slab designs are now dependent not only on beam spacing as in the past, but also on the girder top flange width, the number of tables required to address every design case is excessive. Therefore, we will soon be releasing a slab design program that will generate satisfactory slab designs on a case by case basis.
18. Overhang Slab: We have decided to design our overhangs as outlined in LRFD A13.2 and A13.3 to ensure that our overhangs will resist any load that can be transferred by the barrier.
19. Parapet Concrete Payment: Payment for Parapet Concrete is covered by GDOT Standard Specification 500.4.01.C



20. "top distribution bars": Section 3.2.2.4.3 has been revised to eliminate the term "top distribution bars".
21. Method 2 Barrier Anchorage: Section 3.3.6.2 has been revised to provide more detailed guidance.
22. 200psi stress limit: The Bridge Office will continue to require an initial tension limit of .200ksi
23. Bolted Splices: The Bridge Office will continue to require butt welded connection for I-girders.
24. Missing Reference: This item has been resolved.
25. Deck Drainage Guidance: Some basic guidance towards this topic may be added to the manual.
26. Drainage Details: Deck drainage details or cells may be forthcoming in the future.
27. Foundation data: At this time we will continue to require the same basic foundation design information as has been typical with the exception that all values shall be calculated as described in the LRFD Specification.
28. Footing Thickness: Section 4.1.4.1 has been revised to reflect revised minimum.
29. Footing Thickness: Section 4.1.5.1 has been revised to reflect revised minimums.
30. Punching Shear: The goal of the manual is to provide information and processes that are not implicit to the AASHTO LRFD design process. Therefore describing a need to check punching shear seems unnecessary.
31. Coastal County Clearance: The manual will be updated to clarify in what cases substructure clearances shall be increased from typical.
32. CT Loading: Our goal is to provide adequate intermediate bent designs for current and potential future grade separation configurations. However, we are evaluating the effects of this load as projects are submitted for review.
33. Exposure factor: Section 4.1 was revised to include guidance on the exposure factor.
34. Wall Standards: Yes, the wall standards will all be updated to LRFD.
35. BFI for Standard Walls: We have found the design assumptions used for such walls are typically attainable in the field. We will not be adding any foundation investigation requirements for their use.
36. MSE bearing: We are still exploring the application of the LRFD code as it pertains to earth retention structures. The manual may be revised based on our developing understanding.
37. Culverts: The culvert standards have been reviewed and are in the process of being revised.
38. Sound Barriers: Current limits as presented in the Sound Barrier Construction Details and the Basic Drawings for GSE Traffic Barrier and Coping shall be applied until further notice.
39. Seismic Connection: Section 3.12.2.5.1 implies the use of a 1 ½ inch 50 ksi dowel in all cases to address this matter.