INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

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Michael R. Pence, Governor
Karl B. Browning, Commissioner

FINAL DRAFT MINUTES

December 18, 2014 Standards Committee Meeting

(Changes to the Agenda and the First Draft shown highlighted yellow)

MEMORANDUM

January 09, 2015

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Minutes from the December 18, 2014 Standards Committee Meeting

The Standards Committee meeting was called to order by Mr. Pankow, sitting in as Chair for Mr. Miller, at 09:00 a.m. on December 18, 2014 in the N955 Conference Room. The meeting was adjourned at 10:54 a.m.

The following committee members were in attendance:

Greg Pankow*, Chairman, Construction Management Director
Bob Cales, Contract Administration Division
Joseph Bruno**, Traffic Engineering Division
Elizabeth Phillips, Bridges Division
Kurt Pelz***, State Construction Engineer
Michael Koch, Fort Wayne District Area Engineer
Michelle Gottschalk, Construction Technical Support
Peter Yao, Highway Design and Technical Support Division
Ron Walker, Materials Management

**Proxy for Mark Miller*
***Proxy for Dave Boruff*
****Proxy for Greg Pankow*

Also in attendance were the following:

Athar A. Khan, INDOT
Dan Osborn, ICA
Lori Torres, INDOT
Rick P. Smith, RoadSafe
Tom Duncan, FHWA
Yuhui Hu, INDOT
Scott Trammell, INDOT
Mike Byers, IN-ACPA
Joel Salinas, INDOT
Lana Podorvanova, INDOT

The following items were listed for consideration:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

1. Approval of the Minutes from the November 21, 2014 meeting

DISCUSSION: Mr. Pankow requested a motion to approve the minutes from the November 21, 2014 meeting.

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

ACTION: PASSED AS SUBMITTED

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

(No items were listed)

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

OLD BUSINESS

Item No. 01 11/21/14 (2014 SS)	Mr. Walker	pg 05
SECTION 408	SEALING CRACKS AND JOINTS	
507.02	Materials	
507.03(a)	Routing, Cleaning and Sealing	
507.03(b)	Cleaning and Filling	
507.04(a)	Sawing, Cleaning and Sealing	
507.04(b)	Cleaning and Filling	

ACTION: WITHDRAWN

NEW BUSINESS

Item No. 01 12/18/14 (2014 SS)	Mr. Boruff	pg 11
401.17	Shoulder Corrugations	
402.07	Mix Criteria	
402.17	Shoulder Corrugations	
501.24	Shoulder Corrugations	
502.19	Shoulder Corrugations	
606.01	Description	
606.02	Method of Measurement	
606.03	Basis of Payment	

Recurring Special Provision:

808-T-190	LONGITUDINAL RUMBLE STRIPES
ACTION:	PASSED AS REVISED

Item No. 02 12/18/14 (2014 SS) Mr. Boruff pg 21

808.04	Longitudinal Markings
808.12	Method of Measurement
Standard Drawings:	
808-DLIM-01	~~*PARALLEL & TAPERED ACCELERATION LANES*~~*DOTTED LINE MARKING DRAWING INDEX AND GENERAL NOTES*
808-DLIM-02	~~*PARALLEL & TAPERED DECELERATION LANES*~~*DOTTED LINES FOR FREEWAY ACCELERATION LANES*
808-DLIM-03	~~*FREEWAY SHORT AUXILIARY LANES AND LANE DROPS*~~*DOTTED LINES FOR FREEWAY DECELERATION LANES*
808-DLIM-04	~~*ROUTE SPLIT WITH DEDICATION LANES*~~*FREEWAY SHORT AUXILIARY LANES AND LANE DROPS*
808-DLIM-05	~~*LANE DROPS AT INTERSECTIONS*~~*ROUTE SPLIT WITH DEDICATION LANES*
808-DLIM-06	*LANE DROPS AT INTERSECTIONS*
808-MKRM-01	RAISED PAVEMENT MARKERS ~~TYPI~~CAL ~~LOCATIONS (DETAIL A)~~*DRAWING INDEX AND GENERAL NOTES*
808-MKRM-02	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL B)~~*AT FREEWAY EXIT RAMP GORE AREA*
808-MKRM-03	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL C)~~*AT FREEWAY ENTRANCE RAMPS*
808-MKRM-04	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL D)~~*AT FREEWAY EXIT RAMPS*
808-MKRM-05	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL E)~~*AT CLOVERLEAF FREEWAY EXIT RAMPS*
808-MKRM-06	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL F)~~*AT CLOVERLEAF ENTRANCE RAMPS*
808-MKRM-07	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL G)~~*FOR TAPERED FREEWAY ENTRANCE LANES*
808-MKRM-08	RAISED PAVEMENT MARKERS ~~TYPICAL LOCATIONS (DETAIL H)~~*AT PARALLEL FREEWAY ENTRANCE LANES*
808-MKRM-09	PLACEMENT OF SNOWPLOWABLE RAISED PAVEMENT MARKERS *ON NON-FREEWAYS*
~~808-MKRM-10~~	~~RAISED PAVEMENT MARKER CAST METAL BASE, TYPE 1~~
~~808-MKRM-11~~	~~RAISED PAVEMENT MARKER CAST METAL BASE, TYPE 2~~
ACTION:	PASSED AS REVISED

Item No. 03 12/18/14 (2014 SS) Ms. Phillips pg 45

Recurring Special Provision:

705-X-XXX	*SIDEWALK ON STRUCTURES*

ACTION: PASSED AS SUBMITTED

Item No. 04 12/18/14 (2014 SS) Ms. Phillips p 51

Standard Drawings:

~~402-NVUF-01~~	~~HMA NOOMOTORIZED-VEHICLE-USE FACILITY PAVEMENT SECTION~~
~~402-NVUF-02~~	~~HMA NONMOTORIZED-VEHICLE-USE FACILITY PAVEMENT SECTION ON ABANDONED-RAILROAD CORRIDOR~~
~~502-NVUF-01~~	~~PCCP NONMOTORIZED-VEHICLE-USE FACILITY PAVEMENT SECTION~~
604-NVUF-01	*NON-MOTORIZED VEHICLE-USE FACILITY HMA PAVEMENT SECTION*
604-NVUF-02	*NON-MOTORIZED VEHICLE USE FACILITY HMA PAVEMENT SECTION ON ABANDONED RAILROAD CORRIDOR*
604-NVUF-03	*NONMOTORIZED VEHICLE USE FACILITY PCCP PAVEMENT SECTION*

ACTION: PASSED AS SUBMITTED

Item No. 05 12/18/14 (2014 SS) Ms. Phillips pg 60

Standard Drawing:

703-BRST-01	BAR BENDING DETAILS

ACTION: PASSED AS SUBMITTED

Item No. 06 12/18/14 (2014 SS) Mr. Pankow pg 66

Recurring Special Provision:

731-B-205	MSE RETAINING WALL REQUIREMENTS

ACTION: PASSED AS REVISED

cc: Committee Members
FHWA
ICA

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS OLD BUSINESS ITEM

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED:

There are revisions needed in section 408 of the Standard Specifications. Working cracks should be routed and sealed, not routed and filled. Non-working cracks are filled, not sealed. Crack Filling materials require a correction to limit the use to AE-90S.

Also, clarification is also needed to ensure that hot-poured sealant is filled to within 1/4 inch ***below*** the surface when routing, so the joint is not over-filled. Similar discrepancies also exist in 507.

PROPOSED SOLUTION: Incorporate the necessary revisions to 408 and 507 to ensure that the standard specifications are correct and consistent with current industry practice.

APPLICABLE STANDARD SPECIFICATIONS: 408, 507

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: None

PAY ITEMS AFFECTED: 408

Submitted By: Ron Walker

Title: Manager

Organization: INDOT – Materials and Test

Phone Number: 317-610-7251 x204

Date: October 30, 2014

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Todd Shields, Bill Tompkins, Mike Prather, Mike Buening

REVISION TO STANDARD SPECIFICATIONS OLD BUSINESS ITEM

SECTION 408 - SEALING CRACKS AND JOINTS

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 408, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 408 – SEALING *OR FILLING* CRACKS AND JOINTS

408.01 Description

This work shall consist of sealing *or filling* longitudinal and transverse cracks and joints in existing asphalt pavement in accordance with 105.03.

Full lane width transverse cracks and longitudinal joints shall be routed and sealed. All other cracks shall be filled.

MATERIALS

408.02 Materials

Materials shall be in accordance with the following:

Asphalt Binder ~~for Crack Sealing~~, PG 64-22* .....902.01(a)
Asphalt Emulsion for
Crack ~~Sealing AE-90,~~*Filling*, AE-90S~~, AE-150~~.....902.01(b)
Fine Aggregates, No. 23 or 24 904
Joint Sealing Materials 906.02
* Polypropylene fibers shall be used only in conjunction with warranted micro-surfacing.

CONSTRUCTION REQUIREMENTS

408.03 Equipment

A distributor in accordance with 409.03 shall be used when crack ~~sealing and~~ *filling with asphalt emulsion or* an indirect-heat double boiler kettle with mechanical agitator shall be used when ~~routing and~~ filling *with hot poured material. An indirect-heat double boiler kettle with mechanical agitator shall be used when routing and sealing.* Air compressors shall be capable of producing a minimum air pressure of 100 psi.

408.04 Weather Limitations

Sealing or filling operations shall not be conducted on a wet surface, when the ambient temperature is below 40°F, or when other unsuitable conditions exist, unless approved by the Engineer.

408.05 Routing and ~~Filling~~*Sealing* Cracks and Joints

Cracks and joints*, 1/2 in. or less in width,* shall be routed ~~when specified,~~ with a routing machine capable of cutting a uniform shape to form a reservoir not exceeding 3/4 in. wide with a minimum depth of 3/4 in. *Cracks and joints shall be cleaned by blowing with compressed air or by other suitable means.* The operation shall be coordinated such

that routed materials do not encroach on pavement lanes carrying traffic and all routed materials are disposed of in accordance with 104.07. Cracks and joints shall be ~~filled~~*sealed* with hot poured joint sealant to within 1/4 in. ~~of~~*below* the surface in accordance with the manufacturer's recommendations.

408.06 ~~Sealing~~ *Filling* Cracks ~~and Joints~~

Cracks ~~and joints~~ shall be cleaned by blowing with compressed air or by other suitable means. Asphalt material shall be placed utilizing a "V" shaped wand tip, to allow the penetration of the materials into the cracks ~~and joints~~. The cracks ~~and joints~~ shall be completely filled or overbanded not to exceed 5 in., or as required. All excess asphalt material shall be removed from the pavement. The ~~sealed~~*filled* cracks ~~and joints~~ shall be covered with sufficient fine aggregate *or other suitable material* to prevent tracking of the asphalt materials. All excess cover material shall be removed from the pavement *within 24 h, when directed*.

Application of asphalt materials shall be completed without covering existing pavement markings. When traffic is to be maintained within the limits of the section, temporary traffic control measures in accordance with 801 shall be used. Treated areas shall not be opened to traffic until the asphalt material has been absorbed.

408.07 Method of Measurement

Sealing and filling of cracks and joints in asphalt pavements will be measured by the ton of material used. Routing of cracks and joints will not be measured.

Temporary traffic control measures will be measured in accordance with 801.17.

408.08 Basis of Payment

Sealing and filling of cracks and joints in asphalt pavements will be paid for by the ton of material used for the type specified.

Temporary traffic control measures will be paid for in accordance with 801.18.

Payment will be made under:

Pay Item	Pay Unit Symbol
Cracks in Asphalt Pavement, Fill	*TON*
Cracks and Joints in Asphalt Pavement, Rout and Seal	TON
~~Cracks and Joints in Asphalt Pavement, Seal~~	~~TON~~

The cost of all materials, cover aggregate, cleaning, and all necessary incidentals shall be included in the cost of the pay items in this section.

REVISION TO STANDARD SPECIFICATIONS OLD BUSINESS ITEM

SECTION 507 - PCCP RESTORATION
507.02 MATERIALS
507.03(a) ROUTING, CLEANING AND SEALING
507.03(b) CLEANING AND FILLING
507.04(a) SAWING, CLEANING AND SEALING
507.04(b) CLEANING AND FILLING

The Standard Specifications are revised as follows:

SECTION 507, BEGIN LINE 9, DELETE AS FOLLOWS:

507.02 Materials

Materials shall be in accordance with the following:

Asphalt Binder ~~for Crack Sealing~~, PG 64-22	902.01(a)
~~Asphalt Emulsion AE-90, AE-90S, AE-150~~	~~902.01(b)~~
Dowel Bars	910.01(b)10
Fine Aggregates, Size No. 23 or 24	904
Joint Sealing Materials	906.02
Rapid Setting Patch Materials	901.07

Dowel bars and dowel bar assemblies shall be in accordance with 503.04.

SECTION 507, BEGIN LINE 38, DELETE AND INSERT AS FOLLOWS:

Cracks shall be sealed with hot poured joint sealant in accordance with the manufacturer's recommendations within 1/4 in. ~~of~~*below* the surface. A distributor in accordance with 409.03 shall be used with an indirect-heat double boiler kettle and mechanical agitator. The hot poured joint sealant shall be placed utilizing a "V" shaped wand tip, to allow the penetration of the materials into the cracks.

SECTION 507, BEGIN LINE 54, INSERT AS FOLLOWS:

Cracks shall be filled with asphalt material. The cracks shall be completely filled or overbanded not to exceed 5 in., or as required. Asphalt material shall be placed utilizing a "V" shaped wand tip, to allow the penetration of the materials into the cracks. The filled cracks shall be covered with sufficient fine aggregate *or other suitable material* to prevent tracking of the asphalt material. All excess cover material shall be removed from the pavement *within 24 h, when directed*.

SECTION 507, BEGIN LINE 80, INSERT AS FOLLOWS:

Joints shall be sealed with joint sealing materials in accordance with the sealant manufacturer's recommendations. Transverse joints shall be sealed with *hot poured joint sealant,* silicone sealant or preformed elastomeric joint sealant. Longitudinal joints shall be sealed with hot poured joint sealant or silicone sealants.

SECTION 507, BEGIN LINE 90, DELETE AND INSERT AS FOLLOWS:

(b) Cleaning and Filling

REVISION TO STANDARD SPECIFICATIONS OLD BUSINESS ITEM

SECTION 507 - PCCP RESTORATION
507.02 MATERIALS
507.03(a) ROUTING, CLEANING AND SEALING
507.03(b) CLEANING AND FILLING
507.04(a) SAWING, CLEANING AND SEALING
507.04(b) CLEANING AND FILLING

Joints in PCCP shall be cleaned by blowing with compressed air or by other suitable means when specified. *Cleaning shall include removal of old sealant and backer rod.* Air compressors shall be capable of producing a minimum air pressure of 100 psi. Water blasting shall not be utilized.

Joints shall be filled with hot poured joint sealant in accordance with the manufacturer's recommendations within 1/4 in. ~~of~~*below* the surface. A distributor in accordance with 409.03 shall be used with an indirect-heat double boiler kettle and mechanical agitator. The hot poured joint sealant shall be placed utilizing a "V" shaped wand tip, to allow the penetration of the materials into the joints.

COMMENTS AND ACTION — OLD BUSINESS ITEM

SECTION 408 - SEALING CRACKS AND JOINTS
507.02 MATERIALS
507.03(a) ROUTING, CLEANING AND SEALING
507.03(b) CLEANING AND FILLING
507.04(a) SAWING, CLEANING AND SEALING
507.04(b) CLEANING AND FILLING

DISCUSSION:
Due to scheduling conflicts, this item has been withdrawn to be presented at the January 15, 2015 Standards Committee meeting.

Motion: Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised __X__ Withdrawn
Standard Specifications Sections referenced and/or affected: 304.03 pg. 226; section 408 pg. 281 thru 282; 507.03 pg. 367; 507.04 pg. 368. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2016 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The existing rumble stripe recurring special provision (808-T-190) amends six separate sections of the Spec Book. However, the amendments in the RSP to sections 401, 402, 501, and 502, as well as some of 606 merely update terminology. As a result these provisions could be brought into the 2016 Spec Book.

PROPOSED SOLUTION: Bring the RSP amendments to §§ 401, 402, 501, 502, and 606 concerning terminology into the 2016 Spec Book. Retain the rest of the amendments to §§606 and 808 concerning rumble stripe installation and procedure as a recurring special provision.

APPLICABLE STANDARD SPECIFICATIONS: 401, 402, 501, 502, 606, and 808

APPLICABLE STANDARD DRAWINGS: 606-SHCG-01, 606-SHCG-02, 606-SHCG-03, 606-SHCG-04, 606-SHCG-05, and 808-T-190d

APPLICABLE DESIGN MANUAL SECTION: 502-2.09

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: 606-07484 Milled HMA Corrugations
606-11064 Milled PCCP Corrugations
402-05494 HMA Transverse Rumble Strips

Submitted By: Dave Boruff

Title: Manager, Office of Traffic Administration

Organization: INDOT

Phone Number: (317) 234-7975

Date: 12/1/2014

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Yes, ad hoc review by rumble stripe working group.

REVISION TO STANDARD SPECIFICATIONS

SECTION 400 - ASPHALT PAVEMENTS
401.17 SHOULDER CORRUGATIONS
402.07 MIX CRITERIA
402.17 SHOULDER CORRUGATIONS

(Note: Shown changes were approved on May 16, 2013 meeting and shown in currently used RSP available at:

http://www.in.gov/dot/div/contracts/standards/rsp/sep13/800/808-T-190%20130901.pdf

***Basis for Use**: Required for all contracts with 606-07484 Milled HMA Corrugations or 606-11064 Milled PCCP Corrugations pay items.)*

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 458, DELETE AND INSERT AS FOLLOWS:

401.17 ~~Shoulder~~*Pavement* Corrugations

~~Shoulder~~*Pavement* corrugations shall be in accordance with 606.

SECTION 402, BEGIN LINE 81, DELETE AND INSERT AS FOLLOWS:

402.07 Mix Criteria

(a) Composition Limits for HMA *Transverse* Rumble Strip Mixtures

Transverse ~~R~~*r*umble strip mixtures shall be type A surface in accordance with 402.04. A MAF in accordance with 402.05 will not apply. Aggregate requirements of 904.03(d) do not apply.

SECTION 402, BEGIN LINE 278, DELETE AND INSERT AS FOLLOWS:

Transverse ~~R~~*r*umble strips shall be placed to ensure uniformity of ~~depth~~*height*, width, texture, and the required spacing between strips. A tack coat in accordance with 406 shall be applied on the pavement surface prior to placing the mixture. The tack coat may be applied with a paint brush or other approved methods.

SECTION 402, BEGIN LINE 346, DELETE AND INSERT AS FOLLOWS:

Transverse ~~R~~*r*umble strips shall be compacted with vibratory compacting equipment in accordance with 409.03(d)7 unless otherwise stated.

SECTION 402, BEGIN LINE 395, DELETE AND INSERT AS FOLLOWS:

402.17 ~~Shoulder~~*Pavement* Corrugations

~~Shoulder~~*Pavement* corrugations shall be in accordance with 606.

SECTION 402, BEGIN LINE 425, INSERT AS FOLLOWS:

HMA *Transverse* Rumble Strips .....LFT

REVISION TO STANDARD SPECIFICATIONS

SECTION 500 - CONCRETE PAVEMENT
501.24 SHOULDER CORRUGATIONS
502.19 SHOULDER CORRUGATIONS

The Standard Specifications are revised as follows:

SECTION 501, BEGIN LINE 372, DELETE AND INSERT AS FOLLOWS:

501.24 ~~Shoulder~~*Pavement* Corrugations

~~Shoulder~~*Pavement* corrugations shall be in accordance with 606.

SECTION 502, BEGIN LINE 359, DELETE AND INSERT AS FOLLOWS:

502.19 ~~Shoulder~~*Pavement* Corrugations

~~Shoulder~~*Pavement* corrugations shall be in accordance with 606.

REVISION TO STANDARD SPECIFICATIONS

SECTION 606 - SHOULDER CORRUGATIONS
606.01 DESCRIPTION
606.02 METHOD OF MEASUREMENT
606.03 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 606, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 606 – ~~SHOULDER~~*PAVEMENT* CORRUGATIONS

606.01 Description

(a) All Corrugations

This work shall consist of placing corrugations in the ~~paved shoulders~~*pavement* in accordance with 105.03. Corrugations shall not be constructed within the limits of reinforced concrete bridge approaches or in bridge decks.

The operation shall be coordinated such that milled materials do not encroach on the pavement lanes carrying traffic and all milled materials are disposed of in accordance with 104.07.

The corrugation shall be constructed by cutting smooth strips in existing or newly constructed ~~shoulders~~*pavement*. The operation shall be conducted by means of a cutting machine that provides a series of smooth cuts without tearing or snagging. The equipment shall include guides to maintain uniformity and consistency in the alignment of the strips.

(b) Blank (Note: proposed change for 2016SS)

606.02 Method of Measurement

HMA and PCCP ~~shoulder~~*pavement* corrugations will be measured by the linear foot, measured parallel to the center line of the roadway. ~~Gaps in PCCP shoulder*pavement* corrugations at the D-1 joints will be included in the milled PCCP corrugations.~~ *Gaps longer than 20 ft will not be included in the measurement for milled corrugations.*

606.03 Basis of Payment

HMA and PCCP ~~shoulder~~*pavement* corrugations will be paid for at the contract unit price per linear foot, when specified.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Milled HMA ~~Shoulder~~ Corrugations	LFT
Milled PCCP ~~Shoulder~~ Corrugations	LFT

REVISION TO SPECIAL PROVISIONS

808-T-190 LONGITUDINAL RUMBLE STRIPES

(Note: Shown changes have been approved on May 16, 2013 meeting and are proposed to remain RSP. Additional changes shown highlighted gray.)

808-T-190 LONGITUDINAL RUMBLE STRIPES

(Revised XX-XX-XX)

The Standard Specifications are revised as follows:

SECTION 606, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 606 – PAVEMENT CORRUGATIONS

606.01 Description

(a) All Corrugations

This work shall consist of placing corrugations in the pavement in accordance with 105.03. Corrugations shall not be constructed within the limits of reinforced concrete bridge approaches or in bridge decks.

The operation shall be coordinated such that milled materials do not encroach on the pavement lanes carrying traffic and all milled materials are disposed of in accordance with 104.07. *When corrugations are installed for center line and edge line rumble stripes, milled materials shall be swept and vacuumed following the milling operation.*

The corrugation shall be constructed by cutting smooth strips in existing or newly constructed pavement. The operation shall be conducted by means of a cutting machine that provides a series of smooth cuts without tearing or snagging. The equipment shall include guides to maintain uniformity and consistency in the alignment of the strips.

Longitudinal rumble stripes are the combination of either the center line pavement marking placed in the center line corrugation or the edge line pavement marking placed in the edge line corrugation. They shall be installed as shown in the plans and as specified herein.

(b) ~~Blank~~ Center Line and Edge Line Corrugations

When corrugations are installed for center line and edge line rumble stripes control points that are required as a guide for milling corrugations shall be spotted with paint for the full length of the road to be milled. Control points along tangent sections shall be spaced at a maximum interval of 100 ft. Control points along curve sections shall be spaced to ensure the accurate location of the milled corrugations. The location of control points shall be approved prior to the milling operations.

If snowplowable raised pavement markers exist where center line corrugations are being placed into the existing surface, the prismatic reflectors in these markers shall

be removed and corrugations gapped a maximum of 60 in. and not within 6 in. of the markers.

In the presence of D-1 pavement joints or castings which conflict with the location of the corrugations, the corrugations shall be gapped a maximum of 5 ft and not within 6 in. of the joint or casting.

Corrugations ~~installed~~retrofitted within the HMA traveled way and on HMA shoulder contiguous with a HMA traveled way or a HMA auxiliary lane shall be sealed using liquid asphalt sealant in accordance with 401.15.

1. Installation Tolerances

Lateral deviation of milled center line or edge line corrugations shall not exceed 1 in. in 100 ft. The alignment of all pavement markings placed within rumble stripes shall be ± 1/2 in. of its specified location.

2. Maintenance of Traffic

The rumble stripe traffic control procedures shall be submitted to the Engineer and shall be in accordance with 808.08. Vehicles used in performing the milling, sweeper, vacuum or sealing operations shall have a rear escort vehicle that follows at a distance of 100 to 500 ft.

MATERIALS

606.02 Materials

Materials shall be in accordance with the following:

Pavement Markings.....808

606.0~~2~~*3* Method of Measurement

HMA and PCCP pavement corrugations will be measured by the linear foot, measured parallel to the center line of the roadway. ~~Gaps in PCCP pavement corrugations at the D-1 joints will be included in the milled PCCP corrugations.~~ *Gaps ~~in pavement corrugations for castings~~longer than 20 ft will not be included in the measurement for milled corrugations.*

606.0~~3~~*4* Basis of Payment

HMA and PCCP pavement corrugations will be paid for at the contract unit price per linear foot, when specified.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Milled HMA Corrugations.....	LFT

REVISION TO SPECIAL PROVISIONS

808-T-190 LONGITUDINAL RUMBLE STRIPES

Milled PCCP Corrugations ..... LFT

The cost of removal of existing prismatic reflectors in rumble strip retrofit sections shall be included in the cost of the pay items.

Milling, sweeping, vacuum cleaning, operation protection and maintenance of traffic associated with these pay items and all necessary incidentals shall be included in the cost of the pay items.

Where corrugations are placed in an existing HMA surface, liquid asphalt sealant shall be included in the cost of the pay items.

SECTION 808, BEGIN LINE (TBD, 2016SS)INSERT AS FOLLOWS:

808.04 Longitudinal Markings *and Milled Corrugations*

All longitudinal lines shall be clearly and sharply delineated, straight and true on tangent, and form a smooth curve where required. Lines shall be square at both ends, without mist, drip or spatter.

A solid line shall be continuous. A broken line shall consist of 10 ft line segments with 30 ft gaps.

All lines shall be gapped at intersections unless otherwise specified or directed.

The actual repainting limits for no-passing zone markings will be determined by the Engineer.

A new broken line placed over an existing broken line shall laterally match the existing broken line, and the new line segments shall not extend longitudinally more than 10% beyond either end of the existing line segments.

(a) Center Lines

Center lines shall be used to separate lanes of traffic moving in opposite directions. All center line markings shall be yellow in color and 4 in. in width. They shall be placed such that the edge of the marking, nearest to the geometric centerline of the roadway, shall be offset 4 in. from the geometric centerline.

The center line of a multi-lane roadway shall be marked with a double solid line. The 2 lines forming the double solid line shall be spaced 8 in. apart and shall be equally offset on opposite sides of the geometric centerline.

The center line of a 2-lane, 2-way roadway, where passing is allowed in both directions, shall be marked with a broken line.

The center line of a 2-lane, 2-way roadway, where passing is allowed in 1 direction only, shall be marked with a double line, consisting of a broken line and a solid

line. The broken line and the solid line shall be spaced 8 in. apart and shall be equally offset on opposite sides of the geometric centerline. The solid line shall be offset toward the lane where passing is prohibited. The broken line shall be offset toward the lane where passing is permitted.

The center line shall be placed within the milled corrugation when center line rumble stripes are specified. Placement of the center line marking in the milled corrugation does not alter the pavement marking performance requirements of section 808.07.

(b) Lane Lines

Lane lines shall be used to separate lanes of traffic moving in the same direction. Normal lane line markings shall be white in color and shall be 5 in. wide on freeways, interstates and toll roads, and 4 in. wide on all other roads. They shall be offset 4 in. to the right of longitudinal pavement joints or divisions between traffic lanes. Normal lane lines shall be marked with white broken lines. White solid lines shall be used to mark lane lines only when specified or directed.

(c) Edge Lines

Edge lines shall be used to outline and separate the edge of pavement from the shoulder. Edge line markings shall be 4 in. in width and shall be placed such that the edge of the marking nearest the edge of the pavement shall be offset 4 in. from the edge of the pavement except as otherwise directed. Right edge lines shall be marked with a white solid line and left edge lines shall be marked with a yellow solid line.

The edge line shall be placed in the milled corrugation when edge line rumble stripes are specified. Placement of the edge line marking in the milled corrugation does not alter the pavement marking performance requirements of section 808.07.

(d) Barrier Lines

Barrier lines shall be used as specified or directed. Barrier line markings shall be solid lines of the size and color specified or as directed.

(e) Markings in Retrofitted Corrugations

In sections where corrugations are being placed in the existing surface all existing pavement markings shall be removed in accordance with 808.10 and any existing sealants shall be routed or grinded out. Temporary pavement markings placed in accordance with 801.12 shall be offset a sufficient distance from the longitudinal joint so as to not to obstruct the installation of the corrugations or the application of the liquid asphalt sealant.

The Contractor shall make a record of the existing pavement marking locations so that such markings may be replicated later with the appropriate adjustments for edge line rumble stripes. This record shall show longitudinal and transverse dimensions. The record shall be submitted to and approved by the District Traffic Engineer prior to the

REVISION TO SPECIAL PROVISIONS

808-T-190 LONGITUDINAL RUMBLE STRIPES

removal of existing pavement markings. The District Traffic Section shall be notified two weeks prior to applying pavement markings so as to allow the District Traffic Section to verify the pavement marking plan.

COMMENTS AND ACTION

401.17 SHOULDER CORRUGATIONS
402.07 MIX CRITERIA
402.17 SHOULDER CORRUGATIONS
501.24 SHOULDER CORRUGATIONS
502.19 SHOULDER CORRUGATIONS
606.01 DESCRIPTION
606.02 METHOD OF MEASUREMENT
606.03 BASIS OF PAYMENT
808-T-190 LONGITUDINAL RUMBLE STRIPES

DISCUSSION:
This item was introduced and presented by Mr. Bruno, sitting in for Mr. Boruff, who explained that the Recurring Special Provision 808-T-190 currently updates terminology in Standard Specification sections 401, 402, 501, 502 and 606, and would like those revisions incorporated into the 2016 Standard Specifications Book. Mr. Bruno also stated that they would like for the remaining information in the RSP regarding rumble stripes to remain in the RSP.
A minor revision was made to the description for the uniformity of rumble strips was made to 402, show highlighted above. Following much discussion, further edits were made to 606.02 with regard to not measuring gaps longer than 20 ft for payment.
Mr. Duncan inquired about sealing corrugations in PCCP pavements, and Mr. Walker said they are unsure if those will need to be sealed.
Further discussion ensued regarding sealing disturbed surfaces of the pavements. Mr. Walker explained why centerline corrugations are sealed (due to paving joints) and shoulder millings are not.

Motion: Mr. Bruno
Second: Mr. Cales
Ayes: 8
Nays: 0
FHWA Approval: YES

Action:

_____ Passed as Submitted
__X__ Passed as Revised
_____ Withdrawn

Standard Specifications Sections affected:

401 pg 250; 402 pg 263; 501 pg 327, 502 pg 345; 606 pg 406; 808 pg 795.

Recurring Special Provision affected:

808-T-190 LONGITUDINAL RUMBLE STRIPES;
808-T-190d LONGITUDINAL RUMBLE STRIPES DETAILS

Standard Drawing affected:

NONE

Design Manual Sections affected:

502-2.09

GIFE Sections cross-references:

NONE

__X__ 2016 Standard Specifications (as stated in proposal)

_____ Revise Pay Items List

_____ Create RSP (No._____)
Effective _____ Letting
RSP Sunset Date:

__X__ Revise RSP (No.808-T-190)
Effective Sept. 01, 2015 Letting
RSP Sunset Date:

_____ Standard Drawing
Effective

_____ Create RPD (No. _____)
Effective _____ Letting

____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The 2011 Indiana MUTCD requires dotted lane lines that are distinct from broken or skip lines on freeways and expressways in acceleration/deceleration lanes and auxiliary lanes. Dotted lane lines are also required for lane drops at interchanges and intersections. These new requirements are described in Chapter 502 of the Indiana Design Manual, but standard drawings have been requested to assist contractors and to standardize the placement of dotted lane lines.

PROPOSED SOLUTION: Create 5 new standard drawings for dotted line interchange/intersection markings (DLIM) and revise the RPM spacing shown in the acceleration lane of Standard Drawing 808-MKRM-08.

APPLICABLE STANDARD SPECIFICATIONS: 808.04, and 808.12

APPLICABLE STANDARD DRAWINGS: 808-MKRM-08

APPLICABLE DESIGN MANUAL SECTION: 502-2.02(06) and IDM Figure 502-2B

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: 808-10032, Line, Multi-component, Dotted, White, 8 in.
808-11478, Line, Thermoplastic, Dotted, White, 8 in.
808-11481, Line, Multi-component, Dotted, White, 4 in.
801-11482, Line, Thermoplastic, Dotted, White, 4 in.
808-11484, Line, Multi-component, Dotted, White, 5 in.
808-11485, Line, Thermoplastic, Dotted, White, 5 in.

Submitted By: Dave Boruff

Title: Manager, Office of Traffic Administration

Organization: INDOT

Phone Number: (317) 234-7975

Date: 11/24/2014

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad hoc review by district traffic engineers and district traffic operations managers.

REVISION TO STANDARD SPECIFICATIONS

SECTION 808 - PAVEMENT TRAFFIC MARKINGS
808.04 LONGITUDINAL MARKINGS
808.12 METHOD OF MEASUREMENT

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 808, BEGIN LINE 53, DELETE AND INSERT AS FOLLOWS:

808.04 Longitudinal Markings

All longitudinal lines shall be clearly and sharply delineated, straight and true on tangent, and form a smooth curve where required. Lines shall be square at both ends, without mist, drip or spatter.

A solid line shall be continuous. A broken line shall consist of 10 ft line segments with 30 ft gaps. *A dotted line shall consist of 3 ft line segments with 9 ft gaps unless otherwise indicated on the plans.*

All lines shall be gapped at intersections unless otherwise specified or directed.

The actual repainting limits for no-passing zone markings will be determined by the Engineer.

A new broken line placed over an existing broken line shall laterally match the existing broken line, and the new line segments shall not extend longitudinally more than 10% beyond either end of the existing line segments. *A new dotted line placed over an existing dotted line shall laterally match the existing dotted line, and the new line segments shall not extend longitudinally more than 6 in. beyond either end of the existing line segments.*

(a) Center Lines

Center lines shall be used to separate lanes of traffic moving in opposite directions. All center line markings shall be yellow in color and 4 in. in width. They shall be placed such that the edge of the marking, nearest to the geometric centerline of the roadway, shall be offset 4 in. from the geometric centerline.

The center line of a multi-lane roadway shall be marked with a double solid line. The two lines forming the double solid line shall be spaced 8 in. apart and shall be equally offset on opposite sides of the geometric centerline.

The center line of a two-lane, two-way roadway, where passing is allowed in both directions, shall be marked with a broken line.

The center line of a two-lane, two-way roadway, where passing is allowed in one direction only, shall be marked with a double line, consisting of a broken line and a solid line. The broken line and the solid line shall be spaced 8 in. apart and shall be equally offset on opposite sides of the geometric centerline. The solid line shall be offset toward

REVISION TO STANDARD SPECIFICATIONS

SECTION 808 - PAVEMENT TRAFFIC MARKINGS
808.04 LONGITUDINAL MARKINGS
808.12 METHOD OF MEASUREMENT

the lane where passing is prohibited. The broken line shall be offset toward the lane where passing is allowed.

(b) Lane Lines

Lane lines shall be used to separate lanes of traffic moving in the same direction. Normal *width* lane line markings shall be white in color and shall be 5 in. wide on ~~freeways,~~ interstates and ~~toll roads~~*freeways*, and 4 in. wide on all other roads. They shall be offset 4 in. to the right of longitudinal pavement joints or divisions between traffic lanes. ~~Normal lane lines shall be marked with white broken lines~~. *Wide lane lines for lane drops, route splits, or auxiliary lanes shall be white in color and shall be 8 in. wide.* White solid lines shall be used to mark lane lines only when specified or directed.

(c) Edge Lines

Edge lines shall be used to outline and separate the edge of pavement from the shoulder. Edge line markings shall be 4 in. in width and shall be placed such that the edge of the marking nearest the edge of the pavement shall be offset 4 in. from the edge of the pavement except as otherwise directed. Right edge lines shall be marked with a white solid line and left edge lines shall be marked with a yellow solid line.

(d) Barrier Lines

Barrier lines shall be used as specified or directed. Barrier line markings shall be solid lines of the size and color specified or as directed.

SECTION 808, BEGIN LINE 558, INSERT AS FOLLOWS:

808.12 Method of Measurement

Broken *or dotted* lines, placed or removed, will be measured as 1/4 of the total distance in linear feet of the broken *or dotted* line pattern after excluding gaps for intersections or other openings. Solid lines will be measured as the total distance in linear feet of solid lines placed or removed. The material, type, color, or width of broken, *dotted,* or solid lines to be removed will not be considered when measuring such lines for payment.

Transverse marking lines will be measured as the total distance in linear feet of lines placed or removed. Curb markings will be measured by the linear feet along the front face of the curb. Pavement message markings will be measured by the total number of each type placed. A railroad crossing pavement message marking shall include the two R's, the X, and the three stop lines per traffic lane. Railroad crossing pavement message markings will be measured by the total number of each marking place. Lane indication arrow pavement message markings will be measured by the number of lane indication arrowheads placed. Removal of pavement message markings will be measured in square yards using areas shown in the following table. The material will not be considered when measuring such markings for pavement.

REVISION TO STANDARD SPECIFICATIONS

SECTION 808 - PAVEMENT TRAFFIC MARKINGS
808.04 LONGITUDINAL MARKINGS
808.12 METHOD OF MEASUREMENT

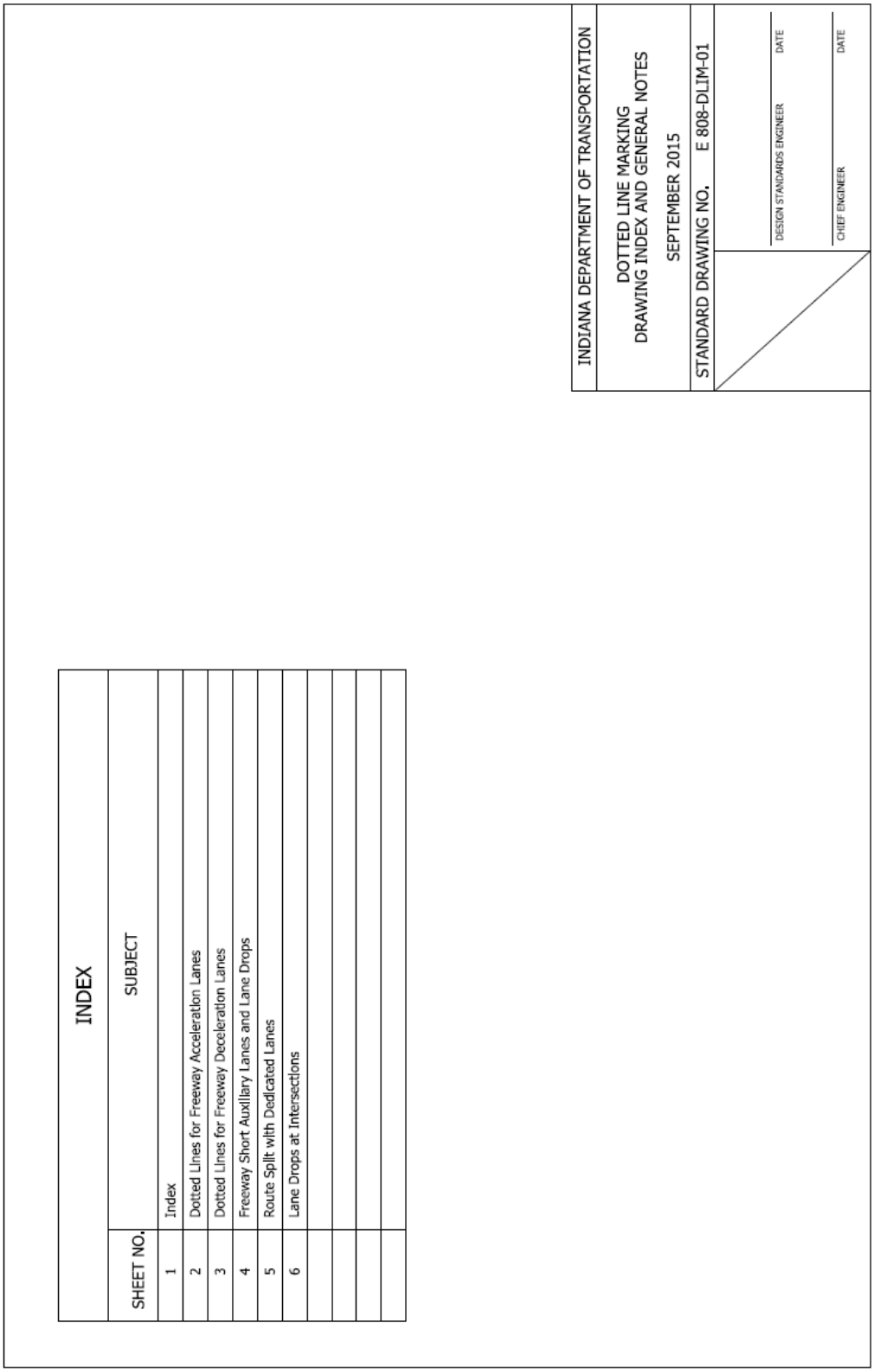
Pavement Message Markings Table

Description	Area
"Ahead"	3.1 SYS
Combo Arrow	3.1 SYS
"Exit"	2.5 SYS
"Left"	2.5 SYS
"Only"	2.5 SYS
Railroad "R"	0.6 SYS
"Right"	3.2 SYS
"RXR"	7.7 SYS
"School"	3.9 SYS
"Stop"	2.6 SYS
Straight Arrow	1.4 SYS
"Turn"	2.6 SYS
Turn Arrow	1.7 SYS
"XING"	2.5 SYS

Snowplowable raised pavement markers will be measured by the number placed or removed. Prismatic reflectors will be measured by the number furnished and installed. Each two-way prismatic reflector will be measured as one reflector. No measurement will be made of the adhesive or the hole patching material used in the placement or removal of snowplowable raised pavement markers.

REVISION TO STANDARD DRAWINGS

PROPOSED NEW 808-DLIM-01 (REVISED DRAFT)



INDIANA DEPARTMENT OF TRANSPORTATION

DOTTED LINE MARKING
DRAWING INDEX AND GENERAL NOTES

SEPTEMBER 2015

STANDARD DRAWING NO. E 808-DLIM-01

DESIGN STANDARDS ENGINEER DATE

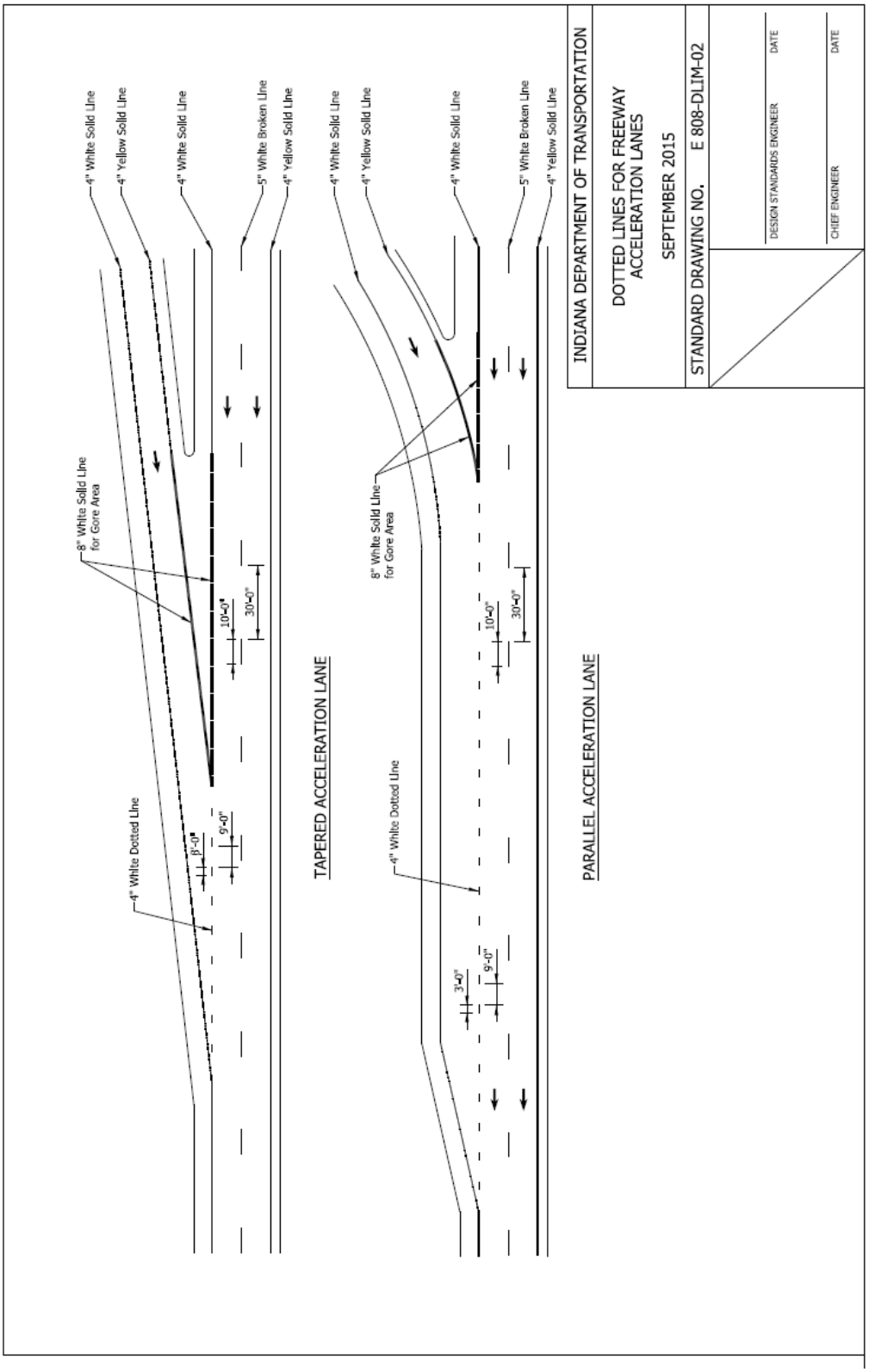
CHIEF ENGINEER DATE

INDEX

SHEET NO.	SUBJECT
1	Index
2	Dotted Lines for Freeway Acceleration Lanes
3	Dotted Lines for Freeway Deceleration Lanes
4	Freeway Short Auxiliary Lanes and Lane Drops
5	Route Split with Dedicated Lanes
6	Lane Drops at Intersections

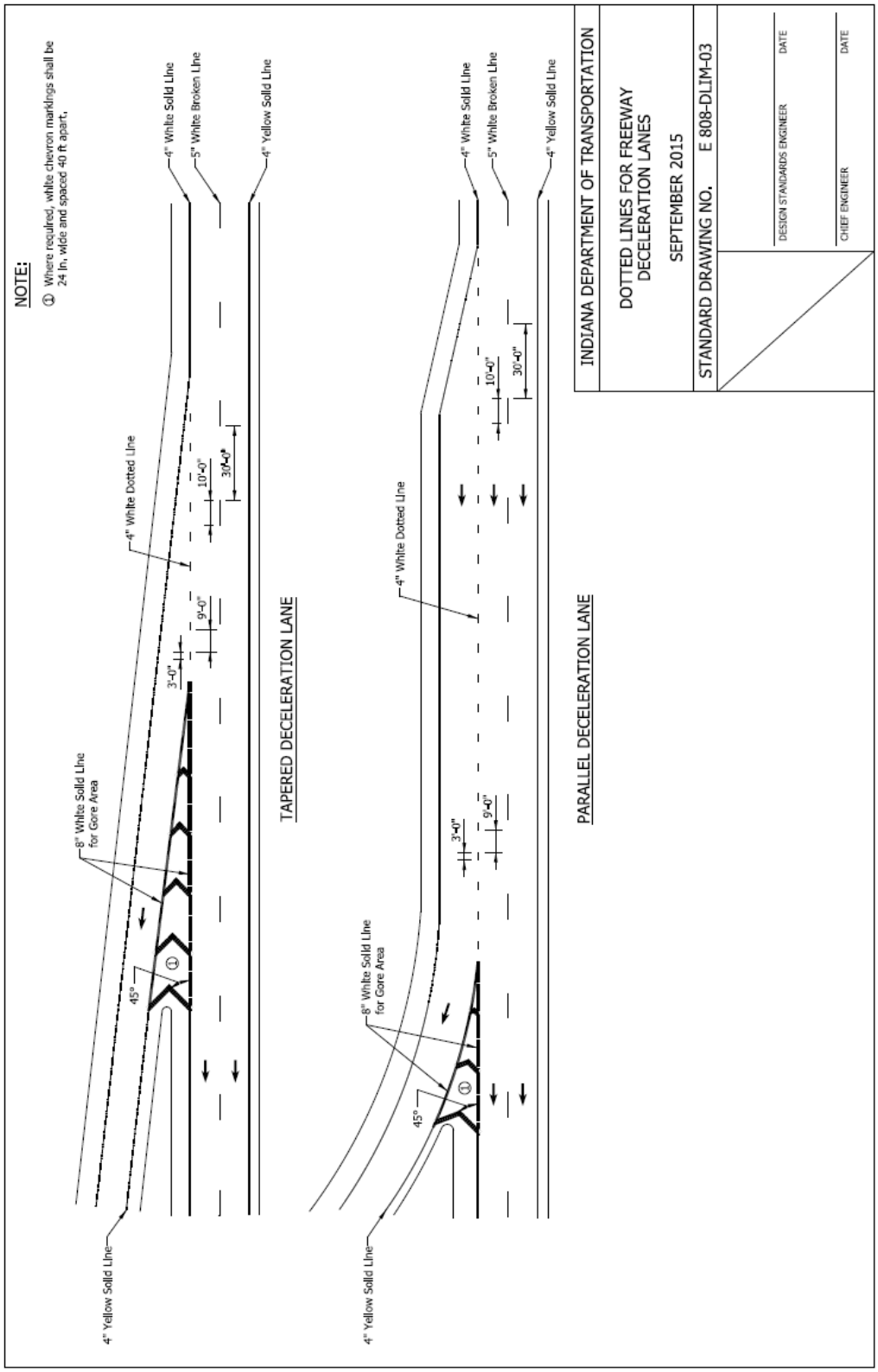
REVISION TO STANDARD DRAWINGS

PROPOSED NEW 808-DLIM-02 (REVISED DRAFT)



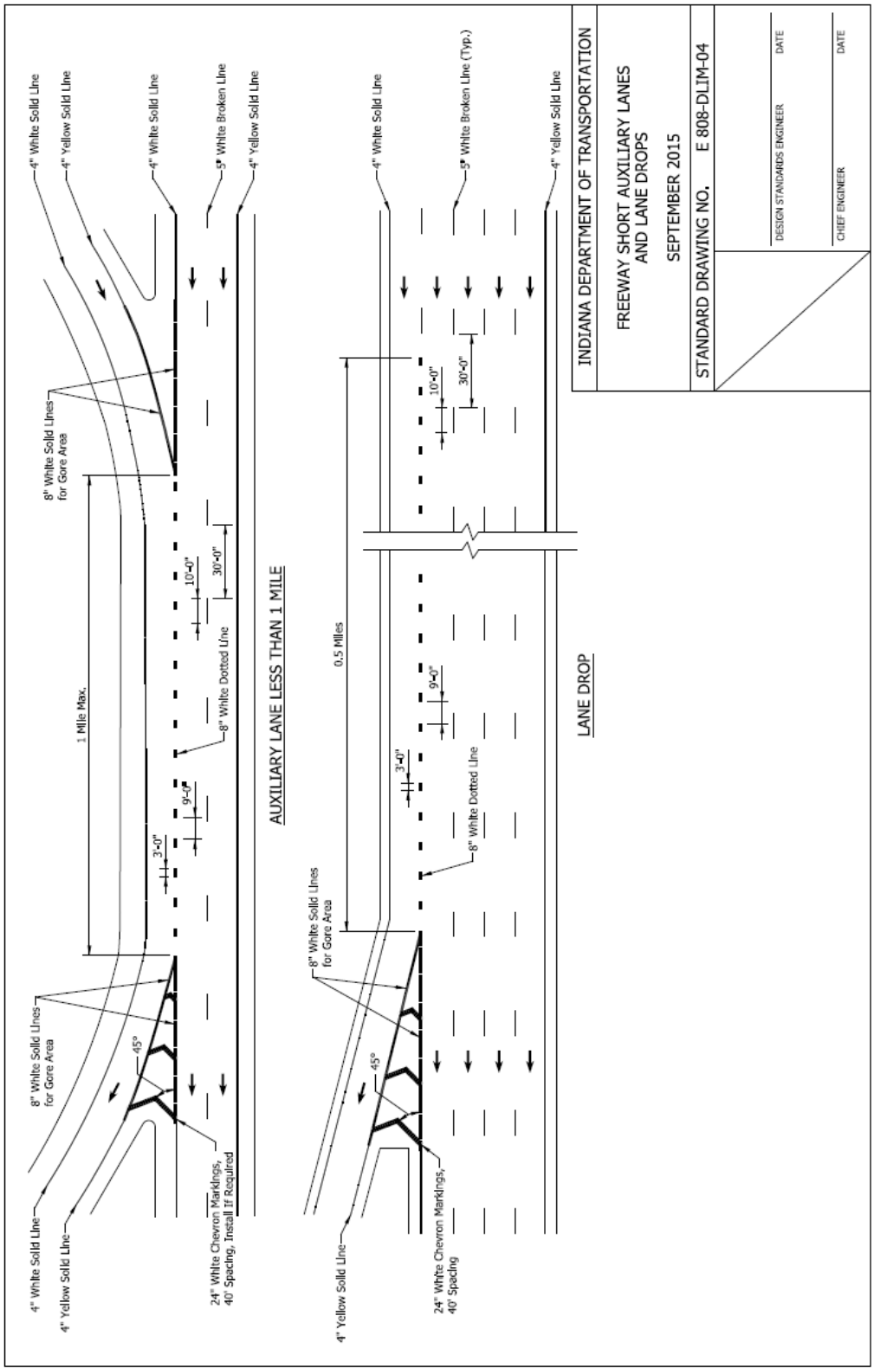
REVISION TO STANDARD DRAWINGS

PROPOSED NEW 808-DLIM-03 (REVISED DRAFT)



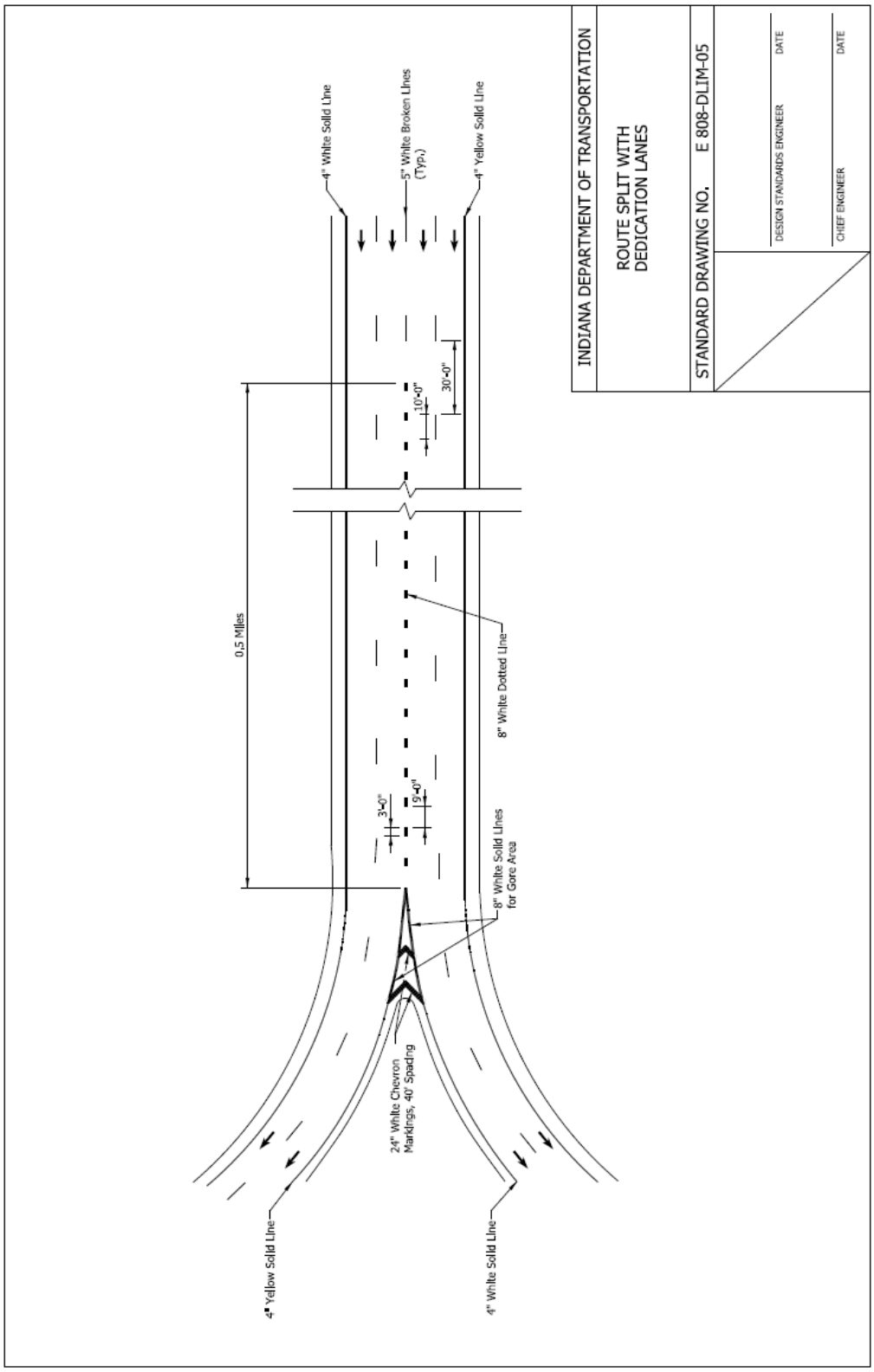
REVISION TO STANDARD DRAWINGS

PROPOSED NEW 808-DLIM-04 (REVISED DRAFT)



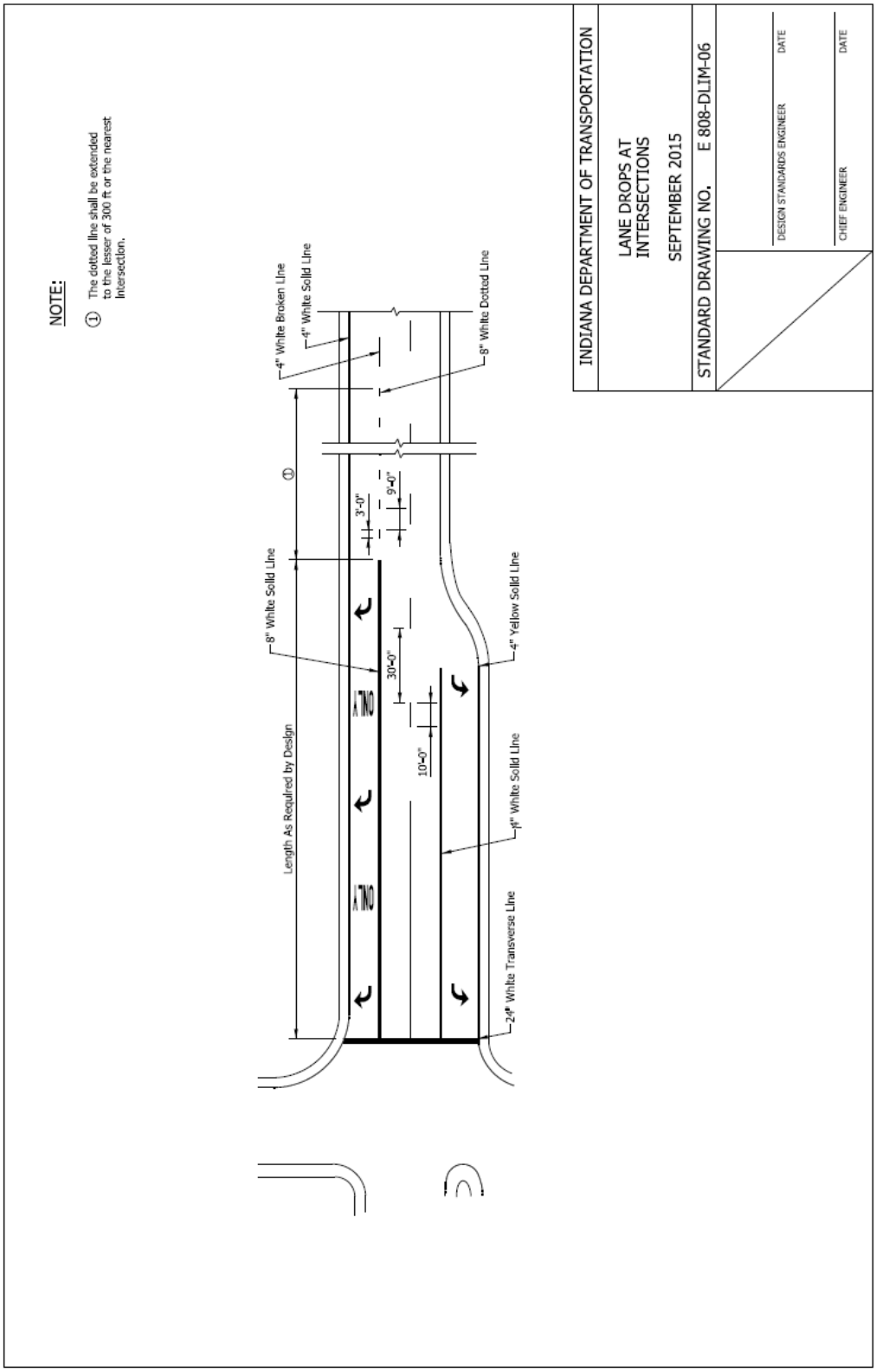
REVISION TO STANDARD DRAWINGS

PROPOSED NEW 808-DLIM-05 (REVISED DRAFT)



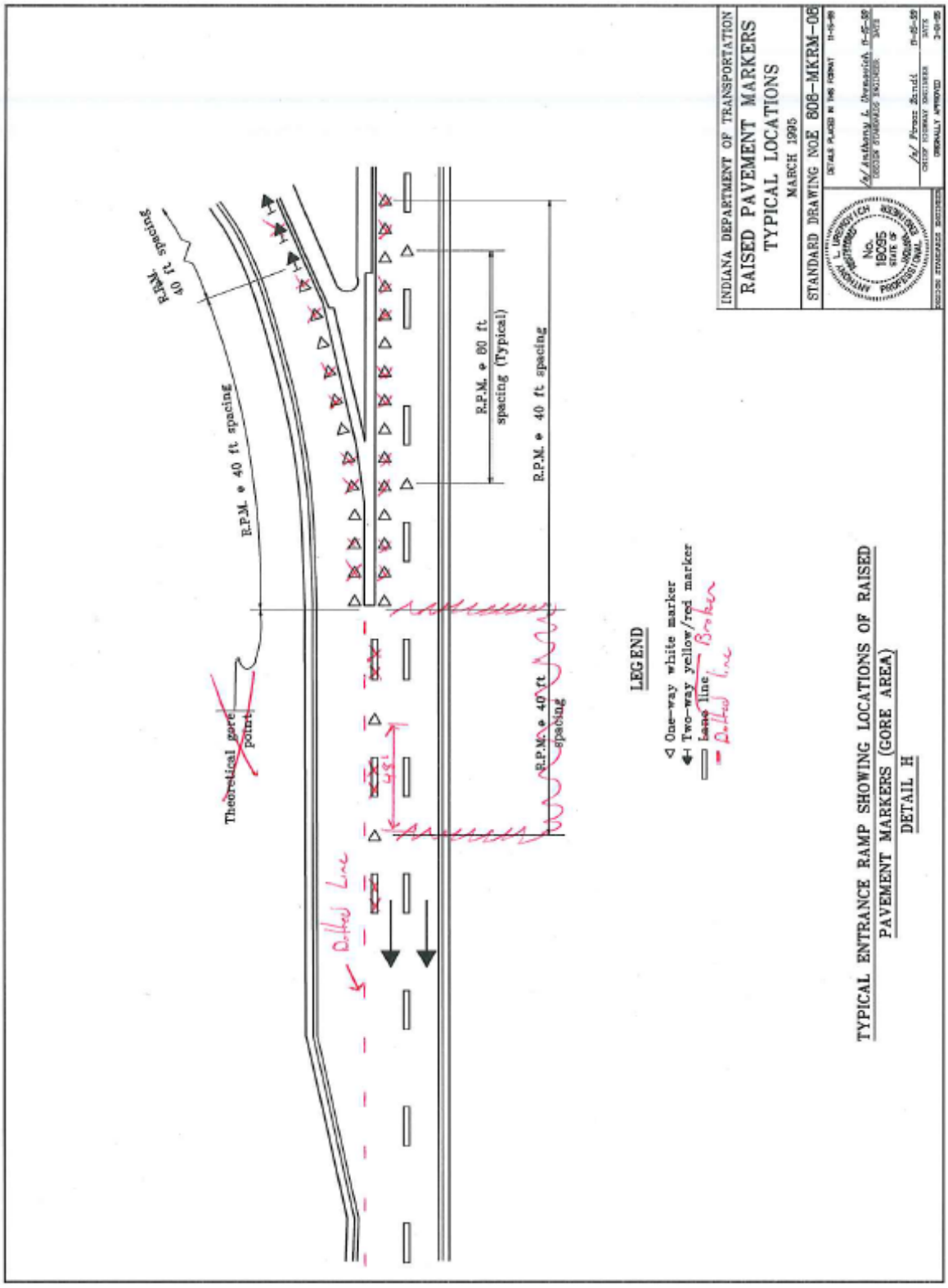
REVISION TO STANDARD DRAWINGS

PROPOSED NEW 808-DLIM-06 (ADDED NEW TO FINAL DRAFT)



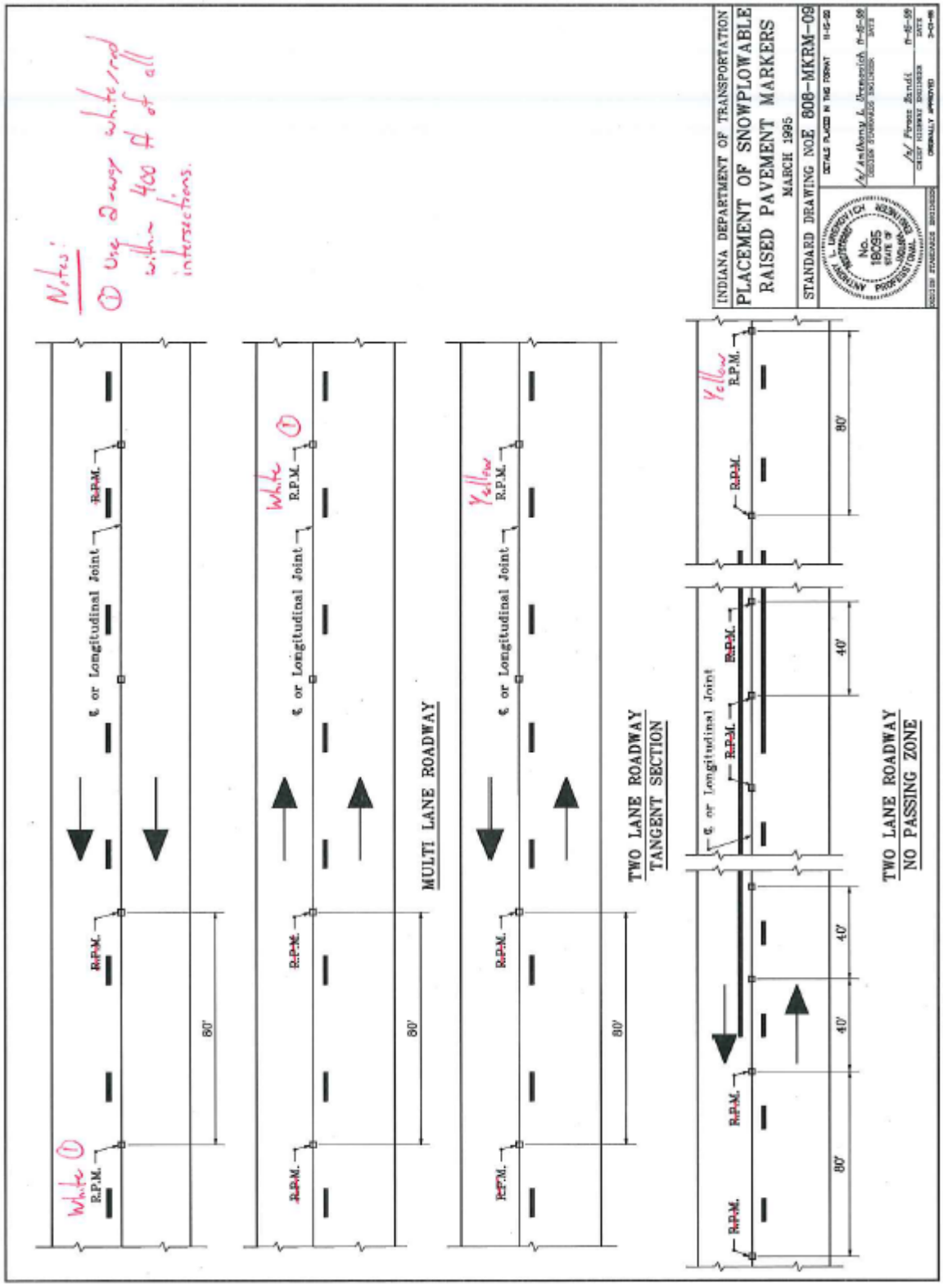
REVISION TO STANDARD DRAWINGS

808-MKRM-08 RAISED PAVEMENT MARKERS TYPICAL LOCATIONS (WITH MARKUPS)



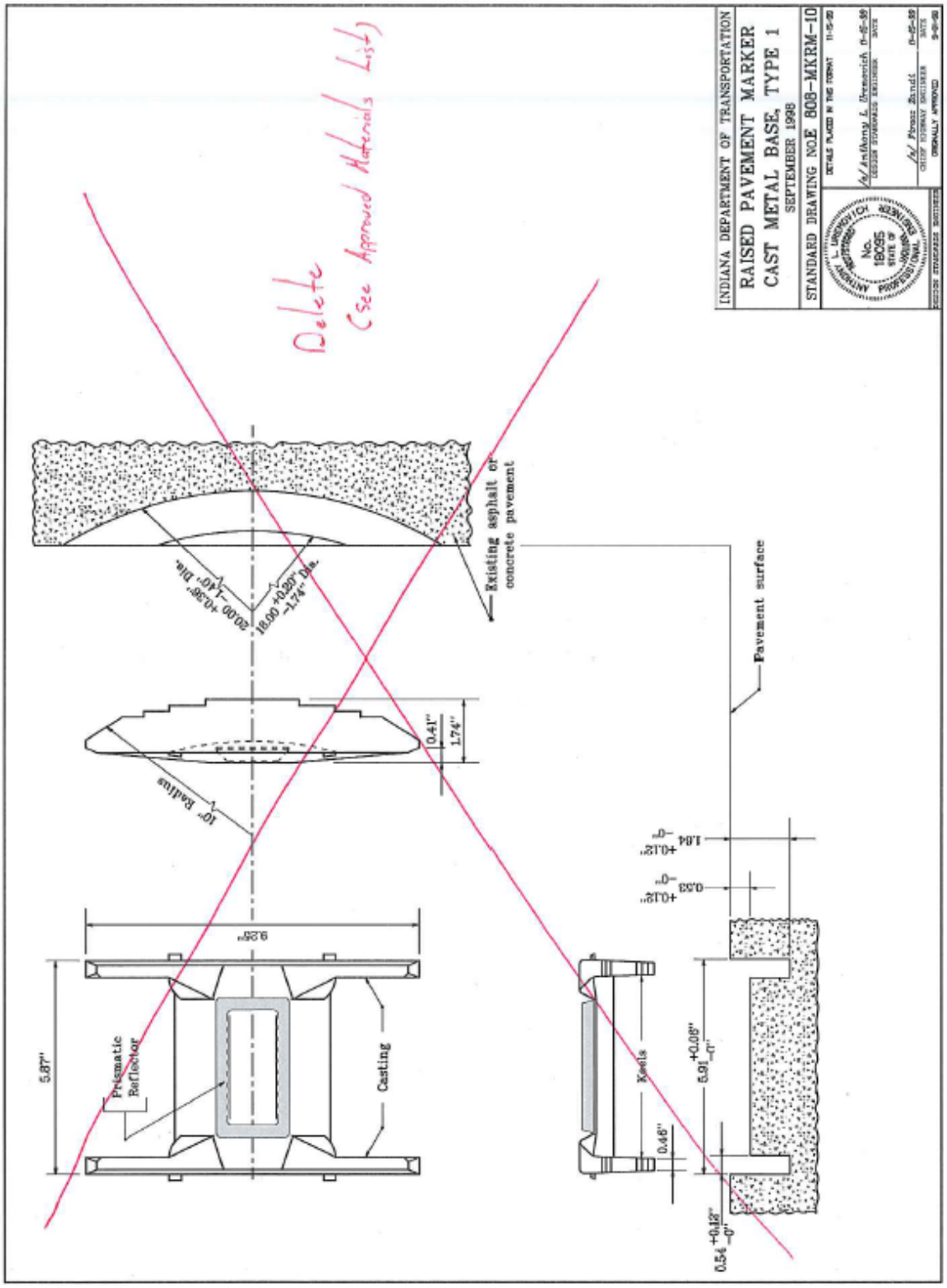
REVISION TO STANDARD DRAWINGS

808-MKRM-09 PLACEMENT OF SNOWPLOWABLE RAISED PAVEMENT MARKERS (WITH MARKUPS)



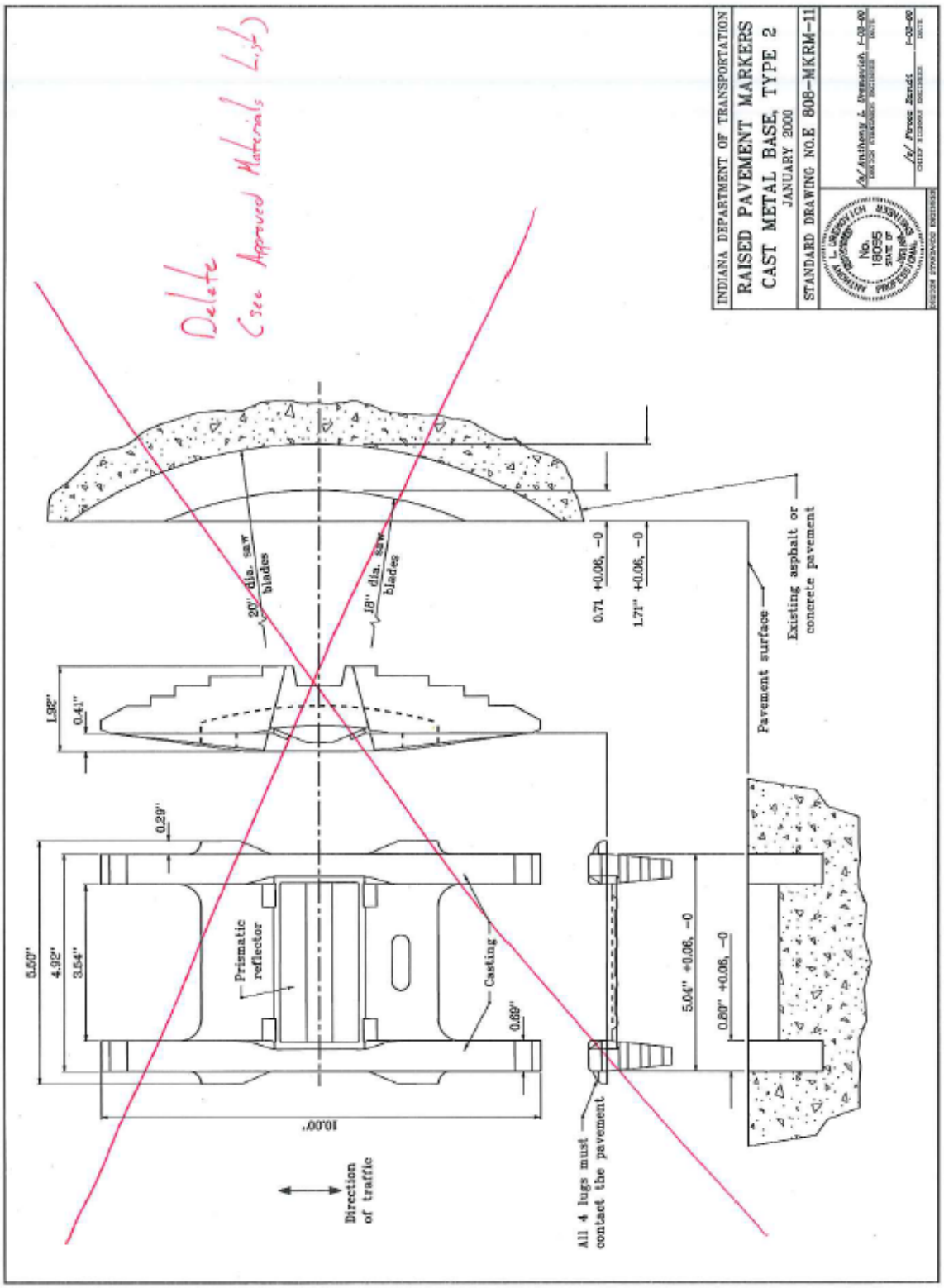
REVISION TO STANDARD DRAWINGS

808-MKRM-10 RAISED PAVEMENT MARKER CAST METAL BASE, TYPE 1 (PROPOSED TO DELETE)



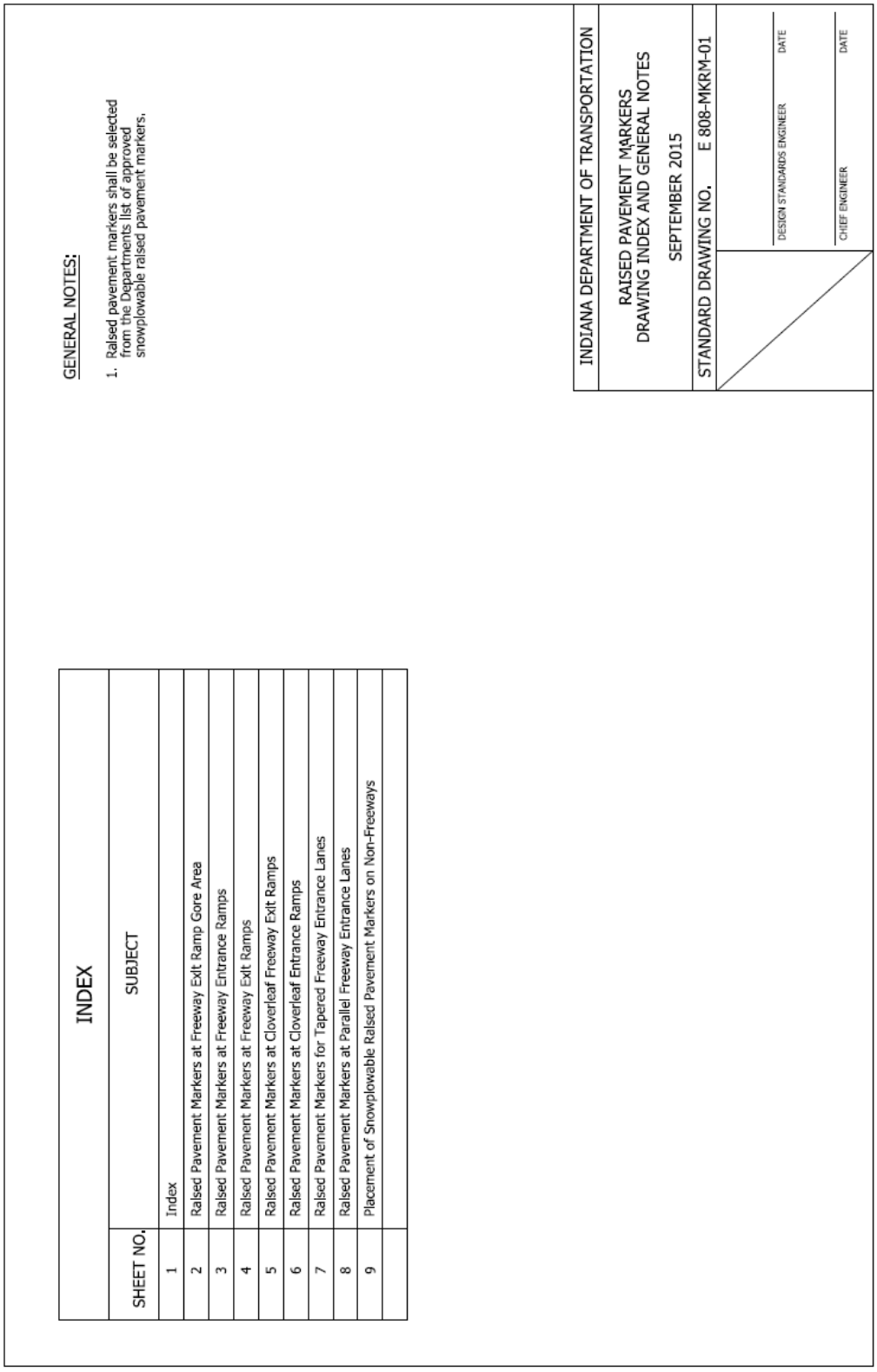
REVISION TO STANDARD DRAWINGS

808-MKRM-11 RAISED PAVEMENT MARKER CAST METAL BASE, TYPE 2 (PROPOSED TO DELETE)



REVISION TO STANDARD DRAWINGS

808-MKRM-01 RAISED PAVEMENT MARKERS (REVISED DRAFT)



INDEX

SHEET NO.	SUBJECT
1	Index
2	Ralsed Pavement Markers at Freeway Exit Ramp Gore Area
3	Ralsed Pavement Markers at Freeway Entrance Ramps
4	Ralsed Pavement Markers at Freeway Exit Ramps
5	Ralsed Pavement Markers at Cloverleaf Freeway Exit Ramps
6	Ralsed Pavement Markers at Cloverleaf Entrance Ramps
7	Ralsed Pavement Markers for Tapered Freeway Entrance Lanes
8	Ralsed Pavement Markers at Parallel Freeway Entrance Lanes
9	Placement of Snowplowable Ralsed Pavement Markers on Non-Freeways

GENERAL NOTES:

1. Ralsed pavement markers shall be selected from the Departments list of approved snowplowable ralsed pavement markers.

INDIANA DEPARTMENT OF TRANSPORTATION

RAISED PAVEMENT MARKERS
DRAWING INDEX AND GENERAL NOTES

SEPTEMBER 2015

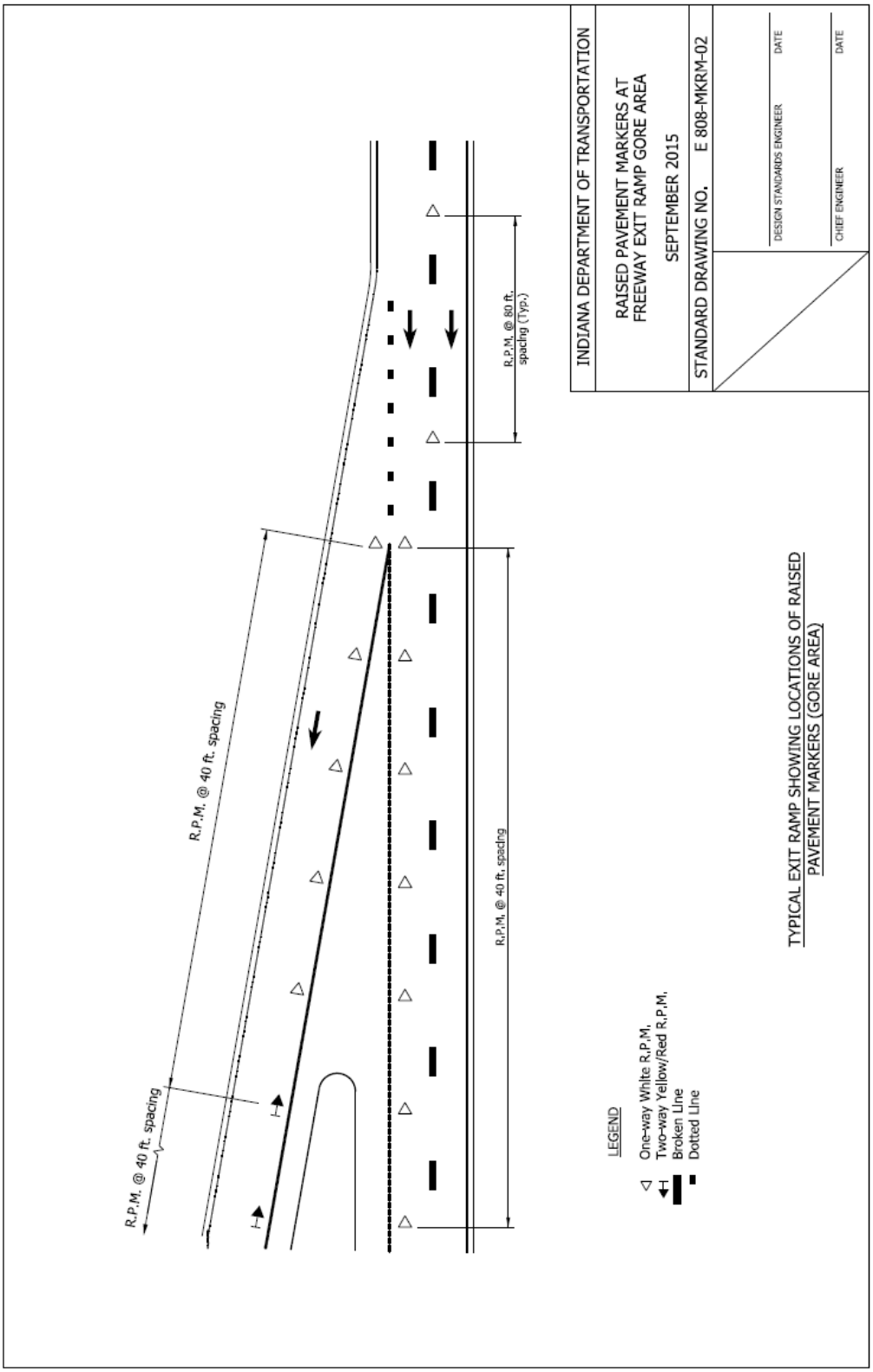
STANDARD DRAWING NO. E 808-MKRM-01

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

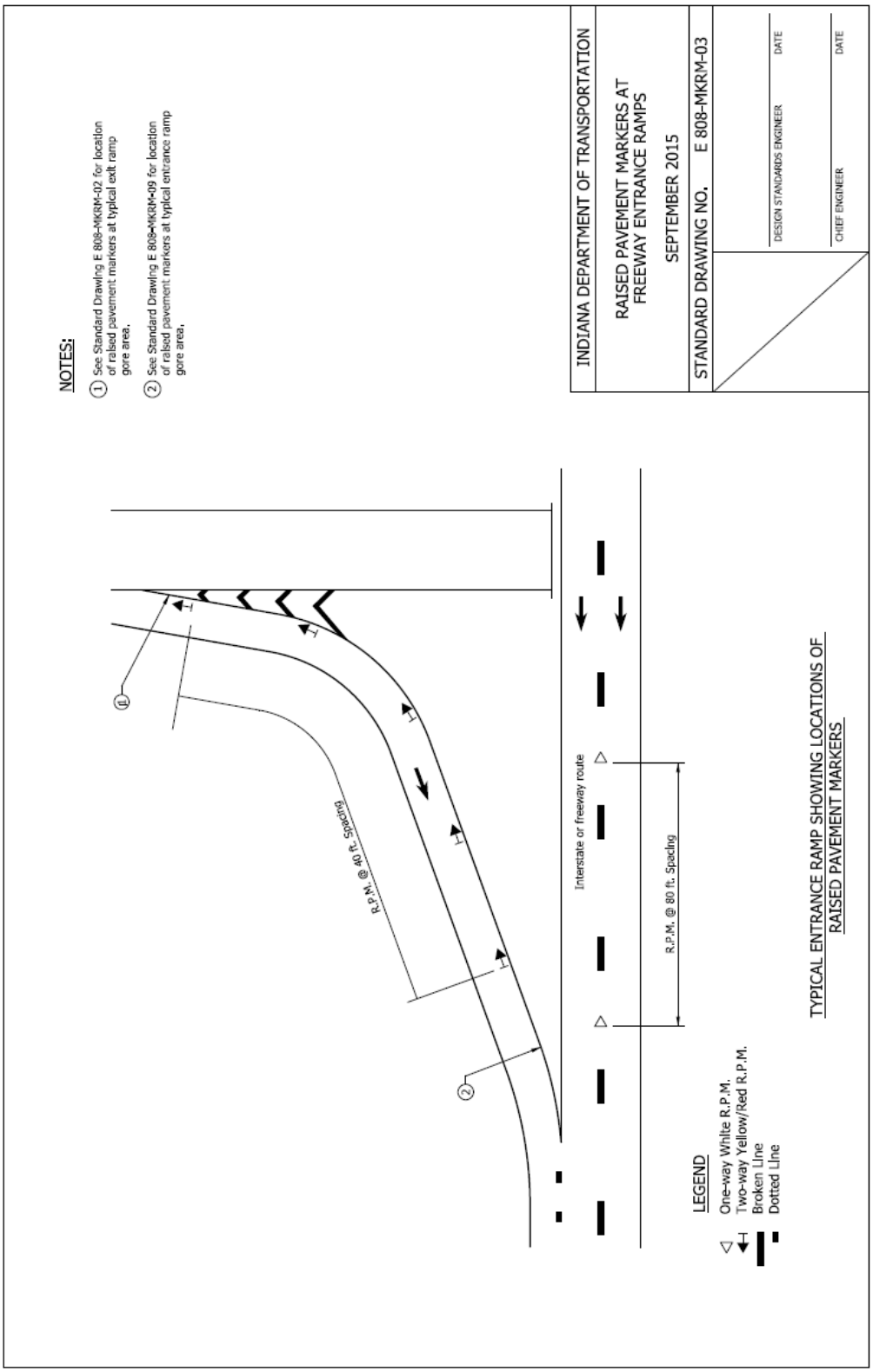
REVISION TO STANDARD DRAWINGS

808-MKRM-02 RAISED PAVEMENT MARKERS (REVISED DRAFT)



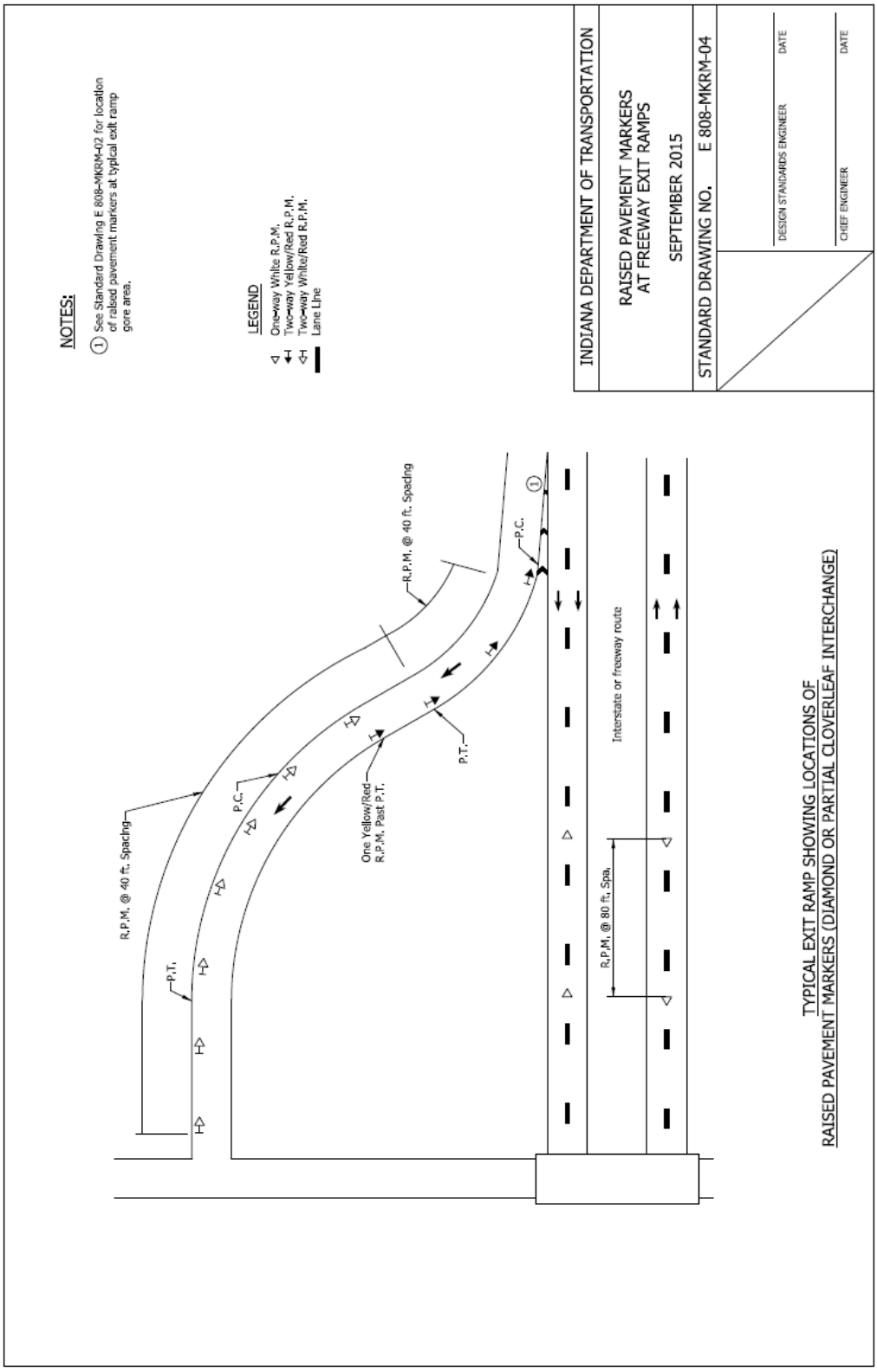
REVISION TO STANDARD DRAWINGS

808-MKRM-03 RAISED PAVEMENT MARKERS (REVISED DRAFT)



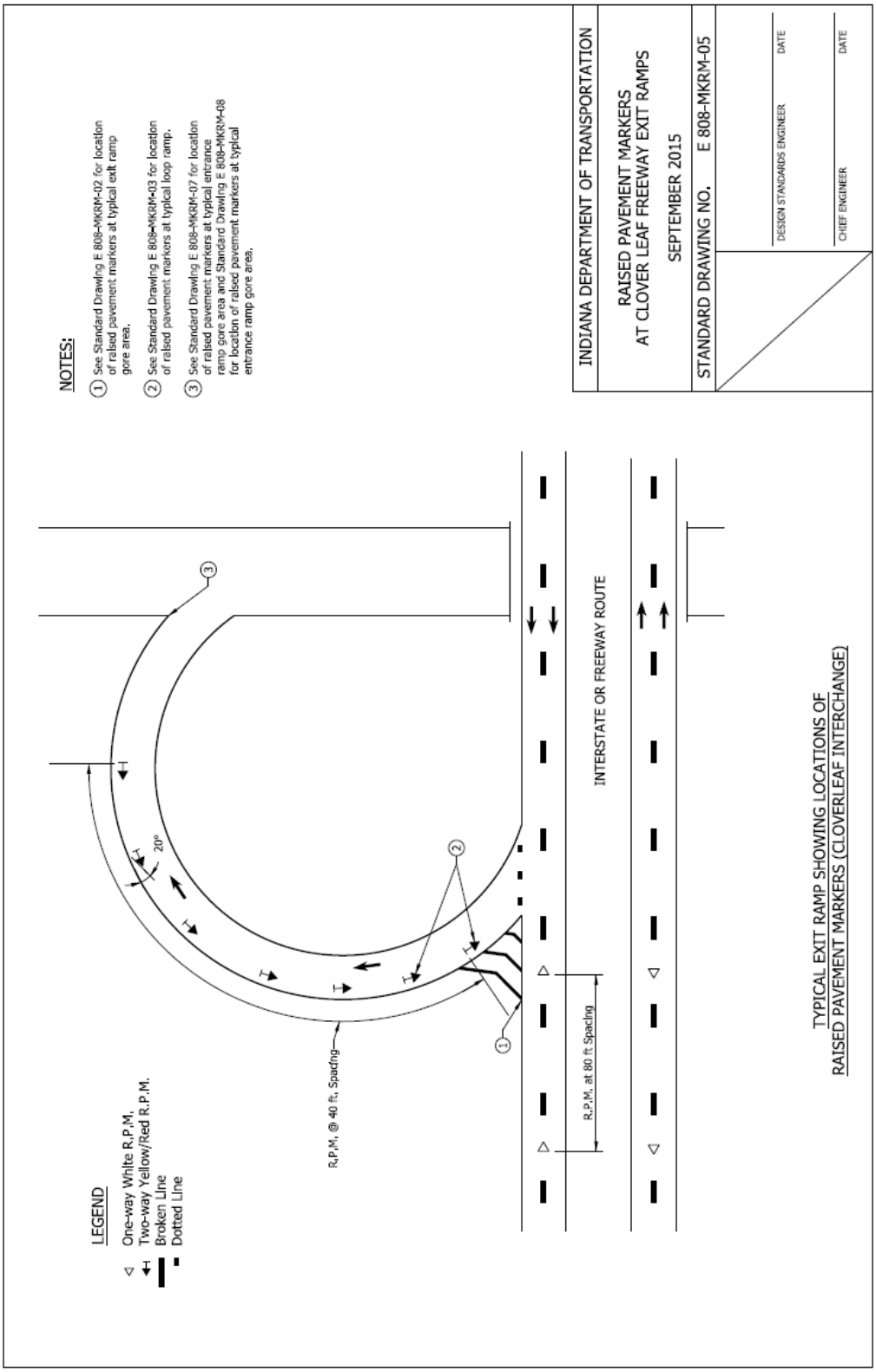
REVISION TO STANDARD DRAWINGS

808-MKRM-04 RAISED PAVEMENT MARKERS (REVISED DRAFT)



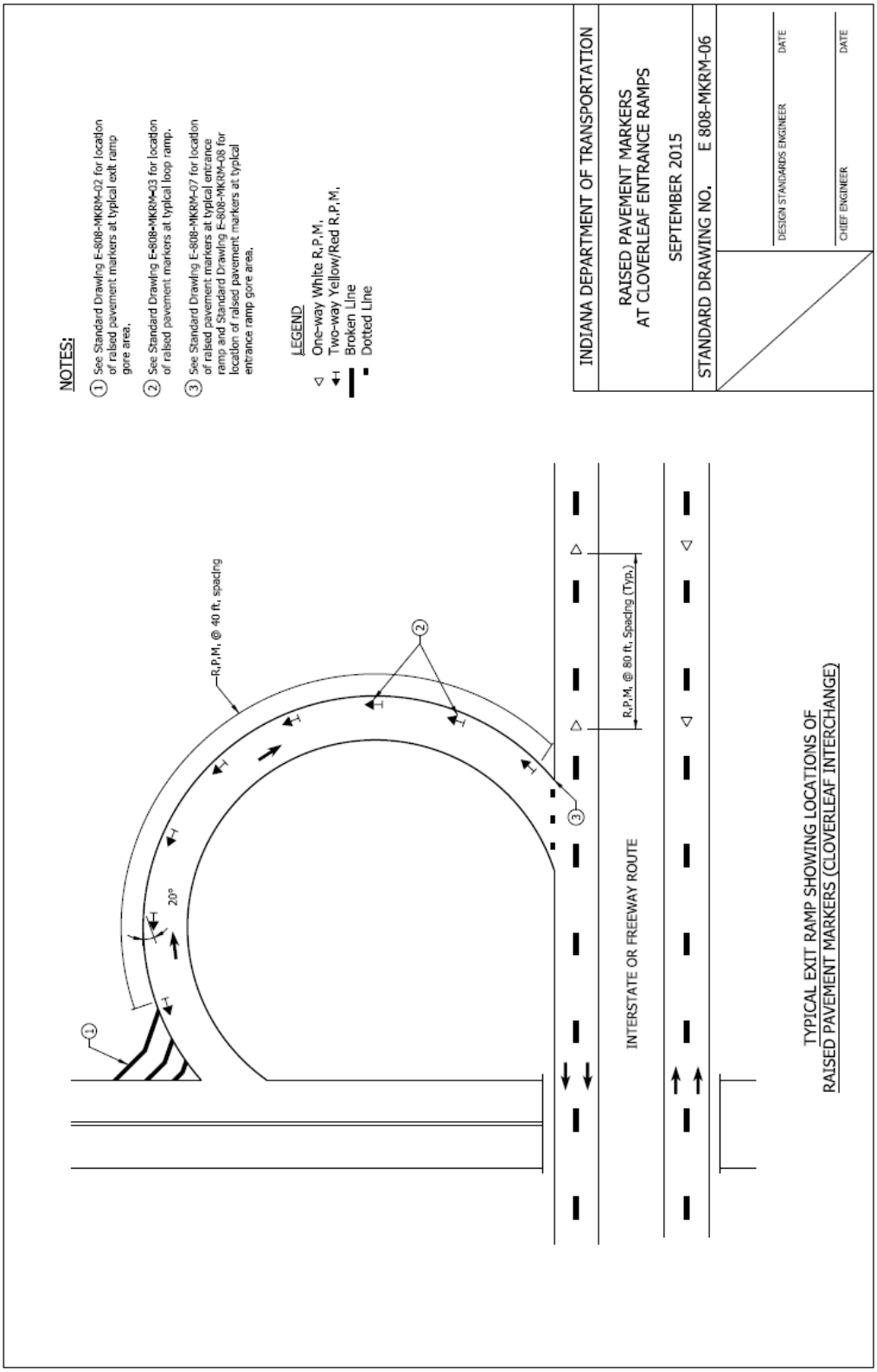
REVISION TO STANDARD DRAWINGS

808-MKRM-05 RAISED PAVEMENT MARKERS (REVISED DRAFT)



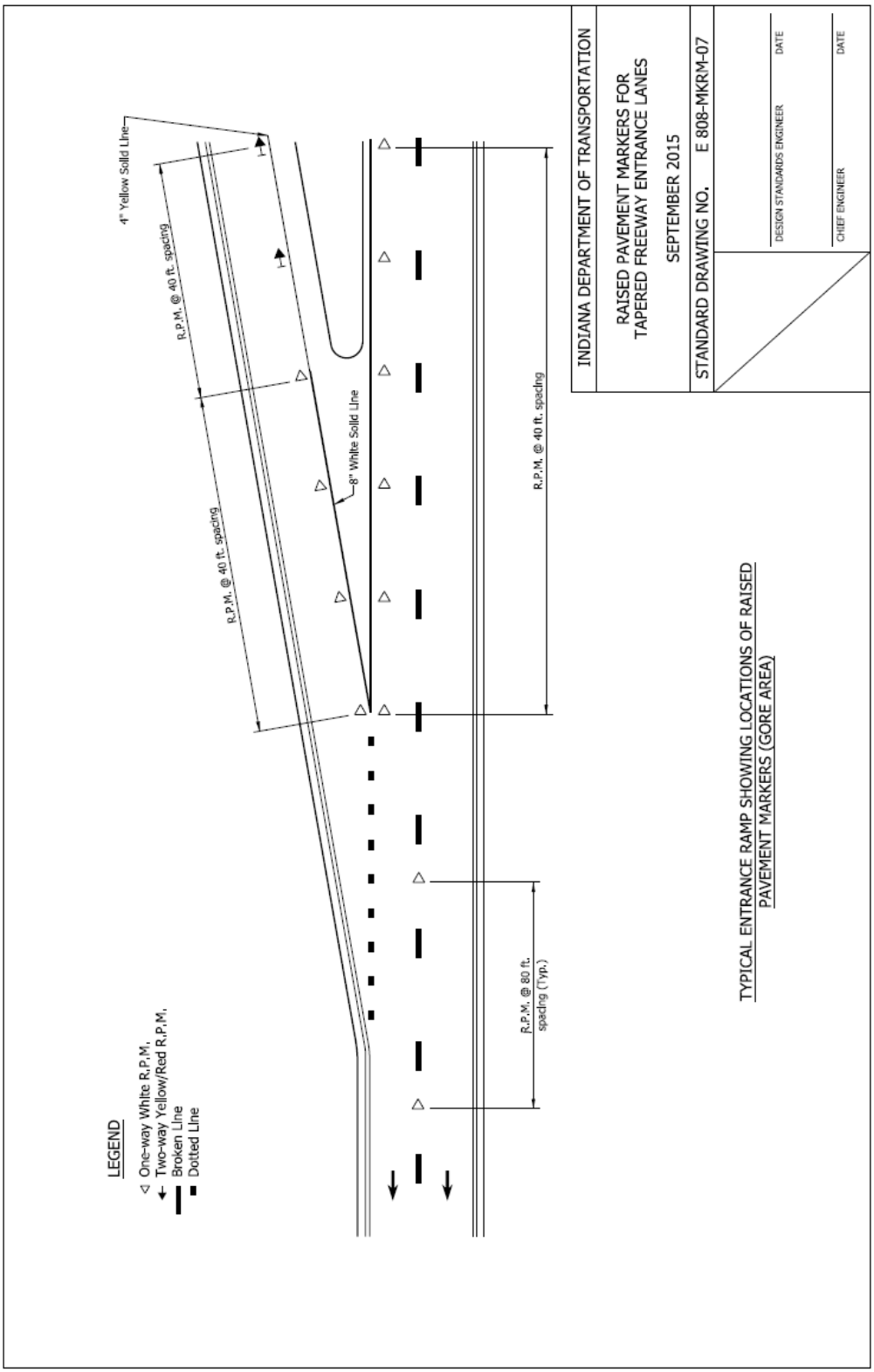
REVISION TO STANDARD DRAWINGS

808-MKRM-06 RAISED PAVEMENT MARKERS (REVISED DRAFT)



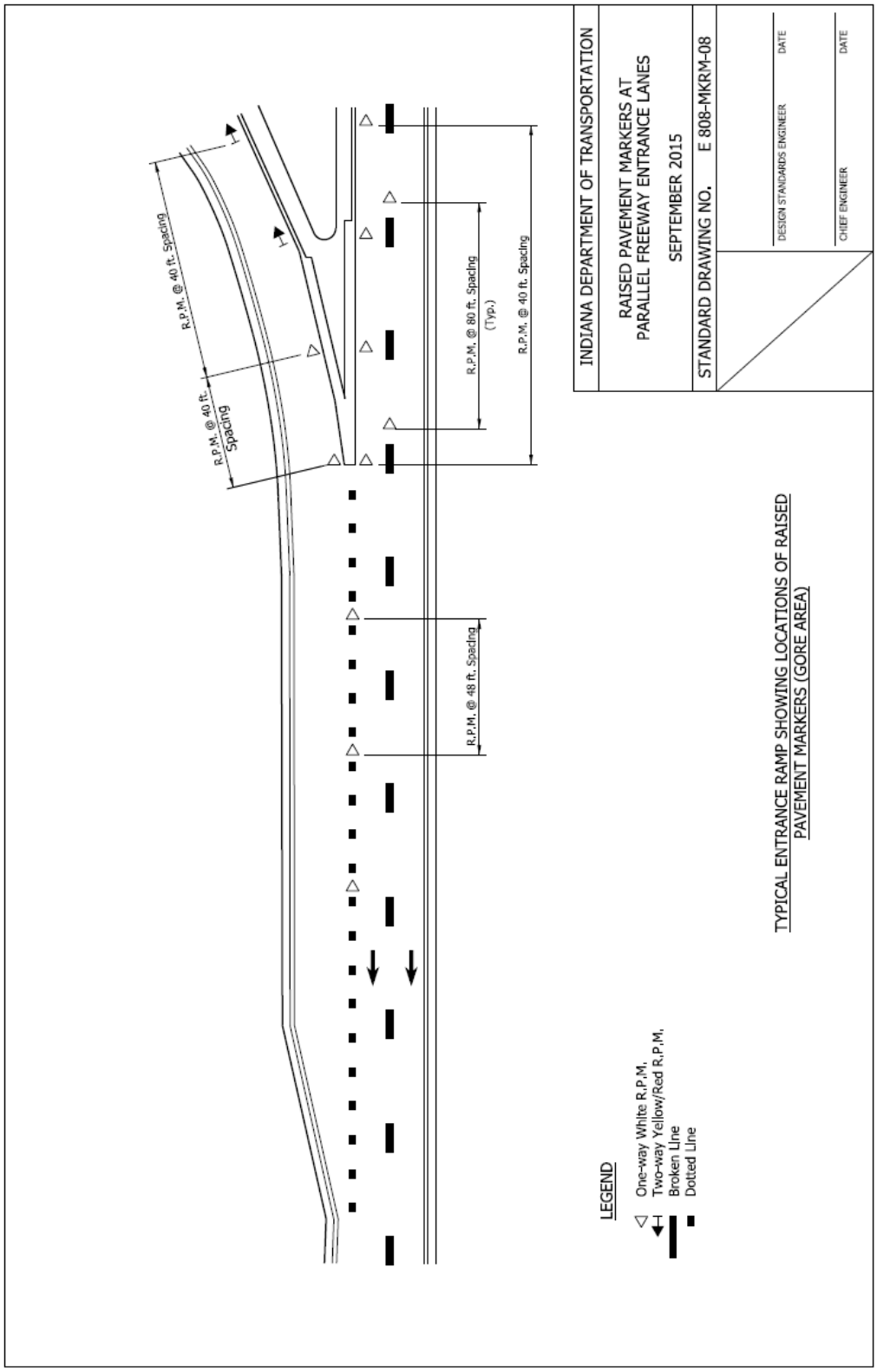
REVISION TO STANDARD DRAWINGS

808-MKRM-07 RAISED PAVEMENT MARKERS (REVISED DRAFT)



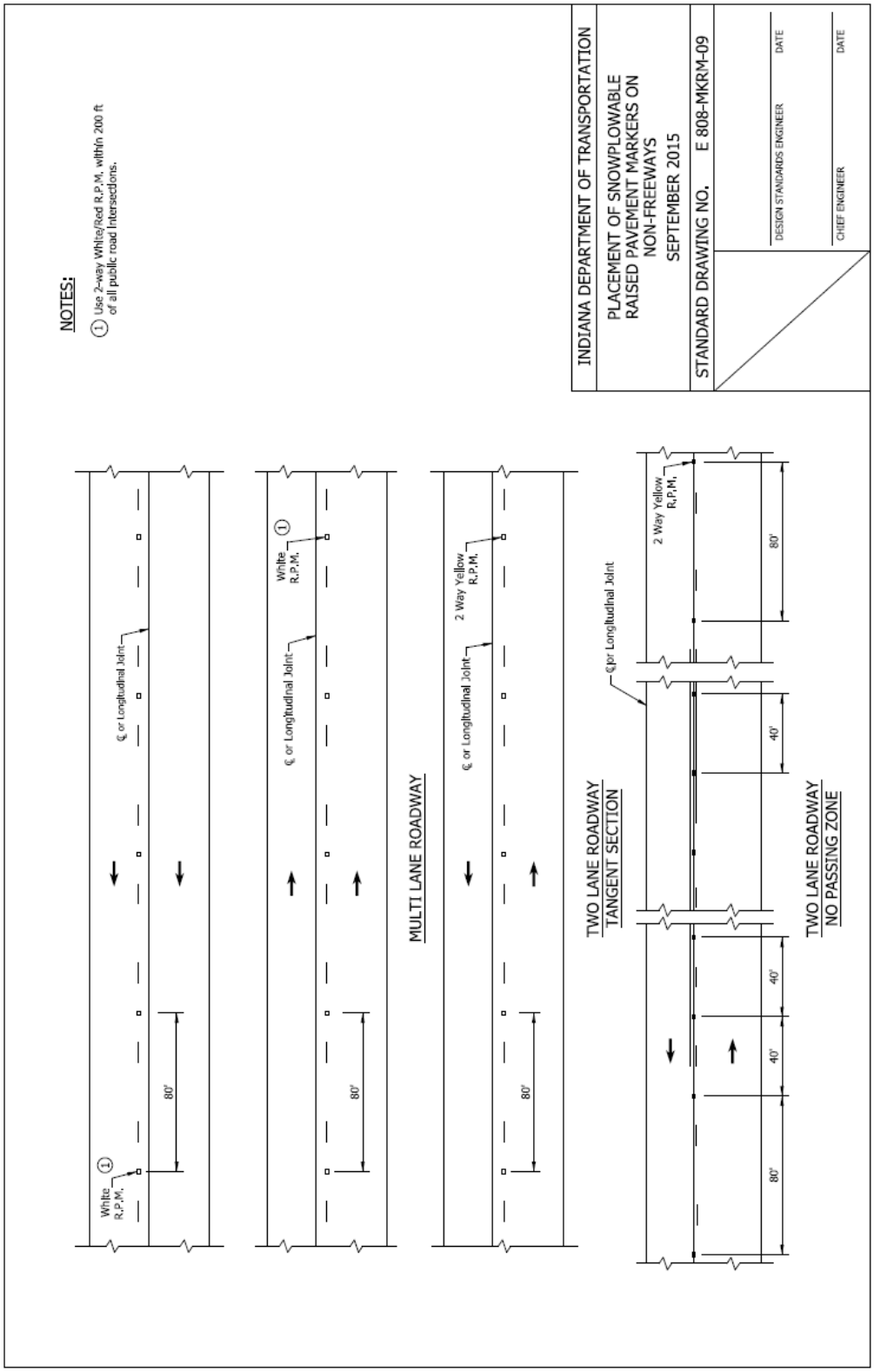
REVISION TO STANDARD DRAWINGS

808-MKRM-08 RAISED PAVEMENT MARKERS (REVISED DRAFT)



REVISION TO STANDARD DRAWINGS

808-MKRM-09 RAISED PAVEMENT MARKERS (REVISED DRAFT)



COMMENTS AND ACTION

808.04 LONGITUDINAL MARKINGS
808.12 METHOD OF MEASUREMENT
808-DLIM-01 thru 06; 808-MKRM-01 thru 11

DISCUSSION:
Mr. Bruno introduced and presented this item explaining the need to incorporate language pertaining to dotted lane lines into the Standard Specifications and Standard Drawings as required by the MUTCD. Mr. Bruno explained the revisions to drawings as shown. Mr. Bruno handed out additional revisions to some drawings as a result of industry input. Approved revisions shown as *revised draft* in these minutes.
Ms. Phillips asked about the chevrons shown, and Mr. Bruno said that they are optional and up to the designer. Ms. Phillips expressed that if it is shown on the standard drawing then it is assumed to be required. Should there be a note on the drawings stating that they are optional?
Ms. Phillips also asked about lane lines with regard to the gore markings and lane widths. Mr. Cales and Mr. Bruno explained that they fall under barrier lines in 808.04.

Mr. Bruno motioned that this item be approved as revised.

Motion: Mr. Bruno Second: Mr. Cales Ayes: 8 Nays: 0 FHWA Approval: YES	Action: ____ Passed as Submitted _X_ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 808.04 begin pg 795. Recurring Special Provision affected: 808-R-190 LONGITUDINAL RUMBLE STRIPES Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_X_ 2016 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _X_ Standard Drawing Effective Sept. 1, 2015 _____ Create RPD (No. _____) Effective Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The *Standard Specifications* are unclear how to pay for sidewalk when constructed in conjunction with a reinforced concrete approach slab.

PROPOSED SOLUTION: Revise section 705, Sidewalk on Structures, to include reinforced concrete approach slabs. This will allow sidewalk to be quantified by the CYS.

Paying for the sidewalk in accordance with 604 is not preferred due to the difference in thickness. Sidewalk on a bridge or RCBA is typically 6 – 8" thick while standard sidewalk on the approach roadway is 4".

APPLICABLE STANDARD SPECIFICATIONS: 705

APPLICABLE STANDARD DRAWINGS: n/a

APPLICABLE DESIGN MANUAL SECTION: 17-5.09(02), and 17-4.15(new)

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS: n/a

PAY ITEMS AFFECTED: n/a

Submitted By: Elizabeth Phillips

Title: Bridge Standards & Policy Manager

Organization: Standards & Policy

Phone Number: 232-6775

Date: 12/1/2014

APPLICABLE SUB-COMMITTEE ENDORSEMENT: none

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

(CONTINUED)

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? 609

Will approval of this item affect the Approved Materials List? n/a

Will this proposal improve:

- Construction costs? n/a
- Construction time? n/a
- Customer satisfaction? n/a
- Congestion/travel time? n/a
- Ride quality? n/a

Will this item improve safety:

- For motorists? n/a
- For construction workers? n/a

Will this proposal improve quality for:

- Construction procedures/processes? n/a
- Asset preservation? n/a
- Design process? yes

Will this proposal provide clarification for the Contractor and field personnel? yes. Clarifies basis of payment for sidewalk on RCBA

Can this item improve/reduce the number of potential change orders? Yes.

Is this item editorial? no

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 705-X-XXX SIDEWALK ON STRUCTURES

(Note: Proposed changes shown highlighted gray)

705-X-XXX SIDEWALK ON STRUCTURES

(Adopted xx-xx-14)

The Standard Specifications are revised as follows:

SECTION 705, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 705 – SIDEWALKS ON STRUCTURES

705.01 Description

This work shall consist of placing cement concrete sidewalks as an integral part of structures *and reinforced concrete bridge approaches* in accordance with 105.03.

705.02 Materials

Materials shall be in accordance with the following:

Concrete, Class C	702
Joint Filler	906.01
Reinforcing Bars	910.01

705.03 Construction Requirements

The concrete shall be placed in the forms in such amount that, after being tamped and struck off, the full required thickness results. Reinforcing bars shall be in accordance with 703.

After floating, the surface shall be marked into uniform rectangles by transverse markings formed with a jointer having 1/4 in. radii, if shown on the plans. On cantilevered sidewalks, a marking shall be placed over the center of each bracket and the space between brackets divided into uniformly marked rectangles as directed.

At expansion joints, the sidewalk and curb shall be cut entirely through and the specified type of joint installed. All edges shall be finished to a 1/4 in. radius.

As soon as finished, the sidewalk shall be cured for no less than 96 h in accordance with 704.06.

The surface shall be checked with a 10 ft straightedge placed parallel to the centerline at sufficient transverse intervals to check the general contour. An acceptable surface shall vary no more than 1/8 in. from the straightedge, except at grade changes, and shall be free from blemishes.

705.04 Method of Measurement

REVISION TO SPECIAL PROVISIONS

PROPOSED NEW 705-X-XXX SIDEWALK ON STRUCTURES

Sidewalks on structures *and reinforced concrete bridge approaches* will be measured by the cubic yard in accordance with the dimensions shown on the plans or as ordered. Reinforcing bars will be measured by the pound in accordance with 703.07.

705.05 Basis of Payment

The accepted quantities of sidewalks on structures *and reinforced concrete bridge approaches* will be paid for at the contract unit price per cubic yard for concrete, C, superstructure. Reinforcing bars will be paid for at the contract unit price per pound in accordance with 703.08.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Concrete, C, Superstructure	CYS

BACKUP 01

IDM 17-4.15 SIDEWALKS AND NON-VEHICLE USE FACILITIES (DRAFT)
17-5.09(02) QUANTITIES

17-4.15 Sidewalks and Non-Vehicle Use Facilities [Add. Dec. 2014]

A sidewalk or non-vehicle use facility can be constructed from HMA or concrete and must be in accordance with the Americans with Disabilities Act (ADA). The estimated quantity for an HMA section should be included as HMA for Sidewalk per ton. The estimated quantity for a concrete section should be included as Sidewalk, Concrete, per square yard. See the *Standard Drawings* series 604-NVUF for pavement section details.

Where a sidewalk is constructed on a bridge or reinforced concrete bridge approach (RCBA), the estimated quantity should be included as Concrete, C, Superstructure by the cubic yard. See section 705 of the *Standard Specifications*.

17-5.09(02) Quantities [Rev. July 2012, Dec. 2014]

Quantities for the following pay items should be included on the Bridge Summary sheet, in the Summary of Bridge Quantities table, separate from other bridge quantities.

1. RCBA of the required thickness, including extensions for bridge-railing transitions, per square yard.

2. Epoxy-coated reinforcing bars in the RCBA and extensions, per pound.

3. Dense-graded subbase placed under the RCBA and extensions, per cubic yard.

Estimated quantity for sidewalks on RCBAs should be shown as Concrete, C, Superstructure, per cubic yard.

COMMENTS AND ACTION

705-X-XXX SIDEWALK ON STRUCTURES

DISCUSSION:
This item was introduced and presented by Ms. Phillips who expressed the need to clarify how to pay for sidewalks when they are constructed in conjunction with reinforced concrete approach slabs, since those sidewalks are not the same as described in 604.

Motion: Ms. Phillips Second: Mr. Cales Ayes: 8 Nays: 0 FHWA Approval: YES	Action: X Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: 705 pg 543 thru 544. Recurring Special Provision affected: PROPOSED NEW Standard Drawing affected: NONE Design Manual Sections affected: 17-5.09(02), and 17-4.15(new) GIFE Sections cross-references: NONE	X 2016 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: 402 Pay items for HMA Type __ were removed from the 2014 Standard Specifications. Standard drawings for Non-Vehicular Use Facility pavement sections (402-NVUF and 502-NVUF) are not clear how to pay for pavement section indicated.

PROPOSED SOLUTION: Revise the E 402-NVUF series to be paid for as HMA for Sidewalk and the E 502-NVUF Concrete to be paid for as Sidewalk Concrete. Update 3-digit lead number to 604 to coordinate with appropriate section of the Standard Specifications.

APPLICABLE STANDARD SPECIFICATIONS: 604

APPLICABLE STANDARD DRAWINGS: Old E 402-NVUF-01 and -02 (New E 604-NVUF-01 and -02), and Old E 502-NVUF-01 (New E 604-NVUF-03).

APPLICABLE DESIGN MANUAL SECTION: 17

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED: 502-11564 PCCP, 4 IN.

Submitted By: Elizabeth Phillips

Title: Bridge Standards & Policy Manager

Organization: Bridge Standards & Policy

Phone Number: 232-6775

Date: 11/25/2014

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Elizabeth Phillips & Kumar Dave

(CONTINUED)

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? n/a

Will approval of this item affect the Approved Materials List? n/a

Will this proposal improve:

- Construction costs? n/a
- Construction time? n/a
- Customer satisfaction? n/a
- Congestion/travel time? n/a
- Ride quality? n/a

Will this item improve safety:

- For motorists? n/a
- For construction workers? n/a

Will this proposal improve quality for:

- Construction procedures/processes? n/a
- Asset preservation? n/a
- Design process? yes

Will this proposal provide clarification for the Contractor and field personnel? yes. Clarifies basis of payment for HMA and PCCP non-vehicular use facilities

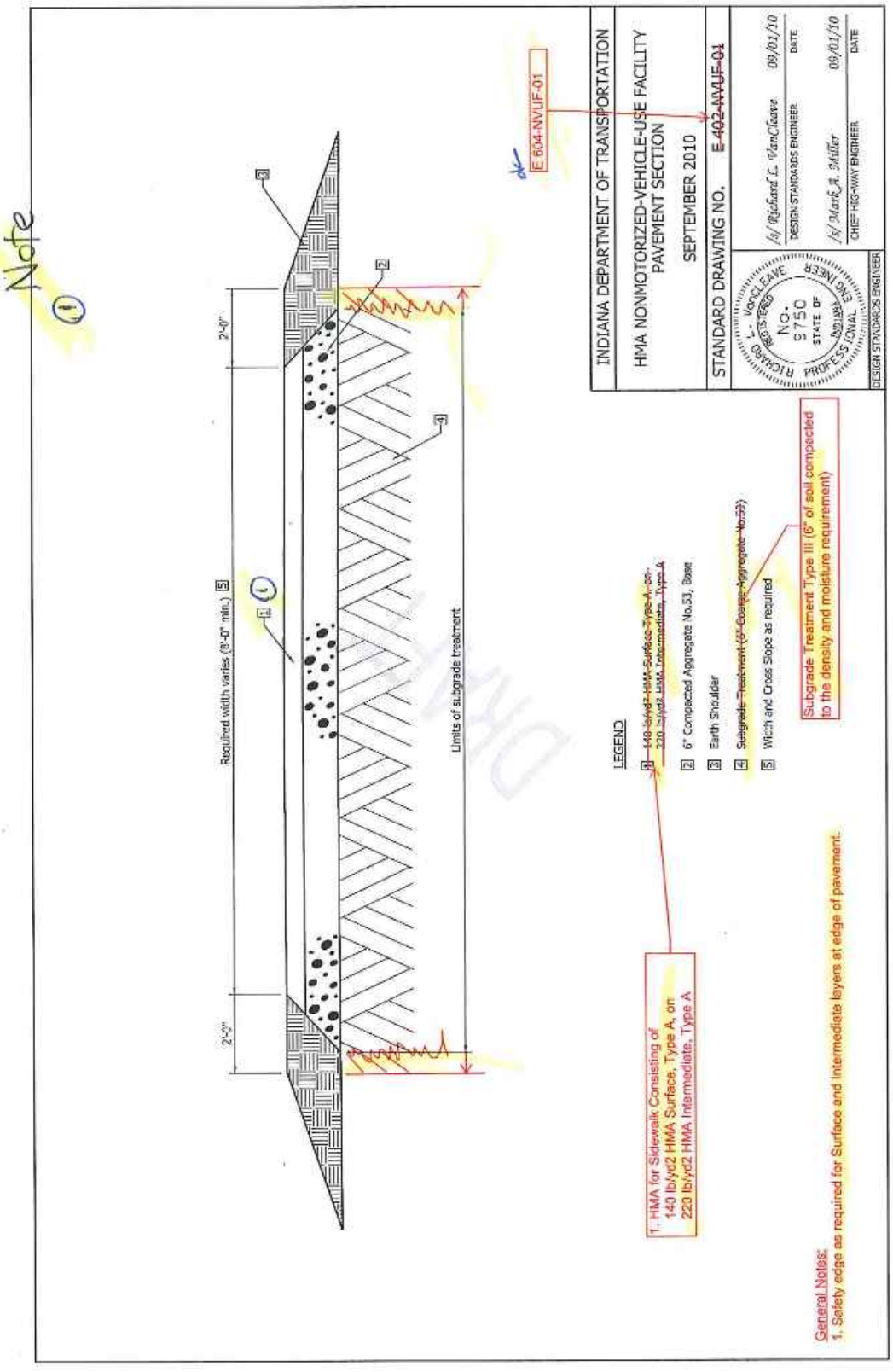
Can this item improve/reduce the number of potential change orders? Yes.

Is this item editorial? no

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

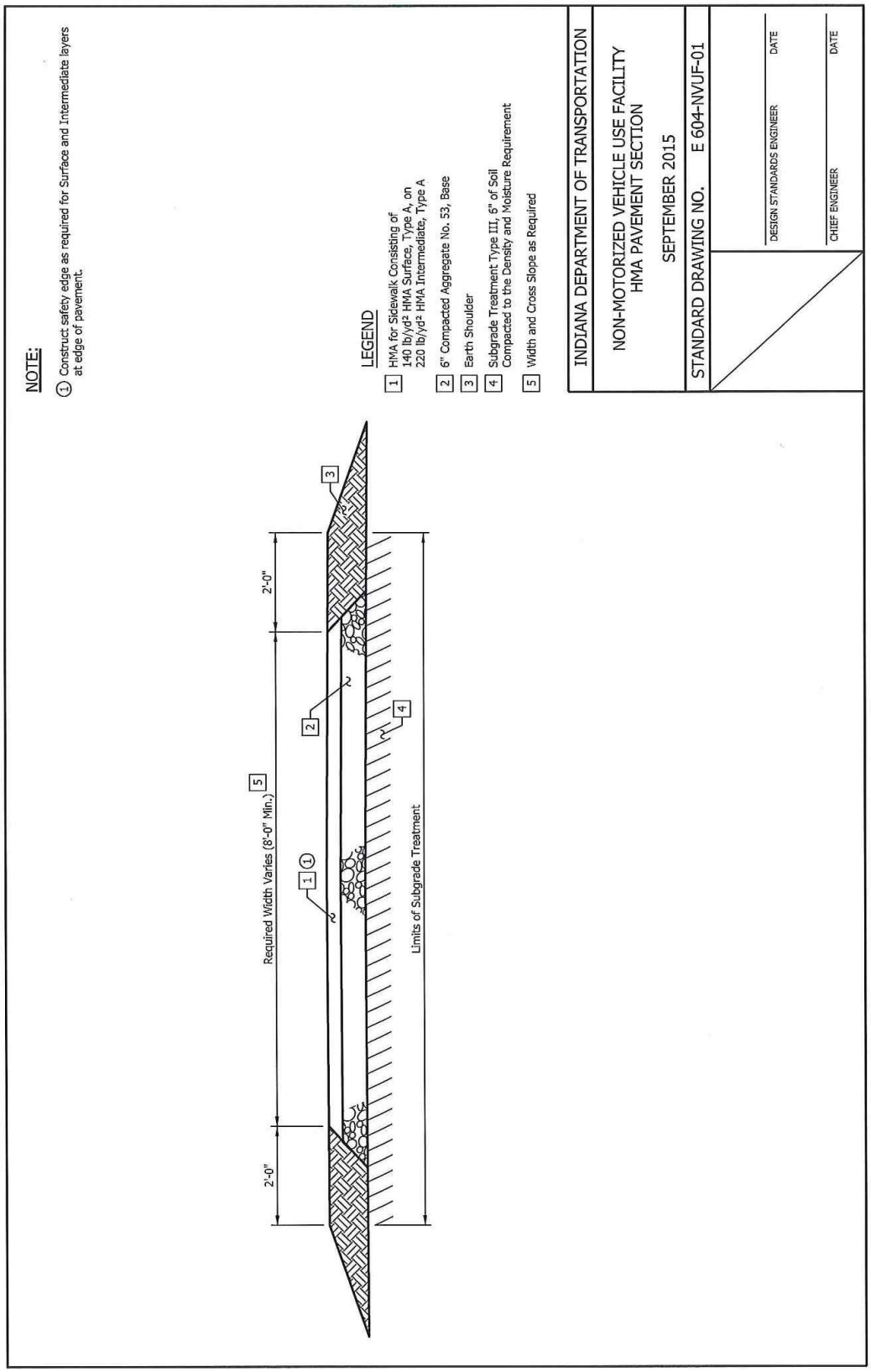
REVISION TO STANDARD DRAWINGS

402-NVUF-01 HMA NONMOTORIZED-VEHICLE-USE FACILITY PAVEMENT SECTION (WITH MARKUPS)



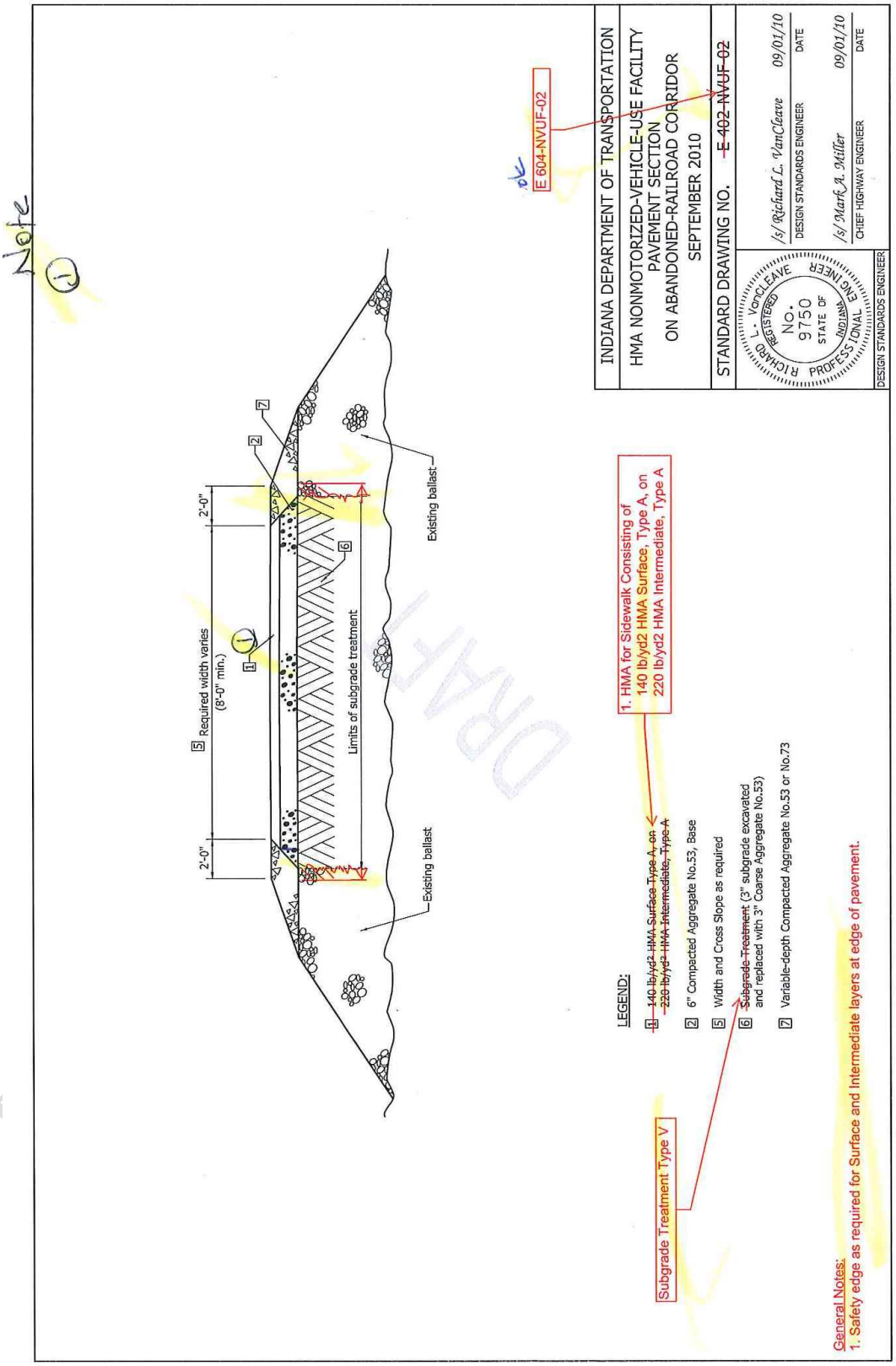
REVISION TO STANDARD DRAWINGS

604-NVUF-01 NON-MOTORIZED VEHICLE-USE FACILITY HMA PAVEMENT SECTION (DRAFT)



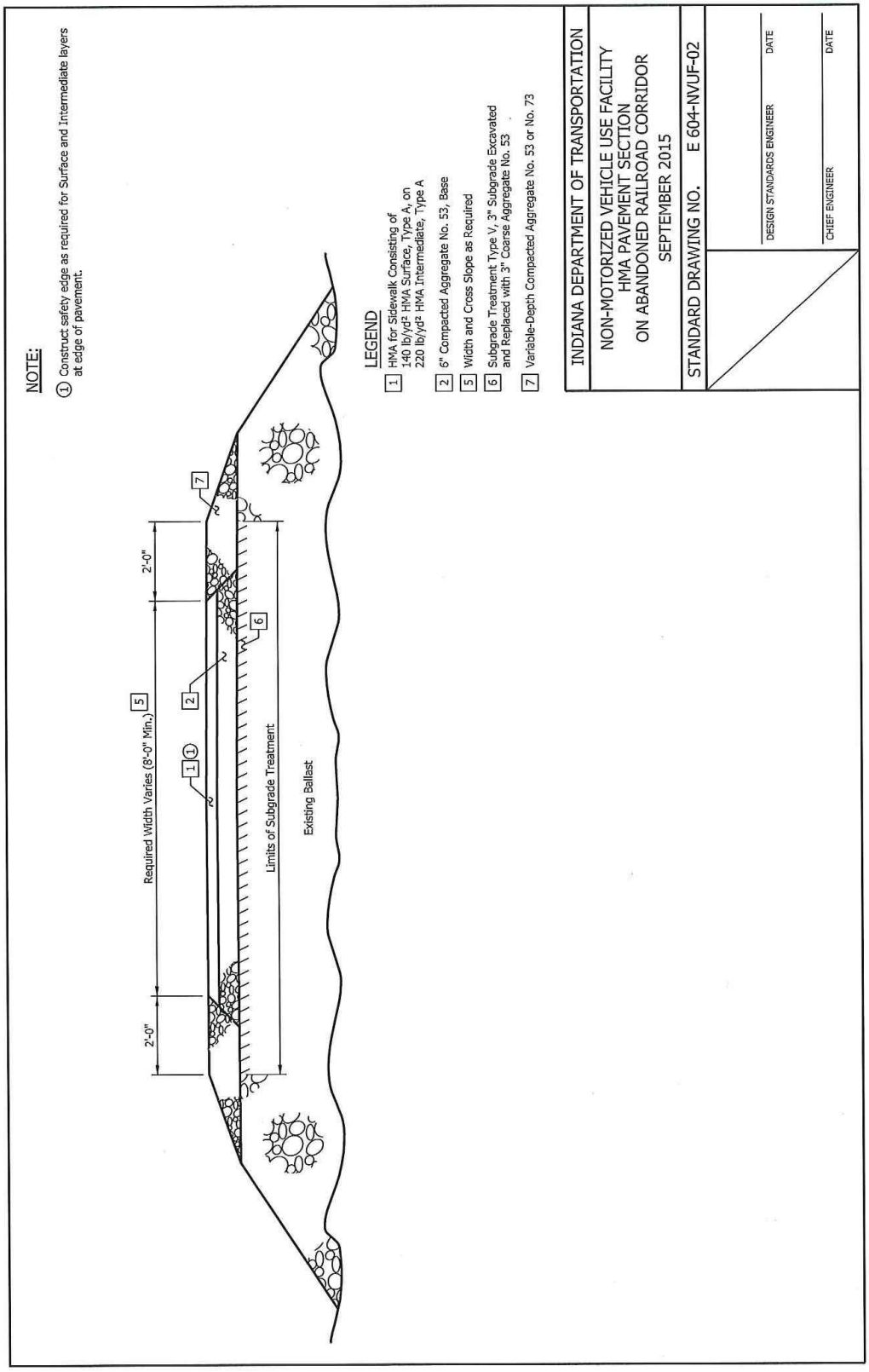
REVISION TO STANDARD DRAWINGS

402-NVUF-02 HMA NONMOTORIZED-VEHICLE-USE FACILITY PAVEMENT SECTION ON ABANDONED-RAILROAD CORRIDOR (WITH MARKUPS)



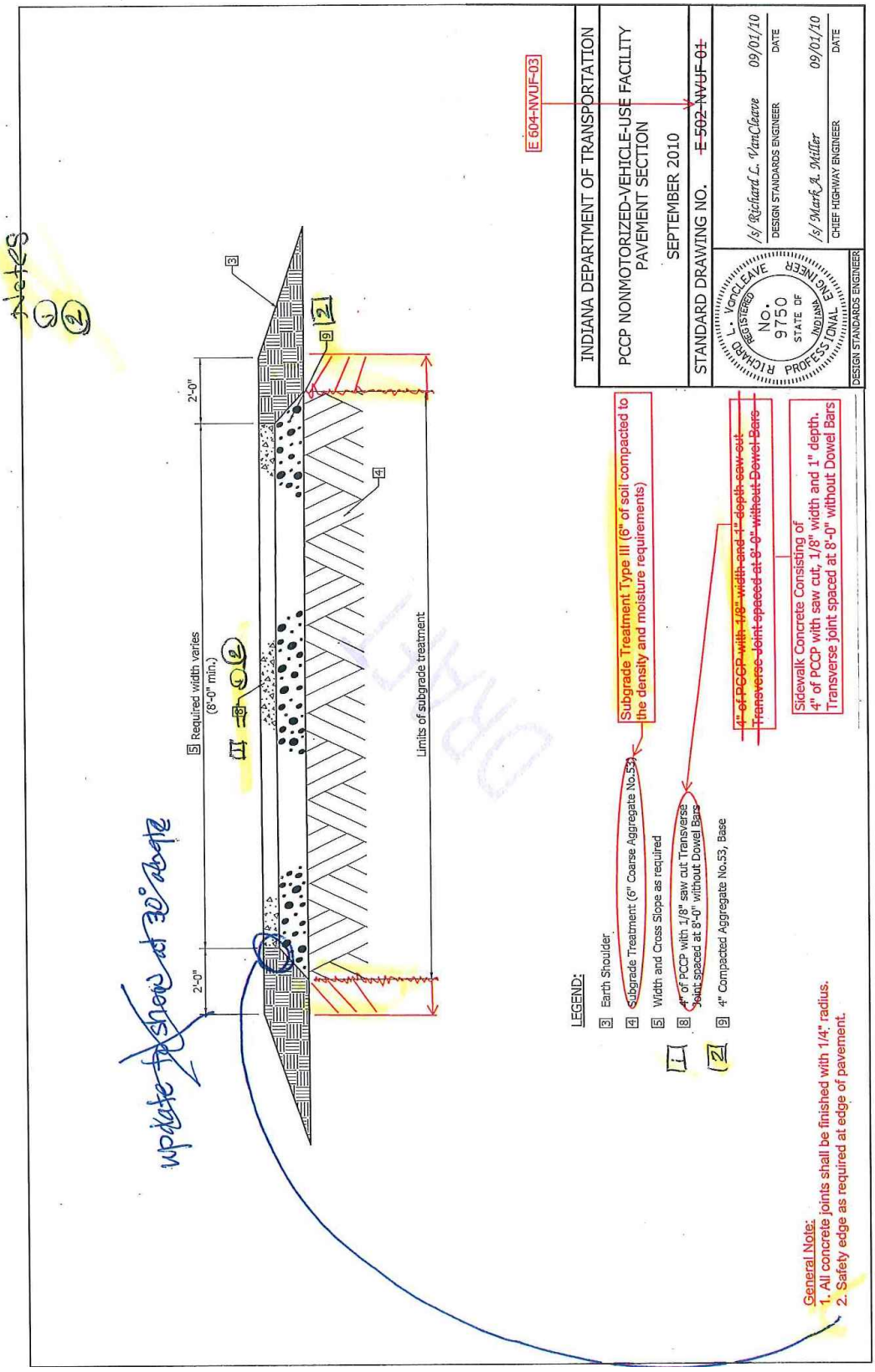
REVISION TO STANDARD DRAWINGS

604-NVUF-02 NON-MOTORIZED VEHICLE USE FACILITY HMA PAVEMENT SECTION ON ABANDONED RAILROAD CORRIDOR (DRAFT)



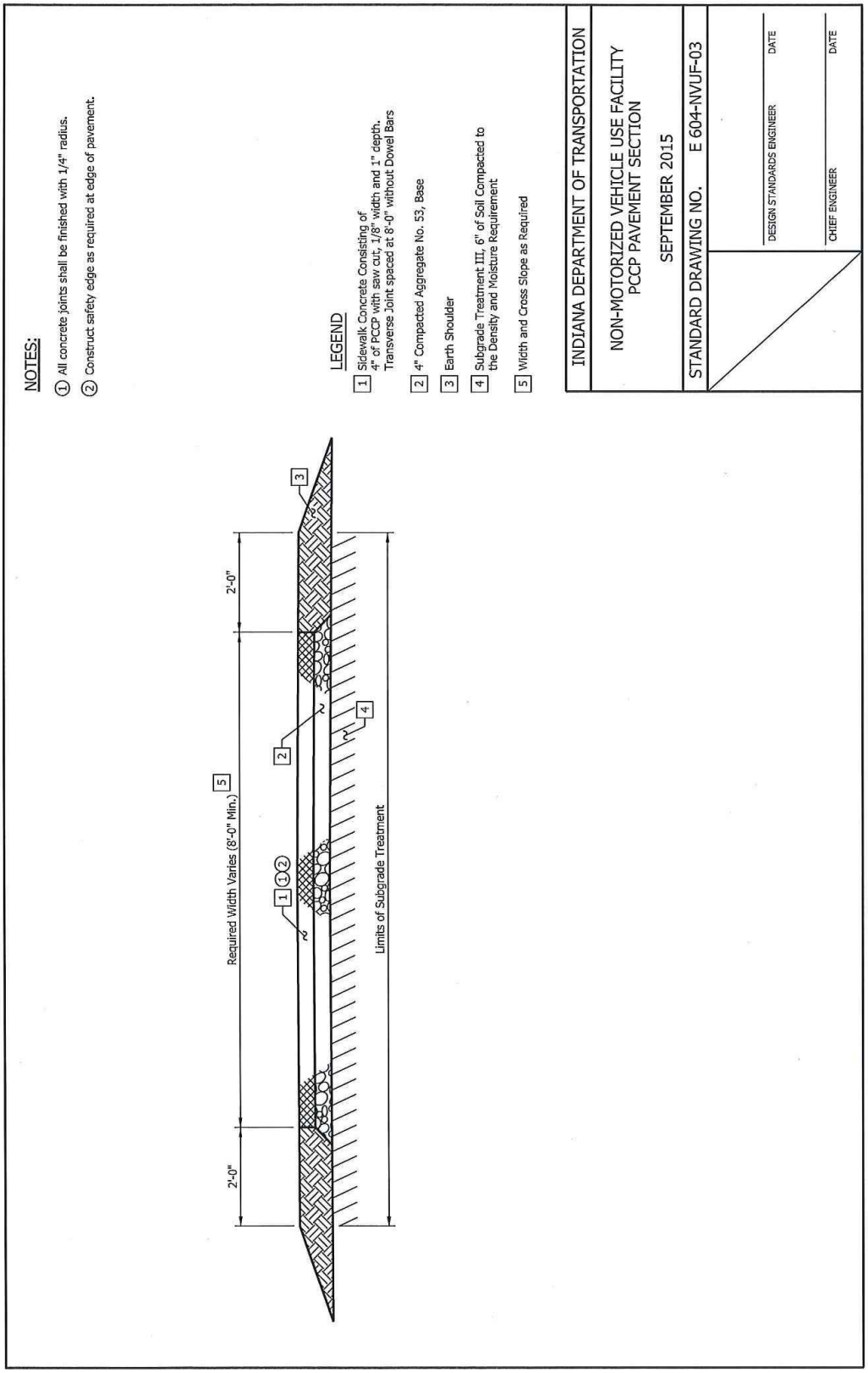
REVISION TO STANDARD DRAWINGS

502-NVUF-01 PCCP NONMOTORIZED-VEHICLE-USE FACILITY PAVEMENT SECTION (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

604-NVUF-03 NONMOTORIZED VEHICLE USE FACILITY PCCP PAVEMENT SECTION (DRAFT)



COMMENTS AND ACTION

402-NVUF-01, -02; 502-NVUF-01; 604-NVUF-01, 02, -03.

DISCUSSION:
This item was introduced and presented by Ms. Phillips who expressed the need to revise the E 402-NVUF series, and the E 502-NVUF series drawings to 604 in order to coordinate with the appropriate, 604, section of the Standard Specifications.

Mr. Walker and Mr. Byers discussed how this could be used with RCC. Mr. Pankow addressed how this could affect trails and ADA requirements. Mr. Duncan mentioned that MEPDG cannot design for less than 6 in. Mr. Pankow said that could be okay.

Motion: Ms. Phillips Second: Mr. Cales Ayes: 8 Nays: 0 FHWA Approval: YES	Action: X Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: NONE	_____ 2016 Standard Specifications _____ Revise Pay Items List
Recurring Special Provision affected: NONE	_____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date:
Standard Drawing affected: 402-NVUF-01, -02; 502-NVUF-01	_____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date:
Design Manual Sections affected: SECTION 17	X Standard Drawing Effective Sept. 1, 2015
GIFE Sections cross-references: NONE	_____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

Ms. Phillips
Date: 12/18/14

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: There are inconsistencies between IDM Figure 405-2Y and Std Dwg E703-BRST-01 regarding the size and dimension for standard reinforcing bar hook details. Neither is completely correct.

PROPOSED SOLUTION: Revise both the Figure and Standard Drawing to be in accordance with ACI 318 and CRSI's Manual of Standard and Practice.
ACI= American Concrete Institute
CRSI = Concrete Reinforcing Steel Institute

APPLICABLE STANDARD SPECIFICATIONS:

APPLICABLE STANDARD DRAWINGS: E703-BRST-01

APPLICABLE DESIGN MANUAL SECTION: Figure 405-2Y

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED:

Submitted By: Elizabeth Phillips

Title: Standards and Policy Manager

Organization: INDOT

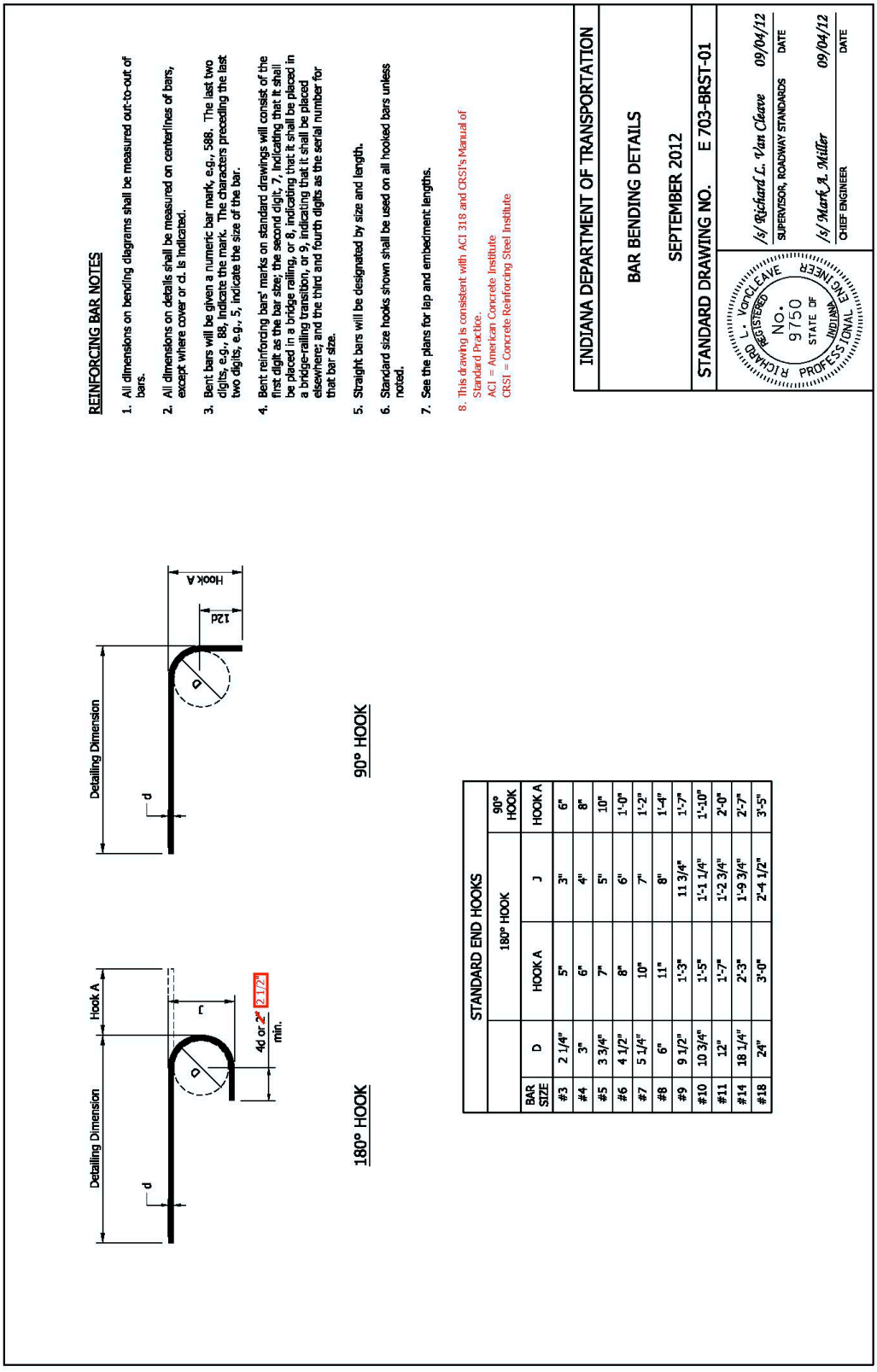
Phone Number: 232-6775

Date: 11-24-14

APPLICABLE SUB-COMMITTEE ENDORSEMENT: none.

REVISION TO AND STANDARD DRAWINGS

703-BRST-01 BAR BENDING DETAILS (WITH MARKUPS)



REINFORCING BAR NOTES

1. All dimensions on bending diagrams shall be measured out-to-out of bars.
2. All dimensions on details shall be measured on centerlines of bars, except where cover or cl. is indicated.
3. Bent bars will be given a numeric bar mark, e.g., S88. The last two digits, e.g., 88, indicate the mark. The characters preceding the last two digits, e.g., S, indicate the size of the bar.
4. Bent reinforcing bars' marks on standard drawings will consist of the first digit as the bar size; the second digit, 7, indicating that it shall be placed in a bridge railing, or 8, indicating that it shall be placed in a bridge-railing transition, or 9, indicating that it shall be placed elsewhere; and the third and fourth digits as the serial number for that bar size.
5. Straight bars will be designated by size and length.
6. Standard size hooks shown shall be used on all hooked bars unless noted.
7. See the plans for lap and embedment lengths.
8. This drawing is consistent with ACI 318 and CRSI's Manual of Standard Practice.
   ACI = American Concrete Institute
   CRSI = Concrete Reinforcing Steel Institute

Detailing Dimension
d
Hook A
J
4d or 2" 2 1/2" min.

180° HOOK

Detailing Dimension
d
D
12d
Hook A

90° HOOK

STANDARD END HOOKS					
		180° HOOK			90° HOOK
BAR SIZE	D	HOOK A	J		HOOK A
#3	2 1/4"	5"	3"		6"
#4	3"	6"	4"		8"
#5	3 3/4"	7"	5"		10"
#6	4 1/2"	8"	6"		1'-0"
#7	5 1/4"	10"	7"		1'-2"
#8	6"	11"	8"		1'-4"
#9	9 1/2"	1'-3"	11 3/4"		1'-7"
#10	10 3/4"	1'-5"	1'-1 1/4"		1'-10"
#11	12"	1'-7"	1'-2 3/4"		2'-0"
#14	18 1/4"	2'-3"	1'-9 3/4"		2'-7"
#18	24"	3'-0"	2'-4 1/2"		3'-5"

INDIANA DEPARTMENT OF TRANSPORTATION

BAR BENDING DETAILS

SEPTEMBER 2012

STANDARD DRAWING NO. E 703-BRST-01

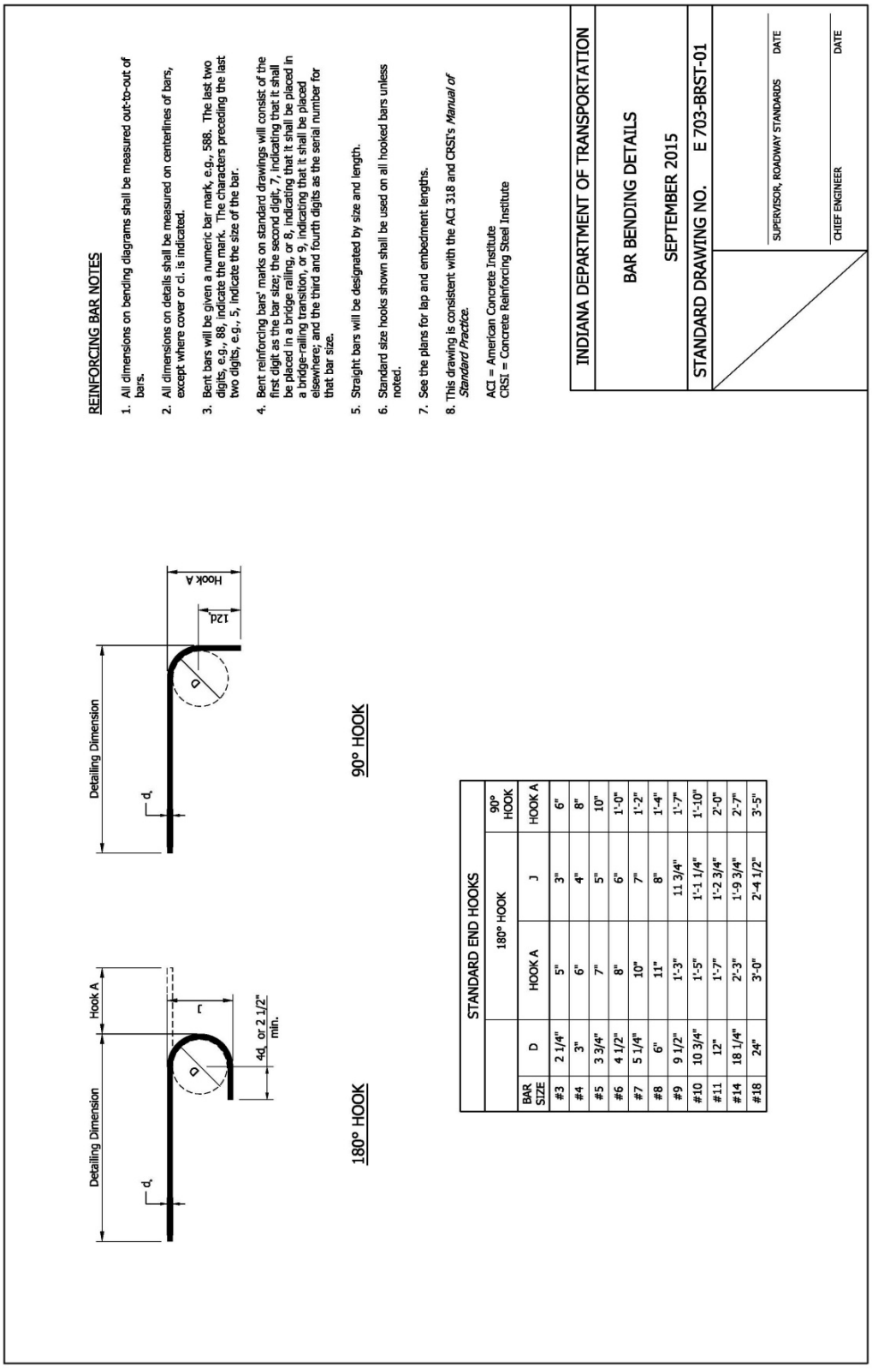
REGISTERED RICHARD L. VANCLEAVE NO. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ Richard L. Van Cleave 09/04/12
SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller 09/04/12
CHIEF ENGINEER DATE

REVISION TO AND STANDARD DRAWINGS

PROPOSED REVISION 703-BRST-01 BAR BENDING DETAILS (DRAFT)



REINFORCING BAR NOTES

1. All dimensions on bending diagrams shall be measured out-to-out of bars.
2. All dimensions on details shall be measured on centerlines of bars, except where cover or cl. is indicated.
3. Bent bars will be given a numeric bar mark, e.g., 588. The last two digits, e.g., 88, indicate the mark. The characters preceding the last two digits, e.g., 5, indicate the size of the bar.
4. Bent reinforcing bars' marks on standard drawings will consist of the first digit as the bar size; the second digit, 7, indicating that it shall be placed in a bridge railing, or 8, indicating that it shall be placed in a bridge-railing transition, or 9, indicating that it shall be placed elsewhere; and the third and fourth digits as the serial number for that bar size.
5. Straight bars will be designated by size and length.
6. Standard size hooks shown shall be used on all hooked bars unless noted.
7. See the plans for lap and embedment lengths.
8. This drawing is consistent with the ACI 318 and CRSI's *Manual of Standard Practice*.

ACI = American Concrete Institute
CRSI = Concrete Reinforcing Steel Institute

Detailing Dimension
Hook A
12d
D
d_b

90° HOOK

Detailing Dimension
Hook A
J
D
4d_b or 2 1/2" min.
d_b

180° HOOK

STANDARD END HOOKS				
		180° HOOK		90° HOOK
BAR SIZE	D	HOOK A	J	HOOK A
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	1'-0"
#7	5 1/4"	10"	7"	1'-2"
#8	6"	11"	8"	1'-4"
#9	9 1/2"	1'-3"	11 3/4"	1'-7"
#10	10 3/4"	1'-5"	1'-1 1/4"	1'-10"
#11	12"	1'-7"	1'-2 3/4"	2'-0"
#14	18 1/4"	2'-3"	1'-9 3/4"	2'-7"
#18	24"	3'-0"	2'-4 1/2"	3'-5"

INDIANA DEPARTMENT OF TRANSPORTATION

BAR BENDING DETAILS

SEPTEMBER 2015

STANDARD DRAWING NO. E 703-BRST-01

SUPERVISOR, ROADWAY STANDARDS DATE

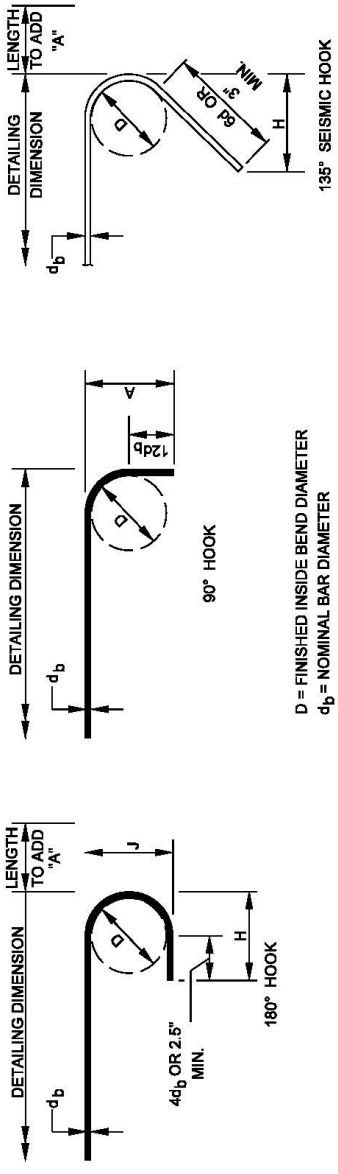
CHIEF ENGINEER DATE

BACKUP 01.

IDM FIGURE 405-2Y HOOKS AND BENTS (WITH MARKUPS)

2013

Current



D = FINISHED INSIDE BEND DIAMETER
d_b = NOMINAL BAR DIAMETER

RECOMMENDED END HOOKS, ALL GRADES							
BAR SIZE	D	180° HOOKS				90° HOOKS	
		A	J		H	A	
#3	2"	5"	2.75"		4"	6"	
#4	3"	6"	4"		4.5"	8"	
#5	4"	7"	5.25"		5"	10"	
#6	4.5"	8"	6"		6"	1'-0"	
#7	5.5"	10"	7.25"		7"	1'-3"	
#8	6"	11"	8"		8"	1'-5"	
#9	10"	1'-3"	1'-0.25"		10"	1'-7"	
#10	11"	1'-5"	1'-1.5"		11.5"	1'-10"	
#11	1'-0"	1'-7"	1'-3"		1'-0.5"	2'-0"	
#14	1'-8.3"	2'-3"	1'-9.5"		1'-5"	2'-7"	
#18	2'-0"	3'-1"	2'-4.5"		1'-10.5"	3'-6"	

SEISMIC TIE HOOKS			
BAR SIZE	135° SEISMIC HOOKS		
	A	J	H
#3	1.5"	4.25"	3"
#4	2"	4.5"	3.5"
#5	2.5"	5.5"	3.75"
#6	4.5"	8"	4.5"
#7	5.5"	9"	6"
#8	6"	10.5"	6"

Notes:
1. Show detailing dimension and total length of bent bar on the bending diagram in the plans.
   Do not show length to add (dimension "A") for 180° hooks or 135° seismic hooks. Do not show bend diameter unless it is not standard.
2. In computing total length of a bent bar with 90° hooks, do not deduct for bends.
3. This drawing is consistent with the ACI 318 and CRSI's Manual of Standard Practice.
   ACI = American Concrete Institute
   CRSI = Concrete Reinforcing Steel Institute

HOOKS AND BENDS

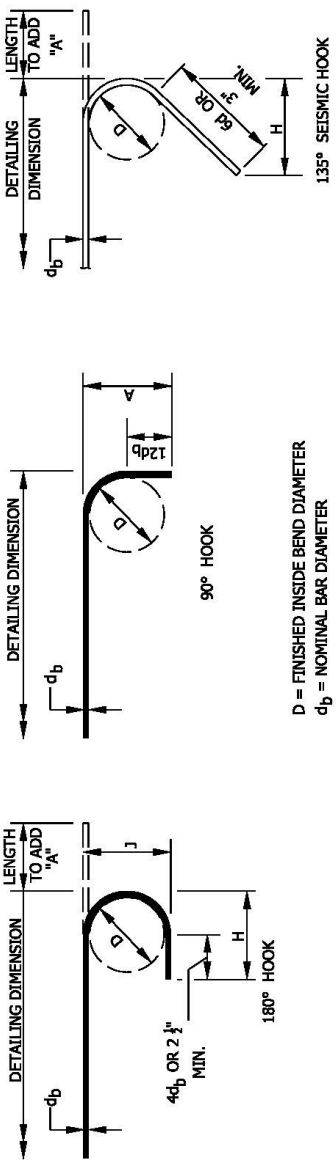
Figure 405-2Y

Back

BACKUP 02.

IDM FIGURE 405-2Y HOOKS AND BENDS (DRAFT)

Proposed



D = FINISHED INSIDE BEND DIAMETER
d_b = NOMINAL BAR DIAMETER

RECOMMENDED END HOOKS, ALL GRADES

BAR SIZE	D	180° HOOKS A	180° HOOKS J	180° HOOKS H	90° HOOKS A
#3	2½"	5"	3"	4"	6"
#4	3"	6"	4"	4½"	8"
#5	3¾"	7"	5"	5"	10"
#6	4½"	8"	6"	6"	1'-0"
#7	5¼"	10"	7"	7"	1'-3"
#8	6"	11"	8"	8"	1'-5"
#9	9½"	1'-3"	11¾"	10"	1'-7"
#10	10¾"	1'-5"	1'-1½"	11¼"	1'-10"
#11	12"	1'-7"	1'-2¾"	1'-½"	2'-0"
#14	18½"	2'-3"	1'-9¾"	1'-5"	2'-7"
#18	24"	3'-1"	2'-4½"	1'-10½"	3'-6"

SEISMIC TIE HOOKS

BAR SIZE	135° SEISMIC HOOKS A	135° SEISMIC HOOKS J	135° SEISMIC HOOKS H
#3	1½"	4½"	3"
#4	2"	4¾"	3¼"
#5	2½"	5½"	3¾"
#6	4½"	8"	4½"
#7	5½"	9"	6"
#8	6"	10½"	6"

Notes:
1. Show detailing dimension and total length of bent bar on the bending diagram in the plans.
   Do not show length to add (dimension "A") for 180 hooks or 135 seismic hooks. Do not show bend diameter unless it is not standard.
2. In computing total length of a bent bar with 90 hooks, do not deduct for bends.
3. This figure is consistent with the ACI 318 and CRSI's *Manual of Standard and Practice*.
   ACI= American Concrete Institute
   CRSI = Concrete Reinforcing Steel Institute

HOOKS AND BENDS

Figure 405-2Y

COMMENTS AND ACTION

703-BRST-01 BAR BENDING DETAILS

DISCUSSION:
Ms. Phillips introduced and presented this item suggesting that Figure 405-27 of the Indiana Design Manual and Standard Drawing E 703-BRST-01 be revised in accordance with ACI 318 and CRSI's Manual of Standard and Practice.

The committee approved this item without any further discussion.

Motion: Ms. Phillips Second: Mr. Cales Ayes: 8 Nays: 0 FHWA Approval: YES	Action: X Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: Recurring Special Provision affected: NONE Standard Drawing affected: 703-BRST-01 BAR BENDING DETAILS Design Manual Sections affected: Figure 405-2Y GIFE Sections cross-references: NONE	_____ 2016 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: X Standard Drawing Effective Sept. 1, 2015 _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: There are currently issues with who is responsible for what as far as the MSE wall design is concerned. We need to address the testing of the soil under the MSE wall footprint and not under the leveling pad. We also need to better clarify measurement and payment of geotextile in this section.

PROPOSED SOLUTION: Clarify the responsibilities of the Engineer and the Contractor on the design of the MSE wall and the parameters used in the wall design. It also clarifies foundation soil preparation with respect to testing the entire MSE wall footprint as opposed to that of the leveling pad. It also clarifies measurement and payment of geotextile.

APPLICABLE STANDARD SPECIFICATIONS: N/A

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: MSE 731-B-205

PAY ITEMS AFFECTED: Geotextile

IMPACT ANALYSIS (attach report): N/A

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: (317) 232-5502

Date: 12/8/14

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISION

(CONTINUED)

IMPACT ANALYSIS REPORT CHECKLIST

Please explain the business case as to why this item should be presented to the Standards Committee for approval.

Please answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? Yes

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

- Construction costs? Yes
- Construction time? No
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? Yes

Will this item improve safety:

- For motorists? Yes
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? Yes
- Design process? Yes

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? Yes

Is this item editorial? No

Please provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: N/A

REVISION TO SPECIAL PROVISION

731-B-205 MSE RETAINING WALL REQUIREMENTS

(Note: Proposed changes shown highlighted gray)

731-B-205 MSE RETAINING WALL REQUIREMENTS

(Revised XX-XX-14)

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 111, DELETE AND INSERT AS FOLLOWS:

(c) Type 3

Structure backfill in accordance with 904.05, except only nominal size aggregates 1 in., 1/2 in., No. 4 or No. 30, and coarse aggregate No. 5, No. 8, No. 9, No. 11, or No. 12 shall be stone ~~or ACBF~~. *ACBF meeting the size requirements for coarse aggregate No. 5 or No. 8 may also be used.*

SECTION 731, BEGIN LINE 60, INSERT AS FOLLOWS:

731.03 Design Criteria

~~The internal stability shall be the responsibility of the Contractor. The design by the Engineer will consider the external stability of the wall mass including the applied bearing pressure, overturning, sliding, and stability of temporary construction slopes. The design for internal stability shall be in accordance with the AASHTO LRFD Bridge Design Specifications and the requirements specified herein. *The design submittal shall include connection strength design. Each design case shall present maximum tension capacity, soil overburden pressure, and horizontal pressure at each reinforcement level, pullout capacity at each reinforcement level, the length of embedment in the resisting zone, L_e, and the total length of reinforcement at each level.*~~

The internal and external stability shall be the responsibility of the Contractor. The design of the Engineer will consider the global stability of the wall mass.

The Contractor shall use the information supplied in the contract documents including but not limited to the plans and the soils report and shall be responsible for the internal and external stability of its design of the MSE retaining wall. The design for the internal and external stability shall be in accordance with the AASHTO LRFD Bridge Design Specifications and the requirements specified herein. The design submittal for the external stability shall include applied bearing pressure, overturning, sliding, and stability of temporary construction slopes. The design submittal for internal stability shall include connection strength design. Each design case shall present maximum tension capacity, soil overburden pressure, and horizontal pressure at each reinforcement level, pullout capacity at each reinforcement level, the length of embedment in the resisting zone, L_e, and the total length of reinforcement at each level.

The design by the Engineer will consider the global stability of the wall mass and will supply information in the contract documents so that the Contractor can design for the external stability of the wall.

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The value of the pullout resistance factor, F, used in design calculations shall be obtained from the AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1.*

SECTION 731, BEGIN LINE 80, DELETE AND INSERT AS FOLLOWS:

The material used as backfill in the reinforced backfill zone shall be assumed to have a unit weight of at least 120 lb/cu ft unless lightweight fill has been specified. The φ, angle for the internal design of the reinforced backfill shall be ~~assumed~~ 34°. The φ angle of the backfill behind the reinforced portion of the MSE volume shall be ~~assumed~~ 30° *for design.* The φ angle ~~for the internal design~~ of the foundation soils shall be ~~assumed~~ *obtained from the geotechnical report and shall not exceed* 30° *for design.* For the external design parameters, such as but not limited to, bearing capacity, sliding, overturning, eccentricity, and global stability, the actual soil strength parameters *and the potential expected settlement of the existing soil under the entire footprint of the MSE wall* used, shall be obtained from the geotechnical report.

The coefficient of uniformity, c_u, of the reinforced backfill for all designs using the ribbed steel strips curve from AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1 shall be 4.0.

SECTION 731, AFTER LINE 134, DELETE AND INSERT AS FOLLOWS:

(d) Other Criteria

1. Traffic Load Considerations

Traffic load shall be considered as live load surcharge. The load factor of traffic load shall be 1.75 in accordance with AASHTO LRFD Bridge Design Specifications table 3.4.1-1.

2. Traffic Impact Considerations

Where traffic barriers are constructed above an MSE wall or reinforced backfill envelope, the MSE wall supporting traffic shall include computations showing that the Extreme Event II limit state due to traffic impact has been met.

Loadings for MSE wall design for the Extreme Event II limit state shall be in accordance with the following table:

Maximum Nominal Tension Rupture and Pullout Impact Loads		
Layer	*Tension Impact Load*	*Pullout Impact Load*
First Top Layer	*2,300 lbs/ft*	*1,300 lbs/ft*
Second Top Layer	*600 lbs/ft*	*600 lbs/ft*

The Extreme Event II design for the top two layers shall be separately prepared and compared with the routine internal stability design.

3. Tributary Area – Design Basis

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For internal stability analysis of MSE walls, each layer of reinforcement is assigned a tributary area, A_{trib} in accordance with FHWA publication no. FHWA-NHI-10-025, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Volume II and as follows:

$$A_{trib} = (w_p)(S_{vt})$$

where:

w_p *= the wall system concrete panel width of the precast facing element, and*
S_{vt} *= the vertical tributary spacing of the reinforcement based on the location of the reinforcement above and below the level of the reinforcement under consideration.*

For a wall system with steel reinforcement, within each tributary area, the factored reinforcement tensile resistance, T_r, and the factored pullout resistance, P_{rr}, shall be no less than the maximum factored tension load, T_{max}. If the calculated minimum number of strips is a decimal number, the minimum number required shall be rounded up to the next whole number.

731.04 Submittals

The Contractor shall submit working drawings ~~and design calculations~~ in accordance with 105.02. *The Contractor shall submit design calculations in accordance with 105.02 and the following additional requirements. In case of discrepancy, the requirements listed below supersede those listed in 105.02. Design calculations shall show the complete design of the MSE wall. Calculations may be in either longhand or computer-printout format and must follow a systematic and logical methodology. A summary sheet that shows design assumptions and their source, controlling parameters and load cases, and other pertinent input and output information shall be attached to the calculations package.* Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.

SECTION 731, BEGIN LINE 208, INSERT AS FOLLOWS:

Fly Ash 901.02
Geotextile *918.02*
Joint Spacers and Joint Covering .....901.10(b)

SECTION 731, BEGIN LINE 239, DELETE AND INSERT AS FOLLOWS:

731.07 Foundation Preparation

~~(a) General~~

~~The~~*Prior to wall construction, the* foundation for the structure shall be graded ~~level~~ for a width equal to or exceeding the length of the ground reinforcement or as shown on the plans. ~~Prior to wall construction, t~~*T*he foundation, if not in rock, shall *then* be compacted in accordance with 203. *After the foundation has been compacted, the*

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resulting grade of the foundation shall be 1 in. per foot sloped from the back of the foundation downward toward the leveling pad. The portion of the foundation beneath the leveling pad shall not be sloped. The ~~base of the wall excavation~~*foundation* shall be proofrolled ~~with approved compacting equipment~~*in accordance with 203.26.* If unsuitable foundation material is encountered, it shall be removed and replaced with B borrow in accordance with 211.02 and compacted in accordance with 211.04.

~~(b) Leveling Pad Foundation~~

After proofrolling has been completed and all unsuitable foundation material has been removed and replaced, compaction of the portion of the foundation beneath the ~~leveling pad~~ entire footprint of MSE wall will be verified by dynamic cone penetrometer, DCP, testing in accordance with ITM 509.

A DCP measurement is defined as the number of blows per 6 in. increment for a total penetration of 30 in. The minimum number of blows of the DCP for each 6 in. increment is five blows per each 6 in. increment in order for the foundation material beneath the MSE ~~leveling pad~~wall to be considered acceptable. There will be five sets of DCP readings at each measurement location.

The frequency of DCP measurements is one DCP measurement for every ~~50 ft~~500 sq ft of ~~linear~~ MSE wall footprint or five DCP measurements per end bent. ~~If, on an end bent, an MSE wingwall is more than 1.5 times the length of the MSE abutment wall, that MSE wingwall will be considered a linear MSE wall for DCP measurement purposes.~~

Unsuitable areas shall be removed, replaced, and compacted in accordance with 203 and 211. DCP verification of the level of compaction beneath the ~~leveling pad~~ MSE wall will not be required if the foundation is in an embankment section that is constructed in accordance with 203.

An unreinforced concrete leveling pad shall be provided at each foundation level as shown on the plans. The leveling pad shall be cured in accordance with 702.22 for a minimum of 12 h before placement of concrete face panels.

SECTION 731, BEGIN LINE 348, INSERT AS FOLLOWS:

~~The work shall also include B borrow backfilling above a theoretical 1:1 slope behind the ground reinforcement as shown on the plans.~~

~~*When structure backfill type 3 coarse aggregate No. 5, No. 8, No. 9, or No. 11 are used in the reinforced backfill zone, geotextiles shall be installed vertically between the interface of the reinforced backfill zone and the backfill behind the reinforced portion of the MSE volume or the retained soil. If the same material is used for both the reinforced backfill zone and the backfill area behind the reinforced backfill zone, geotextiles will not be required to be placed vertically between the interface. Geotextiles shall instead be required between the backfill area behind the reinforced backfill zone and the native soil.*~~

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~~*Geotextiles shall also be installed horizontally across the top of the reinforced backfill zone.*~~

MSE wall backfill shall consist of structure backfill type 3 in the reinforced backfill zone and structure backfill type 3 or B borrow in the non-reinforced backfill zone as shown on the plans.

If coarse aggregate No. 5, No. 8, No. 9, or No. 11 is used in the reinforced backfill zone and the Contractor elects to use a different material in the non-reinforced backfill zone, geotextiles shall be installed at the interface between the reinforced and non-reinforced backfill zones. If the Contractor elects to use coarse aggregate No. 5, No. 8, No. 9, or No. 11 in both the reinforced and non-reinforced backfill zones, geotextiles shall be installed along the interface between the non-reinforced backfill zone and native soil. In addition, geotextiles shall be installed over the top of the No. 5, No. 8, No. 9, or No. 11 aggregate used in the reinforced or non-reinforced backfill zones.

SECTION 731, BEGIN LINE 389, DELETE AND INSERT AS FOLLOWS:

Concrete leveling pad will be measured by the linear foot. Common excavation will be measured by the cubic yard in accordance with 203.27(a) to the neat lines shown on the plans. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. Geotextile ~~shall be measured in accordance with 616.12, except as otherwise specified herein~~*used in conjunction with MSE wall construction will not be measured for payment*. Underdrains for MSE walls and components of the internal drainage system will be measured in accordance with 718.09. ~~Geotextile materials used as joint covering will not be measured.~~*If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the removal, replacement, and compaction of the new material will be measured in accordance with 203 and 211.*

~~*Geotextile materials used as joint covering will not be measured.*~~ Precast or cast-in-place concrete coping will not be measured.

731.13 Basis of Payment

The accepted quantities of concrete face panels will be paid for at the contract unit price per square foot. Wall erection will be paid for at the contract unit price per square foot. Concrete leveling pad, complete and in place, will be paid for at the contract unit price per linear foot for leveling pad. Common excavation will be paid for in accordance with 203.28. Structure backfill and B borrow will be paid for in accordance with 211.10*, except that structure backfill used in the non-reinforced backfill zone will be paid for as B borrow*. Unsuitable foundation materials, if found, will be paid for in accordance with 211.10. ~~Geotextile will be paid for in accordance with 616.13, except as otherwise specified herein.~~ Underdrains for MSE walls and components of an internal drainage system will be paid for in accordance with 718.10.

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SECTION 731, AFTER LINE 432, INSERT AS FOLLOWS:

If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the cost of removal, replacement, and compaction of new material will be paid for in accordance with 203 and 211.

If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad that is constructed on an embankment section that is constructed under the same contract, the cost of removal, replacement, and compaction of new material shall be included in the cost of the leveling pad.

The cost for geotextile used in MSE wall construction shall be included in the cost of the pay items in this section.

SECTION 735, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

735.04 Submittals

The Contractor shall submit working drawings ~~and design calculations~~ in accordance with 105.02. *The Contractor shall submit design calculations in accordance with 105.02 and the following additional requirements. In case of discrepancy, the requirements listed below supersede those listed in 105.02. Design calculations shall show the complete design of the temporary wire-faced wall. Calculations may be in either longhand or computer-printout format and must follow a systematic and logical methodology. A summary sheet that shows design assumptions and their source, controlling parameters and load cases, and other pertinent input and output information shall be attached to the calculations package.* Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.

SECTION 735, BEGIN LINE 121, DELETE AND INSERT AS FOLLOWS:

Common excavation will be measured in accordance with 203.27. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. ~~Geotextile materials will not be measured.~~ *If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the removal, replacement, and compaction of the new material will be measured in accordance with 203 and 211.*

Geotextile materials will not be measured. Drainage of the backfill including piping, aggregates, and incidentals will not be measured.

SECTION 735, BEGIN LINE 143, INSERT AS FOLLOWS:

The cost of all MSE retaining wall components including wire-facing elements, concrete face panels, ground reinforcing, tie strips, fasteners, soil retention materials, repair or replacement of wire-facing elements damaged or removed due to backfill placement, and incidentals shall be included in the cost of temporary wire-facing.

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If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the cost of removal, replacement, and compaction of new material will be paid for in accordance with 203 and 211.

If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad that is constructed on an embankment section that is constructed under the same contract, the cost of removal, replacement, and compaction of new material shall be included in the cost of the leveling pad.

The cost of geotextiles shall be included in the cost of the pay items of this section.

SECTION 910, BEGIN LINE 454, DELETE AND INSERT AS FOLLOWS:

2. Clevis Connector

Clevis connectors, if used, shall be attached to the alignment templates using the bars provided with the forms. The vertical and horizontal alignment of the connectors shall be ±1/8 in. The holes inside the loops shall be free of all concrete and debris, loose or otherwise.

The clevis connector shall be fabricated of cold-drawn steel wire in accordance with ASTM A 1064. Loops shall be galvanized in accordance with ASTM A 153 class B-3, ASTM A 123, coating grade 55~~, or ASTM B 695 class 55~~.

A type A certification in accordance with 916 shall be furnished for the clevis connector. The results of the tension, bend, and coating adhesion tests, and measurements of coating thickness and average weight of the coating, shall be included on the certification for the clevis connector.

3. Connector Bar

The connector bar, if used, shall be fabricated of cold-drawn steel wire in accordance with ASTM A 1064, and galvanized, if so shown on the plans, in accordance with ASTM A 123, coating grade 55~~, or ASTM B 695 class 55~~.

A type A certification in accordance with 916 shall be furnished for the connector bars. The results of the coating adhesion test and the measurements of coating thickness, average weight of the coating, and coating flexibility, shall be included on the certification for the connector bar.

SECTION 910, BEGIN LINE 502, DELETE AND INSERT AS FOLLOWS:

Ground-reinforcement units shall be hot rolled from bars to the required shape and dimensions. Physical and mechanical properties of the units shall be in accordance with ASTM A 572, grade 65. Tie strips shall be shop fabricated with hot-rolled steel in accordance with the minimum requirements of ASTM A 1011, grade 50. Galvanization for ground-reinforcing units and tie strips shall be in accordance with ASTM A 123, coating grade 85~~ or ASTM B 695, class 80~~*, for strip-type reinforcements or ASTM A 641,*

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class 5 or class C, for bar mat or grid-type reinforcements. All ground-reinforcement units and tie strips will be inspected to ensure that they are true to size and free from defects which can impair their strength and durability.

A type A certification in accordance with 916 shall be furnished for ground reinforcement prior to use of the materials. The results of the yield strength, coating thickness, and coating adhesion tests shall be shown on the certification.

(c) Fasteners

Fasteners shall consist of 1/2 in. diameter, bolts, nuts, and washers and shall otherwise be in accordance with 910.02(g)1 with the exception that the hardware shall be coated in accordance with ASTM A 153, class C ~~or ASTM B 695, class 55~~.

The supplier shall provide a certificate of compliance with all requirements for high strength bolts, nuts, and washers used in the assembly of MSE retaining walls. The certification, in addition to complying with the applicable requirements of 916, shall include the lot number and heat number on the shipping package and indicate when or where all testing was performed.

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(Revised XX-XX-14)

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 111, DELETE AND INSERT AS FOLLOWS:

(c) Type 3

Structure backfill in accordance with 904.05, except only nominal size aggregates 1 in., 1/2 in., No. 4 or No. 30, and coarse aggregate No. 5, No. 8, No. 9, No. 11, or No. 12 shall be stone ~~or ACBF~~. *ACBF meeting the size requirements for coarse aggregate No. 5 or No. 8 may also be used.*

SECTION 731, BEGIN LINE 60, INSERT AS FOLLOWS:

731.03 Design Criteria

~~The internal stability shall be the responsibility of the Contractor. The design by the Engineer will consider the external stability of the wall mass including the applied bearing pressure, overturning, sliding, and stability of temporary construction slopes. The design for internal stability shall be in accordance with the AASHTO LRFD Bridge Design Specifications and the requirements specified herein.~~ *The internal and external stability shall be the responsibility of the Contractor. The global stability of the wall mass will be the responsibility of the Engineer.*

The Contractor shall use the information supplied in the contract documents including but not limited to the plans and the geotechnical report when designing the wall. The design of the wall including the internal and external stability shall be in accordance with the AASHTO LRFD Bridge Design Specifications and the requirements specified herein.

The design for internal stability shall include connection strength design. Each design case shall present maximum tension capacity, soil overburden pressure, and horizontal pressure at each reinforcement level, pullout capacity at each reinforcement level, the length of embedment in the resisting zone, and the total length of reinforcement at each level.

The design for the external stability shall include applied bearing pressure, overturning, sliding, and stability of temporary construction slopes.

The value of the pullout resistance factor, F, used in design calculations shall be obtained from the AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1.*

SECTION 731, BEGIN LINE 80, DELETE AND INSERT AS FOLLOWS:

The material used as backfill in the reinforced backfill zone shall be assumed to have a unit weight of at least 120 lb/cu ft unless lightweight fill has been specified. The φ~~,~~ angle for the internal design of the reinforced backfill shall be ~~assumed~~ 34°. The φ angle of the *retained* backfill ~~behind the reinforced portion of the MSE volume~~ shall be

~~assumed~~ 30° *for design.* ~~The φ angle for the internal design of the foundation soils shall be assumed 30°.~~ For the external design parameters, such as but not limited to, bearing capacity, sliding, overturning, eccentricity, and global stability, the actual soil strength parameters *and the expected settlement of the existing soil under the reinforced backfill zone* ~~used,~~ shall be obtained from the geotechnical report.

The coefficient of uniformity, c_u, of the reinforced backfill for all designs using the ribbed steel strips curve from AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1 shall be 4.0.

SECTION 731, AFTER LINE 134, DELETE AND INSERT AS FOLLOWS:

(d) Other Criteria

1. Traffic Load Considerations

Traffic load shall be considered as live load surcharge. The load factor of traffic load shall be 1.75 in accordance with AASHTO LRFD Bridge Design Specifications table 3.4.1-1.

2. Traffic Impact Considerations

Where traffic barriers are constructed above an MSE wall or reinforced backfill zone, the MSE wall supporting traffic shall include computations showing that the Extreme Event II limit state due to traffic impact has been met.

Loadings for MSE wall design for the Extreme Event II limit state shall be in accordance with the following table:

Maximum Nominal Tension Rupture and Pullout Impact Loads		
Layer	*Tension Impact Load*	*Pullout Impact Load*
First Top Layer	*2,300 lbs/ft*	*1,300 lbs/ft*
Second Top Layer	*600 lbs/ft*	*600 lbs/ft*

The Extreme Event II design for the top two layers shall be separately prepared and compared with the routine internal stability design.

3. Tributary Area – Design Basis

For internal stability analysis of MSE walls, each layer of reinforcement is assigned a tributary area, A_{trib} in accordance with FHWA publication no. FHWA-NHI-10-025, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Volume II and as follows:

$$A_{trib} = (w_p)(S_{vt})$$

where:

w_p = *the wall system concrete panel width of the precast facing element, and*

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S_{vt} = the vertical tributary spacing of the reinforcement based on the location of the reinforcement above and below the level of the reinforcement under consideration.

For a wall system with steel reinforcement, within each tributary area, the factored reinforcement tensile resistance, T_r, and the factored pullout resistance, P_{rr}, shall be no less than the maximum factored tension load, T_{max}. If the calculated minimum number of strips is a decimal number, the minimum number required shall be rounded up to the next whole number.

731.04 Submittals

The Contractor shall submit working drawings ~~and design calculations~~ in accordance with 105.02. *The Contractor shall submit design calculations in accordance with 105.02 and the following additional requirements. In case of discrepancy, the requirements listed below supersede those listed in 105.02. Design calculations shall include each design case of the MSE wall analyzed. Calculations may be in either longhand or computer-printout format and shall follow a systematic and logical methodology. A summary sheet that shows design assumptions and their source, controlling parameters and load cases, and other pertinent input and output information shall be included with the calculations package.* Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.

SECTION 731, BEGIN LINE 208, INSERT AS FOLLOWS:

Fly Ash 901.02
Geotextile 918.02
Joint Spacers and Joint Covering .....901.10(b)

SECTION 731, BEGIN LINE 239, DELETE AND INSERT AS FOLLOWS:

731.07 Foundation Preparation

~~The~~*Prior to wall construction, the* foundation for the structure shall be graded ~~level~~ for a width equal to or exceeding the length of the ground reinforcement or as shown on the plans. ~~Prior to wall construction, t~~*T*he foundation, if not in rock, shall *then* be compacted in accordance with 203. *After the foundation has been compacted, the resulting grade of the foundation shall be 1 in. per foot sloped from the back of the foundation downward toward the leveling pad. The portion of the foundation beneath the leveling pad shall not be sloped.* The ~~base of the wall excavation~~*foundation* shall be proofrolled ~~with approved compacting equipment~~*in accordance with 203.26.* If unsuitable foundation material is encountered, it shall be removed and replaced with B borrow in accordance with 211.02 and compacted in accordance with 211.04.

After proofrolling has been completed and all unsuitable foundation material has been removed and replaced, compaction of the portion of the foundation beneath the reinforced backfill zone will be verified by dynamic cone penetrometer, DCP, testing in accordance with ITM 509.

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One DCP measurement for every 500 sq ft within the reinforced backfill zone and five DCP measurements per end bent will be performed.

A DCP measurement is defined as the number of blows per 6 in. increment for a total penetration of 30 in., based on five sets of DCP readings at each location. A minimum of five blows of the DCP for each 6 in. increment is considered acceptable.

Unsuitable areas shall be removed, replaced, and compacted in accordance with 203 and 211. DCP verification of compaction beneath the reinforced backfill zone will not be required if the foundation is in an embankment section that is constructed in accordance with 203.

An unreinforced concrete leveling pad shall be provided at each foundation level as shown on the plans. The leveling pad shall be cured in accordance with 702.22 for a minimum of 12 h before placement of concrete face panels.

SECTION 731, BEGIN LINE 348, DELETE AND INSERT AS FOLLOWS:

~~The work shall also include B borrow backfilling above a theoretical 1:1 slope behind the ground reinforcement as shown on the plans.~~

MSE wall backfill shall consist of structure backfill type 3 in the reinforced backfill zone and structure backfill type 3 or B borrow in the retained backfill zone as shown on the plans.

If coarse aggregate No. 5, No. 8, No. 9, or No. 11 is used in the reinforced backfill zone and the Contractor elects to use a different material in the retained backfill zone, geotextiles shall be installed at the interface between the reinforced and retained backfill zones. If the Contractor elects to use coarse aggregate No. 5, No. 8, No. 9, or No. 11 in both the reinforced and retained backfill zones, geotextiles shall be installed along the interface between the retained backfill zone and the adjacent soil. In addition, geotextiles shall be installed over the top of the No. 5, No. 8, No. 9, or No. 11 aggregate used in the reinforced or retained backfill zones.

SECTION 731, BEGIN LINE 389, DELETE AND INSERT AS FOLLOWS:

Concrete leveling pad will be measured by the linear foot. Common excavation will be measured by the cubic yard in accordance with 203.27(a) to the neat lines shown on the plans. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. Geotextile ~~shall be measured in accordance with 616.12, except as otherwise specified herein~~*used in conjunction with MSE wall construction will not be measured for payment*. Underdrains for MSE walls and components of the internal drainage system will be measured in accordance with 718.09. ~~Geotextile materials used as joint covering will not be measured.~~*If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in*

a cut section, the removal, replacement, and compaction of the new material will be measured in accordance with 203 and 211.

Precast or cast-in-place concrete coping will not be measured.

731.13 Basis of Payment

The accepted quantities of concrete face panels will be paid for at the contract unit price per square foot. Wall erection will be paid for at the contract unit price per square foot. Concrete leveling pad, complete and in place, will be paid for at the contract unit price per linear foot for leveling pad. Common excavation will be paid for in accordance with 203.28. Structure backfill and B borrow will be paid for in accordance with 211.10*, except that structure backfill used in the retained backfill zone will be paid for as B borrow.* Unsuitable foundation materials, if found, will be paid for in accordance with 211.10. ~~Geotextile will be paid for in accordance with 616.13, except as otherwise specified herein.~~ Underdrains for MSE walls and components of an internal drainage system will be paid for in accordance with 718.10.

SECTION 731, AFTER LINE 432, INSERT AS FOLLOWS:

If unsuitable foundation material is encountered in the portion of the foundation beneath the reinforced backfill zone in a section constructed on original ground or in a cut section, the cost of removal, replacement, and compaction of new material will be paid for in accordance with 203 and 211.

If unsuitable foundation material is encountered in the portion of the foundation beneath the reinforced backfill zone that is constructed on an embankment section that is constructed under the same contract, the cost of removal, replacement, and compaction of new material will not be considered for payment.

The cost for geotextile used in MSE wall construction shall be included in the cost of the pay items in this section.

SECTION 735, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

735.04 Submittals

The Contractor shall submit working drawings ~~and design calculations~~ in accordance with 105.02. *The Contractor shall submit design calculations in accordance with 105.02 and the following additional requirements. In case of discrepancy, the requirements listed below supersede those listed in 105.02. Design calculations shall show the complete design of the temporary wire-faced wall. Calculations may be in either longhand or computer-printout format and must follow a systematic and logical methodology. A summary sheet that shows design assumptions and their source, controlling parameters and load cases, and other pertinent input and output information shall be attached to the calculations package.* Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.

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SECTION 735, BEGIN LINE 121, DELETE AND INSERT AS FOLLOWS:

Common excavation will be measured in accordance with 203.27. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. ~~Geotextile materials will not be measured.~~ *If unsuitable foundation material is encountered in the portion of the foundation beneath the reinforced backfill zone in a section constructed on original ground or in a cut section, the removal, replacement, and compaction of the new material will be measured in accordance with 203 and 211.*

Geotextile materials will not be measured. Drainage of the backfill including piping, aggregates, and incidentals will not be measured.

SECTION 735, BEGIN LINE 143, INSERT AS FOLLOWS:

The cost of all MSE retaining wall components including wire-facing elements, concrete face panels, ground reinforcing, tie strips, fasteners, soil retention materials, repair or replacement of wire-facing elements damaged or removed due to backfill placement, and incidentals shall be included in the cost of temporary wire-facing.

If unsuitable foundation material is encountered in the portion of the foundation beneath the reinforced backfill zone in a section constructed on original ground or in a cut section, the cost of removal, replacement, and compaction of new material will be paid for in accordance with 203 and 211.

If unsuitable foundation material is encountered in the portion of the foundation beneath the reinforced backfill zone that is constructed on an embankment section that is constructed under the same contract, the cost of removal, replacement, and compaction of new material will not be considered for payment.

The cost of geotextiles shall be included in the cost of the pay items in this section.

SECTION 910, BEGIN LINE 454, DELETE AND INSERT AS FOLLOWS:

2. Clevis Connector

Clevis connectors, if used, shall be attached to the alignment templates using the bars provided with the forms. The vertical and horizontal alignment of the connectors shall be ±1/8 in. The holes inside the loops shall be free of all concrete and debris, loose or otherwise.

The clevis connector shall be fabricated of cold-drawn steel wire in accordance with ASTM A 1064. Loops shall be galvanized in accordance with ASTM A 153 class B-3, ASTM A 123, coating grade 55~~, or ASTM B 695 class 55~~.

A type A certification in accordance with 916 shall be furnished for the clevis connector. The results of the tension, bend, and coating adhesion tests, and measurements of coating thickness and average weight of the coating, shall be included on the certification for the clevis connector.

REVISION TO SPECIAL PROVISION
731-B-205 MSE RETAINING WALL REQUIREMENTS (FINAL DRAFT)

3. Connector Bar

The connector bar, if used, shall be fabricated of cold-drawn steel wire in accordance with ASTM A 1064, and galvanized, if so shown on the plans, in accordance with ASTM A 123, coating grade 55~~, or ASTM B 695 class 55~~.

A type A certification in accordance with 916 shall be furnished for the connector bars. The results of the coating adhesion test and the measurements of coating thickness, average weight of the coating, and coating flexibility, shall be included on the certification for the connector bar.

SECTION 910, BEGIN LINE 502, DELETE AND INSERT AS FOLLOWS:

Ground-reinforcement units shall be hot rolled from bars to the required shape and dimensions. Physical and mechanical properties of the units shall be in accordance with ASTM A 572, grade 65. Tie strips shall be shop fabricated with hot-rolled steel in accordance with the minimum requirements of ASTM A 1011, grade 50. Galvanization for ground-reinforcing units and tie strips shall be in accordance with ASTM A 123, coating grade 85~~ or ASTM B 695, class 80~~*, for strip-type reinforcements or ASTM A 641, class 5 or class C, for bar mat or grid-type reinforcements*. All ground-reinforcement units and tie strips will be inspected to ensure that they are true to size and free from defects which can impair their strength and durability.

A type A certification in accordance with 916 shall be furnished for ground reinforcement prior to use of the materials. The results of the yield strength, coating thickness, and coating adhesion tests shall be shown on the certification.

(c) Fasteners

Fasteners shall consist of 1/2 in. diameter, bolts, nuts, and washers and shall otherwise be in accordance with 910.02(g)1 with the exception that the hardware shall be coated in accordance with ASTM A 153, class C~~ or ASTM B 695, class 55~~.

The supplier shall provide a certificate of compliance with all requirements for high strength bolts, nuts, and washers used in the assembly of MSE retaining walls. The certification, in addition to complying with the applicable requirements of 916, shall include the lot number and heat number on the shipping package and indicate when or where all testing was performed.

COMMENTS AND ACTION

731-B-205 MSE RETAINING WALL REQUIREMENTS

DISCUSSION:
Mr. Pelz introduced this item and Mr. Pankow stated that the intention of this revision is to clarify the responsibilities of the Engineer and the Contractor regarding the design of the MSE Wall and the parameters used in the wall design. Foundation soil preparation with respect to testing the entire MSE wall footprint, as opposed to that of the leveling pad, is also in need of clarification, as well as the measurement and payment of the geotextile. Various editorial revisions were incorporated into this proposal and are shown highlighted above, in an effort to ensure consistency of the language and terminology.
Mr. Khan concurred. Mr. Pankow mentioned that the only issue remaining may be if any changes or revisions will be needed to the IDM, and possibly to the DCP testing.
Mr. Osborn asked about the 30 in. DCP testing language which was explained by Mr. Pankow and Ms. Hu, in that it does not determine the design of the straps locations. Mr. Pankow expressed the desire to check to see if any necessary editorial revisions to the existing portions of 731, not mentioned in the RSP, will need to be made. All changes approved during the meeting including editorial changes made outside the meeting shown in these minutes as *final draft* of this RSP

Mr. Pelz motioned to pass this item as revised. Ms. Gottschalk seconded.

Motion: Mr. Pelz Second: Mr. Walker Ayes: 8 Nays: 0 FHWA Approval: YES	Action: ____ Passed as Submitted X Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: NONE Recurring Special Provision affected: 731-B-205 MSE RETAINING WALL REQUIREMENTS Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	X 2016 Standard Specifications ____ Revise Pay Items List ____ Create RSP (No.____) Effective ____ Letting RSP Sunset Date: X Revise RSP (No.731-B-205) Effective March 01, 2015 Letting RSP Sunset Date: Sept. 01, 2015 ____ Standard Drawing Effective ____ Create RPD (No. ____) Effective ____ Letting ____ GIFE Update