INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

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Indianapolis, Indiana 46204

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

APPROVED MINUTES

June 17, 2010 Standards Committee Meeting

(Changes to the Final Draft Minutes by Action of the Committee on September 16, 2010 shown as Highlighted Yellow)

MEMORANDUM

September 27, 2010

TO: Standards Committee

FROM: Greg Pankow, State Construction Engineer

RE: Minutes for the June 17, 2010 Standards Committee Meeting

The Standards Committee meeting was called to order by Mr. Miller at 1.03 p.m. on June 17, 2010 in the 9th Conference Center. The meeting was adjourned at 2.48 p.m.

The following committee members were in attendance:

Mark Miller, Chairman	Dave Andrewski, Pvmt. Engineering
Greg Pankow, Constr. Mgmt.	Jeff Clanton***, Contract Admin.
Yadu Shah*, Roadway Services	Dave Boruff, Traffic Admin.
Tony Uremovich**, Str. Services	Ron Walker, Materials Mgmt.
Jim Keefer, Fort Wayne Dist.	Tom Caplinger, Crawfordsville Dist.

**Proxy for John Wright*
***Proxy for Anne Rearick*
****Proxy for Bob Cales*

Also in attendance were the following:

Bren George, FHWA	Todd Shields (for item No. 8), INDOT
Greg Broz, Secretary	Steve Fisher, INDOT Sitemanager
Lucy Marius, FHWA	Kevin Resler, INDOT
Greg Richards, INDOT	Paul Berebitsky, ICA
Peter Capon, Rieth-Riley Co.	Charlie Holland, AsphtPavm. Assoc.
Lana Podorvanova, INDOT	Kirk Frederick, INDOT, Constr. Mgmt.

The following items were considered.

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. Approval of the April 15, 2010 Minutes

ACTION: Approved as Submitted

Motion: Mr. Keefer
Second: Mr. Andrewski
Ayes: 9
Nays: 0

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. Statements in 107-B-040 and their Effect to Construct Projects
Mr. Caplinger

DISCUSSIONS: Mr. Caplinger explained that the Crawfordsville District had concerns about the wording in the tree habitat section of the environmental restrictions provision. Trees may be cleared outside of the construction limits and that should require a resubmittal of the permits. He is requesting a committee be put together to work on this issue.

Mr. Pankow agreed and stated that since this could have large environmental ramifications that there will be a need for OES/IDEM input.

Mr. Miller stated that it would also be good to have input from designers, construction management and the districts.

Mr. Andrewski asked why we could not just move the construction limits to the R/W and the answer was that that will create environmental impacts and may not solve the problem.

FHWA was asked if they would want to be on the committee and Mr. George said yes.

ACTION: Assemble a Committee

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

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

Item No. 01 06/17/10 (2010 SS)	Mr. Pankow	8
722.15	Basis of Payment	
ACTION:	Passed as Submitted	
Item No. 02 06/17/10 (2010 SS)	Mr. Walker	11
RECURRING SPECIAL PROVISION		
400-R-553	HMA PROVISIONS	
ACTION:	Passed as Submitted	
Item No. 03 06/17/10 (2010 SS)	Mr. Walker	23
RECURRING SPECIAL PROVISIONS:		
211-R-570	STRUCTURE BACKFILL FOR ~~MSE~~ *RETAINING* WALL	
731-R-202	MECHANICALLY STABILIZED EARTH RETAINING WALLS	
732-R-310	MODULAR CONCRETE BLOCK RETAINING WALL	
ACTION:	Passed as Revised	
Item No. 04 06/17/10 (2010 SS)	Mr. Walker	28
401.05	Volumetric Mix Design	
ACTION:	Passed as Submitted	
Item No. 05 06/17/10 (2010 SS)	Mr. Walker	31
902.01(a)	Performance Graded Asphalt Binders	
902.02	Sampling and Testing Asphalt Materials	
ACTION:	Passed as Submitted	
Item No. 06 06/17/10 (2010 SS)	Mr. Walker	35
904.03(a)	Classification of Aggregate	
904.03(d)2	SMA Coarse Aggregate	
904.03(f)	Sampling and Testing	
ACTION:	Passed as Revised	
Item No. 07 06/17/10 (2010 SS)	Mr. Pankow	41
103.01(g)	Subcontracts	
ACTION:	Passed as Submitted	
Item No. 08 06/17/10 (2010 SS)	Mr. Wright	46
601.02	Materials	
910.11	Guardrail Accessories, Fittings, and Hardware	
926.03	Alternate material Guardrail Blocks	
ACTION:	Passed as Submitted	
Item No. 09 06/17/10 (2010 SS)	Mr. Boruff	51
805.10	Magnetometer, ~~and~~ Microloop, *and* Wireless Detectors	
805.15	Method of Measurements	
805.16	Basis of Payment	

DESIGN MANUAL:

IDM 77-4.02(03)	Other Detector Types
IDM *77-4.02(04)*	*Decision making criteria for when to use another type of detection*

STANDARD DRAWING:

805-SGDW-01	*WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE*

ACTION: Withdrawn

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

1. CONCEPTUAL PROPOSAL

STATEMENTS IN THE RECURRING SPECIAL PROVISION 107-B-040 AND THEIR EFFECT TO CONSTRUCT PROJECTS.

PROPOSAL TO STANDARDS COMMITTEE

PROBLEMS ENCOUNTERED: Construction is unable to construct projects in accordance with the statements made in recurring special provision 107-B-040. Section 107.14.1(a), states: All trees outside the construction limits shall not be disturbed.

PROPOSED SOLUTION:
There is a conflict in terminology between INDOT Plans, Specifications and Permits. This subject will require a subcommittee to resolve the issue and develop a workable solution.

APPLICABLE STANDARD SPECIFICATIONS:

APPLICABLE STANDARD DRAWINGS:

APPLICABLE DESIGN MANUAL SECTION:

APPLICABLE SECTION OF GIFE:

RECURRING SPECIAL PROVISIONS: 107-B-040 ENVIRONMENTAL RESTRICTIONS

POSSIBLE SUBCOMMITTEE: Construction, Production, OES, Utilities

SUBMITTED BY: Tom Caplinger

TITLE: Senior Designer, Crawfordsville Production Section

ORGANIZATION: INDOT

PHONE NUMBER: 317-232-5354

DATE: May 21, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

1. CONCEPTUAL PROPOSAL

BACKUP: RECURRING SPECIAL PROVISION 107-B-040 ENVIRONMENTAL RESTRICTIONS

(Basis for Use: AS DETERMINED NECESSARY BY PROJECT DESIGNER.

107-B-040 ENVIRONMENTAL RESTRICTIONS

(Revised 04-01-08)

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 525, INSERT AS FOLLOWS:

107.14.1 Environmental Restriction

The work shall be performed in accordance with the environmental restrictions shown below.

(a) Tree Habitat

All trees outside the construction limits shall not be disturbed.

(b) Indiana Bat

All felling of trees equal to or greater than 3 in. (75 mm) in diameter shall be performed between October 1 and the following March 31, inclusive, so as to minimize project-related impacts on the Indiana bat, Myotis Sodalis.

(c) Fish Spawning

If the contract contains an in-channel excavation restriction due to impacts upon fish spawning, the Contractor may request a waiver of a portion of the restriction period by means of written contact to the Indiana Department of Natural Resources Division of Fish and Wildlife, Environmental Supervisor. Such request shall be made not more than 2 weeks prior to anticipated in-channel work during the restriction period shown above. The expected response time from the Indiana Department of Natural Resources will be approximately 5 work days. The Indiana Department of Natural Resources will consider each waiver on a case by case basis.

The information and criteria shown below shall be provided with the waiver request.

1. *Location of the project, including stream name, route number or road name, Indiana Department of Natural Resources Certificate of Approval of Construction in a Floodway docket number, and description of the proposed work.*

2. *Amount of time required to do the work, and the dates requested to be waived. The amount of time required shall be reasonable to accomplish the proposed work.*

3. *The amount of in-channel area proposed to be disturbed by the work. Disturbance across the full width of the stream may result in more negative impacts than disturbance of smaller portions of the stream.*

4. *Water level at the time of the request.*

5. *Approximate water temperature at the time of the request.*

6. *The substrate of the stream bottom at the project site, 100 yd (91 m) upstream of the site, and 100 yd (91 m) downstream of the site. A bedrock substrate is not necessarily beneficial for spawning areas. However, silt, sand, or small gravel is more readily usable. Spawning locations which are downstream of the project may more likely be impacted by disturbances than such locations which are upstream. Sediments may cover eggs.*

A waiver of a portion of the in-channel excavation restriction will be cause for the Department to adjust contract times accordingly. Final approval of the waiver will be made by the Department. Such approval will not occur until the contract time adjustment is agreed upon.

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Due to the rising cost of latex modified concrete there is a need to increase the cost allowed in the specifications to pay for this material when used for partial depth patching or to fill surface irregularities. It is currently paid for as bridge deck overlay, additional, at a cost of $330.00 per cubic yard ($434.50 per cubic meter).

PROPOSED SOLUTION: To increase the cost allowed in 722.15 to $550.00 per cubic yard ($719.00 per cubic meter). This figure is been what has showing up on invoices to contractors for this material.

APPLICABLE STANDARD SPECIFICATIONS: 722.15

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS:

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 317-232-5502

Date: 4/29/2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Greg Pankow

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 722 – LATEX MODIFIED CONCRETE BRIDGE DECK OVERLAYS
REVISION TO 722.15 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 722, BEGIN LINE 559, DELETE AND INSERT AS FOLLOWS:

Patching material used for partial depth patching will be paid for at the contract unit price of ~~$330~~*550* per cubic yard (~~$434.50~~*719* per cubic meter) for bridge deck overlay, additional.

Overlay material used to fill surface irregularities will be paid for at the contract unit price of ~~$330~~*550* per cubic yard (~~$434.50~~*719* per cubic meter) for bridge deck overlay, additional.

COMMENTS AND ACTION

REVISION TO 722.15 BASIS OF PAYMENT

DISCUSSIONS: Mr. Pankow explained that the current price for materials for over runs in a latex overlay have not been updated in several years. Contractors have invoices that are in this price range.

Mr. Boruff asked why this is a fixed price. The answer was that it avoids having to negotiate prices on every contract with a latex overlay. In addition, it is a lower cost to the state than if the contractor were to have a bid price for the item.

Mr. Berebitsky stated that industry supports this revision to the price.

Motion: Mr. Pankow
Second: Mr. Keefer
Ayes: 9
Nays: 0

Standard Specifications Sections affected:

722.15

Recurring Special Provision affected:

NONE

Standard Sheets affected:

NONE

Design Manual Sections affected:

NONE

GIFE Sections cross-references:

NONE

Action:
_X_ Passed as Submitted
____ Passed as Revised
____ Withdrawn
_X_ 2012 Standard Specifications Book

_X_ Create RSP (No.722-B-581)
Effective Sep. 01, 2010 Letting
RSP Sunset Date: ____

____ Revise RSP (No.____)
Effective ____Letting
RSP Sunset Date: ____

Standard Drawing Effective ____

____ Create RPD (No. ____)
Effective ____Letting

____ Technical Advisory

GIFE Update Req'd.? Y ___ N ___
By ____ Addition or ____ Revision

Frequency Manual Update Req'd? Y___N___
By ____ Addition or ____ Revision

Received FHWA Approval? _X

SPECIFICATION REVISIONS

REVISION TO THE SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Chapter 52 of the Design Manual allows the 9.5 mm and 25.0 mm mixtures to be used for intermediate HMA courses. As such, these mixtures are required to be added to 401 and 402 of the Recurring Special Provision 400-R-553.

PROPOSED SOLUTION: Add the 9.5 mm and 25.0 mm mixtures as alternates to the Base and Intermediate mixtures of the table for Maximum Binder Replacement in 401.06. Also add these two mixtures as alternate mixtures to the table for mixture Types in 402.04.

APPLICABLE STANDARD SPECIFICATIONS: 401 and 402

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS: 400-R-553

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251x204

Date: April 29, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?
Revisions recommended by the Office of Materials Management

REVISION TO THE SPECIAL PROVISION

REVISION TO 400-R-553 HMA PROVISIONS

400-R-553 HMA PROVISIONS

(Revised 12-17-09)

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 46, INSERT AS FOLLOWS:

ESAL CATEGORY	ESAL
1	< 300,000
2	300,000 to < 3,000,000
3	3,000,000 to < 10,000,000
4	10,000,000 to < 30,000,000
5	≥ 30,000,000

QC/QA HMA may be produced as warm-mix asphalt, WMA, by using a water-injection foaming device for ESAL category 1, 2 and 3 mixtures. The DMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.

SECTION 401, BEGIN LINE 118, DELETE AND INSERT AS FOLLOWS:

401.06 Recycled Materials

~~Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.~~

~~Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25.0% by weight (mass) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 5.0% by weight (mass) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the DMF.~~

~~A maximum of 15.0% RAP or 3.0% ARS by weight (mass) of the total mixture may be used in ESAL category 3, 4, or 5 surface mixtures and open graded mixtures. The recycled material for the ESAL category 3, 4, or 5 surface mixtures shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.~~

REVISION TO THE SPECIAL PROVISION
REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

~~The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 401.05.~~

~~Mixtures containing 15.0% or less RAP shall use the same grade of binder as specified. The binder for mixtures containing greater than 15.0% and up to 25.0% RAP shall be reduced by one temperature classification, 6°C, for both the upper and lower temperature classifications.~~

Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. The RAP coarse aggregate shall pass the maximum size sieve for the mixture being produced and the RAS shall be 100% passing the 1/2 in. (12.5 mm) sieve. RAP for the ESAL category 3, 4 and 5 surface mixtures shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:

$$Binder\ Replacement,\% = \frac{(A\ x\ B) + (C\ x\ D)}{E}\ x\ 100\%$$

where:

A = RAP, % Binder Content
B = RAP, % in Mixture
C = RAS, % Binder Content
D = RAS, % in Mixture
E = Total, % Binder Content in Mixture

RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in HMA mixtures and shall be stockpiled separately from other materials.

The recycled material percentages shall be as specified on the DMF. HMA mixtures utilizing recycled materials shall be limited to the binder replacement percentages in the following table:

REVISION TO THE SPECIAL PROVISION
REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

HMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

Maximum binder Replacement, %									
Mixture Category	*Base and Intermediate*						*Surface*		
	Dense Graded				*Open Graded*		*Dense Graded*		
	25.0 mm	*19.0 mm*	*12.5 mm*	*9.5 mm*	*25.0 mm*	*19.0 mm*	*12.5 mm*	*9.5 mm*	*4.75 mm*
1	*40.0**				*25.0*		*40.0**		
2	*40.0**				*25.0*		*40.0**		
3	*40.0**				*25.0*		*15.0*		
4	*40.0**				*25.0*		*15.0*		
5	*40.0**				*25.0*		*15.0*		

**RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.*

The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with 401.05 for the HMA mixture specified.

HMA mixtures with a binder replacement less than or equal to 25.0% by weight (mass) of the total binder content by utilizing RAP or RAS or a blend of RAP and RAS materials shall use the specified binder grade.

HMA mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight (mass) of the total binder content by utilizing RAP or a blend of RAP and RAS shall use a binder grade with upper and lower temperature classifications reduced by 6°C from the specified binder grade. RAS materials shall not contribute more than 25.0% by weight (mass) of the total binder content for any HMA mixture.

SECTION 401, BEGIN LINE 158, INSERT AS FOLLOWS:

401.08 Job Mix Formula

A job mix formula, JMF, shall be developed by a certified HMA producer. A JMF used in the current or previous calendar year that was developed to N_{des} will be allowed. The mixture compaction temperature shall be 300 ± 9°F (150 ± 5°C) for dense graded mixtures and 260 ± 9°F (125 ± 5°C) for open graded mixtures. *The JMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.* The JMF for each mixture shall be submitted to the Engineer and shall use the same MAF as the DMF.

SECTION 401, BEGIN LINE 493, INSERT AS FOLLOWS:

If the Lot PWL for any one of the properties is less than 50 or a sublot has an air void content less than 1.0*% or greater than 7.0%*, the lot will be referred to the Office of Materials Management for adjudication as a failed material in accordance with normal Department practice as listed in 105.03.

REVISION TO THE SPECIAL PROVISION
REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

SECTION 401, BEGIN LINE 622, DELETE AND INSERT AS FOLLOWS:

401.20 Appeals

If the QC test results do not agree with the acceptance test results, a request, along with the QC test results, may be made in writing for additional testing. The appeal sample will be analyzed in a lab different than the lab that analyzed the original sample when requested by the Contractor. Additional testing may be requested for one or more of the following tests: MSG, BSG of the gyratory specimens, binder content, or BSG of the density cores. The request for the appeal for MSG, BSG of gyratory specimens, binder content or BSG of the density cores shall be submitted within ~~seven~~*7* calendar days of receipt of the Department's written results for ~~that~~ *the lot accepted under 401.19(a) or the* sublot *accepted under 401.19(b).* The sublot and specific test(s) shall be specified at the time of the appeal request. Only one appeal request per *lot for mixture accepted under 401.19(a) or* sublot *for mixture accepted under 401.19(b)* is permitted. Upon approval of the appeal, the Engineer will perform additional testing as follows.

SECTION 402, BEGIN LINE 18, DELETE AS FOLLOWS:

402.03 Materials

Materials shall be in accordance with the following:

Asphalt Materials
PG Binder~~, PG 58-28*, PG 64-22, PG 64-28*, PG 70-22, PG 76-22~~ .....902.01(a)
Coarse Aggregates 904
Base Mixtures, – Class D or Higher
Intermediate Mixtures – Class C or Higher
~~**~~ Surface Mixtures – Class B or Higher*
Fine Aggregates 904

~~* Only for use in mixtures containing greater than 15% RAP. Refer to 402.05.~~
~~*~~ * Surface aggregate requirements are listed in 904.03(d).

SECTION 402, BEGIN LINE 39, INSERT AS FOLLOWS:

Mixture Type	Type A	Type B	Type C	Type D
Design ESAL	200,000	2,000,000	9,000,000	11,000,000
Surface	*4.75 mm*	*4.75 mm*	*4.75 mm*	*4.75 mm*
	9.5 mm	9.5 mm	9.5 mm	9.5 mm
	12.5 mm	12.5 mm	12.5 mm	12.5 mm
Surface – PG Binder	64-22	64-22	70-22	70-22
Intermediate	*9.5 mm*	*9.5 mm*	*9.5 mm*	*9.5 mm*
	12.5 mm	12.5 mm	12.5 mm	12.5 mm
	19.0 mm	19.0 mm	19.0 mm	19.0 mm
	25.0 mm	*25.0 mm*	*25.0 mm*	*25.0 mm*
Intermediate – PG Binder	64-22	64-22	64-22	70-22
Base	19.0 mm	19.0 mm	19.0 mm	19.0 mm
	25.0 mm	25.0 mm	25.0 mm	25.0 mm
Base – PG Binder	64-22	64-22	64-22	64-22

REVISION TO THE SPECIAL PROVISION
REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

HMA may be produced as warm-mix asphalt, WMA by using a water-injection foaming device for temporary HMA mixtures and type A, B and C mixtures. The DMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.

SECTION 402, BEGIN LINE 87, DELETE AND INSERT AS FOLLOWS:

(c) Composition Limits for Temporary HMA Mixtures

Temporary HMA mixtures shall be *the* type ~~B~~ *specified* in accordance with 402.04. A MAF in accordance with 402.05 will not apply.

SECTION 402, BEGIN LINE 102, DELETE AND INSERT AS FOLLOWS:

402.08 Recycled Materials

~~Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.~~

~~Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25.0% by weight (mass) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 5.0% by weight (mass) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the JMF.~~

~~A maximum of 15.0% RAP or 3.0% ARS by weight (mass) of the total mixture may be used in type C and D surface mixtures provided the recycled material is 100% passing the 3/8 in. (9.5 mm) sieve and 95% to 100% passing the No. 4 (4.75 mm) sieve.~~

~~The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 402.03.~~

~~Mixtures containing 15.0% or less RAP shall use the same grade of binder as specified. The binder for mixtures containing greater than 15.0% and up to 25.0% RAP shall be reduced by one temperature classification, 6°C, for both the upper and lower temperature classifications.~~

Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be

processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. The RAP coarse aggregate shall pass the maximum size sieve for the mixture being produced and the RAS shall be 100% passing the 1/2 in. (12.5 mm) sieve. RAP for the type C and D surface mixtures shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:

$$Binder\ Replacement,\% = \frac{(A\ x\ B) + (C\ x\ D)}{E}\ x\ 100\%$$

where:

A = RAP, % Binder Content
B = RAP, % in Mixture
C = RAS, % Binder Content
D = RAS, % in Mixture
E = Total, % Binder Content in Mixture

RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in HMA mixtures and shall be stockpiled separately from other materials.

The recycled material percentages shall be as specified on the DMF. HMA mixtures utilizing recycled materials shall be limited to the binder replacement percentages in the following table:

HMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

Maximum Binder Replacement, %							
Mixture Category	*Base and Intermediate*				*Surface*		
	Dense Graded				*Dense Graded*		
	25.0 mm	*19.0 mm*	*12.5 mm*	*9.5 mm*	*12.5 mm*	*9.5 mm*	*4.75 mm*
A	*40.0**				*40.0**		
B	*40.0**				*40.0**		
C	*40.0**				*15.0*		
D	*40.0**				*15.0*		

**RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.*

REVISION TO THE SPECIAL PROVISION
REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with 401.05 for the HMA mixture specified.

HMA mixtures with a binder replacement less than or equal to 25.0% by weight (mass) of the total binder content by utilizing RAP or RAS or a blend of RAP and RAS materials shall use the specified binder grade.

HMA mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight (mass) of the total binder content by utilizing RAP or a blend of RAP and RAS shall use a binder grade with upper and lower temperature classifications reduced by 6°C from the specified binder grade. RAS materials shall not contribute more than 25.0% by weight (mass) of the total binder content for any HMA mixture.

SECTION 402, BEGIN LINE 392, INSERT AS FOLLOWS:

HMA for Temporary Pavement, *Type* _*_ ..... TON (Mg)

SECTION 410, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

410.05 SMA Mix Design

The DMF shall be determined for each mixture from a SMA mix design by a design laboratory selected from the Department's list of approved Mix Design Laboratories. A SMA mixture shall be designed in accordance with AASHTO M 325 and R ~~35~~ *46*.

SECTION 410, BEGIN LINE 93, DELETE AND INSERT AS FOLLOWS:

410.06 Recycled Materials

~~Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The recycled material shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95% to 100% passing the No. 4 (4.75 mm) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials.~~

~~Recycled materials may be used as a substitute for a portion of the new materials required to produce mainline surface. When only RAP is used in the mixture, the RAP shall not exceed 15.0% by weight (mass) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 3.0% by weight (mass) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the DMF.~~

~~The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 410.05.~~

~~Mixtures containing RAP shall use the same grade of binder as specified.~~

Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. RAS shall be 100% passing the 1/2 in. (12.5 mm) sieve. RAP shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.

Recycled materials may be used as a substitute for a portion of the new materials required to produce SMA mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:

$$Binder\ Replacement, \% = \frac{(A\ x\ B) + (C\ x\ D)}{E}\ x\ 100\%$$

where:

A = RAP, % Binder Content
B = RAP, % in Mixture
C = RAS, % Binder Content
D = RAS, % in Mixture
E = Total, % Binder Content in Mixture

RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in SMA mixtures and shall be stockpiled separately from other materials.

The recycled material percentages shall be as specified on the DMF. SMA mixtures utilizing recycled materials shall be limited to the binder replacement percentages in the following table:

REVISION TO THE SPECIAL PROVISION
REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

SMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

Maximum Binder Replacement, %		
SMA Surface		
Mixture Category	*12.5 mm*	*9.5 mm*
1	*40.0**	*40.0**
2	*40.0**	*40.0**
3	*15.0*	*15.0*
4	*15.0*	*15.0*
5	*15.0*	*15.0*

**RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.*

The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with 401.05 for the SMA mixture specified.

SMA mixtures with a binder replacement less than or equal to 25.0% by weight (mass) of the total binder content by utilizing RAP or RAS or a blend of RAP and RAS materials shall use the specified binder grade.

SMA mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight (mass) of the total binder content by utilizing RAP or a blend of RAP and RAS shall use a binder grade with upper and lower temperature classifications reduced by 6^{o} C from the specified binder grade. RAS materials shall not contribute more than 25.0% by weight (mass) of the total binder content for any SMA mixture.

SECTION 410, BEGIN LINE 406, INSERT AS FOLLOWS:

410.20 Appeals

If the QC test results do not agree with the acceptance test results, a request, along with the QC test results, may be made in writing for additional testing. Additional testing may be requested for one or more of the following tests: binder content, gradation, or MSG of the mixture samples and bulk specific gravity of the density cores. The appeal request shall be submitted within ~~seven~~*7* calendar days of receipt of the Department's written results for that sublot. The *request for the appeal for MSG, BSG of the density cores or binder content and gradation shall be submitted within ~~seven~~7 calendar days of receipt of the Department's written results for that sublot. The* sublot and specific tests shall be specified at the time of the appeal request. Only one appeal request per sublot is permitted. Upon approval of the appeal, the Engineer will perform additional testing.

SECTION 902, BEGIN LINE 87, DELETE AND INSERT AS FOLLOWS:

AE-F is a medium setting, hard penetration, diluted emulsion intended for fog sealing.

REVISION TO THE SPECIAL PROVISION

REVISION TO 400-R-553 HMA PROVISIONS (CONTINUED)

The requirements for asphalt emulsions shall be in accordance with the following:

Characteristic [1] [2]	AASHTO Test Method	RS-2	HFRS-2	AE-90	AE-90S	AE-T	*AE-F*	SS-1h	AE-150	AE-150L	AE-PL	AE-PMT [6]	AE-PMP [6]
Test on Emulsion													
Viscosity, Saybolt Furol at 25°C, min.	~~T 72~~*T 59*			50				20	50				20+
Viscosity, Saybolt Furol at 25°C, max.	~~T 72~~*T 59*					100	*100*	100		100	115	100	
Viscosity, Saybolt Furol at 50°C, min.	~~T 72~~*T 59*	75	75		50				75				
Viscosity, Saybolt Furol at 50°C, max.	~~T 72~~*T 59*	400	400						300				
Demulsibility w/35 mL, 0.02N CaC12, %, min.	T 59	50	50		30		*25*						
Demulsibility w/50 mL, 0.10N CaC12, %, min.	T 59			75		75						25+	25+
Oil Distillate by Distillation, mL/100 g Emul [3]	T 59	4.0	4.0	4.0	3.0	4.0	*4.0*	4.0	7.0	7.0	3.0	3.0	3.0
Residue by Distillation, %, min.	T 59	68	68	68	65 [5]	54	*27*	57	68	60	30		
Residue by Distillation, % max.	T 59					62	*35*			65			
Sieve Test, %, max.	T 59	0.10	0.10	0.10	0.10	0.10	*0.10*	0.10	0.10	0.10	0.10	0.10	0.10
Penetrating Ability, mm, min.	902.02(w)										6		
Stone Coating Test, %	902.02(t)3a			90					90	90			
Settlement, %, max.	T 59	5	5	5									
Storage Stability, %, max.	T 59				1								
Asphalt Content by Distillation at 204°C, %, min.												54	45
Asphalt Content by Distillation at 204°C, %, max.												62	
Tests on Residue													
Penetration (0.1 mm) at 25°C, 100g, 5 s, min. [4]	T 49	100	100	100	90	50	*40*	40				50	300+
Penetration (0.1 mm) at 25°C, 100g, 5 s, max. [4]	T 49	200	200	200	150	200	*90*	90				200	
Penetration (0.1 mm) at 25°C, 50g, 5 s, min. [4]	T 49								100	100			
Penetration (0.1 mm) at 25°C, 50g, 5 s, max. [4]	T 49								300	300			
Ductility at 25°C, mm, min.	T 51	400	400	400		400		400					
Solubility in Org. Sol., %, min.	T 44	97.5	97.5	97.5	97.5	97.5	*97.5*	97.5	97.5	97.5	97.5	97.5	97.5
Float Test at 50°C, s, max. [4]	T 50												
Float Test at 60°C, s, min. [4]	T 50		1200	1200	1200	1200			1200	1200			
Force Ratio	T 300				0.3								
Elastic Recovery, at 4°C	T 301				58								
Polymer Content by Infrared												1.5+	1.5+

Notes: (1) Broken samples or samples more than 10 days old will not be tested.
(2) Combined percentage of the residue and oil distillate by distillation shall be at least 70% (note the different units – ml for oil and % for residue).
(3) Oil distillate shall be in accordance with ASTM D 396, table 1, grade no. 1
(4) The Engineer may waive the test.
(5) Maximum temperature to be held for 15 minutes 200 ± 5°C.
(6) Asphalt shall be polymerized prior to emulsification.

COMMENTS AND ACTION

REVISION TO 400-R-553 HMA PROVISIONS

DISCUSSIONS: Mr. Walker stated that there was a need to add aggregate sizes to the spec book to match the IDM.

Mr. Andrewski stated he would need to check the IDM as that may be a mistake. A member of industry then pointed out that the need for the 25 mm stemmed from a patching scenario. Mr. Andrewski then stated that it would then be a 402 item and not needed for 401. He also stated a concern that designers may inadvertently use it in their mix design.

Mr. Walker stated that with respect to the patch issue, if the 25 mm mix was allowed, it would have resulted in a patch using a single lift of asphalt instead of the multiple lifts required due to the use of a 19 mm mix.

Mr. Andrewski stated that then there is a concern that the 25 mm mix won't get proper compaction because the lift will be too thick for the compaction equipment.

Motion: Mr. Walker Second: Mr. Boruff Ayes: 9 Nays: 0	Action: _X_ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: SECTION 401 –QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA PAVEMENT; SECTION 402 – HOT MIX ASPHALT, HMA, PAVEMENT.	_X_ 2012 Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ _X_ Revise RSP (No.400-R-553) Effective Jan. 01, 2011 Letting RSP Sunset Date: ____
Recurring Special Provision cross-references: 400-R-553 HMA PROVISIONS	Standard Drawing Effective ____
Standard Sheets affected: NONE	____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory
Design Manual Section as reference: CHAPTER 52	GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision
GIFE Sections cross-references: SECTION 13	Frequency Manual Update Req'd? Y___N___ By ____ Addition or ____ Revision Received FHWA Approval? _X_

SPECIFICATION REVISIONS

REVISION TO THE SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Some types of No. 30 size material are not performing well in the field when used as structure backfill behind MSE walls. Problems are noticed with rolling of the material and with compacting the material.

PROPOSED SOLUTION: Do not allow No. 30 size material as an option for Type 3 structure backfill behind retaining walls that have ground reinforcement.

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: 211-R-570, 731-R-202, 732-R-310

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 610-7251

Date: 5/17/10

APPLICABLE SUB-COMMITTEE ENDORSEMENT?INDOT Wall Committee

Item No. 03 06/17/10 (2010 SS)
Mr. Walker
Date: 06/17/10

REVISION TO THE SPECIAL PROVISIONS

REVISION TO 211-R-570 STRUCTURE BACKFILL FOR MSE WALL

211-R-570 STRUCTURE BACKFILL FOR ~~MSE~~*RETAINING* WALL

(Adopted 12-17-09)

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 112, DELETE AND INSERT AS FOLLOWS:

(c) Type 3

1. structure backfill in accordance with 904.05, except only *nominal size aggregates* ~~No. 30,~~ *1 in., 1/2 in.,* ~~or~~ No. 4, *or No. 30* ~~nominal size aggregates~~, or *coarse aggregate No. 5,* No. 8, No. 9, ~~or~~ No. 11, *or No. 12* ~~coarse aggregate~~ shall be used. No slag other than ACBF will be permitted.

SECTION 904, BEGIN LINE 320, DELETE AND INSERT AS FOLLOWS:

904.05 Structure Backfill

The material shall be of acceptable quality, free from large or frozen lumps, wood, or other extraneous matter. It shall consist of suitable sand, gravel, crushed stone, ACBF, or GBF. Structure backfill shall be in accordance with one of the ~~following~~ gradations *shown in the table below,* or *coarse aggregate No. 5,* No. 8, No. 9, No. 11, *No. 12,* No. 53, or No. 73 ~~coarse aggregate~~ in accordance with the gradation requirements of 904.03(e). Coarse aggregate *No. 5,* No. 8, No. 9, No. 11, *No. 12,* No. 53, or No. 73 shall be crushed stone or ACBF, class D or higher.

Sieve Sizes	NOMINAL SIZES AND PERCENTS PASSING					
	2 in. (50 mm)	1 1/2 in. (37.5 mm)	1 in. (25.0 mm)	1/2 in. (12.5 mm)	No. 4 (4.75 mm)	No. 30 (600 µm)
2 1/2 in. (63 mm)	100					
2 in. (50 mm)	90-100	100				
1 1/2 in. (37.5 mm)	70-100	90-100	100	100		
1 in. (25.0 mm)	55-95	70-100	85-100			
3/4 in. (19.0 mm)	45-90	55-95	70-100			
1/2 in. (12.5 mm)	35-85	40-90	55-95	85-100	100	100
No. 4 (4.75 mm)	20-65	20-70	25-75	45-85	90-100	
No. 8 (2.36 mm)	10-50	10-55	15-60	25-75	75-100	
No. 30 (600 µm)	3-35	3-35	3-35	5-45	15-70	70-100
No 200 (75 µm)	0-8	0-8	0-8	0-8	0-8	0-8

REVISION TO THE SPECIAL PROVISIONS

REVISION TO 731-R-202 MECHANICALLY STABILIZED EARTH RETAINING WALLS

(Only revised section of the Recurring Special Provision is shown.)

BEGIN LINE 226, INSERT AS FOLLOWS:

MATERIALS

731.05 Materials

The Contractor shall make arrangements to purchase the materials described herein, including concrete face panels, retaining strips or mesh, tie strips, fasteners, joint materials, and all necessary incidentals, from a mechanically stabilized earth wall system manufacturer on the Department's list of approved retaining wall systems.

Materials shall be in accordance with the following:

B Borrow	*211.02*
Coarse Aggregate, Class A or Higher, Size No. 8 or 91	*904*
Concrete Admixtures	*912.03*
Concrete, Class A	*702*
Fine Aggregate, Size No. 23	*904*
Fly Ash	*901.02*
Geotextile	*913.18*
Portland Cement	*901.01(b)*
Rapid Set Patching Materials	*901.07*
Steel Welded Wire Reinforcement, Smooth	*910.01*
Reinforcing Bars	*910.01*
Structure Backfill	*904.05*
Water	*913.01*

Backfill material used in the mechanically stabilized earth wall volume shall be structure backfill, type 3 in accordance with 211 ~~with the exception~~ except that nominal size aggregate No. 30 shall not be used.

REVISION TO THE SPECIAL PROVISIONS

REVISION TO 732-R-310 MODULAR CONCRETE BLOCK RETAINING WALL

(Only revised section of the Recurring Special Provision is shown.)

BEGIN LINE 193, INSERT AS FOLLOWS:

MATERIALS

732.05 Materials

The Contractor shall make arrangements to supply the materials described herein, including concrete modular block wall units, fasteners, joint materials, ground reinforcement, and all necessary incidentals.

Materials shall be in accordance with the following:

B Borrow	*211.02*
Coarse Aggregate, Class A or Higher, Size No. 8 or 91*	*904*
*Concrete Admixtures***	*912.03*
Concrete	*702*
Fine Aggregate, Size No. 23	*904*
Fly Ash	*901.02*
Geogrid, Type I	*918.05*
Geotextile	*918.03*
Portland Cement	*901.01(b)*
Structure Backfill	*904.05*
Water	*913.01*

* *Coarse aggregate No. 8 used as drainage fill shall consist of 100% crushed stone.*

** *Admixtures in accordance with ASTM C 1372 may be used for the modular block if approved by the Engineer.*

Backfill material used in the modular block wall volume shall be structure backfill, type 3 in accordance with 211. Where ground reinforcement is required, nominal size aggregate No. 30 shall not be used.

COMMENTS AND ACTION

REVISION TO 211-R-570 STRUCTURE BACKFILL FOR MSE WALL
REVISION TO 731-R-202 MECHANICALLY STABILIZED EARTH RETAINING WALLS
REVISION TO 732-R-310 MODULAR CONCRETE BLOCK RETAINING WALL

DISCUSSIONS: Mr. Walker stated that there was a problem with No.30 aggregate used for type 3 backfill. There was an instance where No. 30 aggregate was used and it is believed to have led to a wall bowing out. The reason for this is that they believe that the No.30 aggregate did not meet AASHTO's requirement for the No.40 sieve. Also, the removal of No. 30 aggregate still leaves 8 other aggregate options for a contractor to choose from.

Mr. Uremovich stated that the wall committee concurred with the removal of No. 30 aggregate.

Mr. Andrewski had an editorial comment and the Committee agreed with the change.

Motion: Mr. Walker Second: Mr. Keefer Ayes: 9 Nays: 0	Action: ____ Passed as Submitted _X_ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: NONE Recurring Special Provision affected: 211-R-570 STRUCTURE BACKFILL FOR MSE WALL; 731-R-202 MECHANICALLY STABILIZED EARTH RETAINING WALLS; 732-R-310 MODULAR CONCRETE BLOCK RETAINING WALL Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_X_ 2012 Standard Specifications Book (211-R-570 only) ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ _X_ Revise RSP (No. 211-R-570, 731-R-202, 732-R-310) Effective Oct. 01, 2010 Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? _X_

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Section 904.03(d)1 requires that for Traffic ESALs equal to or greater than 10,000,000, the coarse aggregate type for HMA surface mixtures shall be air-cooled blast furnace slag (ACBF), steel furnace slag (SF), or sandstone. A combination of these aggregate types and polish resistant aggregate or dolomite may be used provided the blend with ACBF or sandstone does not exceed 50 % of the coarse aggregate by weight or does not exceed 40% of the coarse aggregate by weight when blended with SF. Section 401.05 includes the gradation required for HMA surface mixtures.

A recent project using 60% fine aggregate and 40% blended coarse aggregate meeting the requirements of 904.03(d)1 and 401.05 resulted in low friction numbers after approximately one year of service. A subsequent laboratory and field study indicated that the probable cause of the low friction numbers was poor pavement surface macrotexture caused by a mixture that was too fine-graded.

PROPOSED SOLUTION: A revision to 401.05 for the mix design gradation table to require the gradation to be less than or equal to the Primary Control Sieve (PCS) for the 9.5 mm category 4 and 5 surface mixtures is required. This revision will require the amount passing the 2.36 mm sieve to be equal to or less than 47% for these mixtures.

APPLICABLE STANDARD SPECIFICATIONS: 401

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS: 400-R-553

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251x204

Date: May 27, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?
Revisions recommended by the Office of Materials Management

Item No. 04 06/17/10 (2010 SS)
Mr. Walker
Date: 06/17/10

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 401 – QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA, PAVEMENT
REVISION TO 401.05 VOLUMETRIC MIX DESIGN

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 59, INSERT AS FOLLOWS:

	Dense Graded, Mixture Designation – Control Point (Percent Passing)				
	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm
Sieve Size					
50.0 mm					
37.5 mm	100.0				
25.0 mm	90.0 - 100.0	100.0			
19.0 mm	< 90.0	90.0 - 100.0	100.0		
12.5 mm		< 90.0	90.0 - 100.0	100.0	100.0
9.5 mm			< 90.0	90.0 - 100.0	95.0 - 100.0
4.75 mm				< 90.0	90.0 - 100.0
2.36 mm	19.0 - 45.0	23.0 - 49.0	28.0 - 58.0	32.0 - 67.0*	
1.18 mm					30.0 - 60.0
600 µm					
300 µm					
75 µm	1.0 - 7.0	2.0 - 8.0	2.0 - 10.0	2.0 - 10.0	6.0 - 12.0

** The mix design gradation shall be less than or equal to the PCS control point for 9.5 mm category 4 and 5 surface mixtures.*

PCS Control Point for Mixture Designation (Percent Passing)					
Mixture Designation	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm	NA
PCS Control Point	40	47	39	47	NA

COMMENTS AND ACTION

REVISION TO 401.05 VOLUMETRIC MIX DESIGN

DISCUSSIONS: Mr. Walker explained that a contract recently used 60% fine aggregate, which was allowed, and while the initial skid resistance numbers were good, the numbers were very poor after just 1 year. Research of the problem led to the gradation being the main culprit. This change should prevent that from happening again.

Motion: Mr. Walker Second: Mr. Keefer Ayes: 9 Nays: 0	Action: _X_ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 401.05 page 231. Recurring Special Provision affected: 400-R-553 HMA PROVISIONS Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: SECTION 13	_X_ 2012 Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ _X_ Revise RSP (No.400-R-553) Effective Jan. 01, 2011 Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? _x_

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: In-line blending of asphalt and latex modifiers at the HMA plant would reduce the cost of the asphalt and allow the HMA Producer to manage the quantities of modified asphalts required for the HMA mixtures. A pilot project was completed in 2009 whereby a blending system at the HMA plant was interlocked with the plant control to maintain the latex modifier addition consistent with plant output. Results from the project indicated that a one grade temperature classification change could be made by the in-line blending process for certain grades of asphalt. The specification revision would allow a PG 58-28 to be modified to a PG 64-22 or a PG 64-22 to be modified to a PG 70-22 by in-line blending at the HMA plant.

PROPOSED SOLUTION: The following revisions to 902 are required:
1. Add a section to 902.01(a)to allow in-line blending with SBR polymer latex at the HMA plant in accordance with ITM 581 for PG grades 58-28 and 64-22. Requirements for acceptance of the SBR polymer latex, minimum allowable amounts of the latex, and a reduction of the latex amount are included.
2. Add the sampling procedure for in-line blended asphalts to 902.02(a).

APPLICABLE STANDARD SPECIFICATIONS: 902

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS: 400-R-553

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251 x 204

Date: May 27, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?
Revisions recommended by the Office of Materials Management

Item No. 05 06/17/10 (2010 SS)
Mr. Walker
Date: 06/17/10

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 902 – ASPHALT MATERIALS
REVISION TO 902.01(a) PERFORMANCE GRADED ASPHALT BINDERS
REVISION TO 902.02 SAMPLING AND TESTING ASPHALT MATERIALS

The Standard Specifications are revised as follows:

SECTION 902, AFTER LINE 16, INSERT AS FOLLOWS:

A PG 58-28 or PG 64-22 binder may be modified by in-line blending with styrene butadiene rubber, SBR, polymer latex at the HMA plant in accordance with ITM 581. A PG 58-28 may be modified to a PG 64-28 and a PG 64-22 may be modified to a PG 70-22.

The SBR polymer latex shall be in accordance with the following:

SBR POLYMER LATEX	
Total Polymer Solids, % by weight	*60 – 72*
Butadiene, % by weight	*68 minimum*
Residual Styrene, % by weight	*0.1 maximum*
Ash, % of total polymer solids by weight	*3.5 maximum*
pH	*9 – 11*
Viscosity, Brookfield model RVF, Spindle No. 2 @ 20 rpm @ 25°C	*2000 maximum*

A type A certification for the SBR polymer latex shall be furnished in accordance with 916.

The minimum SBR polymer latex content shall be 2.5 %. The SBR polymer latex content may be reduced below the minimum content provided the following requirements are met:

1. *An AASHTO accredited laboratory shall blend the PG binder and SBR polymer latex at the proposed SBR polymer latex content and test and grade the modified PG binder in accordance with AASHTO M 320.*

2. *The laboratory test results verifying the blend and compliance with 902.01(a) shall be submitted to the Engineer for approval.*

3. *The source of the PG Binder or SBR polymer latex shall not be changed.*

SECTION 902, AFTER LINE 149, INSERT AS FOLLOWS:

902.02 Sampling and Testing Asphalt Materials

The tests and AASHTO references are as follows:

(a) Sampling Bituminous Materials .....AASHTO T 40

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 902 – ASPHALT MATERIALS (CONTINUED)
REVISION TO 902.01(a) PERFORMANCE GRADED ASPHALT BINDERS
REVISION TO 902.02 SAMPLING AND TESTING ASPHALT MATERIALS

The following exceptions to AASHTO T 40 shall apply:

1. Samples may be obtained at any time before material is incorporated into the work.

2. Samples for all grades of asphalt emulsion shall be a minimum of 1/2 gal. (1.9 L). The size of samples of other liquid material may be 1 qt (1.0 L).

3. Samples of liquid materials shall be obtained at one of the following:

   a. bulk storage tanks from sampling valves located in the tank or line and asphalt plant storage tanks from sampling valves located in the tank

   b. transports from sampling valves

   c. distributors from valves

   d. other storage or locations as approved

   e. sampling by other recognized devices may be approved

   f. sampling valves beyond the in-line blending location

COMMENTS AND ACTION

REVISION TO 902.01(a) PERFORMANCE GRADED ASPHALT BINDERS
REVISION TO 902.02 SAMPLING AND TESTING ASPHALT MATERIALS

DISCUSSIONS: Mr. Walker explained that there was a pilot program where they tested the in-line blending of latex modifiers and HMA binder. This process was only tested with a few grades of binder, but it was a success with the grades of binder it was tested with. The use of the latex modifiers would allow a couple of grades of binder to be adjusted to a higher grade (PG 58-28 modified to PG 64-28 and PG 64-22 modified to PG 70-22). This would in turn allow the asphalt plants to have better supply control.

Mr. Andrewski asked if it had been tested with a PG 70 or PG 76 binder. Mr. Walker responded that there were concerns with the polymers in the higher grades of binder neutralizing the effects of the latex and higher grades were not tested.

Motion: Mr. Walker Second: Mr. Keefer Ayes: 9 Nays: 0	Action: __X__ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: 902.02 page 759 Recurring Special Provision affected: 400-R-553 HMA PROVISIONS Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: SECTION 13	__X__ 2012 Standard Specifications Book _____ Create RSP (No._____) Effective _____Letting RSP Sunset Date: _____ __X__ Revise RSP (No.400-R-553) Effective Jan. 01, 2011 Letting RSP Sunset Date: _____ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y___N___ By _____ Addition or _____ Revision Received FHWA Approval? _x_

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Section 904.03 (d)1 requires that only steel furnace slag or sandstone be allowed as coarse aggregates in SMA mixtures. These aggregates are not readily available in all locations of the state and therefore the cost of these aggregates is very expensive in some locations. If other aggregates would be allowed to be blended with these aggregates, as we currently do with dense graded HMA mixtures, the cost of the SMA mixture would be reduced.

In 2009, test sections using a blend of steel slag and Polish Resistant Aggregates were placed with additional requirements of Micro-Deval Abrasion and Aggregate Degradation limits. These coarse aggregate requirements were based on the JTRP study SPR 2865, "Investigation of Coarse Aggregate Strength for Use in Stone Matrix Asphalt". The test sections were successful as far as the quality of the SMA mixtures and subsequent friction results obtained approximately one year later were comparable to the steel slag only control section.

PROPOSED SOLUTION: The following revisions to 904 are required:

1.Add the Micro-Deval and Aggregate Degradation additional SMA coarse aggregate requirements and corresponding Notes to the Classification of Aggregates table of 904.03(a). Also, lower the non-duable deleterious content from a maximum of 4.0% to 2.0% to assure shale and other non-durable materials are not used.

2.Revise the requirements for the use of steel furnace slag, sandstone, crushed dolomite and Polish Resistant Aggregates in the SMA Coarse Aggregate table in 904.03(d)2.

3. Identify AASHTO T 96 as the Los Angeles Abrasion test method and AASHTO T 327 as the Micro-Deval Abrasion test method in the Sampling and Testing test methods for coarse aggregate in 904.03 (f).

APPLICABLE STANDARD SPECIFICATIONS: 904

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS: 400-R-553

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS (CONTINUED)

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251x204

Date: May 27, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

Revisions recommended by the Office of Materials Management

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 904 - AGGREGATES
REVISION TO 904.03(a) CLASSIFICATION OF AGGREGATE
REVISION TO 904.03(d)2 SMA COARSE AGGREGATE
REVISION TO 904.03(f) SAMPLING AND TESTING

SECTION 904, BEGIN LINE 210, INSERT AS FOLLOWS:

a) Classification of Aggregates

Characteristic Classes	AP	AS	A	B	C	D	E	F
Quality Requirements								
Freeze and Thaw Beam Expansion, % Max. (Note 1)	.060							
Los Angeles Abrasion, %, Max. (Note 2)	40.0	30.0	40.0	40.0	45.0	45.0	50.0	
Freeze and Thaw, AASHTO T 103, Procedure A, % Max (Note 3)	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
Sodium Sulfate Soundness, %, Max. (Note 3).	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
Brine Freeze and Thaw Soundness, %, Max. (Note 3)	30	30	30	30	40	40	50	60
Absorption, % Max. (Note 4)	5.0	5.0	5.0	5.0	5.0			
Additional Requirements								
Deleterious, %, Max.								
Clay Lumps and Friable Particles	1.0	1.0	1.0	1.0	2.0	4.0		
Non-Durable (Note 5)	4.0	*2.0* ~~4.0~~	4.0	4.0	6.0	8.0		
Coke					(See	Note 6)		
Iron					(See	Note 6)		
Chert (Note 7)	3.0	3.0	3.0	5.0	8.0	10.0		
Weight per Cubic Foot for Slag, (lbs), Min.	75.0		75.0	75.0	70.0	70.0	70.0	
(Mass per Cubic Meter for Slag, (kg))	(1200)		(1200)	(1200)	(1120)	(1120)	(1120)	
Crushed Particles, % Min. (Note 8)								
Asphalt Seal Coats			70.0	70.0				
Compacted Aggregates			20.0	20.0	20.0	20.0		
Additional SMA Requirements								
Micro-Deval Abrasion, %, Max. (Note 9)		*18.0*						
Aggregate Degradation, %, Max. (Note 10)		*3.0*						

Notes:
1. Freeze and thaw beam expansion shall be tested and re-tested in accordance with ITM 210.
2. Los Angeles abrasion requirements shall not apply to BF.
3. Aggregates may, at the option of the Engineer, be accepted by the Sodium Sulfate Soundness or Brine Freeze and Thaw Soundness requirements.
4. Absorption requirements apply only to aggregates used in PCC and HMA mixtures except they shall not apply to BF. When crushed stone coarse aggregates from Category I sources consist of production from ledges whose absorptions differ by more than two percentage points, the absorption test will be performed every three months on each size of material proposed for use in PCC or HMA mixtures. Materials having absorption values between 5.0 and 6.0 that pass AP testing may be used in PCC. If variations in absorption preclude satisfactory production of PCC or HMA mixtures, independent stockpiles of materials will be sampled, tested, and approved prior to use.
5. Non-durable particles include soft particles as determined by ITM 206 and other particles which are structurally weak, such as soft sandstone, shale, limonite concretions, coal, weathered schist, cemented gravel, ocher, shells, wood, or other objectionable material. Determination of non-durable particles shall be made from the total weight (mass) of material retained on the 3/8 in. (9.5 mm) sieve. Scratch Hardness Test shall not apply to crushed stone coarse aggregate.
6. ACBF and SF coarse aggregate shall be free of objectionable amounts of coke, iron, and lime agglomerates.
7. The bulk specific gravity of chert shall be based on the saturated surface dry condition. The amount of chert less than 2.45 bulk specific gravity shall be determined on the total weight (mass) of material retained on the 3/8 in. (9.5 mm) sieve for sizes 2 through 8, 43, 53, and 73 and on the total weight (mass) of material retained on the No. 4 (4.75 mm) sieve for sizes 9, 11, 12, and 91.
8. Crushed particle requirements apply to gravel coarse aggregates used in compacted aggregates, and seal coats except seal coats used on shoulders. Determination of crushed particles shall be made from the weight (mass) of material retained on the No. 4 (4.75 mm) sieve in accordance with ASTM D 5821.
9. *Micro-Deval abrasion requirements shall apply to each coarse aggregate. A blend of coarse aggregates shall have the abrasion loss value determined in accordance with ITM 220.*
10. *Aggregate degradation shall be determined in accordance with ITM 220.*

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 904 – AGGREGATES (CONTINUED)
REVISION TO 904.03(a) CLASSIFICATION OF AGGREGATE
REVISION TO 904.03(d)2 SMA COARSE AGGREGATE
REVISION TO 904.03(f) SAMPLING AND TESTING

SECTION 904, BEGIN LINE 246, DELETE AND INSERT AS FOLLOWS:

2. SMA Coarse Aggregate

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

Notes:
1. *Steel furnace slag, sandstone, crushed dolomite, polish resistant aggregates or any blend of these aggregates may be used provided the aggregates are in accordance with 904.03(a).*
2. *Polish resistant aggregates or crushed dolomite may be used when blended with sandstone but ~~cannot~~ shall not exceed 50% of the coarse aggregate by weight (mass), or ~~cannot~~shall not exceed 40% of the coarse aggregate by weight (mass) when blended with steel furnace slag. The aggregates shall be in accordance with 904.03(a).*

SECTION 904, BEGIN LINE 253, INSERT AS FOLLOWS:

(f) Sampling and Testing

Sampling and testing will be in accordance with the following AASHTO, ASTM, and ITMs.

Los Angeles Abrasion.....AASHTO T 96
*Amount of Material finer than No. 200 (75 µm) Sieve… .....AASHTO T 11
Brine Freeze and Thaw Soundness. .....ITM 209
Clay Lumps and Friable Particles. .....AASHTO T 112
Control Procedures for Classification of Aggregates.....ITM 203
Crushed Particles.....ASTM D 5821
Dolomite Aggregates. .....ITM 205
Flat and Elongated Particles.....ASTM D 4791
Freeze and Thaw Beam Expansion.....ITM 210
*Lightweight Pieces in Aggregates.....AASHTO T 113
Micro-Deval Abrasion. .....*AASHTO T 327*
Polished Resistant Aggregates .....ITM 214
*Sampling Aggregates .....AASHTO T 2
Sampling Stockpiled Aggregates .....ITM 207
Scratch Hardness.....ITM 206
*Sieve Analysis.....AASHTO T 27
*Soundness..... AASHTO T 103, T 104
*Specific Gravity and Absorption.....AASHTO T 85

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 904 – AGGREGATES (CONTINUED)
REVISION TO 904.03(a) CLASSIFICATION OF AGGREGATE
REVISION TO 904.03(d)2 SMA COARSE AGGREGATE
REVISION TO 904.03(f) SAMPLING AND TESTING

Unit Weight and Voids in Aggregates .....AASHTO T 19
*Except as noted in 904.06

COMMENTS AND ACTION

REVISION TO 904.03(a) CLASSIFICATION OF AGGREGATE
REVISION TO 904.03(d)2 SMA COARSE AGGREGATE
REVISION TO 904.03(f) SAMPLING AND TESTING

DISCUSSIONS: Mr. Walker explained that only a few aggregate types are allowed for SMA and that are not readily available throughout the state. This proposal would allow a few more options for SMA aggregate and allow them to be blended. There is also an additional test for the aggregate to ensure that the aggregate would meet the higher durability requirements of SMA.
Mr. Andrewski asked if the IDM calculated the ESAL's based upon 20 or 25 years.

Mr. Uremovich had an editorial comment on one of the charts and the Committee agreed with the change.

Mr. Miller brought up the test methods and what the Micro-Deval test means for aggregate degradation. Mr. Walker stated that the test creates a situation that is more severe on the aggregate than what we would normally see in the Midwest, so he is confident that if the aggregate meets the requirements of the test, it should do well. Mr. Walker also noted that the values in the chart are the result of a JTRP study.

Mr. Andrewski stated he would need to review the IDM to make certain the ESAL's are calculated based upon 25 years and not 20 years since SMA is projected to last 25 years.

Motion: Mr. Walker Second: Mr. Boruff Ayes: 8 Nays: 0 Absent: 1	Action: ____ Passed as Submitted _X_ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 904.03 pages: 773, 774, 776 and 778 Recurring Special Provision affected: 400-R-553 HMA PROVISIONS Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: SECTION 13	_X_ 2012 Standard Specifications Book _X_ Create RSP (No.904-R-560) Effective Jan. 01, 2011 Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y __ N __ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? _X_

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The Federal Highway Administration regulations require INDOT to track all DBE participation on federal aid contracts, whether INDOT sets a DBE goal on a contract or not. A key way in which INDOT collects this data is through the DBE-3 affidavit form. When INDOT sets a DBE goal on a contract, the prime contractor must complete the DBE-3 after all work has been completed on the contract. The form only collects final DBE payment totals and is signed by the prime and the DBE firms.

This process works well for contracts with DBE goals; however, INDOT lacks data on DBE participations for contracts without goals. This is because DBE-3 requirement is currently effected by the insertion of Recurring Special Provision 100-C-151B into contracts with DBE goals. This Provision alters the language contained in Standard Specification 103.01 and contains all INDOT policies regarding DBE goals, in addition to the DBE-3 Requirement. 100-C-151B is only inserted into contracts with DBE goals, and the bulk of the language is only applicable to contracts with goals. Therefore, INDOT can not correct the DBE-3 problem by inserting 100-C-151B into contracts that do not have DBE goals because the DBE goal provisions would not apply to non-goal contracts.

PROPOSED SOLUTION: INDOT should adopt a new specification that requires contractors to complete a DBE-3 Affidavit form on contracts that do not have a DBE goal.

APPLICABLE STANDARD SPECIFICATIONS: 103.01

APPLICABLE STANDARD DRAWINGS:

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 2.7.2

APPLICABLE RECURRING SPECIAL PROVISIONS: 100-C-151B

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 317-232-5502

Date: 05-11-10

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 103 – AWARD AND EXECUTION OF CONTRACT
REVISION TO 103.01(G) SUBCONTRACTS

The Standard Specifications are revised as follows:

SECTION 103, BEGIN LINE 269, DELETE AND INSERT AS FOLLOWS:

Upon receipt of notification from the Department, a Disadvantaged Business Enterprise Utilization Affidavit, Form ~~MBE-3~~*DBE-3*, shall be completed by the Contractor and returned to the Department. *A DBE-3 Form certification shall be completed and submitted for every DBE utilized on the contract.* The Contractor and the *DBE* subcontractor/lessor/supplier shall certify on Form ~~MBE-3~~*DBE-3* ~~that~~ *what* specific amounts have been paid *to* and received *by the DBE.*

BACKUP NO. 1

FORM DBE-3 DISADVANTAGED BUSINESS ENTERPRISE UTILIZATION AFFIDAVIT

FORM DBE-3

INDIANA DEPARTMENT OF TRANSPORTATION
DISADVANTAGED BUSINESS ENTERPRISE UTILIZATION AFFIDAVIT

KNOW ALL MEN BY THESE PRESENTS:

THAT, in order to comply with the Disadvantaged Business Enterprise requirements set out in Contract _____ Project _____, the below signed persons, representing the Prime Contractor and the Disadvantaged Business Enterprise, do hereby certify and swear that the amounts shown below were paid to, and received by, the Disadvantaged Business Enterprise, represented below, who performed subcontract work, provided materials, or rendered any other service in the carrying forward, performing, and completing of said contract.

AMOUNT PAID TO _____ $_____
(NAME OF DBE)

The DBE was a: Subcontractor Lessor Supplier

Type of work performed or service provided: _____

_____

IN WITNESS WHEREOF, I have affixed my signature this _____ day of _____, _____.

_____
PRIME CONTRACTOR

By _____
SIGNATURE

_____
TITLE

ACKNOWLEDGEMENT

STATE OF INDIANA, COUNTY OF _____ SS:

Subscribed and sworn to before me by

_____ of the firm of

_____ this

_____ day of _____, _____.

_____
NOTARY PUBLIC

My Commission expires _____

* * * * * * * * * * * * * * * * *

AMOUNT **RECEIVED** FROM *(including retainage)* _____ $_____
(NAME OF PRIME CONTRACTOR)

IN WITNESS WHEREOF, I have affixed my signature this _____ day of _____, _____.

_____
DBE COMPANY NAME

By _____
SIGNATURE

_____
TITLE

ACKNOWLEDGEMENT

STATE OF INDIANA, COUNTY OF _____ SS:

Subscribed and sworn to before me by

_____ of the firm of

_____ this

_____ day of _____, _____.

_____
NOTARY PUBLIC

State Form 25381 (R/7-90)

My Commission expires _____

COMMENTS AND ACTION

REVISION TO 103.01(G) SUBCONTRACTS

DISCUSSIONS: Mr. Pankow introduced Mr. Resler who explained that contracts without a DBE goal need to fill out the DBE-3 form per FHWA. This should fill the gap in reporting that we currently have.

Mr. Miller asked how exactly this will help. Mr. Resler responded that currently we have no way to verify the information. There is a program the contractors use, but the sub-contractors have no way to verify the information.

Mr. Miller asked if this could lead to lower DBE goals. Mr. Resler responded that it would later in the year as the total goal for the state is met.

Mr. Berebitsky stated that industry does not see a need for the additional paperwork when there is a program that tracks this information in “real-time”. Filling out the DBE-3 form happens after the contract is complete. Mr. Resler stated that final compliance confirmation is needed and that is currently achieved through the DBE-3 form.

Mr. Miller asked Mr. Berebitsky what the impact would be to the contractors and Mr. Berebitsky stated that it will be more paperwork and more tracking.

Mr. Pankow asked if random audits would fulfill FHWA’s request and Mr. Keefer asked what exactly happens when the goal is 0%. Mr. Resler replied that audits would not meet FHWA’s request and that the DBE-3 form would be required to be filled out by the contractors.

Mr. Miller asked how this could affect contract closeout and Mr. Resler stated that it should not have too great of an impact as a majority of contracts currently have a DBE goal and as such, require a DBE-3 already.

Mr. Clanton asked if INDOT is currently out of compliance with FHWA and if this is requirement or a recommendation. Mr. George stated that this is more of a requirement. Mr. Clanton then asked if there was a problem with the current data and Mr. Resler replied that there was no problem with the current data.

Mr. Miller had concerns about the wording of the provision and asked if it could lead to possibly delays. He asked if INDOT needed to notify the contractors sooner if it was now a requirement on all contracts.

Mr. Pankow stated that he believed the requests for the DBE-3 forms were going out sooner than before because the districts were doing the notification rather than the final review staff making the request.

COMMENTS AND ACTION (CONTINUED)

REVISION TO 103.01(G) SUBCONTRACTS

Motion: Mr. Pankow Second: Mr. Keefer Ayes: 9 Nays: 0	Action: __X__ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: 103.1 Recurring Special Provision: 100-C-151B DISADVANTAGED BUSINESS ENTERPRISE PROCEDURE AND GOOD FAITH EFFORTS 100-C-151C DBE RECORD AND TIMELY PAY Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: SECTION 2.7.2	_____ 20__ Standard Specifications Book __X__ Create RSP (No.103-C-584) Effective Nov. 01, 2010 Letting RSP Sunset Date: _____ _____ Revise RSP (No._____) Effective _____Letting RSP Sunset Date: _____ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y___N___ By _____ Addition or _____ Revision Received FHWA Approval? __X__

Mr. Wright
Date: 06/17/10

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: RSP 601-R-338 acts as an "approved list" for non-timber guardrail blocks. The only approval mechanism for placing blocks on this list is NCHRP 350 approval.

PROPOSED SOLUTION: Incorporate the 350 acceptance criteria into 601 and 926.03 to remove the need for the RSP approved list. Will also require some language inserted into 910.11.

APPLICABLE STANDARD SPECIFICATIONS: 601, 926.03

APPLICABLE STANDARD DRAWINGS: 601-WBGA-01, 601-WBGA-02, 601-WBGA-03, 601-WBGA-06, 601-WBGC-01, 601-WBGC-03

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: Unknown

APPLICABLE RECURRING SPECIAL PROVISIONS: 601-R-338

Submitted By: John Wright/Todd Shields

Title: Manager, Office of Technical Services

Organization: INDOT

Phone Number: 317-233-4726

Date: May, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Reviewed by Yadu Shah (standards section), Evaluations Oversight Committee

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 601 - GUARDRAIL
REVISION TO 601.02 MATERIALS

The Standard Specifications are revised as follows:

SECTION 601, AFTER LINE 19, INSERT AS FOLLOWS:

MATERIALS

601.02 Materials
Materials shall be in accordance with the following:

Rail Accessories, Fittings, and Hardware	910.11
~~Steel~~ Guardrail Posts	910.10
Steel Thrie-Beam Rail	910.09
Steel W-Beam Rail	910.09
Timber Posts and Blocks	911.02(f)
Alternate Material Blocks	*926.03*

All guardrail, post, accessories, fittings, and hardware shall be supplied from a source listed on the Department's list of approved Certified Guardrail Suppliers in accordance with 910.12. Guardrail end treatments shall be selected from the Department's list of approved Guardrail End Treatments in accordance with 601.07 and impact attenuators shall be selected from the Department's list of Approved Impact Attenuators in accordance with 601.08.

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 910 – METAL MATERIALS
REVISION TO 910.11 GUARDRAIL ACCESSORIES, FITTINGS AND HARDWARE

The Standard Specifications are revised as follows:

SECTION 910, LINE 530, INSERT AS FOLLOWS:

910.11 Guardrail Accessories, Fittings, and Hardware

These items consist of brackets, splice plates and bars, post anchors, diaphragms, clamps and clamp bars, end caps, connections, anchor rod assemblies, deadmen, bolts, screws, nuts, ~~and~~ washers, *and blockouts* of the type, dimensions, and design shown on the plans. They shall be in accordance with the requirements set out below. Items of the same type shall be interchangeable regardless of the source.

SECTION 910, AFTER LINE 590, INSERT AS FOLLOWS:

8. Timber blockouts shall be in accordance with 911.02(f). Alternate material blockouts shall be in accordance with 926.03.

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 926 – MISCELLANEOUS MATERIALS
ADDED *926.03 ALTERNATE MATERIAL GUARDRAIL BLOCKS*

The Standard Specifications are revised as follows:

SECTION 926, AFTER LINE 98, INSERT AS FOLLOWS:

926.03 Alternate Material Guardrail Blocks

Non-timber blockouts shall be dimensioned as tested and shall be used with the type of guardrail as tested in accordance with NCHRP 350. Blockouts shall be accompanied by a certification from the manufacturer stating the blockouts furnished have the same chemistry, mechanical properties, and geometry as those certified to have passed the NCHRP 350 crash test and have been certified by the Federal Highway Administration to be acceptable for use on NHS facilities.

Alternate material blockouts meeting the criteria may be used interchangeably with timber blockouts as long as the line and grade of the face of the guardrail is true to that shown on the plans.

COMMENTS AND ACTION

REVISION TO 601.02 MATERIALS
REVISION TO 910.11 GUARDRAIL ACCESSORIES, FITTINGS AND HARDWARE
ADDED *926.03 ALTERNATE MATERIAL GUARDRAIL BLOCKS*

DISCUSSIONS: Mr. Shah explained that the purpose of this provision was to remove the approved list from the RSP. It created a situation that required a revision to the RSP every time there was a new supplier.

Mr. Miller asked if a certification would then be required on every contract covered by this provision and the answer was yes.

Mr. Boruff asked what would happen to the current RSP and Mr. Shah stated that the current RSP would be deleted and replaced with this new proposed version.

Motion: Mr. Shah Second: Mr. Andrewski Ayes: 9 Nays: 0	Action: _X_ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 601.02 910.11 926 Recurring Special Provision affected: 601-R-338 GUARDRAIL BLOCKOUTS Standard Sheets affected: 601-WBGA-01, 601-WBGA-02, 601-WBGA-03, 601-WBGA-06, 601-WBGC-01, 601-WBGC-03 Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_X_ 2012 Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ _X_ Revise RSP (No. 601-R-338) Effective Sep. 01, 2010 Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? _X_

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Sometimes it is difficult to install inductive loop detectors on an approach to a signalized intersection due to poor pavement condition, lack of underground conduit, right-of-way constraints, or other circumstances. The construction of underground cable and conduit and inductive loop detectors, particularly for dilemma zone loops at high-speed intersections, is expensive.

PROPOSED SOLUTION: Wireless magnetometer detection systems make it possible to install vehicle detection on an approach without cutting loops or running conduit and detector housings. The magnetometers are installed in cored holes in the pavement. They transmit wirelessly to either receiver/processors or through repeaters to receiver/processors. Detection of a vehicle and/or vehicular counts are transmitted via ethernet cable to contact closure cards in a standard detector rack in the controller cabinet where they're processed as detected vehicles from inductive loops typically are. The development of special provisions, standard drawings, a revision of the Indiana Design Manual, and an Indiana Test Method (ITM) will ensure that the system is designed and constructed properly.

APPLICABLE STANDARD SPECIFICATIONS: 805.10, 805.15, 805.16, 922.11

APPLICABLE STANDARD DRAWINGS: 805-SGDW-01 (attached)

APPLICABLE DESIGN MANUAL SECTION: Section 77-4.02(03) and Section 77-4.02(04)

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: 805-T-169, 922-T-168

B

Submitted By: David Boruff, P.E.

Title: Traffic Administration Manager

Organization: INDOT

Phone Number: (317) 899-8626

Date: 6/9/10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad-hoc review by district traffic and construction and contractors.

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

SECTION 805 – TRAFFIC SIGNAL (RSP 805-T-169)
REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS
REVISION TO 805.15 METHOD OF MEASUREMENTS
REVISION TO 805.16 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 805, BEGIN LINE 376, DELETE AND INSERT AS FOLLOWS:

805.10 Magnetometer, ~~and~~ Microloop, *and Wireless* Detectors

(a) Magnetometer and Microloop Detectors

Before installation of Magnetometer or Microloop probes the Contractor shall confirm the adequacy of the magnetic field intensity, to be sure that the range is suitable for their operation. Arrangement of probes shall be located at maximum distance from steel support under bridges. Probes shall be installed with their long dimension vertical, and with the cable end at the top. Probes shall be firmly supported, so the lateral and vertical motion is restricted. Probes shall be connected in series. The splice shall be soldered by means of hot iron, or pouring or dripping without flames, with rosin core solder and shall be insulated and waterproofed in accordance with the manufacturer's specifications.

(b) Wireless Vehicle Detection System

This work shall consist of furnishing and installing wireless vehicle detection systems for vehicle detection at traffic signals.

Prior to the installation, the Contractor shall test all in-pavement sensors and demonstrate proper operation and communication between the in-pavement sensors and the receiver processor and wireless repeater, if required.

Prior to the installation, the Contractor shall demonstrate that each in-pavement sensor shall be installed within range of its corresponding receiver processor, using wireless repeaters as necessary. All in-pavement sensors assigned to either a receiver processor or wireless repeater shall be located within a 120 degree arc measured from the receiver processor or wireless repeater.

The Contractor shall install each in-pavement sensor in the roadway in accordance with the manufacturer's recommendations and as shown on the plans. Holes cored in the pavement shall be cleaned and dried before installing in-pavement sensors. The cored pavement shall be backfilled in accordance with the manufacturer's recommendations.

Receiver processors and wireless repeaters shall be mounted on traffic signal steel strain, or cantilever poles, or signal pedestals on type A foundations. The mounting height of receiver processors and wireless repeaters above the pavement surface shall be between 13 ft (3.9 m) and 20 ft (6.0 m).

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

SECTION 805 – TRAFFIC SIGNAL (RSP 805-T-169) (CONTINUED)
REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS
REVISION TO 805.15 METHOD OF MEASUREMENTS
REVISION TO 805.16 BASIS OF PAYMENT

The minimum distance between a receiver processor and wireless repeater mounted on the same structure shall be 2 ft (0.6 m). This distance may be increased to enable better communication between the devices.

After installation, the Contractor shall demonstrate successful communication between each in-pavement sensor, receiver processor, and wireless repeater to the Engineer.

SECTION 805, AFTER LINE 459, INSERT AS FOLLOWS:

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be measured by the number of units installed.

SECTION 805, AFTER LINE 497, INSERT AS FOLLOWS:

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be paid for at the contract unit price per each.

SECTION 805, BEGIN LINE 509, INSERT AS FOLLOWS:

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Contact Closure Card	*EACH*
Controller and Cabinet, _____, _____ Phase (type, no.)	EACH
Controller and Cabinet, Flasher, _____ (type)	EACH
Controller Cabinet Foundation, _____ (type)	EACH
Controller Cabinet Foundation, M, Modify to P-1	EACH
Disconnect Hanger	EACH
Flasher Installation, Location No. _____	LS
Flasher Modernization, Location No. _____	LS
Handhole, Signal	EACH
Loop Detector Delay Amplifier, _____ Channel (no.)	EACH
Magnetometer Detector	EACH
Microloop Detector	EACH
Miscellaneous Equipment for Traffic Signals	LS
Pedestrian Push Button	EACH
Pedestrian Signal Head, _____, _____ (type, lens size)	EACH
Receiver Processor	*EACH*

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

SECTION 805 – TRAFFIC SIGNAL (RSP 805-T-169) (CONTINUED)

REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS

REVISION TO 805.15 METHOD OF MEASUREMENTS

REVISION TO 805.16 BASIS OF PAYMENT

Saw Cut for Roadway Loop and Sealant .....LFT (m)
Signal Cable, _____, No. _____ Copper, _____ C/ ___LFT (m)
type conductors/size
Signal Cantilever Structure, Mast Arm _____ ft (m).....EACH
length
Signal Detector Housing .....EACH
Signal Interconnect Cable, ____, No. ____
type
Copper, ____ C/ ____.....LFT (m)
conductors/size
Signal Pedestal, _____ ft (m).....EACH
length
Signal Pole, Wood, _____, _____ ft (m) .....EACH
class length
Signal Service.....EACH
Signal Strain Pole, Steel, _____ ft (m).....EACH
length
Signal Support Foundation, _____ in. (mm) x _____ in. (mm)
x _____ in. (mm).....EACH
Span and Catenary for Flasher .....EACH
Span, Catenary, and Tether .....EACH
Traffic Signal Equipment, Remove.....LS
Traffic Signal Head, _____ Way, _____ Section, ____ ...EACH
no. no. lens sizes & colors
Traffic Signal Installation, _____, Location No. _____ .....LS
type
Traffic Signal Modernization, _____, Location No. _____....LS
type
Transportation of Salvageable Signal Equipment.....LS
Wireless Magnetometer Detector Type _____.....EACH
Wireless Repeater.....EACH

The cost of coring the pavement, sealant, and all work necessary for proper installation and operation of the in-pavement sensors will be included in the cost of the wireless magnetometer detector.

The cost of cables, connectors, set-up and operating software, access boxes, rack mounted expansion cards, and all hardware necessary to complete the installation will be included in the cost of the contact closure cards.

The cost of required mounting equipment, cables, connectors, and miscellaneous equipment necessary for proper installation and operation of the receiver/processors will be included in the cost of the receiver processors.

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

SECTION 805 – TRAFFIC SIGNAL (RSP 805-T-169) (CONTINUED)
REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS
REVISION TO 805.15 METHOD OF MEASUREMENTS
REVISION TO 805.16 BASIS OF PAYMENT

The cost of required mounting equipment, connectors, and miscellaneous equipment necessary for proper installation and operation of the wireless repeaters shall be included in the cost of the wireless repeaters.

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

SECTION 922 – TRAFFIC SIGNALS MATERIALS (RSP 922-T-168)
REVISION TO 922.11 SIGNAL CABLE
REVISION TO 922.13 DETECTION WIRE AND SEALANT

SECTION 922, AFTER LINE 3394, INSERT AS FOLLOWS:

(d) Ethernet Cable

Ethernet cable for wireless vehicle detectors shall be outdoor rated and UV shielded.

SECTION 922, LINE 3430, DELETE AND INSERT AS FOLLOWS:

922.13 Detection Wire and ~~Sealant~~ *Wireless Detectors*

SECTION 922, AFTER LINE 3460, INSERT AS FOLLOWS:

(d) Wireless detectors

The wireless vehicle detection system, WVDS, shall consist of wireless in-pavement magnetometers, contact closure cards, receiver processors, and wireless repeaters for a signalized intersection. The system shall be capable of monitoring vehicles on a roadway via detection of changes in inductance caused by the presence or passage of a vehicle and shall provide detector outputs to a traffic signal controller.

The WVDS shall include in-pavement magnetometers, a minimum of two receiver processors, the required mounting equipment, cables, rack mounted cards, set-up and operating software, all connectors, and miscellaneous equipment necessary for the installation and operation of the system. If required, the WVDS shall also include wireless repeaters.

Only models from the Department's list of approved traffic signal control equipment shall be used.

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES
ADDED IDM *77-4.02(04) DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

77-4.02(03) Other Detector Types

There are numerous types of vehicular detectors available. However, INDOT typically uses the inductive-loop detector. The following discusses several other detector types that are available.

1. Magnetic Detector

Magnetic detectors consist of a small coil of wires located inside a protective housing embedded into the roadway surface. As vehicles pass over the device, the detector registers the change in the magnetic field surrounding the device. This signal is recorded by an amplifier and relayed back to the controller as a vehicular detection. A major problem with this detector is that it can only detect the passage of a vehicle traveling at speeds of 3 mph (5 km/h) or greater. It cannot be used to determine a stopped vehicle's presence. The advantages are that they are simple to install and are resistant to pavement-surfacing problems.

2. Magnetometer Detector

A magnetometer detector consists of a magnetic metal core with wrapped windings, similar to a transformer. This core is sealed in a cylinder about 1 in. (25 mm) in diameter and 4 in. (100 mm) long. The detector is placed in a drilled vertical hole about 1 ft (0.3 m) deep in the pavement surface. Magnetometer detectors sense the variation between the magnetic fields caused by the passage or presence of a vehicle. The signal is recorded by an amplifier and is relayed to the controller as a passage or presence vehicle. Magnetometer detectors are sufficiently sensitive to use to detect bicyclists or as a counting device. A problem with the magnetometer detector is that it does not provide a sharp cutoff at the perimeter of the detection vehicle (i.e., it may detect vehicles in adjacent lanes).

3. Wireless Vehicle Detector

A wireless vehicle detector is similar to a magnetometer detector except that it uses a low-power radio to transmit the signal to a wireless repeater or receiver processor. The signal is recorded by an amplifier and is relayed to the controller as a passage or presence vehicle. The detector is placed in a drilled vertical hole about 0.2 ft (60 mm) deep in the pavement surface. The wireless repeaters and receiver processors at

intersections should be mounted to signal structures. The ethernet cable for the receiver processors may be run across span wire on span and strain pole installations. Wireless vehicle detectors are sufficiently sensitive to detect bicyclists or for use as a counting device. One of the disadvantages of wireless vehicle detector is that they have to be replaced, at least every 10 years, and the wireless repeaters' batteries have to be replaced every 2 years. See Figure 77-4H and Figure 77-4I for typical installation designs.

4. Microloop Detector

A microloop detector is similar to the magnetometer detector, but it can work with the standard inductive loop detector amplifiers. The microloop is typically installed by drilling a 3-in. (75 mm) diameter hole 1'-6" (500 mm) deep into the pavement structure, by securing it to the underside of a bridge deck, or inserting a 3" diameter conduit under the pavement to accommodate a series of microloops (non-invasive microloop system). A major disadvantage of the microloop detector is that it requires some motion to activate the triggering circuitry of the detector and does not detect stopped vehicles. This type of detector would typically require two detectors placed side-by-side per lane due to its limited field of detection.

5. Video Image Detection

The video image detector consists of one to six video cameras, an automatic control unit and a supervisor computer. The computer detects a vehicle by comparing the images from the camera(s) to those stored in memory. The detector can work in both the presence and passage modes. This detector also allows the images to be used for counting and vehicular classification. Special housings are required to protect the camera from environmental elements. Early models experienced problems with the video detection during adverse weather conditions (e.g., fog, rain, snow). INDOT currently allows video detection only for temporary signals.

6. Pedestrian Detectors

The most common pedestrian detector is the pedestrian push or call button. These pedestrian call buttons should be placed so that they are convenient to use, reachable by the handicapped and not placed in the direct path for the blind. Inconvenient placement of pedestrian detectors is one of the reasons pedestrians may choose to cross the intersection illegally and unsafely.

7. Bicycle Detectors

The two most common methods for bicycle detection are:

a. Pedestrian Push-Button Detector

With the push-button detector, the bicyclist must stop and push the detector button for the controller to record the detection. This may require the bicyclist to leave the roadway and proceed on the sidewalk to reach the detector.

b. Inductive-Loop Detector

The inductive-loop detector can detect the bicycle without the bicyclist's interaction. For the greatest sensitivity of the detector, the bicyclist should be guided directly over the wire. A problem with bicycle inductive-loop detectors is that they require a significant amount of metal to be activated. Today's bicycle designs tend to use a substantial amount of non-magnetic, man-made materials to increase their strength and reduce their weight. This has substantially reduced the metal content that can be detected.

77-4.02(04) Decision making criteria for when to use another type of detection

Detection systems other than inductive loops require plan detailing. See Figures 77-4H and 77-4I for typical plan details. In order to use a type of detection other than inductive loops, INDOT designers and consultants and local agency consultants must provide and submit documentation that 2 of the following 3 conditions have been met:

1. *An inductive loop design will not work because of a physical limitation (R/W, geometrics, pavement conditions, obstructed conduit paths, etc).*
2. *A full inductive loop design has been considered and there is a post-design lifecycle cost advantage to using a detection system other than loops. No design time cost or labor savings will be considered in lifecycle cost calculations.*
3. *A hybrid design using loops at the stop bar and wireless magnetometers for advance vehicle detection has been considered and evaluated where wireless magnetometers have been evaluated for advance vehicle detection only, and the hybrid design is the most cost effective (post design lifecycle cost).*

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

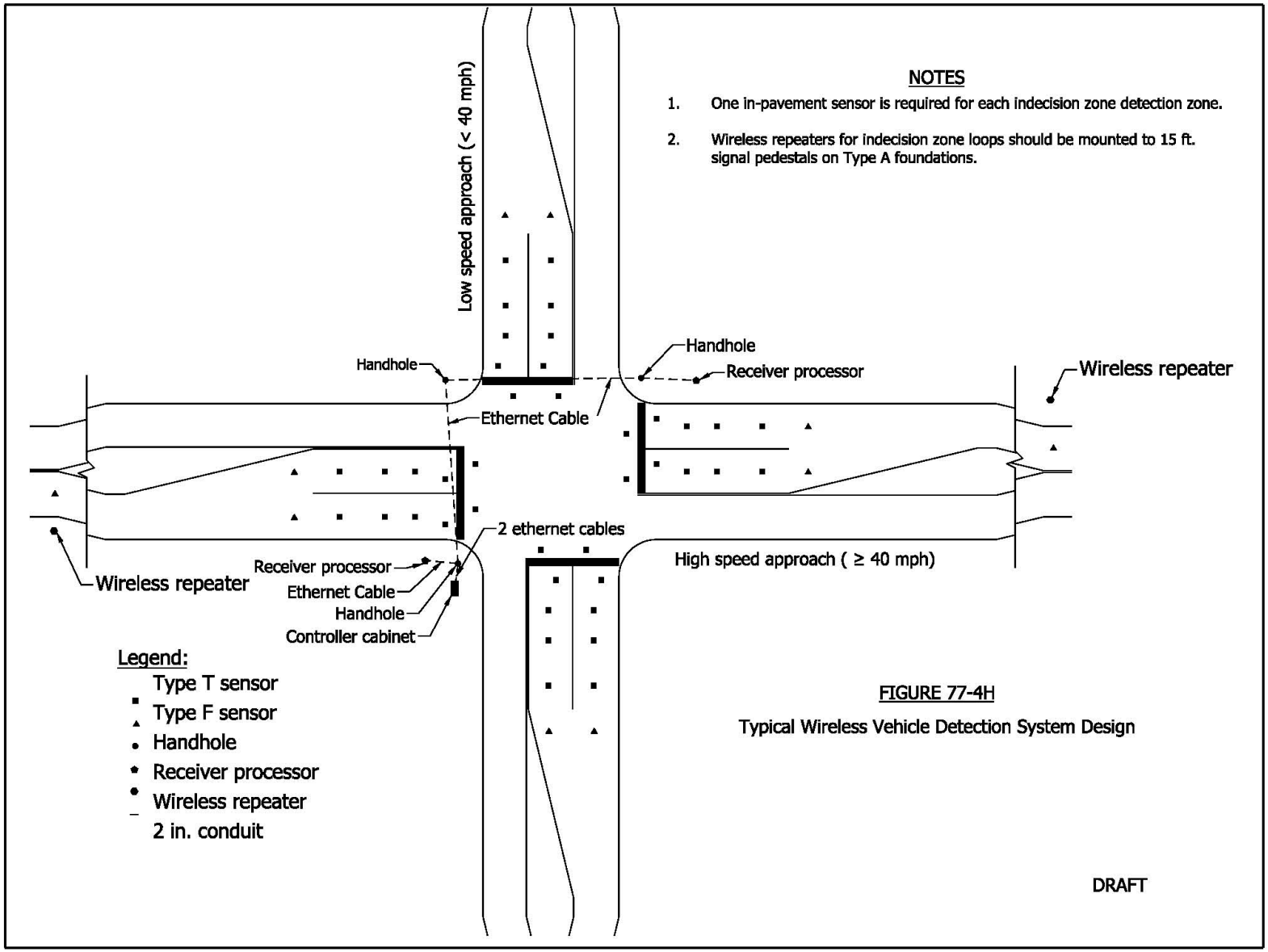
IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT (CONTINUED)
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES
ADDED IDM *77-4.02(04) DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

In addition, written concurrence from both the INDOT Office of Traffic Control Systems and the District Traffic Engineer, or the local agency for local projects, before wireless vehicle detection may be used at a specific location.

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT (CONTINUED)

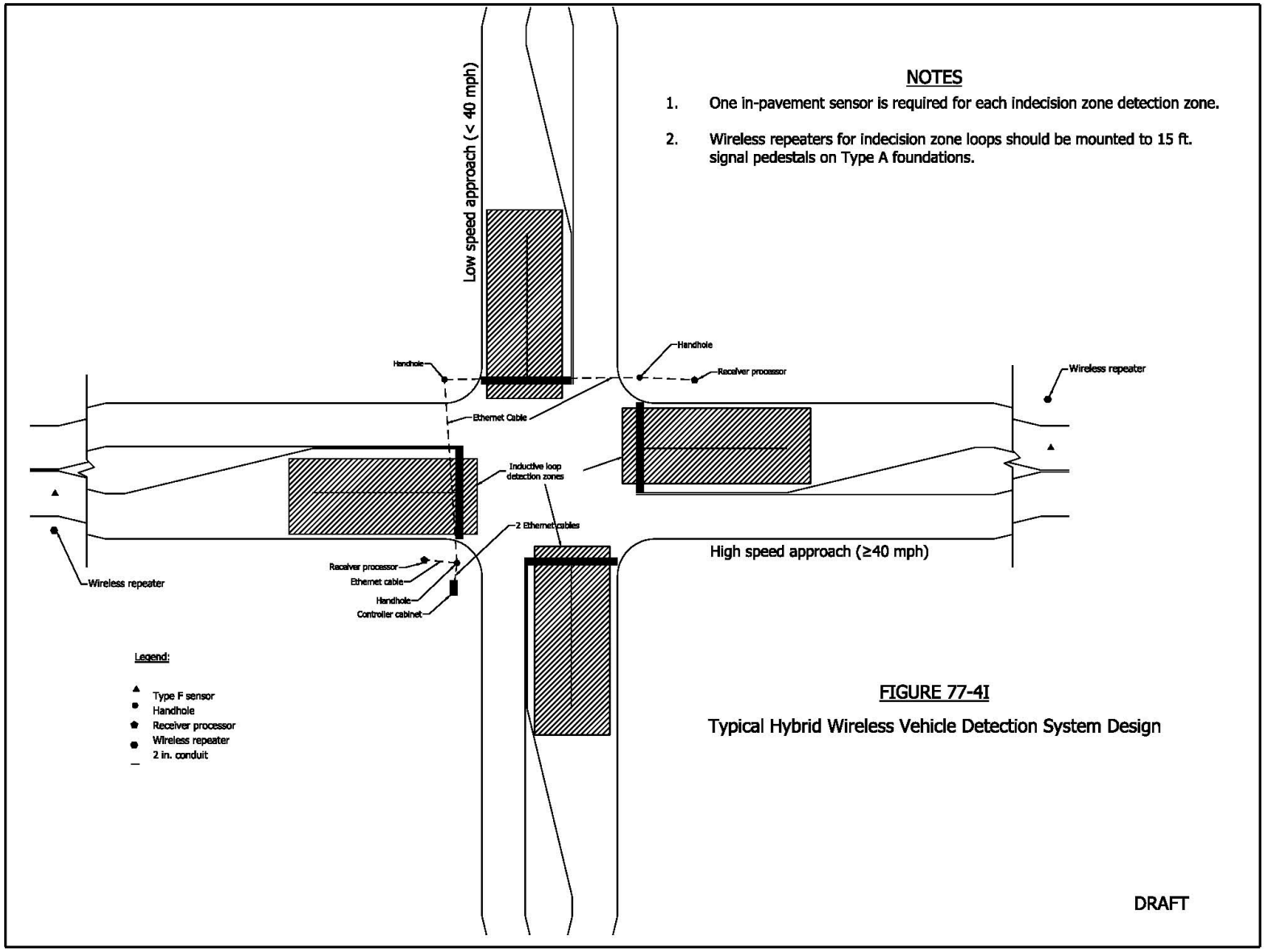
ADDED FIGURE *77-4H TYPICAL WIRELESS VEHICLE DETECTION SYSTEM DESIGN (DRAFT)*



REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT (CONTINUED)

ADDED FIGURE *77-4I TYPICAL HYBRID WIRELESS VEHICLE DETECTION SYSTEM DESIGN (DRAFT)*

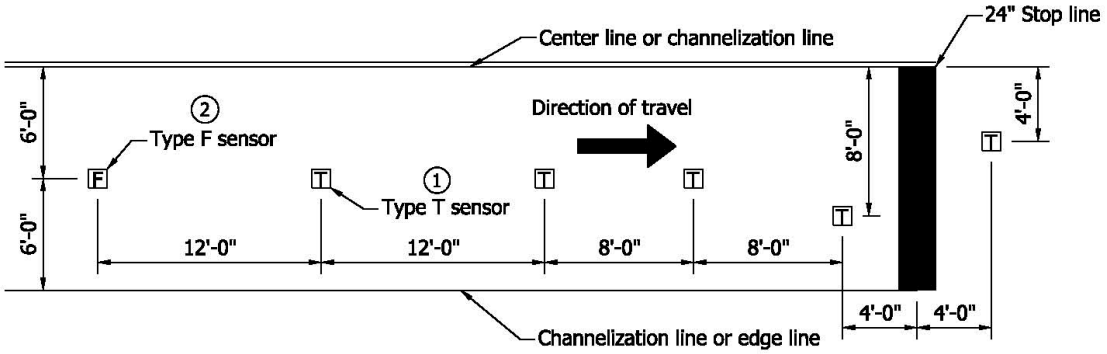


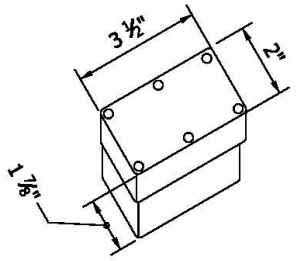
REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

PROPOSED NEW STANDARD DRAWING *805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE* (DRAFT)

GENERAL NOTES

1. Type T Sensors detect only vehicle presence.
2. Type F Sensors detect vehicle presence and provide vehicle counts.
3. There should be at least ¼" and no more than ½" of clearance between the top of the sensor and the top of the pavement





DETAIL A

Wireless in-pavement sensor
(both types)

INDIANA DEPARTMENT OF TRANSPORTATION

WIRELESS VEHICLE DETECTORS
STOP BAR DETECTION ZONE
DRAFT

STANDARD DRAWING NO. E 805-SGDW-01

/s/ Richard L. VanCleave XX/XX/XX
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller XX/XX/XX
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

PROPOSED NEW STANDARD DRAWING *805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE* (DRAFT)

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REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

BACKUP No. 1 (ITM)
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

New ?-??-10
Effective ?-??-10

INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT

PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)
ITM No.

1.0 SCOPE.

1.1 This test procedure covers the methods that a wireless vehicle detection system (WVDS) is bench tested, evaluated in the field, and is placed on, maintained on, or removed from an approval list.

1.2 The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this Indiana Testing Method (ITM) is used. Within the text, SI metric units are shown in parentheses. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.

1.3 This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITM's use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 Indiana Test Methods or Procedures

Indiana Test Method No. 934-08P, Procedure for Evaluating Vehicle Detection Performance

2.2 NEMA Standards.

2003 NEMA Standards Publication TS-2 Traffic Signal Controller Assemblies.

3.0 TERMINOLOGY. Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101 and NEMA TS-2 Section 1.

3.1 Abbreviations Wherever the following abbreviations are used in this ITM, they are to be construed the same as the respective expressions represented.

WVDS	Wireless Vehicle Detection System

4.0 SIGNIFICANCE AND USE.

4.1 This Indiana Testing Method (ITM) is used to evaluate, approve, maintain approval, and remove from the approval listing of wireless vehicle detection systems which is placed on the Department's List of Approved Traffic Controller Equipment. Each model of WVDS will be bench tested and field tested separately.

5.0 APPARATUS.

5.1 A fully functional instrumented intersection, with detector data output logging and live video overlay capabilities.

6.0 SAMPLING. The manufacturer shall furnish, at no cost to the Department, one randomly selected production-run wireless vehicle detection system of each model for bench testing and field testing. The model shall include all components and purpose-built cables and connectors necessary for operation.

The wireless vehicle detection system shall consist of all electronic equipment, in-pavement sensors, receiver/processors, repeaters, mounting hardware, cables, and power supplies.

7.0 PROCEDURE. The Department will evaluate the performance of individual vehicle detectors upon successful completion of all other requirements specific to the vehicle detector being tested.

8.0 SUBMITTAL REVIEW. The documentation will be reviewed for usability of the WVDS with Department approved NEMA TS-2 traffic controller assemblies. The documentation will be reviewed for product compliance with the MUTCD and the draft INDOT specifications. The manufacturer's recommended schedule and extent of maintenance will be reviewed for acceptability.

9.0 BENCH TESTING. The WVDS will be bench tested for compatibility with all NEMA TS-2 signal controller assemblies used by the Department. The WVDS will be verified for full NEMA TS-2 functionality & full manufacturer's claimed optional functionality.

10.0 FIELD TESTING. Field testing of the WVDS shall be in accordance with ITM 934-08P.

11.0 REPORT. A final report will include the notations and findings from the electronic bench test and field testing results and documentation.

12.0 APPROVAL LIST

12.1 Approval of a wireless vehicle detection system. The WVDS model may be placed on the approval list when the following conditions are met:

12.1.1 A potential net benefit to the Department is realized by inclusion of the item on the list.

12.1.2 The bench and field testing are completed with satisfactory results.

12.1.3 The required documentation is submitted.

12.1.4 No excessive amount of routine or periodic maintenance is required.

12.1.5 No failure with any of the different types of NEMA TS-2 traffic controller assemblies or individual traffic control components used by the Department.

12.1.6 The wireless vehicle detection system shall include:

- All manuals & documents
- All required software to realize full potential of the WVDS.

12.1.7 Only minimal maintenance operations were necessary during the field testing.

12.2 Maintaining Approval. Maintaining approval of the WVDS shall be in accordance with ITM 934-08P.

12.3 Removal from Approval List. Removal from the approval list shall be in accordance with ITM 934-08P.

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST
REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

ITM ???-?? New 2-09-05
Effective 9-01-05

APPENDIX A

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF OPERATIONS SUPPORT
PRELIMINARY INFORMATION FOR PRODUCT MATERIAL EVALUATION

Trade Name _____ Date _____

Manufacturer _____ Patented? Yes _____ No _____ Applied for ____

Address _____
Street No (P. O. Box) City State Zip Code

Representative _____ Phone No ( )_____

Address _____
Street No (P. O. Box) City State Zip Code

Product Information _____
_____

Materials Composition _____
_____
_____

** Is this product considered HAZARDOUS MATERIAL when disposing of non-used or surplus materials? Yes _____ No _____

** What is the shelf life of this material? Years ____Months _____N/A_____

Recommended Use-Primary _____

_____

_____

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST
REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

Recommended Use-Alternate _____

_____

Advantages and/or Benefits _____
_____
_____

** Materials specifications by manufacturer, installation/operation manual, maintenance manual, literature, test results, guarantee, hazardous material data sheets, plan, picture or sketch must be submitted with this form. In the case of electronic devices the schematic diagram, parts list, and parts layout diagram must be submitted for each printed circuit board within the device.

Meets following specifications:

AASHTO _____ _____

ASTM _____ _____

OTHER _____

Use by highway authorities or similar agencies in other states.

Agency	Years Used	Remarks
_____	_____	_____
_____	_____	_____
_____	_____	_____

** Has product ever been evaluated by and rejected for use by a governmental agency?

Yes _____ No _____ yes, by what agency and for what reason?
_____
_____

Will demonstration be provided? Yes _____ No _____

Availability: Seasonal _____ Nonseasonal _____ Delivery at site _____

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST
REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

After receipt of order, are quantities limited? Yes _____ No _____

** Will FREE SAMPLES be furnished? Yes _____ No _____
If yes, Quantity Furnished _____

** If the sample is salvageable, do you desire to have it returned Yes ___ No ___

(Desired return of salvageable samples will be at the supplier's expense.)
(The manufacturer agrees upon the return of salvageable samples, such samples may be damaged or non-operable. Normal care will be taken that the samples, when returned, are in operable condition; INDOT, however, does not guarantee that the returned samples are operable.)

Will laboratory analysis be furnished? Yes _____ No _____

** Approximate cost _____ Royalty Cost _____

When was the product introduced to the market? _____

This product is an alternate for what product? _____
_____
_____

Will warranty be provided? Yes ____ No _____ If yes, for how long? _____
Background of company, including principal products _____
_____
_____
_____

What offices of the Indiana Department of Transportation have been contacted?
_____
Additional Information _____
_____
_____
_____
(Attach additional sheets as necessary)

Person furnishing information _____
Name Title

Address _____
Street No (P. O. Box) City State Zip Code

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST
REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

Items marked ** MUST BE RESPONDED TO or further consideration may not be given for this product.

Please mail this form to:

Manager, Office of Traffic Engineering
100 N. Senate Ave., Room N925
Indianapolis, IN 46204-2249

If INDOT elects to evaluate your product/material - traffic signal equipment will be shipped to:

Electronic Technician Supervisor
Indiana Department of Transportation
6400 E. 30th Street
Indianapolis, IN 46219-8222

While all other materials to be evaluated will be shipped to:

Traffic Evaluations Engineer
Indiana Department of Transportation
6400 E. 30th Street
Indianapolis, IN 46219-8222

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

HANDOUT (SEE COMMENTS AND ACTION FOR THIS ITEM)

The Contractor shall install each in-pavement sensor in the roadway according to the manufacturer's recommendations and as shown on the plans. Holes cored in the pavement shall be cleaned and dried before installing in-pavement sensors. The cored pavement shall be backfilled according to the manufacturer's recommendations.

Receiver processors and wireless repeaters will be mounted on traffic signal steel strain, or cantilever poles, or signal pedestals on type A foundations. The mounting height of receiver processors above the pavement surface shall be between 20 ft. (6.0 m) and 35 ft. (10.7 m). The mounting height of wireless repeaters above the pavement surface shall be between 13 ft. (3.9 m) and 35 ft. (10.7 m).

The minimum distance between a receiver processor and wireless repeater mounted on the same structure shall be 2 ft. (0.6 m). This distance may be increased to enable better communication between the devices.

After installation, the Contractor shall demonstrate successful communication between each in-pavement sensor, receiver processor, and wireless repeater to the Project Engineer.

805.15 Method of Measurement

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be measured by the number of units installed.

805.16 Basis of Payment

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be paid for at the contract unit price.

Pay Item	Pay Unit Symbol
Wireless Magnetometer Detector Type ___	*Each*
Contact Closure Card	*Each*
Receiver processor	*Each*
Wireless Repeater	*Each*

The cost of coring the pavement, sealant, and all work necessary for proper installation and operation of the in-pavement sensors will be included in the cost of the wireless magnetometer detector.

The cost of cables, connectors, set-up and operating software, access boxes, rack mounted expansion cards, and all hardware necessary to complete the installation will be included in the cost of the contact closure cards.

The cost of required mounting equipment, cables, connectors, and miscellaneous equipment necessary for proper installation and operation of the receiver processors will be included in the cost of the receiver processors.

The cost of required mounting equipment, connectors, and miscellaneous equipment necessary for proper installation and operation of the wireless repeaters will be included in the cost of the wireless repeaters.

COMMENTS AND ACTION

REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS
REVISION TO 805.15 METHOD OF MEASUREMENTS
REVISION TO 805.16 BASIS OF PAYMENT
REVISION TO IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT
STANDARD DRAWING *805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE*

Note: This item was revised on 06-14-10 and was considered as replacement to the original agenda item.

DISCUSSIONS: Mr. Boruff introduced Mr. Richards who explained that the use of wireless detectors on a limited basis would be cost effective to the State and he also handout a revision to the proposed item (included in these minutes).

Mr. Keefer asked about the life of the batteries especially in the detectors and the answer was that the detector batteries lasted about 10 years in the detectors and 2 years in the repeaters. Mr. Keefer then asked if other states were using this technology. The answer was that there are other states as as well as our use of it on SR37 in Noblesville.

Mr. Andrewski asked if there was proof that the batteries lasted for the stated timeframes and if there was any way to track how long the batteries had been in place. Mr. Richards stated that the company had not been around for 10 years yet so the detector battery life was an estimate at this time ad there is a program to track the various intersections throughout the state and this could probably be added to that program.

Mr. Miller asked if intersection would revert to a timer if there was a detector failure and the answer was yes.

Mr. Andrewski asked what the cost to replace the batteries was and who would be responsible for the replacement cost and labor. Mr. Richards stated that the repeater batteries were approximately $80 each and the detectors had to be completely replaced at a cost of $400-$500 each. The cost would come out of the traffic management budget and the work would be performed by maintenance crews.

Mr. Keefer asked if there was any way the signal could be interrupted. He is concerned about the use of this due to the installation and removal of many video detection systems throughout the state.

Mr. Andrewski asked if the intent of this provision was to be a USP or a RSP that went into the book. Mr. Richards stated that they wanted it to be a RSP that would go into the next book. Mr. Andrewski asked why they would want to do this when they wanted to limit the number of installations.

Mr. Caplinger asked if it was possible to take control of the signal remotely as in the case of the message boards.

Mr. Pankow had some questions about the wording in the provision.

The decision was made to withdraw the provision.

COMMENTS AND ACTION (CONTINUED)

REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS
REVISION TO 805.15 METHOD OF MEASUREMENTS
REVISION TO 805.16 BASIS OF PAYMENT
REVISION TO IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT
STANDARD DRAWING *805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE*

Motion: Second: Ayes: Nays:	Action: ____ Passed as Submitted ____ Passed as Revised _X_ Withdrawn
Standard Specifications Sections affected: SECTION 805 TRAFFIC SIGNALS Recurring Special Provisions 805-T-169 TRAFFIC SIGNALS 922-T-168 TRAFFIC SIGNAL MATERIALS AND EQUIPMENT Standard Sheets affected: NONE Design Manual Sections affected: SECTION 77-4 GIFE Sections cross-references: NONE	____ 20__ Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? ____