INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

100 North Senate Avenue
Room N925
Indianapolis, Indiana 46204

PHONE: (317) 232-5502
FAX: (317) 232-5551

Mitchell E. Daniels, Jr., Governor
Michael B. Cline, Commissioner

# APPROVED MINUTES

## November 16, 2012 Standards Committee Meeting

**(Changes to the Final Draft on page 12, part 2 highlighted yellow.)**



MEMORANDUM

February 06, 2013

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Minutes from the November 16, 2012 Standards Committee Meeting

A Standards Committee meeting was called to order by Mr. Miller at 09:06 a.m. on November 16, 2012 in the N955 Bay Window Conference Room.

The meeting was adjourned at 12:56 p.m.

The following committee members were in attendance:

Mark Miller, Chairman
Mike Beuchel*, Contr. Admin.
Dave Boruff, Traffic Admin.
Elizabeth Phillips, Bridge Stand.
Jim Keefer, Fort Wayne Distr.
Ron Walker, Materials Mgmt.
Jim Reilman**, State Constr. Eng.
Richard Vancleave, Rdway. Svc.
Mike Prather***, Pavmnt. Eng.

** Proxy for Bob Cales*
*** Proxy for Greg Pankow*
**** Proxy for Mike Buening*

Also in attendance were the following:

Bren George, FHWA
Scott Trammell, Secretary
Wendy Chiles, INDOT
Lana Podorvanova, INDOT
Allen Squires, Rinker Materials
Tom Struewing, Cardno ATC
Chris Shewmaker, Illini Drilled Foundations, Inc
John Crist, East Jordan Iron Works
Steve Fisher, INDOT
Paul Berebitsky, ICA
Prakash Patel, INDOT
Lalit Garg, INDOT
John Susong, Rinker Materials
Yolanda Belew, INDOT

The following items were listed for consideration:

*A. GENERAL BUSINESS ITEMS*

OLD BUSINESS

*(No items were listed)*

NEW BUSINESS

*1. Approval of the Minutes from the October 18, 2012 meeting.*

DISCUSSION: Mr. Reilman recommended to match the language that is in section 731.09 (begin line 255 on pg 678 2012 SS) and incorporation of the words *"to be"* for the φ angle (line 70, 731.03) to the statements that were approved at last month's meeting in a revision to 732 (item 04).

Motion: Mr. Boruff
Second: Mr. Walker
Ayes: 8
Nays: 0

ACTION: PASSED AS SUBMITTED

*B. CONCEPTUAL PROPOSAL ITEMS*

OLD BUSINESS

*(No items were listed)*

NEW BUSINESS

*1. Underseal material migration problem (Mr. Buening, see pg 05)*

DISCUSSION: Presented by Mr. Prather as described on the proposal sheet. Mr. Miller offered that perhaps the milling should occur first, prior to the undersealing. Mr. Prather and his group will work with Tommy Nantung to resolve this issue and possibly revise the spec. Also recommended is to have someone from Mr. Walker's team involved. Mr. Miller asked if the material is coming up from the plugs or if it could be coming up from the joints. That is something the group will look into. Mr. Miller suggested the pavement group form a committee and look at solutions to this issue.

*2. Castings for use within a sidewalk or pedestrian area (Ms. Phillips, see pg 08)*

DISCUSSION: Presented by Ms. Phillips as described on the proposal page. Mr. Keefer mentioned that the lids with the smaller openings are also of a smaller diameter, so would not be interchangeable with the lids in question. Mr. Miller asked if this could be resolved by a design memo. Mr. Keefer suggested it be a separate item for ADA/sidewalk applications. Mr. Vancleave agreed. Ms. Phillips asked if a supplemental description would be enough.

John Crist of East Jordan Iron Works suggested modifying their Type 4 cover to fit this application. Also the diamond pattern on the Type 4 is quite aggressive. Mr. Crist suggested a different frame set altogether that has smaller vent hole and the diamond pattern is less aggressive.

The suggestion by Mr. Miller is to create a separate pay item for this specific application. Ms. Phillips will work on that.

*C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS PROPOSED ITEMS*

OLD BUSINESS

| | | |
|---|---|---|
| Item No. 02 06/19/12 (2012 SS) | Mr. Walker | pg 12 |
| Recurring Special Provisions: | | |
| *728-B-XXX* | *DRILLED SHAFT FOUNDATIONS* | |
| ACTION: | WITHDRAWN | |

NEW BUSINESS

| | | |
|---|---|---|
| Item No. 01 11/16/12 (2012 SS) | Mr. Pankow | pg 35 |
| Recurring Special Provisions: | | |
| 411-R-432 | WARRANTED MICRO-SURFACING (411.09 Warranty) | |
| 414-R-590 | ULTRATHIN BONDING COURSE, WARRANTED (414.14 Warranty) | |
| ACTION: | PASSED AS SUBMITTED | |

| | | |
|---|---|---|
| Item No. 02 11/16/12 (2012 SS) | Mr. Pankow | pg 39 |
| Recurring Special Provisions: | | |
| *411-R-xxx* | *COST OF CLOSURE PERIODS FOR MICRO-SURFACING REMEDIAL WORK* | |
| *414-R-xxx* | *COST OF CLOSURE PERIODS FOR UBWC REMEDIAL WORK* | |
| ACTION: | PASSED AS SUBMITTED | |

| | | |
|---|---|---|
| Item No. 03 11/16/12 (2012 SS) | Mr. Pankow | pg 45 |
| 701.09(b) | Location and Alignment Tolerance | |
| ACTION: | PASSED AS REVISED | |

| | | |
|---|---|---|
| Item No. 04 11/16/12 (2012 SS) | Mr. Walker | pg 48 |
| 907.16 | Thermoplastic Pipe Requirements | |
| 907.22 | Profile Wall Polyvinyl Chloride Pipe | |
| ACTION: | PASSED AS REVISED | |

| | | |
|---|---|---|
| Item No. 05 11/16/12 (2012 SS) | Mr. Walker | pg 52 |
| 923.01 | Temporary Pavement Marking Tape | |
| ACTION: | PASSED AS SUBMITTED | |

| | | |
|---|---|---|
| Item No. 06 11/16/12 (2012 SS) | Mr. Walker | pg 56 |
| 910.01(b)10 | Dowel Bars | |

ACTION: PASSED AS REVISED

Item No. 07 11/16/12 (2012 SS) Mr. Walker pg 59
211.03.1(C) Type 3

ACTION: PASSED AS SUBMITTED

Item No. 08 11/16/12 (2012 SS) Mr. Walker pg 62
904.03(d)1 HMA Coarse Aggregate

ACTION: PASSED AS REVISED

Item No. 09 11/16/12 (2012 SS) Mr. Walker pg 65
Recurring Special Provision:
203-R-562 DYNAMIC CONE PENETROMETER TESTING FOR EMBANKMENT

ACTION: PASSED AS SUBMITTED (ON HOLD, FOR FUTURE REVISION)

Item No. 10 11/16/12 (2012 SS) Mr. Vancleave (see PART 2) pg 01
802.06 Placing Concrete
802.07(B) Structural Frames
802.08 Installing Signs
802.11 Method of Measurement
802.12 Basis of Payment
910.19 Overhead Sign Structures

Standard Drawings:
*802-DMSS-01 thru 23* *DYNAMIC MESSAGE SIGN STRUCTURE*
*802-SBTS-01 thru 29* *SIGN BOX TRUSS STRUCTURE*
*802-SCLS-01 thru 22* *SIGN CANTILEVER STRUCTURE*
~~802-SNWW-1 thru 11~~ ~~SIGN ILLUMINATION~~ (TO DELETE, SEE PROPOSAL SHEET)
~~802-SNIL-1,2,3,6,7~~ ~~SIGN WALKWAY~~ (TO DELETE, SEE PROPOSAL SHEET)

ACTION: PASSED AS REVISED

Item No. 11 11/16/12 (2012 SS) Mr. Vancleave (see PART 2) pg 91
Recurring Special Provision:
805-T-169 TRAFFIC SIGNALS

Standard Drawings:
*805-SDAC-01 thru 09* *SIGNAL DUAL ARM CANTILEVERS*

ACTION: WITHDRAWN

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cc: Committee Members (11)
FHWA (2)
ICA (1)

CONCEPTUAL PROPOSAL ITEMS

1. UNDERSEAL MATERIAL MIGRATION PROBLEM

CONCEPTUAL 1

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: To date, I have heard of underseal material migrating upwards on three active contracts to include the US-40 project west of Greenfield. Standard Specification section 612 states:

1. The pumping holes are typically made by drilling a uniform diameter hole (612.04).
2. Wood plugs are to be used (612.05) and their use has been verified by multiple responses from District Construction personnel.
3. The wood plugs are supposed to be oversized by 1/16" (612.05) and driven to refusal at least 3" into the pavement (612.05).

This should be the end of the story but as of recent it has not been. We know the undersealing operations have/are occurring before milling operations. We know the historical material used has been UA-III but recent projects have been using UA-II (less viscous) due to supply issues with UA-III. The UA-II material can be 4 times more ductile and approximately 1.5 times softer at higher temperatures than the UA-III. Tommy Nantung's assessment that UA-II is the wrong material for use in undersealing operations is probably correct but should be irrelevant assuming the drilled holes were properly sealed. Some drilled holes are being properly sealed as evidenced by only a percentage of them displaying visual evidence of actually leaking. I believe milling the pavement after the drilled holes are plugged is the primary cause for the observed problem; the secondary cause is the UA-II material. Hypothesis: the wooden plugs are damaged to an extent they no longer afford a reliable seal to prevent the UA-II material from migrating upwards; the underseal material lacks the physical qualities to resist the upward migration.

The current specification in 612 does not account for the milling operation.

PROPOSED SOLUTION: Require an inspection of all wood plugs upon completion of milling and before overlaying with HMA pavement. Damaged or loose plugs should be replaced.

APPLICABLE STANDARD SPECIFICATIONS: 612

APPLICABLE STANDARD DRAWINGS:

APPLICABLE DESIGN MANUAL SECTION:

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED: Drilled Hole for Underseal

CONCEPTUAL PROPOSAL ITEMS

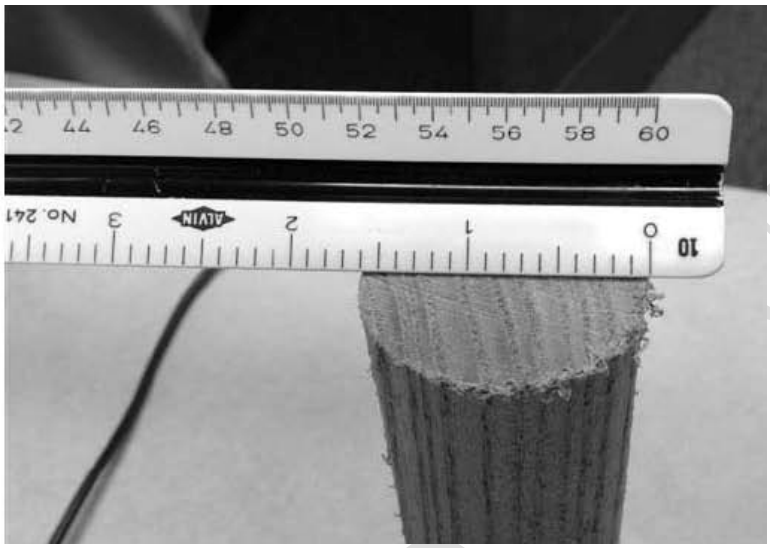
1. UNDERSEAL MATERIAL MIGRATION PROBLEM

Submitted By: Michael Prather for Michael Buening

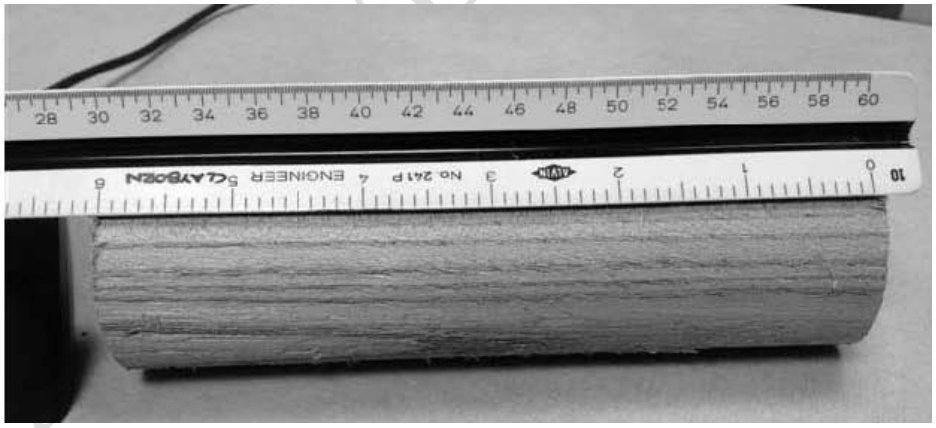
Title: Area Pavement Engineer Phone Number: 234-8250

Date: 10/15/12

APPLICABLE SUB-COMMITTEE ENDORSEMENT:




**Picture 1**




**Picture 2**

CONCEPTUAL PROPOSAL ITEMS

1. UNDERSEAL MATERIAL MIGRATION PROBLEM

**Picture 3 & 4**

**Picture 5**

CONCEPTUAL PROPOSAL ITEMS

2. CASTINGS FOR USE WITHIN A SIDEWALK OR PEDESTRIAN AREA

CONCEPTUAL 2

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: With the ADA regulations it is recommended that castings not be placed in an area that pedestrians can walk. Many times a casting cannot be relocated to outside of this area. The castings used within a sidewalk or pedestrian area are typically a flat top lid. The current INDOT standards for a flat casting on a manhole is meant for placing this only in a pavement area and is not conducive to a pedestrian environment. A flat castings is needed that can also be placed within an area that pedestrians navigate. The current INDOT design guideline states the following:

Gratings should not be placed within the walking surface. If, however, gratings are located in the walking surface, they should have openings of not greater than 1/2 in. in one direction. If gratings have elongated openings, they should be placed so that the long dimension is perpendicular to the dominant direction of travel.

PROPOSED SOLUTION: Provide a casting detail for use within a sidewalk that does not violate the opening greater than 1/2". This standard would be added to the other standard castings and be identified to use within a sidewalk or pedestrian area.

On a current LPA project this issue required a casting to be utilized in a pedestrian area. The contractor had contacted Neenah and the best solution was to provide a Neenah casting type 1772 and fill the concealed pick hole with a piece of rubber. With the standard of not having an opening greater than 1/2" the selection of available casting is very limited.

APPLICABLE STANDARD SPECIFICATIONS: 2012

APPLICABLE STANDARD DRAWINGS: This would require a new standard drawing or add to the current E-720 MHCA-03 detail.

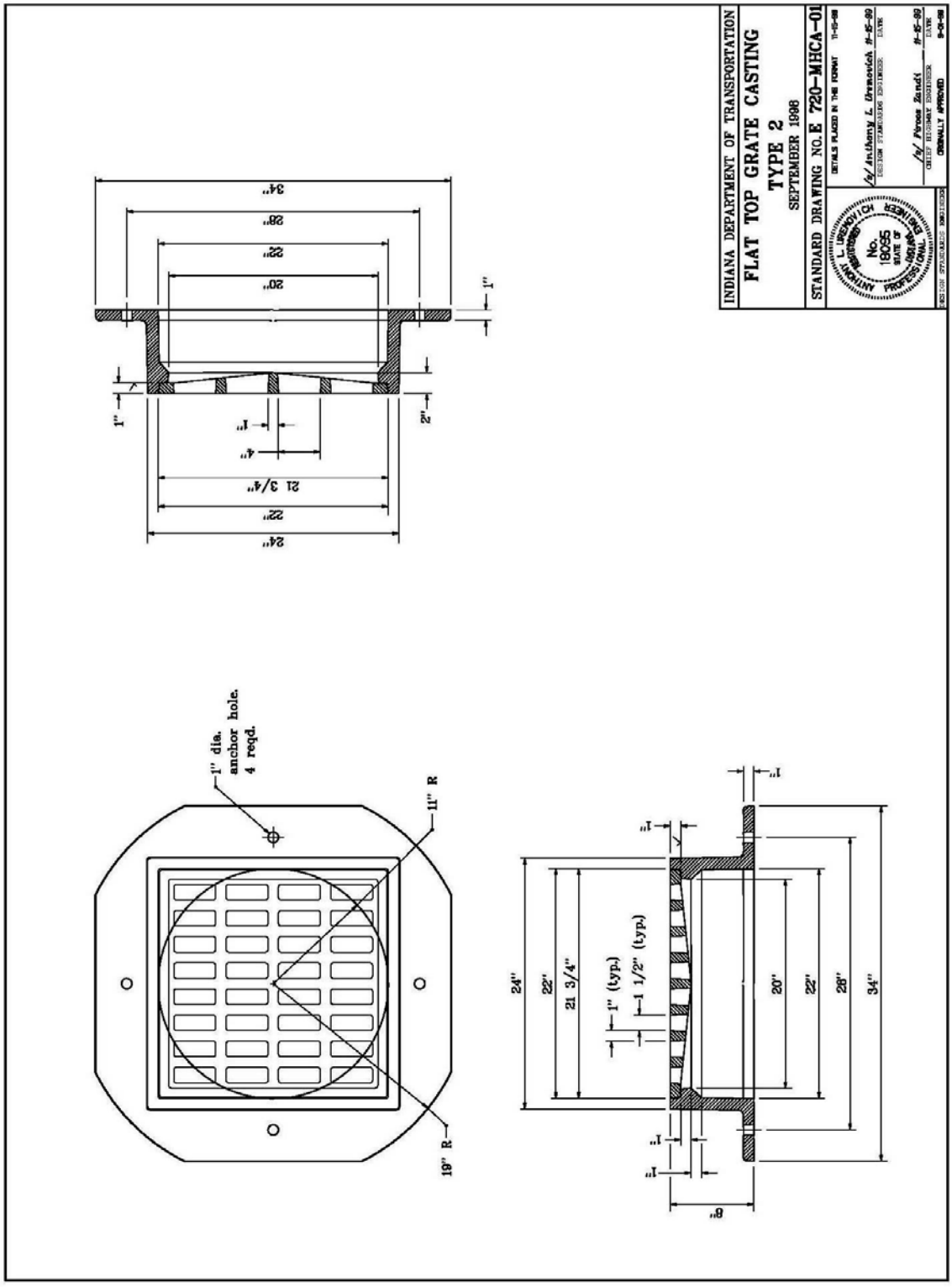
APPLICABLE DESIGN MANUAL SECTION: 51-1.05 (01) Sidewalk on Accessible Routes
APPLICABLE SECTION OF GIFE: N/A
APPLICABLE RECURRING SPECIAL PROVISIONS: N/A
PAY ITEMS AFFECTED: Casting type would indicate the specific pay item to use.

Submitted By: Gregory J. Smith, P.E. for Elizabeth Phillips

Title: Local Project Engineer
Organization: INDOT Fort Wayne District
Phone Number: 260/399-7322
Date: 9-17-12
APPLICABLE SUB-COMMITTEE ENDORSEMENT:

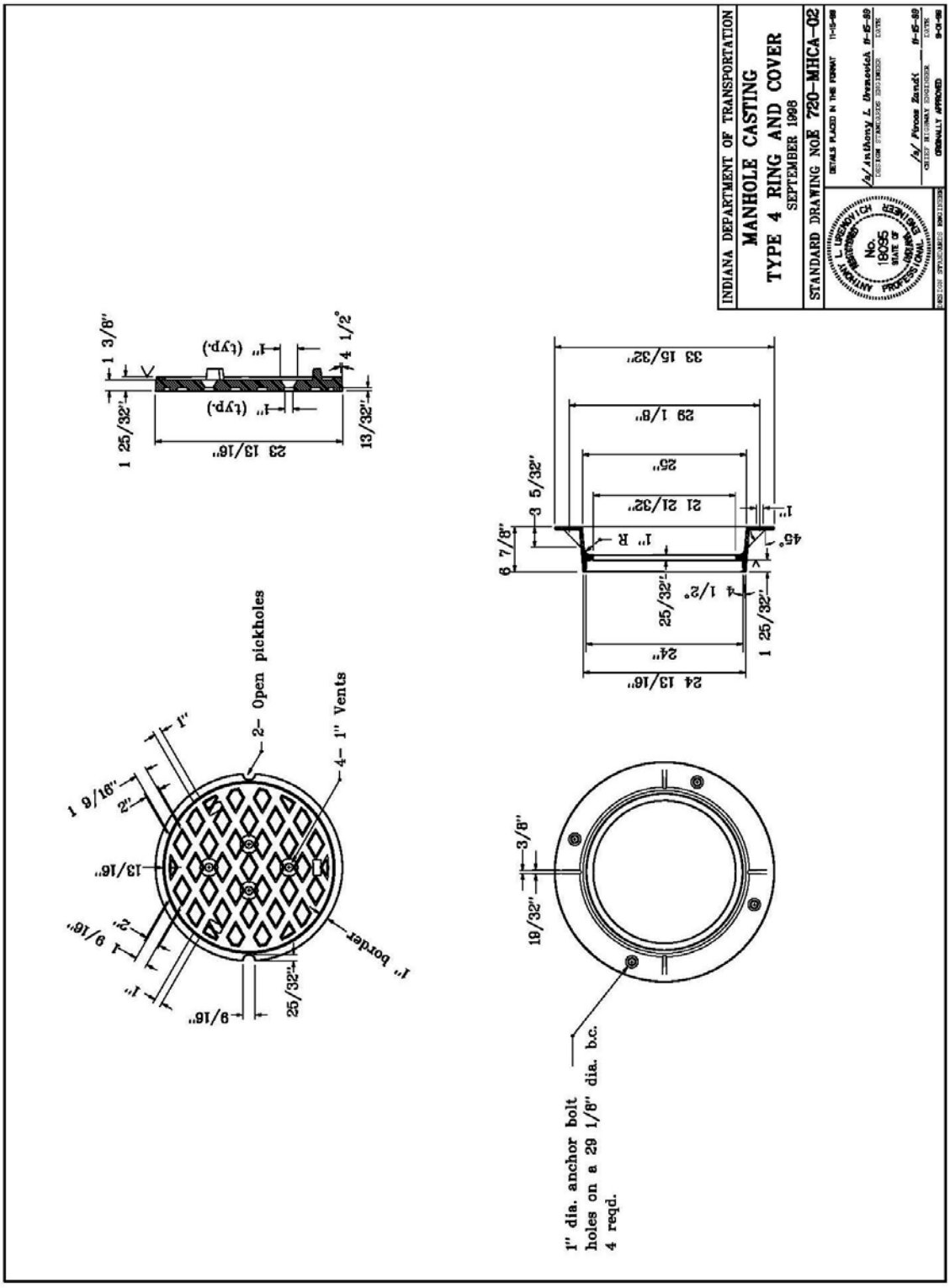
CONCEPTUAL PROPOSAL 2

BACKUP 01 EXISTING DRAWING 720-MHCA-01 FLAT TOP GRATE CASTING TYPE 2



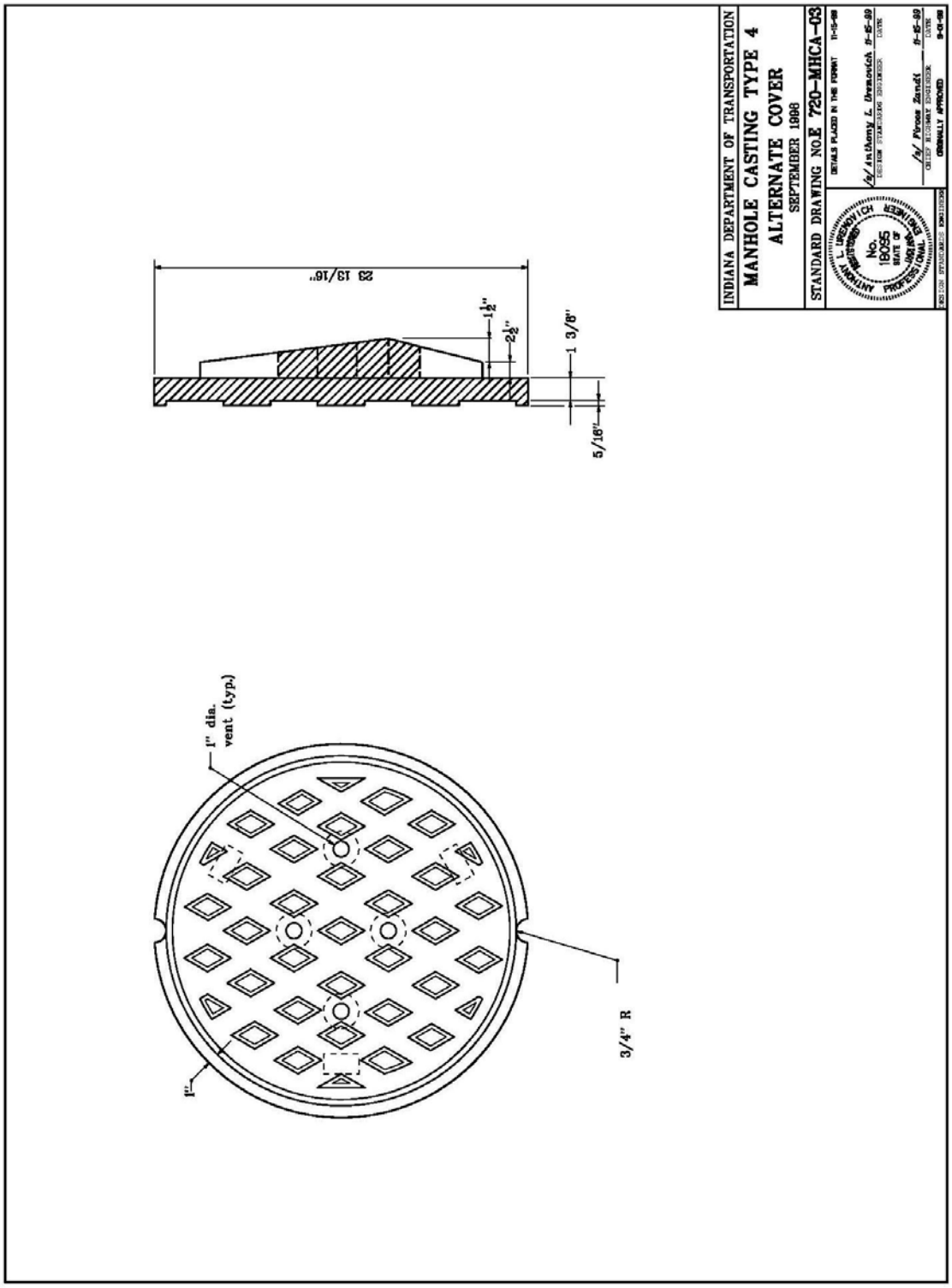
CONCEPTUAL PROPOSAL 2

BACKUP 02 EXISTING DRAWING 720-MHCA-02 MANHOLE CASTING TYPE 4 RING AND COVER



CONCEPTUAL PROPOSAL 2

BACKUP 03 EXISTING DRAWING 720-MHCA-03 MANHOLE CASTING TYPE 4 ALTERNATE COVER



STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: INDOT currently allows the use of drilled shaft foundations through unique special provision. The problem occurs when design consultants obtain the unique special provision and make changes. These changes effect the production, testing, and quality of the drilled shaft foundation.

Additionally, the unique special provisions that currently exist are not written in accordance with INDOT standard format or structure and are somewhat confusing.

PROPOSED SOLUTION: Create a recurring special provision to be placed on the menu of Recurring Special Provisions to be selected by design consultants when drilled shaft foundations are to be used in an INDOT contracts.

The recurring special provision shall be written in accordance with INDOT's standard formatting and structure.

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: create new 728 provision

PAY ITEMS AFFECTED: Create or modify existing pay items to have drilled shafts designated by diameter. Also the item for exploratory core needs to be created or maintained.

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 610-7251

Date: October 23, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: ad hoc committee consisting of: Youlanda Belew, Ron Heustis, Jim Reilman, Tom Struewing, & Mir Zaheer. Also considered ADSC (International Association of Foundation Drilling) comments.

REVISION TO SPECIAL PROVISIONS (OLD BUSINESS ITEM)
PROPOSED NEW 728-B-XXX DRILLED SHAFT FOUNDATIONS

728-B-XXX DRILLED SHAFT FOUNDATIONS

*(Adopted xx-xx-xx)*

The Standard Specifications are revised as follows:

SECTION 728, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

## SECTION 728 - ~~BLANK~~*DRILLED SHAFT FOUNDATIONS*

### *728.01 Description*

*This work shall consist of the construction of reinforced concrete drilled shaft foundations in accordance with 105.03.*

## *MATERIALS*

### *728.02 Materials*

*Materials shall be in accordance with the following:*

*Admixtures for Use in Concrete*.....912.03*
*Cement Grout*.....707.09*
*Coarse Aggregate*
*For exposed concrete, Class A or Higher,*
*Size No. 8 or No. 9*.....904*
*For non-exposed concrete, Class B or Higher,*
*Size No. 8 or No. 9*.....904*
*Fine Aggregate, Size No. 23*.....904*
*Fly Ash*.....901.02*
*Ground Granulated Blast Furnace Slag*.....901.03*
*Portland Cement***.....901.01(b)*
*Reinforcing Bars*.....910.01*
*Water*.....913.01*

**Except as modified herein*
*** Air- entraining cement shall not be used. This includes Type IA, IIA, IIIA, IP-A, IS-A.*

*If indicated on the plans, casings shall be in accordance with either ASTM A 252, grade 2 or ASTM A 36. Otherwise, casings shall be steel, smooth, clean, watertight, and of adequate strength to resist construction stresses. The outside diameter of casing shall not be less than the specified diameter of the drilled shaft unless otherwise shown on the plans. Casing diameters shall be within the American Pipe Institute's tolerances for regular steel pipe. The Contractor may request to provide a casing larger in diameter than that specified.*

*Slurry shall be either a polymer or mineral, using sodium bentonite or attapulgite. Slurry shall have a grain size that will remain in suspension with sufficient viscosity and gel characteristics to transport excavated material and shall be capable of maintaining the stability of the drilled shaft excavation to allow proper concrete placement.*

***728.03 Drilled Shaft Concrete Mix Design***

*The mix design for the drilled shaft concrete shall be determined based on the design compressive strength, f'c, and the requirements stated in Appendix X1 of ASTM C 94, as well as the following conditions:*

*(a) The target water/cementitious ratio for the mix design shall not exceed 0.450.*

*(b) The design total cementitious content shall be set such that it is no less than 650 lbs and not more than 800 lbs.*

*(c) Fly ash may be used in combination with portland cement. Fly ash content for a mix design shall not exceed 25% of the total cementitious, by weight. Fly ash shall not be used in conjunction with blended cement or ground granulated blast furnace slag, GGBFS.*

*(d) GGBFS may be used in combination with portland cement. GGBFS content for a mix design shall not exceed 40% of the total cementitious, by weight. GGBFS shall not be used in conjunction with blended cement or fly ash.*

*(e) Silica fume may be used as part of the cementitious content. The silica fume content for the mix design shall not exceed 5% of the total cementitious, by weight. Silica fume may be used in combination with fly ash or GGBFS.*

*(f) The drilled shaft concrete shall be air entrained. The target air content for the mix design shall be set at 6.5% air or 1.755 cu ft/cu yd of concrete.*

*(g) The target fine aggregate content shall be set such that it is no less than 35%, but not more than 50% of the total weight of the aggregate in each cubic yard. Aggregate proportions shall be based on material in the saturated surface dry condition.*

*The air content shall be 6.5% ± 2.0 by volume at the time of acceptance. Air content shall be determined in accordance with 505.*

*Drilled shaft concrete mix shall remain workable until the entire placement operation is complete and any temporary casings have been removed from the excavation. When the dry construction method is used, the concrete shall have a slump of 6 in. to 9 in. When the wet construction method or casing construction method is used, the concrete shall have a slump of 7 in. to 10 in.. The concrete shall maintain a slump within the ranges specified herein until the entire placement operation is complete. One of the following admixtures shall be used to achieve and maintain the required slump:*

*(a) type F admixture,*

*(b) type G admixture,*

*(c) high range water reducing admixture system, or*

*(d) high range water reducing retarding admixture system.*

*A rheology-modifying admixture meeting the requirements of type S chemical admixture in accordance with ASTM C 494 may be used if approved by the Engineer and admixture manufacturer. Chemical admixtures type B, type C, and type E will only be permitted with prior written permission. The concrete shall not be retempered with additional amounts of chemical admixtures type F or type G after the initial mixing has been completed.*

*A concrete mix design, CMD, shall be prepared for the drilled shaft based on the requirements as specified herein and shall be verified by a trial batch. The CMD shall be submitted to the Engineer for verification at least 7 days prior to the trial batch demonstration. The CMD submittal shall include the following:*

*(a) list of all ingredients*
*(b) source of all materials*
*(c) gradation of the aggregates*
*(d) absorption of the aggregates*
*(e) SSD bulk specific gravity of the aggregates*
*(f) specific gravity of pozzolan*
*(g) batch weights*
*(h) names of all admixtures*
*(i) range of admixture dosage rates as recommended by the manufacturer*

***728.04 Trial Batch***

*An American Concrete Institute certified concrete field testing technician, grade 1, hereinafter referred to as the Contractor's certified technician, shall be on site to direct and perform all sampling and testing.*

*A trial batch shall be produced and tested by the Contractor's certified technician and the Department's qualified technician to verify that the CMD meets the concrete mix criteria. The trial batch shall be of sufficient quality to allow the Contractor and the Engineer to perform all required tests from the same batch. Concrete shall be batched, mixed, and delivered in accordance with 702.06, 702.07, and 702.09. The Engineer will test the trial batch and provide the Contractor with the results. Trial batch concrete shall not be used for more than one test, except the concrete used for the unit weight may be used to conduct the air content test. In order for the trial batch concrete to be considered*

*acceptable, the air content will measure at least 6.5%. After mixing, the concrete shall be agitated for a time period to simulate delivery, not to exceed 45 minutes.*

*The Contractor shall cast four 6 in. by 12 in. cylinders for compressive strength determination. Two of the cylinders shall be tested at an age of 7 days and 2 cylinders tested at an age of 28 days. Compressive strength shall be reported as the average of the two cylinders tested at the appropriate age.*

*The Department will cast four 6 in. by 12 in. cylinders. Two of the cylinders will be tested at an age of 7 days and 2 cylinders tested at an age of 28 days. Compressive strength will be reported as the average of the 2 cylinders tested at the appropriate age. Additional cylinders may be cast and tested at another age. Average compressive strength test results by the Department, which achieve the minimum compressive strength requirement at an earlier age, will be considered as validating the compressive strength requirement for the CMD; however, compressive strength at 28 days is still required. The 28-day compressive strength shall meet or exceed the requirements of ASTM C 94, Appendix X1, unless otherwise approved by the Engineer.*

*The Department's test results will be used to validate CMD compliance with the required concrete properties.*

*All molds, facilities, and materials necessary to prepare and initially cure cylinders shall be provided.*

*Gradations will be determined to validate the fine and coarse aggregates used.*

*The Department's qualified technician will measure the concrete properties and verify compliance to the Contractor's results within the following tolerances.*

*CONCRETE PROPERTIES AND ALLOWABLE TOLERANCES BETWEEN RESULTS*

| *Concrete Property* | *Tolerance between results* |
|---|---|
| *Aggregate Correction Factor* | *±0.1% point* |
| *Air Content* | *±0.5% point* |
| *Slump* | *±1.0 in.* |
| *28-day Compressive Strength* | *±8.5%* |
| *Unit Weight* | *±1.9 lb/cu ft* |
| *Water/Cementitious ratio* | *±0.015* |

*All test results not within the tolerance are to be investigated by the Department and the Contractor as to the cause and determine corrective actions required to resolve the discrepancy. The relative yield shall be determined by both the Department and*

REVISION TO SPECIAL PROVISIONS (OLD BUSINESS ITEM)
PROPOSED NEW 728-B-XXX DRILLED SHAFT FOUNDATIONS

*Contractor and compared to the theoretical value for relative yield in the following table based on the measured air content. A relative yield that is more than ±0.005 from the theoretical is not cause for rejection, but will be investigated for cause and possible corrective action.*

*THEORETICAL EFFECT OF AIR CONTENT ON RELATIVE YIELD*
*(@ 6.5% Target Air Content)*

| *Air Content* | *Theoretical Relative Yield* | *Air Content* | *Theoretical Relative Yield* | *Air Content* | *Theoretical Relative Yield* |
|---|---|---|---|---|---|
| *3.0 (fail)* | *0.965* | *5.7* | *0.992* | *8.4 (fail)* | *1.019* |
| *3.1 (fail)* | *0.966* | *5.8* | *0.993* | *8.5 (fail)* | *1.020* |
| *3.2 (fail)* | *0.967* | *5.9* | *0.994* | *8.6 (fail)* | *1.021* |
| *3.3 (fail)* | *0.968* | *6.0* | *0.995* | *8.7 (fail)* | *1.022* |
| *3.4 (fail)* | *0.969* | *6.1* | *0.996* | *8.8 (fail)* | *1.023* |
| *3.5 (fail)* | *0.970* | *6.2* | *0.997* | *8.9 (fail)* | *1.024* |
| *3.6 (fail)* | *0.971* | *6.3* | *0.998* | *9.0 (fail)* | *1.025* |
| *3.7 (fail)* | *0.972* | *6.4* | *0.999* | *9.1 (fail)* | *1.026* |
| *3.8 (fail)* | *0.973* | *6.5* | *1.000* | *9.2 (fail)* | *1.027* |
| *3.9 (fail)* | *0.974* | *6.6* | *1.001* | *9.3 (fail)* | *1.028* |
| *4.0 (fail)* | *0.975* | *6.7* | *1.002* | *9.4 (fail)* | *1.029* |
| *4.1 (fail)* | *0.976* | *6.8* | *1.003* | *9.5 (fail)* | *1.030* |
| *4.2 (fail)* | *0.977* | *6.9* | *1.004* | *9.6 (fail)* | *1.031* |
| *4.3 (fail)* | *0.978* | *7.0* | *1.005* | *9.7 (fail)* | *1.032* |
| *4.4 (fail)* | *0.979* | *7.1* | *1.006* | *9.8 (fail)* | *1.033* |
| *4.5 (fail)* | *0.980* | *7.2* | *1.007* | *9.9 (fail)* | *1.034* |
| *4.6 (fail)* | *0.981* | *7.3* | *1.008* | *10.0 (fail)* | *1.035* |
| *4.7 (fail)* | *0.982* | *7.4* | *1.009* | *10.1 (fail)* | *1.036* |
| *4.8 (fail)* | *0.983* | *7.5* | *1.010* | *10.2 (fail)* | *1.037* |
| *4.9 (fail)* | *0.984* | *7.6* | *1.011* | *10.3 (fail)* | *1.038* |
| *5.0* | *0.985* | *7.7* | *1.012* | *10.4 (fail)* | *1.039* |
| *5.1* | *0.986* | *7.8* | *1.013* | *10.5 (fail)* | *1.040* |
| *5.2* | *0.987* | *7.9* | *1.014* | *10.6 (fail)* | *1.041* |
| *5.3* | *0.988* | *8.0* | *1.015* | *10.7 (fail)* | *1.042* |
| *5.4* | *0.989* | *8.1 (fail)* | *1.016* | *10.8 (fail)* | *1.043* |

| | | | | | |
|---|---|---|---|---|---|
| *5.5* | *0.990* | *8.2 (fail)* | *1.017* | *10.9 (fail)* | *1.044* |
| *5.6* | *0.991* | *8.3 (fail)* | *1.018* | *11.0 (fail)* | *1.045* |

*CMD's, which have had a successful trial batch demonstration for another drilled shaft contract may be submitted for the Engineer's approval. The results from Department and Contractor testing of the concrete properties listed above from the trial batch concrete shall be included in the submittal.*

*If the Engineer approves the use of the submitted CMD which has had a successful trial batch demonstration from another drilled shaft contract, verification of the tolerances shall be made during the first day of production by tests conducted by the Contractor and the Engineer. The results of the tests from the first day of concrete production shall be within the concrete property tolerances listed above.*

*Except for adjustments to compensate for routine aggregate moisture fluctuations, changes in target aggregate SSD batch weights shall be documented and submitted to the Engineer for approval, prior to implementing. A maximum adjustment of ±3 percentage points of fine to total aggregate ratio by volume will be permitted. Changes to the admixture dosages will be permitted.*

*A new CMD shall be prepared and successfully demonstrated by trial batch for any change in material, cementitious content or target water/cementitious ratio.*

## *CONSTRUCTION REQUIREMENTS*

### *728.05 Quality Control Testing*

*The Contractor shall perform all quality control testing including, but not limited to, slurry testing and plastic and hardened concrete testing. The Contractor shall provide copies of all quality control test reports to the Engineer no later than 5 business days after the tests are completed. If the Contractor fails to submit test reports within the timeframe allowed, the Engineer may withhold progress estimates until the reports are provided.*

### *728.06 Control of Temperature*

*When the diameter of the drilled shaft is 5 ft or greater it will be considered mass concrete. The Contractor shall control and manage the maximum temperature, temperature gradients, and thermal stresses within the mass concrete resulting from the thermal conditions present in mass concrete. Temperature control measures may include but are not limited to: limiting the total cementitious materials content, controlling the fresh concrete placement temperature, and careful selection of cementitious materials such as using type II cement, fly ash, or GGBFS.*

*The Contractor shall develop and submit a thermal control plan in accordance with 728.07. It shall be based on models and test results for the specific properties of the*

*mass concrete placement and the ambient temperatures possible during the curing period. The plan shall be prepared by a professional engineer with experience in temperature differential and mass pour concrete. The thermal control plan shall include predictions for the differential temperature from the core to the surface of the drilled shaft. The plan shall work to limit thermal stresses to avoid cracking.*

*In order to maintain the temperature requirements stated in the mix criteria at time of placement, the mix water may be chilled or an appropriate amount of ice may be added to the concrete mix. Addition of ice will be accounted for when measuring the water/cementitous ratio. Remote sensors measuring temperature at hourly intervals shall be used to monitor the concrete. Remote monitoring data shall be collected and provided promptly to the Engineer during the monitoring of curing. Planned action shall be taken as necessary to control maximum core temperature and surface to core temperature differential of mass concrete contained within the drilled shaft. Concrete shall be protected from thermal shock at all times. The core temperature of the drilled shaft concrete shall not exceed 160°F. The maximum temperature differential between the core and surface shall not exceed 36°F. A higher differential may be allowed if the thermal control plan provides justification based on test results from the actual drilled shaft concrete. The Engineer will determine the end period for monitoring, but in no case shall it be less than 28 days.*

***728.07 Submittals***

*A minimum of 45 days prior to the start of drilled shaft construction, the Contractor shall submit a QCP in accordance with ITM 803 detailing the plan for construction of the drilled shafts. The QCP shall at a minimum include the following:*

*(a) The name of the contractor that will perform the drilled shaft construction.*

*(b) A list of equipment to be used including, but not limited to cranes, drills, augers, bailing buckets, final cleaning equipment, de-sanding equipment, slurry pumps, core sampling equipment, tremies, concrete pumps, and temporary casings.*

*(c) A list of proposed materials and suppliers including, but not limited to concrete, reinforcement bars, permanent casings and slurry.*

*(d) A detailed description of the proposed sequence of construction through the project, at each structure and at each bent and pier of each structure.*

*(e) A detailed explanation of methods and procedures for construction including, but not limited to the following:*

1. *The method of construction proposed for each drilled shaft.*
2. *The procedures for ensuring correct horizontal and vertical alignment of each drilled shaft.*

3. *The procedures for removing or excavating through subsurface obstructions, whether natural or man-made.*
4. *The procedures for advancing casing, as applicable.*
5. *The details regarding the lengths, sizes and locations of the temporary casings and details regarding the methods to install and extract the temporary casing as applicable.*
6. *The methods of mixing, circulating and de-sanding slurry. A copy of the slurry manufacturer's recommendations shall be included.*
7. *The names and qualifications of technicians that will perform slurry testing.*
8. *The names and qualifications of the certified technicians.*
9. *The procedures for dewatering and cleaning drilled shaft excavations.*
10. *The methods for placing and supporting reinforcement bars in the correct locations.*
11. *The materials and methods for installing, protecting and grouting crosshole sonic logging testing access tubes.*
12. *The procedures for concrete placement*
13. *The procedures and materials for pressure grouting voids when using permanent casing.*
14. *Detailed procedures for how construction problems will be addressed.*

*(f) If a thermal control plan is required per 728.06, the QCP shall also include, but not be limited to the following:*

1. *Mix design for drilled shaft concrete.*
2. *Thermal modeling to predict concrete temperatures and temperature differences as a function of time. Assumptions for variables used in modeling shall be clearly defined and shall include concrete properties and ambient temperature and if applicable insulation, forms, and curing.*
3. *Methods to limit maximum temperature.*
4. *Methods to control differential temperature.*
5. *Curing methods, if applicable.*
6. *Temperature monitoring.*
7. *Verification of thermal control.*
8. *Removal of formwork and exposure of concrete to ambient temperatures, if applicable.*
9. *Corrective measures.*

*Modeling the maximum temperature rise of the cast-in-place drilled shaft concrete shall be based on the design cementitious content and the range of concrete temperatures at time of placement (i.e. 50°F, 60°F, 70°F & 80°F). Unless established otherwise in the thermal control plan, the estimates will be determined using the following equation:*

$$T_{max} = T_p + [12.8°F \times ((C+SF+GGBFS+0.35FA)/100)]$$

*Where:*

$T_{max}$ *=approximate maximum temperature rise in °F of the cast-in-place concrete*
$T_p$ *= temperature of concrete at time of placement in °F*
*C = cement content in lbs/cu yd of concrete*
*SF = silica fume content in lbs/cu yd of concrete*
*GGBFS = ground granulated blast furnace slag content in lbs/cu yd of concrete*
*FA = fly ash content in lbs/cu yd of concrete*

*Drilled shaft construction shall not begin until the QCP is approved in writing by the Engineer.*

***728.08 Preconstruction Meeting***

*The Contractor shall hold a pre-construction meeting with the Engineer after approval of the QCP and a minimum of 14 days prior to construction. The pre-construction meeting shall include at a minimum representatives of the Contractor, the subcontractor performing the drilled shaft construction, the Engineer, the design consultant, the geotechnical consultant drilled shaft inspector, and the Office of Geotechnical Services.*

***728.09 Equipment***

*Drilling and excavation equipment shall be capable of producing a drilled shaft that is a minimum of 20% of the planned drilled shaft length below the tip elevations shown in the plans. Blasting will not be permitted for drilled shaft excavation unless approved in writing by the Engineer.*

*Drop chutes for concrete placement shall consist of a smooth tube of one piece construction with an attached hopper.*

*Tremies shall consist of a watertight tube of sufficient length, diameter, and wall thickness to discharge concrete at the base of the drilled shaft excavation without bending, crimping or impeding the flow of concrete. The inside diameter of the tremie shall be a minimum of 10 in. The discharge end of the tremie shall be constructed to permit the free radial flow of concrete during placement operations. The inside and outside surfaces of the tremie shall be clean and smooth.*

*Concrete pumps shall be capable of maintaining a continuous flow of concrete from beginning to completion of a drilled shaft pour. Pump lines shall have a minimum 4 in. diameter and shall be constructed with watertight joints.*

***728.10 Construction Methods***

REVISION TO SPECIAL PROVISIONS (OLD BUSINESS ITEM)
PROPOSED NEW 728-B-XXX DRILLED SHAFT FOUNDATIONS

*The Contractor shall use the construction methods specified in the contract for each drilled shaft. If more than one method is specified or no method is specified for a drilled shaft, the Contractor may choose the method suitable for the drilled shaft. Construction methods shall be one of the following:*

***(a) Dry Construction Method***

*The dry construction method shall consist of drilling the excavation, removing accumulated water and loose material from the excavation, and placing concrete and reinforcement in a relatively dry excavation.*

*The dry construction method shall only be used in locations where conditions are such that the rate of groundwater infiltration into the excavation does not exceed 12 in. per hour. The maximum depth of water shall not exceed 2 in. prior to concrete pour. The sides and bottom of the excavation shall remain stable without any caving, sloughing, or swelling, and the full depth of the excavation may be visually inspected prior to placing concrete.*

***(b) Wet Construction Method***

*The wet construction method shall consist of drilling the excavation, cleaning the excavation by muck bucket and air lifting, and placing concrete in a manner to displace water and slurry up and out of the excavation as concrete is placed.*

*The wet construction method shall be used where conditions are not suitable for the dry construction method. To prevent caving, sloughing, or swelling of the excavation during drilling, slurry shall be added to the excavation prior to encountering groundwater.*

***(c) Casing Construction Method***

*The casing construction method shall consist of placing either a temporary or permanent casing in accordance with the following:*

***1. Temporary Casing Method***

*The temporary casing method shall consist of drilling the shaft excavation in accordance with the dry or wet construction method, placing a casing to maintain the excavation, and then withdrawing the casing during placement of the concrete.*

***2. Permanent Casing Method***

*The permanent casing method shall consist of driving, vibrating, or drilling a casing to a specified depth prior to excavation of the drilled shaft. Material inside the casing is then excavated and concrete placed in accordance with the dry or wet construction method.*

***728.11 Construction***

*The Contractor shall maintain a construction log for each drilled shaft. The log shall include the following as a minimum:*

*(a) The drilled shaft number.*
*(b) The method of construction.*
*(c) A description and approximate top and bottom elevation of each soil or rock material encountered during excavation.*
*(d) The rate of groundwater infiltration.*
*(e) The depth of water in the excavation just prior to concrete placement.*
*(f) The type of slurry, as applicable.*
*(g) The results of all slurry testing, as applicable.*
*(h) The methods used to clean and check the excavation prior to concrete placement.*
*(i) The method of concrete placement.*
*(j) The results of all plastic concrete testing.*
*(k) The number of concrete cylinders made for compressive strength testing.*
*(l) Time of completion of excavation cleaning*
*(m) Time of installation of reinforcing steel*
*(n) Time that concrete placement begins and ends*
*(o) The rate of concrete placement and the total time required to place concrete.*
*(p) The method of temporary casing removal, as applicable.*
*(q) A record of the head of concrete before and during removal of temporary casing, as applicable.*
*(r) The total volume of concrete placed versus theoretical volume of concrete required.*
*(s) A description of all equipment and materials used.*
*(t) A record of any problems encountered including possible soil and water inclusion, possible voids, and possible drilled shaft or casing collapse.*

*A drilled shaft excavation shall not be left unfilled overnight unless cased to full depth.*

***(a) Exploratory Cores and Proof Testing***

*The Contractor shall obtain exploratory cores within the footprint of each drilled shaft prior to the start of production drilling. Cores shall be NX-size and shall extend a minimum of 15 ft below the planned tip elevation of the drilled shaft and shall include observing such indicators as speed of drilling under given drill pressure, dropping or clogging of the drill bit and loss of drill water, if used. The Engineer will observe exploratory coring and will inspect cores to determine if the material is suitable for the planned depth and size of drilled shaft. Additional exploratory cores shall be obtained as directed by the Engineer.*

*The Contractor shall take soil samples and rock cores for all drilled shafts to determine the character of the material throughout the entire drilled shaft length and to a depth directly below the complete shaft excavation. The soil samples shall be extracted with a split spoon sampler or undisturbed sample excavation. The test borings and rock*

*cores shall be obtained by an INDOT-Approved Geotechnical Consultant and complete boring logs shall be prepared and submitted by the geotechnical consultant.*

*The Contractor shall take rock cores, approximately 2 in. in diameter, to a minimum of 15 ft. below the tip of the drilled shaft rock sockets or three times the diameter of the rock socket, whichever is greater, or as directed by the Engineer. The rock cores shall be extracted with a core barrel. The core hole shall be grouted upon completion of coring. The rock cores shall be extracted with a core barrel. Rock cores shall be measured, visually identified, and described on the Contractor's field log within 24 hours after the exploration is completed. The Engineer will inspect the cores and determine the final depth of required excavation based on evaluation of the material's suitability.*

***(b) Casing***

*All subsurface casing shall be considered temporary unless specified as permanent casing in the contract.*

*If the Contractor elects to remove a casing and substitute a longer or larger diameter casing through caving soils, the excavation shall be stabilized either with slurry or by backfilling before the new casing is installed.*

*If the dry construction method is used and casing is not placed during excavation, the Contractor shall take appropriate measures to prevent deterioration of the excavation. If the excavation has deteriorated, the Contractor shall over-ream the excavation prior to placement of concrete and reinforcement. Over-reaming shall be by methods approved by the Engineer.*

*If the temporary casing method is used, the casing shall be advanced with the drilling until a nearly impervious ground formation is reached. The casing shall be seated in the formation and excavation shall continue until the required tip elevation is reached. Dependent on the rate of groundwater infiltration, construction shall proceed in accordance with either the dry or wet construction method. The temporary casing shall be withdrawn during placement of the concrete and while the concrete is still in a plastic state. The casing shall be withdrawn at a slow, uniform rate in a direction parallel to the axis of the drilled shaft. The casing shall not be rotated, reinserted, driven, or vibrated during withdrawal unless prior approval is granted by the Engineer. The rate of concrete placement and rate of casing withdrawal shall be such that the concrete displaces all loose materials, water and slurry up and out of the excavation without mixing with or displacing the concrete. At a minimum, a 5 ft head of concrete shall be maintained above either the highest hydrostatic water level or slurry, whichever is higher, as the casing is withdrawn.*

*Temporary casing which becomes bound and cannot be practically removed will constitute a defect in the drilled shaft. The Contractor shall submit a proposed method to*

*remediate the defect to the Engineer for approval. The submittal shall include design drawings and calculations stamped by a professional engineer.*

*When temporary casing is used and the drilled shaft extends above ground or through a body of water, the portion of the drilled shaft above the existing ground or above the bottom of the body of water may be formed with a removable casing. Removable casings may be removed when the following conditions are met:*

1. *The concrete has cured for a minimum of 72 hours.*

2. *The concrete attains a compressive strength of at least 2500 psi, as determined from 6 in. x 12 in. concrete cylinder breaks.*

3. *The drilled shaft concrete is not exposed to moving water for 7 days.*

*If the permanent casing method is used, the casing shall be driven, vibrated, or advanced by drilling to the specified tip elevation. If the casing cannot be driven to the full depth of the excavation, the Contractor may either excavate material within the embedded portion of the casing or drill a pilot hole ahead of the casing until the casing reaches the specified depth. If a pilot hole is drilled, it shall be centered in the drilled shaft and shall be no larger than 1/2 the diameter of the drilled shaft. The Contractor shall not over-ream the excavation to the outside diameter of the casing. Permanent casing shall be continuous between the elevations shown on the plans. Any length of permanent casing installed below the shaft cutoff elevation, shall remain in place. Temporary casing shall not be used instead of, or in addition to, permanent casing. After the permanent casing is placed, all loose materials and water shall be removed. Reinforcement shall be placed and the casing shall be filled with concrete. All voids between the casing and the soil surrounding the casing shall be pressured grouted with cement grout.*

***(c) Slurry***

*When slurry is used during drilled shaft excavation, the Contractor shall perform testing to determine the density, viscosity, and pH of the slurry. A minimum of 4 sets of tests shall be made during the first 8 hours of slurry use. If the first 4 sets of tests indicate consistent, acceptable results, the testing frequency may be decreased to 1 set of tests for every 4 hours of slurry use. Tests shall be performed when the slurry temperature is above 40° F. Test results shall be within the ranges shown below:*

*SLURRY PROPERTIES*

| *Property* | *Test Method* | *Required Range* |
|---|---|---|
| *Density, pcf* | *Density Balance* | *64.3-69.1* |
| *Viscosity, seconds/quart* | *Marsh Cone* | *28-45* |
| *pH* | *pH paper or meter* | *8-11* |

*The Contractor shall perform sand content testing in accordance with the American Petroleum Institute. The sand content shall not exceed 4% by volume at any point in the excavation when slurry is used.*

*Prior to placing concrete in a drilled shaft excavation with slurry, the Contractor shall obtain slurry samples from the base of the excavation and at intervals of 10 ft along the length of the excavation. The samples shall be tested and 2 consecutive samples shall have acceptable results for density, viscosity, pH, and sand content before concrete is placed in the drilled shaft excavation. If test results are not acceptable, the Contractor shall take corrective action to bring the slurry in to compliance with the requirements.*

*The Contractor shall ensure that heavily contaminated slurry suspension, which could impair the free flow of concrete, has not accumulated in the bottom of the shaft.*

*The level of slurry in a drilled shaft excavation shall be maintained at a level sufficient to prevent caving of the hole, but not less than 4 ft above the highest expected piezometric pressure head along the depth of the shaft. In the event of a sudden significant loss of slurry in the excavation, the construction of that drilled shaft shall be stopped until either a method to stop slurry loss or an alternate construction procedure has been approved by the Engineer.*

***728.12 Excavation Inspection***

*The Contractor shall provide all necessary equipment for checking the dimensions, alignment, and cleanliness of the drilled shaft excavation. The dimensions and alignment shall be determined by the Contractor under the direction of the Engineer. Final drilled shaft depths shall be measured with a suitable weighted tape or other approved method after final cleaning.*

*The bottom of the drilled shaft excavation shall be clean such that a minimum of 50% of the base surface of each drilled shaft has less than 1/2 in. of loose material at the time of concrete placement. The maximum depth of loose material at any location on the base surface of the drilled shaft excavation shall not exceed 1.5 in. The Contractor shall remove any loose material adhering to the vertical sides of the bedrock socket. Acceptability of the excavation for cleanliness will be determined by the Engineer by means of visual inspection and sounding for dry excavations and by measuring and sounding with a weighted tape or by other methods deemed appropriate by the Engineer for wet excavations. For dry excavations, the maximum depth of water shall not exceed 2 in. at the time of concrete placement and the rate of groundwater flow into the excavation shall not exceed 12 in. per hour.*

***728.13 Construction Tolerances***

*Drilled shafts shall meet the following construction tolerances:*

*(a) Drilled shafts shall be within 3 in. horizontally of the location shown in the plans.*

*(b) The top of drilled shafts shall be within plus 1 in. and minus 3 in. of the elevation shown in the plans.*

*(c) The alignment of vertical drilled shafts shall not vary from plumb by more than 1/4 in. per ft of depth.*

*(d) The alignment of battered drilled shafts shall not vary by more than 1/2 in. per ft of depth from the specified batter rate.*

*(e) After placement of concrete, the top of reinforcing bars shall be within plus 6 in. and minus 3 in. of the location shown in the plans.*

*(f) Excavation equipment and methods shall be such that the completed drilled shaft will have a planar bottom. The cutting edges of excavation equipment shall be normal to the vertical axis of the drilled shaft within a tolerance of 3/8 in. per ft of diameter.*

***728.14 Reinforcing Bar Cage Construction and Placement***

*Reinforcement shall be fastened and placed in accordance with 703. Approved non-corrosive spacing devices shall be installed to hold the reinforcement at least 3 in. from the sides of the drilled shaft excavation along its entire height and concentrically centered within the drilled shaft. At a minimum, spacers shall be placed within 1 ft of the bottom of the drilled shafts and at intervals not exceeding 10 ft along the height of the drilled shaft. Approved bottom supports shall be installed to hold reinforcement the required dimension above the bottom of the drilled shaft. Concrete shall be placed immediately after placing reinforcement in the drilled shaft excavation. If concrete is not placed immediately after placing reinforcement, the Contractor shall remove the reinforcement to allow the Engineer to verify the integrity of the drilled shaft excavation and to ensure loose material has been removed.*

*Prior to placement of concrete, the Contractor shall determine and record the elevation of the bottom of the drilled shaft excavation and provide a copy of the record to the Engineer.*

***728.15 Concrete Production and Placement***

*The concrete used in the drilled shaft shall be in accordance with 728.03 and 728.04.*

*Concrete placement shall be in accordance with the applicable portions of 702, except as modified herein.*

*Concrete shall not be placed in a drilled shaft excavation without approval from the Engineer. Concrete placement shall be made by 1 continuous pour from the bottom to the top of the drilled shaft. The elapsed time from batching of the first load of concrete to the completion of concrete placement shall not exceed 2 hours. At no time during construction shall the slump loss result in a slump below the minimum specified. The Contractor may submit a request for approval by the Engineer for a longer placement time provided the concrete mix maintains the minimum specified slump requirements*

*over the longer placement time as demonstrated by a trial batch and results of slump loss testing from a trial batch.*

*Concrete shall be placed by means of a chute, tremie or a concrete pump. Placement of concrete by a chute shall only be for the dry construction method in excavations where the maximum depth of water does not exceed 2 in.*

*Concrete placed by chute shall fall directly to the base of the drilled shaft without contacting either the reinforcement or sides of the drilled shaft excavation. The drop chute shall be supported so that the free fall of the concrete measured from the bottom of the chute is no more than 60 ft. If concrete placement causes the drilled shaft excavation to cave or slough, or if the concrete strikes the rebar cage or sidewall, the Contractor shall reduce the height of free fall or reduce the rate of concrete flow into the excavation. If concrete placement cannot be satisfactorily accomplished by chute, the Contractor shall use either a tremie or concrete pump to accomplish the pour.*

*Placement of concrete under water or slurry by tremie shall not begin until the tremie is in place at the base of the drilled shaft. Valves, bottom plates, or plugs shall be used only if concrete discharge can begin within a distance of 1/2 times the diameter of the tremie from the base. Plugs shall either be removed from the drilled shaft excavation or be of a material approved by the Engineer which will not cause a defect in the drilled shaft if left in place. The tremie discharge end shall remain at least 10 ft below the head of the plastic concrete at all times after the first 10 ft of concrete is placed. The flow of concrete shall be continuous and the concrete in the tremie shall be maintained at a positive pressure differential at all times to prevent water or slurry intrusion into the drilled shaft concrete.*

*Placement of concrete under water or slurry by concrete pump shall not begin until the pump discharge opening is in place at the base of the drilled shaft. A plug or similar device shall be used to separate the concrete from the fluid in the drilled shaft excavation until pumping begins. The plug shall either be removed from the drilled shaft excavation or be of a material approved by the Engineer which will not cause a defect in the drilled shaft if left in place.*

*The Contractor shall pump an adequate quantity of grout, mortar, or concrete without coarse aggregate through the pump system and lines ahead of the drilled shaft concrete to lubricate the pumping system. Material used for lubrication shall not be allowed to remain in the drilled shaft, but shall be discharged ahead of the drilled shaft concrete up and out of the drilled shaft excavation. The lubrication process shall not be repeated during the remainder of the pour. The pump shall be operated so that a continuous stream of concrete without air pockets is delivered into the excavation. The discharge opening shall remain at least 10 ft below the head of the plastic concrete at all times after the first 10 ft of concrete is placed. When lifting the pump line during concrete placement, the Contractor may temporarily reduce the line pressure until the opening has been repositioned at a higher level in the excavation. The rate of concrete placement*

*shall be controlled to prevent displacement of the reinforcement. When the concrete reaches the top of the drilled shaft excavation, all laitance shall be removed.*

*If at any time during the concrete pour, the tremie or pump discharge opening is removed from the plastic concrete column and discharges concrete above the rising concrete head, the shaft shall be considered defective. In such case, the Contractor shall remove the reinforcement and concrete, clean the excavation and complete any other remedial actions as directed by the Engineer.*

*Concrete in the drilled shaft shall not be vibrated, except that in dry excavations, the concrete in the top 10 ft of the shaft shall be vibrated.*

*Concrete placement shall continue after the drilled shaft excavation is full and quality concrete is evident at the top of the shaft. Any laitance or contaminated concrete shall be displaced or removed.*

*The Contractor shall maintain a concrete volume as a function of depth chart for all concrete placed under slurry. Minimum depth measurements shall be taken after every load of concrete placed by tremie and after every 3 ft if pumped.*

***728.16 Acceptance***

*The Engineer will perform all quality assurance testing and acceptance testing.*

***(a) Drilled Shaft Concrete***

*Acceptance of drilled shaft concrete will be determined on the basis of tests performed by the Department. Concrete and any necessary labor to conduct sampling shall be furnished as required by the Department. During concrete placement at each drilled shaft, testing for slump, unit weight, relative yield, and air content will be conducted on the first load of the day and once every 30 cu yds. Slump, slump retention, and air content shall be in accordance with 728.03. The relative yield should not exceed 0.010 more than the theoretical value shown in the THEORETICAL EFFECT OF AIR CONTENT ON RELATIVE YIELD table in 728.04, based on the measured air content. Should this occur, the process and material will be reviewed through an increase in testing frequency to check results, establish trends, or validate impact of corrective actions.*

*During the concrete placement at each drilled shaft, 2 cylinders will be cast for compressive strength at a frequency of once every 60 cu yds. If plastic concrete properties of high air content, high slump, or high relative yield indicate a cause for concern, additional pairs of cylinders will be cast for compressive strength. Initial curing of cylinders shall be completed by submerging the cylinders in water saturated with calcium hydroxide at a temperature range of between 60 to 80 °F for no less than 16 hours and no more than 48 hours. Each cylinder will be tested for 28 day compressive strength and the paired values averaged to determine the sample result. Concrete placed*

*in the drilled shafts shall have a 28 day compressive strength that meets or exceeds the compressive strength shown in the plans.*

*If at any time a construction method fails, in the opinion of the Engineer, to produce the desired final results, the Contractor shall stop construction of drilled shafts and submit a proposed remedy and alternate method for approval to the Engineer.*

***(b) Slurry***

*The Contractor shall provide copies of all slurry test reports, signed by the testing technician, to the Engineer. The Contractor shall receive written approval from the Engineer indicating that the slurry is acceptable prior to placing concrete in the drilled shaft.*

***(c) Drilled Shaft***

*Completed drilled shafts will be tested for acceptance by the Engineer using crosshole sonic logging, CSL, and impulse response spectrum, IRS, test methods. The Contractor shall provide all equipment, labor and material required by the Engineer to perform CSL and IRS testing. CSL and IRS testing will be performed no sooner than 5 business days after placement of concrete in the drilled shaft.*

*The Contractor shall provide access for the Engineer to the top of each drilled shaft for CSL and IRS testing. Access shall include a stable work platform for the test operators and equipment close to the head of each shaft, and be large enough to accommodate 2 operators with a standard surveyor's tripod and a small bench or table.*

***1. CSL Testing***

*Unless otherwise specified, the Contractor shall provide and install access tubes for CSL testing in all drilled shafts. The Contractor shall at a minimum provide the following for CSL testing:*

*a. Schedule 40, 1.5 in. I.D. mild steel tubes for each drilled shaft. The bottom of each tube shall be sealed watertight with a threaded end-cap. Any coupling of tubing required to make up the required lengths shall be made using threaded sleeve couplers, sealed watertight. The tubing shall be round and regular in section, with a clean interior surface, free of defects or obstructions that would prevent the passage of a 1 1/4 in. diameter probe through the tube. The exterior surfaces shall be free of dirt, oil, grease, heavy rust scale, or other contaminants which may inhibit formation of a good mechanical bond with the drilled shaft concrete. The use of used or recycled tubing or slightly rusted tubing is acceptable provided that it meets the requirements herein.*

*b. Clean, potable water sufficient to fill the access tubes completely.*

*c. Cement grout sufficient to fill the access tubes on completion of testing.*

*d. Grout mixing equipment and operator.*

*e. Grout pumping equipment and operator. The pump shall have a 1.0 in. tremie pipe capable of reaching the bottom of the access tubes.*

*f. Hosepipe, pump, or other means of placing clean water in the access tubes prior to testing, and for topping off the tubes during testing.*

*The Contractor shall install access tubes for CSL testing as follows:*

*(1) A minimum of 4 tubes or 1 tube per foot of drilled shaft diameter, whichever is greater, shall be installed at approximately equidistant points around the interior of the reinforcement. Tubes shall be installed parallel to each other and securely attached to the reinforcement to prevent excessive movement during handling, installation and placement of concrete. The diameter used when figuring the number of tubes shall be the largest diameter of the shaft and shall be rounded up to the next 1 ft. increment.*

*(2) The bottoms of each tube shall be set a minimum of 3 in. and not more than 6 in. above the bottom of the drilled shaft. Tubes shall not be placed in contact with the bottom of the drilled shaft excavation. The top of each tube shall extend 3 ft to 6 ft above the planned top of the drilled shaft. If the top of the drilled shaft will be below grade or water, tubes shall extend 3 ft to 6 ft above grade or water level, or other reasonable access level if cofferdams or casings are used.*

*(3) Reinforcement shall be handled and installed to prevent kinking or permanent bending of the access tubes or displacement of the tubes from the required position. Access tubes shall be parallel, undamaged, and securely fixed at the time of concrete placement.*

*(4) Prior to placing concrete, the Contractor shall determine and record the bottom elevation of at least 1 of the access tubes and provide the record to the Engineer.*

*(5) Prior to placing concrete, access tubes shall be completely filled with potable water and the top of the tubes sealed with*

*watertight fittings. Anti-freeze shall be added to the water in cold weather to prevent freezing.*

*(6) Upon acceptance of the drilled shaft by the Engineer, the Contractor shall remove the water from the CSL access tubes and completely fill the tubes with cement grout.*

***2. IRS Testing***

*The Contractor shall prepare a minimum of 2 areas on the top of each completed drilled shaft for IRS testing. The areas shall be prepared using chipping hammers or other hand tools not weighing more than 15 lb. Each prepared area shall be a minimum of 3 in. in diameter, shall be within ± 1 in. of the level of surrounding concrete, shall be clean, sound, level, and free of standing water and all foreign or loose materials. Chipping hammers shall not be heavier than 15 lb. At least 1 area shall be in the center of the drilled shaft and at least 1 area shall be a minimum of 18 in. from the center of the drilled shaft, but shall not be outside of the reinforcement of the drilled shaft.*

*The Engineer will make a preliminary interpretation of the IRS test results on site. If anomalous responses are recorded, or the data indicates a low modulus or contaminated concrete near the top of the drilled shaft, the Contractor shall prepare a new test area near the perimeter of the shaft, at a minimum of 60° rotation from the first test location.*

*The Engineer will provide copies of all CSL and IRS test results to the Contractor.*

*The Engineer will evaluate the results of CSL and IRS testing and notify the Contractor in writing if the drilled shaft is accepted or rejected.*

*If a drilled shaft is rejected, the Engineer may require excavation or coring in order to allow for further assessment of the drilled shaft. If coring is required, the Contractor shall obtain full depth cores from the drilled shaft at locations determined by the Engineer. An accurate log of the coring shall be kept. The cores and coring log shall be submitted to the Engineer for testing and inspection. The Contractor may provide calculations or other test results to the Engineer to support the acceptability of the drilled shaft.*

*The Engineer will evaluate cores and any additional information provided and will notify the Contractor in writing of the final determination of whether the drilled shaft is accepted or rejected. If a drilled shaft is rejected, the Contractor shall submit a plan to the Engineer for approval to either repair or replace the defective drilled shaft. The Contractor shall not continue construction on a drilled shaft until authorized in writing by the Engineer.*

***728.17 Method of Measurement***

REVISION TO SPECIAL PROVISIONS (OLD BUSINESS ITEM)

PROPOSED NEW 728-B-XXX DRILLED SHAFT FOUNDATIONS

*Drilled shafts will be measured by the linear foot for the diameter of drilled shaft specified. The length of drilled shaft will be the difference between the top of drilled shaft elevation and the actual tip elevation of the drilled shaft.*

*Exploratory cores for drilled shafts will be measured by the linear foot of core.*

*Permanent casing will be measured by the linear foot for the outside diameter of casing placed.*

***728.18 Basis of Payment***

*Drilled shafts will be paid for at the contract unit price per linear foot of the diameter of drilled shaft specified.*

*Exploratory cores for drilled shafts will be paid for at the contract unit price per linear foot.*

*Permanent casing for drilled shafts will be paid for at the contract unit price for the outside diameter placed.*

*Payment will be made under:*

| ***Pay Item*** | ***Pay Unit Symbol*** |
|---|---|
| *Drilled Shaft,_____ diameter* | *LFT* |
| *Drilled Shaft, Exploratory Core* | *LFT* |
| *Drilled Shaft, Permanent Casing* | *LFT* |

*All costs required for the construction of drilled shafts, including, but not limited to labor, equipment, and materials, excavation, cleaning and dewatering, temporary casing, reinforcement, trial batches, thermal control plan and its implementation, all required reports, quality control plans and logs, and all other incidentals shall be included in the cost of the drilled shaft.*

*All equipment, labor, materials, and costs for the testing of the drilled shaft and quality control testing and reports shall be included in the cost of the drilled shaft.*

*Rejected drilled shafts shall be repaired or replaced, as approved by the Engineer, with no additional payment.*

COMMENTS AND ACTION (OLD BUSINESS ITEM)

728-B-XXX DRILLED SHAFT FOUNDATIONS

DISCUSSION: This item was introduced by Mr. Walker who turned it over to Mr. Reilman who presented the proposed revisions to this item. There was more discussion by Mr. Shewmaker of Illini Drilled Shaft Foundations, Inc. concerning temperature requirements prior to placing the concrete. Mr. Reilman explained the various issues under consideration which can attribute to the increased heat of hydration resulting from the mass-pours with some drilled shafts. Further discussion ensued from industry and Ms. Belew relating to temperature requirements.
Further discussion ensued on the diameters of the drilled shafts. At what diameter does it become a problem? It appears the issue arises when the diameter is 5 ft or greater. Mr. Reilman pointed out that the problem is when the concrete cracks, and excessive heats of hydration contributes to the cracks which allows groundwater to get in which causes further problems, therefore the 70 degree temperature requirement is critical.
Mr. Miller suggested that more research is in order. Mr. Struewing of Cardin ATC asked if permanent casings would eliminate the need for the temperature requirement. Mr. Reilman responded that it would not.

Mr. Miller suggested that we need to know the cost impacts before we approve a particular method. Ms. Belew commented that we need this resolved as quickly as possible since there are going to be more drilled shafts.

After much more discussion on controlling the temperatures, Mr. Miller suggested withdrawing this item pending further review.
Mr. Walker withdrew this item.



| | |
|---|---|
| Motion: Mr. Walker<br>Second:<br>Ayes:<br>Nays: | Action:<br>_____ Passed as Submitted<br>_____ Passed as Revised<br>__X__ Withdrawn |
| Standard Specifications Sections affected:<br><br>SECTION 728 (Blank)<br><br>Recurring Special Provision affected:<br><br>NONE<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | _____ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>_____ Create RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>_____ Revise RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? _____ |

Mr. Pankow
Date: 11/16/12

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: INDOT has not consistently been receiving warranty bonds on 411-microsurfacing and 414-ultrathin bonded wearing course contracts.

PROPOSED SOLUTION: Revise the provisions to indicate when and to whom the warranty bond should be submitted.

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS: 411-R-432 & 414-R-590

PAY ITEMS AFFECTED: None

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 232-5502

Date: October 18, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: None. This proposal was discussed with Bob Cales, Jim Keefer, Mark Miller, Todd Shields, & Bill Tompkins prior to submission.

REVISION TO SPECIAL PROVISIONS

411-R-432 WARRANTED MICRO-SURFACING

(Only an affected section of the RSP 411-R-432 rev. 08-24-12 shown with proposed changes as: deletion - with strikethroughs and insertions - highlighted in gray)

***411.09 Warranty***

*A warranty bond is to insure completion of required warranty work, including payments for all labor, materials, equipment, and incidentals necessary or convenient to the successful completion of the project and the carrying out of the duties and obligations imposed by the contract used to remediate any warranted distresses.*

*The Contractor shall ~~provide~~furnish to the Engineer a warranty bond at the preconstruction conference or prior to beginning any work on the contract. The warranty bond shall be equal to 100% of the contract total for the warranted micro-surfacing pay items, and shall be properly executed by a surety satisfactory to the Department, and shall be payable to the State of Indiana. The warranty bond shall be in effect for 3 years from the date of substantial completion. ~~The warranty bond shall be properly executed by a surety satisfactory to the Department and be payable to the State of Indiana and submitted with the Contractor's bid.~~*

*Upon the final acceptance of the project, the contractual obligations of the Contractor are satisfied as long as the micro-surfacing continues to meet or exceed the warranted values as defined herein.*

*All warranty work shall be accomplished in accordance with 411.11. At the end of the warranty period, the Contractor will be released from further warranty work or responsibility, provided all previous warranty work has been satisfactorily completed and approved by the Department.*

REVISION TO SPECIAL PROVISIONS

414-R-590 ULTRATHIN BONDED WEARING COURSE, WARRANTED

(Only an affected section of the RSP 414-R-590 rev. 03-05-12 shown with proposed changes as: deletion - with strikethroughs and insertions - highlighted in gray)

***414.14 Warranty***

*A warranty bond is to insure completion of required warranty work, including payments for all labor, materials, equipment, and incidentals necessary or convenient to the successful completion of the project and the carrying out of the duties and obligations imposed by the contract used to remediate any warranted distresses.*

*The Contractor shall ~~provide~~furnish to the Engineer a warranty bond at the preconstruction conference or prior to beginning any work on the contract. The warranty bond shall be equal to 100% of the contract total for the warranted UBWC pay items, and shall be properly executed by a surety satisfactory to the Department, and shall be payable to the State of Indiana. The warranty bond shall be in effect for 3 years from the date of substantial completion. ~~The warranty bond shall be properly executed by a surety satisfactory to the Department and be payable to the State of Indiana and submitted with the Contractor's bid.~~*

*Upon the final acceptance of the project, the contractual obligations of the Contractor are satisfied as long as the UBWC continues to meet or exceed the warranted values as defined herein.*

*All warranty work shall be accomplished in accordance with 414.16. At the end of the warranty period, the Contractor will be released from further warranty work or responsibility, provided all previous warranty work has been satisfactorily completed and approved by the Department.*

COMMENTS AND ACTION

411-R-432 WARRANTED MICRO-SURFACING (411.09 WARRANTY)
414-R-590 ULTRATHIN BONDED WEARING COURSE, WARRANTED (414.14 WARRANTY)

DISCUSSION: This item was introduced and presented by Mr. Reilman who stated that we want and require a warranty bond for these two treatments. Mr. Reilman and Mr. Keefer explained the need for clarification so that our field personnel are aware of the bond, and also so that only the successful bidder, the Contractor, will be required to supply the warranty bond.

There were no question or discussion and this motion passed as submitted.

Note: The originally approved effective date for these RSPs as of 02-01-2013 was changed to 03-01-2013 due to pending clarification on the test method for PG 70-22 (RSP 414-R-590).



| | |
|---|---|
| Motion: Mr. Reilman<br>Second: Mr. Keefer<br>Ayes: 8<br>Nays: 0 | Action:<br>__X__ Passed as Submitted<br>_____ Passed as Revised<br>_____ Withdrawn |
| Standard Specifications Sections affected:<br><br>SECTION 411 (BLANK)<br>and SECTION 414 (BLANK)<br><br>Recurring Special Provision affected:<br><br>411-R-432 WARRANTED MICRO-SURFACING<br>414-R-590 ULTRATHIN BONDED WEARING COURSE, WARRANTED<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>_____ Create RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>__X__ Revise RSP (No. 411-R-432;<br>414-R-590)<br>Effective March 01, 2013 Letting<br>RSP Sunset Date: Sept. 01, 2013<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? YES |

Mr. Pankow
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO SPECIAL PROVISIONS (2014 SS EDITION)

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: RSPs 411-R-432 Warranted Micro-surfacing and 414-R-590 Ultrathin Bonded Wearing Course, Warranted have been approved by the Standards Committee to be incorporated into 2014 Standard Specifications.
The cost of closure periods for remedial work needs to stay on a Menu and Basis for Use as separate fill-in provisions.

PROPOSED SOLUTION: Revise these RSPs by removing the portions that are not going into 2014 SS. The fill-in part will remain to establish the cost of the closure periods to be effective for lettings on or after September 01, 2013 (2014 Edition of the Standard Specifications).

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS: 411-R-432 & 414-R-590

PAY ITEMS AFFECTED: None

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 232-5502

Date: October 18, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: None.

REVISION TO SPECIAL PROVISIONS (2014 SS EDITION)

411-X-XXX COST OF CLOSURE PERIODS FOR MICRO-SURFACING REMEDIAL WORK

(Only an affected section of the current RSP 411-R-432 rev. 08-24-12 shown with proposed changes as: deletion - with strikethrough and insertions - highlighted in gray.
See Approved Minutes from November 16, 2011, item 04.)

***411.11 Warranty Work***

*Elective work is performed by the Contractor at its discretion to meet the performance requirements of warranted micro-surfacing prior to direction from the Department for the Contractor to perform remedial work.*

*Remedial work is performed as a result of pavement distress surveys performed by the Department.*

*During the warranty period, elective work and remedial work shall be performed at no cost to the Department. Elective work shall be at the Contractor's option. The scope of all elective work or remedial work to be performed as well as materials to be used shall be proposed by the Contractor and shall be subject to approval by the Department. Prior to proceeding with any warranty work or monitoring, all necessary permits shall be obtained from the Department.*

*Elective work during the warranty period will not be assessed a lane closure fee. For remedial work, costs for closure periods will be ~~applied using the following closure period rates:~~as shown in the contract.*

~~*From _____ to _____: .....$_____/lane/hour*~~
~~*From _____ to _____: .....$_____/lane/hour*~~

*During the warranty period, the Contractor may monitor the warranted micro-surfacing using non-destructive procedures.*

*Coring, milling or other destructive procedures may not be performed by the Contractor, without prior consent of the Department. The Contractor will not be responsible for damages to the pavement as a result of coring, milling or other destructive procedures conducted by the Department.*

*The Contractor has the first option to perform the remedial work. If the problem requires immediate attention, as determined by the Engineer, for safety of the traveling public and the Contractor cannot perform the remedial work within 24 h of notification, the Department will perform the remedial work. The Contractor shall be responsible for all costs incurred by the Department for remedial work performed by the Department. Remedial work performed by the Department will not alter the requirements, responsibilities, or obligations of the warranty.*

REVISION TO SPECIAL PROVISIONS (2014 SS EDITION)

411-X-XXX COST OF CLOSURE PERIODS FOR MICRO-SURFACING REMEDIAL WORK

411-R-XXX COST OF CLOSURE PERIODS FOR MICRO-SURFACING REMEDIAL WORK

*(Adopted xx-xx-xx)*

The Standard Specifications are revised as follows:

SECTION 411, AFTER LINE (tbd), INSERT AS FOLLOWS:

*The costs of closure periods for remedial work will be assessed using the following closure periods rates:*

*From _____ to_____: .....$_____/lane/hour*
*From _____ to _____: .....$_____/lane/hour*

REVISION TO SPECIAL PROVISIONS (2014 SS EDITION)

414-X-XXX COST OF CLOSURE PERIODS FOR UBWC REMEDIAL WORK

(Only an affected section of the RSP 414-R-590 rev. 03-05-12 shown with proposed changes as: deletion - with strikethrough and insertions - highlighted in gray. See Approved Minutes from November 11, 2011, item 07.)

***414.16 Warranty Work***

*Elective work is performed by the Contractor at its discretion to meet the performance requirements of warranted UBWC prior to direction from the Department for the Contractor to perform remedial work.*

*Remedial work is performed as a result of pavement distress surveys performed by the Department.*

*During the warranty period, elective work and remedial work shall be performed at no cost to the Department. Elective work shall be at the Contractor's option. The scope of all elective work or remedial work to be performed as well as materials to be used shall be proposed by the Contractor and shall be subject to approval by the Department. Prior to proceeding with any warranty work or monitoring, all necessary permits shall be obtained from the Department.*

*Elective work during the warranty period will not be assessed a lane closure fee. For remedial work, costs for closure periods will be ~~applied using the following closure period rates:~~as shown in the contract.*

~~*From _____ to _____: .....$_____/lane/hour*~~
~~*From _____ to _____: .....$_____/lane/hour*~~

*During the warranty period, the Contractor may monitor the warranted UBWC using non-destructive procedures.*

*Coring, milling or other destructive procedures may not be performed by the Contractor, without prior consent of the Department. The Contractor will not be responsible for damages to the pavement as a result of coring, milling or other destructive procedures conducted by the Department.*

*The Contractor has the first option to perform the remedial work. If the problem requires immediate attention, as determined by the Engineer, for safety of the traveling public and the Contractor cannot perform the remedial work within 24 h of notification, the Department will perform the remedial work. The Contractor shall be responsible for all costs incurred by the Department for remedial work performed by the Department. Remedial work performed by the Department will not alter the requirements, responsibilities, or obligations of the warranty.*

REVISION TO SPECIAL PROVISIONS (2014 SS EDITION)

414-X-XXX COST OF CLOSURE PERIODS FOR UBWC REMEDIAL WORK

414-R-XXX COST OF CLOSURE PERIODS FOR UBWC REMEDIAL WORK

*(Adopted xx-xx-xx)*

The Standard Specifications are revised as follows:

SECTION 414, AFTER LINE (tbd), INSERT AS FOLLOWS:

*The costs of closure periods for remedial work will be assessed using the following closure periods rates:*

*From _____ to_____: .....$_____/lane/hour*
*From _____ to _____: .....$_____/lane/hour*

COMMENTS AND ACTION

411-X-XXX COST OF CLOSURE PERIODS FOR MICRO-SURFACING REMEDIAL WORK
414-X-XXX COST OF CLOSURE PERIODS FOR UBWC REMEDIAL WORK

DISCUSSION: This item was introduced and presented by Mr. Reilman who explained that we needed to create two fill-in RSP's to be able to have the provisions for closure periods for each of the two pavement preservation surface treatments shown above.

Mr. Prather asked if we could just set a cost per lane mile, and the response was that it would be difficult to do and may change per project. It was then agreed to leave the proposed language as-is.

There were no further questions or discussion, and this proposal passed as submitted.



| | |
|---|---|
| Motion: Mr. Reilman<br>Second: Mr. Boruff<br>Ayes: 8<br>Nays: 0 | Action:<br>__X__ Passed as Submitted<br>_____ Passed as Revised<br>_____ Withdrawn |
| Standard Specifications Sections affected:<br><br>SECTION 411 (BLANK)<br>and SECTION 414 (BLANK)<br><br>Recurring Special Provision affected:<br><br>411-R-432 WARRANTED MICRO-SURFACING<br>414-R-590 ULTRATHIN BONDED WEARING COURSE, WARRANTED<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>__X__ Create RSP (No. 411-R-TBD;<br>414-R-TBD)<br>Effective Sept. 01, 2013 Letting<br>RSP Sunset Date: see proposal sheet<br><br>_____ Revise RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? YES |

Mr. Pankow
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The existing specification regarding location and alignment tolerance for piling is causing confusion.

PROPOSED SOLUTION: Revise the specification to remove the confusion.

APPLICABLE STANDARD SPECIFICATIONS: 701.09

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

PAY ITEMS AFFECTED: None

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 232-5502

Date: October 18, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: None.

REVISION TO STANDARD SPECIFICATIONS

SECTION 701 – DRIVEN PILING
701.09(b) LOCATION AND ALIGNMENT TOLERANCE

The Standard Specifications are revised as follows:

SECTION 701, BEGIN LINE 699, DELETE AS FOLLOWS:

**(b) Location and Alignment Tolerance**

A maximum deviation of 1 1/2 in. in any direction from the plan position will be permissible in pile trestle bents and exposed pile bents. A maximum deviation of 6 in. in any direction will be permitted for a foundation pile in footings for piers or abutments. The tendency of concrete or steel piles to twist or rotate shall be prevented and corrected. Piles to be swaybraced shall be aligned as necessary so that the swaybracing may be properly welded to the piles by a welder qualified in accordance with 711.32. No pile shall be closer than 4 in. from an edge of the pile cap. Pulling *or pushing* laterally on installed piles to correct misalignment, or splicing a properly aligned section on a misaligned section shall not be done ~~unless approved by the Engineer~~. The pile head at cutoff elevation shall be within 2 in. of plan elevation for bent caps supported by piles.

Piles driven at integral end bents shall be installed so that the axial alignment of the top 10 ft of the pile is within 2% of the specified alignment.

Battered piles shall be installed so that the alignment of the top 10 ft of the pile does not vary by more than 3% from the batter rate shown in the plans.

If the location or alignment tolerances are exceeded, the extent of overloading shall be investigated. If the Engineer determines that corrective measures are necessary, such corrective measures shall be designed and constructed by the Contractor. Proposed corrective measures will be subject to approval by the Engineer.

COMMENTS AND ACTION

701.09(b) LOCATION AND ALIGNMENT TOLERANCE

DISCUSSION: This item was introduced and presented by Mr. Reilman who stated the objectives as illustrated in the proposal page, and as shown above.

Mr. Reilman explained that the adjustments can be made while the pile is being driven, but not after, in the best interest in the structure.

At Mr. Keefer's suggestion, the words *"or pushing"* were added to further clarify the intent of this revision.

There were no further questions or discussion and this item passed as revised.



| | |
|---|---|
| Motion: Mr. Reilman<br>Second: Mr. Keefer<br>Ayes: 8<br>Nays: 0 | Action:<br>____ Passed as Submitted<br>__X__ Passed as Revised<br>____ Withdrawn |
| Standard Specifications Sections affected:<br><br>701.09(b) pg 476.<br><br>Recurring Special Provision affected:<br><br>NONE<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>____ Revise Pay Items List<br><br>__X__ Create RSP (No.701-B-202)<br>Effective March 01, 2013 Letting<br>RSP Sunset Date: Sept. 01, 2013<br><br>____ Revise RSP (No.____)<br>Effective ____ Letting<br>RSP Sunset Date: ____<br><br>Standard Drawing Effective ____<br>____ Create RPD (No. ____)<br>Effective ____ Letting<br>____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By ____ Addition or ____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By ____ Addition or ____ Revision<br><br>Received FHWA Approval? YES |

Mr. Walker
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Approval of Profile Wall PVC Pipe is currently by ITM 806, Procedure A. With the development of an AASHTO NTPEP Audit Program for Profile Wall PVC Pipe, the Office of Materials Management would like to adopt this program for PVC as has already been done for Corrugated HDPE Pipe.

PROPOSED SOLUTION: The specification change involves changing the Manufacturer Requirements for Profile Wall PVC Pipe in sections 907.16 and 907.22 from ITM 806, Procedure A to ITM 806, Procedure O.

APPLICABLE STANDARD SPECIFICATIONS: 907.16, 907.22

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

Submitted By: Ron Walker

Title: State Materials Engineer

Organization: INDOT Office of Materials Management

Phone Number: 317-610-7251 x203, x204

Date: 11/1/2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: The Pipe Committee has approved the adoption of the NTPEP Audit Program and the applicable changes to ITM 806 and 907.16 and 907.22. The ITM Committee has made editorial changes to allow a broader scope of materials to utilize ITM 806, Procedure O.

REVISION TO STANDARD SPECIFICATIONS

SECTION 907 – CONCRETE, CLAY, AND PLASTIC DRAINAGE COMPONENTS
907.16 THERMOPLASTIC PIPE REQUIREMENTS
907.22 PROFILE WALL POLYVINYL CHLORIDE PIPE

The Standard Specifications are revised as follows:

SECTION 907, BEGIN LINE 236, DELETE AND INSERT AS FOLLOWS:

**907.16 Thermoplastic Pipe Requirements**

A list of approved thermoplastic pipe and liner pipe will be maintained by the Department. The list will specify the manufacturer and thermoplastic pipe designation. All of these materials shall comply with the applicable AASHTO or ASTM requirements listed in the following table and will only be accepted from qualified manufacturers. The manufacturer is defined as the plant which produces the thermoplastic pipe. The manufacturer shall become qualified by establishing a history of satisfactory quality control of these materials as evidenced by the test results performed by the manufacturer's testing laboratory.

| SUMMARY OF THERMOPLASTIC PIPE SPECIFICATION REQUIREMENTS | | | | |
|---|---|---|---|---|
| Pipe Material | Standard Specifications | AASHTO | ASTM | Manufacturer Requirements |
| Corrugated Polyethylene Drainage Tubing | 907.17 | M 252 | | ITM 806, Procedure ~~A~~*O* |
| Perforated Polyvinyl Chloride Semicircular Pipe | 907.18 | | D 3034 | ITM 806, Procedure A |
| Corrugated Polyethylene Pipe | 907.19 | M 294 | | ITM 806, Procedure O |
| Ribbed Polyethylene Pipe | 907.20 | | F 894 | ITM 806, Procedure A |
| Smooth Wall Polyethylene Pipe | 907.21 | | F 714 | ITM 806, Procedure A |
| Profile Wall Polyvinyl Chloride Pipe | 907.22 | M 304 | F 949 | ITM 806, Procedure ~~A~~*O* |
| Smooth Wall Polyvinyl Chloride Pipe | 907.23 | M 278 | F 679 | ITM 806, Procedure A |
| Type PSM Polyvinyl Chloride Pipe and Fittings | 907.24(a) | | D 3034 | ITM 806, Procedure A |
| Schedule 40 Polyvinyl Chloride Pipe | 907.24(b) | | D 1785 | 916, Type C Cert. |

**907.17 Corrugated Polyethylene Drainage Tubing**

Tubing and fittings shall be in accordance with AASHTO M 252. Perforations shall be required for tubing used as a longitudinal underdrain. Qualification requirements for the manufacturers shall be in accordance with ITM 806, Procedure ~~A~~*O*.

SECTION 907, BEGIN LINE 285, DELETE AND INSERT AS FOLLOWS:

**907.22 Profile Wall Polyvinyl Chloride Pipe**

REVISION TO STANDARD SPECIFICATIONS

SECTION 907 – CONCRETE, CLAY, AND PLASTIC DRAINAGE COMPONENTS
907.16 THERMOPLASTIC PIPE REQUIREMENTS
907.22 PROFILE WALL POLYVINYL CHLORIDE PIPE

Pipe and fittings shall be in accordance with AASHTO M 304 or ASTM F 949. Perforations shall be required when used as a longitudinal underdrain or end bent drain pipe. Qualification requirements for the manufacturers shall be in accordance with ITM 806, Procedure ~~A~~*O*.

COMMENTS AND ACTION

907.16 THERMOPLASTIC PIPE REQUIREMENTS
907.22 PROFILE WALL POLYVINYL CHLORIDE PIPE

DISCUSSION: This item was introduced and presented by Mr. Walker, who explained that the proposed revisions are to meet ITM requirements. Mr. Reilman also presented further revisions as shown.

The new revisions (as shown in these minutes) were added and were agreed upon by the committee and this item passed as revised.



| | |
|---|---|
| Motion: Mr. Walker<br>Second: Mr. Boruff<br>Ayes: 8<br>Nays: 0 | Action:<br>_____ Passed as Submitted<br>__X__ Passed as Revised<br>_____ Withdrawn |
| Standard Specifications Sections affected:<br><br>907.16 pg 846; 907.22 pg 847.<br><br>Recurring Special Provision affected:<br><br>NONE<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>__X__ Create RSP (No.907-R-606)<br>Effective Feb. 01, 2013 Letting<br>RSP Sunset Date: Sept. 01, 2013<br><br>_____ Revise RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? YES |

Mr. Walker
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Section 923.01 needs to be updated because the standards are no longer consistent with ASTM specifications and acceptance procedures for the Temporary Pavement Marking Tape, Type I will now be accepted using NTPEP testing.

PROPOSED SOLUTION: Revise 923.01 to reference ASTM D 4592 and include Procedure H of ITM 806 for the acceptance of the manufacturer

APPLICABLE STANDARD SPECIFICATIONS: 923.01

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: 11-2-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? ITM Committee

REVISION TO STANDARD SPECIFICATIONS

SECTION 923 – TEMPORARY TRAFFIC CONTROL DEVICES
923.01 TEMPORARY PAVEMENT MARKING TAPE

The Standard Specifications are revised as follows:

SECTION 923, BEGIN LINE 3, DELETE AND INSERT AS FOLLOWS:

**923.01 Temporary Pavement Marking Tape**

Temporary pavement marking tape shall be furnished in 2 colors and 2 types. It shall consist of a white or yellow reflecting film on a conformable backing which is a minimum of 4 in. ~~(100 mm)~~ wide, and is designed for marking either asphalt or concrete pavements. *The temporary pavement marking tape shall be in accordance with ASTM D 4592.*

~~The white or reflective film on the tape shall be in accordance with highway colors. The tape shall have an average thickness, as determined by 5 micrometer readings, of no less than 20 mils (0.50 mm). The type I reflective film shall have glass beads uniformly distributed throughout the reflective film. Type I and type II reflective film shall have a reflective layer of glass beads bonded to the surface.~~

~~The tape shall be supplied in rolls ready for application and have a precoated, pressure sensitive adhesive on the backing which shall not require activation procedures. There shall be no more than 3 splices per 50 yds (46 m) of length. It shall be shipped in standard commercial containers so constructed as to ensure acceptance by the carrier and prevent damage during shipment and storage. It shall be capable of being stored at temperatures up to 100°F (38°C) for periods of 1 year without deterioration.~~

~~When the tape is applied in accordance with the manufacturer's recommended procedures, it shall be weather and traffic resistant and show no appreciable fading, lifting, or shrinkage during the useful life of the line. The material shall be good appearance, free from cracks, and edges shall be true, straight, and unbroken. The material shall be capable of performing satisfactory for a minimum of 1 year.~~

Type I tape shall be selected from the Department's list of approved Temporary Pavement Marking Tape, Type I. Temporary pavement marking tape type I will be placed and maintained on the Department's approved list in accordance with ITM 806, *Procedure H.*

Type I tape furnished under this specification shall be covered by a type C certification in accordance with 916.

~~The minimum reflective intensity values expressed as 0.12 Candlepower/sq ft/foot candle (0.12 Candela/m$^2$/lux) when tested in accordance with ASTM D 4061 shall be in accordance with the following table:~~

~~**SPECIFIC LUMINANCE USING ENTRANCE ANGLE 86 DEGREE**~~

REVISION TO STANDARD SPECIFICATIONS

SECTION 923 – TEMPORARY TRAFFIC CONTROL DEVICES

923.01 TEMPORARY PAVEMENT MARKING TAPE

| ~~Observation Angle~~ | ~~White~~ | | ~~Yellow~~ | |
|---|---|---|---|---|
| | ~~0.2°~~ | ~~0.5°~~ | ~~0.2°~~ | ~~0.5°~~ |
| ~~Specific Luminance, Type I~~ | ~~1770~~ | ~~1270~~ | ~~1310~~ | ~~820~~ |
| ~~Specific Luminance, Type II~~ | ~~1000~~ | ~~760~~ | ~~820~~ | ~~510~~ |

COMMENTS AND ACTION

923.01 TEMPORARY PAVEMENT MARKING TAPE

DISCUSSION: Mr. Walker introduced this item and stated that section 923 needs to be updated in order to meet ASTM specifications. The crossed out items are due that language already being included in the ASTM. AASHTO requirements are currently being revised, but until that happens, the recommendation is to update our specs to meet ASTM.



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|---|---|
| Motion: Mr. Walker<br>Second: Mr. Boruff<br>Ayes: 8<br>Nays: 0 | Action:<br>__X__ Passed as Submitted<br>_____ Passed as Revised<br>_____ Withdrawn |
| Standard Specifications Sections affected:<br><br>923.01 pg 1020 and 1021.<br><br>Recurring Special Provision affected:<br><br>NONE<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>__X__ Create RSP (No.923-R-607)<br>Effective Feb. 01, 2013 Letting<br>RSP Sunset Date: Sept. 01, 2013<br><br>_____ Revise RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? YES |

Mr. Walker
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Specification requirements for dowel bars need to be revised to be in compliance with the MEPDG guidelines for this material. Section 910.01(b)10 should require grade 40 or higher dowel bars.

PROPOSED SOLUTION: Revise 910.01(b)10 to require grade 40 or higher dowel bars

APPLICABLE STANDARD SPECIFICATIONS: 910.01(b)10

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

Submitted By: Ron Walker

Title: Materials Services Engineer, through State Materials Engineer

Organization: INDOT Office of Materials Management

Phone Number: 317-610-7251 x203, x204

Date: 11-1-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT: None

REVISION TO STANDARD SPECIFICATIONS

SECTION 910 - METAL MATERIALS
910.01(b)10 DOWEL BARS

The Standard Specifications are revised as follows:

SECTION 910, BEGIN LINE 145, DELETE AND INSERT AS FOLLOWS:

**10. Dowel Bars**

Dowel bars shall be ~~in accordance with AASHTO M 254 and the metal core in accordance with AASHTO M 255, grade 60 (420)~~ *plain billet steel in accordance with ASTM A 615, grade 40 or higher, except that the bend test and elongation requirements will not apply*. The dowel bar area and weight ~~(mass)~~ for the nominal bar diameter shall be as follows.

| Nominal Bar Diameter, in. ~~(mm)~~ | Cross Sectional Area, sq in. ~~(mm2)~~ | Weight ~~(Mass)~~ lb/ft ~~(kg/m)~~ |
|---|---|---|
| 1 ~~(25)~~ | 0.79 ~~(510)~~ | 2.670 ~~(3.973)~~ |
| 1 1/~~4~~ ~~(32)~~ | 1.23 ~~(794)~~ | 4.172 ~~(6.209)~~ |
| ~~1 5/16 (33)~~ | ~~1.35 (871)~~ | ~~4.600 (6.846)~~ |
| 1 1/2 ~~(38)~~ | 1.77 ~~(1142)~~ | 6.008 ~~(8.941)~~ |

Dowel bars shall be coated with an epoxy coating material selected from the list of approved Epoxy Coating for Steel. The coating thickness after cure shall be a minimum of 7 mils ~~(175µm)~~. Dowel bars shall not have burring or other deformation restricting slippage in concrete. Dowel bar ends shall be saw cut. Chips from the cutting operation shall be removed from coated bars.

Dowel bars shall be furnished by selecting bars made by a coater and manufacturer on the list of approved Certified Reinforcing Bar Epoxy Coaters and in accordance with ITM 301. When shipped to the project site, the dowel bars shall be accompanied by the types of certifications specified in ITM 301 and in accordance with 916.

COMMENTS AND ACTION

910.01(b)10 DOWEL BARS

DISCUSSION: This item was introduced and presented by Mr. Walker, who explained that there is a need to revise 910 to coincide with the design requirements of the MEPDG.

Mr. Prather commented that the 1 5/16 bars are not readily available, and suggested striking that one bar size, since it is not used. Mr. Miller agreed to strike that one line. Mr. Walker suggested checking all of the standard drawings to make sure it is not mentioned there. Mr. Prather said that Mr. Kumar Dave is currently performing that task.



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| Motion: Mr. Walker<br>Second: Mr. Boruff<br>Ayes: 8<br>Nays: 0 | Action:<br>____ Passed as Submitted<br>_X_ Passed as Revised<br>____ Withdrawn |
| Standard Specifications Sections affected:<br><br>910.01(b)10 pg 874.<br><br>Recurring Special Provision affected:<br><br>503-R-582 DOWEL BARS AND DOWEL BARS ASSEMBLIES<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | _X_ 2014 Standard Specifications Book<br>____ Revise Pay Items List<br><br>____ Create RSP (No.____)<br>Effective ____ Letting<br>RSP Sunset Date: ____<br><br>_X_ Revise RSP (No.503-R-582)<br>Effective Feb. 01, 2013 Letting<br>RSP Sunset Date: Sept. 01, 2013<br><br>Standard Drawing Effective ____<br>____ Create RPD (No. ____)<br>Effective ____ Letting<br>____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By ____ Addition or ____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By ____ Addition or ____ Revision<br><br>Received FHWA Approval? YES |

Mr. Walker
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: There needs to be clarification concerning the testing required for Type 3 structural backfill. The frequency of testing and types of tests required for all retaining walls and retaining walls that have metal components in contact with the structural backfill are required.

PROPOSED SOLUTION: Revise 211.03.1(c) for the frequency of testing and types of tests required for all retaining walls and retaining walls that have metal components in contact with the structural backfill.

APPLICABLE STANDARD SPECIFICATIONS: 211.03.1(c)

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: 11-2-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? INDOT/Aggregates Technical Committee

REVISION TO STANADARD SPECIFICATIONS

SECTION 211 - B BORROW AND STRUCTURE BACKFILL
211.03.1(C) TYPE 3

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 120, DELETE AND INSERT AS FOLLOWS:

Structure backfill for all retaining walls shall be in accordance with the following criteria:

| Property | Criteria | Test Method |
|---|---|---|
| pH | 5 < pH < 10 | AASHTO T 289 |
| Organic Content | 1 % max. | AASHTO T 267 |
| ~~Resistivity, min.~~ | ~~3000 Ω cm~~ | ~~AASHTO T 288~~ |
| Permeability, min. | 30 ft/day ~~(9 m/day)~~ | AASHTO T 215 |

The gradation shall be run on the material used in the permeability test. Testing for permeability shall be performed on the sample of the material compacted to 95% in accordance with AASHTO T 99, Method C or D. All of the tests listed above shall be run a minimum of once ~~per calendar year~~*every 12 months* per source. The ~~Engineer~~ *Office of Materials Management* will evaluate the material from each source and determine the appropriate tests to be performed.

In addition to the criteria above, structure backfill for ~~use in MSE, steel bin-type, cut-wall, and temporary wire-faced~~ retaining wall systems *containing metal components in contact with structure backfill* shall also be in accordance with the following criteria:

| Property | Criteria | Test Method |
|---|---|---|
| Chlorides | < 100 ppm | AASHTO T 291 |
| Sulfates | < 200 ppm | AASHTO T 290 |
| Resistivity, min. | 3,000 Ω cm | AASHTO T 288 |
| Internal friction angle, φ | 34° minimum | AASHTO T 236* or T 297* |

*under consolidated drained conditions

If the minimum resistivity exceeds 5,000 Ω cm, the requirement for the testing of chlorides and sulfates ~~may~~*will* be waived. The resistivity shall be tested at 100% saturation. All of the tests listed above shall be run a minimum of once ~~per calendar year~~ *every 12 months* per source. The ~~Engineer~~*Office of Materials Management* will evaluate the material from each source and determine the appropriate tests to be performed.

~~For MSE, concrete block, or wire-faced retaining walls, t~~*T*esting for φ shall be performed on the portion that passes the No. 8 (2.36 mm) sieve, using a sample of the material compacted to 95% in accordance with AASHTO T 99, Method C or D. Testing for ~~internal friction angle~~ φ ~~is~~*will* not *be* required if 80% *or more* of the materials ~~do not pass~~ *is retained on or above* the No.4 (4.75 mm) sieve.

COMMENTS AND ACTION

211.03.1(C) TYPE 3

DISCUSSION: Mr. Walker introduced and presented this item explaining that the changes are for clarification for what is required for retaining walls and all wall systems.

There were no questions or discussion and this item passed as submitted.



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| Motion: Mr. Walker<br>Second: Mr. ~~Boruff~~*Reilman*<br>Ayes: 8<br>Nays: 0 | Action:<br>__X__ Passed as Submitted<br>_____ Passed as Revised<br>_____ Withdrawn |
| Standard Specifications Sections affected:<br><br>211.03.1(c) pg 196 and 197; 731.05 pg 676; 733.02 pg 682; 735.05 pg 691.<br><br>Recurring Special Provision affected:<br><br>NONE<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>__X__ Create RSP (No.211-R-608)<br>Effective Feb. 01, 2013 Letting<br>RSP Sunset Date: Sept. 01, 2013<br><br>_____ Revise RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? YES |

Mr. Walker
Date: 11/16/12

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: ITM 221 is now approved for evaluation of aggregates used in HMA surface mixtures with ESAL≥ 10,000,000 and revisions to include these changes are required in 904.03(d)1.

PROPOSED SOLUTION: Incorporate revisions to the table for allowed aggregates in 904.03(d) 1.

APPLICABLE STANDARD SPECIFICATIONS: 904.03(d)1

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: 11-2-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? INDOT/Aggregates Technical Committee, INDOT/Asphalt Technical Committee, and ITM Committee

REVISION TO STANADARD SPECIFICATIONS

SECTION 904 - AGGREGATES
904.03(d)1 HMA COARSE AGGREGATE

The Standard Specifications are revised as follows:

SECTION 904, BEGIN LINE 244, INSERT AS FOLLOWS:

**1. HMA Coarse Aggregate**

| Coarse Aggregate Type | Traffic ESALs | | |
|---|---|---|---|
| | < 3,000,000 | < 10,000,000 | ≥ 10,000,000 |
| Air-Cooled Blast Furnace Slag | Yes | Yes | Yes |
| Steel Furnace Slag | Yes | Yes | Yes |
| Sandstone | Yes | Yes | Yes |
| Crushed Dolomite | Yes | Yes | (Note 1) |
| Polish Resistant Aggregates | Yes | Yes | (Note 1) |
| Crushed Stone | Yes | ~~No~~*(Note 2)* | ~~No~~*(Note 2)* |
| Gravel | Yes | ~~No~~*(Note 2)* | ~~No~~*(Note 2)* |

Note 1. Polish resistant aggregates or crushed dolomite may be used when blended with ACBF or sandstone but cannot exceed 50% of the coarse aggregate by weight ~~(mass)~~, or cannot exceed 40% of the coarse aggregate by weight ~~(mass)~~ when blended with steel furnace slag.

*Note 2. Crushed stone or gravel in accordance with ITM 221 may be used.*

COMMENTS AND ACTION

904.03(d)1 HMA COARSE AGGREGATE

DISCUSSION: Mr. Walker introduced and presented this item stating the need for revisions as shown above.

Mr. Miller asked why the *(Note 2)* was also included for the <10,000,000 column but is shown in the ≥10,000,000. Mr. Walker agreed that *(Note 2)* should be shown in both columns, as shown highlighted in the above table.

Further discussion ensued concerning the use of the Polished Resistance Aggregates, which was explained by Mr. Walker as to when it is allowed to be used, when mixed with other aggregates, as described in Note 1 of the table.



| | |
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| Motion: Mr. Walker<br>Second: Mr. Keefer<br>Ayes: 8<br>Nays: 0 | Action:<br>____ Passed as Submitted<br>__X__ Passed as Revised<br>____ Withdrawn |
| Standard Specifications Sections affected:<br><br>904.03(d)1 pg 826.<br><br>Recurring Special Provision affected:<br><br>NONE<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | __X__ 2014 Standard Specifications Book<br>____ Revise Pay Items List<br><br>__X__ Create RSP (No.904-R-605)<br>Effective Feb. 01, 2013 Letting<br>RSP Sunset Date: Sept. 01,2013<br><br>____ Revise RSP (No.____)<br>Effective ____ Letting<br>RSP Sunset Date: ____<br><br>Standard Drawing Effective ____<br>____ Create RPD (No. ____)<br>Effective ____ Letting<br>____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By ____ Addition or ____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By ____ Addition or ____ Revision<br><br>Received FHWA Approval? YES |

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The Recurring Special Provision for the use of the Dynamic Cone Penetrometer needs revisions because of the addition of an ITM for this test procedure, to add a test procedure for the organic content, and the need to eliminate the test section.

PROPOSED SOLUTION: Revise the RSP 203-R-562

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: 203-R-562

PAY ITEMS AFFECTED: None

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: 11-2-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT: NONE

REVISION TO SPECIAL PROVISIONS

203-R-562 DYNAMIC CONE PENETROMETER TESTING FOR EMBANKMENT

(Note: Proposed changes shown as highlighted in gray)

203-R-562 DYNAMIC CONE PENETROMETER TESTING FOR EMBANKMENT

*(Revised XX-XX-XX)*

The Standard Specifications are revised as follows:

SECTION 203, BEGIN LINE 835, DELETE AS FOLLOWS:

**203.23 Embankment Other Than Rock and Shale, With Density Control**

~~Unless otherwise specified, all embankments shall be compacted to at least 95% of their maximum dry density. The moisture content shall be controlled within -2 and +1 percentage points of optimum moisture content. Maximum density and optimum moisture content shall be determined in accordance with AASHTO T 99 using method A for soil and method C for granular materials.~~

SECTION 203, AFTER LINE 914, INSERT AS FOLLOWS:

***203.24.1 Compaction Acceptance with DCP~~T~~***

*The compaction will be determined by dynamic cone penetrometer, DCP, testing, ~~DCPT~~, in accordance with ~~ASTM D 6951 using a 17.6-lb (8-kg) hammer~~ ITM 509. The moisture content ~~shall~~will be ~~controlled within -3 and +2 percentage points of the optimum moisture content~~ determined in accordance with AASHTO T 99. The compaction procedures shall be in accordance with 203.23.*

*The Department will establish the criteria for DCP~~T~~ acceptance of compaction by performing the sieve analysis, liquid limit, plastic limit, organic content, and optimum moisture and maximum density testing in accordance with ASTM D 1140, AASHTO ~~T 88, T 89,~~T 90, ~~and~~ T 99, and T 267, respectively, on representative samples of the soils to be used. The required blow counts will be determined based on the laboratory tests ~~for each soil type~~.*

*The required moisture content shall be controlled within -3 percentage points and the optimum moisture content for silty and sandy soils and within the optimum moisture content and +2 percentage points of the optimum moisture content for clayey soils.*

~~*Test sections shall be constructed in the presence of a Geotechnical representative with the available equipment of the Contractor to determine the roller type, pattern, and the number of passes for verification of the blow counts for a 6 in. (150 mm) lift. The Office of Geotechnical Services will be contacted prior to construction of the test sections to determine the number of test sections required for the evaluation of the DCPT process. The embankment shall be constructed in two 6 in. (150 mm) successive lifts placed in accordance with 203.23. The Engineer will select an area approximately 100 ft (33 m) long and 20 ft (6 m) wide within each lift for a test section. The test section in the second lift will be approximately in the same location as the test*~~

REVISION TO SPECIAL PROVISIONS

203-R-562 DYNAMIC CONE PENETROMETER TESTING FOR EMBANKMENT

~~*section in the first lift. The soil immediately below the test section in the first liftt shall be proofrolled in accordance with 203.26 prior to construction of the lift.*~~

~~*Moisture tests will be performed in accordance with ITM 506 at 2 random locations and DCPT will be performed at 4 random locations in each lift. The locations will be determined in accordance with ITM 802. The moisture content shall be controlled within -3 and +2 percentage points of the optimum moisture content. Blow counts greater than 10 or less than 4 will be discarded and a new random test location will be selected in the test section in that lift. If all of the test section blow counts are outside of the range of 10 to 4, the Office of Geotechnical Services will be contacted for determination of the target blow counts.*~~

COMMENTS AND ACTION

203-R-562 DYNAMIC CONE PENETROMETER TESTING FOR EMBANKMENT

DISCUSSION: This item was introduced and presented by Mr. Walker who explained the necessary revisions as shown above, stating the need to revise RSP 203-R-562. This revision is also to meet the requirements set forth in the new ITM 509.
Mr. Berebitsky stated that he and the Contractors are in agreement with Mr. Walker's findings.

There were no further questions or discussion and this item passed as submitted.

Note: Before publishing these Minutes, it was directed by the Chairman, Mark Miller, to postpone the release of this RSP for use due to future revision.



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|---|---|
| Motion: Mr. Walker<br>Second: Mr. Keefer<br>Ayes: 8<br>Nays: 0 | Action:<br>__X__ Passed as Submitted(on hold)<br>_____ Passed as Revised<br>_____ Withdrawn |
| Standard Specifications Sections affected:<br><br>203.23 pg 156.<br><br>Recurring Special Provision affected:<br><br>203-R-562 DYNAMIC CONE PENETROMETER TESTING FOR EMBANKMENT<br><br>Standard Sheets affected:<br><br>NONE<br><br>Design Manual Sections affected:<br><br>NONE<br><br>GIFE Sections cross-references:<br><br>NONE | ~~__X__~~ 2014 Standard Specifications Book<br>_____ Revise Pay Items List<br><br>_____ Create RSP (No._____)<br>Effective _____ Letting<br>RSP Sunset Date: _____<br><br>__X__ Revise RSP (No.203-R-562)<br>Effective Feb. 01, 2013 Letting<br>RSP Sunset Date: TBD<br><br>Standard Drawing Effective _____<br>_____ Create RPD (No. _____)<br>Effective _____ Letting<br>_____ Technical Advisory<br><br>GIFE Update Req'd.? Y ___ N ___<br>By _____ Addition or _____ Revision<br><br>Frequency Manual Update Req'd? Y___N___<br>By _____ Addition or _____ Revision<br><br>Received FHWA Approval? YES |