INDIANA DEPARTMENT OF TRANSPORTATION

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Eric Holcomb, Governor
Joe McGuinness, Commissioner

AGENDA

February 20, 2020 Standards Committee Meeting

MEMORANDUM

February 6, 2020

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Agenda for the February 20, 2020 Standards Committee Meeting

A Standards Committee meeting is scheduled for 09:00 a.m. on February 20, 2020 in the IGCS Building Conference Room 4&5.

The following items are listed for consideration:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. *Approval of the Minutes from the January 16, 2020 meeting*

2. *Revision to the Notes in Standards Committee schedule for 2020: "The ~~April~~February meeting is the last opportunity for the approval of Standard Drawings effective on September 1, 2020."*

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

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(No items on this agenda)

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

OLD BUSINESS

Item No. 2 (01/16/20)	Mr. Reilman	pg 4
SECTION 215	CHEMICAL MODIFICATION OF SOILS	

NEW BUSINESS

Item No. 1	Mr. Reilman	pg 13
207.02	Materials	
207.04	Subgrade Treatment Types	
207.05	Method of Measurement	
207.06	Basis of Payment	
Item No. 2	Mr. Reilman	pg 19
401-R-xxx	*HMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)*	
410-R-xxx	*SMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)*	
Item No. 3	Mr. Reilman	pg 28
701-x-xxx	*PILE AND DRIVING EQUIPMENT DATA FORM*	
Item No. 4	Mr. Pelz	pg 32
10X-C-XXX	*MAINTAINING PEDESTRIAN ACCESSIBILITY DURING CONSTRUCTION*	
Item No. 5	Mr. Pelz	pg 36
802-T-XXX	*SIGN, GROUND MOUNTED, RESET*	
Item No. 6	Mr. Reilman and Mr. Dave	pg 40
502.02	Materials	
502.03	Concrete Mix Design	
502.04	Concrete Mix Criteria	
502.05	Job Control	
502.18	Opening to Traffic	
503.02	Materials	

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503.03	Joints
503.05	Sealing Cracks and Joints
504.04	Curing
SECTION 506	PCCP PATCHING
805.08	Controller Cabinet, Signal Service, and Detector Housing
901.01	Hydraulic Cement
901.03	Ground Granulated Blast Furnace Slag Used as A Pozzolan

Standard Drawings:

E 503-CCPJ SERIES
E 506-CCPP SERIES

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cc: Committee Members
FHWA
ICI

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Specification 215 was originally written with the contractor bidding on lime modification only. During construction, field work resulting in a mix design for chemical modification of soils is performed by the contractor. Occasionally the field work results in a mix design recommending cement instead of lime. This results in a change order being generated to change from lime to cement. There are over 50 such change orders on state projects every year. Similarly, there are also numerous change orders on local public agency projects. These unanticipated change orders place unplanned financial burdens on both state and local public agency project budgets.

PROPOSED SOLUTION: Add cement modification as a pay item in Sec 215 in order to reduce change orders.

APPLICABLE STANDARD SPECIFICATIONS: 207 and 215

APPLICABLE STANDARD DRAWINGS: NA

APPLICABLE DESIGN MANUAL SECTION: NA

APPLICABLE SECTION OF GIFE: Yes

APPLICABLE RECURRING SPECIAL PROVISIONS: create a 215 RSP

PAY ITEMS AFFECTED: Yes

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Contractors, ACPA, geotechnical consultant

IMPACT ANALYSIS (attach report):

Submitted By: Jim Reilman for Nayyar Siddiki

Title: State Materials Engineer

Organization: Office of Materials and Tests

Phone Number: 317-522 9692

Date: 01/27/2020

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IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? yes

Will this proposal improve:

Construction costs? Yes

Construction time? Yes

Customer satisfaction? Yes

Congestion/travel time? Na

Ride quality? Na

Will this proposal reduce operational costs or maintenance effort? NA

Will this item improve safety:

For motorists? NA

For construction workers? NA

Will this proposal improve quality for:

Construction procedures/processes? yes

Asset preservation? NA

Design process? Yes

Will this change provide the contractor more flexibility? 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 proposal needed for compliance with:

Federal or State regulations? NA

AASHTO or other design code? NA

Is this item editorial? No

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

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(Note: Proposed changes shown as: ~~deletion~~ and *insertions.*
Previously was submitted and discussed on January 16, 2020 meeting.)

The Standard Specifications are revised as follows:

SECTION 215, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 215 – CHEMICAL MODIFICATION OF SOILS

215.01 Description

This work shall consist of the modification of soils by uniformly mixing portland cement, fly ash, *or* lime ~~or a combination of the materials~~ with soil to aid in strength gain and achieving the workability of soils ~~having excessive moisture content~~.

MATERIALS

215.02 Materials

Materials shall be in accordance with the following:

Fly Ash*, Class C* 901.02
Lime .....913.04(b)
Portland Cement, Type I .....901.01(b)
Water 913.01
Note: Quicklime or portland cement may be used dry or as a slurry.

~~Soils containing greater than 6% by dry weight calcium/magnesium carbonate, or organic material, or having a maximum dry density of less than 95 pcf, or with a soluble sulfate content greater than 1,000 ppm shall not be used in the subgrade. The density shall be determined in accordance with AASHTO T 99, the loss on ignition shall be determined in accordance with AASHTO T 267, the calcium/magnesium carbonate shall be determined in accordance with ITM 507, and the sulfate content shall be determined in accordance with ITM 510~~*Soils for chemical modification shall meet the following requirements.*

Soil Property	*Test Method*	*Requirement*
Maximum Dry Density	*AASHTO T 99*	*≥90 pcf*
Organic Material	*AASHTO T 267*	*≤6%*
Sulfate Content	*ITM 510*	*≤1,000 ppm*

CONSTRUCTION REQUIREMENTS

215.03 Testing and Mix Design

The Contractor shall be responsible for ~~all tests required to determine the chemical modifier type and optimum chemical modifier content for modification of the soils. The~~

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~~modifier selection,~~ laboratory testing~~,~~ and mix design*, and* shall be performed by an approved geotechnical consultant in accordance with the Department's Design Procedures for Soil Modification or Stabilization.

The quantities for hydrated lime, quicklime, or portland cement shall be based on ~~4.0%~~*5.0%* of the maximum dry density of the soils. The quantities for lime by-products shall be based on ~~5.0%~~*6.0%* of the maximum dry density of the soils. The quantities for fly ash class C shall be based on 12.0% of the maximum dry density of the soils. Class F fly ash shall not be used~~ except in combination with lime or cement~~.

If hydrated lime, quick lime, lime by-products or portland cement are used, test results and the geotechnical consultant recommendations shall be submitted to the Engineer prior to use. If fly ash ~~or any combination of chemical modifiers are~~*is* used, the test results and the geotechnical consultant recommendations shall be submitted to the Engineer and to the Office of Geotechnical Services for approval at least ~~five~~*three* business days prior to use. If the modifier as bid is not appropriate for the soils encountered, portland cement shall be used. Portland cement, fly ash, lime, and lime by-products shall be from the Department's list of approved sources.

The quantity of chemical modifier may be adjusted for different soil types. However, the source or type of chemical modifier shall not be changed during the progress of the work without approval. A change in source or type shall require a new mix design.

215.04 Storage and Handling

The chemical modifier shall be stored and handled in accordance with the manufacturer's recommendations.

215.05 Weather Limitations

The chemical soil modification shall be performed when the soil has a minimum temperature of 45°F, measured 4 in. below the surface, and with the air temperature rising. The chemical modifier shall not be mixed with frozen soils or with soil containing frost. Chemical soil modification shall only be performed in areas which are going to be paved during the same construction season.

215.06 Preparation of Soils

The soils shall be prepared in accordance with 207.03. All aggregates which are larger than approximately 3 in. encountered before or after mixing the soils and chemical modifiers shall be removed.

215.07 Spreading of Chemical Modifiers

Where type A-6 or A-7 soils are used or encountered, the surface shall be scarified to the specified depth prior to distribution of the chemical modifier. ~~If a combination of modifiers is used, the modifiers shall be mixed mechanically prior to being incorporated.~~ The chemical modifier shall be distributed uniformly by a cyclone, screw-type, or pressure

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manifold type distributor. If a slurry is used, the surface shall be scarified prior to the distribution of the slurry. The chemical modifier shall not be applied when wind conditions create problems in adjacent areas or create a hazard to traffic on any adjacent roadway. The spreading of the chemical modifier shall be limited to an amount which can be incorporated into the soil within the same work day. If weather causes stoppage of work or exposes the chemical modifier to washing or blowing, additional chemical modifier may be spread when the work resumes.

215.08 Mixing

The chemical modifier, soil, and water when necessary, shall be thoroughly mixed by rotary speed mixers~~ or a disc harrow~~. The mixing shall continue until a homogenous layer of the required thickness has been obtained. One hundred percent of the material, exclusive of rock particles, shall pass a 1 in. (25 mm) sieve and at least 60% shall pass a No. 4 (4.75 mm) sieve. The mixing depth shall be 14 in. *The gradation test shall be performed in accordance with ITM 516.*

The chemically modified soil mixture shall be at least 1% above the optimum moisture content during mixing and compaction. Water shall not be added to the chemically modified soil when the moisture content of the soil exceeds 3% above optimum moisture. Water shall be added during mixing only.

215.09 Compaction

Compaction of the mixture shall begin as soon as practicable after mixing and shall be in accordance with ~~203 or~~ 207.03 as applicable. Compaction after mixing shall be as follows:

(a) For portland cement modified soils, mixing shall be completed within 1 h of portland cement placement and grading and final compaction shall be completed within 3 h after mixing.

(b) Fly ash modified soils shall be compacted within 4 h.

(c) Lime modified soils shall be compacted within 24 h.

Acceptance of chemically modified soils will be determined~~ by measuring the compaction with a Dynamic Cone Penetrometer, DCP,~~ in accordance with *ITM 508 or* ITM 509~~ or with a Light Weight Deflectometer, LWD, in accordance with 203.24(b)~~. Testing of the chemically modified soils will begin *a minimum of* 24 h~~ours~~ after compaction.

Acceptance of chemically modified soils will be determined by averaging three LWD tests obtained at random stations determined in accordance with ITM 802. The deflection shall be equal to or less than the allowable average deflection shown in the table below.

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Material Type	*Allowable Average Deflection, (mm)*	*Maximum Deflection at a Single Test Location (mm)*
Cement Modified Subgrade	*0.27*	*0.31*
Lime Modified Subgrade	*0.30*	*0.35*

For measuring the compaction with a DCP, three random test locations will be determined in accordance with ITM 802~~ for each 1,500 lft of chemically modified soil for each 2-lane pavement section. The average of the blow counts obtained at the three random locations will be the DCP blow count representing the 1,500 lft section~~. Blow counts of 15 and above will be used to determine the average for the top 6 in. of a 14 in. lift. Blow counts of 14 and above will be used to determine the average for the bottom 8 in. of a 14 in. lift. Blow counts of 18 and above will be used to determine the average for the 8 in. lift. Locations with test results less than the specified minimum blow counts will be retested and shall be reworked if the minimum blow count is not obtained. *The frequency of LWD and DCP testing will be three tests for each 1,400 cu yd of chemically modified soils.*

The chemically modified soil lift shall meet the following requirements for compaction:

(a) The average DCP blow count shall not be less than 17 for the top 6 in. of a 14 in. lift.

(b) The average DCP blow count shall not be less than 16 for the bottom 8 in. of a 14 in. lift.

(c) ~~The average DCP blow count shall not be less than 20 for an 8 in. lift.~~*Moisture tests for chemically modified soils mixture shall be performed in accordance with ITM 506 every 4 h during chemical and soils mixing.*

(d) One gradation test shall be performed for each 2,500 cu yd of chemically modified soil in accordance with 215.08 and ITM 516.

~~Moisture tests for chemically modified soils mixture will be performed every 4 h during chemical and soils mixing. One gradation test in accordance with 215.08 will be performed for each 2,500 lft of chemically modified soil for each 2-lane pavement section.~~

Construction traffic or equipment will not be allowed on the treated soils until the soil meets the ~~DCP~~*compaction* test requirements.

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215.10 Curing

~~The moisture content of the mixture shall be at the optimum moisture content or above the optimum moisture content as determined by the mix design in accordance with 215.03. Moisture content will be determined in accordance with ITM 506.~~ Moisture content shall be maintained *at 1%* above the optimum moisture content for the first 48 h after mixing ~~with quicklime or hydrated lime~~.

215.11 Proofrolling

Proofrolling shall be performed in accordance with 203.26.

215.~~11~~*12* Method of Measurement

The accepted quantity of chemically modified soils*, for the material specified,* will be measured by the square yard, complete in place. All removal and replacement required to modify the soils below the specified depth will be measured in accordance with 203.27(b).

215.~~12~~*13* Basis of Payment

The accepted quantity of chemically modified soils*, for the material specified,* will be paid for by the square yard, complete in place. *Fly ash, when used, will be paid for as lime.* All removal and replacement required to modify the soils below the specified depth will be paid for in accordance with 203.28.

Adjustment of materials for chemical modification that exceeds the limits of 215.03 will be included in a change order for materials only and paid for as chemical modifier adjustments. If mix design test results show that the chemical modifier as bid by the Contractor is not appropriate and the strength of the modified soil can not be achieved, a price adjustment will be made for the use of portland cement. The price adjustment will be calculated at a cost equal to the difference in the invoice cost of the chemical modifier found to be appropriate for use and the invoice or quoted delivered cost of the chemical modifier as bid by the Contractor. This adjustment will be included in a change order and will be paid for as chemical modifier adjustments. *Fly ash will not be considered for price adjustment.* Payment for chemical modifier adjustments will be made for direct delivered material costs incurred by the Contractor ~~and shall not include any other markups~~*in accordance with 109.05*.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Chemical Modification, Soils, _____ *material*	.....SYS

The cost of performing the laboratory tests, providing an approved geotechnical consultant, scarification of the ~~subgrade~~*soil*, spreading and mixing of the chemical modifier

AGENDA

and soil, compaction of the resultant mixture, shaping the ~~subgrade~~*soil*, work required due to adjustments of modifier proportioning, additional modification required due to weather conditions, correction of deficient areas, water required for the modification process, modified ~~subgrade~~*soil* trimming, *moisture testing, gradation testing, proofrolling,* and all operations needed to meet the requirements of this specification shall be included in the cost of the pay items of this section.

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COMMENTS AND ACTION

SECTION 215 - CHEMICAL MODIFICATION OF SOILS

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 215 pg 239 - 243 Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: TBD	___ 2022 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.___) Effective: RSP Sunset Date: ___ Revise RSP (No.___) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Additional subgrade treatment types and pay items needed in Specification 207 to complement revisions proposed for Specification 215. Specification 215 was originally written with the contractor bidding on lime only. During construction, field work resulting in a mix design for chemical stabilization of soils is performed by the contactor. Occasionally the field work results in a mix design recommending cement instead of lime. This results in a change order being generated to change from lime to cement. There are over 50 such change orders on state projects every year. In addition, we propose Type IIA to be removed from Specification 207 due to material failing in construction.

PROPOSED SOLUTION: To add cement modification as a pay item in Sec 207 would reduce change orders.

APPLICABLE STANDARD SPECIFICATIONS: 207 and 215

APPLICABLE STANDARD DRAWINGS: NA

APPLICABLE DESIGN MANUAL SECTION: NA

APPLICABLE SECTION OF GIFE: Yes

APPLICABLE RECURRING SPECIAL PROVISIONS: yes, 207-R-687 SUBGRADE TREATMENT TYPE ID

PAY ITEMS AFFECTED: Yes

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Contractors, ACPA, geotechnical consultant

IMPACT ANALYSIS (attach report):

Submitted By: Jim Reilman for Nayyar Siddiki

Title: State Materials Engineer

Organization: Office of Materials and Tests

Phone Number: 317-522 9692

Date: 01/27/2020

AGENDA

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? yes

Will this proposal improve:

Construction costs? Yes

Construction time? Yes

Customer satisfaction? Yes

Congestion/travel time? Na

Ride quality? Na

Will this proposal reduce operational costs or maintenance effort? NA

Will this item improve safety:

For motorists? NA

For construction workers? NA

Will this proposal improve quality for:

Construction procedures/processes? yes

Asset preservation? NA

Design process? Yes

Will this change provide the contractor more flexibility? 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 proposal needed for compliance with:

Federal or State regulations? NA

AASHTO or other design code? NA

Is this item editorial? No

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

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REVISION TO STANDARD SPECIFICATIONS

SECTION 207 – SUBGRADE
207.02 MATERIALS
207.04 SUBGRADE TREATMENT TYPES
207.05 METHOD OF MEASUREMENT
207.06 BASIS OF PAYMENT

(Note: Proposed changes shown as: ~~deletion~~ and *insertions*)

The Standard Specifications are revised as follows:

SECTION 207, BEGIN LINE 19, DELETE AND INSERT AS FOLLOWS:

~~Soils containing greater than 3% by dry weight organic material, or with a maximum dry density of less than 100 pcf, or with liquid limit of greater than 50, or with a soluble sulfate content greater than 1,000 ppm, will not be allowed within the specified thickness of the subgrade treatment in cut sections and will not be allowed within 24 in. of the finished subgrade elevation in fill sections. Density will be determined in accordance with AASHTO T 99 or ITM 512 and organic content will be determined in accordance with AASHTO T 267. Liquid limits will be determined in accordance with AASHTO T 89. Sulfate content will be determined in accordance with ITM 510.~~

Soil Property	*Test Method*	*Requirements*
Dry Weight Organic Material	*AASHTO T 267*	*≤3%*
Max Dry Density	*AASHTO T 99 or ITM 512*	*≤100 pcf*
Liquid Limit	*AASHTO T 89*	*≤50*
Soluble Sulfate	*ITM 510*	*≤1000 ppm*
Note: Soils not meeting requirements will not be allowed within the specified thickness of the subgrade treatment in cut sections and will not be allowed within 24 in. of the finished subgrade elevation in fill sections		

SECTION 207, BEGIN LINE 71, DELETE AND INSERT AS FOLLOWS:

207.04 Subgrade Treatment Types

The subgrade treatment type shall be as specified on the contract plans. If required, the subgrade foundation shall be corrected as directed by the Engineer prior to subgrade treatment.

Type	Subgrade Description
I	24 in. of soil compacted in accordance with 203.23
IA	[blank]
IB*C*	14 in. chemical soil modification *using cement*
IBL	*14 in. chemical soil modification using lime*
IC	12 in. coarse aggregate No. 53 in accordance with 301
II	6 in. coarse aggregate No. 53 in accordance with 301
~~IIA~~	~~8 in. chemical soil modification~~
III	In-place compaction in accordance with 203.23
IV	12 in. coarse aggregate No. 53 with Type IB geogrid in accordance with 214
IVA	12 in. coarse aggregate with Geocell confining system in accordance with 214
V	3 in. of subgrade excavated and replaced with 3 in. coarse aggregate No. 53

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In areas where shallow utilities are encountered or chemical modification is not allowed, the Contractor may submit a request to the Engineer to substitute Type IC for Type IB*C or Type IBL*.

Where the strength or density and moisture control option is used, compaction of embankment areas shall be in accordance with 203.23. In cut and transition areas, the top lifts shall be removed, and the bottom 6 in. compacted in-place in accordance with 203.23. The excavated material shall then be replaced and compacted in 6 in. lifts in accordance with 203.23. Removal of the lifts may be waived and only the upper 6 in. compacted in accordance with 203.23 when it is determined, through testing in accordance with 203.24, that the lower lifts comply with 203.23.

In sections where rock, shale, sandstone or its mixtures are encountered, these materials shall be undercut 24 in. below the subgrade elevation and replaced with coarse aggregate No. 53 or No. 73 and compacted in accordance with 301.06. Geotextiles used shall be in accordance with 918.02. All irregularities and holes shall be graded with either coarse aggregate No. 53 or No. 73. If an aggregate base is part of the HMA pavement structure, the 24 in. excavation depth shall be reduced by the thickness of the aggregate base.

The 3 in. compacted aggregate as part of the subgrade treatment Type V shall be compacted to 100% prior to the placement of the pavement.

When conditions are encountered below the specified subgrade treatment depth that prevent achieving the specified subgrade compaction, such conditions shall be corrected in accordance with 203.09, or as directed.

Proofrolling shall be performed in accordance with 203.26. ~~The proof rolling shall cover the entire subgrade surface. The maximum allowable deflection or rutting in subgrade shall not be greater than 1/2 in.~~

207.05 Method of Measurement

Subgrade treatment will be measured in both cut and fill areas by the square yard per type. Chemicals for *soil* modification *using cement or lime*, excavation, aggregates, and geogrid materials will not be measured.

The undercutting of rock, where encountered, will be measured in accordance with 203.27(b).

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207.06 Basis of Payment

The accepted quantities of subgrade treatment will be paid for at the contract unit price per square yard per type, complete in place. In areas where shallow utilities are encountered or the Contractor elects to use Type IC for Type IB*C or Type IBL*, payment will be made at the price of Type IB*C or Type IBL*.

The undercutting of rock, where encountered, will be paid for in accordance with 203.28.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Subgrade Treatment, Type _____	SYS

The cost of subgrade treatments including testing, sampling, aggregates, chemicals for *soil* modification *with cement or lime*, geogrid, geotextile and geocell confining system, coarse aggregate for subgrade Type IC, Type II, Type IV, Type IVA, Type V, water, and the excavation required, shall be included in the cost of the pay item.

The cost of excavation and grading of existing railroad ballast and railroad bed material shall be included in the cost of subgrade treatment, Type V.

Where conditions exist below the specified subgrade compaction depth that prevent achieving the specified compaction, payment for correcting such conditions will be made based on the directed method of treatment.

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COMMENTS AND ACTION

207.02 MATERIALS
207.04 SUBGRADE TREATMENT TYPES
207.05 METHOD OF MEASUREMENT
207.06 BASIS OF PAYMENT

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 207 pg 218 - 221 Recurring Special Provision affected: 207-R-687 SUBGRADE TREATMENT TYPE ID Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	___ 2022 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.___) Effective: RSP Sunset Date: ___ Revise RSP (No.___) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Current tack coat and bonding techniques often do not correctly and fully create a bond in between asphalt layers.

PROPOSED SOLUTION: Achieve bonding through the use of a spray paver which allows increased shot rates, eliminates tracking and allows the use of polymer modified emulsions

APPLICABLE STANDARD SPECIFICATIONS: 401,410

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: Figure 17-4A?? If converted to spec book?

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: OMM/Pavement Committee

IMPACT ANALYSIS (attach report):

Submitted By: Jim Reilman

Title: State Materials Engineer

Organization: INDOT

Phone Number: 317-522-9692

Date: 1/27/2020

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IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? N

Will approval of this item affect the Approved Materials List? N

Will this proposal improve:

Construction costs? N

Construction time? Y

Customer satisfaction? Y

Congestion/travel time? N

Ride quality? Y

Will this proposal reduce operational costs or maintenance effort? Y

Will this item improve safety:

For motorists? N

For construction workers? N

Will this proposal improve quality for:

Construction procedures/processes? Y

Asset preservation? Y

Design process? Y

Will this change provide the contractor more flexibility? Y
Will this proposal provide clarification for the Contractor and field personnel? Y
Can this item improve/reduce the number of potential change orders? N
Is this proposal needed for compliance with:

Federal or State regulations? N

AASHTO or other design code? N

Is this item editorial? N
Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: Would like to make these an RSP but insert manually with approval of OMM until a better BFU is established by the Department. This is not to become part of the spec book, but to lock it down so Department has better control on its insertion and use.

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(Note: Proposed changes shown as: ~~deletion~~ and *insertions*)

401-R-xxx HMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)

(Adopted xx-xx-20)

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 21, INSERT AS FOLLOWS:

401.03 Materials

Materials shall be in accordance with the following:

Asphalt Emulsion.....902.01(b)2
Asphalt Materials
PG Binder.....902.01(a)
Coarse Aggregates 904
Base Mixtures – Class D or Higher
Intermediate Mixtures – Class C or Higher
Surface Mixtures* – Class B or Higher
Fibers.....AASHTO M 325
Fine Aggregates 904
*Surface aggregate requirements are listed in 904.03(d).

SECTION 401, BEGIN LINE 360, DELETE AND INSERT AS FOLLOWS:

Rubblized concrete pavements shall be primed in accordance with 405. PCCP, milled asphalt surfaces, and ~~asphalt surfaces~~*new and existing asphalt surfaces* shall be tacked in accordance with ~~406~~*401.14.* Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

SECTION 401, BEGIN LINE 381, INSERT AS FOLLOWS:

401.14 Spreading and Finishing

The mixture shall be placed upon an approved surface by means of laydown equipment in accordance with 409.03(c) *except as follows:*

(a) The paver shall be self-priming, designed and built for applying the HMA. The paver shall have a receiving hopper, feed system, asphalt emulsion storage tank, a calibrated metering system for measuring the emulsion volume applied, spray bar and a heated, variable width, combination vibratory screed or a combination vibratory-tamping bar screed.

(b) The paver shall be capable of spraying the asphalt emulsion, applying the asphalt mix and leveling the surface of the mat in one pass.

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The tack asphalt emulsion, in accordance with 902.01(b)2, shall be applied at a temperature recommended by the emulsion supplier and applied uniformly across the entire width of pavement to be overlaid. Equipment shall not operate on the applied tack asphalt emulsion before the asphalt mix is placed.

The asphalt emulsion spray bar affixed to the spray paver shall not be turned off while applying the HMA except when passing over the sampling plates. A 100 ft long section incorporating the sampling location shall be pre-tacked in accordance with 406 and 409.03(a).

The recommended plan application rates of the tack asphalt emulsion are as shown in the table below. Determination of actual application rates shall be the responsibility of the Contractor.

Recommended Tack Asphalt Emulsion Application Rate and Adjustment Factors for Surface Conditions			
Mixture Designation	19.0 mm or 25.0 mm	12.5 mm	9.5 mm
Tack Emulsion Application Rate, gal./sq yd	0.25	0.20	0.17
Existing Surface Condition	Recommended adjustment to application rate, gal./sq yd		
PCCP, smooth or polished	-0.03	-0.03	-0.03
PCCP, broomed or textured	0	0	0
Flushed asphalt concrete surface	-0.02	-0.03	-0.03
Dense, unaged asphalt concrete surface	0	0	0
Open textured, dry, aged or oxidized asphalt concrete surface	+0.02	+0.01	+0.01
Milled asphalt concrete surface	+0.02	+0.01	+0.01

A pre-paving meeting between the Engineer and the Contractor shall be held on-site prior to beginning work. The following shall be reviewed:

(a) work schedule
(b) traffic control plan
(c) equipment calibrations and adjustments
(d) inspection and evaluation of the condition and adequacy of equipment, including units for transport of materials
(e) design mix formula
(f) the Contractor's proposed emulsion and mix application rates
(g) QCP in accordance with ITM 803
(h) the Contractor's authorized representative.

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Prior to paving, both the planned quantity and lay rate shall be adjusted by multiplying by the MAF. When mixture is produced from more than one DMF for a given pay item, the MAF will be applied to the applicable portion of the mixture for each. The temperature of each mixture at the time of spreading shall be less than 315°F whenever PG 64-22 or PG 70-22 binders are used or not more than 325°F whenever PG 76-22 binder is used. *No mixture shall be placed on a previously paved course that has not cooled to below 175°F. For mixtures compacted in accordance with 402.15, the temperature of each mixture at the time of spreading shall not be less than 245°F.*

SECTION 401, AFTER LINE 869, INSERT AS FOLLOWS:

Asphalt emulsion for tack coat will be measured in accordance with 406.06.

SECTION 401, AFTER LINE 886, INSERT AS FOLLOWS:

The accepted quantities of asphalt emulsion for tack coat will be paid for in accordance with 406.07.

SECTION 406, BEGIN LINE 38, INSERT AS FOLLOWS:

406.06 Method of Measurement

Asphalt for tack coat will be measured by the ton or by the square yard. *Asphalt emulsion for tack coat will be measured by the ton.*

406.07 Basis of Payment

The accepted quantities of tack coat will be paid for at the contract unit price per ton, or per square yard for asphalt for tack coat, complete in place.

The accepted quantities of asphalt emulsion for tack coat will be paid for at the contract unit price per ton, complete in place.

Payment will be made under:

Pay Item	Pay Unit Symbol
Asphalt for Tack Coat	TON SYS
Asphalt Emulsion for Tack Coat	*TON*

AGENDA

410-R-xxx SMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)

(Adopted xx-xx-20)

The Standard Specifications are revised as follows:

SECTION 410, BEGIN LINE 22, INSERT AS FOLLOWS: ..

Materials shall be in accordance with the following:

Asphalt Emulsion .....902.01(b)2
Asphalt Materials
PG Binder, PG 76-22, PG 70-22.....902.01(a)
Coarse Aggregates, Class AS.....904
Fibers.....AASHTO M 325
Fine Aggregates (sand, mineral filler) 904

SECTION 410, BEGIN LINE 238, DELETE AND INSERT AS FOLLOWS:

Milled asphalt surfaces and asphalt surfaces shall be tacked in accordance with ~~406~~ *410.14*. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

SECTION 410, BEGIN LINE 251, INSERT AS FOLLOWS:

410.14 Spreading and Finishing

The mixture shall be placed upon an approved surface by means of a paver or other mechanical devices in accordance with 409.03 *except as follows*:

(a) The paver shall be self-priming, designed and built for applying the SMA. The paver shall have a receiving hopper, feed system, asphalt emulsion storage tank, a calibrated metering system for measuring the emulsion volume applied, spray bar and a heated, variable width, combination vibratory screed or a combination vibratory-tamping bar screed.

(b) The paver shall be capable of spraying the asphalt emulsion, applying the asphalt mix and leveling the surface of the mat in one pass.

The tack asphalt emulsion, in accordance with 902.01(b)2, shall be applied at a temperature recommended by the emulsion supplier and applied uniformly across the entire width of pavement to be overlaid. Equipment shall not operate on the applied tack asphalt emulsion before the asphalt mix is placed.

The asphalt emulsion spray bar affixed to the spray paver shall not be turned off while applying the SMA except when passing over the sampling plates. A 100 ft long section

AGENDA

incorporating the sampling location shall be pre-tacked in accordance with 406 and 409.03(a).

The recommended plan application rates of the tack asphalt emulsion are as shown in the table below. Determination of actual application rates shall be the responsibility of the Contractor.

Recommended Tack Asphalt Emulsion Application Rate and Adjustment Factors for Surface Conditions			
Mixture Designation	*19.0 mm*	*12.5 mm*	*9.5 mm*
Tack Emulsion Application Rate, gal./sq yd	*0.25*	*0.20*	*0.17*
Existing Surface Condition	*Recommended adjustment to application rate, gal./sq yd*		
PCCP, smooth or polished	*-0.03*	*-0.03*	*-0.03*
PCCP, broomed or textured	*0*	*0*	*0*
Flushed asphalt concrete surface	*-0.02*	*-0.03*	*-0.03*
Dense, unaged asphalt concrete surface	*0*	*0*	*0*
Open textured, dry, aged or oxidized asphalt concrete surface	*+0.02*	*+0.01*	*+0.01*
Milled asphalt concrete surface	*+0.02*	*+0.01*	*+0.01*

A pre-paving meeting between the Engineer and the Contractor shall be held on-site prior to beginning work. The following shall be reviewed:

(a) work schedule
(b) traffic control plan
(c) equipment calibrations and adjustments
(d) inspection and evaluation of the condition and adequacy of equipment, including units for transport of materials
(e) design mix formula
(f) the Contractor's proposed emulsion and mix application rates
(g) QCP in accordance with ITM 803
(h) the Contractor's authorized representative.

Mixtures in areas inaccessible to mechanical devices may be placed by other methods. The temperature of mixture at the time of spreading shall be no more than 315°F whenever PG 70-22 binder is used or no more than 325°F whenever PG 76-22 binder is used. *The temperature of each mixture shall not be less than 245°F at the time of spreading when placed with paving equipment in accordance with 409.03(c)2 or 409.03(c)3. No mixture shall be placed on a previously paved course that has not cooled to less than 175°F.*

SECTION 410, AFTER LINE 488, INSERT AS FOLLOWS:

Asphalt emulsion for tack coat will be measured in accordance with 460.06.

AGENDA

REVISION TO STANDARD SPECIFICATIONS AND RECURRING SPECIAL PROVISIONS

401-R-xxx HMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)
410-R-xxx SMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)

SECTION 410, AFTER LINE 497, INSERT AS FOLLOWS:

The accepted quantities of asphalt emulsion for tack coat will be paid for in accordance with 406.07.

SECTION 406, AFTER LINE 37, INSERT AS FOLLOWS:

406.06 Method of Measurement

Asphalt for tack coat will be measured by the ton or by the square yard. *Asphalt emulsion for tack coat will be measured by the ton.*

406.07 Basis of Payment

The accepted quantities of tack coat will be paid for at the contract unit price per ton, or per square yard for asphalt for tack coat, complete in place.

The accepted quantities of asphalt emulsion for tack coat will be paid for at the contract unit price per ton, complete in place.

Payment will be made under:

Pay Item	Pay Unit Symbol
Asphalt for Tack Coat	TON SYS
Asphalt Emulsion for Tack Coat	*TON*

AGENDA

COMMENTS AND ACTION

401-R-xxx HMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)
410-R-xxx SMA SPRAY PAVER AND ASPHALT EMULSION FOR TACK COAT (2020 SS)

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 401 pg 287 - 312; 410 pg 336 - 350	___ 2022 Standard Specifications ___ Revise Pay Items List
Recurring Special Provision references in: 401-R-701 QC/QA HMA PAVEMENT 410-R-703 QC/QA HMA - SMA PAVEMENT	___ Create RSP (No.___) Effective: RSP Sunset Date:
Standard Drawing affected: NONE	___ Revise RSP (No.___) Effective: RSP Sunset Date:
Design Manual Sections affected: Figure 17-4A?? If converted to spec book?	___ Standard Drawing Effective:
GIFE Sections cross-references: NONE	___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

AGENDA

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The 701 spec is unclear on who is responsible for reviewing the pile and equipment data form on LPA projects. This is causing confusion.

PROPOSED SOLUTION: Incorporate language in 701.04 that clearly defines responsibility for review of the pile and equipment data form.

APPLICABLE STANDARD SPECIFICATIONS: 701

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 5

APPLICABLE RECURRING SPECIAL PROVISIONS: create a new one

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc: Kathy Eaton-McKalip, Jim Reilman, Mir Zaheer

IMPACT ANALYSIS (attach report):

Submitted By: Jim Reilman

Title: State Materials Engineer

Organization: INDOT, Office of Materials & Tests

Phone Number: 317-522-9692

Date: 1/27/20

AGENDA

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. 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? Yes

Customer satisfaction? N/A

Congestion/travel time? N/A

Ride quality? N/A

Will this proposal reduce operational costs or maintenance effort? 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? Yes

Asset preservation? N/A

Design process? N/A

Will this change provide the contractor more flexibility? N/A

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

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

Is this proposal needed for compliance with:

Federal or State regulations? No

AASHTO or other design code? No

Is this item editorial? No

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

AGENDA

(Note: Proposed changes shown as: ~~deletion~~ and *insertions*)

701-x-xxx PILE AND DRIVING EQUIPMENT DATA FORM

(Adopted xx-xx-20)

The Standard Specifications are revised as follows:

SECTION 701, BEGIN LINE 56, DELETE AND INSERT AS FOLLOWS:

701.04 Equipment for Driving Piles

(a) Approval of Pile Driving Equipment

All pile driving equipment, including the pile driving hammer, hammer cushion, helmet or pile drive head, pile cushion, and other appurtenances furnished by the Contractor shall be in working condition and approved in writing by the Engineer prior to delivery of the pile driving equipment to the job site. All pile driving equipment shall be sized such that the piles can be driven to the length required without damage. Approval of pile driving equipment does not relieve the Contractor of the responsibility to drive piles, free of damage, to the required nominal driving resistance and, if specified, the minimum tip elevation shown on the plans. Pile driving equipment will be subject to satisfactory performance during production.

~~The~~*For state-administered contracts, the* Contractor shall submit to the ~~Office of~~*Department's* Geotechnical Services *Division*, a completed pile and driving equipment data form at least 15 calendar days prior to driving piles. A copy shall also be furnished to the Engineer. *For local public agency contracts, the Contractor shall submit to the Engineer, a completed pile and driving equipment data form at least 15 calendar days prior to driving piles.* The pile and driving equipment data form is available on the Department's website. The Contractor will be notified of the acceptance of the proposed pile driving system within 15 calendar days of the receipt of the pile and driving equipment data form. Acceptance of pile and driving equipment does not relieve the Contractor of the responsibility to provide equipment suitable for driving the specified piling to the required bearing without damage.

AGENDA

COMMENTS AND ACTION

701-x-xxx PILE AND DRIVING EQUIPMENT DATA FORM

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 701.04 pg 556. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: Section 5.	___ 2022 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.___) Effective: RSP Sunset Date: ___ Revise RSP (No.___) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

AGENDA

PROPOSAL TO THE STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Unique Special Provisions are intended for a single use on a specific contract for a specific situation on the contract that is not already covered by the Standard Specification or a Special Provision. This USP has been utilized quite frequently on numerous contracts, and as a result of the USP Review Process which involves Subject Matter Experts and Legal reviews, no longer requires any further changes or revisions.

PROPOSED SOLUTION: The proposed solution for this USP is to convert it to a Recurring Special Provision in order to expedite the process of implementing this Special Provision into future contracts, while eliminating the need for further review.

APPLICABLE STANDARD SPECIFICATIONS: 104 or 107

APPLICABLE STANDARD DRAWINGS:

APPLICABLE DESIGN MANUAL SECTION:

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Scott Trammell, Construction Specifications Engineer, and the USP Review Process, et al.

IMPACT ANALYSIS (attach report): Yes

Submitted By: Kurt Pelz,

Title: Technical Services Manager

Organization: Construction Management

Phone Number: 317-234-7726

Date: January 24, 2020

AGENDA

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No, just 802.
Will approval of this item affect the Approved Materials List? No
Will this proposal improve:

Construction costs? Yes

Construction time? Yes

Customer satisfaction? Yes

Congestion/travel time? Yes

Ride quality? N/A

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

For motorists? Yes

For construction workers? Yes

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? Yes

Design process? N/A

Will this change provide the contractor more flexibility? 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 proposal needed for compliance with:

Federal or State regulations? Yes

AASHTO or other design code? N/A

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: For ease of use for implementation and to improve the USP Review Process flow capacity.

AGENDA

10X-C-XXX MAINTAINING PEDESTRIAN ACCESSIBILITY DURING CONSTRUCTION

(Adopted XX-XX-20)

Pedestrian accessibility shall be maintained during the construction of this project where existing sidewalk and curb ramps exist through the use of signed pedestrian detours that utilize nearby curb ramps less than 1,000 ft away from the construction zone or the use of construction phasing or temporary sidewalk in accordance with 107.08 and as shown in the maintenance of traffic details.

Sidewalk and ramp closures at any single location shall be limited to 14 days to minimize pedestrian travel disruption even if temporary sidewalks or pedestrian detours are used.

AGENDA

COMMENTS AND ACTION

10X-C-XXX MAINTAINING PEDESTRIAN ACCESSIBILITY DURING CONSTRUCTION

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 104.04 pg 36; 107.08 pg 72. Recurring Special Provision references in: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	___ 2022 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.___) Effective: RSP Sunset Date: ___ Revise RSP (No.___) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

AGENDA

PROPOSAL TO THE STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Unique Special Provisions are intended for a single use on a specific contract for a specific situation on the contract that is not already covered by the Standard Specification or a Special Provision. This USP has been utilized quite frequently on numerous contracts, and as a result of the USP Review Process which involves Subject Matter Experts and Legal reviews, no longer requires any further changes or revisions.

PROPOSED SOLUTION: The proposed solution for this USP is to convert it to a Recurring Special Provision in order to expedite the process of implementing this Special Provision into future contracts, while eliminating the need for further review.

APPLICABLE STANDARD SPECIFICATIONS: 802

APPLICABLE STANDARD DRAWINGS:

APPLICABLE DESIGN MANUAL SECTION:

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED: Reset of Ground Mounted Signs

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Scott Trammell, Construction Specifications Engineer, and the USP Review Process, et al.

IMPACT ANALYSIS (attach report): Yes

Submitted By: Kurt Pelz,

Title: Technical Services Manager

Organization: Construction Management

Phone Number: 317-234-7726

Date: January 24, 2020

AGENDA

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No, just 802.
Will approval of this item affect the Approved Materials List? No
Will this proposal improve:

Construction costs? Yes

Construction time? Yes

Customer satisfaction? Yes

Congestion/travel time? Yes

Ride quality? N/A

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

For motorists? Yes

For construction workers? Yes

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? Yes

Design process? N/A

Will this change provide the contractor more flexibility? 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 proposal needed for compliance with:

Federal or State regulations? Yes

AASHTO or other design code? N/A

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: For ease of use for implementation and to improve the USP Review Process flow capacity.

AGENDA

802-T-xxx SIGN, GROUND MOUNTED, RESET

(Adopted xx-xx-20)

The Standard Specifications are revised as follows:

SECTION 802, AFTER LINE 8, INSERT AS FOLLOWS:

Existing ground mounted signs to be reset shall be removed without damage, stored and re-installed as shown on the plans.

SECTION 802, AFTER LINE 280, INSERT AS FOLLOWS:

Existing ground mounted signs reset will be measured by the number of signs removed and reinstalled, complete in place.

SECTION 802, BEGIN LINE 305, INSERT AS FOLLOWS:

Existing ground mounted signs reset will be paid for at the contract unit price per each.

SECTION 802, AFTER LINE 354, INSERT AS FOLLOWS:

Sign, Ground Mounted, Reset ..... EACH

SECTION 802, AFTER LINE 415, INSERT AS FOLLOWS:

The cost of existing ground mounted sign removal, existing post removal, and storage shall be included in the cost of sign resetting. Existing signs or posts that are damaged by the Contractor shall be replaced with no additional payment.

AGENDA

COMMENTS AND ACTION

802-T-XXX SIGN, GROUND MOUNTED, RESET

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 802 begin pg 837. Recurring Special Provision references in: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	___ 2022 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.___) Effective: RSP Sunset Date: ___ Revise RSP (No.___) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

AGENDA

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The 502 Portland Cement Concrete Pavement (PCCP) and the 506 PCCP Patching sections are outdated. The current 506 section is only intended to address short pavement repairs that consist of a single transverse joint. Much longer concrete patches are now common and the available time to restrict traffic for patching work is getting shorter. Also, the term ground granulated blast furnace slag (GGBFS) is outdated.

PROPOSED SOLUTION: Update the Standard Specifications with the changes as shown herein. unique provision for PCCP patching has been used for the past several years that addressed patches based on length and provided an alternative mix for high early strength concrete that includes CSA cement. The proposed revisions include much of the language from the USP. However, modifications have been made to resolve testing frequency problems encountered by construction, as well as, changing mix design target values to be more in line with current practice and the desired design strength.

To address the outdated "GGBFS" terminology it is proposed to change "GGBFS" to "slag cement" throughout the Standard Specifications. Slag cement is the nationally recognized name for the material.

APPLICABLE STANDARD SPECIFICATIONS: 502, 504.04, 506, 805.08, 901.01, 901.03

APPLICABLE STANDARD DRAWINGS: Delete E506-CCPP-01 and E503-CCPJ-06. Revise E503-CCPJ-01 and -03. Create new E506-CCPP-01 thru -06. Incorporate E503-CCPJ-06 into E503-CCPJ-03.

APPLICABLE DESIGN MANUAL SECTION: None
APPLICABLE SECTION OF GIFE: None
APPLICABLE RECURRING SPECIAL PROVISIONS: None
PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc committee consisting of: Mike Nelson, Jim Reilman, & Tony Zander. These changes were also presented and discussed with IRMCA and IACPA. Kumar Dave, Pankaj Patel, and Zach Corrice prepared the Standard Drawing changes.
IMPACT ANALYSIS (attach report):

Submitted By: Jim Reilman (Standard Specifications revisions) and Pankaj Patel (Standard Drawings drafts)

Date: 02/04/20

AGENDA

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 502 - PORTLAND CEMENT CONCRETE PAVEMENT, PCCP
502.02 MATERIALS
502.03 CONCRETE MIX DESIGN
502.04 CONCRETE MIX CRITERIA
502.05 JOB CONTROL
502.18 OPENING TO TRAFFIC
SECTION 503 - PCCP JOINTS
503.02 MATERIALS
503.03 JOINTS
503.05 SEALING CRACKS AND JOINTS
SECTION 504 - PCCP FINISHING AND CURING
504.04 CURING
SECTION 506 - PCCP PATCHING
SECTION 805 - TRAFFIC SIGNALS
805.08 CONTROLLER CABINET, SIGNAL SERVICE, AND DETECTOR HOUSING
SECTION 901 - PCC MATERIALS
901.01 HYDRAULIC CEMENT
901.03 GROUND GRANULATED BLAST FURNACE SLAG USED AS A POZZOLAN

(Note: Proposed changes shown as: ~~deletion~~ and *insertions*)

The Standard Specifications are revised as follows:

SECTION 502, BEGIN LINE 7, DELETE AND INSERT AS FOLLOWS:

MATERIALS

502.02 Materials

Materials shall be in accordance with the following:

Admixtures.....912.03
Coarse Aggregate, Class AP, Size No. 8 904
Fine Aggregate, Size No. 23 904
Fly Ash.....901.02
~~Ground Granulated Blast Furnace Slag.....901.03~~
Portland Cement.....901.01(b)
Rapid Setting Patch Materials.....901.07
Slag Cement.....901.03
Water.....913.01

502.03 Concrete Mix Design

A concrete mix design submittal, CMDS, shall be in accordance with 502.04. The CMDS shall be submitted ~~one week prior to production and approved by the Engineer~~*to the DTE*. The CMDS shall be submitted ~~utilizing~~*a minimum of seven calendar days prior to production. The CMDS shall use* the Department provided spreadsheet and shall include the following:

(a) a list of all ingredients
(b) the source of all materials
(c) the fine to total aggregate ratio
(d) the absorption of the aggregates
(e) the SSD bulk specific gravity of the aggregates

AGENDA

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 502 - PORTLAND CEMENT CONCRETE PAVEMENT, PCCP
502.02 MATERIALS
502.03 CONCRETE MIX DESIGN
502.04 CONCRETE MIX CRITERIA
502.05 JOB CONTROL
502.18 OPENING TO TRAFFIC
SECTION 503 - PCCP JOINTS
503.02 MATERIALS
503.03 JOINTS
503.05 SEALING CRACKS AND JOINTS
SECTION 504 - PCCP FINISHING AND CURING
504.04 CURING
SECTION 506 - PCCP PATCHING
SECTION 805 - TRAFFIC SIGNALS
805.08 CONTROLLER CABINET, SIGNAL SERVICE, AND DETECTOR HOUSING
SECTION 901 - PCC MATERIALS
901.01 HYDRAULIC CEMENT
901.03 GROUND GRANULATED BLAST FURNACE SLAG USED AS A POZZOLAN

(f) the specific gravity of pozzolan
(g) the batch weights
(h) the names of all admixtures
(i) the admixture dosage rates and the manufacturer's recommended range.

The absolute volume of the mix design shall be 27.0 cu ft at the design air content of 6.5%.

Production ~~may commence once the DTE approves the submission as a CMDP.~~*shall not commence until the DTE has assigned a mix number to the CMDS. The mix design will henceforth be identified as a concrete mix design for production, CMDP.*

Any of the following changes or adjustments to an existing CMDP shall require a new CMDS to be submitted to the DTE.

(a) cement source or type
(b) pozzolan source or type
(c) aggregate source or type
(d) admixture source or type
(e) addition or deletion of an admixture
(f) proportioning of the concrete in accordance with 502.04 as follows:

1. cement content or cement reduction
2. pozzolan to cement substitution ratio
3. target water/cementitious ratio
4. proportion of aggregate by weight exceeding ±2%.

A CMDP in accordance with 501.05 or a CMDP in accordance with 502.04 from a previous contract may be submitted for *review for* use ~~upon the approval~~*on the current*

AGENDA

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 502 - PORTLAND CEMENT CONCRETE PAVEMENT, PCCP
502.02 MATERIALS
502.03 CONCRETE MIX DESIGN
502.04 CONCRETE MIX CRITERIA
502.05 JOB CONTROL
502.18 OPENING TO TRAFFIC
SECTION 503 - PCCP JOINTS
503.02 MATERIALS
503.03 JOINTS
503.05 SEALING CRACKS AND JOINTS
SECTION 504 - PCCP FINISHING AND CURING
504.04 CURING
SECTION 506 - PCCP PATCHING
SECTION 805 - TRAFFIC SIGNALS
805.08 CONTROLLER CABINET, SIGNAL SERVICE, AND DETECTOR HOUSING
SECTION 901 - PCC MATERIALS
901.01 HYDRAULIC CEMENT
901.03 GROUND GRANULATED BLAST FURNACE SLAG USED AS A POZZOLAN

contract to the DTE. *The DTE will notify the Contractor when the review is complete and whether or not the previously used CMDP can be used on the current contract.*

502.04 Concrete Mix Criteria

Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed if shown on the CMDP. The supplied concrete mix shall include one of the following water reducing admixtures: type A, type D, type E, or type F.

The fine aggregate shall be at least ~~35~~*40*% but not more than 45% of the total weight of the aggregate in each cubic yard. Proportions will be based upon saturated surface dry aggregates.

(a) Portland Cement Concrete

The CMD shall produce workable concrete mixtures, with the minimum amount of water, and having the following properties.

~~Portland cement content.....564 lbs/cu yd~~
~~Maximum water/cementitious ratio .....0.450~~
~~Maximum cement reduction for GGBFS replacement .....30%~~
~~Fly Ash/portland cement substitution ratio.....1.25 by weight~~
~~Maximum cement reduction for fly ash replacement .....20%~~
~~GGBFS/portland cement substitution ratio.....1.00 by weight~~
~~Slump, formed.....2 to 6 in.~~
~~Slump, slipformed.....1.25 to 3 in.~~
~~Air .....5.0% to 8.0%~~
~~Minimum flexural strength, third point~~
~~loading, with fly ash.....550 psi at 28 days~~
~~Relative yield .....0.98 to 1.02~~

Targets for the CMD:

Portland cement content .....564 lbs/cu yd[A]
Maximum portland cement content.....752 lbs/cu yd[A]

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Minimum water/cementitious ratio.....0.340[B]
Maximum water/cementitious ratio .....0.435[B]
Maximum portland cement reduction
for slag cement 30%
Slag cement/portland cement substitution ratio .....1.00 by weight
Maximum cement reduction for fly ash replacement.....20%
Fly ash/portland cement substitution ratio.....1.25 by weight
Air Content.....6.5%
Minimum modulus of rupture.....570 psi at 7 days[C]
Relative Yield 1.00

Field Acceptance Properties
Minimum water/cementitious ratio.....0.320[B]
Maximum water/cementitious ratio .....0.450[B]
Slump.....2 to 6 in.
Air content.....5.0% to 8.0%
Minimum modulus of rupture.....570 psi at 7 days[C]
Relative yield.....0.98 to 1.02

[A] *The target cement content during production shall not be adjusted from the value stated on the CMDP.*
[B] *The water cementitious ratio during production shall not deviate more than 0.020 from the target stated in the CMDP and shall not fall outside the limits above.*
[C] *Beams shall be standard cured in a water tank in accordance with AASHTO T 23 and 505.01(a). The water does not need to be saturated with calcium hydroxide. Minimum flexural strength for opening to traffic shall be in accordance with 506.11.*

Class C concrete in accordance with 702 using Class AP coarse aggregate may be substituted in PCCP.

~~Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval.~~

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~~F~~*Blended portland pozzolan cements, f*ly ash*,* or ~~GGBFS used as an additive, or blended cements~~*slag cement* may only be incorporated in the concrete mix ~~between April 1 and October 15 of the same calendar year~~*when the ambient temperature is above 50°F during the entire placement period*. If type IP, type IP-A, type IS or type IS-A cements are to be used, the *minimum* portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or ~~GGBFS as an additive~~*slag cement* will not be allowed when blended cement types IP, IP-A, IS, or IS-A are used.

(b) High-Early Strength Concrete

~~The Contractor shall submit, along with the CMDS, all supporting test results for approval to the DTE prior to placing concrete. Testing shall be conducted by an American Concrete Institute, ACI, certified concrete field testing technician, grade 1. The supporting test results shall be signed by the technician and include air content, slump, relative yield, water cement ratio, and the flexural strengths at 1 day, 2 days, and 7 days.~~

~~The CMD shall produce workable concrete mixtures, with the minimum amount of water, and having the following properties.~~

~~Minimum portland cement content (types I, IL or III) ..... 564 lbs/cu yd~~
~~Maximum fly ash addition ..... 10% of cement content~~
~~Maximum water/cementitious ratio (types I or IL)..... 0.42~~
~~Maximum water/cementitious ratio (type III)..... 0.45~~
~~Maximum GGBFS addition..... 15% of cement content~~
~~Slump, formed..... 2 to 6 in.~~
~~Slump, slipformed..... 1.25 to 3 in.~~
~~Air content ..... 5.0% to 8.0%~~
~~Minimum flexural strength, third point loading ..... 550 psi at 2 days~~
~~Relative yield ..... 0.98 to 1.02~~

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~~Fly ash or GGBFS used as an additive may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year.~~

~~Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval~~*Patching concrete in accordance with 506.04(b) shall be used.*

502.05 Job Control

Control of PCCP for air content, slump, or relative yield will be determined on the basis of tests performed by the Engineer in accordance with 505. Concrete and necessary labor for sampling shall be furnished as required by the Engineer. Testing will be in accordance with the Frequency Manual.

SECTION 502, BEGIN LINE 338, DELETE AND INSERT AS FOLLOWS:

502.18 Opening to Traffic

~~When fly ash, GGBFS, or cement type IP, type IS, type IP-A, or type IS-A is incorporated into the PCCP, traffic shall not be allowed on the PCCP until the test beams indicate a modulus of rupture of 550 psi or greater. Opening to traffic of PCCP not containing the above additives shall be based on the following.~~

~~(a) Construction~~

~~Construction vehicles or equipment may be allowed on the PCCP after 10 days or when the test beams indicate a modulus of rupture of 550 psi or greater. Any construction vehicle or equipment that may damage the PCCP shall not be used on the PCCP unless adequate protection is provided. Approved joint cutting saws may be operated on the PCCP as determined by the Contractor.~~

~~(b) Non-Construction~~

PCCP may be opened to *equipment and* traffic ~~after 14 days or~~ when *the flexural strength of the* test beams indicate a modulus of rupture of 550 psi or greater. *ITM 402 may be used as an alternate method to determine the flexural strength. If adequate strengths are not achieved, an investigation by the Engineer and Contractor will be conducted to*

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determine if the PCCP is deficient. Resolutions for all deficiencies will be developed at the completion of the investigation. Prior to opening to traffic, cracks and joints shall be sealed in accordance with 503.05 and the PCCP shall be cleaned.

SECTION 503, BEGIN LINE 9, INSERT AS FOLLOWS:

503.02 Materials

Materials shall be in accordance with the following:

Chemical Anchor System.....901.05
Dowel Bars.....910.01(b)10
Epoxy Coated Reinforcing Bars.....910.01(b)9
Hot Poured Joint Sealant.....906.02(a)2
Joint Filler 906.01
Joint Materials.....906
PCC Sealer/Healers.....901.06
Reinforcing Bars 910.01

SECTION 503, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

(a) Type D-1 Contraction Joint

Type D-1 contraction joints shall be created by sawing slots in the pavement unless alternative methods are approved. The sawed contraction joint spacing shall be as shown on the plans or as directed, but shall not exceed 18 ft.

~~Sawed contraction joints shall be cut in two operations.~~ The ~~initial~~ saw cut shall commence as soon as the concrete has hardened sufficiently to enable sawing without raveling, usually 2 to 12 h after placement. All joints shall be saw cut through the edges of the pavement to the required depth before uncontrolled shrinkage cracking takes place. The sawing operations shall be carried on during day and night, regardless of weather conditions. The sawing of a joint shall be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discontinued if a crack develops ahead of the saw. Formed contraction joints may be used where conditions make sawing impractical.

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~~The second saw cut shall be made after the concrete has sufficiently cured, but before opening the pavement to non-construction traffic~~*The width of the saw cut shall be measured for specification compliance at the time of the sawing operations.* Slurry or saw residue remaining in the slot shall be immediately flushed with water. Construction traffic shall not be allowed on the PCCP after the ~~second~~ saw cut until the joint is sealed.

The sawed slot shall be cleaned to remove all foreign matter from the entire depth of cut. Joint sealing shall be in accordance with 503.05.

(b) Longitudinal Joint

Longitudinal joints shall be created by sawing slots in the pavement unless alternative methods are approved. The longitudinal joint spacing shall be as shown on the plans or as directed, but shall not exceed ~~16~~*14* ft. Tie bars shall be placed by mechanical equipment in accordance with 508.04(a), or rigidly secured in place.

Longitudinal joints shall be cut to the depth, width, and line shown on the plans. The longitudinal joint slots shall be sawed concurrently with the ~~initial~~ D-1 contraction joint slots. If random cracking occurs ahead of sawing, the sawing operations shall be discontinued in that area. ~~A second saw cut shall be made when construction traffic uses the PCCP prior to sealing~~*The sawed joint shall be cleaned as specified in 503.03(a).* Joint sealing shall be in accordance with 503.05.

Longitudinal joints may be replaced with longitudinal construction joints when approved by the Engineer.

SECTION 503, BEGIN LINE 204, DELETE AND INSERT AS FOLLOWS:

503.05 Sealing Cracks and Joints

~~Cracks and~~*All* joints *and cracks* in the PCCP shall be cleaned and sealed *with hot poured joint sealant* in accordance with the sealant manufacturer's recommendations. Water blasting shall not be applied under pressure which may damage the concrete. All cracks and joints shall be sealed prior to discontinuing work for the winter.

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~~When preformed elastomeric joint seals are used, the material shall be installed in one continuous piece by means of an approved machine. The seal shall not be stretched more than 5% while being placed and show no twisting, rollover, folding, cutting, or excess lubricant-adhesive on the top of the seal. Elastomeric joint seal may be installed in two separate pieces for phased construction with the splice point occurring at the highest point of the joint. The splicing method used shall be in accordance with the seal manufacturer's recommendations.~~

SECTION 504, BEGIN LINE 52, DELETE AND INSERT AS FOLLOWS:

504.04 Curing

Curing materials shall be applied to exposed surfaces and sides of newly placed PCCP within 30 minutes after the finishing operations have been completed, or as soon as marring of the concrete does not occur. Paving operations shall be immediately suspended if sufficient curing materials are not available on site.

When forms are used, the edges of the pavement shall be cured immediately upon removal of the forms. The edge shall be covered with curing materials equal to the material used on the surface or banked with soil 12 in. wide or greater.

When conditions arise which prevent immediate application of curing materials, the paving operation shall be suspended and the PCCP shall be kept wet with a fine spray of water. The fine spray of water shall continue until application of curing materials resumes.

When blended portland pozzolan cements, fly ash, or slag cement are used in the concrete mix, the average ambient temperature must be above 50°F for the curing period. The average temperature shall be calculated based on hourly temperature measurements taken at the jobsite or from published weather station data within 10 miles of the jobsite. If the temperature restrictions are not met during placement or during the required curing period, curing shall continue and the PCCP shall not be opened to traffic until the strength requirements are met.

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If liquid membrane forming compounds are used as the curing method and open to traffic strength has been achieved, the road may be opened to traffic and the 96 h stipulation stated below will not apply. ~~C~~*Except when liquid membrane forming compounds are used, c*uring shall be continuous for 96 h unless a longer period is ordered ~~and~~. *Curing* shall be in accordance with the following.

(a) Liquid Membrane Forming Compounds

~~Immediately after surface water has disappeared, a uniform coating of the liquid membrane forming curing compound shall be applied.~~

~~The compound shall be applied in a continuous uniform film at a rate not less than 1 gal./150 sq ft. It shall be applied in two applications.~~ *The curing compound shall be mixed thoroughly within 1 h before use. The rate of application shall be as approved, with a minimum spreading rate per application of 1 gal. of liquid coating for 150 sq ft of concrete surface. Curing compound shall be applied to provide a uniform, solid, white opaque coverage on all surfaces, similar to a white sheet of paper. All concrete cured by this method shall receive two applications of the curing compound. The first application shall be applied immediately after surface water has disappeared and surface texturing has been applied. If formwork has been used, both applications of curing compound shall be applied immediately after the formwork is removed. The second application shall be applied after the first application has set.* The curing compound may be warmed in a water bath during cold weather at a temperature not exceeding 100°F. Thinning with solvents will not be allowed. Non-uniform film rates will result in the discontinuance of that application method.

A new coat of curing compound shall be applied to areas damaged by rain or other means during the curing period. The recoating shall be applied as soon as possible and at a rate equal to that specified for the original coat.

SECTION 506, BEGIN LINE 3, DELETE AND INSERT AS FOLLOWS:

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506.01 Description

This work shall consist of the removal and replacement of *jointed plain PCCP or jointed reinforced* PCCP in accordance with 105.03.

MATERIALS

506.02 Materials

Materials shall be in accordance with the following:

Admixtures 912.03
Calcium Chloride, Type L 913.02
Chemical Anchor System 901.05
Coarse Aggregate, Class A or Higher, Size No. 11 904
Coarse Aggregate, Class AP, Size No. 8 904
Dowel Bars ..... 910.01(b)10
Dowel Bar Assemblies 503.04
Fine Aggregate, Size No. 23 904
Fly Ash 901.02
Joint Fillers ..... 906.01[A]
Joint Sealing Materials ..... 906.02(a)2
Portland Cement ..... 901.01(b)
Rapid Hardening Hydraulic Cement ..... 901.01(d)
Slag Cement 901.03
Water 913.01

[A] *A flexible foam expansion joint material meeting the requirements of ASTM D 5249, type 2 may also be used for the retrofit pressure relief joint. If the flexible foam expansion joint is used, the basis for use will be a type C certification in accordance with 916.*

Coarse aggregate for partial depth patching shall be size No. 11. Coarse aggregate for full depth patching shall be size No. 8. Coarse aggregate for patch~~ing~~*es* shall be *dolomite, lime*stone*,* or gravel.

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Retrofitted tie bars shall be No. 5 or No. 6 epoxy coated reinforcing bars in accordance with 910.01(b)9.

The rapid hardening hydraulic cement or calciumsulfoaluminate, CSA, cement type selected shall be a type shown in ASTM C 1600 that will enable opening to traffic in accordance with the contract requirements. Food grade citric acid may be used as an organic retarding admixture in concrete utilizing CSA cement. The use and strength of food grade citric acid, or any other admixture, shall be approved in writing by the manufacturer of the CSA cement. The basis for use for the food grade citric acid will be visual inspection.

A bonding agent shall be selected from the Department's list of approved Non-Vapor Barrier Type Bonding Agents.

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

506.03 Concrete Mix Design

A concrete mix design submittal, CMDS, shall be in accordance with 506.04. The CMDS shall be submitted to ~~and approved by~~ the DTE. The CMDS shall be submitted a minimum of seven calendar days prior to the trial batch. ~~utilizing~~*The CMDS shall use* the Department provided spreadsheet and shall include the following:

(a) a list of all ingredients*, including the type of CSA cement, if applicable*
(b) the source of all materials
(c) the fine to total aggregate ratio
(d) the absorption of the aggregates
(e) the SSD bulk specific gravity of the aggregates
(f) the specific gravity of pozzolan
~~(f)~~*(g)* the batch weights

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~~(g)~~*(h)* the names of all admixtures
~~(h)~~*(i)* the admixture dosage rates and the manufacturer's recommended range.

The absolute volume of the mix design shall be 27.0 cu ft at the design air content of 6.5%.

The CMDS ~~is~~*shall be* used to conduct a trial batch in accordance with 506.05. Upon completion of the trail batch, the Contractor shall submit the ~~concrete mix design for production, CMDP~~ *CMDS and the Contractor's and Engineer's trial batch results for the CMDS to the DTE*. The ~~CMDP~~*results* shall be submitted to the DTE utilizing the Department furnished spreadsheet a minimum of three work days prior to production. Production shall not commence ~~without an approved~~*until the DTE has assigned a mix number to the CMDS. The concrete mix design will henceforth be identified as a concrete mix design for production,* CMDP. ~~Both the Contractor's and Engineer's test results from the trial batch will be included in the CMDP submittal.~~

A CMDP may be changed or adjusted in accordance with the following:

(a) Change in Materials

A change in a previously approved CMDP, for a given contract, to any of the following shall be submitted to the DTE as a CMDS, referencing the original CMDP.

1. cement source or type
2. pozzolan source or type
3. coarse aggregate source or type
4. admixture type.

A trial batch shall be conducted in accordance with 506.05~~, or verification of the new CMDS may be made during the first day of production by tests conducted by the~~

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~~Contractor and the Engineer. Production may continue until flexural strength tests are completed, provided all other properties are in accordance with 506.04. The test results shall be submitted to the DTE utilizing the Department spreadsheet no later than one day after the flexural strength test results are complete. If the flexural strength is not in accordance with 506.04, production shall stop and all PCCP patching constructed with the new CMDS will be adjudicated as a failed material in accordance with normal Department practice as listed in 105.03~~.

(b) Adjustments to Materials

An adjustment in a previously approved CMDP, for a given contract, to any of the following shall be submitted to the DTE as a CMDS, referencing the original CMDP.

1. admixture source
2. admixture product of same type and from same source designated in the original CMDP
3. fine aggregate source
4. fine to total aggregate ratio in excess of ±3% from the value designated by the original CMDP
5. Increase in cement content from amount designated in the original CMDP.

The new CMDS shall be submitted to the DTE utilizing the Department spreadsheet a minimum of one work day prior to production. A trial batch or verification testing is not required for approval. Production shall not commence without an approved CMDP.

(c) Other Adjustments

Other adjustments in previously approved CMDP, for a given contract, to ~~any of the following~~*the admixture dosage rate* will be allowed and DTE notification and ~~approval~~*review* prior to use is not required.

~~1. admixture dosage rate~~

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~~2. fine aggregate to total aggregate ratio within ±3% of the value designated by the original CMDP.~~

A~~n approved~~ CMDP, from another contract in the current or previous calendar year may be ~~used on additional contracts~~*submitted for review for use on the current contract to the DTE. The DTE will notify the Contractor when the review is complete and whether or not the previously used CMDP can be used on the current contract.* ~~The CMDP shall be submitted to the DTE for review and approval prior to use.~~

506.04 Concrete Mix Criteria

The design flexural strength of each CMDP shall be set such that the minimum opening to traffic strength is achieved at an age consistent with the work schedule, including any lane closure restrictions.

The fine aggregate shall be at least ~~35~~*40*% but not more than 45% of the total weight of the aggregate in each cubic yard. Proportions ~~will~~*shall* be based upon SSD aggregates.

Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed if shown on the CMDP. The supplied concrete mix shall include one of the following water reducing admixtures: type A, type D, type E, type F, or type G.

Type C admixtures or calcium chloride, type L, shall not be used in conjunction with type III portland cement. Calcium chloride, type L, may only be used in mixes for non-reinforced PCCP and for mixes in accordance with 506.04(a).

Blended portland pozzolan cements, fly ash, or slag cement may only be incorporated in the concrete mix when the ambient temperature is above 50°F during the entire placement period. If type IP, type IP-A, type IS or type IS-A cements are to be used, the minimum portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or slag cement will not be allowed when blended cement types IP, IP-A, IS, or IS-A are used.

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The Contractor may use either portland cement or CSA cement in the concrete. Fly ash or slag cement may also be used.

If concrete has a permeability of 900 coulombs or less at 56 days, the acceptable range of air content will be 0-6.0%. Verification of this property for a mix design will be determined by testing specimens cast at the trial batch. Testing will be done per AASHTO T 23 Section 10.1 Standard Cure conditions.

The CMD shall produce workable concrete mixtures~~, with the minimum amount of water,~~ having the following *targets and field acceptance* properties~~:~~.

(a) Patches Less than or Equal to 15 ft in Length

The Contractor shall use either concrete as described below or concrete in accordance with 506.04(b). If concrete in accordance with 506.04(b) is used, 506.11(b) shall be used for the minimum open to traffic strength.

Targets for the CMD:

Minimum portland cement content ..... ~~658~~*564* lbs/cu yd[A]
Maximum portland cement content.....752 lbs/cu yd[A]
Minimum CSA cement content.....564 lbs/cu yd[A, B]
Maximum CSA cement content .....658 lbs/cu yd[A, B]
Minimum water/cementitious ratio (types I or IL).....0.340[C]
Maximum water/cementitious ratio (types I or IL) .....0.400[C]
Minimum water/cementitious ratio (type III or CSA).....0.340[C]
Maximum water/cementitious ratio (type III or CSA) ..... 0.435 [C]
Maximum fly ash or slag cement addition ..... 30% of the cement content[B]
Maximum silica fume addition..... 7% of the cementitious content
Air Content 6.5%
Minimum modulus of rupture.....400 psi at 24 h
Minimum modulus of rupture..... 550 psi at 3 days[D]

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Relative Yield *1.00*

Field Acceptance Properties:

Minimum water/cementitious ratio (types I or IL) ..... *0.320*[C]
Maximum water/cementitious ratio (types I or IL) ..... *0.420*[C]
Minimum water/cementitious ratio (type III or CSA) ..... *0.340*[C]
Maximum water/cementitious ratio (type III or CSA) ..... *0.450*[C]
~~Maximum water/cement ratio ..... 0.45~~
~~Minimum s~~*S*lump ..... 2 *to 6* in.
Air Content ..... ~~6.5% ± 1.5~~*5.0% to 8.0*%
~~Minimum Flexural strength, third point loading ..... 300 psi at 24 h~~
Minimum ~~flexural strength, third point loading~~*modulus of rupture* .....
~~500~~*550* psi at 3 days[D]
Relative yield ..... *0.98 to 1.02*

[A] *The cement content shall not be adjusted from the target stated on the CMDP during production.*
[B] *Fly ash or slag cement shall not be used in combination with CSA cement unless approved in writing by the manufacturer of the CSA cement.*
[C] *The water/cementitious ratio shall not deviate more than 0.020 from the target stated in the CMDP and shall not fall outside the limits shown.*
[D] *Beams shall be standard cured in a water tank in accordance with AASHTO T 23 and 505.01(a). The water does not need to be saturated with calcium hydroxide.*

When *a* calcium chloride solution is added, ~~a maximum of~~ *the maximum amount of solid calcium chloride contained in solution shall not exceed* 2%, ~~by~~*of the total batch* weight of cement~~, shall be used~~. ~~The percentage shall be reduced to 1 if the ambient temperature is above 80°F. If the mixture is used in an 805 application, calcium chloride shall not be used.~~ *If the ambient temperature is above 80°F, the maximum amount of solid calcium chloride contained in solution shall not exceed 1% of the total batch weight of cement.*

(b) Patches Greater than 15 ft in Length

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The Contractor shall use either concrete as described below, or portland cement concrete in accordance with 502.04(a). If concrete in accordance with 502.04(a) is used, a trial batch is not required.

Targets for the CMD:

Minimum portland cement content (types I, IL or III) ..... 564 lbs/cu yd[A]
Maximum portland cement content (types I, IL, or III) ..... 752 lbs/cu yd[A]
Minimum CSA cement content ..... 564 lbs/cu yd[A, B]
Maximum CSA cement content ..... 658 lbs/cu yd[A, B]
Minimum water/cementitious ratio (types I or IL) ..... 0.340[C]
Maximum water/cementitious ratio (types I or IL) ..... 0.400[C]
Minimum water/cementitious ratio (type III or CSA) ..... 0.340[C]
Maximum water/cementitious ratio (type III or CSA) ..... 0.435[C]
Maximum fly ash or slag cement addition ..... 30% of the cement content[B]
Maximum silica fume addition ..... 7% of the cementitious content
Air Content 6.5%
Minimum modulus of rupture ..... 425 psi at 24 h
Minimum modulus of rupture ..... 550 psi at 3 days[D]
Relative Yield 1.00

Field Acceptance Properties:

Minimum water/cementitious ratio (types I or IL) ..... 0.320[C]
Maximum water/cementitious ratio (types I or IL) ..... 0.420[C]
Minimum water/cementitious ratio (type III or CSA) ..... 0.340[C]
Maximum water/cementitious ratio (type III or CSA) ..... 0.450[C]
Slump ..... 2 to 6 in.
Air content ..... 5.0% to 8.0%
Minimum modulus of rupture ..... 550 psi at 3 days[D]
Relative yield ..... 0.98 to 1.02

[A] *The target cement content during production shall not be adjusted from the value stated on the CMDP.*

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[B] *Fly ash or slag cement shall not be used in combination with CSA cement unless approved in writing by the manufacturer of the CSA cement.*

[C] *The water cementitious ratio during production shall not deviate more than 0.020 from the target stated in the CMDP and shall not fall outside the limits above.*

[D] *Beams shall be standard cured in a water tank in accordance with AASHTO T23 and 505.01(a). The water does not need to be saturated with calcium hydroxide.*

506.05 Trial Batch

A trial batch shall be produced and tested *by the Contractor's certified technician* to verify that the CMD*S* is in accordance with the concrete mix criteria. *Concrete produced at a plant shall be batched within the proportioning tolerances of 502.10.* An American Concrete Institute certified concrete field testing technician, grade 1 shall be on site to direct all sampling and testing. The trial batch shall be produced at the plant prior to production. *A sufficient number of flexural strength test beams shall be made and will be tested to demonstrate that opening to traffic strength is achieved at an age consistent with the proposed range of usage of the mixture. At a minimum, flexural strength gain will be determined at the target opening to traffic times and at the specified 24 h and 3 day targets as specified by the respective mix criteria.* The Engineer will test the concrete's air content and determine the water/cement*itious* ratio, and prepare and test flexural beams. The flexural strength will be determined by averaging a minimum of two beam breaks. *The Department will provide the apparatus to test the beams for flexural strength. Personnel shall be provided to assist the Department in casting, curing, and testing the beams.* The Engineer will provide the Contractor the results of the tests. *The Contractor shall submit, along with the CMDS, all supporting test results for approval to the DTE prior to placing concrete. The supporting test results shall be signed by the technician and include air content, slump, relative yield, water cement ratio, and the flexural strengths at the targets listed in 506.04(a) or 506.04(b). Maturity in accordance with ITM 402 may be used as an alternate method to determine the flexural strength for opening to traffic.* The Engineer will provide the Contractor the results of the tests.

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A trial batch will not be required when the total quantity of ~~partial depth patching or~~ full depth patching ~~will~~ require*s* less than 10 cu yd of material per contract.

The trial batch shall be of sufficient quantity to allow the Engineer to perform all required tests from the same batch. Trial batch concrete shall not be used for more than one test*, except concrete used to measure relative yield may also be used to measure air content*.

506.06 Job Control

Control of PCCP for air content*, relative yield,* and flexural strength beams will be determined on the basis of tests performed by the Engineer in accordance with 505. Concrete and necessary labor for sampling shall be furnished as required by the Engineer. Testing for air content *and relative yield* will be on the first load of the day and once per every 50 cu yd.

(a) Beams for Validation of CMDP

~~Beams~~*At least one set consisting of three beams per set* will be made once per every 150 cu yd *of concrete placed* and tested for compliance with ~~3~~*either the three* day *or seven day* flexural strength requirements *stated in 506.04, for the purpose of CMDP validation. Air content and relative yield will be measured on each sample of concrete from which beams are made. Beams for validation shall be placed on the concrete pavement or shoulder adjacent to the patch and cured in a similar manner as the patch in accordance with 505.01(a) until patch area is open to traffic. At which point the beams shall be relocated off-site and standard cured in accordance with AASHTO T 23, Section 10.1.2 with the exception that the water does not need to be saturated with calcium hydroxide until the three or seven day time period has elapsed. Failure of the validation beams to meet or exceed the three day or seven day flexural strength requirements specified herein will result in the use of the CMDP being suspended until the Department concludes an investigation into why the failure occurred. If the CMDP is subsequently shown to be acceptable, another set of validation beams will be tested on the next use of the CMDP.*

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(b) Beams for Opening to Traffic

Additional beams shall be cast for the purpose of opening to traffic for concrete meeting the requirements of 506.04(a) or 506.04(b). Such beams shall be cast from sampling the last load to finish the patching operations for the day's production for each of the concrete mixes used. Beams for opening to traffic shall be placed on top of a concrete patch that they represent and cured in a similar manner as the patch.

The Engineer will notify the Contractor when test results for air content*, relative yield,* or flexural strength are outside the requirements of 506.04. Rounding will be in accordance with 109.01(a).

CONSTRUCTION REQUIREMENTS

Patch areas shown on the plans or marked by the Engineer as greater than 15 ft in length shall be placed as one continuous patch and shall not be subdivided into multiple smaller patches.

506.07 PCCP Removal

PCCP removal areas will be marked. *The Contractor may saw cut the patch areas prior to removing the patch. When the lane is subject to intermittent closures, the saw cutting shall occur no more than 24 h prior to removing the patch.* Vertical saw cuts around the perimeter of the removal areas shall be made in the PCCP. Transverse cuts shall be perpendicular to the centerline of the PCCP. *In no case shall the transverse joint be over-cut into the adjacent pavement. Following the saw cutting, the concrete that remains in the corners of the patch area shall be removed by pneumatic hammers that do not damage the adjacent PCCP pavement or shoulders. Pneumatic hammers shall not exceed 45 lb.*

PCCP removal areas shall not remain open overnight. Shoulders or adjacent PCCP damaged during the removal shall be repaired as directed.

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(a) Partial Depth Removal

The saw cut shall be a minimum of ~~1~~*2* in., to a maximum of ~~3 in~~*one-third the thickness of the existing pavement*. Removal of all unsound concrete to a minimum depth of ~~1~~*2* in. shall be by hand chipping tools or handheld mechanically driven equipment. Mechanical hammers shall not be heavier than a nominal 45 lb class. Mechanically driven tools shall be operated at a maximum angle of 45° from the PCCP surface. If the saw cut face is damaged, a parallel saw cut 1 in. outside the initial saw cut shall be made and the concrete in this area shall be removed by hand chipping. *In lieu of using hand chipping tools or handheld mechanically driven equipment, a milling machine may be used. If a milling machine is used it shall be one that does not damage the adjacent pavement.*

~~R~~*If r*einforcing bars *are* encountered during the removal operation~~ shall be cause for~~*, the patch shall be changed to* a full depth patch in accordance with 506.07(b). Wire mesh reinforcement exposed during the removal operations shall be removed.

~~Exposure of unsound concrete below 3 in. shall be cause for~~*If concrete is exposed below one-third the thickness of the existing pavement, the patch shall be changed to* a full depth patch in accordance with 506.07(b).

~~The p~~*P*artial depth cavities shall be thoroughly sandblasted and, just prior to placing new concrete, cleaned of all dust, chips, and water. The air lines for sandblasting and air cleaning shall be equipped with oil traps to prevent contamination of the surfaces.

(b) Full Depth Removal

The saw cut shall be full lane width and thickness of the PCCP. After the full depth saw cut is completed, vehicle mounted removal equipment may be used to remove the concrete provided this equipment does not damage the adjacent sound concrete.

Removal areas in the same lane which are closer than 10 ft shall require the PCCP between these areas to be removed and replaced. If a transverse joint is located within the

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removal area, the limits of removal shall be ~~increased to a minimum of 1 ft beyond the joint~~*as shown on the plans*.

Full depth removal shall be extended until sound PCCP is encountered to allow *the drilling and installation of* dowel bars ~~to be firmly anchored~~*for load transfer, without inflicting further damage to the existing PCCP*.

~~All subbase material disturbed during the removal operation shall be recompacted as directed.~~*Existing subbase shall be completely removed.*

506.08 Concrete Mixing and Transportation

(a) For Patches Less than or Equal to 15 ft in Length

~~Concrete mixing and transportation shall be completed by central mixed, shrink mixed, or transit mixed methods.~~ *Concrete batching tolerances, mixing, and transportation shall be in accordance with 502.10 and the following.* Discharge from non-agitating equipment shall be completed within 30 minutes of mixing the water, cement, aggregates, and calcium chloride solution. Discharge from a truck agitator or a truck mixer shall be completed within 90 minutes of mixing the water, cement, and aggregates or within 30 minutes of the addition of calcium chloride solution. If the location of the plant is such that this time limit cannot be met, the calcium chloride solution shall be added to the concrete in a transit mixer at the site and the concrete shall then be mixed for an additional 40 revolutions prior to discharge.

~~Concrete shall be uniformly mixed when delivered to the job site. Tickets for each load of PCC shall indicate the weight of cement, and aggregates, volume of water, and the type and volume of admixtures. The weight of the cement shall be within 1% of the CMDP and the saturated surface dry weight of the aggregates shall be within 2% of the CMDP.~~

~~Wash water shall not be used as a portion of the mixing water.~~

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~~When concrete is delivered in transit mixers, additional water to increase the workability of a load may be added within 45 minutes of initial mixing. Any addition of water shall be noted on the ticket and shall not occur as a continuing operation.~~

~~(a)~~*1.* Central Mixed Concrete
Central mixed concrete shall be in accordance with 502.10(a).

~~(b)~~*2.* Shrink Mixed Concrete
Shrink mixed concrete shall be in accordance with 502.10(b).

~~(c)~~*3.* Transit Mixed Concrete
Transit mixed concrete shall be in accordance with 502.10(c).

(b) For Patches Greater than 15 ft in Length
For patches containing Portland cement, the mixing and transportation shall be in accordance with 502.10. If concrete containing CSA cement is used, it may be batched and mixed in a mobile volumetric mixer meeting the requirements of 722.09, regardless of the patch length. Calibration of the mobile mixer shall be in accordance with 722.13. Alternatively, a mixer from a CSA cement supplier may be used, contingent upon approval by the Engineer.

506.09 Weather Limitations
~~Placement of PCCP patches in continuous reinforced concrete pavement shall be after 1:00 p.m. when the next day's forecasted ambient temperature is 70°F or greater, unless otherwise directed.~~

PCCP patches shall not be placed on frozen subgrade, subbase, or PCCP.

506.10 Placing Concrete
The concrete shall be placed level to the adjacent PCCP and consolidated by internal vibration. The concrete shall be hand finished in accordance with 504. Texturing

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and tining are not required if the PCCP is to be resurfaced with HMA or diamond ground in accordance with 507.06.

The PCCP patch shall be cured *with liquid membrane forming curing compound* in accordance with 504.04(a). In addition *to applying liquid membrane forming curing compound*, *if the ambient temperature is below 55°F at the time of placement,* polyethylene film shall be placed over the patch and covered with a 4 in. layer of rigid or flexible insulation and firmly anchored. *Otherwise, polyethylene film, insulation, or any other covering shall not be used.* Small dimension lumber weighted with sandbags may be used, but large objects such as rocks or concrete blocks shall not be used. *Covering with polyethylene film or any other covering does not replace the requirement to use liquid membrane forming curing compound.*

The PCCP patch shall be inspected in accordance with 502.17.

For patches which are not to be overlaid and have a length greater than 20 ft, pavement smoothness will be in accordance with 501.25 except profilograph requirements will not apply.

(a) Partial Depth

A non-vapor barrier type bonding agent shall be applied to the vertical and horizontal surfaces prior to placing concrete. Coated surfaces shall be protected from contaminants such as dust and dirt. Contaminated surfaces shall be recleaned and recoated. The bonding agent and concrete shall be placed in accordance with the bonding agent manufacturer's recommendations. The recommended time limits will be strictly enforced.

Existing joint openings within the patch shall be maintained for the full depth of the patch by preformed joint fillers or forms. After the patch has cured, these joints shall be sawed and sealed in accordance with 503.

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(b) Full Depth

~~Patches shall be anchored with dowel bars to the adjacent PCCP as shown on the plans. Dowel bars shall be installed using a chemical anchoring system.~~

~~Patches constructed adjacent to transverse contraction joints or random cracks that are to remain in place shall be constructed with type D-1 contraction joints. The joint shall be made continuous across the width of the PCCP to match the existing joint or random crack. Patches greater than 18 ft shall have type D-1 contraction joints in accordance with 503~~*Subgrade treatment and subbase shall be constructed as shown on the plans.*

Dowel bars shall be installed to provide load transfer from the adjoining PCCP to the patch. The diameter of the drilled holes shall be no more than 1/8 in. greater than the diameter of the dowel bar. Dowel bars shall be placed parallel to the pavement surface and to the longitudinal joint. Dowel alignment tolerances shall be as shown on the plans. Dowel holes shall be drilled using hydraulic, electric, or pneumatic percussion drills without spalling or damaging the existing concrete. Drills shall be capable of independent adjustment of each drill shaft in the horizontal and vertical direction. The device used to drill dowel holes shall be slab-riding and be capable of drilling a minimum of three holes at a time. The drilled holes shall be free of dust, moisture, and grease prior to installation of the dowel bars. The chemical anchor system shall be injected to the back of the hole to eliminate air pockets prior to inserting the dowel bar. The quantity of material injected shall be sufficient to disperse the chemical anchor material along the entire length of the dowel bar and completely fill all voids around the bar. After the anchor system has been injected, the dowel bar shall be fully inserted in the hole using a back-and-forth twisting motion, leaving the proper length exposed. A lightweight plastic, clear or semi-transparent grout retention ring shall be installed after each dowel bar is inserted into the hole. The grout retention ring shall be pushed flush to the vertically sawn concrete surface and shall be used to help retain the chemical anchor system in the dowel hole. If it is necessary to use a hammer to seat the dowel bar, the exposed end shall be protected with a wood block. Application of the chemical anchor system by buttering it onto the dowel bar will not be

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allowed. Joint filler and grout retention rings shall be placed and installed as shown on the plans.

All patches greater than 15 feet shall be placed in accordance with 502.12 and shall have joints in accordance with 503. Dowel bars shall be installed within the boundaries of the patch at a spacing as shown on the plans or as approved by the Engineer.

Patches longer than 15 ft shall be finished in accordance with 504.

Patches longer than 15 ft, constructed with concrete containing Portland cement, shall be cured in accordance with 504.04(a) unless ambient air and concrete temperatures warrant following the requirements in 506.10.

Patches constructed in accordance with 506.04(b) and containing CSA cement shall be water cured in accordance with 702.22(a)1 except that soaker hoses will not be required. Water curing shall be initiated after finishing and as soon as the concrete patch can support the wet covering. Water curing shall be maintained for a minimum of 1-1/2 h, and shall be removed no sooner than 1 hour before the patch is opened to traffic.

Concrete shall be placed around manholes or similar structures in accordance with 720.

Sawing and sealing of transverse joints may be omitted when the existing PCCP is to be overlaid as part of the contract.

506.11 Opening to Traffic

For purposes of this section, traffic shall include construction vehicles, construction equipment, and all non-construction vehicles. Any construction vehicle or equipment that may damage the PCCP shall not be used on the PCCP unless adequate

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protection is provided. Joint cutting saws may be operated on the PCCP as determined by the Contractor.

(a) For Patches Less than or Equal to 15 ft in Length

A patch may be opened to traffic in accordance with the following when calcium chloride is used *in accordance with 506.04(a)*.

T	H	HT	T	H	HT
40 - 42°F	30	26	61 - 63°F	14	9
43 - 45°F	27	23	64 - 66°F	14	9
46 - 48°F	24	21	67 - 69°F	14	8
49 - 51°F	21	19	70 - 72°F	14	7
52 - 54°F	19	16	73 - 75°F	14	6
55 - 57°F	16	14	above 75°F	14	5
58 - 60°F	16	11			

T = Lowest ambient temperature during placement, or the temperature of concrete at time of delivery, whichever is lower
H = Time in hours to open to traffic
HT = Time in hours to open to traffic when the average daily traffic is less than 10,000

PCCP patches with calcium chloride may be opened to traffic sooner than specified in the above table if test beams indicate a modulus of rupture of 300 psi or greater. ITM 402 may be used as an alternative method to determine the flexural strength.

When other admixtures or admixture systems are used, the PCCP patches may be opened to traffic when flexural strength tests indicate a modulus of rupture of 300 psi or greater. ITM 402 may be used as an alternate method to determine the flexural strength.

(b) For Patches Greater than 15 ft in Length

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Traffic shall not be allowed on the PCCP until a modulus of rupture of 425 psi from flexural strength testing is achieved. The modulus of rupture will be determined by averaging two beams.

506.12 Method of Measurement

Partial depth patching and full depth patching will be measured by the square yard.

D-1 contraction joints and retrofitted tie bars used in PCCP patching will be measured in accordance with 503.07.

When subgrade treatment is specified, it will be measured in accordance with 207.05. New subbase will be measured in accordance with 302.08.

PCCP removal, subbase *removal*, ~~and subgrade excavation, when required, subbase and subgrade recompaction, non-vapor barrier bonding agent, individual dowel bars, chemical anchor system,~~concrete, finishing, curing, and sawing and sealing of joints will not be measured for payment.

Retrofit pressure relief joints, retrofit contraction joints, non-vapor barrier bonding agent, anchored dowel bars installed at the beginning and end of the patch, individual dowel bars, joint fillers, joint materials, drilling holes for dowel bars, grout retention rings, and chemical anchor systems will not be measured for payment.

506.13 Basis of Payment

PCCP patching will be paid for at the contract unit price per square yard for the type of patching required.

D-1 contraction joints and retrofitted tie bars used in PCCP patching will be paid for in accordance with 503.08.

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Subgrade treatment will be paid for in accordance with 207.06. New subbase will be paid for in accordance with 302.09.

Partial depth patches which have been directed to be full depth will be paid for at the contract unit price per square yard for PCCP patching, partial depth, plus 80% of the contract unit price per square yard for PCCP patching, full depth.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
PCCP Patching, Full Depth	SYS
PCCP Patching, Partial Depth	SYS

The cost of PCCP removal, subbase *removal*, ~~and subgrade excavation, when required, subbase and subgrade recompaction, non-vapor barrier bonding agent, individual dowel bars, chemical anchoring system,~~ concrete, finishing, ~~and~~ curing, and sawing and sealing of joints shall be included in the cost of PCCP patching.

The cost of retrofit pressure relief joints, retrofit contraction joints, non-vapor barrier bonding agent, anchored dowel bars installed at the beginning and end of the patch, individual dowel bars, joint fillers, joint materials, drilling holes for dowel bars, grout retention rings, and chemical anchoring system shall be included in the cost of PCCP patching.

The cost of corrections for pavement smoothness and re-texturing shall be included in the cost of PCCP patching.

Repair or replacement of adjacent PCCP or shoulder damaged by the Contractor shall be made at no additional cost to the Department.

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SECTION 805, BEGIN LINE 310, DELETE AND INSERT AS FOLLOWS:

A minimum of 12 in. and a maximum of 18 in. of loop wire duct will be allowed in the detector housing for each loop lead. Concrete used in the installation of detector housings shall be in accordance with 506*.04(a)*, except 506.05 will not apply *and calcium chloride shall not be used*. A CMDS in accordance with ~~502.03~~*506.03* shall be submitted, however, utilization of the Department provided spreadsheet is not required. Where a portion of the road is closed or where there is no vehicular traffic, then class A concrete in accordance with 702 may be used. The concrete shall be placed flush with existing surface and shall be covered with a steel plate during the setting time.

SECTION 901, AFTER LINE 157, INSERT AS FOLLOWS:

(d) Rapid Hardening Hydraulic Cement

Rapid hardening hydraulic or CSA cement shall be furnished from a manufacturer or manufacturer/distributor on the Department's list of Cement Sources. It shall be CSA cement or a blended CSA cement. A source may be added to the approved list by completing the requirements of ITM 806, Procedure U.

SECTION 901, BEGIN LINE 263, DELETE AND INSERT AS FOLLOWS:

901.03 ~~Ground Granulated Blast Furnace~~ Slag *Cement* Used As a Pozzolan

(a) General

~~Blast furnace s~~*S*lag *cement* shall consist of the non-metallic product, consisting essentially of silicates and aluminosilicates of calcium and other bases, that is developed in a molten condition simultaneously with iron in a blast furnace. A glassy granular material is formed when molten blast furnace slag is rapidly chilled by immersion in water. This material is then ground to cement fineness, producing ~~ground granulated blast furnace~~ slag *cement*.

~~Ground granulated blast furnace s~~*S*lag *cement* will be accepted from one of the sources on the Department's list of approved ~~Fly Ash and Ground Granulated Blast Furnace Slag~~*Pozzolan* Sources. ~~Ground granulated blast furnace s~~*S*lag *cement* from different sources or different grades of ~~ground granulated blast furnace~~ slag *cement* shall

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not be mixed or used alternately in the same construction unless approved in writing. ~~Ground granulated blast furnace s~~*S*lag *cement* will be subject to random assurance sampling and testing by the Department. Failure of these random samples to be in accordance with the specified requirements will be cause for suspension of ~~ground granulated blast furnace~~ *the* slag *cement* source approval.

(b) Acceptance Criteria

~~Ground granulated blast furnace s~~*S*lag *cement* will be accepted based on the manufacturer's or manufacturer/distributor's documented ability to consistently furnish these materials in accordance with the applicable ASTM and AASHTO requirements.

1. Requirements

~~The ground granulated blast furnace s~~*S*lag *cement* shall be in accordance with ASTM C 989 for grade 100 or 120.

For each 2,500 t produced, a complete ASTM C 989 analysis shall be performed on a sample composited randomly from the daily samples. The method of randomization shall be subject to approval by the Department.

2. Test and Calibration Procedure

The testing procedures followed shall be in accordance with ASTM C 989 or other methods approved in writing by the Department.

The minimum frequency for calibration of test equipment is:

a. The No. 325 (45 µm) sieve shall be calibrated every 100 determinations or every six months, whichever comes first.

b. The analytical balances and scales shall be calibrated each year.

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c. The concrete compression machine shall be calibrated annually.

d. The Blaine apparatus shall be calibrated annually.

e. All instrumentation used for rapid chemical analysis shall be in accordance with the applicable requirements of ASTM C 114 using NIST reference materials.

3. Documentation

~~Ground granulated blast furnace s~~*S*lag *cement* suppliers requesting approval shall supply the following:

a. For the initial approval, a current ~~Materials~~ Safety Data Sheet and a summary of results for all specified tests for six consecutive months shall be submitted. No test results shall be more than one year old at the time of request.

b. To maintain approval, a summary of results for all specified tests shall be submitted monthly. The results of the daily tests shall be available by telephone during normal working hours.

c. The ~~ground granulated blast furnace~~ slag *cement* suppliers shall furnish a QCP in accordance with the applicable requirements of ITM 806. The QCP shall ensure the Department of a continuous supply of ~~ground granulated blast furnace~~ slag *cement* which is in accordance with the requirements. This QCP will be reviewed to determine its adequacy.

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d. Certification:

(1) For source approval, the supplier shall furnish a certification indicating the grade of ~~ground granulated blast furnace~~ slag *cement*, the name, location, and type of manufacturing facility. It shall state that the ~~ground granulated blast furnace~~ slag *cement* shipped for use on Department projects will be produced under appropriate quality control and shall be in accordance with the specified requirements. A sample certification form addressing all of the required information is included in ITM 804.

(2) For certification of test reports, the test results generated in accordance with 901.03(b) shall be summarized and submitted monthly. The reports shall state the name and location of the testing facility, and shall be signed by the chemist or technical manager. This certification shall also identify the concrete plants receiving ~~ground granulated blast furnace~~ slag *cement* represented by these results.

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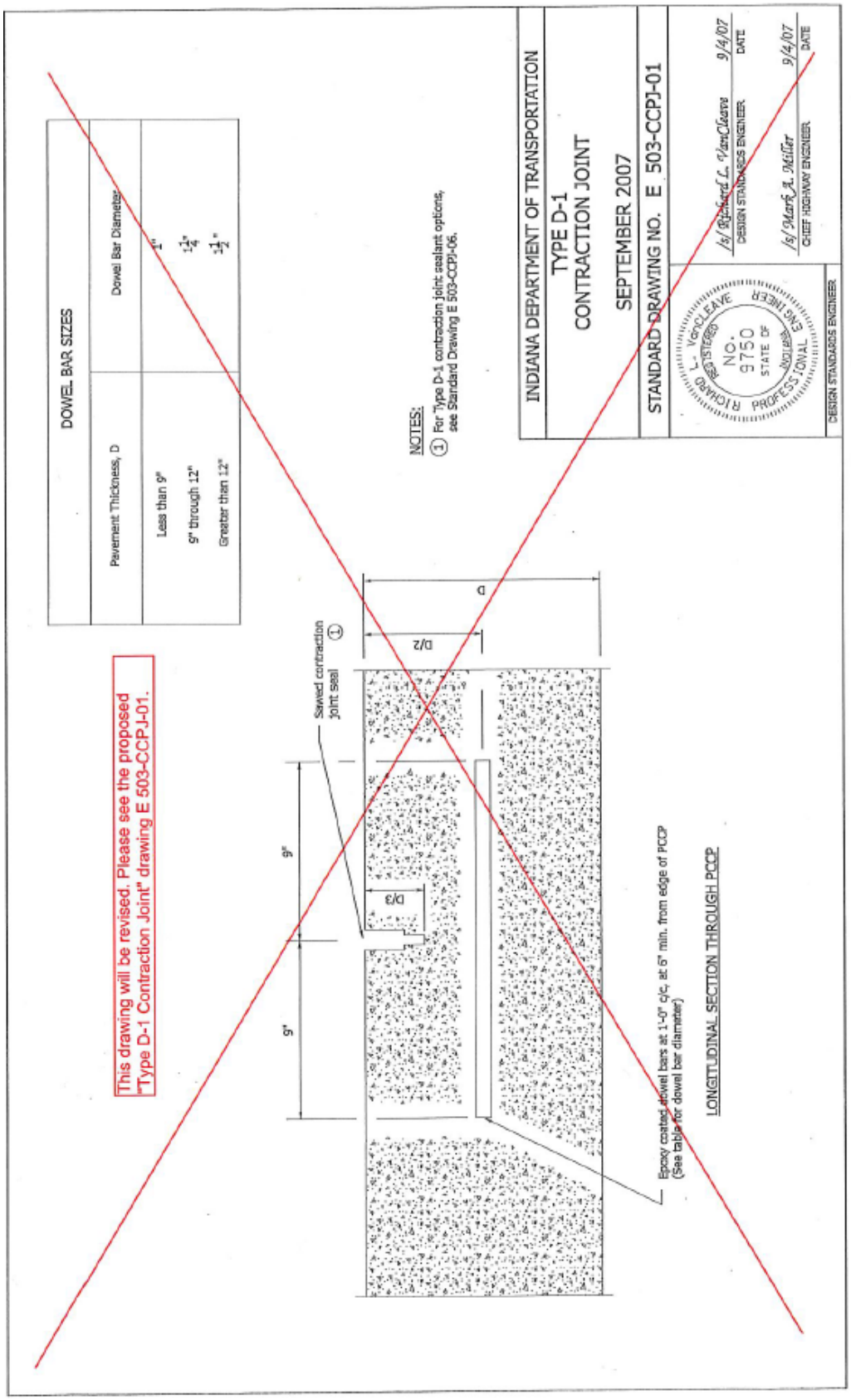
E 503-CCPJ-01 TYPE D-1 CONTRACTION JOINT (PROPOSED TO DELETE)



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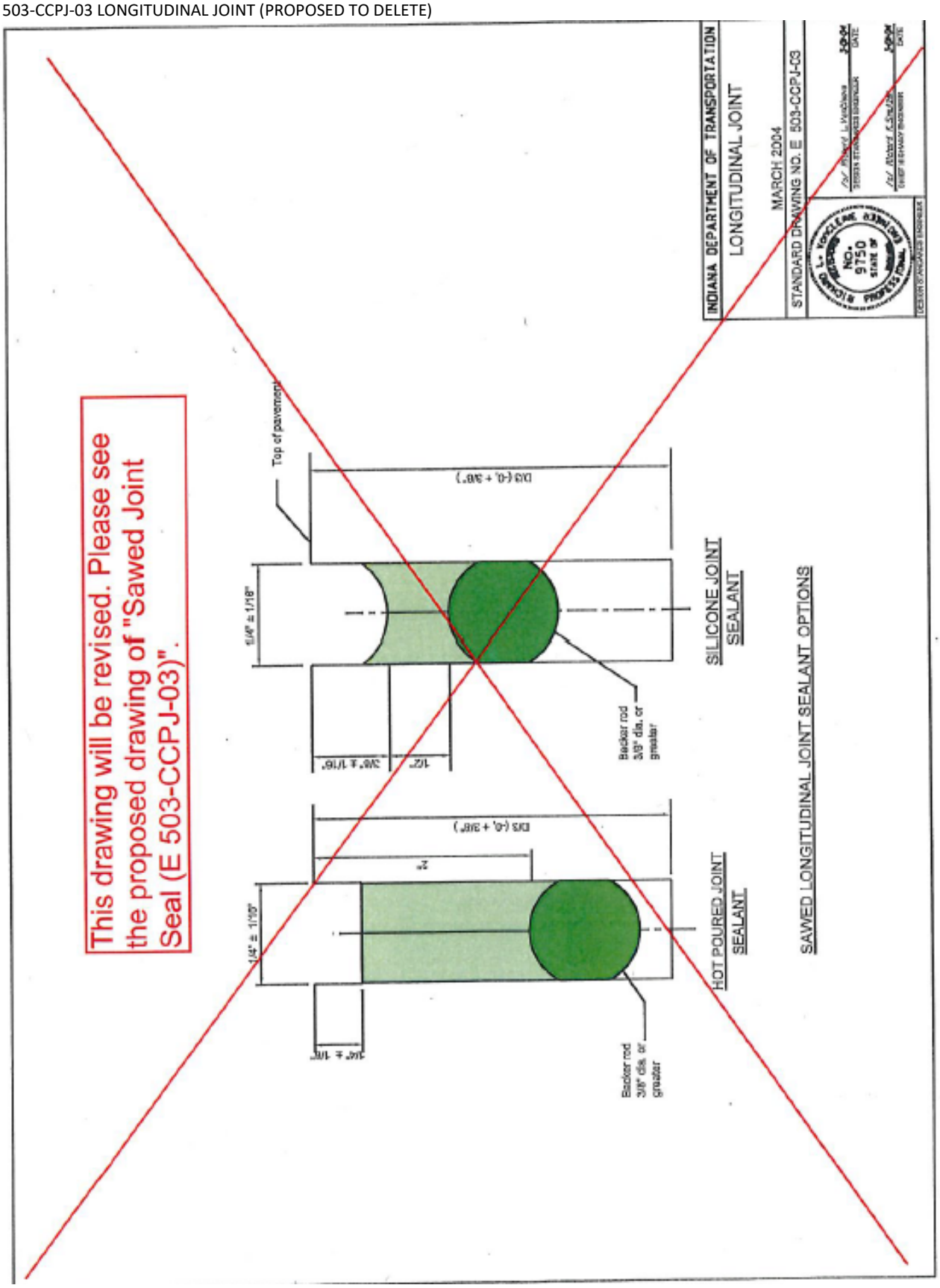
E 503-CCPJ-03 LONGITUDINAL JOINT (PROPOSED TO DELETE)



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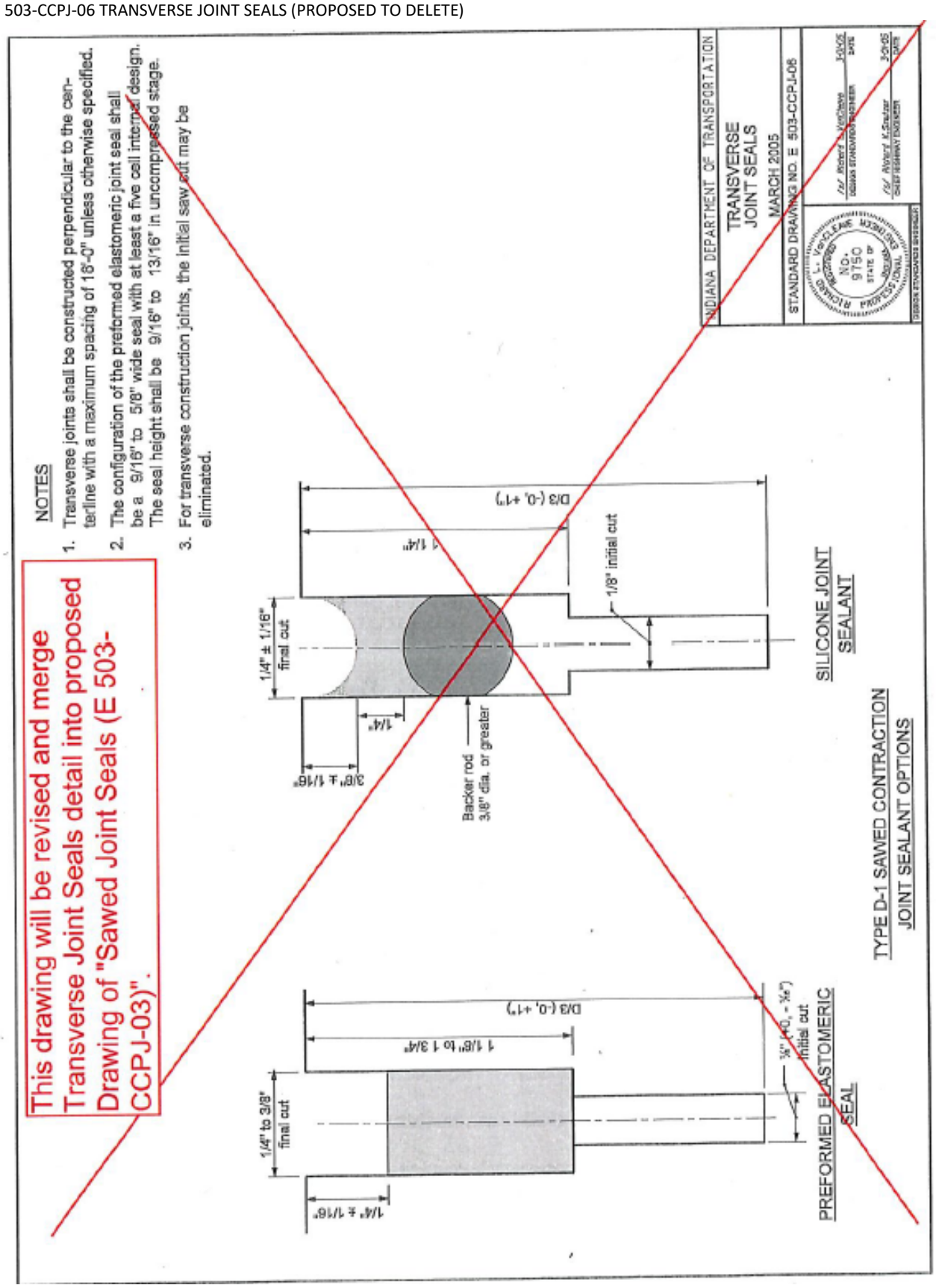
E 503-CCPJ-06 TRANSVERSE JOINT SEALS (PROPOSED TO DELETE)



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E 503-CCPJ-01 JOINT INDEX AND GENERAL NOTES (DRAFT)

INDEX	
SHEET NO.	SUBJECT
1	Joint Index and General Notes
2	Sawed Joints and Hot Pour Sealant
3	Transverse Construction Joint
4	Longitudinal Construction Joint

GENERAL NOTES:

1. Diameter of drilled holes shall be in accordance with the chemical anchor system manufacturer's instructulons.

INDIANA DEPARTMENT OF TRANSPORTATION

JOINT INDEX AND
GENERAL NOTES

SEPTEMBER 2020

STANDARD DRAWING NO. E 503-CCPJ-01

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 503-CCPJ-02 SAWED JOINTS AND HOT POUR SEALANT (DRAFT)

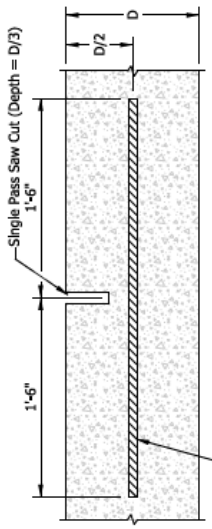
NOTES:

1. Multiple passes of sealant may be required.
2. Backer rod shall not be installed.

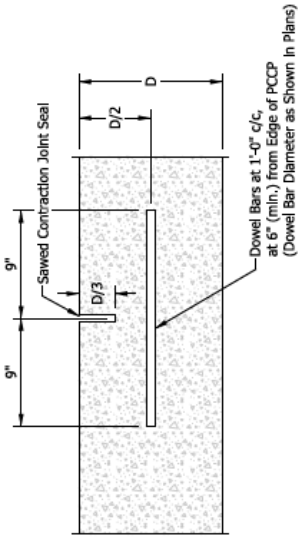
TYPE OF JOINT	DEPTH OF SAW CUT	DEPTH OF SEALANT
Longitudinal Joint	D/3	2" (min.)
D-1 Contraction Joint	D/3	2" (min.)
Retrofit Contraction Joint	1"	Bottom of Saw Cut
Retrofit Pressure Relief Joint	1"	Bottom of Saw Cut
Transverse Construction Joint	1"	Bottom of Saw Cut
Longitudinal Construction Joint	1"	Bottom of Saw Cut

D = PCCP Thickness

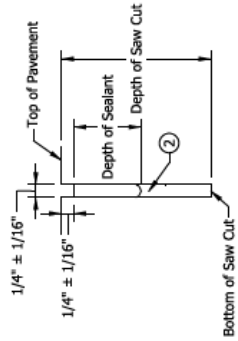
TIE-BAR SIZES FOR LONGITUDINAL JOINT	
Pavement Thickness, D	Tie-Bar Size
Less than or equal to 9"	#5
Greater than 9"	#6



LONGITUDINAL JOINT
TRANSVERSE SECTION THROUGH PCCP



TYPE D-1 CONTRACTION JOINT
LONGITUDINAL SECTION THROUGH PCCP



SAWED JOINT WITH HOT
POUR SEALANT

INDIANA DEPARTMENT OF TRANSPORTATION

SAWED JOINTS
AND
HOT POUR SEALANT
SEPTEMBER 2020

STANDARD DRAWING NO. E 503-CCPJ-02

DESIGN STANDARDS ENGINEER DATE

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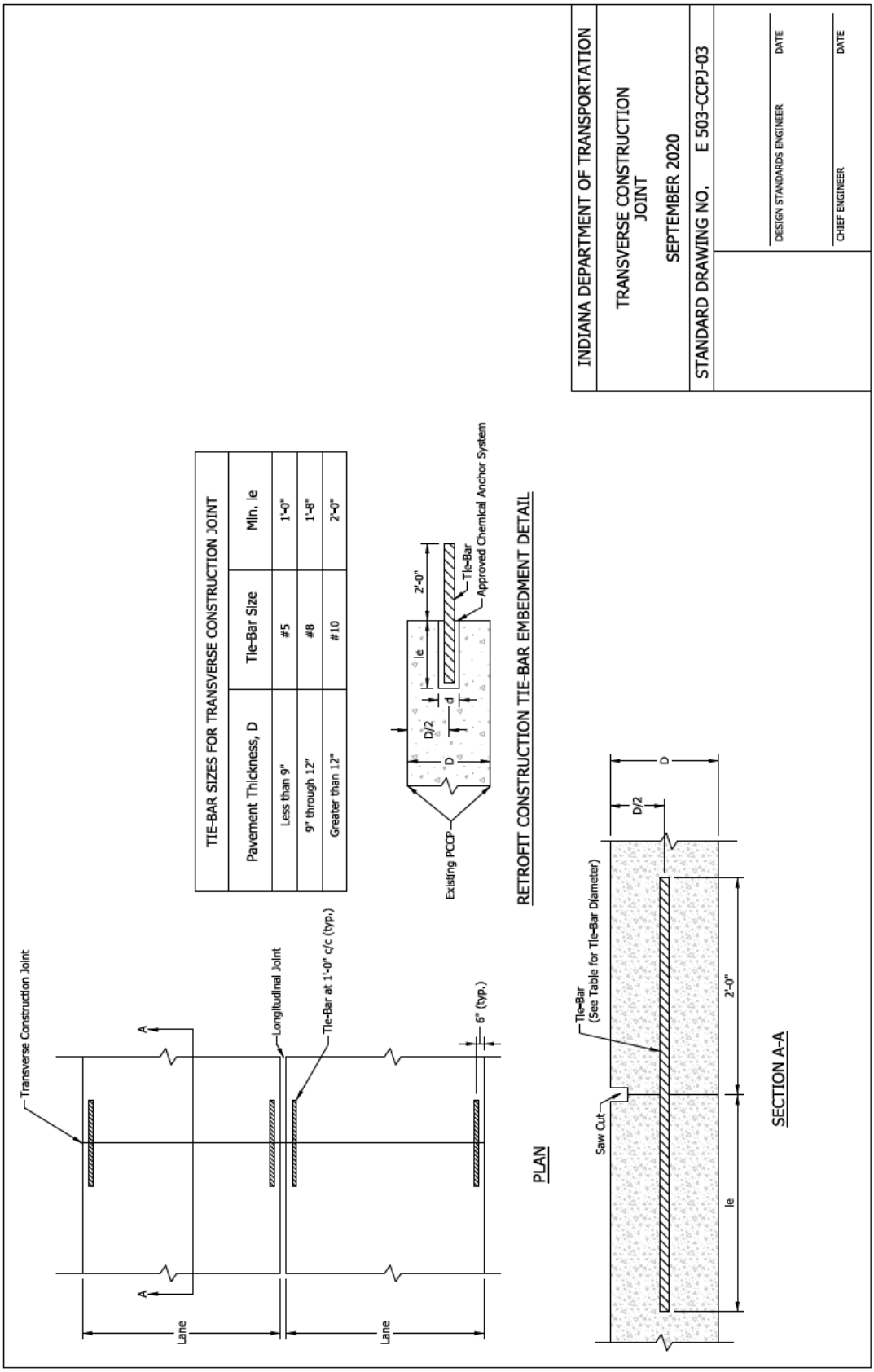
E 503-CCPJ-03 TRANSVERSE CONSTRUCTION JOINT (DRAFT)

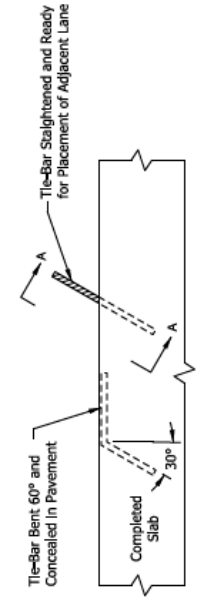


REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

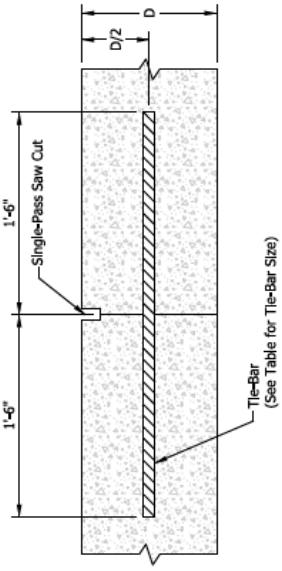
E 503-CCPJ-04 LONGITUDINAL CONSTRUCTION JOINT (DRAFT)

NOTES:

1. Diameter of drilled hole (d) shall be in accordance with the chemical anchor system manufacturer's instructions.

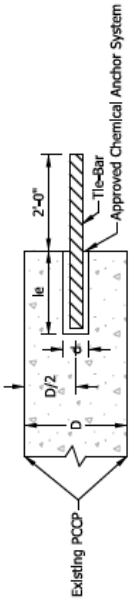


PLAN VIEW



SECTION A-A

METHOD OF PLACING TIE-BAR
FOR LONGITUDINAL CONSTRUCTION JOINT



RETROFIT CONSTRUCTION TIE-BAR EMBEDMENT DETAIL

PAVEMENT THICKNESS, D	LONGITUDINAL CONSTRUCTION JOINT RETROFIT TIE-BARS AT 3'-0" c/c	
	TIE-BAR SIZE	MIN. LENGTH OF EMBEDMENT, le
Less than or equal to 9"	#5	1'-0"
Greater than 9"	#6	1'-0"

TIE-BAR SIZES FOR LONGITUDINAL CONSTRUCTION JOINT		
Pavement Thickness, D	Tie-Bar Size	Spacing
Less than 9"	#5	3'-0" c/c
9" through 12"	#6	3'-0" c/c
Greater than 12"	#6 or #7	2'-0" c/c 3'-0" c/c

INDIANA DEPARTMENT OF TRANSPORTATION

LONGITUDINAL CONSTRUCTION JOINT

SEPTEMBER 2020

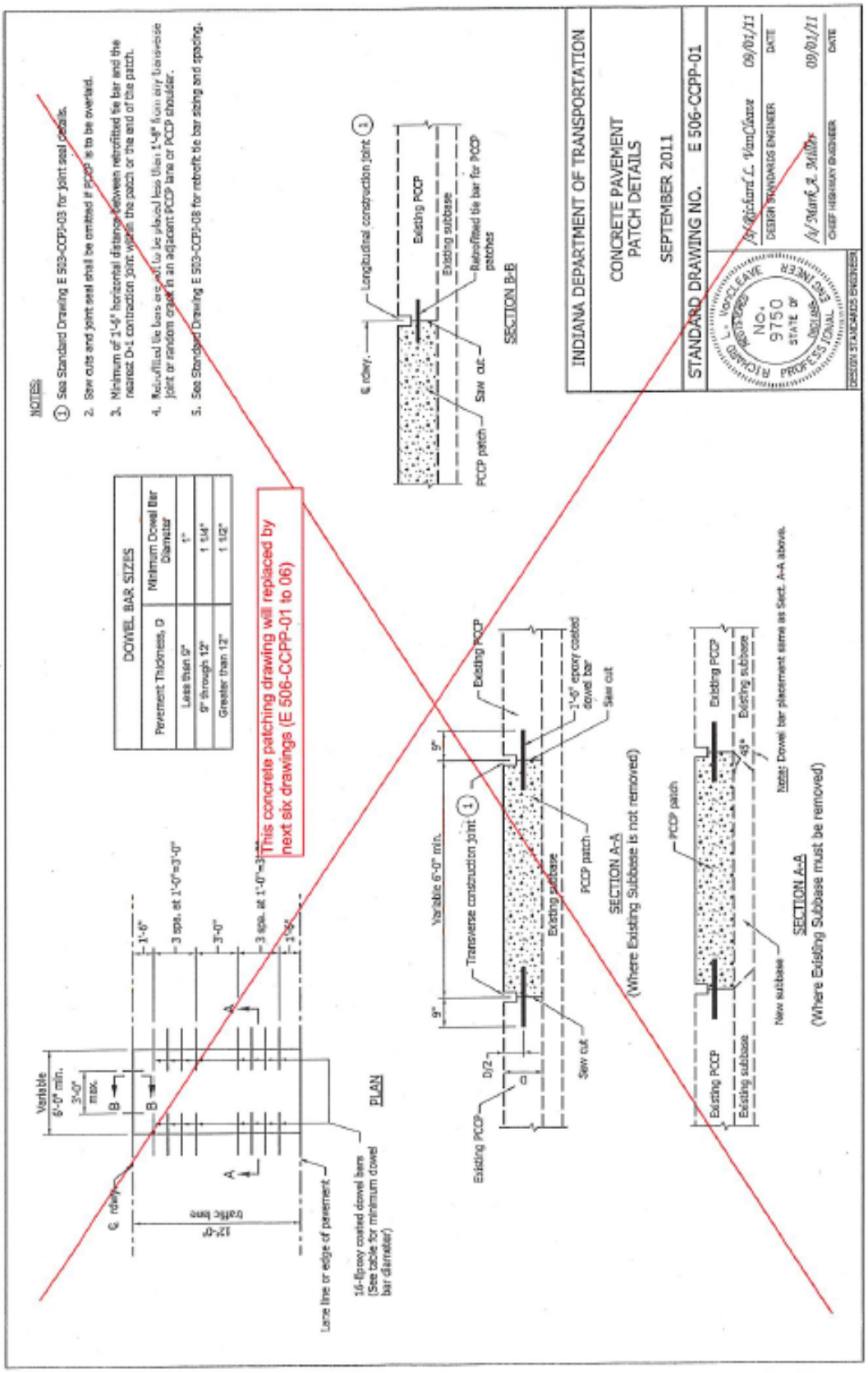
STANDARD DRAWING NO. E 503-CCPJ-04

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-01 CONCRETE PAVEMENT PATCH DETAILS (PROPOSED TO DELETE)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-01 CONCRETE PAVEMENT PATCHING DRAWING INDEX AND GENERAL NOTES (DRAFT)

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SHEET NO.	SUBJECT
1	Concrete Pavement Patching Drawing Index and General Notes
2	Joint Details and Joint Placement
3	Patch Lengths ≥ 6' ≤ 15'
4	Patch Lengths > 15' ≤ 60'
5	Patch Lengths > 60'
6	Dowel Bar Placement Tolerance

GENERAL NOTES:

1. Additional preparation of existing subgrade will be determined by the Engineer.
2. For existing PCCP thickness 10 in. or less, 1 in. dowel bars shall be used. For PCCP thickness 10 in. or more, 1.5 in. dowel bars shall be used.
3. Regardless of the diameter of the dowel bar, length shall be 1 ft 2 in. minimum and 1 ft 6 in. maximum.
4. Sawing and sealing of joints shall be omitted if PCCP is to be overlaid.
5. If existing JRCP is encountered, dowel bars may have to be relocated lower to avoid existing steel reinforcement. Minimum cover below dowel bar shall be 3 in. Location will be determined by the Engineer.
6. Maximum panel length for patches is 15 ft.
7. A patch shall not be tied to two consecutive existing panels.
8. See Standard Drawing E 503-CCPJ-02 for D-1 contraction joint and joint seal details.
9. See Standard Drawing E 503-CCPJ-04 for retrofit tie-bar details.

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT PATCHING
DRAWING INDEX AND GENERAL NOTES

SEPTEMBER 2020

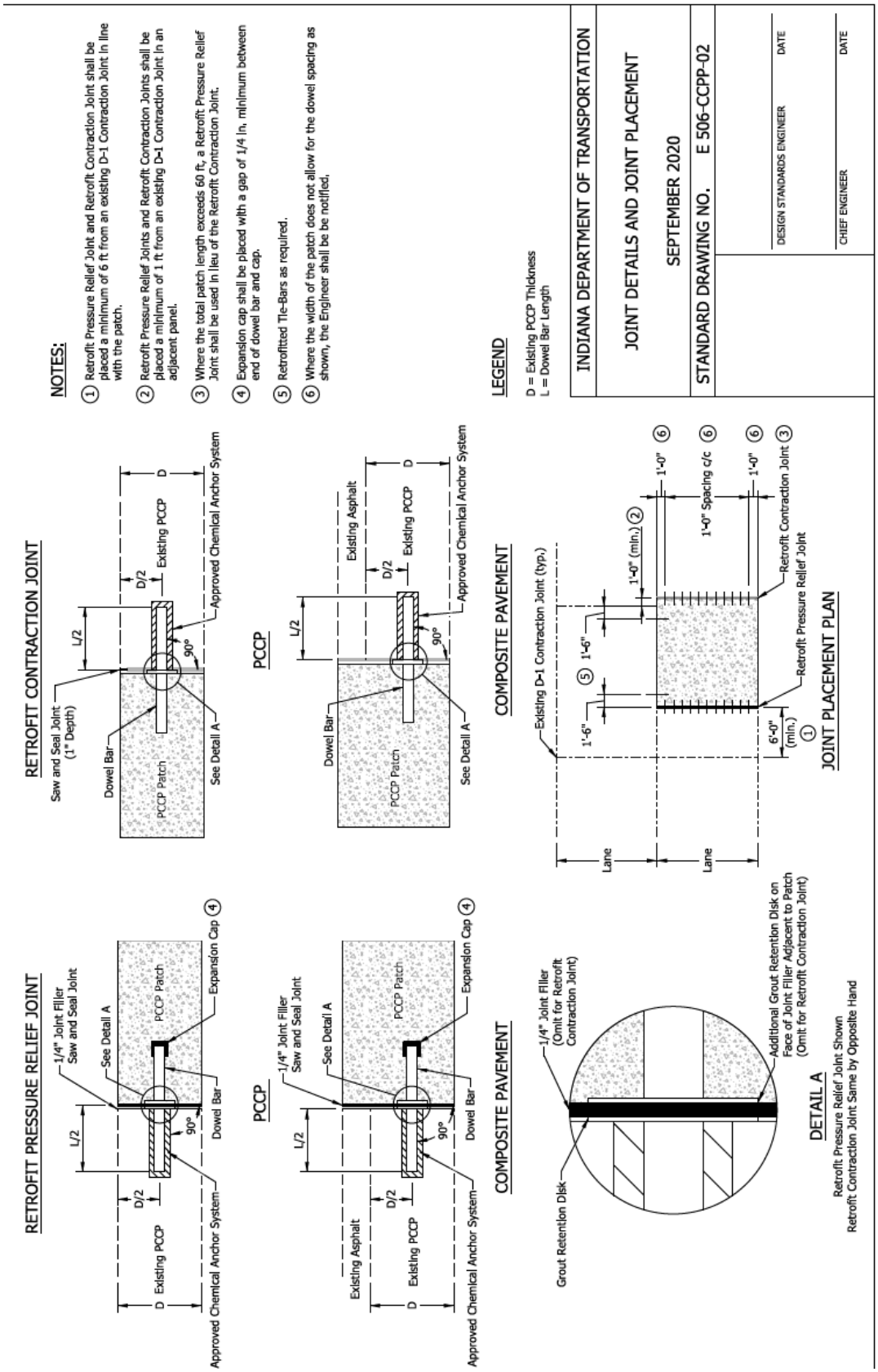
STANDARD DRAWING NO. E 506-CCPP-01

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

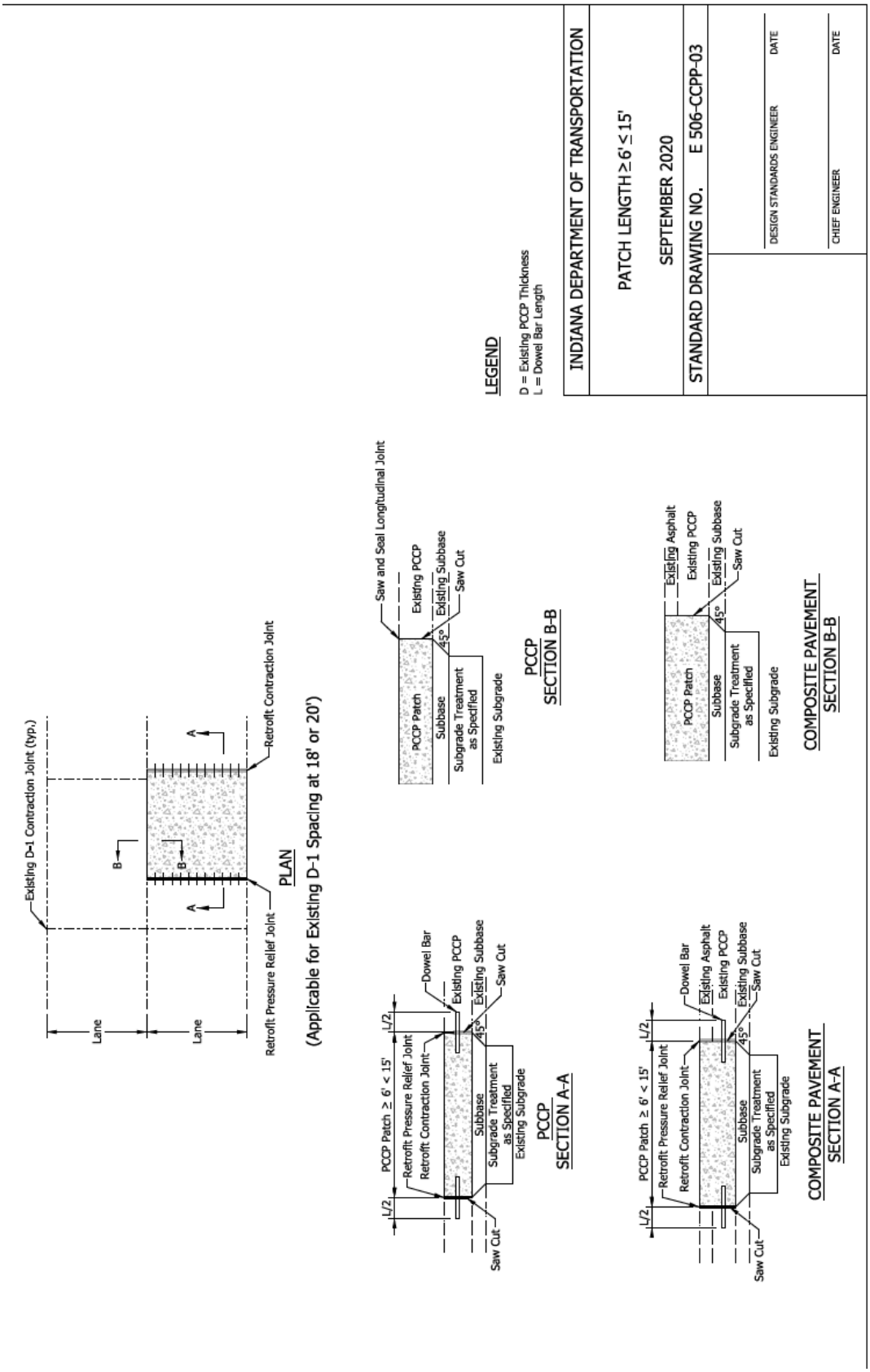
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-02 JOINT DETAILS AND JOINT PLACEMENT (DRAFT)



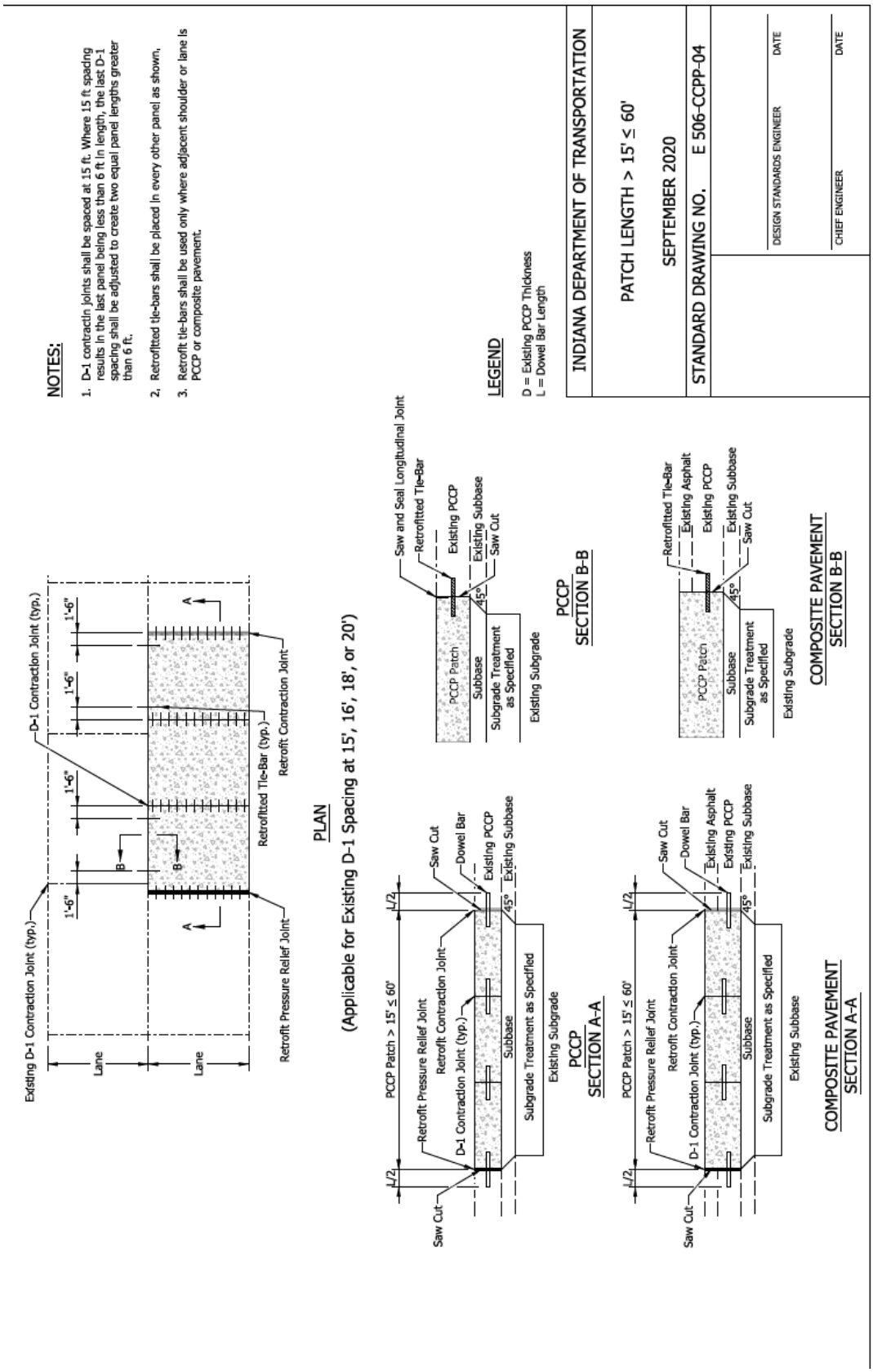
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-03 PATCH LENGTH ≥ 6' ≤ 15' (DRAFT)



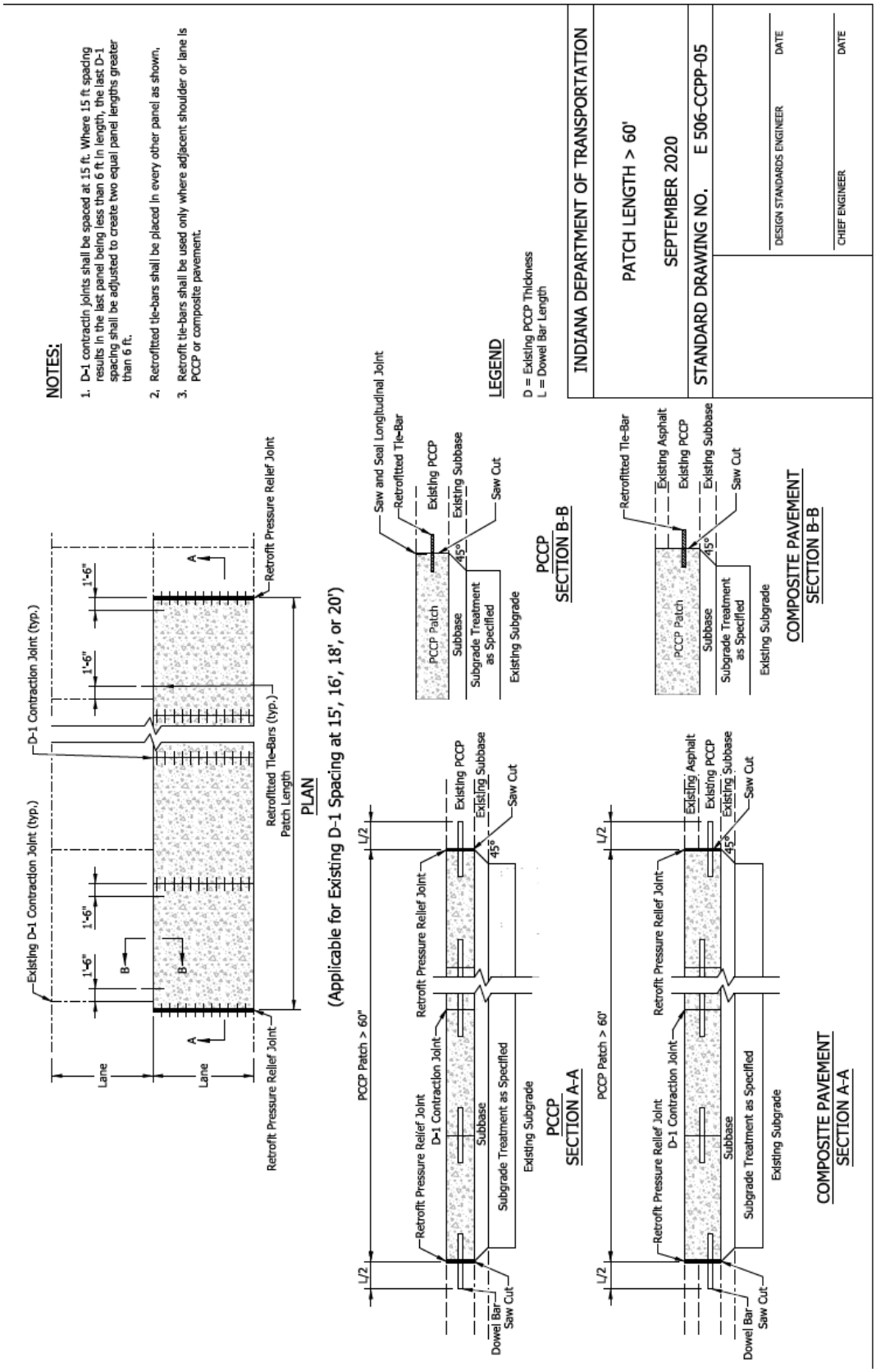
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-04 PATCH LENGTH > 15' ≤ 60' (DRAFT)



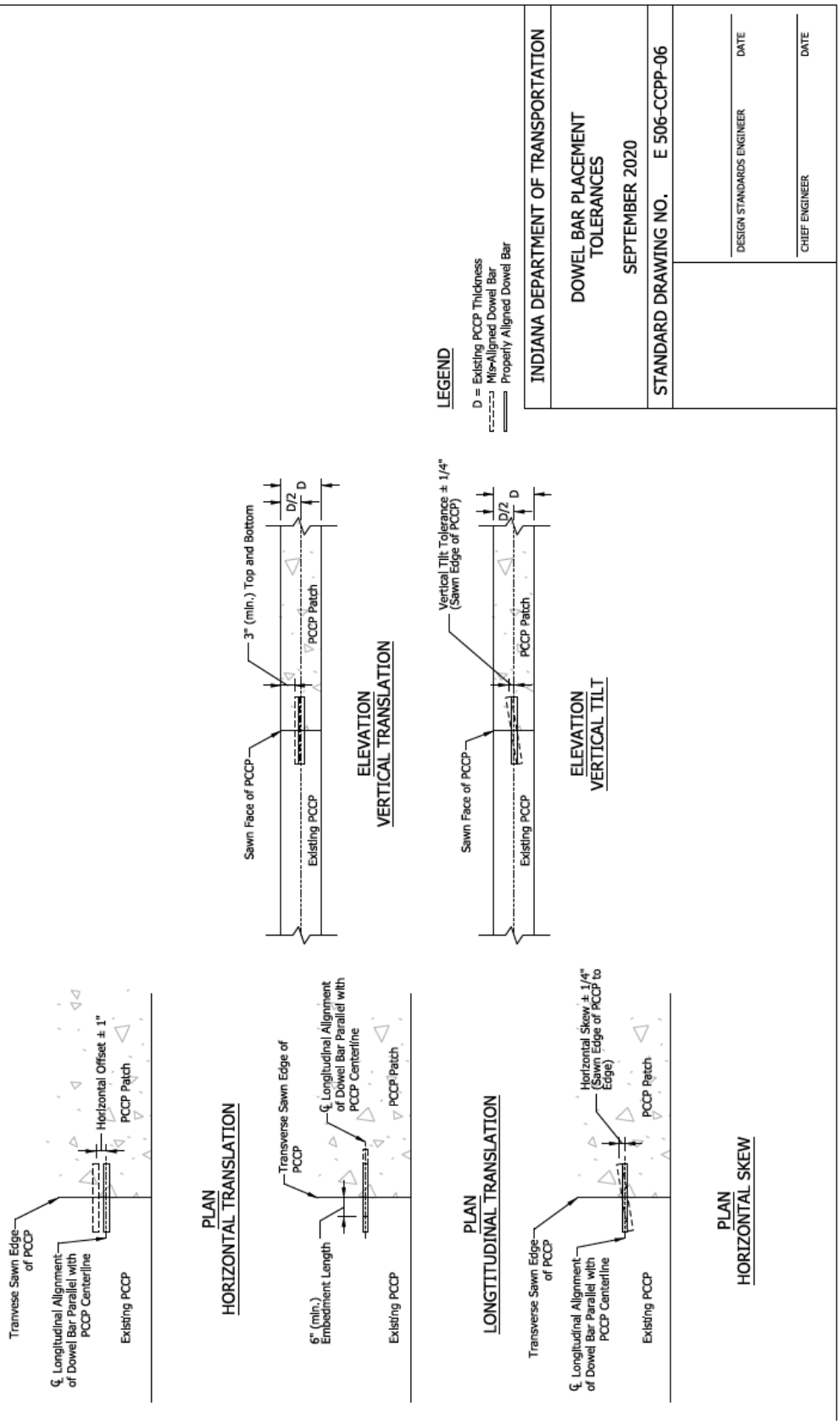
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-05 PATCH LENGTH > 60' (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

E 506-CCPP-06 DOWEL BAR PLACEMENT TOLERANCES (DRAFT)



COMMENTS AND ACTION

502.02 MATERIALS; 502.03 CONCRETE MIX DESIGN; 502.04 CONCRETE MIX CRITERIA; 502.05 JOB CONTROL; 502.18 OPENING TO TRAFFIC
503.02 MATERIALS; 503.03 JOINTS; 503.05 SEALING CRACKS AND JOINTS
504.04 CURING
SECTION 506 - PCCP PATCHING
805.08 CONTROLLER CABINET, SIGNAL SERVICE, AND DETECTOR HOUSING
901.01 HYDRAULIC CEMENT; 901.03 GROUND GRANULATED BLAST FURNACE SLAG USED AS A POZZOLAN
E 503-CCPJ SERIES
E 506-CCPP SERIES

DISCUSSION:

Motion: Second: Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 502 begin pg 405; 503 begin pg 416; 504 pg 423; 506 begin pg 426; 805.08 pg 858; 901.01 pg 909; 901.03 pg 914. Recurring Special Provision affected: 502-R-713 PORTLAND CEMENT CONCRETE PAVEMENT, PCCP 503-R-692 TERMINAL JOINTS Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	___ 2022 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.___) Effective: RSP Sunset Date: ___ Revise RSP (No.___) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. ___) Effective: ___ GIFE Update ___ SiteManager Update

AGENDA