Volume 7 **January 2008**

Florida Department of Transportation

District 4 Design Newsletter

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From the Editor's Desk

By: Howard Webb, P.E., District Design Engineer

A Paradigm Shift –
I remember the days when I tracked PDE projects for a chance to design one of them in my in-house section. I was mainly looking for those capacity projects to develop the technical skills of young engineers and to motivate seasoned and experienced engineers in my section. There were plenty of capacity projects for all in-house design sections and for our consultants. Today, this is not the case even though the Work Program dollars has more than quadrupled with Strategic Intermodal System (SIS) projects. The number of new/reconstruction projects have been significantly reduced. Additionally, a lot of our projects are being procured with alternative contracting methods, instead of the conventional design-bid-build.

In the last 5 years, there has been a significant percentage of our reconstruction projects that has been advertised as design-build, design-build-operate-maintain-finance, construction manager at risk (CM@Risk), and design-build-finance. Although design-bid-build remains our primary method of contracting, alternative contracting has become more prevalent. We now need to change our way of doing business and look for varying ways to motivate our staff and expand the skill level of our staff internally. This is also true for the consultant industry. The consultants are now expanding their focus to include partnering with contractors and concessioners in order to maintain their existence. This is a paradigm shift which probably started at the turn of the millennium but now we are seeing and feeling a greater impact.

Inside this issue:

Scheduled PS&E Field Review Meeting

By: Richard Creed, P.E., District Roadway Engineer

Purpose:

The purpose of the PS&E field review is to take one last look at the project site and verify if field conditions have changed in any manner which will affect the Plans, Specifications, or Estimate. (Hence the name PS&E, pretty clever huh?). Each office in FDOT as well as each local agency should take one last look at the project site for verification that the proposed "Constructability" plans are compatible with the existing conditions.

District 4 Quarterly Design Newsletter

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Scheduled PS&E Field Review Meeting Continued

This intent of the meeting is not for each reviewer to simply repeat Constructability Phase submittal comments destined for the Electronic Review Comments (ERC). It is to clarify issues or concerns before they may get into the ERC, or to identify issues which have changed or have gone unnoticed in the field. To make the meeting more effective, each "reviewer" in attendance should have either already gone into the field and generated comments based on that field review, or needs to go to the field with the PM to clarify or identify potential issues. This process relies on reviewers with different expertise seeing the same conditions through different perspectives.

When is the meeting?

The PS&E meeting has been rescheduled under the new phase review process to after the Constructability Phase Submittal. It had previously been scheduled after the Final Engineering Phase Submittal which is obviously very late in the design process. This new date allows more time for the Designer to react if major issues or concerns are brought up at the meeting and field review. (Not that this would ever happen….)

How should the meeting be organized?

The Design PM will inform all other FDOT offices and local agencies of the PS&E meeting date as part of the Constructability Phase submittal and ask them to either visit the project site at their own convenience prior to the meeting date or go with Design after the office portion of the PS&E meeting. Typically, the Design PM and a small number of key FDOT folks will visit the project site together prior to the PS&E meeting date or the day of the meeting.

The meeting itself will involve an office discussion and a possible "group" field review if needed based on input from those in attendance. Extra time should be set aside at each PS&E meeting offering an invitation to anyone who would like for the PM to go in the field with them after the meeting adjourns.

I hope this helps clarify the meeting's purpose and organizational set up. If you have any additional questions, please contact any FDOT Design PM or myself for further clarification.

Did you know?

By: L. Wetherell, P.E., Project Manager

Your project requires a 60-day ad if any of the following apply:

1. Pre-bid meeting
2. Mechanical and/or electrical work on a bridge

2a. Bascule bridgework

3. Complete bridge rehab
4. Add lanes and reconstruction
5. Interchange
6. Lump Sum
7. Letting is greater then $20 million
8. Complex construction

Please check your schedule and talk to your project manager if any of these apply to your projects.

News from the Utility Section

By: Tim Brock, P.E., District Utility/Value Engineer

The 2007 Utility Accommodation Manual (2007 UAM) is approved and available for immediate use. One interesting note in 2007 UAM - the definition of a Utility Facility has not changed. What are defined 'utility facilities' and what are not may surprise you. I know there are some designers in District IV that were recently taken by surprise.

Please note that utility facilities are defined the same in both the 2004 as well as the 2007 Utility Accommodation Manual as follows:

Utility Facilities: *All privately, publicly, or cooperatively owned lines, facilities, and systems for producing, transmitting, or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, and storm water not connected with highway drainage, and other similar commodities, including television transmission signals, publicly owned fire and police signal systems, and street lighting systems, which, directly or indirectly serve the public or any part thereof. The term "Utility" shall also mean the Utility Agency/Owner or Permittee, inclusive of a wholly owned or controlled subsidiary. This term does not include wireless telecommunications providers who provide cellular or digital communications to the public.*

Some of our designers and utility coordinator's recent "lessons learned" revolved around the fact that "storm water not connected with highway drainage" is a utility facility by definition and as such, requires a utility permit for it to be located in public R/W. Everyone knows that all utility facilities within the public R/W must have an approved utility permit application on file. One of the fundamental reasons for a permit is to allow the Department an avenue to address unsafe or deficient facilities placed in the public R/W.

Utility coordination during the early stages of design could have eliminated wasted time and money during construction on one of our recent contracts. One way to avoid future oversights is for the utility coordinator to be clear on the definition of a utility facility by referring to the 2007 UAM upon project commencement.

The very first activity after the utility kickoff meeting with me and my staff is to identify the existing utilities within the project limits. Knowledge is power...ignorance is not bliss! Let's all get informed early on. Doing so will save us time, money and aggravation.

Taking Another Look at Steel

By: Fred Ochoa, P.E., District Structures Engineer

Innovations in bridge design normally occur at a relatively slow pace. On the other hand, changes in material prices and availability can occur at a much faster pace. Because of this dichotomy bridge designers need to continually check the accuracy of the facts underlying their design assumptions. One such example is the use of unpainted weathering steel and of High Performance Steel (HPS).

The words "unpainted weathering steel" bring to mind bridges in other states – out west or in the northeast – but not in Florida. But did you know that FDOT currently has fifteen bridges made of unpainted weathering steel? A quick overview of those bridges yields some interesting facts. For example:

- Of the fifteen bridges, fourteen are composed of multiple plate girders and one is a closed box girder,
- The first was built back in 1971,
- In total Florida has over 23,000 lf of bridge girder/beam made of unpainted weathering steel,
- Over 99.5% of the total length of unpainted weathering steel girder/beam is in Condition State 1 (meaning there is little or no corrosion),
- The bridges made of unpainted weathering steel cover both simple span and continuous span statical systems. Therefore, bridges made of unpainted weathering steel are performing quite well in the state of Florida.

But as bridge designers know, unpainted weathering steel is not appropriate for all sites. The steel industry has provided guidance on determining the suitability of a given site (primarily due to environmental concerns) for the use of unpainted weathering steel. One clear advantage of unpainted weathering steel is the cost savings due to the elimination of initial painting. In addition to that there may be other cost savings in the potential for reduced subsequent maintenance. On the other hand, unpainted weathering steel will likely incur additional cost due to the required detailing and construction complexities. Keep in mind that the inside of closed box girders made of unpainted weathering steel must still be painted in accordance with the Specifications.

The dynamism of the steel market has resulted in fluctuations in the cost and availability of HPS. Nonetheless, as has occurred historically when a new, higher strength grade of steel is introduced, the cost differential between Grade 50 and HPS can be expected to diminish over time until it reaches a steady state based on market conditions. Because of this bridge designers must continue to update their assumptions about the cost of HPS material. The designer must evaluate not only a Grade 50 alternative and an HPS alternative but also a hybrid alternative. A hybrid alternative uses Grade 50 throughout and HPS in the areas where it is most advantageous. Of course there are other differences between the materials (both positive and negative) that must be taken into account, such as: increased toughness of HPS, and the potential for greater deflections with HPS (due to the reduced moment of inertia required for strength).

Overall, bridge designers are continuously challenged to keep up to the state of the art in bridge design in order to achieve the best possible product for their clients.

Landscaping on State Roads

By: Morteza Alian, P.E., DCPME

Landscaping issues have been the theme for me in the past three months. Most issues, as you may have guessed it, came from projects under construction. I would like to highlight few things you need to keep in mind when discussing landscaping plans with the maintaining agencies and those are as follows:

1. Commitment letter – This is the first step in this process. We need to make sure that the maintaining agency is willing to accept responsibilities once new landscaping is constructed and accepted.

2. Develop scheme – The landscape architect needs to develop a plan based on the allotted project budget and FDOT design criteria. This plan needs to be presented to the maintaining agency soon after a commitment letter is received. We need to remember two things as we are developing the plan:
   A. Most maintaining agencies rely on the landscape architects to educate them about the maintainability and durability of type of trees, ground covers and bushes used along a corridor. As a result, the architects need to present their plans with tree palettes and other illustrations to the maintaining agencies for better understanding and visualization.

   B. These plans are developed for FDOT projects therefore; the landscape architects must comply with all FDOT applicable design standards and specifications. There are other standards that FDOT uses such as high wind-resistance trees, invasive trees, and FPL Guidelines that District Landscape Architect, Elizabeth Hassett shares with all landscape architects once a year at the annual landscaping workshop. In a nutshell, the landscape architect needs to be mindful of all standards and district practices when developing plans for the department.

3. Documentation – This is very important. All discussions with the maintaining agencies must be documented and reviewed by all parties after each meeting. This will ensure the history of plans development as the project proceeds. Most people have selective memory therefore; they need written documents to help them recall issues discussed and commitments made.

4. Follow up – District 4 does not want to maintain landscaping on arterial state roads and every effort is made to ask a local government to take this responsibility. With the exception of tree-only landscaping where FDOT takes responsibility for the maintenance, all other projects require a Memorandum of Agreement (MOA) with the local government for landscaping maintenance. Therefore, every project requires a Memorandum of Agreement (MOA) with the local government for the landscaping maintenance. The landscape architect must follow up with the maintaining agency to review a final set of plans to make sure all parties understand the extent of the scope of the landscaping plans. Again, the landscape architect needs to document the meeting minutes and distribute to all attendants.

There are times that the maintaining agency wants to allocate more funds towards the landscaping. If this is the case then, the landscape architect must make sure that the additional landscaping still complied with all applicable design criteria and specifications.

Lessons Learned - Drainage

By: Bill Arata, PLS, District Survey Office

The Survey Office has had an opportunity to learn from some recent mistakes suffered by our survey consultants. This displays the need for a good exchange of the available record information between the project managers and the surveyors.

As part of pipe rehabilitation a survey crew measured large diameter CMP culvert pipes. The existing pipe was to be sleeved with pre manufactured material. Unfortunately the diameter was grossly mis-measured. This mistake was only discovered during the installation. The final results were delays to the project and a substantial cost (over $30,000) to the surveyor to replace the sleeves.

During the review of another survey project it was discovered there was an adjoining and overlapping project. A comparison of a few of the pipe inverts was made and conflicting information (pipe sizes & elevations) was found. A FDOT crew visited the site, confirmed and found additional errors and omissions. This data was compared with the existing plan set. The consultant was required to resurvey all drainage structures and resolve the conflicts. This problem was discovered accidentally during the review. The delays and costs could have been significantly greater later in the design process or worse, during construction.

A third situation occurred when the surveyor failed to locate two of the multiple pipes entering a catch basin. All other details were properly located but the 2 pipes were hidden from view. The drainage engineer discovered this omission and was able to revise the plans to incorporate a conflict box.

A proactive approach would put the plan set, as-builts and/or straight line diagrams in the field with the surveyor. Pipe size, elevation and direction can be compared and checked during the actual survey. Discrepancies can be documented giving the surveyors greater confidence and assuring the engineers in the quality and accuracy of the data.

Designers' Corner

Nicholas De Fex

My name is Nicolas De Fex; I graduated from FIU on May 2007 and just started working as a Highway Designer in Section II. I am originally from Medellin, Colombia and moved to the US eight years ago. Just came back from Texas, where I was working with an oil exploration company until I got the opportunity to work with FDOT and move back to South Florida.

Lessons Learned - Landscape Irrigation System

By: Bing Wang, P.E., Project Manager

Most 3R projects include landscape with irrigation system. The installation and relocation of water meters sometimes become a problem during construction.

One of my projects, needless to say which one, had landscaping and irrigation in the plans. According to the plan there were three water meters relocation, two water meters removal and four new water meters installation.

FDOT has a Memorandum of Agreement (MOA) for the landscaping with the City. The MOA was reviewed by the city's Engineering Department and Parks & Recreation Department and approved by the city's commissioners. Meanwhile, the water meters are controlled by Utilities Distribution & Collections Department (UDCD). They all belong to one city but each department has its own budget and operates independently. Needless to say that the MOA was not reviewed by the UDCD but it had the following statement: "If it becomes necessary to provide utilities to the median or along the right-of-way lines (water/electricity) for these improvements, all costs associated with irrigation maintenance, impact fees and connections as well as on-going cost of water are the maintaining agency's responsibility".

During construction, the Utilities and Distribution & Collections Department stated that the Department needs to apply for a permit for water meters and fees will not be waived. And the city had a different understanding of the above statement in the MOA. The City' new interpretation is that the MOA will become effective one year after the landscaping and irrigation has been installed and accepted but not during the construction.

So, the best way to resolve this problem, as I have learned it thru this project, is to include the water meters in the Utility Relocation Schedule. This way, the Utilities Distribution & Collections Department has to sign the utility relocation schedule and they will include the work into their budget and coordinate with contractor to finish the work in a timely manner.

Another way is to include water meters cost and application fees in the Landscaping lump sum pay item. This means the landscaping budget for your project includes all fees and costs for the water meters hence there is less dollars to spend on trees, ground covers and hardscaping. If you choose this method, you need to know that the contractor still needs to coordinate with the city to obtain the work order and it will take six to eight weeks for the city to issue the work order after the application is approved.