INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue
Room N925 CM
Indianapolis, Indiana 46204

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

Eric Holcomb, Governor
Joe McGuinness, Commissioner

APPROVED MINUTES

January 19, 2017 Standards Committee Meeting

MEMORANDUM

February 23, 2017

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Minutes from the January 19, 2017 Standards Committee Meeting

The Standards Committee meeting was called to order by Mr. Pankow, sitting in for Mr. Miller, at 09:01 a.m. on January 19, 2017 in the N955 Bay Window Conference Room. The meeting was adjourned at 12:14 p.m.

The following committee members were in attendance:

Greg Pankow*, Chairman, State Construction Engineer
Michael Beuchel, Contract Administration Division
Dave Boruff, Traffic Engineering Division
Elizabeth Phillips, Bridges Division
Kurt Pelz**, Field Engineer, Construction Management
Kumar Dave, Pavement Engineering, Highway Design
Mike Prather***, Area Pavement Engineer, Highway Management
Michael Koch, Fort Wayne District Area Engineer
Peter Yao, Road Services
Rob Goldner, Manager, Construction Technical Support

* Proxy for *Mark Miller*
** Proxy for *Greg Pankow*
*** Proxy for *Matthew Beeson*

Also in attendance were the following:

Andrew Pangallo, INDOT
Emily Towles, INDOT
James, Boehm, INDOT
Jeremy Hunter, INDOT
Joel Salinas, INDOT
Kirk Frederick, INDOT
Lalit Garg, INDOT
Lynn Butcher, INDOT
Steve Duncan, INDOT
Steve Smart, County Materials
Scott Trammell, INDOT
Joe Bruno, INDOT
John Susong, Rinker Materials
Tom Duncan, FHWA
Prakash Patel, INDOT
Ellis Holder, INDOT
Ting Nahrwold, INDOT
Derrick Hauser, INDOT
Lana Podorvanova, INDOT
Dan Osborn, ICI
Tom Harris, INDOT

The following items were listed for consideration:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

1. Approval of the Minutes from the November 18, 2016 meeting

DISCUSSION: Mr. Pankow requested a motion to approve the minutes from the November 18, 2016 meeting.

Motion: Ms. Phillips
Second: Mr. Boruff
Ayes: 8
Nays: 0

ACTION: PASSED AS SUBMITTED

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

(No items were listed)

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

OLD BUSINESS

Item No. 01 11/18/16 (2016 SS) Mr. Boruff pg 7

Recurring Special Provision:

801-M-006	MAINTAINING TRAFFIC FOR MAINTENANCE OR RESURFACE WORK
801-T-XXX	*LANE CLOSURES*

ACTION: PASSED AS REVISED

NEW BUSINESS

Item No. 01 (2016 SS) Mr. Boruff pg 12

801.02	Materials
801.09	Drums
919.01(b)	Sheeting Material

ACTION: PASSED AS SUBMITTED

Item No. 02 (2016 SS)	Ms. Phillips	pg 16
Standard Drawings:		
720-CBCA-01	PIPE CATCH BASIN CASTING	
720-CBST-06	CATCH BASIN PIPE	
ACTION:	WITHDRAWN	

Item No. 03 (2016 SS)	Mr. Boruff	pg 24
801.02	Materials	
801.16	Temporary Traffic Control Zone	
ACTION:	WITHDRAWN	

Item No. 04 (2016 SS)	Mr. Boruff	pg 30
Standard Drawings:		
801-TCDT-01	RURAL DETOUR	
801-TCDT-02	URBAN DETOUR	
801-TCDT-03	~~DETOUR ROUTE MARKER ASSEMBLIES~~*URBAN DETOUR WITH ONE-WAY STREETS*	
801-TCDT-04	*DETOUR ROUTE MARKER ASSEMBLIES*	
ACTION:	PASSED AS REVISED	

Item No. 05 (2016 SS)	Mr. Boruff	pg 39
Recurring Special Provision:		
807-T-193	LUMINAIRES	
807-T-XXX	*HIGH PRESSURE SODIUM LUMINAIRES*	
ACTION:	PASSED AS REVISED	

Item No. 06 (2016 SS)	Mr. Boruff	pg 83
206.02(b)	Excavation for Foundation Of Traffic Support Structures	
206.11	Basis of Payment	
802.07	Installing Supports	
910.14(b)	Wide Flange Posts	
919.01(c)	Letters, Numbers, Symbols, and Accessories	
Standard Drawings:		
802-SNGP-01	~~SIGN PLACEMENT~~*WIDE-FLANGE SIGN SUPPORT AND PANEL SIGN DRAWING INDEX*	
802-SNGP-02	~~WIDE FLANGE SIGN SUPPORT BASE~~*WIDE FLANGE SIGN SUPPORT PLACEMENT AND POST SPACING*	
802-SNGP-03	~~SIGN PLAN DETAILS~~*WIDE-FLANGE SIGN SUPPORT BASE CONNECTION*	
802-SNGP-04	~~SIGN DETAILS~~*WIDE-FLANGE SIGN SUPPORT BASE CONNECTION DIMENSIONS*	
802-SNGP-05	~~SIGN DATA TABLES~~*WIDE-FLANGE SIGN SUPPORT FUSE/HINGE PLATE CONNECTION*	
802-SNGP-06	~~SIGN DATA TABLES~~*PANEL SIGN CONNECTION DETAILS*	
802-SNGP-07	~~WIDE FLANGE SIGN POST FOUNDATION DATA~~*PANEL SIGN POST CLIP*	

802-SNGP-08	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=8 FT*
802-SNGP-09	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=10 FT*
802-SNGP-10	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=12 FT*
~~802-SNGP-10A~~	~~PANEL SIGN POST CLIP~~
802-SNGP-11	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=14 FT*
802-SNGP-12	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=16 FT*
802-SNGP-13	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=18 FT*
802-SNGP-14	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=20 FT*
802-SNGP-15	*WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=22 FT*
802-SNGP-16	*WIDE-FLANGE SIGN SUPPORT FOUNDATION*
802 SNGS-01	~~ROUTE MARKER DETAILS~~*SIGNS DRAWING INDEX AND GENERAL NOTES*
802-SNGS-02	ROUTE MARKER DETAILS
802-SNGS-03	ROUTE MARKER DETAILS
802-SNGS-04	~~ROUTE MARKER DETAILS~~*SIGN REFLECTORIZATION SCHEDULE*
802-SNGS-05	SIGN REFLECTORIZATION SCHEDULE
802-SNGS-06	~~SIGN REFLECTORIZATION SCHEDULE~~*MISCELLANEOUS SIGN DETAILS*
802-SNGS-07	~~MISC. SIGN DETAILS~~*STEEL SIGN POST SELECTION TABLE*
802-SNGS-08	~~MISC. SIGN DETAILS GENERAL NOTES~~*STEEL SIGN POSTS BRACING FOR SIGNS GREATER THAN 90"*
802-SNGS-09	~~STEEL SIGN POSTS~~*STEEL SIGN POSTS ANCHOR BASE DETAILS*
802-SNGS-10	~~STEEL SIGN POSTS~~*SIGN IDENTIFICATION MARKING*
~~802-SNGS-11~~	~~SIGN IDENTIFICATION MARKING~~
~~802-SNGS-12~~	~~WIDE FLANGE POST SELECTION TABLE~~
~~802-SNGS-13~~	~~STEEL SIGN POSTS~~
805-SGFB-01	FLASHING BEACON WITH WARNING SIGN
805-SGFB-01A	FLASHING BEACON WITH WARNING SIGN DETAILS
805-SGFB-02	FLASHING BEACON WITH WARNING SIGN DETAILS
805-SGFB-03	~~PEDESTAL MOUNTED SOLAR POWERED SCHOOL SPEED LIMIT FLASHING BEACON ASSEMBLY~~*FLASHING BEACON WITH WARNING SIGN DETAILS*
805-SGFB-04	PEDESTAL MOUNTED SOLAR POWERED ~~WARNING SIGN~~*SCHOOL SPEED* FLASHING BEACON ASSEMBLY
805-SGFB-05	*PEDESTAL MOUNTED SOLAR POWERED WARNING SIGN FLASHING BEACON ASSEMBLY*

ACTION: PASSED AS REVISED

Item No. 07 (2016 SS)	Mr. Koch	pg 153
301.02	Materials	
301.03	Preparation of Subgrade	
301.05	Spreading	
301.06	Compaction	
301.09	Method of Measurement	
301.10	Basis of Payment	
302.05	Spreading	
303.03	Preparation of Subgrade	
303.05	Spreading	
303.06	Compacting	
610.05	Method of Measurement	

ACTION: WITHDRAWN

Item No. 08 (2016 SS)	Mr. Boruff	pg 161
920.01(b)4	Luminaire Ring Assembly	

Standard Drawings:

~~807-LTPD-01~~	~~LIGHTING HIGH MAST POLE POLE DATA SCHEDULE~~
~~807-LTPD-02~~	~~LIGHTING HIGH MAST POLE POLE DATA SCHEDULE~~
~~807-LTHI-01~~	~~HIGHWAY ILLUMINATION TOWER BOTTOM LATCH~~
~~807-LTHI-02~~	~~HIGHWAY ILLUMINATION TOWER BOTTOM LATCH~~
~~807-LTHI-03~~	~~HIGHWAY ILLUMINATION TOWER DETAILS - BOTTOM LATCH~~
~~807-LTHI-03A~~	~~HIGHWAY ILLUMINATION TOWER DETAILS - BOTTOM LATCH~~
~~807-LTHI-03B~~	~~HIGHWAY ILLUMINATION TOWER DETAILS - BOTTOM LATCH~~
~~807-LTHI-04~~	~~HIGHWAY ILLUMINATION TOWER BOTTOM LATCH~~
~~807-LTHI-05~~	~~HIGHWAY ILLUMINATION TOWER DETAILS BOTTOM LATCH~~
~~807-LTHI-06~~	~~TEMPORARY HIGHWAY ILLUMINATION DETAILS~~
~~807-LTHI-07~~	~~TEMPORARY HIGHWAY ILLUMINATION DETAILS~~
~~807-LTHM-01~~	~~HIGH MAST POLE~~
~~807-LTHM-02~~	~~HIGH MAST POLE PERFORATED ALUMINUM SKIRT~~
~~807-LTHM-03~~	~~LIGHTING HIGH MAST POLE CONCRETE PAD~~
~~807-LTHM-04~~	~~LIGHTING HIGH MAST POLE CONCRETE PAD WITH RETAINING WALL~~
807-LTHI-01	*HIGHWAY ILLUMINATION TOWER INDEX*
807-LTHI-02	*HIGHWAY ILLUMINATION TOWER CIRCUIT BREAKER AND GROUNDING*
807-LTHI-03	*HIGHWAY ILLUMINATION TOWER WIRING DETAILS*
807-LTHI-04	*HIGHWAY ILLUMINATION TOWER BOTTOM LATCH AND WINCH DETAILS*
807-LTHI-05	*HIGHWAY ILLUMINATION TOWER WINCH DRIVE DETAILS*
807-LTHI-06	*HIGHWAY ILLUMINATION TOWER POWER UNIT MOUNTING BRACKET DETAILS*

807-LTHI-07	*HIGHWAY ILLUMINATION TOWER HANDHOLE DETAILS*
807-LTHI-08	*HIGHWAY ILLUMINATION TOWER LUMINAIRE RING ASSEMBLY*
807-LTHI-09	*HIGHWAY ILLUMINATION TOWER ID PLATES*
807-LTHI-10	*HIGHWAY ILLUMINATION TOWER PERFORATED ALUMINUM SKIRT*
807-LTHI-11	*HIGHWAY ILLUMINATION TOWER CONCRETE PAD*
807-LTHI-12	*HIGHWAY ILLUMINATION TOWER CONCRETE PAD WITH RETAINING WALL*
807-LTHI-13	*HIGHWAY ILLUMINATION TOWER POLE DATA SCHEDULE*
807-LTHI-14	*HIGHWAY ILLUMINATION TOWER POLE DATA SCHEDULE*
807-THID-01	*TEMPORARY HIGHWAY ILLUMINATION DETAILS POLE AND LUMINAIRE*
807-THID-01	*TEMPORARY HIGHWAY ILLUMINATION WIRING*

ACTION: PASSED AS SUBMITTED

Item No. 09 (2016 SS) Mr. Beeson pg 196

503.03(b) Longitudinal Joint

ACTION: PASSED AS REVISED

Item No. 10 (2016 SS) Mr. Beeson pg 200

704.04 Placing Reinforcement and Concrete

ACTION: PASSED AS REVISED

Item No. 11 (2016 SS) Mr. Beeson pg 204

Recurring Special Provision:

411-R-635 WARRANTED MICRO-SURFACING

ACTION: PASSED AS SUBMITTED

cc: Committee Members
FHWA
ICI

Mr. Boruff
Date: 01/19/17
(OLD BUSINESS ITEM)

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Recurring special provision 801-M-006 is a short RSP about maintaining traffic for resurface or maintenance work and it is included in all resurface contracts. The RSP dates to the 1990's and could be brought into the Standard Specifications.

PROPOSED SOLUTION: Update RSP 801-M-006 and bring it into the 2018 Standard Specifications.

APPLICABLE STANDARD SPECIFICATIONS: 801.03

APPLICABLE STANDARD DRAWINGS: No

APPLICABLE DESIGN MANUAL SECTION: No

APPLICABLE SECTION OF GIFE: No

APPLICABLE RECURRING SPECIAL PROVISIONS: No

PAY ITEMS AFFECTED: No

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad hoc review by Dave Boruff, Mischa Kachler, and Joe Bruno

IMPACT ANALYSIS (attach report): Yes, attached.

Submitted By: Joe Bruno on behalf of Dave Boruff

Title: Traffic Administration Engineer

Organization: INDOT

Phone Number: (317) 234-7949

Date: 10/24/2016

Mr. Boruff
Date: 01/19/17
(OLD BUSINESS ITEM)

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS

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? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? No

Congestion/travel time? No

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? No

For construction workers? No

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? Yes

Design process? No

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? No

Can this item improve/reduce the number of potential change orders? No

Is this proposal needed for compliance with:

Federal or State regulations? No

AASHTO or other design code? No

Is this item editorial? Yes

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

REVISION TO RECURRING PROVISIONS AND STANDARD SPECIFICATIONS

801-M-006 MAINTAINING TRAFFIC FOR MAINTENANCE OR SURFACE WORK

Basis for Use: Required for all resurface or maintenance contracts with the Maintaining Traffic pay item. Proposed to incorporate into 2018 Standard Specifications.)

801-M-006 MAINTAINING TRAFFIC FOR MAINTENANCE OR RESURFACE WORK

(Revised 09-01-05)

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 150, INSERT AS FOLLOWS:

Traffic shall be maintained for maintenance activities or for HMA resurface work ~~as shown on the plans or as described herein~~. The Contractor shall have an extra set of construction signs and an extra flashing arrow sign on the project site so that the taper may be moved forward without suspending the operations and clearing the work area. Additional traffic control devices shall be furnished for situations determined to be more complex, for protection in hazardous areas, and when traffic conditions warrant. All non-fixed signs shall be removed at the completion of each day's operations. All fixed signs shall remain in place until all temporary pavement markings have been removed. All lanes shall be open to normal traffic during ~~hours other than~~ non-daylight hours. If a traffic lane is directed to remain closed during ~~hours other than~~ non-daylight hours, traffic shall be maintained on the remaining lanes as shown on the plans. ~~Work days will not be charged from the time of completion of other work until the markings have been removed~~.

REVISION TO RECURRING PROVISIONS AND STANDARD SPECIFICATIONS

801-T-XXX LANE CLOSURES (PROPOSED NEW, REVISED DRAFT)

801-T-216 LANE CLOSURES

(Adopted 01-19-17)

All lane closures on Interstate highways shall be in accordance with the INDOT Interstate Highway Congestion Policy. The following closure schedule has been approved for this contract. Lanes shall be closed or restricted only during these times.

Interstate Route: _____

Segment: from exit _____ to exit _____

Travel direction: _____

Number of lanes that may be restricted or closed:

Approved closure schedule:

Enter the days of the week and hours of the day when the lane closure or restriction is permitted (e.g. each weekend from 9 pm Friday through 6 am Monday).

Additional conditions:

Enter any additional conditions, including whether the lane or lanes may not be restricted at certian times during holiday weekends or special events (e.g. Indianapolis 500, Brickyard 400, etc.).

COMMENTS AND ACTION

801-M-006 MAINTAINING TRAFFIC FOR MAINTENANCE OR RESURFACE WORK
801-T-XXX LANE CLOSURES

DISCUSSION:
Mr. Boruff introduced and presented this item suggesting to accept the updated RSP 801-M-006 and incorporate it into the 2018 Standard Specifications. Mr. Boruff also proposed to implement the new Recurring Special Provision concerning lane closures.

Minor edits, as proposed by Mr. Pelz, are as shown.

Mr. Boruff revised his motion. The new RSP will be created and the old RSP will remain unchanged but revised, as shown here, be incorporated into the 2018 SS book.

Motion: Mr. Boruff Second: Mr. Koch Ayes: 9 Nays: 0 FHWA Approval: YES	Action: _____ Passed as Submitted _X_ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: 801.03 GENERAL REQUIREMENTS, pg 743 Recurring Special Provision affected: 801-M-006 MAINTAINING TRAFFIC FOR MAINTENANCE OR RESURFACE WORK Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_X_ 2018 Standard Specifications _____ Revise Pay Items List _X_ Create RSP (No.801-T-216) Effective July 01, 2017 Letting RSP Sunset Date: _X_ Delete RSP (No. 801-M-006) Effective _____ Letting RSP Sunset Date: 2018 SS book _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: INDOT's Standard Specifications allow only type III sheeting for construction drums- this is unnecessarily restrictive as higher level, flexible sheeting is now available that provides equal or better performance.

The Standards Specifications contain an obsolete reference on the effective date requiring fluorescent orange sheeting for construction warning signs.

PROPOSED SOLUTION: Revise the Standard Specifications to allow type III or higher. Eliminate obsolete effective date.

APPLICABLE STANDARD SPECIFICATIONS: 801.09 and 919.01; 801.02

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

PAY ITEMS AFFECTED: No

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Traffic Standards Subcommittee

IMPACT ANALYSIS (attach report): Yes, attached.

Submitted By: Dave Boruff

Title: Traffic Administration Engineer

Organization: INDOT

Phone Number: (317) 234-7975

Date: 12/13/2016

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

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? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? Potentially

Congestion/travel time? No

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? Potentially

For construction workers? Potentially

Will this proposal improve quality for:

Construction procedures/processes? No

Asset preservation? No

Design process? No

Will this change provide the contractor more flexibility? Yes

Will this proposal provide clarification for the Contractor and field personnel? No

Can this item improve/reduce the number of potential change orders? No

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: N/A

REVISION TO STANDARD SPECIFICATIONS

SECTION 801 - TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS
801.02 MATERIALS
801.09 DRUMS
SECTION 919 - TRAFFIC SIGNS
919.01(b) SHEETING MATERIAL

The Standard Specifications are revised as follows:

SECTION 801, BEGIN LINE 40, DELETE AND INSERT AS FOLLOWS:

The background of construction signs shall be reflective sheeting in accordance with 919.01(b)1. The sheeting type used for construction signs shall be the same for the entire project. Reflective sheeting for drums shall be in accordance with 919.01(b)1. ~~Effective on project lettings after July 1, 2006, t~~*T*he background for all construction signs shall be fluorescent orange reflective sheeting.

SECTION 801, BEGIN LINE 316, DELETE AS FOLLOWS:

~~Flexible encapsulated lens reflective sheeting shall be used to achieve reflectorization~~. Construction warning lights shall be used in accordance with 801.14 and as shown on the plans and shall be securely fastened to the mounting brackets. Signs shall not be mounted on drums.

SECTION 919, BEGIN LINE 79, INSERT AS FOLLOWS:

(b) Sheeting Material

Only sheeting materials from the Department's list of approved Sign Sheeting Materials shall be used. Type IV or higher sheeting shall be used for highway signs. The sheeting type for the sign copy and border shall be the same type or higher than the sheeting type used for the background. Sheeting materials will be placed and maintained on the Department's approved list in accordance with ITM 930.

1. Reflective Sheeting

Reflective sheeting used for signs, channelizing and delineation devices shall be in accordance with ASTM D 4956. Type V or higher reflective sheeting shall be used on delineators, except for barrier delineators which shall be Type III or higher. *Type III or higher reflective sheeting shall be used on drums.* Reboundable reflective sheeting shall be used on plastic drums, flexible delineator posts, and other flexible channelizers.

The reflective sheeting shall include an adhesive backing Class 1 or Class 2 in accordance with ASTM D 4956.

COMMENTS AND ACTION

801.02 MATERIALS
801.09 DRUMS
919.01(b) SHEETING MATERIAL

DISCUSSION:
This item was introduced and presented by Mr. Boruff who stated that the current Standard Specifications allow only type III sheeting for construction drums, which is unnecessarily restrictive since higher level, flexible sheeting is now available that provides equal or better performance. Mr. Boruff also mentioned that 801.02 contains an obsolete reference on the effective date requiring fluorescent orange sheeting for construction warning signs. Mr. Boruff therefore proposes to revise the Standard Specifications to allow type III or higher, and to eliminate the obsolete effective date.

This item passed as submitted without discussion.

Motion: Mr. Boruff Second: Mr. Koch Ayes: 9 Nays: 0 FHWA Approval: YES	Action: __X__ Passed as Submitted _____ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: 801 pg 742 and 919 pg 1014. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	__X__ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Pipe basin providers are no longer making catch basin pipes with bell sizes that fit the pipe catch basin castings described in standard drawing series E720-CBCA-01.

PROPOSED SOLUTION: Updated standard drawings E720-CBST-06 and E720-CBCA-06 to match industry standard casting sizes.

APPLICABLE STANDARD SPECIFICATIONS: N/A

APPLICABLE STANDARD DRAWINGS: E720-CBST-06 and E720-CBCA

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: None

IMPACT ANALYSIS (attach report):

Submitted By: Elizabeth Phillips

Title: Standards and Policy Supervisor

Organization: INDOT

Phone Number:

Date: 12/19/16

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

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? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? No

Congestion/travel time? No

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? No

For construction workers? No

Will this proposal improve quality for:

Construction procedures/processes? No

Asset preservation? No

Design process? No

Will this change provide the contractor more flexibility? No

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

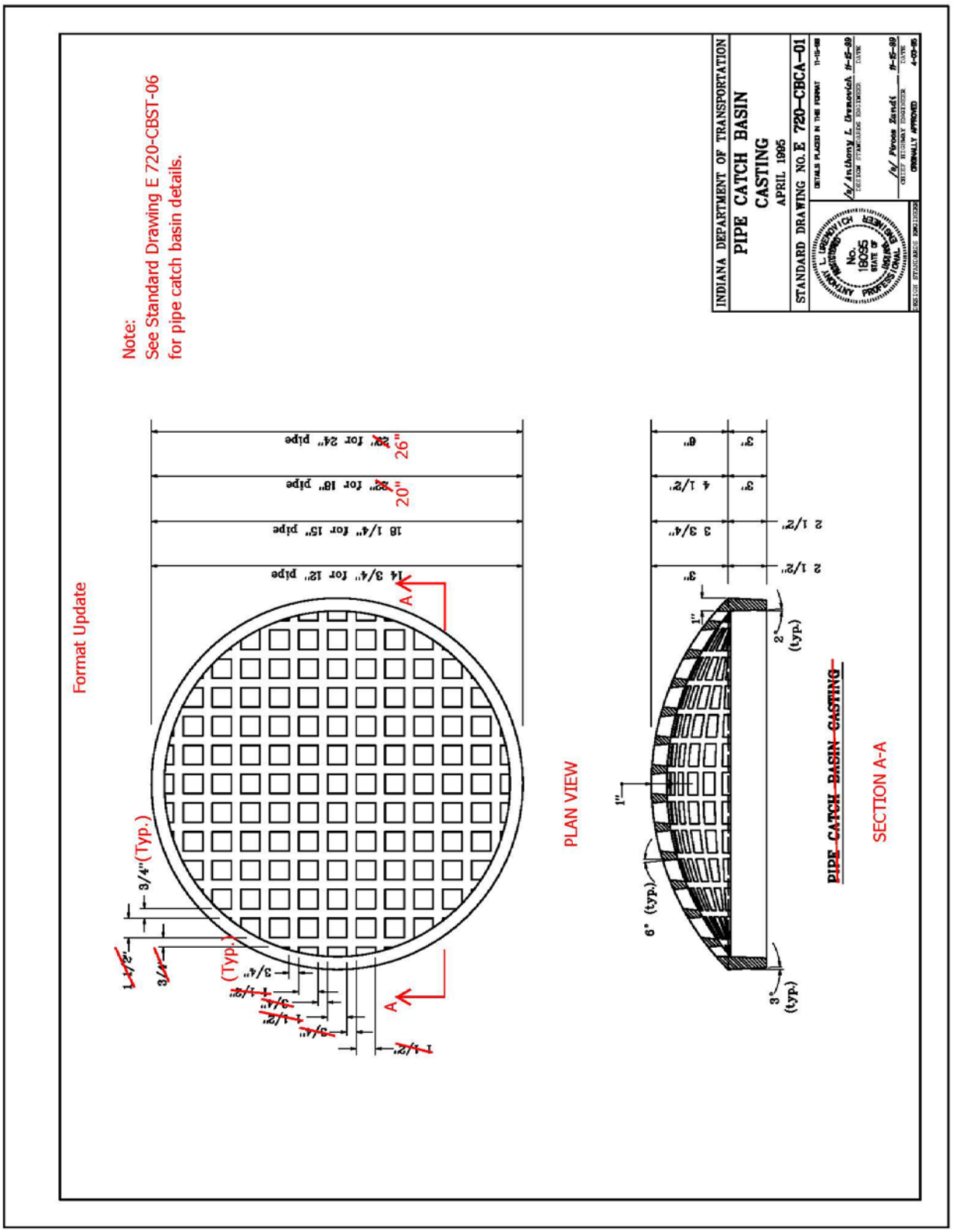
AASHTO or other design code? Yes

Is this item editorial? No

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

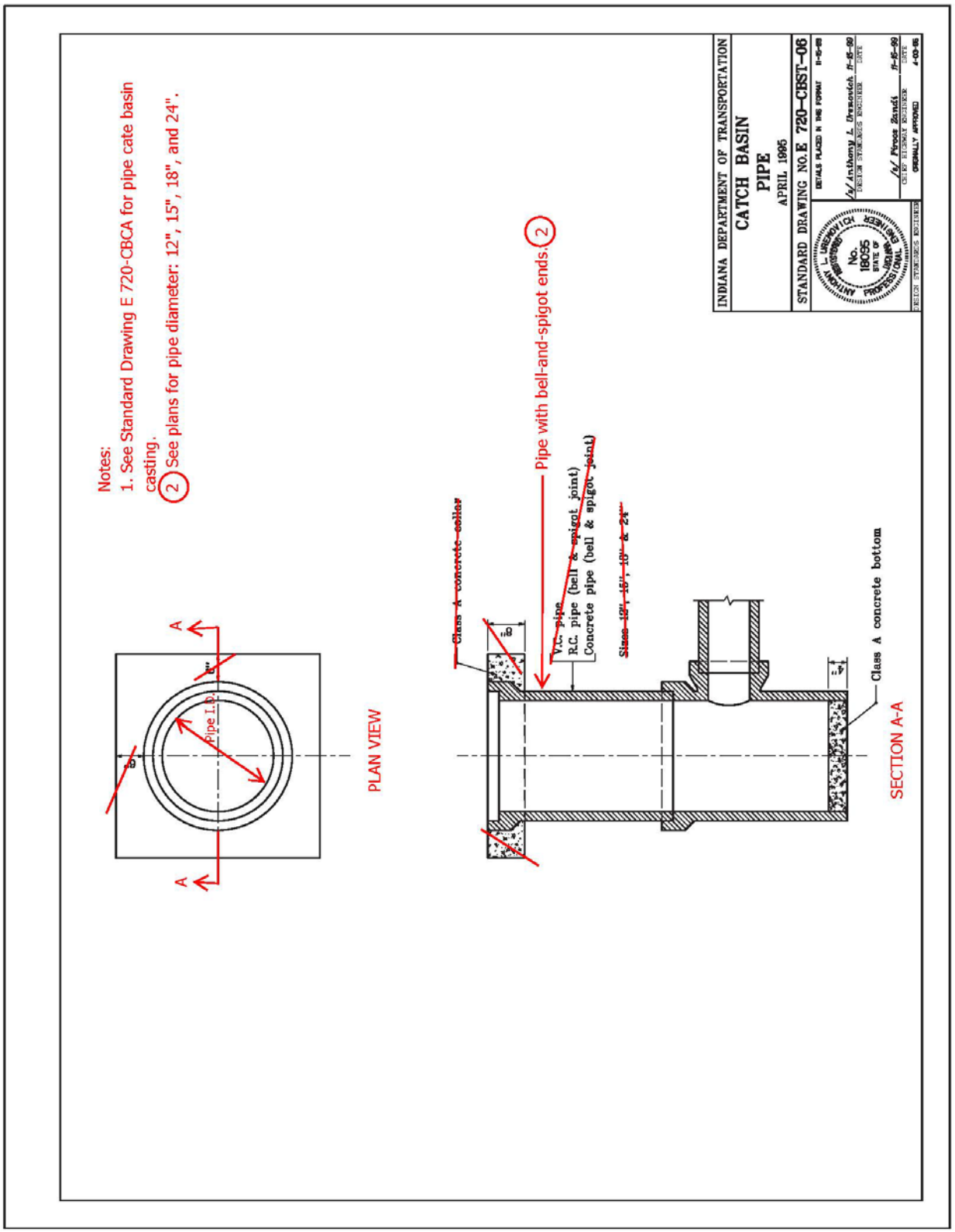
REVISION TO STANDARD DRAWINGS

720-CBCA-01 PIPE CATCH BASIN CASTING (WITH MARKUPS)



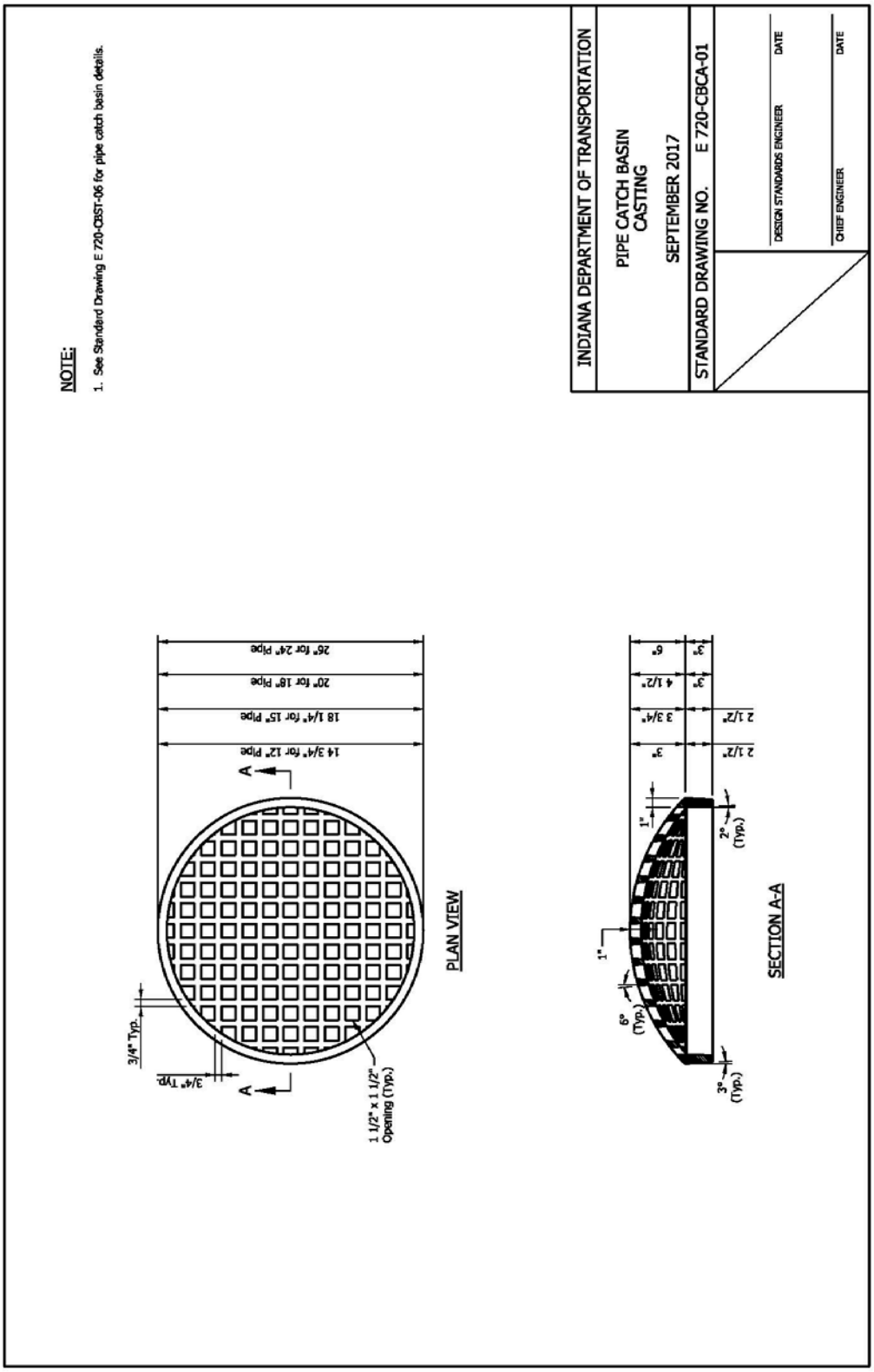
REVISION TO STANDARD DRAWINGS

720-CBST-06 CATCH BASIN PIPE (WITH MARKUPS)



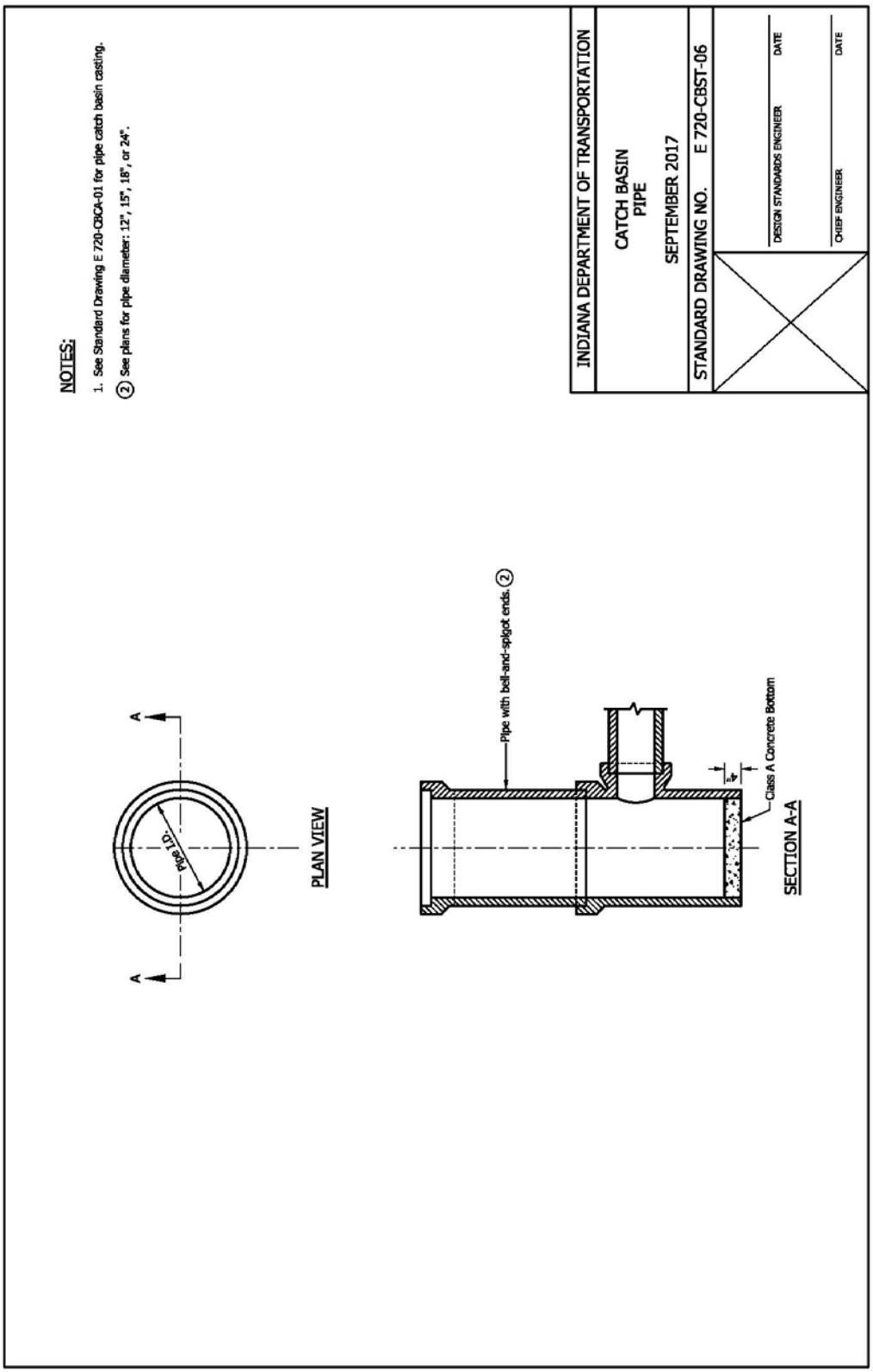
REVISION TO STANDARD DRAWINGS

720-CBCA-01 PIPE CATCH BASIN CASTING (DRAFT)



REVISION TO STANDARD DRAWINGS

720-CBST-06 CATCH BASIN PIPE (DRAFT)



COMMENTS AND ACTION

720-CBCA-01 PIPE CATCH BASIN CASTING
720-CBST-06 CATCH BASIN PIPE

DISCUSSION:
This item was introduced and presented by Ms. Phillips who stated that pipe basin providers are no longer making catch basin pipes with bell sizes that fit the pipe catch basin castings described in standard drawing series E720-CBCA-01.

Ms. Phillips withdrew this item regarding industry retooling concerns, stating that this item may be re-introduced at a future date once those concerns have been addressed.

Motion: Ms. Phillips Second: Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised __X__ Withdrawn
Standard Specifications Sections referenced and/or affected: NONE Recurring Special Provision affected: NONE Standard Drawing affected: 720-CBCA-01 PIPE CATCH BASIN CASTING 720-CBST-06 CATCH BASIN PIPE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: __X__ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: RSP 801-T-164 for temporary roll-up signs has been used successfully on mowing and herbicide contracts since 2007. Roll-up signs could be used on other contracts with short duration work that does not affect the travel lanes. Additionally, for roadways with on-street parking, clarification is needed in §801.16 of the Standard Specifications that the mounting height for signs mounted on stands shall be greater than 1.5 ft.

PROPOSED SOLUTION: Bring RSP 801-T-164 into the 2018 Standard Specifications as a subtype of temporary traffic control sign in §801.16. Clarify that the mounting height for signs on stands shall be 7 ft on a highway with on-street parking and move a paragraph about temporary traffic control signs from §801.04 to §801.16

APPLICABLE STANDARD SPECIFICATIONS: 801.02, 801.04, and 801.16

APPLICABLE STANDARD DRAWINGS: No

APPLICABLE DESIGN MANUAL SECTION: No

APPLICABLE SECTION OF GIFE: No

APPLICABLE RECURRING SPECIAL PROVISIONS: 801-T-164

PAY ITEMS AFFECTED: No

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Yes, Traffic Standards Subcommittee

IMPACT ANALYSIS (attach report): Yes, attached.

Submitted By: Joe Bruno on behalf of Dave Boruff

Title: Traffic Administration Engineer

Organization: INDOT

Phone Number: (317) 234-7949

Date: 11/21/2016

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

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? No

Will this proposal improve:

Construction costs? Yes

Construction time? Yes

Customer satisfaction? No

Congestion/travel time? No

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? No

For construction workers? No

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? No

Design process? No

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? No

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: N/A

REVISION TO STANDARD SPECIFICATIONS

SECTION 801 - TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS
801.02 MATERIALS
801.16 TEMPORARY TRAFFIC CONTROL ZONE

The Standard Specifications are revised as follows:

SECTION 801, BEGIN LINE 35, INSERT AS FOLLOWS:

Non-ground mounted temporary traffic sign backing material and supports shall both be certified to meet NCHRP 350 crash test standards and approved for use by the FHWA. A copy of the FHWA acceptance letter shall be provided to the Engineer upon request. Roll-up materials will not be allowed *except as specified in 801.16.* [switched order of the last two sentences]

SECTION 801, BEGIN LINE 190, DELETE AS FOLLOWS:

~~Temporary mounted construction signs shall not be used for operations which affect traffic lanes or paved shoulders. Temporary mounted construction signs shall not be used or left in place during nighttime hours.~~ [revised paragraph has been moved to 801.16]

SECTION 801, BEGIN LINE 795, INSERT AS FOLLOWS:

801.16 Temporary Traffic Control Zone

A temporary traffic control zone is a work zone with frequently changing operation, a maximum duration of seven calendar days; mobile operation; or a temporary traffic stoppage.

Daytime lane closures on two-lane two-way roads shall be limited in length to a maximum of 1 mi or the length of a half day's operation, whichever is less, or as shown on an approved alternate traffic control plan.

(a) ~~Temporary Traffic Control~~ *Portable Supports for Construction* Signs

~~Temporary traffic control signs, TTCS, are construction signs in a temporary traffic control zone.~~

~~Trailer mounted TTCS shall be positioned such that the tongue and the method of pinning shall minimize the hazard to motorists. Wheel chocks other than sandbags shall not be used. During non-working hours, trailers with signs that do not apply to existing conditions shall be stored in accordance with 107.08.~~ [paragraph covered in 801.04]

~~TTCS shall not be mounted on barricades or other non-approved supports.~~ *Portable supports may be used for the construction signs in a temporary traffic control zone. The bottom of a construction sign mounted on a portable support shall be at least 12 in. above the traveled way.* ~~When the vertical mounting height for TTCS is between 12 in. and 18 in. to the bottom of the sign, tripod supports may be used. When allowed for use, the s~~Signs on tripod supports shall be installed so that the angle from vertical does not exceed 30°.

~~*TTCS shall not be used for operations*~~ *Construction signs for nighttime work, or for operations which affect traffic lanes, shall be mounted on portable supports that have a minimum sign mounting height of 5 ft above the traveled way.* ~~*TTCS shall not be used or left in place during nighttime hours.*~~

REVISION TO STANDARD SPECIFICATIONS

SECTION 801 - TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS
801.02 MATERIALS
801.16 TEMPORARY TRAFFIC CONTROL ZONE

On roadways where on-street parking is allowed, ~~TTCS~~construction signs on portable supports shall have a minimum sign mounting height of 7 ft above the traveled way.

Roll-up materials will only be allowed for mobile, short duration, or short-term stationary work which will not exceed one daytime period. Roll-up materials shall be selected from the Department's List of approved reflective sheeting. ~~If predicted wind speeds are greater than 20 mph, roll-up TTCS~~ Sign supports shall be ballasted in accordance with the manufacturer's recommendations.

BACKUP 01

RSP 801-T-164 TEMPORARY ROLL-UP SIGNS (PROPOSED TO INCORPORATE INTO 2018 SS)

(Note: Basis for Use: "Required for all mowing and herbicide contracts only.")

801-T-164 TEMPORARY ROLL-UP SIGNS

(Revised 06-08-15)

The Standard Specifications are revised as follows:

SECTION 801, BEGIN LINE 35, DELETE AND INSERT AS FOLLOWS:

Non-ground mounted temporary traffic sign backing material and supports shall both be certified to meet NCHRP 350 crash test standards and approved for use by the FHWA. Roll-up materials will ~~not be allowed~~*only be allowed for temporary use*. A copy of the FHWA acceptance letter shall be provided to the Engineer upon request.

COMMENTS AND ACTION

801.02 MATERIALS
801.16 TEMPORARY TRAFFIC CONTROL ZONE

DISCUSSION:
Mr. Boruff introduced and presented this item stating that RSP 801-T-164, for temporary roll-up signs, has been used successfully on mowing and herbicide contracts since 2007. Mr. Boruff added that roll-up signs could be used on other contracts with short duration work that does not affect the travel lanes. Additionally, for roadways with on-street parking, clarification is needed in 801.16 stating that the mounting height for signs mounted on stands shall be greater than 1.5 ft.

Mr. Boruff proposed to bring RSP 801-T-164 into the 2018 Standard Specifications as a subtype of temporary traffic control sign in 801.16. Mr. Boruff also proposed to add language to clarify that the mounting height for signs on stands shall be 7 ft on a highway with on-street parking and move the paragraph about temporary traffic control signs from 801.04 to 801.16. Revisions to this language are as shown highlighted above, as are as explained by Mr. Bruno.

The language concerning ballasts was revised as shown following a brief discussion by all.

Mr. Boruff withdrew this item at this time pending further review.

Mr. Pankow suggested bringing this item back in February pending further review of the language with regard to plan sheet language.

Motion: Mr. Boruff Second: Mr. Koch Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised __X__ Withdrawn
Standard Specifications Sections referenced and/or affected: 801.02 pg 742 and 801.16 pg 759. Recurring Special Provision affected: 801-T-164 TEMPORARY ROLL-UP SIGNS Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED:. The existing detour standard drawing series does not show all the signs that are needed for rural and urban detours (e.g. “Road Closed Ahead”, “End Detour”, etc.) nor are the barricades shown properly on some of the side street approaches. Also the current drawing for urban detours details a one-way pair scenario that could be simplified where two way traffic is maintained on the detour route.

PROPOSED SOLUTION: Update the 801-TCDT series to show the end detour assembly and the set-up for cross streets on a two-way street urban detour.

APPLICABLE STANDARD SPECIFICATIONS: 801

APPLICABLE STANDARD DRAWINGS: 801-TCDT-01, 801-TCDT-02, 801-TCDT-03

APPLICABLE DESIGN MANUAL SECTION: §82-1.03

APPLICABLE SECTION OF GIFE: §2.11, §25.4, and §25.5

APPLICABLE RECURRING SPECIAL PROVISIONS: No

PAY ITEMS AFFECTED: No

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Yes, Traffic Standards Subcommittee

IMPACT ANALYSIS (attach report): Yes, attached.

Submitted By: Joe Bruno on behalf of Dave Boruff

Title: Traffic Administration Engineer

Organization: INDOT

Phone Number: (317) 234-7949

Date: 12/27/2016

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

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? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? Yes

Congestion/travel time? Yes

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? Yes

For construction workers? No

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? No

Design process? Yes

Will this change provide the contractor more flexibility? No

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

Can this item improve/reduce the number of potential change orders? No

Is this proposal needed for compliance with:

Federal or State regulations? Yes

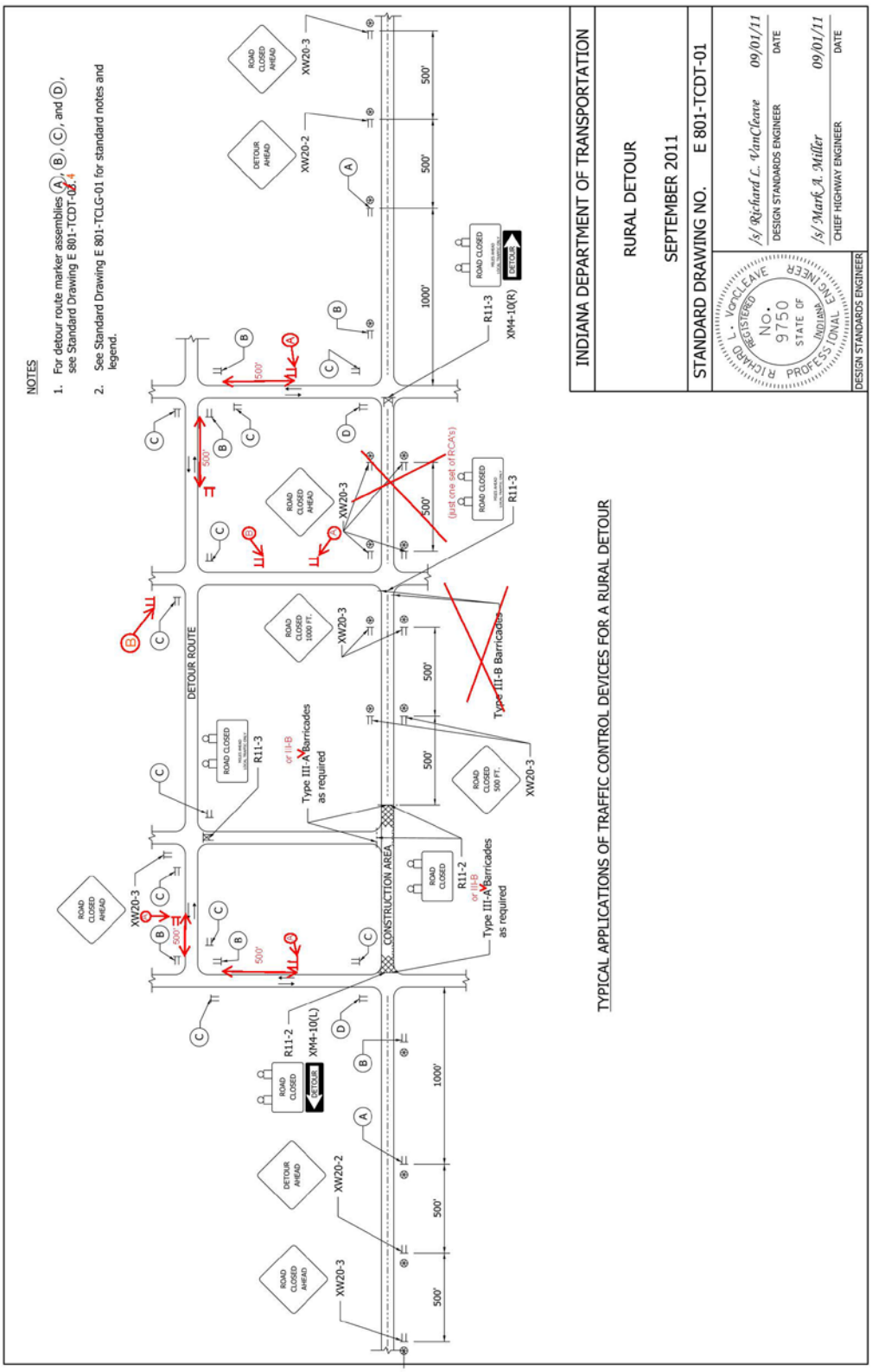
AASHTO or other design code? No

Is this item editorial? No

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

REVISION TO STANDARD DRAWINGS

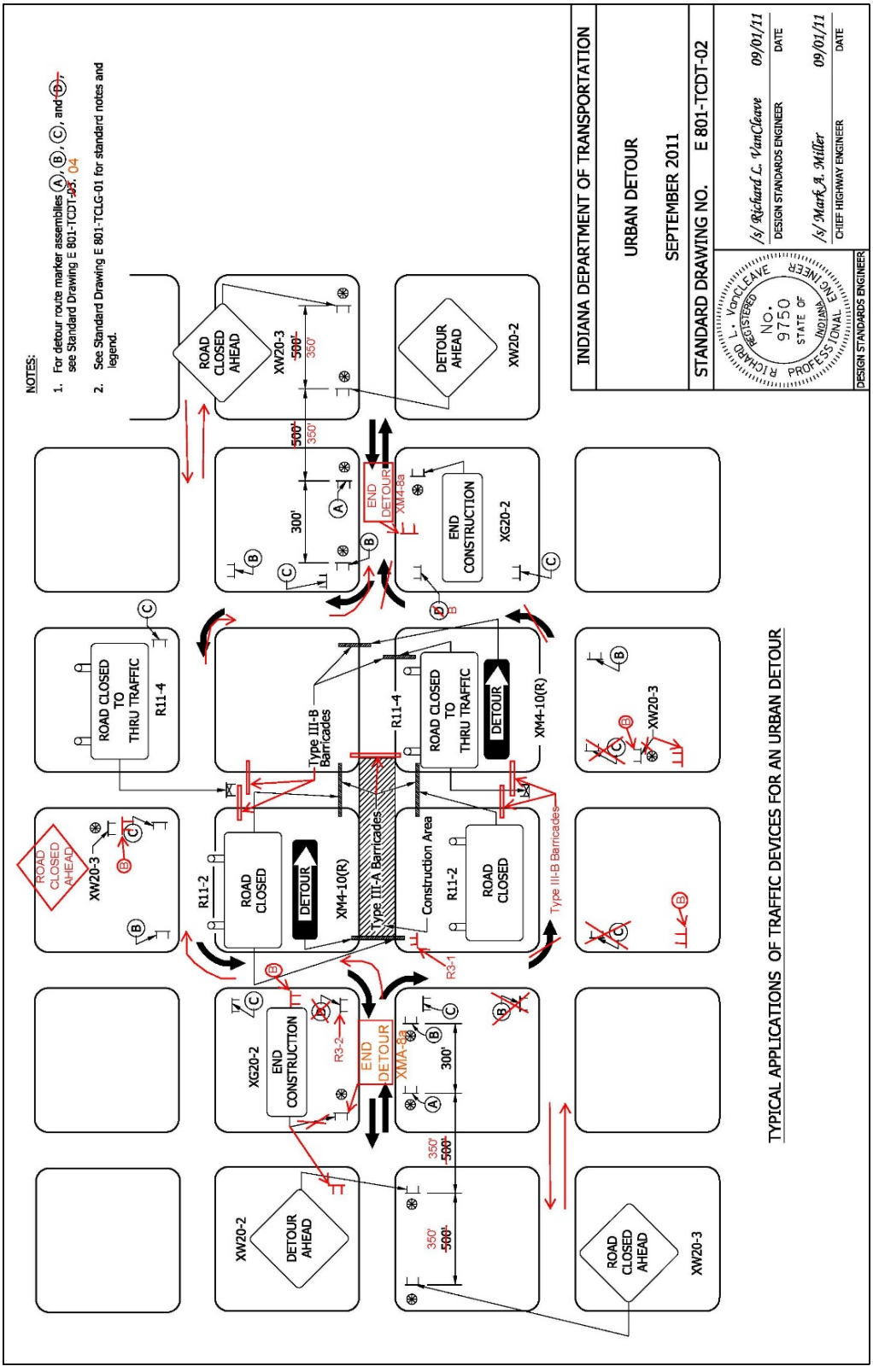
801-TCDT-01 RURAL DETOUR (WITH MARKUPS)



TYPICAL APPLICATIONS OF TRAFFIC CONTROL DEVICES FOR A RURAL DETOUR

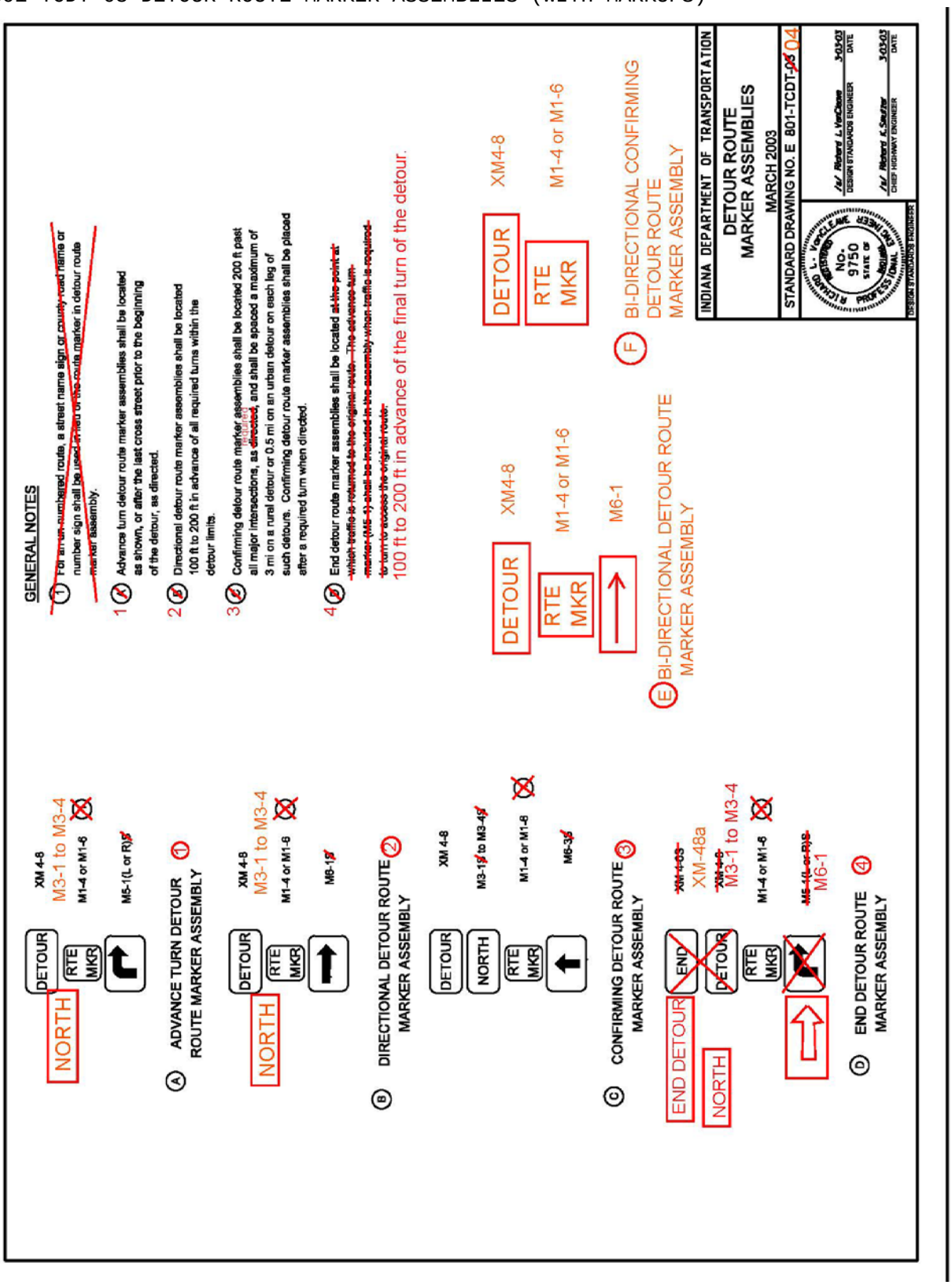
REVISION TO STANDARD DRAWINGS

801-TCDT-02 URBAN DETOUR (WITH MARKUPS)



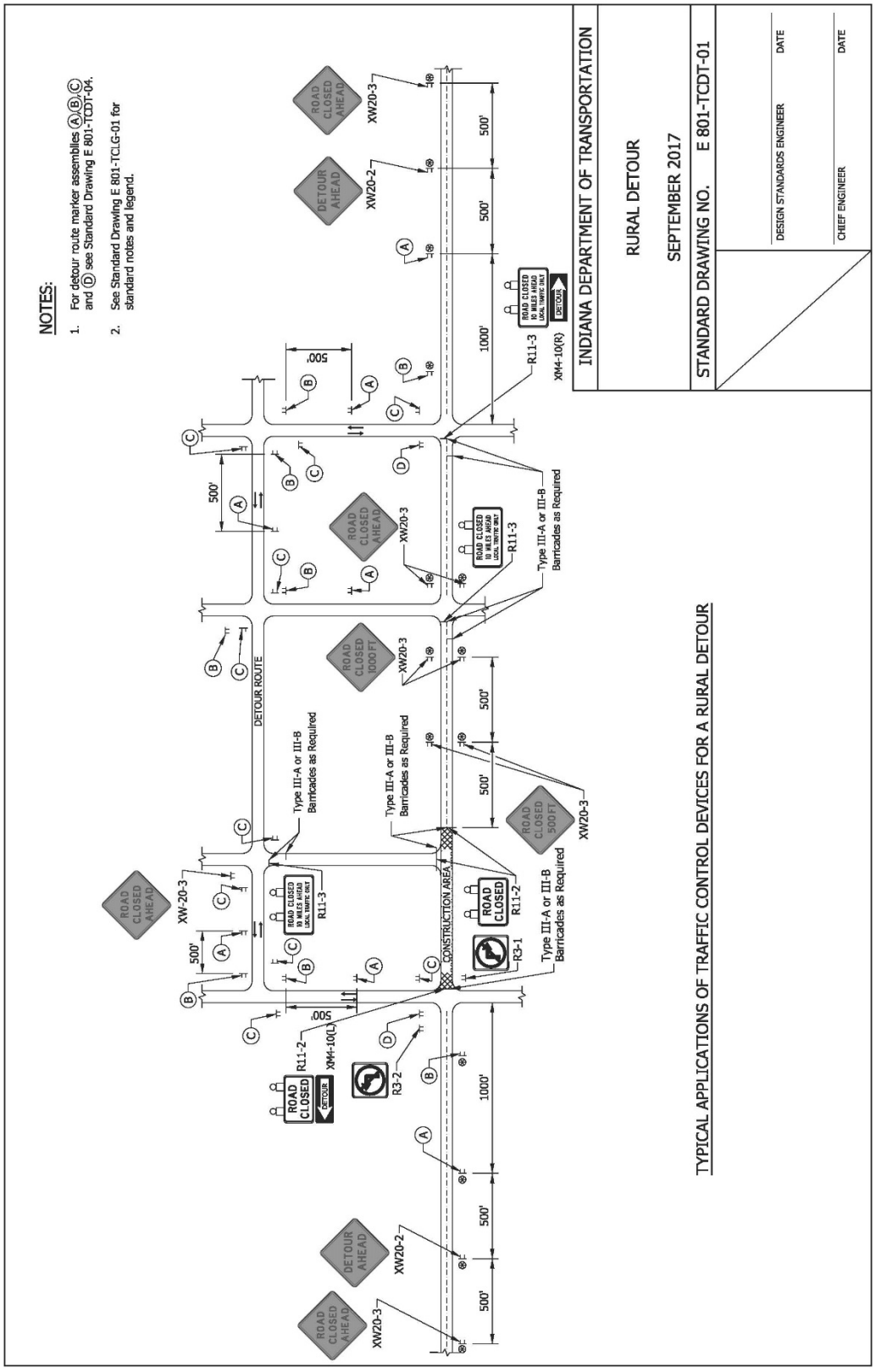
REVISION TO STANDARD DRAWINGS

801-TCDT-03 DETOUR ROUTE MARKER ASSEMBLIES (WITH MARKUPS)



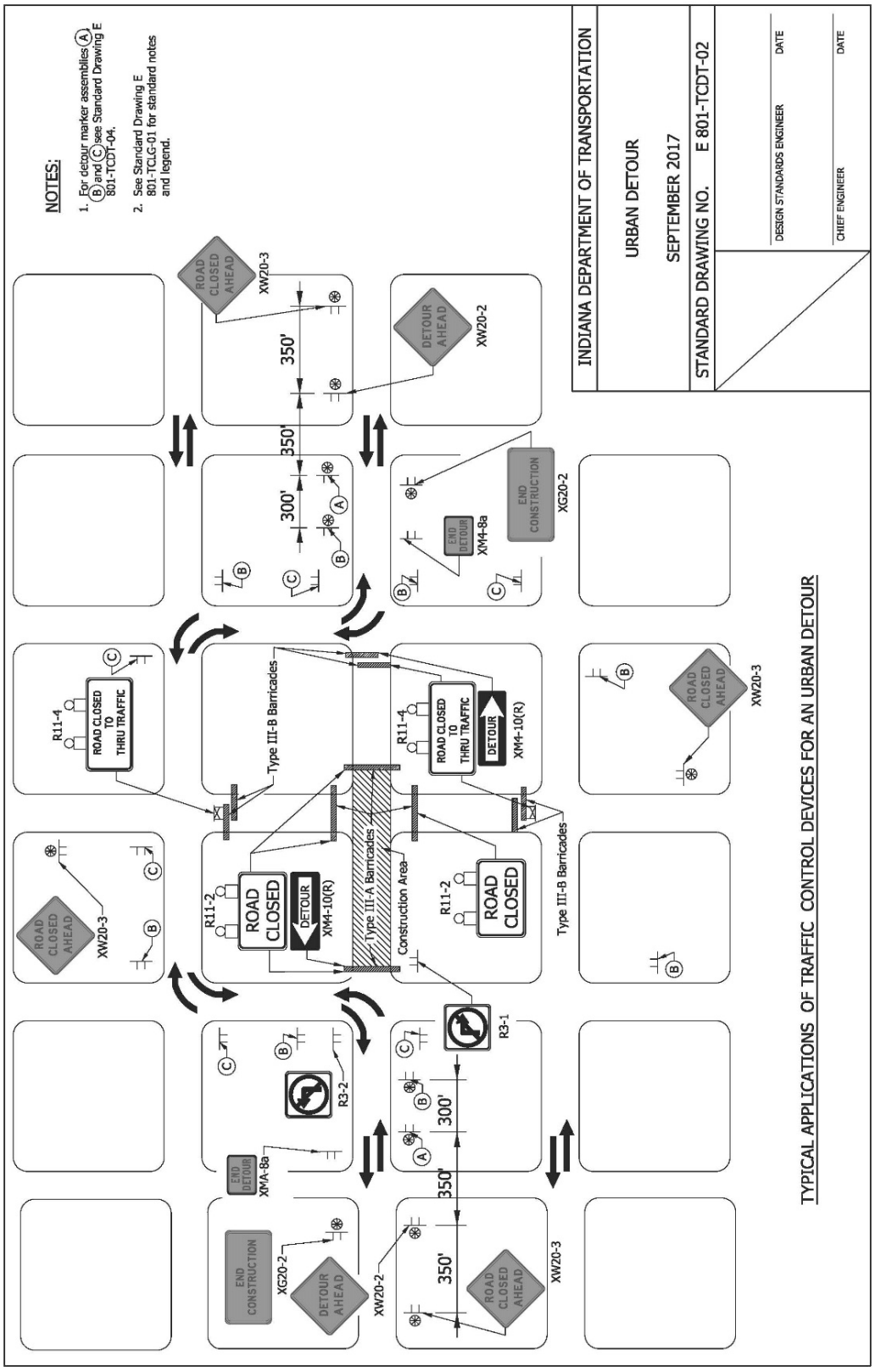
REVISION TO STANDARD DRAWINGS

801-TCDT-01 RURAL DETOUR (REVISED DRAFT)



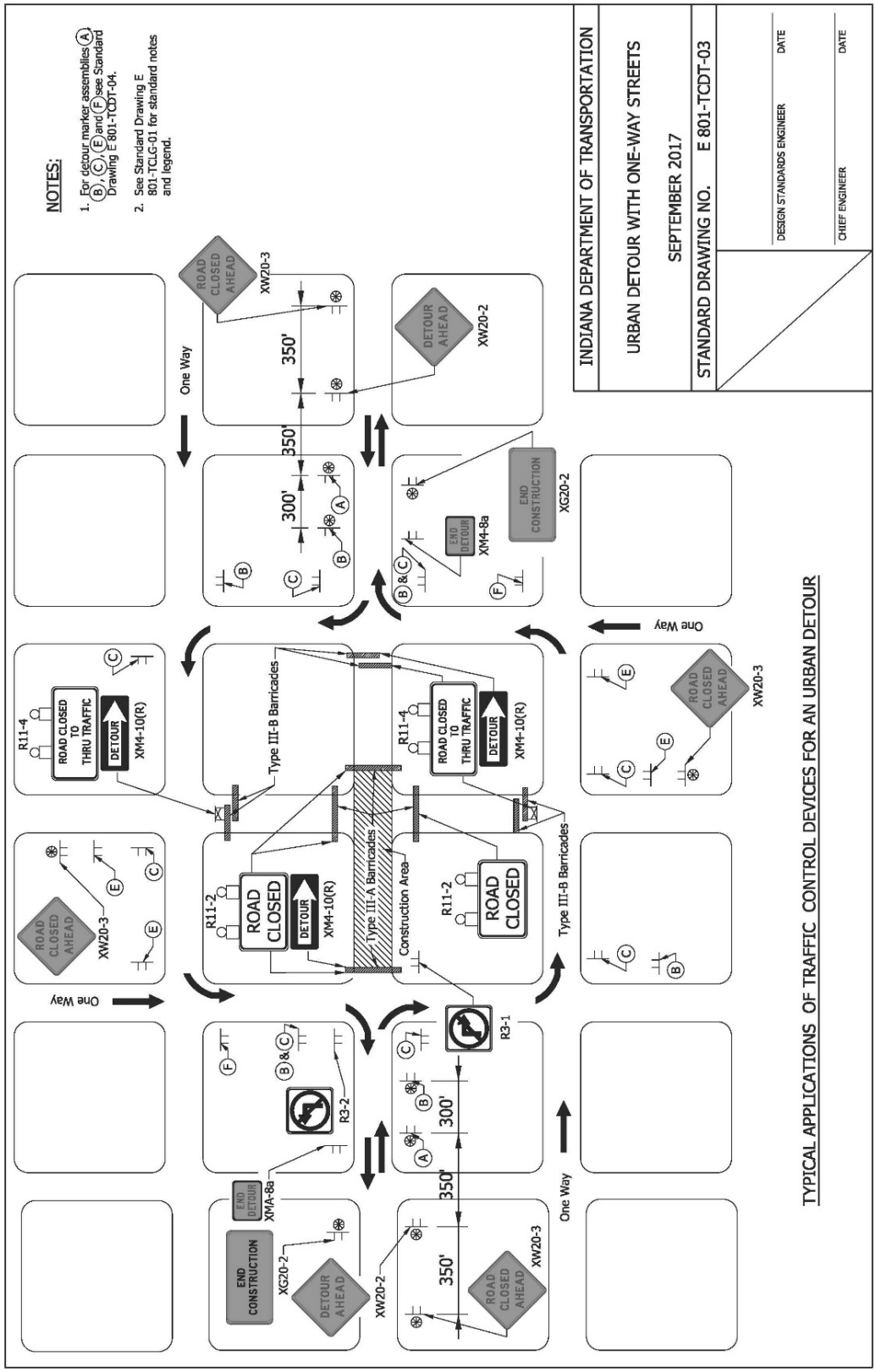
REVISION TO STANDARD DRAWINGS

801-TCDT-02 URBAN DETOUR (DRAFT)



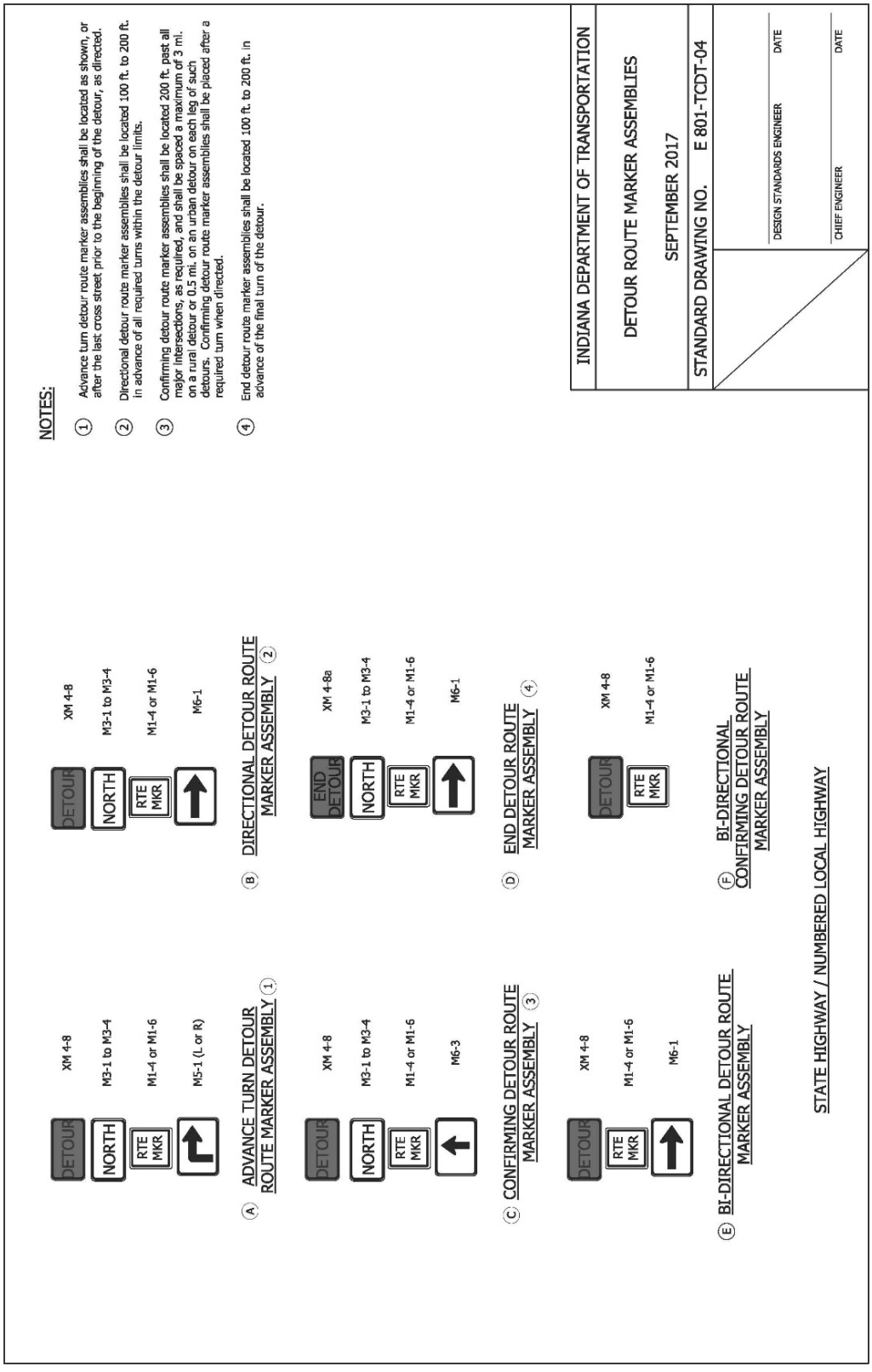
REVISION TO STANDARD DRAWINGS

801-TCDT-03 URBAN DETOUR WITH ONE-WAY STREETS (DRAFT)



REVISION TO STANDARD DRAWINGS

801-TCDT-04 DETOUR ROUTE MARKER ASSEMBLIES (DRAFT)



COMMENTS AND ACTION

801-TCDT-01 RURAL DETOUR
801-TCDT-02 URBAN DETOUR
801-TCDT-03 URBAN DETOUR WITH ONE-WAY STREETS
801-TCDT-04 DETOUR ROUTE MARKER ASSEMBLIES

DISCUSSION:
This item was introduced and presented by Mr. Boruff who stated that the existing detour standard drawing series does not show all the signs that are needed for rural and urban detours, such as "Road Closed Ahead" and "End Detour", nor are the barricades shown properly on some of the side street approaches. Also the current drawing for urban detours details a one-way pair scenario that could be simplified where two way traffic is maintained on the detour route.

Mr. Boruff mentioned one drawing that will require revision since it shows a barricade being deleted, but the barricades should actually only be relocated. Mr. Boruff will make sure this drawing is corrected.

Mr. Boruff therefore proposes that the committee approve the updated 801-TCDT series to show the end detour assembly and the set-up for cross streets on a two-way street urban detour, as illustrated above.

There were no further comments or discussion.

Motion: Mr. Boruff Second: Mr. Koch Ayes: 9 Nays: 0 FHWA Approval: YES	Action: _____ Passed as Submitted _X_ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: 801, begin pg 742. Recurring Special Provision affected: NONE Standard Drawing affected: 801-TCDT-01, -02, -03. Design Manual Sections affected: 82-1.03 GIFE Sections cross-references: 2.11, 25.4, and 25.5	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _X_ Standard Drawing Effective September 01, 2017 _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: High Pressure Sodium (HPS) luminaires are still allowed by the current design process and by Standard Specification but are no longer the state of the art technology. Over the last 6 years significant advancements have been made in solid state lighting technology, particularly LED, resulting in luminaires that require less maintenance and are much energy efficient compared to HPS. As INDOT is considering and will likely undertake a statewide energy savings initiative on highway lighting it is solid state technology that will be used.

PROPOSED SOLUTION: Eliminate HPS as a design alternative and remove references to HPS from the Standard Specifications. A Recurring Special Provision for HPS luminaires has been created for maintenance and LPA contracts.

The lighting design process will be further simplified as a solid state luminaire approved list is being established, the designer need not perform iterations with all possible light source technologies but will be able to select a model or two from the approved list as a basis for the design. The other models on the list will be compatible with the design so the contractor will be freed up in their bidding.

Migrate the material and most of the working drawing requirements for roadway, underpass, and high mast luminaires from the 920 and 807 sections respectively to the test method, ITM 957. Working drawing documentation is extensive so use of an approved list greatly reduces effort on the part of the manufacturer, contractor, project staff, and designer.

Other technical improvements have been made to the specification on the recommendation of industry and the Purdue Office off Energy Efficiency and Reliability. These changes are incorporated into a revised ITM.

APPLICABLE STANDARD SPECIFICATIONS: 807.03, 807.13, and 920.01(d)
APPLICABLE STANDARD DRAWINGS: None
APPLICABLE DESIGN MANUAL SECTION: 502-4.0
APPLICABLE SECTION OF GIFE: 26-XX
APPLICABLE RECURRING SPECIAL PROVISIONS: 807-T-193
PAY ITEMS AFFECTED: No
APPLICABLE SUB-COMMITTEE ENDORSEMENT: Industry, Purdue Office of Energy Efficiency and Reliability, Traffic Standards Subcommittee
IMPACT ANALYSIS (attach report): Yes, attached.
Submitted By: Dave Boruff
Title: Manager, Office of Traffic Administration
Organization: INDOT
Phone Number: (317) 234-7949
Date: 12/29/2016

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND SPECIAL PROVISION

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? No (approved list has not been populated at this time)

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? Yes

Congestion/travel time? No

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

For motorists? Potentially

For construction workers? N/A

Will this proposal improve quality for:

Construction procedures/processes? No

Asset preservation? Yes

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? No

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:

REVISION TO SPECIAL PROVISION
807-T-193 LUMINAIRES

(Separate statements have been moved in sections 1. General Requirements and 2. Roadway Lighting Luminaires for purposes of clarity and flow of information.
Basis For Use: "Required for all items with 807 pay items".
Final draft of the proposed RSP shown on page 49.)

807-T-193 LUMINAIRES

(Revised 02-19-15)

The Standard Specifications are revised as follows:

SECTION 807, BEGIN LINE 41, INSERT AS FOLLOWS:

807.03 Working Drawings

Working drawings shall be submitted in accordance with 105.02 for lighting-standard assemblies, luminaires, and external drive assemblies.

Working drawings for each luminaire model submitted shall include the luminaire specifications and data sheets~~:~~.

~~(a) Luminaire specifications and data sheets.~~
~~(b) Test report verifying UL 1598 compliance.~~
~~(c) Test report indicating compliance with ANSI C136.31, 2G or 3G requirements.~~
~~(d) Test reports indicating the IP rating specified in 920.01(d)2 are met in accordance with ANSI/IEC, International Electrotechnical Committee, standard 60529.~~
~~(e) Report of testing performed in accordance with ANSI C82.77 for electronic power drivers, or ANSI C82.6 for mechanical ballast indicating that the Total Harmonic Distortion does not exceed the limit specified in 920.01(d)2 and the Power Factor meets or exceeds the minimum specified in 920.01(d)1.~~

~~For luminaires utilizing solid state power drivers, the working drawings shall also include:~~

~~(a) IESNA LM - 79 test report.~~
~~(b) Test report indicating surge protection device survival in accordance with ANSI/IEEE C62.41.2.~~
~~(c) UL 1449 certification.~~
~~(d) Test report indicating Title 47 CFR Part 15, Class A compliance.~~
~~(e) Mean Time to Failure prediction for the power driver in accordance with Telcordia SR 332, issue 3 or MIL-HDBK-217F~~
~~(f) Power Driver Lifetime Report.~~

~~For luminaires utilizing an LED light source, the IESNA LM - 80 test shall be submitted. For plasma luminaires the emitter manufacturer's life test report indicating lumen maintenance at 50,000 hrs shall also be submitted. For post top mounted and underpass luminaires, the working drawings shall also include a report for a salt spray test in accordance with ASTM B117, 2,000 hrs time horizon.~~

REVISION TO SPECIAL PROVISION
807-T-193 LUMINAIRES

~~*Certifications and test reports shall be issued by a laboratory that is either listed as a National Recognized Testing Laboratory on the U.S. Department of Labor's website or is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). Additionally, LM-79 and LM-80 testing shall be performed by a laboratory that is accredited by the U.S. Department of Energy's CALIPER program.*~~

For ~~local federal aid projects~~contracts not utilizing the approved materials list for solid state luminaires, w~~W~~orking drawings for luminaires shall also include the Illumination Engineering Society of North America, IESNA, photometric distribution file if the file number varies from what is ~~indicated~~shown on the plans. The IESNA photometric distribution file shall be in either Visual, developed by Acuity Brands Lighting, or AGi32 from Lighting Analysis, Inc.

SECTION 807, BEGIN LINE 525, DELETE AND INSERT AS FOLLOWS:

807.13 Luminaire ~~Installation~~

(a) Installation

Luminaire installation shall consist of the physical placing of the luminaire. Each installation shall include the furnishing and placing of the ~~lamp~~*light source* as designated. *Luminaires shall be compatible with other lighting materials as specified in 920.01*.

~~(a)~~*1*. Roadway Luminaires

Each luminaire shall be leveled in both directions in the horizontal plane after the light standard has been erected and adjusted. Rotary adjustment of the mast arm and vertical adjustment of roadway luminaires to obtain an installed level position in both directions shall be accomplished by means of the bolted saddle arrangement used to attach the luminaires to the mast arm. Lamp socket positions may be shown on the plans by type of Illuminating Engineering Society of North American, IES, *and* light pattern. The specified lamp socket position, *or comparable arrangement of LEDs* shall be used to obtain the desired light pattern delivery. Proper connections shall be made to provide ~~ballast~~ operation at the voltage being supplied. Replacements needed because of faulty or incorrect voltage connections shall be made with no additional payment. *All roadway luminaires provided for an intersection, interchange, or contiguous highway segment shall be the same model.*

~~(b)~~ *2*. Sign Luminaires

Connections in which plain and galvanized steel are in contact shall be protected such that aluminum surfaces shall receive one coat of zinc chromate primer. Steel surfaces shall be prepared in accordance with 619.08(a), 619.08(b) and 619.08(d) and painted with a structural steel system in accordance with 619.09(a). All paint shall be allowed to cure before assembly. Conduit fittings, if required, shall be watertight. Required conduit shall be either rigid or flexible as necessary. Conduit shall not be clamped to a sign panel.

Sign luminaires shall be mounted on overhead sign structures on two metal channels located at the extremity of the sign walkway support brackets. The distance between lighting unit support channels shall be 7 in. These channels shall be located in such a manner that they readily

receive the mounting bolts from the rear of the sign luminaire. The installation of the sign luminaire shall consist of the physical placement of the luminaire on the channels.

Sign luminaires shall be connected to a phase conductor and a neutral conductor. The luminaires shall be alternately connected to opposite phase conductors to balance the load. The connections in the base of the sign structure shall be in accordance with 807.06. Conductor splicing shall be in junction boxes, in-ground handholes, inside handholes of sign structures, and circuit breaker enclosures. *All sign luminaires provided for an interchange or contiguous highway segment shall be the same model.*

~~(c)~~ *3.* Underpass Luminaires

Underpass luminaires shall be mounted on the vertical side surfaces of bridge bent structures or suspended by means of pendants supported by angle-iron struts or clips fastened to the structural beam members of the bridge. All parts of the pendent pipe assembly shall be hot-dipped galvanized after threads are cut. Silicone caulking compound shall be applied to the threads during assembly of the pendent. Underpass luminaires may require separately mounted ballasts which shall be installed in close proximity to the luminaires.

Underpass luminaires shall be connected to a phase conductor and a neutral conductor. The luminaires shall be alternately connected to opposite phase conductors to balance the load. Conductor splicing will only be allowed in junction boxes, in-ground handholes, and circuit breaker enclosures. *All underpass luminaires provided for an interchange shall be the same model.*

~~(d)~~ *4.* High Mast Luminaires

The aiming of the luminaires shall be as shown on the plans. When the aiming process is being done the luminaire shall be oriented to conform to its raised position and the ring properly tethered to prevent rotation during the aiming adjustment. The long axis of the luminaire shall be parallel to the aiming direction indicated on the plans. *All high mast luminaires provided for an interchange shall be the same make and model.*

(b) Warranty

A non-prorated manufacturer's written warranty, against loss of performance, defects in materials and defects in workmanship, shall be provided to and in favor of ~~INDOT~~the Department. For roadway, underpass, and high mast luminaires t~~T~~he warranty shall cover a period of ~~fiveten~~ 10 years from the date of installation of the luminaire; for sign luminaires the period shall be five years. The warranty shall cover all components of the luminaire, including but not limited to ballast, driver, and light source. Loss of performance is defined to include, but is not limited to, the luminaire or any of its components falling out of compliance with the specification in place at the time of installation, which includes but is not limited to the following: there is no light output from 10% or more of the LEDs, LED junction temperature exceeds 158 ℉ under any circumstance, the luminaire is operating below the lumen maintenance curve, or the color temperature shifts more than 500K outside of the specified color temperature range. The warranty shall stipulate that replacement luminaires shall be shipped to the appropriate Department District Office, at no cost to the Department, within ~~thirty~~30 days after the manufacturer's receipt of failed luminaires. Warranty documents shall include the manufacturer's name, address to which failed luminaires

are to be shipped for replacement, contact person and contact person's telephone number and e-mail address. *Warranty documents shall be submitted to the Engineer with the type C certification. Warranty documents shall provide the estimated life cycle of the lamp, LEDs, plasma emitter and power driver.*

807.14 Sign, Underpass, Roadway, ~~and~~ High Mast Lighting Location, *and Luminaire* Identification

All high mast towers, roadway light standards, underpass lighting installations, and sign lighting installations shall have an identification code number as shown on the plans. In addition, each luminaire at a sign or underpass installation shall be individually identified with a single capital letter.

The code number shall be displayed on the light standard, sign structure column, and high mast tower as shown on the plans. The underpass code number shall be displayed near the breaker box at a location as directed.

The code number for the lighting standard and sign structure column shall be applied to the pole, as specified by the manufacturer, by using individual, pressure sensitive, adhesive backed tags. The code number for the high mast tower shall be applied to an aluminum plate which is mounted with spacers away from the structure as shown on the plans.

A luminaire identification sticker shall be provided on each luminaire and on the light pole or tower that supports the luminaire. The sticker shall be titled "LUMINAIRE" and contain the following information: light source type, manufacturer, model, wattage, date of installation, and warranty period. The pole/tower sticker shall be attached underneath the light pole ID tag, shall face the roadway, and shall have 3/4 in. lettering, and be no greater than 8 in. by 8 in.

SECTION 807, BEGIN LINE 808, INSERT AS FOLLOWS:

Luminaire, High Mast~~, _____, _____ Watts~~.....EACH
~~*light source* type~~

Luminaire, High Lumen Roadway .....*EACH*

Luminaire, Low Lumen Roadway .....*EACH*

Luminaire, Low Lumen-Low Mounting Height Roadway.....*EACH*

~~Luminaire, Roadway, _____, _____ Watts.....EACH~~
~~*light source* type~~

Luminaire, Sign~~, _____, _____ Watt~~ .....*EACH*
~~*light source type*~~

Luminaire, Underpass~~, _____, _____ Watt~~ .....*EACH*
~~*light source type*~~

SECTION 807, BEGIN LINE 821, INSERT AS FOLLOWS:

The cost of lamps, *LED arrays, plasma emitters,* ~~ballast,~~ *drivers,* optical systems, weatherproof housings, *surge protection devices,* and electrical connections shall be included in the cost of luminaire.

SECTION 920, BEGIN LINE 499, DELETE AND INSERT AS FOLLOWS:

REVISION TO SPECIAL PROVISION
807-T-193 LUMINAIRES

(d) Luminaires

Underpass, Roadway, and High Mast models shall be selected from the Department's list of approved solid state luminaires.

1. General Requirements

Luminaires shall be compatible with the lighting materials specified in this section and in the plans. Luminaires, including primary fuse protection, surge protection devices, power drivers, and other major components, shall be rated for a minimum operational life of 50,000 hours at 77°F.

Luminaires shall be a single, self-contained device, not requiring on-site assembly for installation. ~~*Power supply drivers, surge protection devices, and light sources shall be replaceable without replacing the entire luminaire.*~~ *Connectors shall be crimp type.*

All internal components shall be adequately supported to withstand mechanical shock and vibration. Luminaires shall be tested in accordance with ANSI C136.31, 2G loading or ANSI C136.31, 3G loading for luminaires on bridges. Testing about all axes shall be accomplished with a single luminaire.

Luminaires shall include gasketing that will completely seal out dust, moisture, and insects from the interior of the optical assembly and retard the formation of an undesirable film from gaseous vapors on the interior of the optical assembly. The optical assembly shall be rated at IP 66 or better in accordance with ANSI/IEC 60529 while ballasts, power drivers and surge protection devices shall be rated at IP 65 or better.

~~Lamps~~*Light sources* supplied for luminaires shall be electrically compatible with the luminaires. Luminaires shall include ~~the lamp ballast *or*~~ *an integrally built in power driver*. ~~The ballast *or power driver* shall be integrally built in. and~~*Ballasts shall* ~~of the constant wattage regulator type of sufficient size to operate the designated lamp at the required voltage.~~ The ~~ballast shall provide satisfactory lamp performance to 20°F~~*luminaire shall operate satisfactorily in temperatures from - 40°F to 122°F* with an input voltage variation of ± 10% of the rated operating voltage specified. ~~*Luminaires shall be a single, self contained device, not requiring on-site assembly for installation.*~~ *Power consumption, wattage, shall not exceed that which is indicated on the plans. The luminaire power factor shall be 0.9 or greater. Power drivers shall maintain constant current and have a minimum Mean Time to Failure of 2,000,000 hrs as determined by Telcordia SR 332, issue 3 or MIL-HDBK-217F methodology. Total Harmonic Distortion, THD, of the power driver shall not exceed 20% as verified by ANSI C82.77.*

Roadway lighting luminaires shall have a precision-cast aluminum housing with weatherproof finish.

Refractors or lenses shall be scratch resistant and made from high impact, heat-resistant, glass or UV inhibited, high impact plastic. If utilized, reflectors shall be detachable and made of highly specular aluminum.

REVISION TO SPECIAL PROVISION
807-T-193 LUMINAIRES

Luminaires shall have seven wire photocontrol receptacle in accordance with ANSI C136.41 with shorting cap for adaptive lighting control.

Luminaires shall exhibit a color temperature in the range of 3500K to 4500K per ANSI C78.377 and a minimum Color Rendering Index of 70 as verified by the IESNA LM-79 test.

A Surge Protection Device, SPD, shall be included to protect the luminaire from damage and failure for transient voltage and currents. The SPD shall conform to UL 1449 and shall be tested in accordance with, and survive, the procedure in ANSI/IEEE C62.41.2 definitions for standard and optional waveform for location category C-High. Once the surge current has subsided, the SPD shall automatically restore normal operation and reset to a state ready to receive the next surge.

Luminaires shall comply with Title 47 CFR Part 15, Class A on unlicensed transmissions in a business, commercial, or industrial environment.

Underpass and post top mounted luminaires shall be protected against salt spray and conform to ASTM B117, 2,000 hrs time horizon.

Luminaires shall include vandal shields when installed on an underpass or signs on bridge brackets and when otherwise specified. The vandal shield shall be made of a tough durable plastic, such as Lexan, mounted in a rugged galvanized steel or aluminum frame, and shall withstand severe impact without being damaged or allowing the refractor to be damaged. It shall be fastened securely to the luminaire so it cannot be removed from the outside and shall not interfere with the light distribution pattern. It shall protect the face of the refractor and if ventilation is necessary, the ventilating apertures shall be arranged so that they do not admit a probe of a diameter greater than 1/4 in.

a. LED Luminaires

LEDs shall be connected so that the loss of one LED will not result in the loss of the entire luminaire. LED circuitry shall prevent flickering to the unaided eye at the voltage specified on the plans and the range indicated herein. LED junction temperature shall not exceed 158°F.

LEDs shall deliver a minimum of 85% of the initial rated lumens after 50,000 hours of operation at 130°F ambient temperature as indicated by LM-80 lumen maintenance test of the light source as calculated by IESNA TM-21, L85 > 50,000 hrs.

A passive thermal management system to dissipate the heat generated by operation shall be provided. Fans or other mechanical cooling systems shall not be used.

b. Light Emitting Plasma Luminaires

Plasma emitters shall deliver a minimum of 70% of the initial lumens after 50,000 hrs of operation.

c. Metal Halide Luminaires

REVISION TO SPECIAL PROVISION
807-T-193 LUMINAIRES

Metal halide luminaires shall utilize a power driver; external capacitors or igniters shall not be used. Metal Halide lamps used in high mast luminaires shall be supported at both ends with mechanical spring grips or other means to hold the lamp secure against vibration.

2. Roadway Lighting Luminaires

~~Roadway lighting luminaires shall have a precision-cast aluminum housing and refractor holder with weatherproof finish. They shall have a strong, easily operated, positive latch on the street side of the refractor holder and a hinge with a safety catch that prevents accidental unhinging on the house side of the refractor holder. They shall include a slipfitter capable of adapting to a 2 in. mounting bracket; an easily detachable highly specular aluminum reflector; and an easily adjustable socket in both horizontal and vertical directions capable of producing lighting patterns to meet all the requirements of the American Standard Practice for Roadway Lighting as sponsored by the Illumination Engineering Society and as shown on the They shall have a high impact, heat-resistant, glass, prismatic refractor; and include gasketing that will completely seal out dust, moisture, and insects from the interior of the optical assembly and retard the formation of an undesirable film from gaseous vapors on the interior of the optical assembly.~~ *Roadway ~~lighting~~ luminaires ~~shall have a precision-cast aluminum housing with weatherproof finish. They~~ shall have a strong, easily operated, positive latch on the street side of the housing with a hinge and a safety catch that prevents accidental unhinging on the house side of the refractor or lens holder. They shall include a four bolt slipfitter capable of adapting to a 2 in. mounting bracket that is adjustable ± 5° for leveling.*

~~*Luminaires shall include gasketing that will completely seal out dust, moisture, and insects from the interior of the optical assembly and retard the formation of an undesirable film from gaseous vapors on the interior of the optical assembly. The optical assembly shall be rated at IP 66 or better in accordance with ANSI/IEC 60529 while ballasts, power drivers and surge protection devices shall be rated at IP 65 or better.*~~

~~*All internal components shall be adequately supported to withstand mechanical shock and vibration. Luminaires shall be tested in accordance with ANSI C136.31, 2G loading or ANSI C136.31, 3G loading for luminaires on bridges. Testing about all axes shall be accomplished with a single luminaire.*~~

~~*Total Harmonic Distortion, THD, of the ballast or power driver shall not exceed 20% as verified by ANSI C82.6 for mechanical ballasts or ANSI C82.77 for power drivers.*~~

Luminaires shall be adjustable in the horizontal and vertical directions to meet the specified IESNA light distribution pattern. Luminaire weight shall not exceed 53 lbs and its projected area shall not exceed 2.4 sq ft. ~~*Luminaires shall be either High Pressure Sodium, HPS, or utilize another light source in accordance with 920.01(d)2b.*~~

~~***a. High Pressure Sodium Luminaires***~~

~~*HPS luminaires shall have a high impact, heat-resistant, glass, prismatic refractor; a precision-cast, aluminum refractor holder with weatherproof finish, a detachable highly specular aluminum reflector; and an adjustable socket in both horizontal and vertical directions capable of*~~

producing lighting patterns to meet all the requirements of the American Standard Practice for Roadway Lighting as sponsored by the IESNA and as shown on the plans.

b. Other Light Source Types

Luminaires that utilize technologies other than HPS shall be compatible with the lighting materials specified in this section and in the plans. Luminaires, including primary fuse protection, surge protection devices, power drivers, and other major components, shall be rated for a minimum operational life of 50,000 hours at 77°F. Power drivers shall maintain constant current and have a minimum Mean Time to Failure of 2,000,000 hrs as determined by Telcordia SR 332, issue 3 or MIL-HDBK-217F methodology Luminaires shall be adjustable in the horizontal and vertical directions to meet the specified IESNA light distribution pattern. Refractors or lenses shall be scratch resistant and made from high impact, heat-resistant, glass or UV inhibited, high impact plastic. If utilized, reflectors shall be detachable and made of highly specular aluminum. Power supply drivers, surge protection devices, LED arrays, and plasma emitters shall be replaceable without replacing the entire luminaire. Luminaires shall have five or seven wire photocontrol receptacle in accordance with ANSI C136.41 with shorting cap for adaptive lighting control.

LEDs shall be connected so that the loss of one LED will not result in the loss of the entire luminaire. LED circuitry shall prevent flickering to the unaided eye at the voltage specified on the plans and the range indicated herein. LED junction temperature shall not exceed 158°F.

Metal halide luminaires shall utilize a power driver; external capacitors or igniters shall not be used.

Solid state and plasma luminaires shall meet these additional requirements:

(1) .....Wattage. The wattage shall be verified by the IESNA LM-79 test.

(2) Lumen Output. The total lumen output shall meet or exceed the amount specified on the plans and shall be verified by the IESNA LM-79 test. LEDs shall deliver a minimum of 85% of the initial rated lumens after 50,000 hours of operation at 130°F ambient temperature as indicated by LM-80 lumen maintenance test of the light source as calculated by IESNA TM-21 (L85 > 50,000 hrs). Plasma emitters shall deliver a minimum of 70% of the initial lumens after 50,000 hrs of operation.

(3) Chromaticity. Luminaires shall exhibit a color temperature in the range of 4000K to 5000K per ANSI C78.377 and a minimum Color Rendering Index of 70 as verified by the IESNA LM-79 test.

(4) Surge Protection. Solid State luminaires shall include a Surge Protection Device, SPD, to protect the luminaire from damage and failure for transient voltage and currents. The SPD shall conform to UL 1449 and shall be tested in accordance with, and survive, the procedure in ANSI/IEEE C62.41.2 definitions for standard and optional waveform for

~~location category C-High. Once the surge current has subsided, the SPD shall automatically restore normal operation and reset to a state ready to receive the next surge.~~

~~(5) Electromagnetic Interference. Luminaires shall comply with Title 47 CFR Part 15, Class A on unlicensed transmissions in a business, commercial, or industrial environment.~~

~~(6) Heat Dissipation. A passive thermal management system to dissipate the heat generated by operation shall be provided. Fans or other mechanical cooling systems shall not be used.~~

3. Sign Luminaires

Sign Luminaires shall be *LED and operate on no more than* 250W *of power* ~~metal halide unless otherwise specified~~. Sign luminaires shall have ~~the same requirements as roadway luminaires plus~~ a shield that blocks the view of the refractor from an approaching motorist. This shall be accomplished by the design of the housing or by a shield fabricated from sheet aluminum, approximately 0.05 in. thick, and of sufficient size to be fastened onto the horizontal edge of the refractor holder with self tapping screws and placed between the refractor and approaching traffic.

Aluminum and steel structural members for luminaire supports shall include aluminum conduit, conduit clamps, fittings, and stainless steel screws.

~~4. Underpass Luminaires~~

~~Underpass luminaires shall have the same requirements as roadway luminaires except they shall have vandal shields and the ballast shall meet the same requirements except it may be mounted separately near the luminaire as shown on the plans.~~

~~5. High Mast Luminaires~~

~~The luminaires shall be in accordance with the American Standard Practice for Roadway Lighting by the Illumination Engineering Society and shall produce lighting patterns as shown on the plans. The lamp in the high mast luminaire *lamp or light source* shall be supported at both ends with mechanical spring grips or other means to hold the lamp secure against vibration. The sockets shall be mogul sized and porcelain enclosed. The luminaire housing shall be an enclosed aluminum unit with a reflector and borosilicate glass refractor *or lens*. It shall include gasketing that will completely seal out dust, moisture, and insects from the interior of the optical assembly and retard the formation of an undesirable film from gaseous vapors on the optical assembly. *High pressure sodium luminaires shall have an aluminum reflector. High mast luminaires utilizing light sources other than HPS shall meet the requirements of 920.01(d)1 and 920.01(d)2.*~~

REVISION TO SPECIAL PROVISION

PROPOSED NEW RSP 807-T-XXX HIGH PRESSURE SODIUM LUMINAIRES (DRAFT)

807-T-XXX HIGH PRESSURE SODIUM LUMINAIRES

(Adopted xx-xx-17)

Description

This work shall consist of furnishing and installing high pressure sodium roadway, underpass, and high mast luminaires in accordance with 105.03.

Materials

Lamps supplied for luminaires shall be electrically compatible with the luminaires. Luminaires shall include the lamp ballast. The ballast shall be integrally built in and of the constant wattage regulator type of sufficient size to operate the designated lamp at the required voltage. The ballast shall provide satisfactory lamp performance to 20°F with an input voltage variation of ± 10% of the rated operating voltage specified. Luminaires shall be a single, self-contained device, not requiring on-site assembly for installation. Power consumption, wattage, shall not exceed that which is indicated on the plans.

Underpass and post top mounted luminaires shall be protected against salt spray and conform to ASTM B117, 2,000 hrs time horizon.

Luminaires shall include vandal shields when installed on an underpass or signs on bridge brackets and when otherwise specified. The vandal shield shall be made of a tough durable plastic, such as Lexan, mounted in a rugged galvanized steel or aluminum frame, and shall withstand severe impact without being damaged or allowing the refractor to be damaged. It shall be fastened securely to the luminaire so it cannot be removed from the outside and shall not interfere with the light distribution pattern. It shall protect the face of the refractor and if ventilation is necessary, the ventilating apertures shall be arranged so that they do not admit a probe of a diameter greater than 1/4 in.

Luminaires shall include gasketing that will completely seal out dust, moisture, and insects from the interior of the optical assembly and retard the formation of an undesirable film from gaseous vapors on the interior of the optical assembly. The optical assembly shall be rated at IP 66 or better in accordance with ANSI/IEC 60529 while ballasts and surge protection devices shall be rated at IP 65 or better.

All internal components shall be adequately supported to withstand mechanical shock and vibration. Luminaires shall be tested in accordance with ANSI C136.31, 2G loading or ANSI C136.31, 3G loading for luminaires on bridges. Testing about all axes shall be accomplished with a single luminaire.

Total Harmonic Distortion, THD, of the ballast shall not exceed 20% as verified by ANSI C82.6.

(a) Roadway Lighting Luminaires

Roadway lighting luminaires shall have a precision-cast aluminum housing with weatherproof finish. They shall have a strong, easily operated, positive latch on the street side of the housing with a hinge and a safety catch that prevents accidental unhinging on the house side of the refractor or lens holder.

They shall include a four bolt slipfitter capable of adapting to a 2 in. mounting bracket that is adjustable ± 5° for leveling.

Luminaires shall have a high impact, heat-resistant, glass, prismatic refractor; a precision-cast, aluminum refractor holder with weatherproof finish, a detachable highly specular aluminum reflector; and an adjustable socket in both horizontal and vertical directions capable of producing lighting patterns to meet all the requirements of the American Standard Practice for Roadway Lighting as sponsored by the IESNA and as shown on the plans.

Luminaire weight shall not exceed 53 lbs and its projected area shall not exceed 2.4 sq ft.

(b) Underpass Luminaires

Underpass luminaires shall have the same requirements as roadway luminaires except they shall have vandal shields and the ballast shall meet the same requirements except it may be mounted separately near the luminaire as shown on the plans.

(c) High Mast Luminaires

The luminaires shall be in accordance with the American Standard Practice for Roadway Lighting by the Illumination Engineering Society and shall produce lighting patterns as shown on the plans. The lamp in the high mast luminaire shall be supported at both ends with mechanical spring grips or other means to hold the lamp secure against vibration. The sockets shall be mogul sized and porcelain enclosed. The luminaire housing shall be an enclosed aluminum unit with an aluminum reflector and borosilicate glass refractor.

Construction Requirements

Luminaire installation shall consist of the physical placing of the luminaire. Each installation shall include the furnishing and placing of the lamp as designated.

Working drawings shall be submitted in accordance with 105.02 and for each luminaire model submitted shall include:

1. Luminaire specifications and data sheets.
2. Test report verifying UL 1598 compliance.
3. Test report indicating compliance with ANSI C136.31, 2G or 3G requirements.
4. Test reports indicating the IP rating specified herein are met in accordance with ANSI/IEC, International Electrotechnical Committee, standard 60529.
5. Report of testing performed in accordance ANSI C82.6 indicating that the Total Harmonic Distortion does not exceed the limit specified herein.

Certifications and test reports shall be issued by a laboratory that is either listed as a National Recognized Testing Laboratory on the U.S. Department of Labor’s website or is accredited by the National Voluntary Laboratory Accreditation Program, NVLAP.

Working drawings for luminaires shall also include the Illumination Engineering Society of North America, IESNA, photometric distribution file if the file number varies from what is indicated on the plans. The IESNA

photometric distribution file shall be in either Visual, developed by Acuity Brands Lighting, or AGi32 from Lighting Analysis, Inc.

A non-prorated manufacturer's written warranty, against loss of performance, defects in materials and defects in workmanship, shall be provided to and in favor of ~~INDOT~~*the Department*. The warranty shall cover a period of five years from the date of installation of the luminaire. The warranty shall cover all components of the luminaire, including but not limited to ballast and light source. Loss of performance is defined to include, but is not limited to, the luminaire or any of its components falling out of compliance with specification. The warranty shall stipulate that replacement luminaires shall be shipped to the appropriate Department District Office, at no cost to the Department, within ~~thirty~~*30* days after the manufacturer's receipt of failed luminaires. Warranty documents shall include the manufacturer's name, address to which failed luminaires are to be shipped for replacement, contact person and contact person's telephone number and e-mail address. Warranty documents shall be submitted to the Engineer with the type C certification.

(a) Roadway Luminaires

Each luminaire shall be leveled in both directions in the horizontal plane after the light standard has been erected and adjusted. Rotary adjustment of the mast arm and vertical adjustment of roadway luminaires to obtain an installed level position in both directions shall be accomplished by means of the bolted saddle arrangement used to attach the luminaires to the mast arm. Lamp socket positions may be shown on the plans by type of Illuminating Engineering Society of North American, IES, light pattern. The specified lamp socket position shall be used to obtain the desired light pattern delivery. Proper connections shall be made to provide ballast operation at the voltage being supplied. Replacements needed because of faulty or incorrect voltage connections shall be made with no additional payment.

(b) Underpass Luminaires

Underpass luminaires shall be mounted on the vertical side surfaces of bridge bent structures or suspended by means of pendants supported by angle-iron struts or clips fastened to the structural beam members of the bridge. All parts of the pendent pipe assembly shall be hot-dipped galvanized after threads are cut. Silicone caulking compound shall be applied to the threads during assembly of the pendent. Underpass luminaires may require separately mounted ballasts which shall be installed in close proximity to the luminaires. Underpass luminaires shall be connected to a phase conductor and a neutral conductor. The luminaires shall be alternately connected to opposite phase conductors to balance the load. Conductor splicing will only be allowed in junction boxes, in-ground handholes, and circuit breaker enclosures.

(c) High Mast Luminaires

The aiming of the luminaires shall be as shown on the plans. When the aiming process is being done the luminaire shall be oriented to conform to its raised position and the ring properly tethered to prevent rotation during the aiming adjustment. The long axis of the luminaire shall be parallel to the aiming direction indicated on the plans.

Method of Measurement

Luminaire will be measured by the number of units installed.

Basis of Payment

REVISION TO SPECIAL PROVISION

PROPOSED NEW RSP 807-T-XXX HIGH PRESSURE SODIUM LUMINAIRES (DRAFT)

Luminaire will be paid for at the contract unit price per each for the type and wattage specified.

Payment will be made under:

Luminaire, High Mast, High Pressure Sodium, _____ Watt.....EACH
Luminaire, Roadway, High Pressure Sodium, _____ Watt.....EACH
Luminaire, Underpass, High Pressure Sodium, _____ Watt.....EACH

The cost of lamps, ballast, optical systems, weatherproof housings, surge protection devices, and electrical connections shall be included in the cost of luminaire.

BACKUP 01

"CLEAN" (WITHOUT MARKED CHANGES)DRAFT OF THE RSP 807-T-193 LUMINAIRES

807-T-193 LUMINAIRES

(Revised xx-xx-17)

The Standard Specifications are revised as follows:

SECTION 807, BEGIN LINE 41, INSERT AS FOLLOWS:

807.03 Working Drawings

Working drawings shall be submitted in accordance with 105.02 for lighting-standard assemblies, luminaires, and external drive assemblies.

Working drawings for each luminaire model submitted shall include the luminaire specifications and data sheets.

For local federal aid projects not utilizing the approved materials list for solid state luminaires working drawings for luminaires shall also include the Illumination Engineering Society of North America, IESNA, photometric distribution file if the file number varies from what is indicated on the plans. The IESNA photometric distribution file shall be in either Visual, developed by Acuity Brands Lighting, or AGi32 from Lighting Analysis, Inc.

SECTION 807, BEGIN LINE 525, DELETE AND INSERT AS FOLLOWS:

807.13 Luminaire

(a) Installation

Luminaire installation shall consist of the physical placing of the luminaire. Each installation shall include the furnishing and placing of the light source as designated. Luminaires shall be compatible with other lighting materials as specified in 920.01.

1. Roadway Luminaires

Each luminaire shall be leveled in both directions in the horizontal plane after the light standard has been erected and adjusted. Rotary adjustment of the mast arm and vertical adjustment of roadway luminaires to obtain an installed level position in both directions shall be accomplished by means of the bolted saddle arrangement used to attach the luminaires to the mast arm. Lamp socket positions may be shown on the plans by type of Illuminating Engineering Society of North American, IES, and light pattern. The specified lamp socket position, or comparable arrangement of LEDs shall be used to obtain the desired light pattern delivery. Proper connections shall be made to provide operation at the voltage being supplied. Replacements needed because of faulty or incorrect voltage connections shall be made with no additional payment. All roadway luminaires provided for an intersection, interchange, or contiguous highway segment shall be the same model.

2. Sign Luminaires

Connections in which plain and galvanized steel are in contact shall be protected such that aluminum surfaces shall receive one coat of zinc chromate primer. Steel surfaces shall be prepared in accordance with 619.08(a), 619.08(b) and 619.08(d) and painted with a structural steel system in accordance with 619.09(a). All paint shall be allowed to cure before assembly. Conduit fittings,

if required, shall be watertight. Required conduit shall be either rigid or flexible as necessary. Conduit shall not be clamped to a sign panel.

Sign luminaires shall be mounted on overhead sign structures on two metal channels located at the extremity of the sign walkway support brackets. The distance between lighting unit support channels shall be 7 in. These channels shall be located in such a manner that they readily receive the mounting bolts from the rear of the sign luminaire. The installation of the sign luminaire shall consist of the physical placement of the luminaire on the channels.

Sign luminaires shall be connected to a phase conductor and a neutral conductor. The luminaires shall be alternately connected to opposite phase conductors to balance the load. The connections in the base of the sign structure shall be in accordance with 807.06. Conductor splicing shall be in junction boxes, in-ground handholes, inside handholes of sign structures, and circuit breaker enclosures. All sign luminaires provided for an interchange or contiguous highway segment shall be the same model.

3. Underpass Luminaires

Underpass luminaires shall be mounted on the vertical side surfaces of bridge bent structures or suspended by means of pendants supported by angle-iron struts or clips fastened to the structural beam members of the bridge. All parts of the pendent pipe assembly shall be hot-dipped galvanized after threads are cut. Silicone caulking compound shall be applied to the threads during assembly of the pendent. Underpass luminaires may require separately mounted ballasts which shall be installed in close proximity to the luminaires.

Underpass luminaires shall be connected to a phase conductor and a neutral conductor. The luminaires shall be alternately connected to opposite phase conductors to balance the load. Conductor splicing will only be allowed in junction boxes, in-ground handholes, and circuit breaker enclosures. All underpass luminaires provided for an interchange shall be the same model.

4. High Mast Luminaires

The aiming of the luminaires shall be as shown on the plans. When the aiming process is being done the luminaire shall be oriented to conform to its raised position and the ring properly tethered to prevent rotation during the aiming adjustment. The long axis of the luminaire shall be parallel to the aiming direction indicated on the plans. All high mast luminaires provided for an interchange shall be the same make and model.

(b) Warranty

A non-prorated manufacturer's written warranty, against loss of performance, defects in materials and defects in workmanship, shall be provided to and in favor of INDOT. For roadway, underpass, and high mast luminaires the warranty shall cover a period of ~~ten~~*10* years from the date of installation of the luminaire; for sign luminaires the period shall be five years. The warranty shall cover all components of the luminaire, including but not limited to ballast, driver, and light source. Loss of performance is defined to include, but is not limited to, the luminaire or any of its components falling out of compliance with specification, which includes but is not limited to the following: there is no light output from 10% or more of the LEDs, LED junction temperature

exceeds 158°F under any circumstance, the luminaire is operating below the lumen maintenance curve, or the color temperature shifts more than 500K outside of the specified color temperature range. The warranty shall stipulate that replacement luminaires shall be shipped to the appropriate Department District Office, at no cost to the Department, within thirty days after the manufacturer's receipt of failed luminaires. Warranty documents shall include the manufacturer's name, address to which failed luminaires are to be shipped for replacement, contact person and contact person's telephone number and e-mail address. Warranty documents shall be submitted to the Engineer with the type C certification. Warranty documents shall provide the estimated life cycle of the lamp, LEDs, plasma emitter and power driver.

807.14 Sign, Underpass, Roadway, High Mast Lighting Location, and Luminaire Identification

All high mast towers, roadway light standards, underpass lighting installations, and sign lighting installations shall have an identification code number as shown on the plans. In addition, each luminaire at a sign or underpass installation shall be individually identified with a single capital letter.

The code number shall be displayed on the light standard, sign structure column, and high mast tower as shown on the plans. The underpass code number shall be displayed near the breaker box at a location as directed.

The code number for the lighting standard and sign structure column shall be applied to the pole, as specified by the manufacturer, by using individual, pressure sensitive, adhesive backed tags. The code number for the high mast tower shall be applied to an aluminum plate which is mounted with spacers away from the structure as shown on the plans.

A luminaire identification sticker shall be provided on each luminaire and on the light pole or tower that supports the luminaire. The sticker shall be titled "LUMINAIRE" and contain the following information: light source type, manufacturer, model, wattage, date of installation, and warranty period. The pole/tower sticker shall be attached underneath the light pole ID tag, shall face the roadway, and shall have 3/4 in. lettering, and be no greater than 8 in. by 8 in.

SECTION 807, BEGIN LINE 808, INSERT AS FOLLOWS:

Luminaire, High Lumen Roadway.....EACH
Luminaire, High Mast.....EACH
Luminaire, Low Lumen Roadway.....EACH
Luminaire, Low Lumen-Low Mounting Height Roadway.....EACH
Luminaire, Sign.....EACH
Luminaire, Underpass.....EACH

SECTION 807, BEGIN LINE 821, INSERT AS FOLLOWS:

The cost of lamps, LED arrays, plasma emitters, drivers, optical systems, weatherproof housings, surge protection devices, and electrical connections shall be included in the cost of luminaire.

SECTION 920, BEGIN LINE 499, DELETE AND INSERT AS FOLLOWS:

BACKUP 01

"CLEAN" (WITHOUT MARKED CHANGES)DRAFT OF THE RSP 807-T-193 LUMINAIRES

(d) Luminaires

Underpass, Roadway, and High Mast models shall be selected from the Department's list of approved solid state luminaires.

1. General Requirements

Luminaires shall be compatible with the lighting materials specified in this section and in the plans. Luminaires, including primary fuse protection, surge protection devices, power drivers, and other major components, shall be rated for a minimum operational life of 50,000 hours at 77°F.

Luminaires shall be a single, self-contained device, not requiring on-site assembly for installation**.** Power supply drivers, surge protection devices, and light sources shall be replaceable without replacing the entire luminaire.

All internal components shall be adequately supported to withstand mechanical shock and vibration. Luminaires shall be tested in accordance with ANSI C136.31, 2G loading or ANSI C136.31, 3G loading for luminaires on bridges. Testing about all axes shall be accomplished with a single luminaire.

Luminaires shall include gasketing that will completely seal out dust, moisture, and insects from the interior of the optical assembly and retard the formation of an undesirable film from gaseous vapors on the interior of the optical assembly. The optical assembly shall be rated at IP 66 or better in accordance with ANSI/IEC 60529 while ballasts, power drivers and surge protection devices shall be rated at IP 65 or better.

Light sources supplied for luminaires shall be electrically compatible with the luminaires. Luminaires shall include an integrally built in power driver. The luminaire shall operate satisfactorily in temperatures from - 40°F to 122°F with an input voltage variation of ± 10% of the rated operating voltage specified. Power consumption, wattage, shall not exceed that which is indicated on the plans. The luminaire power factor shall be 0.9 or greater. Power drivers shall maintain constant current and have a minimum Mean Time to Failure of 2,000,000 hrs as determined by Telcordia SR 332, issue 3 or MIL-HDBK-217F methodology. Total Harmonic Distortion, THD, of the power driver shall not exceed 20% as verified by ANSI C82.77.

Roadway lighting luminaires shall have a precision-cast aluminum housing with weatherproof finish.

Refractors or lenses shall be scratch resistant and made from high impact, heat-resistant, glass or UV inhibited, high impact plastic. If utilized, reflectors shall be detachable and made of highly specular aluminum.

Luminaires shall have seven wire photocontrol receptacle in accordance with ANSI C136.41 with shorting cap for adaptive lighting control.

Luminaires shall exhibit a color temperature in the range of 3500K to 4500K per ANSI C78.377 and a minimum Color Rendering Index of 70 as verified by the IESNA LM-79 test.

A Surge Protection Device, SPD, shall be included to protect the luminaire from damage and failure for transient voltage and currents. The SPD shall conform to UL 1449 and shall be tested in accordance with, and survive, the procedure in ANSI/IEEE C62.41.2 definitions for standard and optional waveform for location category C-High. Once the surge current has subsided, the SPD shall automatically restore normal operation and reset to a state ready to receive the next surge.

Luminaires shall comply with Title 47 CFR Part 15, Class A on unlicensed transmissions in a business, commercial, or industrial environment.

Underpass and post top mounted luminaires shall be protected against salt spray and conform to ASTM B117, 2,000 hrs time horizon.

Luminaires shall include vandal shields when installed on an underpass or signs on bridge brackets and when otherwise specified. The vandal shield shall be made of a tough durable plastic, such as Lexan, mounted in a rugged galvanized steel or aluminum frame, and shall withstand severe impact without being damaged or allowing the refractor to be damaged. It shall be fastened securely to the luminaire so it cannot be removed from the outside and shall not interfere with the light distribution pattern. It shall protect the face of the refractor and if ventilation is necessary, the ventilating apertures shall be arranged so that they do not admit a probe of a diameter greater than 1/4 in.

a. LED Luminaires

LEDs shall be connected so that the loss of one LED will not result in the loss of the entire luminaire. LED circuitry shall prevent flickering to the unaided eye at the voltage specified on the plans and the range indicated herein. LED junction temperature shall not exceed 158°F.

LEDs shall deliver a minimum of 85% of the initial rated lumens after 50,000 hours of operation at 130°F ambient temperature as indicated by LM-80 lumen maintenance test of the light source as calculated by IESNA TM-21 (L85 > 50,000 hrs).

A passive thermal management system to dissipate the heat generated by operation shall be provided. Fans or other mechanical cooling systems shall not be used.

b. Light Emitting Plasma Luminaires

Plasma emitters shall deliver a minimum of 70% of the initial lumens after 50,000 hrs of operation.

c. Metal Halide Luminaires

Metal halide luminaires shall utilize a power driver; external capacitors or igniters shall not be used. Metal Halide lamps used in high mast luminaires shall be supported at both ends with mechanical spring grips or other means to hold the lamp secure against vibration.

2. Roadway Lighting Luminaires

BACKUP 01

"CLEAN" (WITHOUT MARKED CHANGES)DRAFT OF THE RSP 807-T-193 LUMINAIRES

Roadway luminaires shall have a strong, easily operated, positive latch on the street side of the housing with a hinge and a safety catch that prevents accidental unhinging on the house side of the refractor or lens holder. They shall include a four bolt slipfitter capable of adapting to a 2 in. mounting bracket that is adjustable ± 5° for levelin.

Luminaires shall be adjustable in the horizontal and vertical directions to meet the specified IESNA light distribution pattern Luminaire weight shall not exceed 53 lbs and its projected area shall not exceed 2.4 sq ft.

3. Sign Luminaires

Sign Luminaires shall be LED and operate on no more than 250W of power. Sign luminaires shall have a shield that blocks the view of the refractor from an approaching motorist. This shall be accomplished by the design of the housing or by a shield fabricated from sheet aluminum, approximately 0.05 in. thick, and of sufficient size to be fastened onto the horizontal edge of the refractor holder with self tapping screws and placed between the refractor and approaching traffic.

Aluminum and steel structural members for luminaire supports shall include aluminum conduit, conduit clamps, fittings, and stainless steel screws.

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

502-4.0 HIGHWAY LIGHTING

502-4.03(04) Luminaire [Rev. ??? 2017]

A luminaire is defined as a complete lighting unit consisting of a light source (lamp or lamps, LED arrays, plasma emitter) together with the parts designed to distribute light. The INDOT *Standard Specifications*, along with the following, provide the Department's criteria for luminaire hardware. Section 502-4.06(03) item 1 discusses the light distributions for a luminaire. For additional information, the designer should contact the Traffic Administration Manager, Traffic Engineering Division for the latest products and specifications.

1. Light Source. The following provides information on the light sources that may be used.

   ~~a. High-Pressure Sodium (HPS). The HPS lamp produces a soft, pinkish-yellow light by passing an electric current through a sodium-and-mercury vapor.~~

   ~~b. Low-Pressure Sodium (LPS). Its disadvantage is that it requires long tubes and has poor color quality. INDOT does not allow the use of LPS on a state facility. However, a local agency can consider the use of an LPS lighting source. The LPS lamp produces a yellow light by passing an electrical current through a sodium vapor.~~

   a. Metal Halide (MH). A metal-halide lamp produces color at higher efficiency than a mercury vapor (MV) lamp. However, life expectancy for a traditional MH lamp which utilizes an electromagnetic ballast is short~~er than that for an HPS or MV~~. An MH lamp is also more sensitive to lamp orientation than other light sources. The traditional MH luminaire is used for lighting a sports arena or major sports stadium, for high-mast lighting, or for lighting a downtown area or park. Metal Halide luminaires utilizing solid state ballasts are viable options for general roadway applications. Metal halide produces good color rendition. Light is produced by passing a current through a combination of metallic vapors.

   b. Light Emitting Diode (LED). LED chips are either individually mounted onto a printed circuit board or are packaged together in one module commonly referred to as Chip on Board (COB). Chip on Board technology is newer, reduces heat generated and retained, and is more efficient. ~~are arranged in clusters which are attached to a panel~~. ~~Various designs utilize different LED types~~ Heat sinks are built into the housing to facilitate heat dissipation and maximize luminaire service

life. Light is directly emitted from the lens, so reflectors are not required, resulting in the light being delivered more efficiently than the HPS type and also resulting in less light pollution. LEDs are energy efficient, have a long life, and generate a full color spectrum resulting in good color rendition. Due to the manner in which light is emitted the arrays must be carefully arranged to provide sufficient light distribution and yet be energy efficient. Properly arranged LEDs can provide energy efficient, effective light distribution.

LED retrofits are available for existing high mast luminaires. LED modules are attached to a threaded rod which is fit into the existing housing. Luminaire dimensions should be verified as housing diameters less than 16 inches may require an attachment plate as well as the threaded rod, pending the retrofit manufacturer's specific design.

c. Light Emitting Plasma. Plasma lamps generate light by exciting gas with radio frequency power. They produce visible light without phosphor conversion which results in a higher luminaire efficiency and which eliminates color shift. The point-source light they generate results in an even distribution of light through highly efficient optics. Plasma luminaires have no electrodes which reduces maintenance requirements. They are highly efficient, have a long life, and generate a full color spectrum resulting in good color rendition. Heat sinks are built into the housing to facilitate heat dissipation and maximize luminaire service life.

d. Induction Lighting. Magnetic induction lamps also contain no electrodes resulting in an extended service life. The power used to generate light is transferred from outside the lamp to inside via electromagnetic fields. Induction lamps are also efficient light generators compared to HPS lamps.

High-Pressure Sodium (HPS) lamps produce a soft, pinkish-yellow light by passing an electric current through a sodium-and-mercury vapor amalgam. Through 2016 nearly all INDOT lighting consists of HPS lamps but since the color rendering, energy consumption, and maintenance requirements of HPS is poor compared to solid state it is no longer to be specified on INDOT projects. Individual HPS luminaires may be repaired or replaced to maintain an existing HPS system, local agencies may also use HPS on their facilities.

Low-Pressure Sodium (LPS) lamps produce a yellow light by passing an electrical current through a sodium vapor which results in the poorest color quality of all light source types- it is difficult to distinguish colors in an LPS environment. INDOT does not allow the use of LPS on a state facility; however, a local agency can consider its use on roadways under their jurisdiction. LPS typically

has been used for security lighting due to is high efficiency and in long tunnels as it may be less detrimental to the human eye than whiter light.

2. Optical System. The optical system consists of a light source, a reflector (except for certain LED models), and also a refractor (or lens for certain LED models).

   a. Light Source. Item 1 above discusses light sources that should be considered.

   b. Reflector. The reflector is used in optical control to change the direction of the light rays. Its purpose is to take that portion of light emitted by the lamp that otherwise will be lost or poorly utilized, and to redirect it to a more desirable distribution pattern. A reflector is designed to work either alone or with a refractor. Reflectors are specular or diffuse. A specular reflector is made from a glossy material that provides a mirror-like surface. A diffuse reflector is used where the intent is to spread the light over a wider area.

   c. Refractor. The refractor is another means in optical control to change the direction of the light. A refractor is made of transparent high-strength glass or plastic. Plastic is used in a high-vandalism area. However, plastic can yellow over time due to heat and ultraviolet exposure. The refractor, through its prismatic construction, controls and redirects both the light emitted by the lamp and the light reflected off the reflector. It can also be used to control the brightness of the lamp source.

3. ~~Ballast~~/Power Driver (Electronic Ballast). Each luminaire must operate with an input voltage variation of ±10% of the rated operating voltage specified~~, with non-solid state technologies this is accomplished through a built-in ballast. A ballast is used to regulate the voltage to the lamp to ensure that the lamp is operating within its design parameters. It also provides the proper open-circuit voltage to start the lamp. The ballast should be an auto-regulator type. Figure 502-4E, Lamp Data, provides the approximate expected operating wattage for a ballast based on the lamp wattage.~~

   ~~For solid state technology luminaires~~ The input voltage is controlled by a power driver. Power drivers are completely electronic and are considered to be the controlling component in the performance and service life of the luminaire. Power drivers allow for the light source to be dimmed so they provide an opportunity to reduce energy consumption through adaptive lighting (reduced light levels after a certain time at night).

[……]

d. High-Mast Luminaire. A high-mast luminaire is an enclosed unit with a reflector and a borosilicate glass refractor or lens. The luminaire is attached to the mast ring. The mounting attachment is adjustable to allow for directing the light.

[……]

502-4.04 Lighting Methodologies

~~The~~ Lighting-design methodologies ~~are those for~~ include illuminance, luminance, and small-target visibility. The Illuminating Engineering Society (IES) of North America has been the leader in the development of these procedures. Only the illuminance methodology should be used in the design of roadway (highway) lighting- lighting for facilities that do not accommodate or experience pedestrian traffic. The luminance method should be used for street lighting. "Street" for the purposes of lighting design methods and design criteria refers to urbanized areas characterized by pedestrian facilities, bicyclists, parking areas, etc., For additional information on these procedures, see the references listed in Section 502-4.01(01).

[……]

502-4.04(02) Luminance

Luminance is defined as the luminous intensity of a surface in a given direction per unit of projected area of the surface as viewed from that direction. It is measured in candelas per square foot. The luminance methodology is concerned with the measurement of light from the luminaire reflecting off the pavement surface to the motorist's eyes. This measurement is affected by the pavement's reflectivity characteristics. To obtain the lighting measurements for the roadway, readings are taken from a set of observation points spread across the roadway in a grid pattern. Compared to the illuminance methodology, the luminance methodology is considered a more-accurate representation of the motorist's visibility requirements. However, the methodology is more complicated to understand and use. Also, the pavement reflectivity must be estimated for the current time and for the future.

The design factors in luminance design include average maintained luminance (L_{avg}), minimum luminance (L_{min}), maximum luminance (L_{max}) in both the horizontal and vertical planes, as well as maximum veiling luminance (L_v), and ratios of L_{avg} to L_{min}, L_{max} to L_{min}, and L_v to L_{avg} in both planes This methodology should not be used in lighting-determination design. See Figure 502-4? to obtain the luminance design criteria and I.E.S RP 8-14 for additional guidance.

[……]

502-4.05 Design Procedure [Rev. ??? 2017]

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

For additional design information, see the references listed in Section 502-4.01(01).

Lighting-system design ~~should consider various light sources and~~ may require several iterations ~~for each type of light source~~ to produce an acceptable or optimal design. After the first run, if the design criteria are not satisfied, the initial parameters should be changed, e.g., pole spacing, mounting height~~, light source, luminaire wattage,~~ and lamp lumen output. The design should be rechecked to determine if it then satisfies the criteria. This process is repeated until the design is optimized and all criteria are satisfied.

The designer may consider one or more of these types of systems; on freeways and at interchanges a design consisting of high mast and high lumen roadway may be the best alternative:

1. High Lumen Roadway**.** These system utilizing 40 ft to 50 ft mounting heights with luminaires that operate at no more than 250 watts of power. IESNA Type II and Type III light distributions may be used.

2. High Mast. This type of system consists of any number of towers typically supporting 4 to 6 luminaires. Mounting heights may be as great as 200 ft but typically is 125 ft to 150 ft. Luminaires operate at no more than 550 watts. High mast luminaires may provide symmetric and/or asymmetric light distributions, See Section 502-4.07 for additional guidance.

3. Low Lumen-Low Mounting Height. A system utilizing 25 or 30 ft mounting heights with luminaires that operate at no more than 150 watts of power. IESNA Type II and Type III light distributions may be used.

4. Low Lumen Roadway Luminaires. A system utilizing 35 or 40 ft mounting heights with luminaires operating at no more than 150 watts of power. IESNA Type II and Type III light distributions may be used.

[…….]

502-4.05(02) Design Process [Rev. ??? 2017]

Lighting may be designed under four different scenarios. The procedural steps in designing a lighting system for each are as follows.

1. Spot Lighting. Spot lighting comprises no more than one or two lights at an intersection or other particular spot along the roadway where it is deemed necessary to identify that roadway feature at nighttime.

In this circumstance AASHTO design criteria need not be applied so it is not necessary for the designer to perform light level computations.

The design should be developed as follows:

a. Coordinate with the utility company to determine the availability of electric service and to identify the location of the service point. Reimbursement costs to the utility company should be identified in a special provision and the cost incorporated into the bid estimate.

b. Develop a plan sheet for the location. The plan sheet should include the roadway geometry, the location of the service point indicating the voltage being supplied, location of the pole(s), the orientation of the luminaire(s), ~~the light source type and luminaire wattage~~, as well as any underground wiring, conduit, handholes, and cable duct markers needed.

c. Select the appropriate pay item description- for spot lighting this should be either Low Lumen or Low-Lumen-Low Mounting Height depending on the desired/needed mounting height. The contractor will select the model to be used from the appropriate approved list of solid state luminaires.

2. Luminaire Replacement or Partial Modernizations. This type of project involves the replacement of luminaires on existing poles. Other equipment may also be replaced.

The design should be developed as follows:

a. Assembly of Information. Obtain a plan of the existing lighting system.

b. Verification of Plan. Verify that the geometrics and lighting system are accurately detailed on the existing plan sheet.

c. Confirmation of Scope. Confirm which elements in the system are to be modernized. This should be coordinated with the district Traffic Office.

d. Selection of Design Criteria. Select the appropriate AASHTO design criteria based on the type of roadway. See 502-4.06(02) for more information.

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

e. Photometric Analysis. Select a photometric curve associated with a luminaire model from INDOT list of approved solid state luminaires for the type of system being modernized. The I.E.S. distribution files are available from the manufacturer. Perform the photometric analysis to determine the illumination level and uniformity ratio and ensure that design criteria is met

~~Selection of Light Source Type. Select the optimal light source type and wattage to satisfy the design criteria in a cost effective manner. Because calculations by computer are relatively quick and easy, the designer should try a number of alternative light source types even if the first design satisfies the criteria since more than one alternative may be satisfactory. Systems with 40-ft height poles will typically utilize a luminaire that provides approximately 28,000 or 50,000 lumens of initial light output in a M-S Type II, III or Type IV IES distribution classification. See Figure 502-4C for more information on lumen output and Figure 502-4-I for information on the IES classification system.~~

~~At a minimum the alternatives should include one HPS, one LED, one plasma, and one metal halide model. Other light source types may also be considered. For systems utilizing a shorter mounting height (e.g. with streetscape projects utilizing pedestal poles), induction lighting may be viable. Only luminaire types and models that have an accessible IES light distribution file can be used. For a list of manufacturers that have approached INDOT about use of their luminaires go to Y:\TrafficManagement\Luminaire Manufacturers. Consultants and local agencies may contact their Project Manager or the Office of Traffic Administration to obtain this information.~~

~~Design optimization should include an analysis for the purpose of minimizing service costs. The lowest service cost per year alternative should be selected. The service cost is defined to be:~~

~~Service Cost per Year =~~
~~Annual Energy Cost + Annual Routine Luminaire Maintenance Costs~~
~~+ Installation Cost/Service Life~~

~~Where:~~

~~Annual Energy Cost = (Total Luminaire Wattage of the System) x (Hours Operated per Year) x (Cost of Electricity)~~

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

~~Hours Operated per Year = 4380 h~~

~~Cost of Electricity (estimated) = $0.10 per kWh (as of Oct. 2014)~~

~~The average cost of electricity for the transportation sector in the state of Indiana is available from the U.S. Energy Information Administration's Electric Monthly Report, table 5.6.b, at~~

~~*http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_b*~~.

~~The electric provider or district may have a more location specific unit cost.~~

~~Maintenance Cost for HPS should be based on re-lamping the entire system every 3 years as well as other miscellaneous work. Currently this cost is estimated at $60 per year for each 250-watt or 400-watt luminaire and $105 per year for each 1000-watt high-mast luminaire. The cost for non-HPS light sources may be estimated at $25 per year for roadway luminaires and $50 per year for high-mast luminaires plus any additional maintenance costs that are specific to the type and model. The designer should confer with the manufacturer for these specific maintenance costs; however, typically plasma emitters will need to be replaced after 50,000 (11 years). LED arrays and power drivers may also need to be replaced within the expected service life- these additional maintenance costs should be included. If manufacturer specific information is not available additional annual maintenance costs of $15 per LED or plasma roadway luminaire and $20 per LED or plasma high mast luminaire may be used; bringing the total estimated annual maintenance costs for the lighting system to $40 per roadway luminaire and $70 per year for high mast.~~

~~Recent bid history as obtained on the INDOT website should be used to estimate the cost of HPS luminaires. Cost of luminaires utilizing alternative light sources should be obtained from the manufacturer along with an estimate of the cost to install for about 1 hour of labor per luminaire. A $75 estimate can be used for labor cost.~~

~~Service life may be estimated at 20 years, including the luminaire regardless of light source type..~~

~~A Service Costs Analysis for Luminaire Modernization worksheet should be completed for each alternative considered and placed in the project file. An editable version of this worksheet is available from the Department's Editable Documents webpage at http://www.in.gov/dot/div/contracts/design/dmforms/, under Lighting. If the service cost analysis does not yield a clear choice, other factors such as the light color or district preferences should be weighed into the decision regarding the type of light source.~~

f. Electric Design. Once the luminaire model has been selected, the designer will need to determine the voltage drop for the system. Section 502-4.06(07) provides

information on how to determine the voltage drop for the lighting system. If the most cost effective model results in too much voltage drop the designer may either check the voltage drop of the second most cost effective design for use or may try additional luminaire models.

g. Preparation of Plans. The plan sheet should indicate the average illumination level and uniformity ratio and should show the location of the existing equipment being reused with an indication of what items are being replaced or added. Equipment includes the service point indicating voltage being supplied, pole(s), the orientation of the luminaire(s), underground wiring, conduit, handholes, and cable duct markers. The ~~light source type, luminaire wattage~~ luminaire type (e.g. "High Lumen Roadway"), total initial lumen output, estimated light loss factor, and the IES ~~file~~ distribution type and file number used ~~will~~ should be ~~given~~ provided on the plans ~~with a note that the distribution pattern of the actual luminaire to be supplied will be equivalent, e.g., "Luminaire shall provide a light distribution equivalent to IES distribution type GE 452918.IES." This distribution pattern is based on how a specific luminaire model distributes light, i.e., how it is designed, and also corresponds to the lumen output and power draw of the fixture~~. If a particular backlight/uplight/glare rating is needed this information should also be specified on the plans. The luminaire table, service point amp table, and the lighting ID numbers should also be included on the plans.

h. Utility Notification. If there is a change in service location or an increase in the power required the designer must coordinate with the electric provider. Reimbursement costs to the utility company should be identified in a special provision and the cost incorporated into the bid estimate.

~~i.~~ Working (Shop) Drawing Check. Working drawings will be submitted by the contractor to verify that an approved model with the lumen output and light distribution pattern given on the plans is being provided~~. As part of the working drawing approval the contractor will submit the IES photometric distribution file for each model when the IES file number is different from that indicated on the plans, i.e., when the contractor is submitting a different model than that on which the design is based. In these cases, the IES files will be provided to the design engineer of record for his/her review and concurrence that the design light level criteria will be satisfied.~~

[……..]

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

d. Selection of Optimum Design ~~and Light Source Type~~. Because recalculations by computer are relatively quick and easy, the designer should try several alternatives based on two or three of the models on the appropriate approved list. Alternatives designs may vary pole placements, trying low versus high lumen, or comparing high mast versus roadway versus a combination, even if one design satisfies the criteria. There is often more than one satisfactory alternative.

The type of system or combination of systems should be selected- see Section 502-4.05. Once that is determined the photometric analysis is performed. Photometric curves should be selected from models on INDOT's list of approved solid state luminaires for the type of system being considered. The I.E.S. distribution files are available from the manufacturer.

~~At a minimum, the alternatives should include one HPS, one LED, one plasma, and one metal halide model, although other light source types may also be considered. For systems utilizing shorter mounting height (e.g. with streetscape projects utilizing pedestal poles) induction lighting may be viable. Only luminaire types and models that have a published IES light distribution can be used. For a list of manufacturers that have approached INDOT about use of their luminaires go to Y:\TrafficManagement\Luminaire_Manufacturers_list. Consultants and local agencies may contact their Project Manager or the Office of Traffic Administration to obtain this information.~~

~~Design Optimization should include an analysis for the purpose of minimizing service costs. The lowest service cost per year alternative should be selected. The service cost is defined to be:~~

~~Service Cost per Year =~~

~~Annual Energy Cost + Annual Routine Luminaire Maintenance Costs + Installation Costs/Service life~~

~~Where:~~

~~Annual Energy Cost = (Total Luminaire Wattage of the System) x (Hours Operated per Year) x (Cost of Electricity)~~

~~Hours Operated per Year = 4380 h~~

~~Cost of Electricity (estimated) = $0.10 per kWh (as of Oct. 2014)~~

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

~~The average cost of electricity for the transportation sector in the state of Indiana is available from the U.S. Energy Information Administration's Electric Monthly Report, table 5.6.b, at~~

~~*http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_b*~~.

~~*The electric provider or district may have a more location specific unit cost. The electric provider or district may have a more location specific* unit cost.~~

~~Maintenance Cost for HPS should be based on re-lamping the entire system every 3 years as well as other miscellaneous work. Currently this cost is estimated at $60 per year for each 250-watt or 400-watt luminaire and $105 per year for each 1000-watt high mast luminaire. The cost for non-HPS light sources may be estimated at $25 per year for roadway luminaires and $50 per year for high-mast luminaires plus any additional maintenance costs that are specific to the type and model. The designer should confer with the manufacturer for these specific maintenance costs; however, typically plasma emitters will need to be replaced after 50,000 (11 years). LED arrays and power drivers may also need to be replaced within the expected service life- these additional maintenance costs should be included. If manufacturer specific information is not available additional annual maintenance costs of $15 per LED or plasma roadway luminaire and $20 per LED or plasma high mast luminaire may be used; bringing the total estimated annual maintenance costs for the lighting system to $40 per roadway luminaire and $70 per year for high mast.~~

~~Installation Cost should include poles and foundations as well as the luminaires. Recent bid history as obtained on INDOT website should be used. Cost of luminaires utilizing other light sources should be obtained from the manufacturer along with an estimate of the cost to install for about 1 hour of labor per luminaire. A $75 estimate can be used for labor cost.~~

~~Service life may be estimated at 20 years, including the luminaire regardless of light source type.~~

~~A Service Costs Analysis for New or Fully Modernized Lighting worksheet should be completed for each alternative considered and placed in the project file. An editable version of this worksheet is available for download from are available for download from the Department's Editable Documents webpage at http://www.in.gov/dot/div/contracts/design/dmforms/, under Lighting. If the service cost analysis does not yield a clear choice, other factors such as the light~~

~~color or district preferences should be weighed into the decision regarding the type of light source.~~

i. Selection of Equipment ~~and Light Output Characteristics~~. In the preliminary design, initial assumptions should be made regarding the equipment composition and light output. This includes mounting height, pole setback distance, ~~light source,~~ mast-arm length, light source type, lamp wattage, etc. A 40-ft height pole should be used with a luminaire that provides approximately 28,000 or 50,000 lumens of initial light output in an M-S-Type II, III or Type IV IES distribution classification. See Figure ~~502-4-I~~ 502-4G for information on the IES classification system. Figure ~~502-4E,~~ 502-4C Lamp Data, provides the information on lighting levels for HPS lighting sources. See Sections 502-4.03 and 502-4.06(03) for additional information on equipment selection. After selecting the luminaire equipment, the photometric data sheet should be obtained from the manufacturer for the luminaire selected.

[…..]

$$\textit{Uniformity Ratio} = \frac{\textit{Average Maintained Illumination Value}}{\textit{Minimum Maintained Illumination Value}}$$

(Equation 502-4.05)

~~When comparing alternative designs that yield approximately equivalent annual service costs the designer should also consider the number of poles- from a safety consideration the fewer the better.~~

e. Electric Design. Once the type, number, size, and location of the luminaires are determined, the electric voltage drop should be determined for the system. Section 502-4.06(07) provides this information.

f. INDOT Pre-Design Approval. For a consultant-designed project, the consultant should ~~submit the service cost analysis worksheets and~~ discuss the optimum alternatives with the Traffic Review Team prior to preparing the plans to expedite project development. Upon approval from INDOT, FHWA if necessary, and the local utility company, the final development of the plans may proceed.

g. Preparation of Plans. Once the final design has been selected, the plan sheets, quantities, cost estimate, voltage drop calculations, circuit schematic layouts, and special provisions, should be submitted to the Traffic Review Team for review.

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

The ~~light source type, luminaire wattage~~ luminaire type (e.g. "High Lumen Roadway"), total initial lumen output, estimated light loss factor, luminaire table, service point amp table, and the lighting ID numbers should be included on the plans. Additionally the IES ~~file~~ distribution type and file number used in the design will be given on the plans ~~with a note that distribution pattern of the actual luminaire to be supplied will be equivalent, e.g., "Luminaire shall provide a light distribution equivalent to IES distribution type GE 452918.IES."~~. If a particular backlight/uplight/glare rating is needed this information should also be specified on the plans

~~h.~~ Working (Shop) Drawing Check. Working drawings will be submitted by the contractor to verify that an approved model with the lumen output and light distribution pattern given on the plans is being provided. ~~As part of the working (shop) drawing approval the contractor will submit the IES photometric distribution file for each model when the IES file number is different from that which is indicated on the plans, i.e., when the contractor is submitting a different model than that on which the design is based. In these cases, the IES files will be provided to the design engineer of record for review and concurrence that the design light level criteria will be satisfied.~~

[……..]

d. Selection of Equipment. In the preliminary design, the designer will need to make some initial assumptions regarding the equipment composition. This includes mounting height, pole setback distance, mast arm length, ~~light source type,~~ luminaire wattage, photometric distribution pattern (INDOT typically uses M-S-Type II, III, or IV), and initial lumen output (typically 28,000 or 50,000). See Sections 502-4.03 and 502-4.06(03) for additional details on equipment selection. Normally mounting heights and mast arm lengths will be uniform through the project limits. If the project ties into adjacent lighting systems consideration should be given to matching these considerations.

~~At a minimum the alternatives should include one HPS, one LED, one plasma, and one metal halide model, although other light source types may also be considered. For systems utilizing shorter mounting height (e.g. with streetscape projects utilizing pedestal poles) induction lighting may be viable. Only luminaire types and models that have an accessible IES light distribution file can be used. For a list of manufacturers that have approached INDOT about the use of their luminaires go to Y:\TrafficManagement\Luminaire Manufacturers. Consultants and local agencies may contact their Project Manager or the Office of Traffic Administration to obtain this information.~~

e. Selection of Layout Arrangement. Section 502-4.06(04) provides information on commonly used lighting arrangements. The selection of an appropriate layout design depends upon local site conditions and the engineer's judgment. Section 502-4.06(05) provides the roadside safety considerations in selecting the lighting arrangements. Section 502-4.06(06) provides other layout considerations.

f. Luminaire Spacing. For an INDOT-route lighting project, use the illuminance methodology to determine the appropriate luminaire spacing. This step is conducted by the computer.

Normally for a tangent alignment where roadway width is constant, spacing will be uniform through the project limits. If the project ties into adjacent lighting systems consideration should be given to matching the spacing.

g. Check for Uniformity. Once the spacing has been determined, the designer should check the uniformity of light distribution and compare this to the criteria selected in Item c. Use the following equation to determine the uniformity ratio:

$$\text{Uniformity Ratio} = \frac{\text{Average Maintained Illumination Value (Equation 502-4.05)}}{\text{Minimum Maintained Illumination Value}}$$

h. Selection of Optimum Design. Because recalculations by computer are relatively quick and easy, the designer should try several alternatives even if the first design satisfies the criteria, such as varying placements, trying low versus high lumen, or comparing high mast versus roadway versus a combination. There is often more than one satisfactory alternative.~~. Design Optimization should include an analysis for the purpose of minimizing service costs. The service cost is defined to be:~~

The type of system or combination of systems should be selected- see Section 502-4.05. Once that is determined the photometric analysis is performed. Photometric curves should be selected from luminaire models on the INDOT list of approved solid state luminaires for the type of system selected. The I.E.S. distribution files are available from the manufacturer.

~~Service Cost per Year =~~

~~Annual Energy Cost + Annual Routine Luminaire Maintenance Costs + Installation Cost/ Service Life~~

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

~~Where:~~

~~Annual Energy Cost = (Total Luminaire Wattage of the System) x (Hours Operated per Year) x (Cost of Electricity)~~

~~Hours Operated per Year = 4380 h~~

~~Cost of Electricity (estimated) = $0.10 per kWh (as of Oct. 2014)~~

~~The average cost of electricity for the transportation sector in the state of Indiana is available from the U.S. Energy Information Administration's Electric Monthly Report, table 5.6.b, at~~

~~*http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_b*.~~

~~The electric provider or district may have a more location specific unit cost.~~

~~The electric provider or district may have a more location specific unit cost.~~

~~Maintenance Cost for HPS should be based on re-lamping the entire system every 3 years as well as other miscellaneous work. Currently this cost is estimated at $60 per year for each 250-watt or 400-watt luminaire and $105 per year for each 1000-watt high-mast luminaire. The cost for non-HPS light sources may be estimated at $25 per year for roadway luminaires and $50 per year for high-mast luminaires plus any additional maintenance costs that are specific to the type and model. The designer should confer with the manufacturer for these specific maintenance costs; however, typically plasma emitters will need to be replaced after 50,000 (11 years). LED arrays and power drivers may also need to be replaced within the expected service life- these additional maintenance costs should be included. If manufacturer specific information is not available additional annual maintenance costs of $15 per LED or plasma roadway luminaire and $20 per LED or plasma high mast luminaire may be used; bringing the total estimated annual maintenance costs for the lighting system to $40 per roadway luminaire and $70 per year for high mast.~~

~~Estimated cost of the system should include poles, foundations, wiring, conduit, handholes, service points as well as the luminaires. Recent bid history as obtained on INDOT website should be used. Cost of alternative technology luminaires should be obtained from the manufacturer along with an estimate of the cost to install for about 1 hour of labor per luminaire. A $75 estimate can be used for labor cost.~~

~~Service life may be estimated at 20 years, including the luminaire regardless of light source type.~~

~~A Service Costs Analysis for New or Fully Modernized Lighting worksheet should be completed for each alternative considered and placed in the project file. An editable version of this~~

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

~~worksheet is available for download from the are available for download from the Department's Editable Documents webpage at http://www.in.gov/dot/div/contracts/design/dmforms/, under Lighting. If the service cost analysis does not yield a clear choice, other factors such as the light color or district preferences should be weighed into the decision regarding the type of light source.~~

~~When comparing alternative designs that yield approximately equivalent annual service costs the designer should also consider the number of poles- from a safety consideration the fewer the better.~~

i. Electric Design. Once the type, number, size, and location of the luminaires are determined, the designer will need to determine the appropriate electric voltage drop for the system. Section 502-4.06(07) provides information on how to determine the voltage drop for the lighting system. For light source types other than HPS, the design current (amperage) requirement should be obtained from the manufacturer.

j. Preparation of Plans. Once the final design has been selected, the lighting designer will prepare and submit to the Traffic Review Team the plan sheets, design criteria, initial lumen output, estimated light loss factor, photometric files, ~~service cost analysis worksheets~~, luminaire shop drawing, quantities, cost estimate, voltage drop calculations, circuit schematic layouts for review. The plan sheet shall indicate the luminaire type (e.g. "High Lumen Roadway"), the IES photometric distribution file number used in the design, the ~~luminaire type and~~ initial lumen output, and should include the luminaire table, service point amp table, and the lighting ID numbers. If a particular backlight/uplight/glare rating is needed this information should also be specified on the plans.

k. Plans Submission. Plans should be submitted in accordance with the project witness and hold point schedule

[……]

502-4.06(02) Design Criteria [Rev. xxx 2017]

The lighting criteria vary according to the design methodology, highway classification, area classification, and pavement type. The following provide AASHTO and INDOT lighting design criteria.

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

1. Figure ~~502-4G~~ 502-4E provides the roadway illuminance design criteria.

2. NCHRP *Report 672, Roundabouts: An Informational Guide*, provides the recommended illuminance design criteria for roundabout lighting.

The Uniformity Ratios given in Figure 502-4G should be regarded as target values. A driver's visual ability may be adversely affected by lighting that varies significantly from the recommended uniformity value, i.e. it is possible for lighting to be too uniform or too non-uniform.

502-4.06(03) Equipment Considerations [Rev. xxx 2017]

Figure ~~502-4H~~ 502-4F, Luminaire Geometry, illustrates the terms used in defining and designing luminaires, e.g., mounting height, overhang, rotation. Other equipment considerations for design are as follows.

1. Light Distribution. In determining the lighting-design layout, the expected light distribution must be known for the luminaire. Photometric data can be obtained from luminaire manufacturers. The proper distribution of light from the luminaire is a factor in the design of efficient lighting. Figure ~~502-4 I~~ 502-4G, Luminaire Classification System, provides the IES classifications for luminaire light distributions: width, spacing, and glare control. Figure ~~502-4J~~ 502-4H, Luminaire Placement and Light Type, provides additional guidance for the selection of luminaires based on these classifications. Figure ~~502-4K~~ 502-4I, Plan View for Luminaire Coverages, illustrates a plan view of a roadway which has been modified to show a series of Longitudinal Roadway Lines (LRL) and Transverse Roadway Lines (TRL) and how these distribution factors are interrelated. The following describes these classifications.

[……]

   b. Lateral Light Distribution. The IES has developed the lateral light distributions which are provided in Figure ~~502-4K~~ 502-4I. The following provides information on the placement for lateral light distribution.

      i. Type I. The luminaire is placed in the center of the street or area where lighting is required. It produces a long, narrow, oval-shaped lighted area. Some types of high-mast lighting are also considered a modified form of Type I.

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

ii. Type I, 4-Way. The luminaire is placed in the center of the intersection and distributes the light along the four legs of the intersection. This type applies to high-mast lighting.

[……]

c. Control of Distribution (for HPS and Metal Halide light sources only). As the vertical light angle increases, discomforting glare also increases. To distinguish the glare effects on the motorist from the light source, IES has defined the glare effects as follows.

[……]

2. Mounting Height. There are two criteria for determining a preferred luminaire mounting height: the desirability of minimizing direct glare from the luminaire and the need for a reasonably uniform distribution of illumination on the street surface. A higher-wattage ~~bulb~~ allows the use of a higher mounting height, fewer luminaires, and fewer support poles, and still provides ~~the~~ desirable lighting quality. A higher mounting height tends to produce the most efficient design. For practical and aesthetic reasons, the mounting height should remain constant throughout the system. The manufacturer's photometric testing results are required to determine the appropriate adjustments for mounting height. The mounting height for INDOT projects should be at least 30 ft but no more than 50 ft, using an even 5-ft increment.

3. Coefficient of Utilization. The coefficient-of-utilization curve defines the percentage of bare-lamp lumens that are required to light the desired surface. Figure ~~502-4L~~ 502-4J illustrates a sample coefficient-of-utilization curve. The curve and the isolux diagram are used to determine the amount of illumination to a given point on the pavement. The curve provides a value for the street side of the luminaire and the private-property side. If the luminaire is located over the roadway, the private-property-side value should also be used to determine the level of illumination. The manufacturer is required to provide these charts with its photometric testing results.

4. Light-Loss Factor, or Maintenance Factor. The efficiency of a luminaire is reduced over time. This reduction must be determined to properly estimate the light available at the end of the lamp, emitter, or LED service life. The maintenance factor ~~for HPS lighting~~ can range ~~from 0.50 to 0.90 and~~ from 0.50 to 0.70 for LED lighting (0.50 to 0.90 for HPS). Figure ~~502-4F~~ 502-4D, Lighting Design Parameters, provides the factors used for designing a lighting system. The maintenance factor is the product of the following.

[……]

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

502-4.07 High-Mast Lighting Design [Rev. Jan. 2016]

The design of a high-mast lighting system consists of the same procedures as discussed in Section 502-4.05(02). The following should also be considered.

1. Lighting Source~~. For HPS designs, if used, a 130,000 lumen (1000 watt) light source should be used.~~ For LED and plasma design the lumen and wattage requirements may vary. The number of required luminaires should be determined based on the area to be lighted and target design criteria as shown in Figure ~~502-4U~~ 502-4E. ~~At a minimum the designer should consider one HPS, one LED, and one plasma model when determining the optimal design.~~

[……]

4. Design. The methodologies for checking the adequacy of uniformity are the point-by-point method and the template method. The point-by-point method checks illumination by using the manufacturer's isolux diagram. The total illumination at a point is the sum of the contributions of illumination from all luminaire assemblies within the effective range of the point. The template methodology uses isolux templates to determine the appropriate location for each tower. The templates may be moved to ensure that the minimum-maintained illumination is provided, and that the uniformity ratio has been satisfied.

   A retaining wall should be included with the concrete pad at the base of the tower if the surrounding ground's slope is steeper than 5:1. The height of the retaining wall should be determined from Figure ~~502-4V~~ 502-4T.

   [……]

5. Information To Be Shown on Plans. This includes the tower location, foundation details if not standard, estimated mounting height, retaining-wall height if applicable, and number of luminaires. The IES ~~file~~ distribution type and file number used in the design will be given on the plans ~~with a note that the distribution pattern of the actual luminaire to be supplied will be equivalent, e.g., "Luminaire shall provide a light distribution equivalent to IES distribution type GE 452918.IES."~~. The plans should ~~indicate the light source type and also~~ include ~~luminaire wattage,~~ total initial lumen output, luminaire table, service point amp table, and the lighting ID numbers.

   ~~When a high mast luminaire retrofit is selected as the best option, the designer should include a unique special provision that incorporates any needed changes to the standard specifications on High Mast Luminaires, as well as information on the existing high mast luminaire since the housing will be re-used. At a minimum this information should include~~

BACKUP 02

IDM CHAPTER 502-4.0 HIGHWAY LIGHTING (DRAFT, ONLY AFFECTED SECTIONS ARE SHOWN)

~~manufacturer, model name/number, and dimensions of the housing. Additionally the designer should include a pay item for Luminaire, High Mast, Retrofit, ___ (watts),….each. The unique special provision should include a basis of payment section indicating that in addition to the cost of the LEDs and mounting hardware, the cost of all work necessary to remove, disassemble, re-assemble with the new LED modules, and then reinstall the existing luminaire is included in the Retrofit pay item.~~

BACKUP 03

CHANGES TO GIFE SECTION 26 TRAFFIC CONTROL DEVICES AND LIGHTING

SECTION 26 – TRAFFIC CONTROL DEVICES AND LIGHTING

[……]

26.x LIGHTING LEVELS *(Adop. xx-xx-17)*

Illumination levels, the amount of light that reaches the pavement, and the Correlated Color Temperature (CCT) can be verified after installation through the use of a Chroma meter. The Office of Traffic Administration has this equipment and may be contacted for this test if needed or desired.

COMMENTS AND ACTION

807-T-193 LUMINAIRES
807-T-XXX HIGH PRESSURE SODIUM LUMINAIRES

DISCUSSION:
This item was introduced and presented by Mr. Boruff who stated that High Pressure Sodium, HPS, luminaires are still allowed in our standard specifications but are no longer the state of the art technology. Over the last 6 years, significant advancements have been made in solid state lighting technology, particularly LED, resulting in luminaires that require less maintenance and are much energy efficient compared to HPS. As INDOT is considering and will likely undertake a statewide energy savings initiative on highway lighting it is solid state technology that will be used.

Mr. Boruff therefore proposes to eliminate HPS as a design alternative and remove references to HPS from the Standard Specifications. A Recurring Special Provision for HPS luminaires has been created for maintenance and LPA contracts.

The lighting design process will be further simplified as a solid state luminaire approved list is being established, the designer need not perform iterations with all possible light source technologies but will be able to select a model or two from the approved list as a basis for the design. The other models on the list will be compatible with the design so the Contractor will be freed up in their bidding.

Mr. Boruff also proposes to migrate most of the working drawing requirements for roadway, underpass, and high mast luminaires from the 920 and 807 sections respectively to the test method, ITM 957. Working drawing documentation is extensive so use of an approved list greatly reduces effort on the part of the manufacturer, contractor, project staff, and designer.

Other technical improvements have been made to the specification on the recommendation of industry and the Purdue Office of Energy Efficiency and Reliability. These changes are incorporated into a revised ITM.

Further edits have been incorporated as recommended by Ms. Butcher and as discussed and approved by the committee.

Following the meeting, more changes were made to the IDM 502 and will appear with the release of the Technical Advisory.

COMMENTS AND ACTION

807-T-193 LUMINAIRES
807-T-XXX HIGH PRESSURE SODIUM LUMINAIRES

(CONTINUED)

Motion: Mr. Boruff Second: Ms. Phillips Ayes: 9 Nays: 0 FHWA Approval: YES	Action: ____ Passed as Submitted _X_ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: SECTION 807, begin on pg 799.	_X_ 2018 Standard Specifications _____ Revise Pay Items List
Recurring Special Provision affected: 807-T-193 LUMINAIRES	_X_ Create RSP (No.807-T-217)(HPS) Effective Sept. 01, 2017 Letting RSP Sunset Date:
Standard Drawing affected: NONE	_X_ Delete RSP (No.807-T-193) Effective _____ Letting RSP Sunset Date: 2018 SS book
Design Manual Sections affected: CHAPTER 502-4.0.	_____ Standard Drawing Effective
GIFE Sections cross-references: SECTION 26.	_____ Create RPD (No. _____) Effective _____ Letting _X_ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Ground mounted panel sign supports: 1) failures have occurred for several reasons - too much sign area, elevation of sign not accounted for in the standard design, overdrilling of the perforated holes in the fuse plates leading to an overweakened plate, and undertightened hardware at the upper fuse plate breakaway. 2) The range of sign sizes provided for in the current post selection table is insufficient for current letter height/sign sizing requirements. 3) Post size selections are based on an older AASHTO design specification. 4) Payment amounts for excavation of class X material do not accurately reflect current costs.

Sheet sign series: the current standards do not require fluorescent yellow sheeting for warning signs - this conspicuity enhancement measure has been proven to significantly reduce crashes in horizontal curves and is beneficial in other applications as well.

PROPOSED SOLUTION: Revise the 802-SNGP series and Standard Specifications by: 1) Updating the structural and foundation design per the current 2015 LRFD AASHTO Design Specifications. In doing so the post selection tables will be expanded to account for larger sign sizes and variations in elevation differences between the top of the foundation and the bottom of the sign, referred to as "clear height". 2) Changing the detail for the connection of the middle and upper beam sections by specifying a non-perforated hinge plate on the back side- this plate is stronger than the perforated fuse plate currently specified but still meets FHWA breakaway requirements. 3) Allowing the use of direct tension indicators (hardware) at the upper fuse plate joint. DTI's are an inexpensive option that facilitates proper tightening. 4) update the cost for excavation of class X material in 206.11; in 206.02 clarify which foundation types require full depth foundations when class X material is encountered.

The 805-SGFB drawing series is included in the proposal as it contains references to the SNGP series that must be changed.

The 919.01 section is being revised to remove the reference to demountable letters as they are no longer used on panel signs.

Revise the 802-SNGS series to call for fluorescent yellow sign sheeting for all warning signs including those placed overhead.

APPLICABLE STANDARD SPECIFICATIONS: 206.02, 206.11, 802.07, 910.14, and 919.01

APPLICABLE STANDARD DRAWINGS: 802-SNGP, 802-SNGS, and 805-SGFB series

APPLICABLE DESIGN MANUAL SECTION: 502-1.0

APPLICABLE SECTION OF GIFE: 26

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: Yes, for Wide Flange Sign Post Foundations (number of types therefore code numbers will be decreased)

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Traffic Standards Subcommittee, District Maintenance, Logistic Support Center, the Standards and Traffic Safety Offices

IMPACT ANALYSIS (attach report): yes

Submitted By: David Boruff

Title: Manager, Office of Traffic Administration

Organization: INDOT

Phone Number: 317-234-7975

Date: 12/28/16

Mr. Boruff
Date: 01/19/17

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

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? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? Yes

Congestion/travel time? No

Ride quality? N/A

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? Yes

For construction workers? N/A

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? No

Design process? Yes

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? Yes

Is this item editorial? No

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

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 206 - STRUCTURE EXCAVATION
206.02(b) EXCAVATION FOR FOUNDATION OF TRAFFIC SUPPORT STRUCTURES
206.11 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 206, BEGIN LINE 46, DELETE AND INSERT AS FOLLOWS:

(b) Excavation for Foundation of Traffic Support Structures

If class X material as defined in 206.02(a) is encountered within the limits of foundation excavation for traffic support structures, overhead sign structure foundations, strain pole, or high mast lighting foundations, the foundation shall be located as directed.

~~If class X material in accordance with 206.02(a)1 is encountered, the material shall be excavated to allow the foundation to be embedded a distance that is equal to 1/2 of the remaining depth of the foundation before the material was encountered, except for overhead sign structures, strain poles, and high mast lighting foundations.~~

If class X material in accordance with 206.02(a)1 is encountered at foundations for ~~O~~overhead sign structure*s* ~~foundations~~, strain poles, *signal cantilever structures,* ~~and~~ high mast lighting *poles, and ITS towers, the* ~~foundations~~ *material* shall be excavated to allow the foundation to be embedded as shown on the plans or as directed.

If class X material in accordance with 206.02(a)1 is encountered at foundations for wide flange sign supports, signal pedestals, conventional light poles, the material shall be excavated to allow the foundation to be embedded a distance that is equal to 1/2 of the remaining depth of the foundation before the material was encountered or to a minimum 3 ft depth whichever is greater.

If class X material in accordance with 206.02(a)2, 206.02(a)3, or 206/02(a)4 is encountered, the material shall be removed to the total depth of the foundation as shown on the plans.

SECTION 206, BEGIN LINE 286, DELETE AND INSERT AS FOLLOWS:

If class X excavation is encountered at locations for sign foundations, traffic signal foundations, ~~and~~ highway illumination, *and ITS* foundations and there is no contract unit price for class X excavation, payment will be made as follows:

1. $500.00~~*700.00*~~ if the quantity of class X excavation is less than or equal to 1 cubic yard per foundation.

2. $500.00~~*700.00*~~ per cu yd for all quantities over 1 cubic yard.

In addition to the payment for class X excavation at sign foundations, traffic signal foundations, ~~and~~ highway illumination, *and ITS* foundations when there is no contract unit price for class X excavation, a mobilization and demobilization payment for class X excavation will be paid in the amount of $1,500.00~~*2,000.00*~~ per occurrence. Multiple mobilization and demobilization payments will be paid if all project foundation locations are not

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 206 - STRUCTURE EXCAVATION
206.02(b) EXCAVATION FOR FOUNDATION OF TRAFFIC SUPPORT STRUCTURES
206.11 BASIS OF PAYMENT

made available in a reasonable time frame while the equipment is on the project. The cost of this work will be included in a change order developed in accordance with 109.05 and paid as class X excavation and a mobilization and demobilization for class X excavation.

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 802 - SIGNS
802.07 INSTALLING SUPPORTS

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 802, BEGIN LINE 99, DELETE AND INSERT AS FOLLOWS:

802.07 Installing Supports

(a) Posts

Posts shall be vertical after installation. All damaged posts shall be removed and replaced with an acceptable post.

Square sign post foundations shall be reinforced anchor base or unreinforced anchor base as shown on the plans. If sign post type A or sign post type B is specified, square sign posts may be used. Splicing of square steel sign posts will not be allowed.

In locations where class X excavation is encountered~~, the Engineer will determine the design for the installation of foundations. If~~ *if* the total length of the anchor bolts cannot be used, they shall be cut off. A steel plate measuring 6 by 6 by 1/2 in. shall be welded to the bottom of the bolts. The plate shall have a hole cut which allows the bolt to pass through it and the plate and bolt shall be completely welded together around the circumference of the bolt on both sides of the plate. No butt welding is allowed. The length of the bolts shall allow the plate to be covered by 3 to 4 in. of concrete at the bottom of the foundation.

Base plate bolts for panel sign post installations shall be tightened in accordance with 711.65(d). Bolts at the fuse or hinge plate joint ~~may~~shall be tightened in accordance with 711.65(d) or by the direct tension indicator, DTI, method.

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 910 - METAL MATERIALS
910.14(b) WIDE FLANGE POSTS

The Standard Specifications are revised as follows:

SECTION 910, BEGIN LINE 912, DELETE AND INSERT AS FOLLOWS:

(b) Wide Flange Posts

Structural steel members for the support of signs shall be in accordance with ASTM A 36 and ASTM A 709, grade 36. These members shall be galvanized in accordance with ASTM A 123. Base plates and stiffeners shall be in accordance with the requirements of ASTM A 709, grade 36. Fuse *and hinge* plates shall be in accordance with the requirements of ASTM A 36 and shall be galvanized in accordance with ASTM A 123. All bolts, nuts, and washers shall be high strength and be in accordance with ASTM ~~A 325~~*F 3125. Direct Tension Indicator hardware shall be in accordance with ASTM F 959.*

All holes shall be drilled. All cutting shall preferably be saw cuts however flame cuts as specified in 711.13 may be allowed. Metal projecting beyond the plane of the plate face will not be allowed.

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 919 - TRAFFIC SIGNS
919.01(c) LETTERS, NUMBERS, SYMBOLS, AND ACCESSORIES

The Standard Specifications are revised as follows:

SECTION 919, BEGIN LINE 105, DELETE AS FOLLOWS:

(c) Letters, Numbers, Symbols, and Accessories

Letters, numbers, symbols, and accessories shall be demountable.

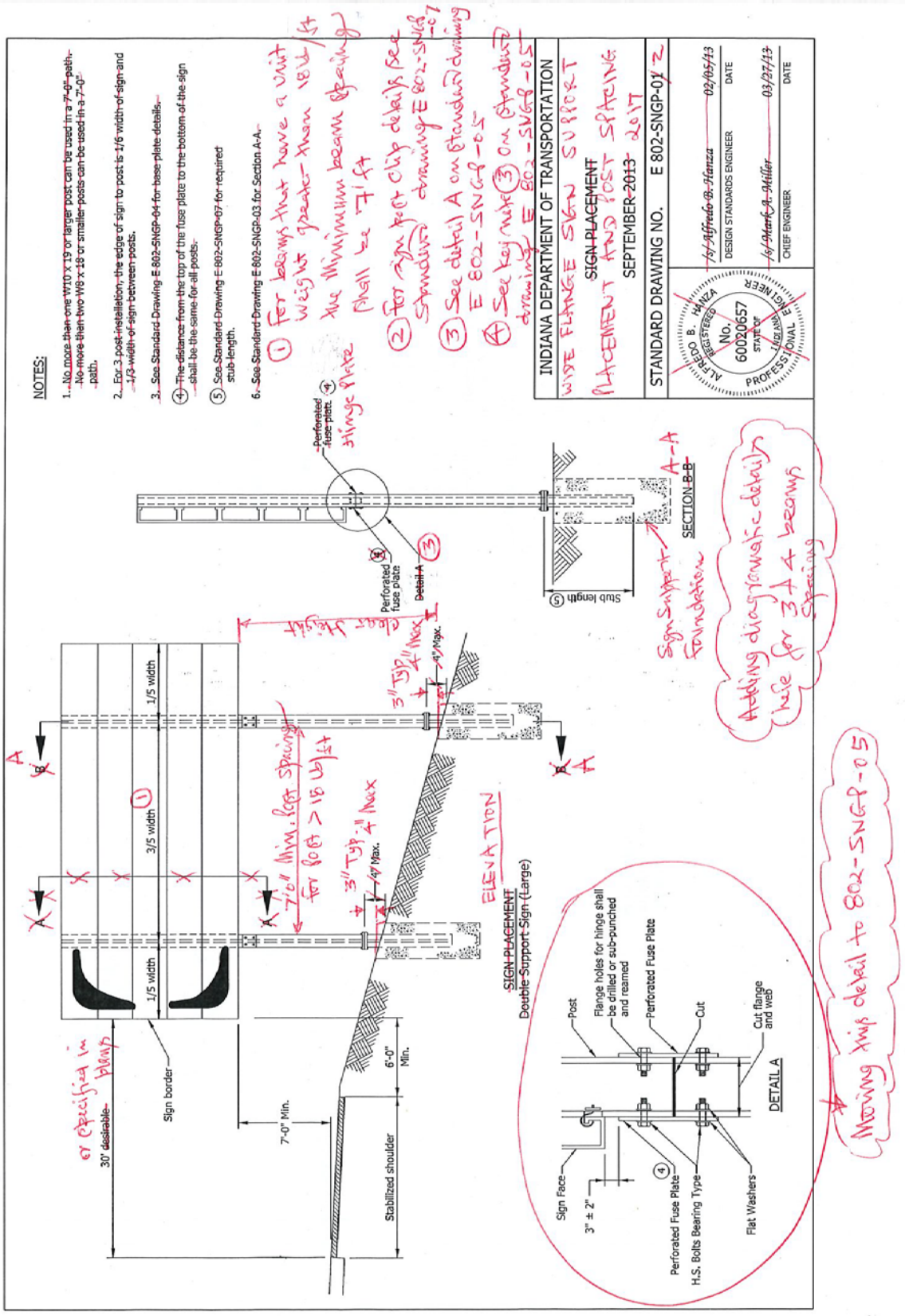
The reflective sheeting shall be of the same type as used on the background and mechanically applied to the properly prepared aluminum in a manner prescribed by the sheeting manufacturer.

Each demountable legend unit, supplemental panel, and border frame shall be supplied with mounting holes and shall be secured to the sign face with aluminum rivets with aluminum mandrels. Adhesives that, when removed, may damage the sign face, legend unit, or border shall not be used to hold the unit in place.

~~Completed demountable units shall be dipped coated with a high gloss clear finish coat as specified by the sheeting manufacturer. The finished units shall be clean cut, sharp, and have essentially a plane surface.~~

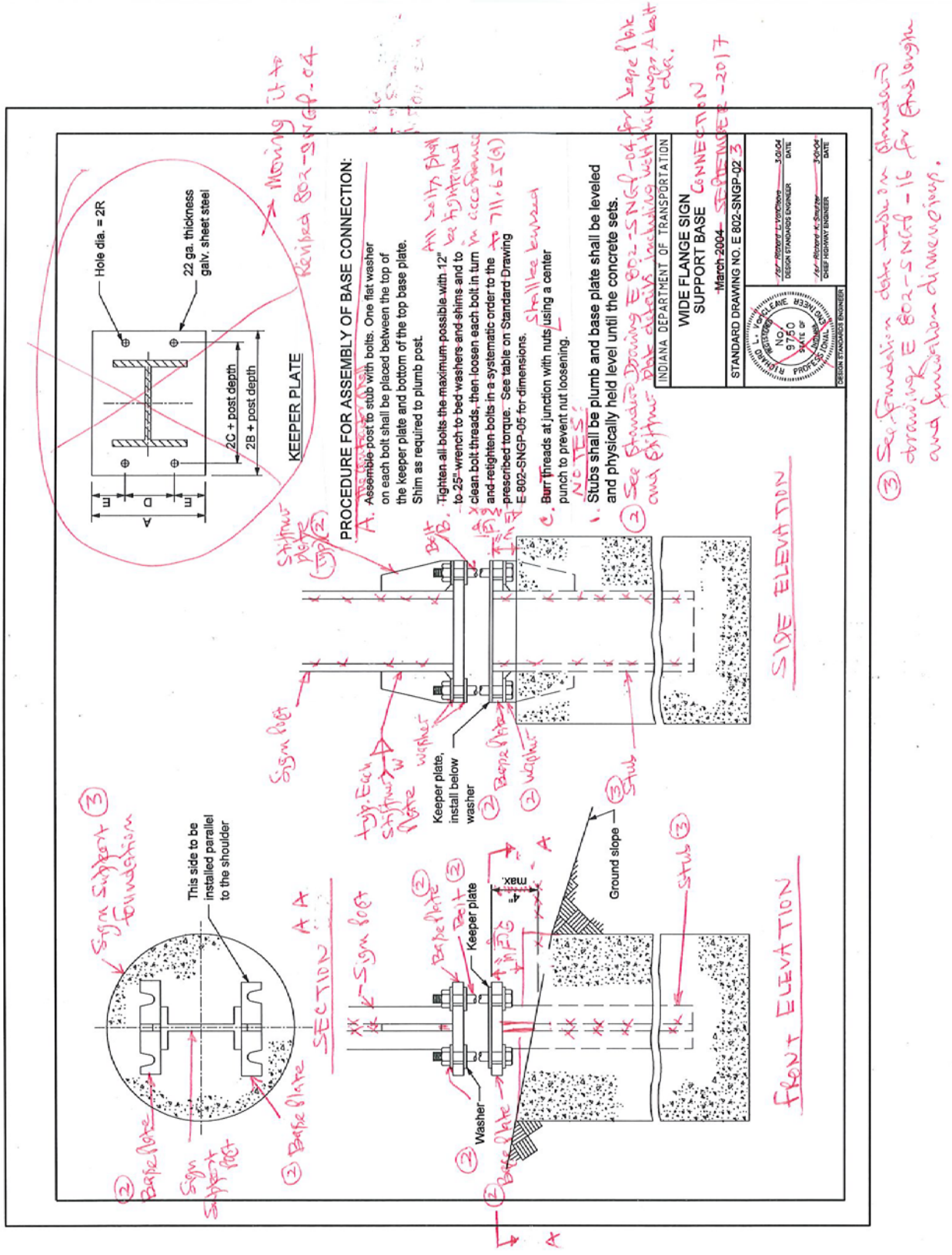
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-01 SIGN PLACEMENT (WITH MARKUPS)



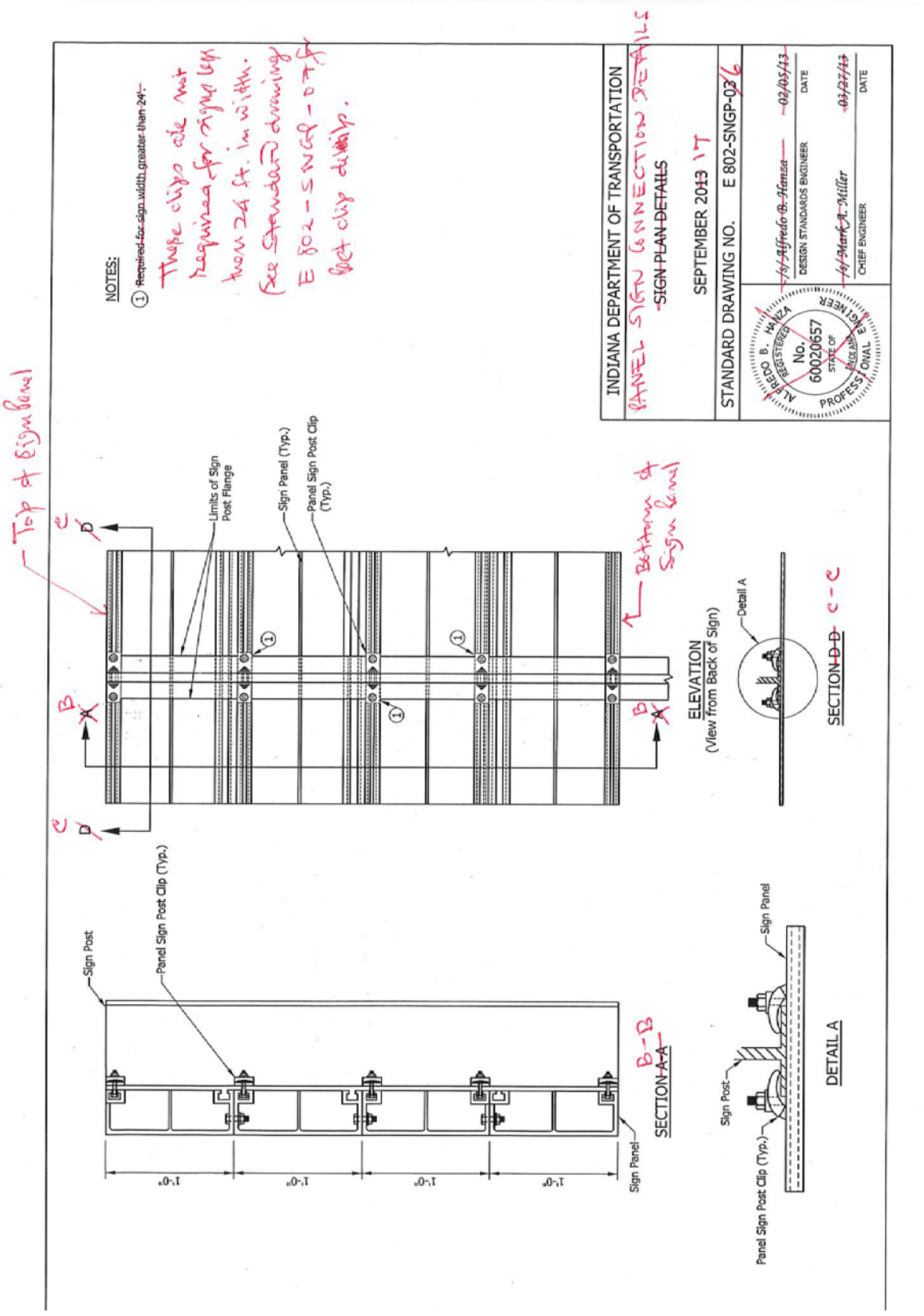
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-02 WIDE FLANGE SIGN SUPPORT BASE (WITH MARKUPS)



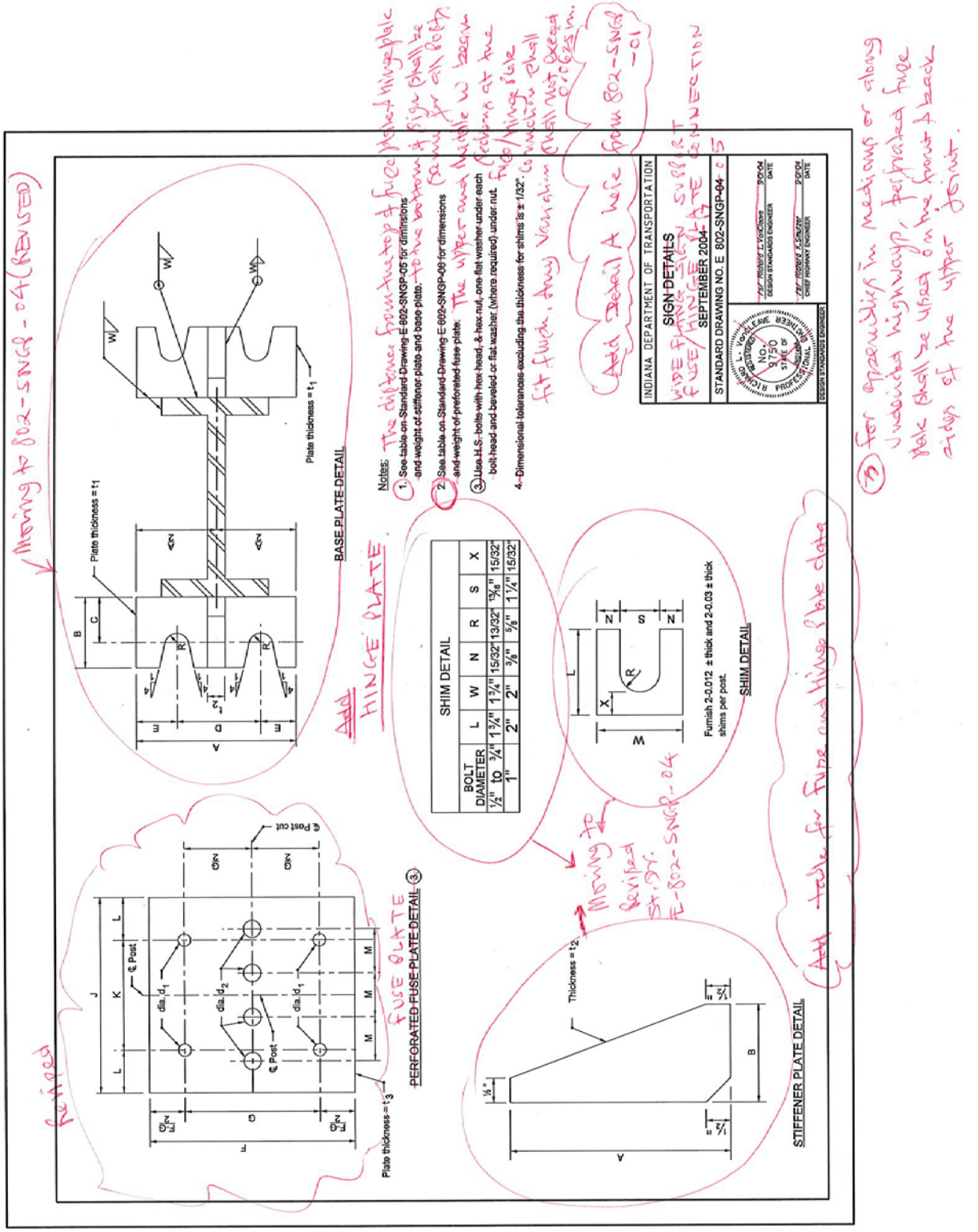
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-03 SIGN PLAN DETAILS (WITH MARKUPS)



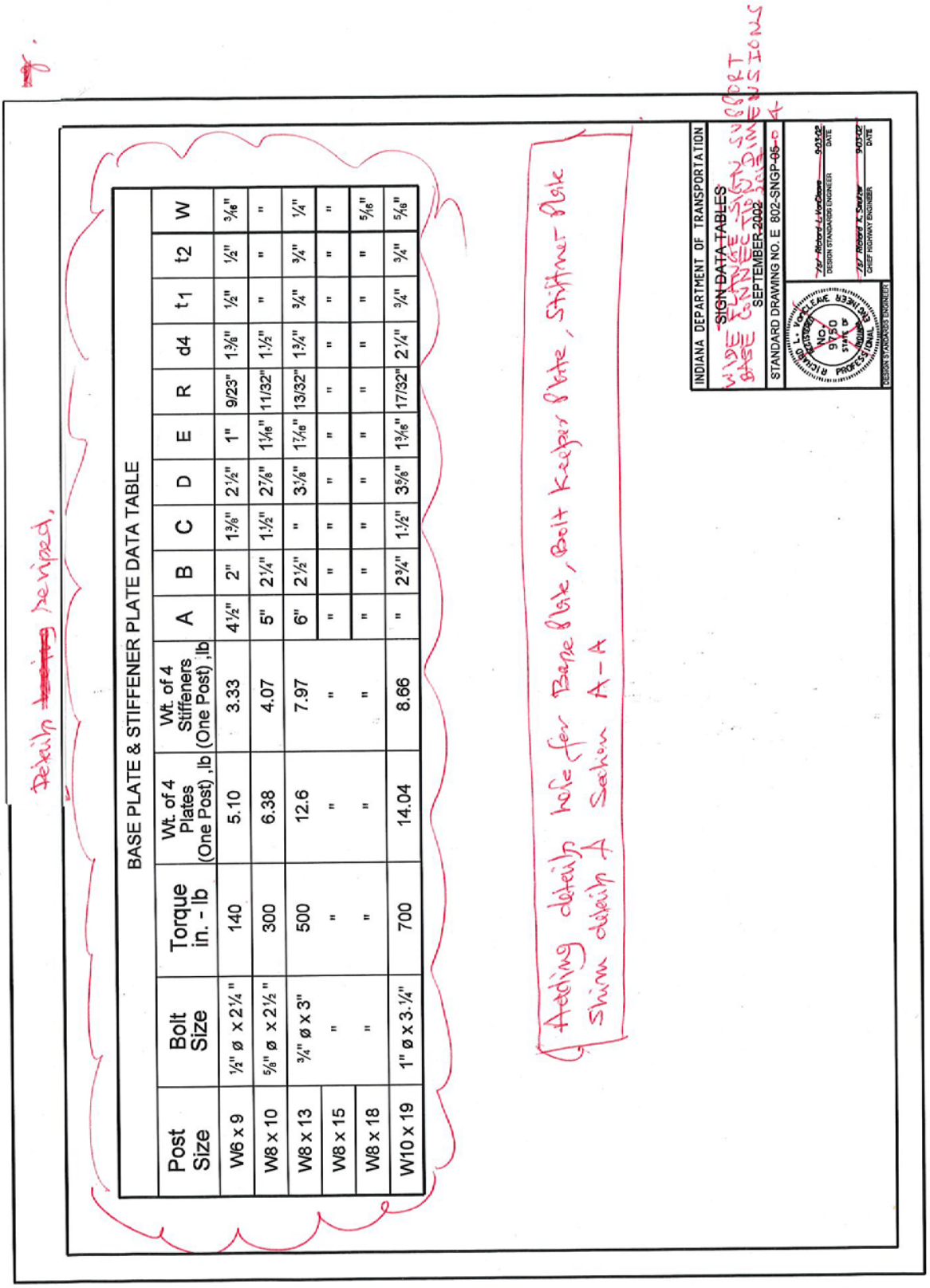
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-04 SIGN DETAILS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-05 SIGN DATA TABLES (WITH MARKUPS)



BASE PLATE & STIFFENER PLATE DATA TABLE

Post Size	Bolt Size	Torque in. - lb	Wt. of 4 Plates (One Post), lb	Wt. of 4 Stiffeners (One Post), lb	A	B	C	D	E	R	d4	t1	t2	W
W6 x 9	½" ø x 2¼"	140	5.10	3.33	4½"	2"	1⅜"	2½"	1"	9/23"	1⅜"	½"	½"	⅜"
W8 x 10	⅝" ø x 2½"	300	6.38	4.07	5"	2¼"	1½"	2⅞"	1⅛"	11/32"	1½"	"	"	"
W8 x 13	¾" ø x 3"	500	12.6	7.97	6"	2½"	"	3⅛"	1⅞"	13/32"	1¾"	¾"	¾"	¼"
W8 x 15	"	"	"	"	"	"	"	"	"	"	"	"	"	"
W8 x 18	"	"	"	"	"	"	"	"	"	"	"	"	"	⅝"
W10 x 19	1" ø x 3.¼"	700	14.04	8.66	"	2¾"	1½"	3⅝"	1⅜"	17/32"	2¼"	¾"	¾"	⅝"

Adding details for Base Plate, Bolt Keeper Plate, Stiffner Plate
Shim details A Section A-A

INDIANA DEPARTMENT OF TRANSPORTATION
SIGN DATA TABLES
WIDE FLANGE SIGN SUPPORT
SEPTEMBER 2002
STANDARD DRAWING NO. E 802-SNGP-05-c

RICHARD L. VONDERAU REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

9/03/02
DESIGN STANDARDS ENGINEER DATE

9/03/02
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-06 SIGN DATA TABLES (WITH MARKUPS)

Moving this table to 802-SNGP-05

PERFORATED FUSE PLATE DATA TABLE

Post Size	BOLT SIZE	Wt. of Plate* (One Post), lb	F	G	J	K	L	M	d_1	d_2	t_3	Bolt Tension, lbs
W6 x 9	½" x 1½"	1.01	4¼"	2"	4"	2¼"	⅞"	1"	9⁄16"	¾"	¼"	12000
W8 x 10	½" x 1½"	1.01	4¼"	2"	4"	2¼"	⅞"	1"	9⁄16"	¾"	¼"	12000
W8 x 13	½" x 1½"	1.01	4¼"	2"	4"	2¼"	⅞"	1"	9⁄16"	¾"	¼"	12000
W8 x 15	⅝" x 2¼"	1.72	5"	2½"	4"	2¼"	⅞"	1"	11⁄16"	¾"	⅜"	19000
W8 x 18	⅝" x 2¼"	2.27	5"	2½"	5¼"	2¾"	1¼"	1¼"	11⁄16"	11⁄16"	⅜"	19000
W10 x 19	⅝" x 2¼"	1.72	5"	2½"	4"	2¼"	⅞"	1"	11⁄16"	¾"	⅜"	19000

* Gross weight with holes deducted from weight. Incidental weights of bolts and washers are not included in plan quantities.

NOTES:

1. See Standard Drawing E 802-SNGP-01 through 07 for details and notes for posts, bolts, washers, etc.

INDIANA DEPARTMENT OF TRANSPORTATION

~~SIGN DATA TABLES~~

~~SEPTEMBER 2008~~

STANDARD DRAWING NO. ~~E 802- SNGP-06~~

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

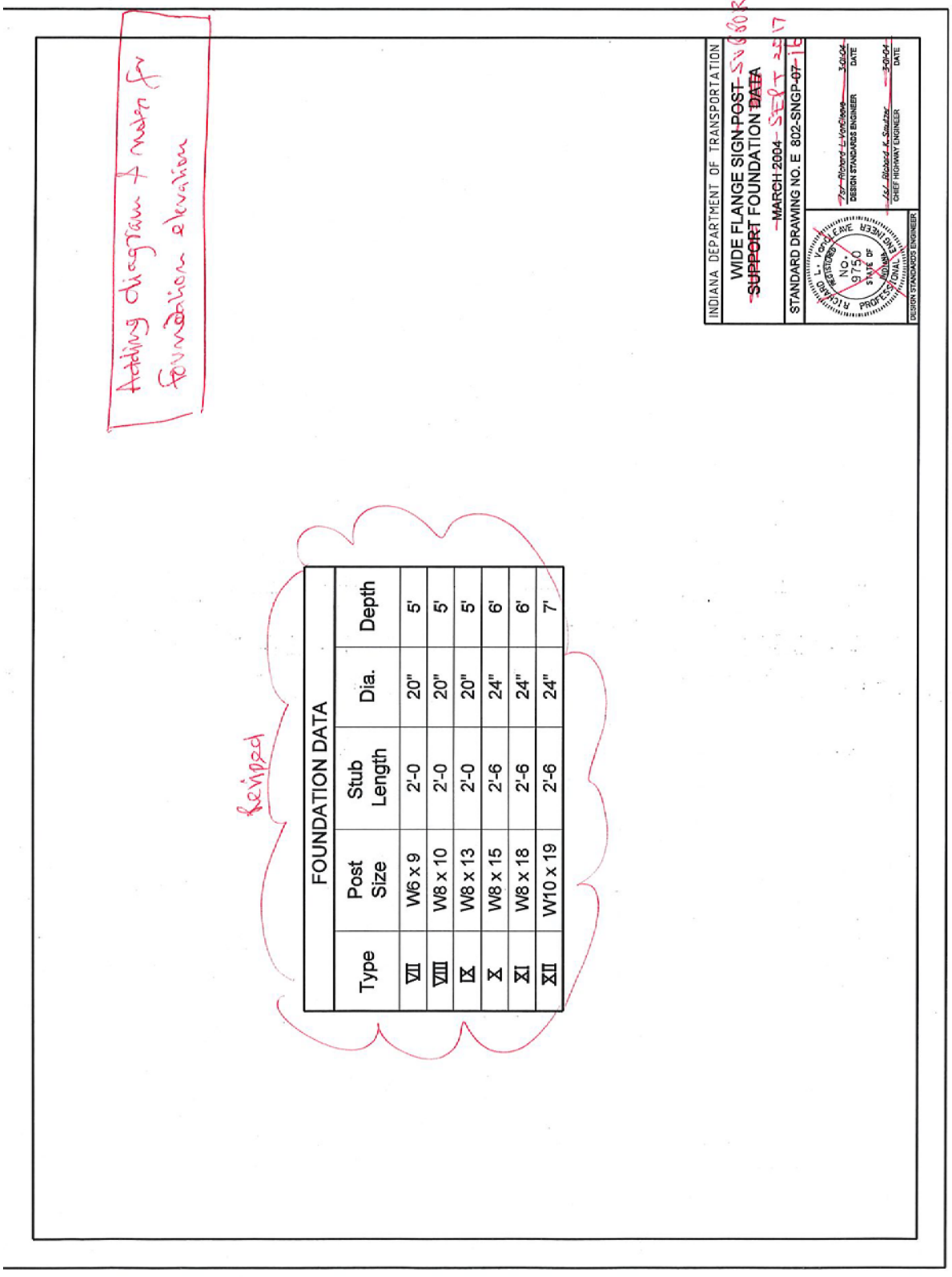
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE

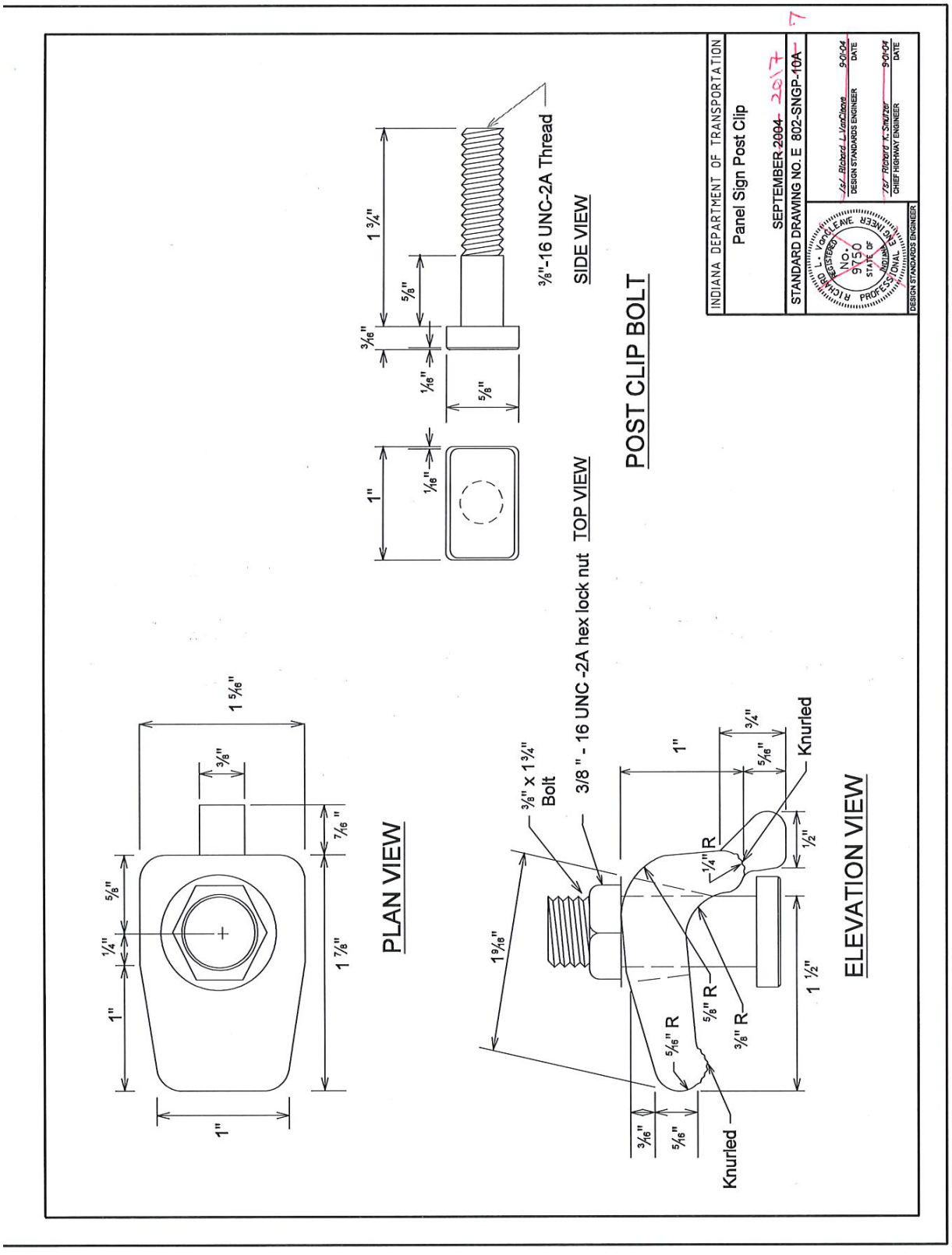
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-07 WIDE FLANGE SIGN POST FOUNDATION DATA (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-10A PANEL SIGN POST CLIP (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-01 WIDE-FLANGE SIGN SUPPORT AND PANEL SIGN DRAWING INDEX (DRAFT)

INDEX

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT AND PANEL SIGN DRAWING INDEX

SEPTEMBER 2017

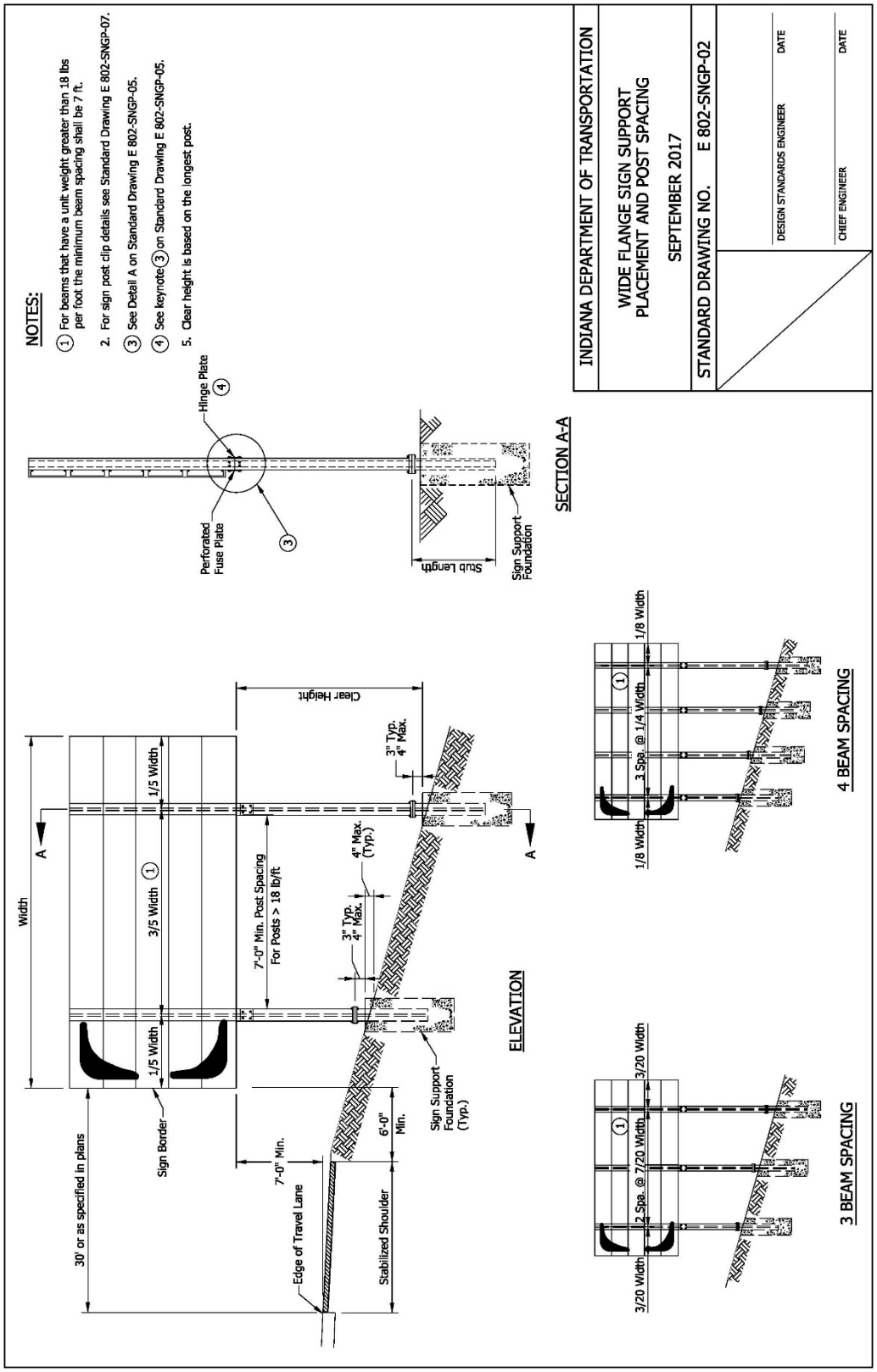
STANDARD DRAWING NO. E 802-SNGP-01

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

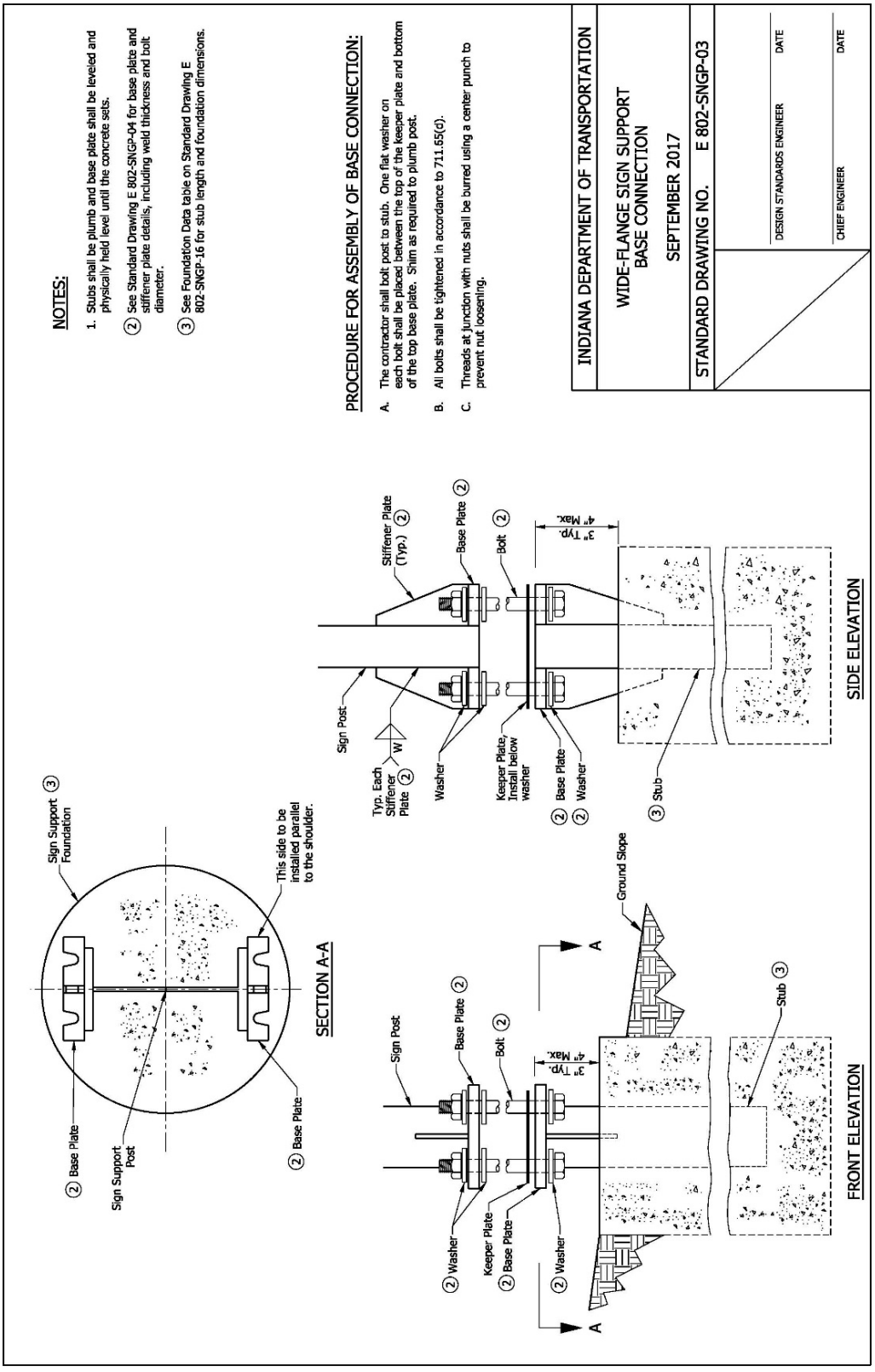
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-02 WIDE FLANGE SIGN SUPPORT (REVISED DRAFT)



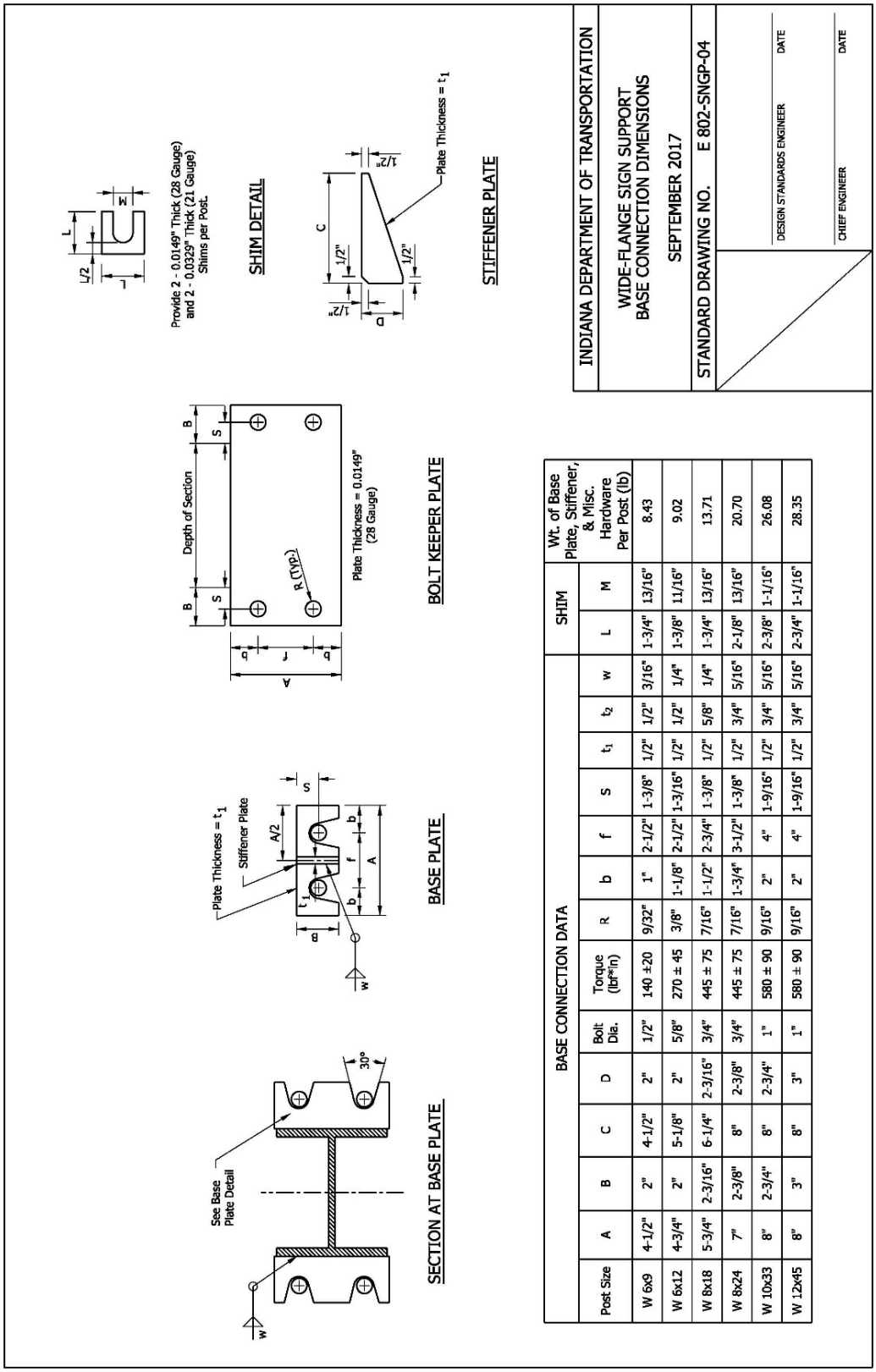
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-03 WIDE-FLANGE SIGN SUPPORT BASE CONNECTION (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

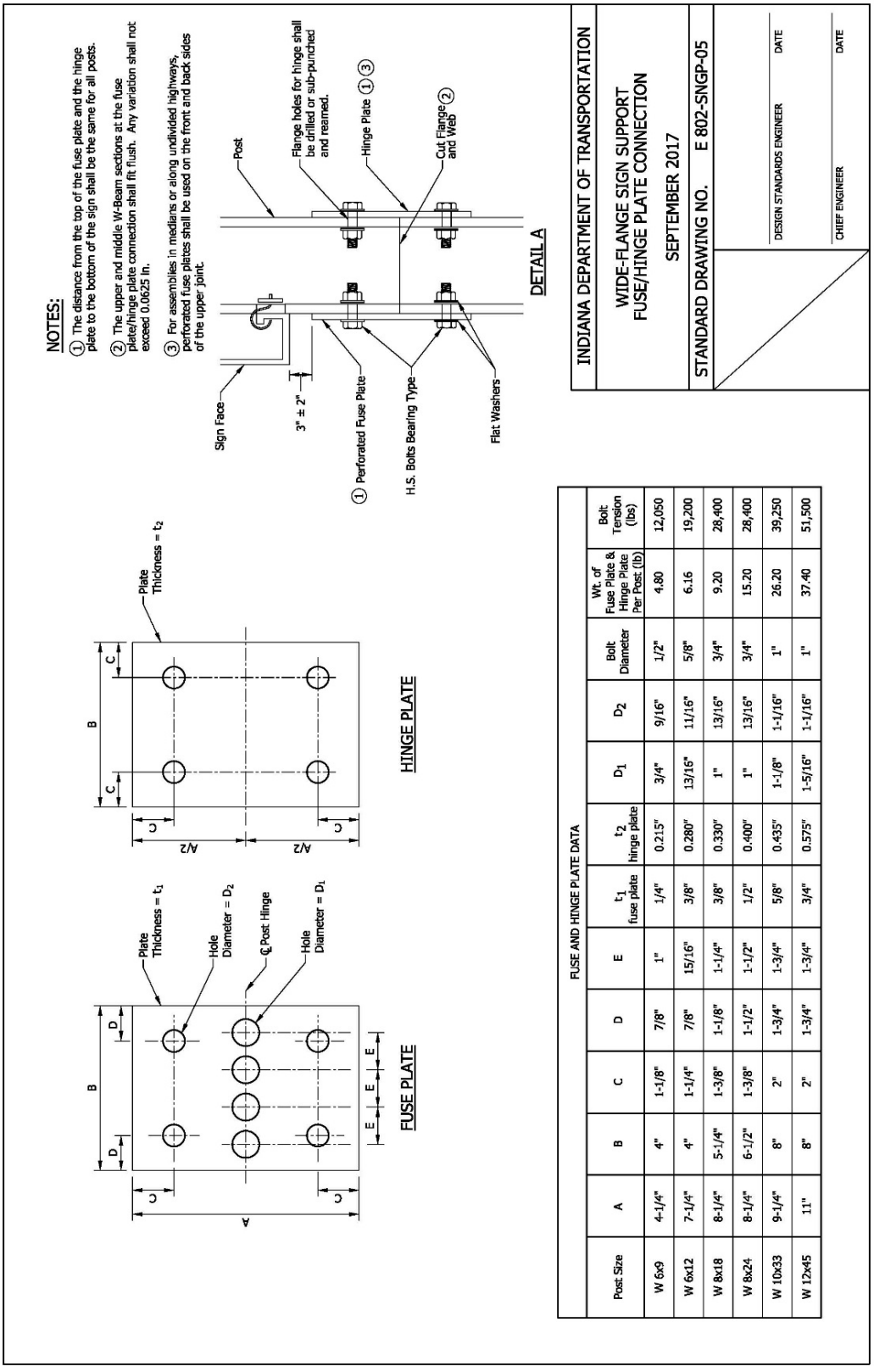
802-SNGP-04 WIDE-FLANGE SIGN SUPPORT BASE CONNECTION DIMENSIONS (DRAFT)



BASE CONNECTION DATA														SHIM		Wt. of Base Plate, Stiffener, & Misc. Hardware Per Post (lb)
Post Size	A	B	C	D	Bolt Dia.	Torque (lbf*in)	R	b	f	S	t_1	t_2	w	L	M	
W 6x9	4-1/2"	2"	4-1/2"	2"	1/2"	140 ±20	9/32"	1"	2-1/2"	1-3/8"	1/2"	1/2"	3/16"	1-3/4"	13/16"	8.43
W 6x12	4-3/4"	2"	5-1/8"	2"	5/8"	270 ± 45	3/8"	1-1/8"	2-1/2"	1-3/16"	1/2"	1/2"	1/4"	1-3/8"	11/16"	9.02
W 8x18	5-3/4"	2-3/16"	6-1/4"	2-3/16"	3/4"	445 ± 75	7/16"	1-1/2"	2-3/4"	1-3/8"	1/2"	5/8"	1/4"	1-3/4"	13/16"	13.71
W 8x24	7"	2-3/8"	8"	2-3/8"	3/4"	445 ± 75	7/16"	1-3/4"	3-1/2"	1-3/8"	1/2"	3/4"	5/16"	2-1/8"	13/16"	20.70
W 10x33	8"	2-3/4"	8"	2-3/4"	1"	580 ± 90	9/16"	2"	4"	1-9/16"	1/2"	3/4"	5/16"	2-3/8"	1-1/16"	26.08
W 12x45	8"	3"	8"	3"	1"	580 ± 90	9/16"	2"	4"	1-9/16"	1/2"	3/4"	5/16"	2-3/4"	1-1/16"	28.35

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-05 WIDE-FLANGE SIGN SUPPORT FUSE/HINGE PLATE CONNECTION (DRAFT)

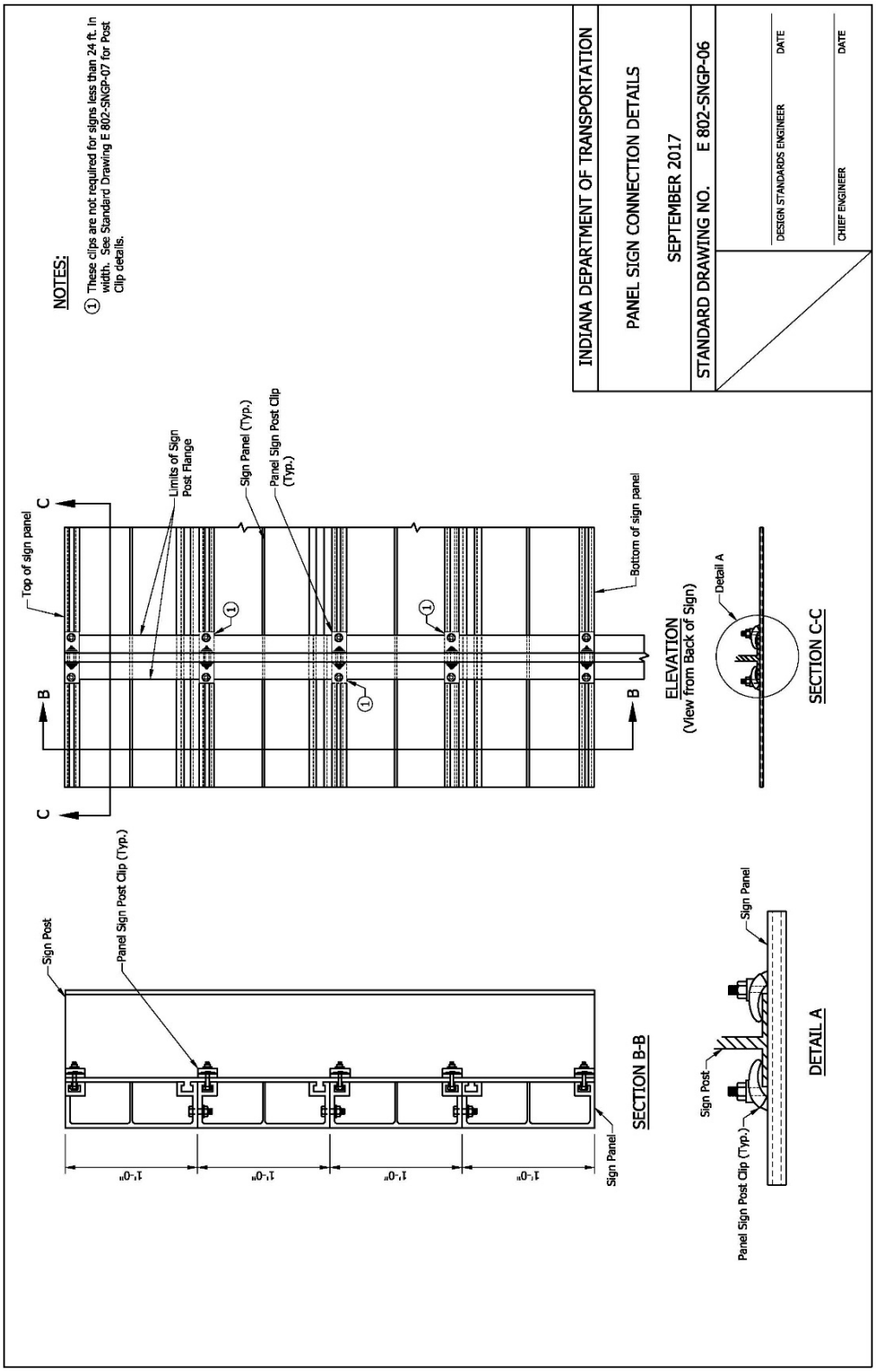


FUSE AND HINGE PLATE DATA

Post Size	A	B	C	D	E	t_1 fuse plate	t_2 hinge plate	D_1	D_2	Bolt Diameter	Wt. of Fuse Plate & Hinge Plate Per Post (lb)	Bolt Tension (lbs)
W 6x9	4-1/4"	4"	1-1/8"	7/8"	1"	1/4"	0.215"	3/4"	9/16"	1/2"	4.80	12,050
W 6x12	7-1/4"	4"	1-1/4"	7/8"	15/16"	3/8"	0.280"	13/16"	11/16"	5/8"	6.16	19,200
W 8x18	8-1/4"	5-1/4"	1-3/8"	1-1/8"	1-1/4"	3/8"	0.330"	1"	13/16"	3/4"	9.20	28,400
W 8x24	8-1/4"	6-1/2"	1-3/8"	1-1/2"	1-1/2"	1/2"	0.400"	1"	13/16"	3/4"	15.20	28,400
W 10x33	9-1/4"	8"	2"	1-3/4"	1-3/4"	5/8"	0.435"	1-1/8"	1-1/16"	1"	26.20	39,250
W 12x45	11"	8"	2"	1-3/4"	1-3/4"	3/4"	0.575"	1-5/16"	1-1/16"	1"	37.40	51,500

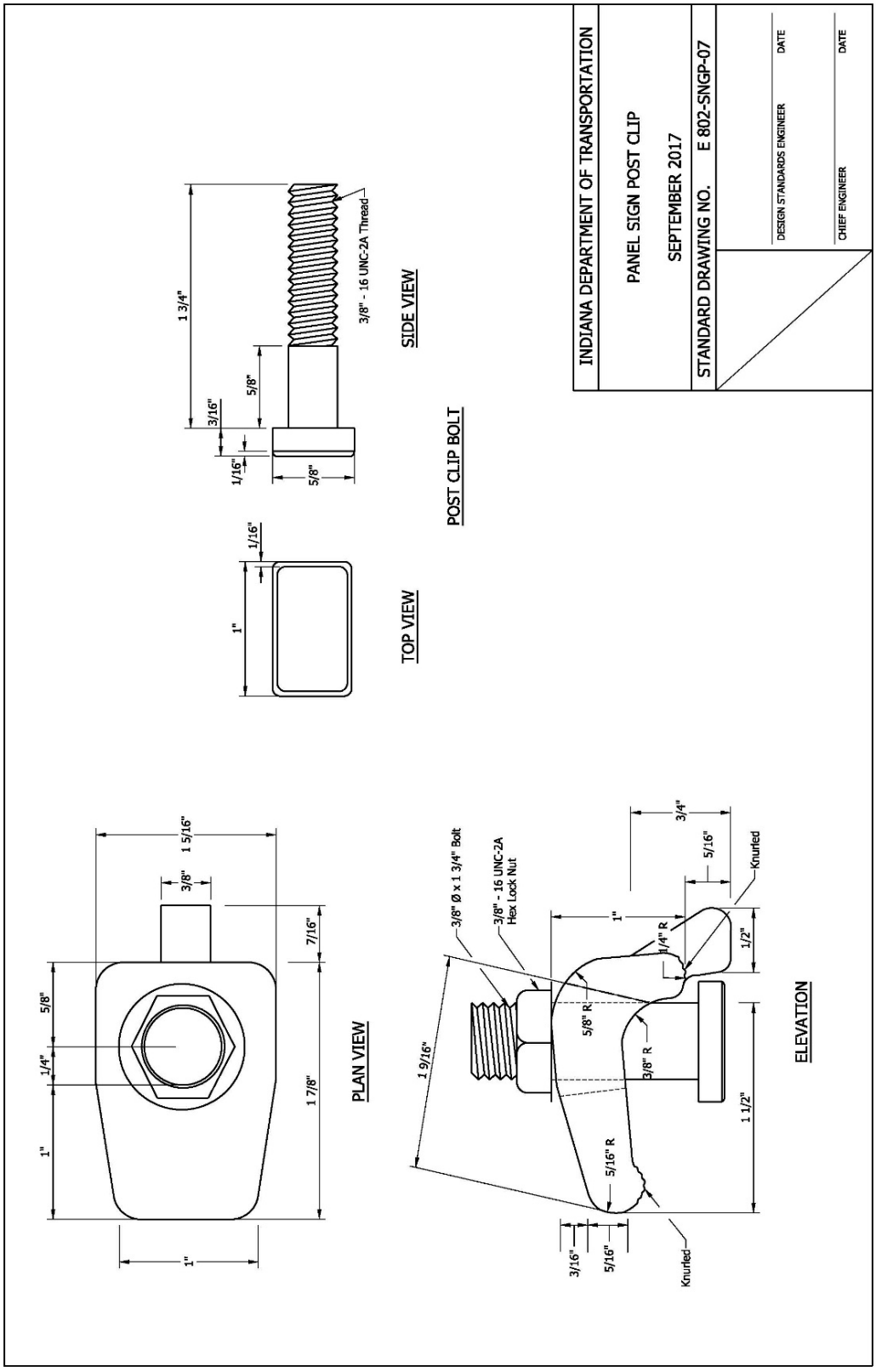
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-06 PANEL SIGN CONNECTION DETAILS (DRAFT)



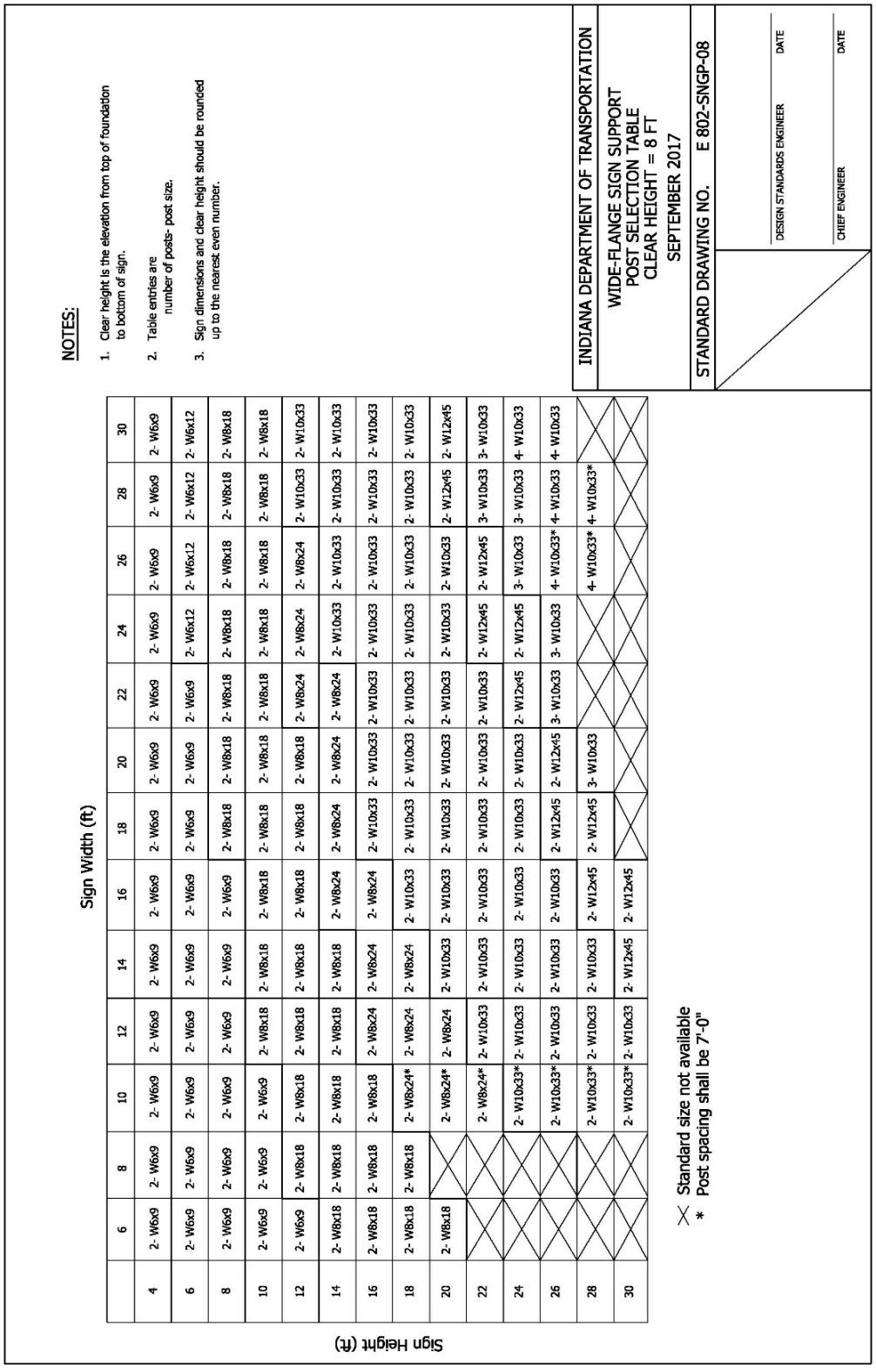
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-07 PANEL SIGN POST CLIP (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-08 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=8 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Width (ft)

Sign Height (ft)	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9
6	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12	2- W6x12	2- W6x12
8	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
10	2- W6x9	2- W6x9	2- W6x9	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
12	2- W6x9	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33
14	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33
16	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
18	2- W8x18	2- W8x18	2- W8x24*	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
20	2- W8x18	XX	2- W8x24*	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45
22	XX	XX	2- W8x24*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	3- W10x33
24	XX	XX	2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	3- W10x33	4- W10x33
26	XX	XX	2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	3- W10x33	4- W10x33*	4- W10x33	4- W10x33
28	XX	XX	2- W10x33*	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	XX	XX	4- W10x33*	4- W10x33*	XX
30	XX	XX	2- W10x33*	2- W10x33	2- W12x45	2- W12x45	XX	XX	XX	XX	XX	XX	XX

XX Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 8 FT
SEPTEMBER 2017

STANDARD DRAWING NO. E 802-SNGP-08

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-09 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=10 FT (DRAFT)

NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Width (ft)

Sign Height (ft)	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12
6	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18
8	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
10	2- W6x9	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33
14	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
16	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
18	2- W8x18	2- W8x18	2- W8x24*	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45
20	2- W8x18	2- W8x24*	2- W8x24*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33
22			2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	3- W10x33	3- W10x33	3- W10x33
24			2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	3- W10x33	3- W10x33	3- W10x33	4- W10x33	4- W10x33
26			2- W10x33*	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	3- W10x33		4- W10x33*	4- W10x33	4- W10x33
28			2- W10x33*	2- W10x33	2- W12x45	2- W12x45	3- W10x33*	3- W10x33			4- W10x33*	4- W10x33	
30			2- W10x33*	2- W10x33	2- W12x45								

X Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 10 FT
SEPTEMBER 2017

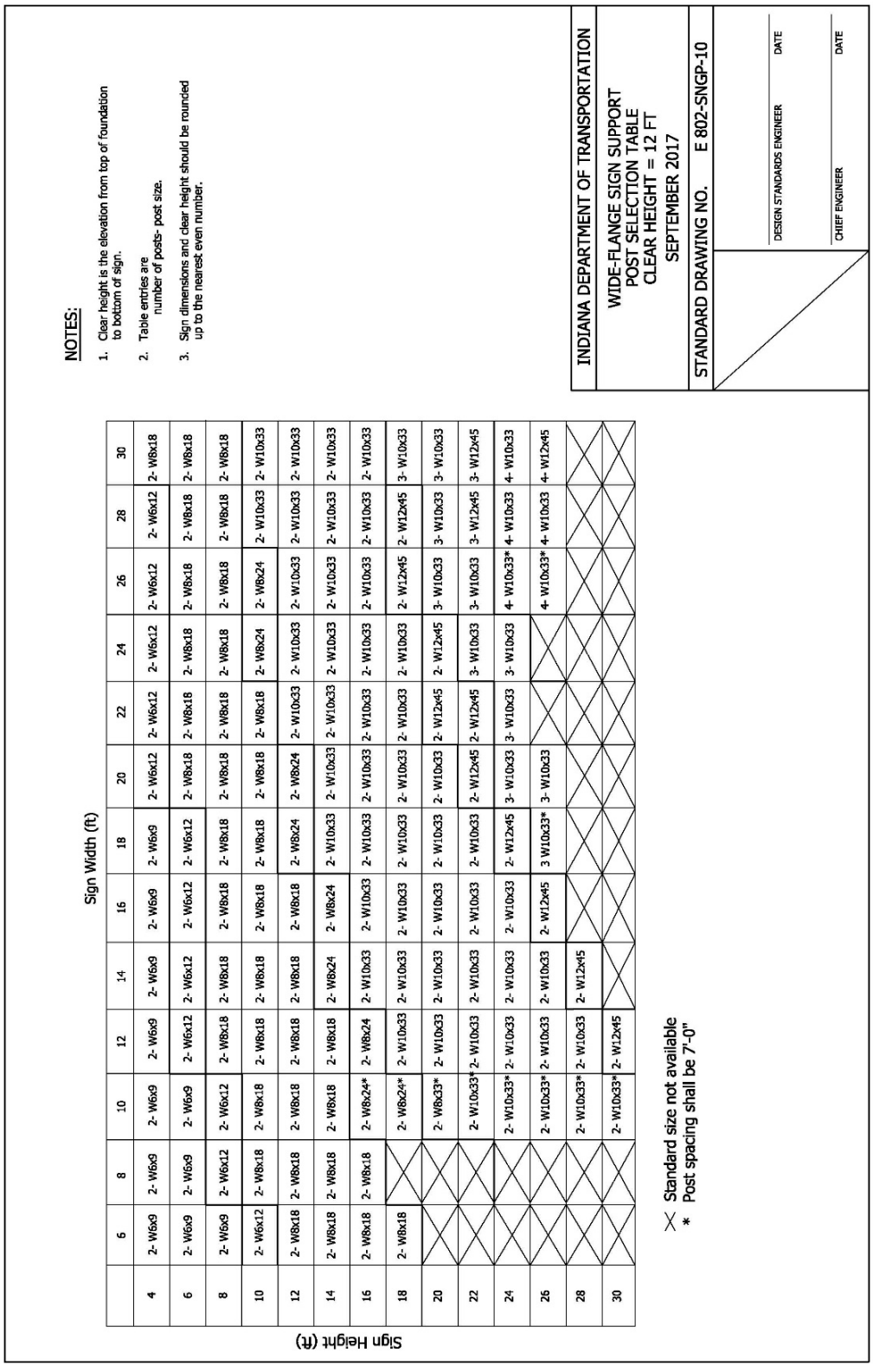
STANDARD DRAWING NO. E 802-SNGP-09

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-10 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=12 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Height (ft) / Sign Width (ft)

	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W8x18
6	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
8	2- W6x9	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
10	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W10x33	2- W10x33
12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
14	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
16	2- W8x18	2- W8x18	2- W8x24*	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
18	2- W8x18	2- W8x18	2- W8x24*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33
20			2- W8x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	3- W10x33	3- W10x33
22			2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W12x45	2- W12x45	3- W10x33	3- W10x33	3- W12x45	3- W12x45
24			2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W12x45	3- W10x33	3- W10x33	3- W10x33	4- W10x33*	4- W10x33	4- W10x33
26			2- W10x33*	2- W10x33	2- W10x33	2- W12x45	3 W10x33*	3- W10x33			4- W10x33*	4- W10x33	4- W12x45
28			2- W10x33*	2- W10x33	2- W12x45								
30			2- W10x33*	2- W12x45									

⨯ Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 12 FT
SEPTEMBER 2017

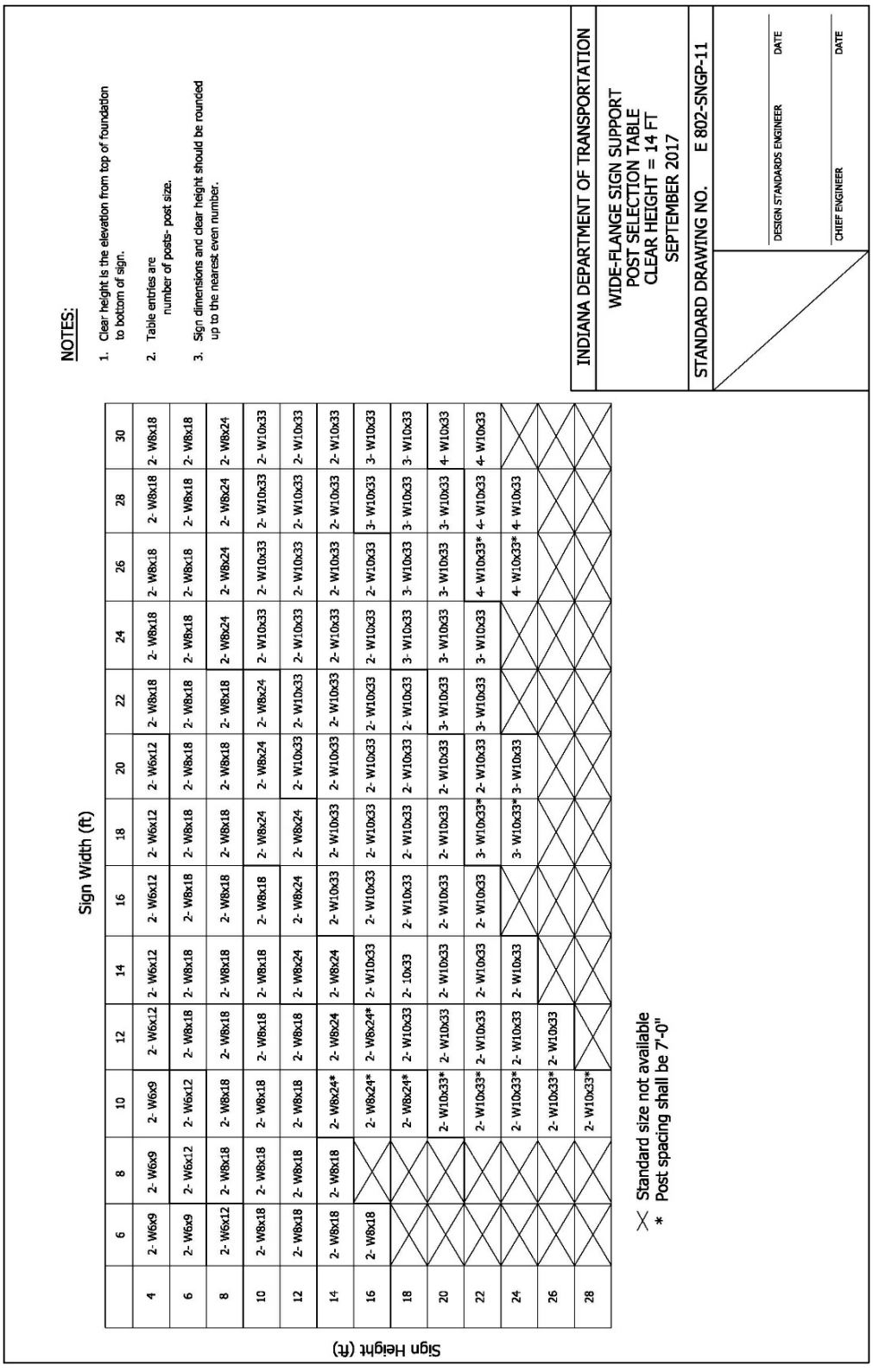
STANDARD DRAWING NO. E 802-SNGP-10

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-11 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=14 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Width (ft)

Sign Height (ft)	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W6x9	2- W6x9	2- W6x9	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
6	2- W6x9	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
8	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24
10	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33
12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
14	2- W8x18	2- W8x18	2- W8x24*	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
16	2- W8x18	X	2- W8x24*	2- W8x24*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33
18	X	X	2- W8x24*	2- W10x33	2- 10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33	3- W10x33	3- W10x33
20	X	X	2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33	3- W10x33	3- W10x33	4- W10x33
22	X	X	2- W10x33*	2- W10x33	2- W10x33	2- W10x33	3- W10x33*	2- W10x33	3- W10x33	3- W10x33	4- W10x33*	4- W10x33	4- W10x33
24	X	X	2- W10x33*	2- W10x33	2- W10x33	X	3- W10x33*	3- W10x33	X	X	4- W10x33*	4- W10x33	X
26	X	X	2- W10x33*	2- W10x33	X	X	X	X	X	X	X	X	X
28	X	X	2- W10x33*	X	X	X	X	X	X	X	X	X	X

X Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 14 FT
SEPTEMBER 2017

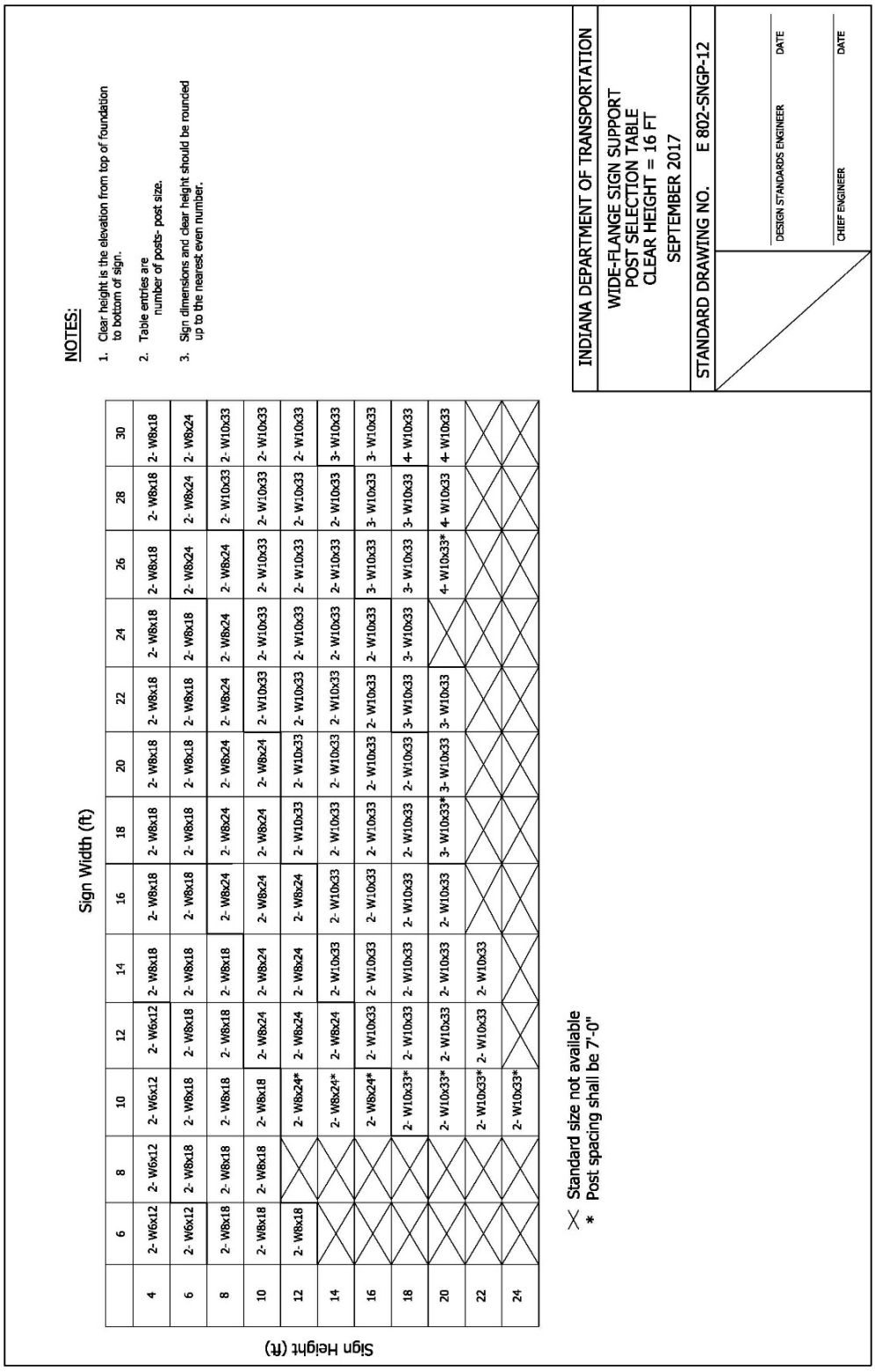
STANDARD DRAWING NO. E 802-SNGP-11

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-12 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=16 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Width (ft)

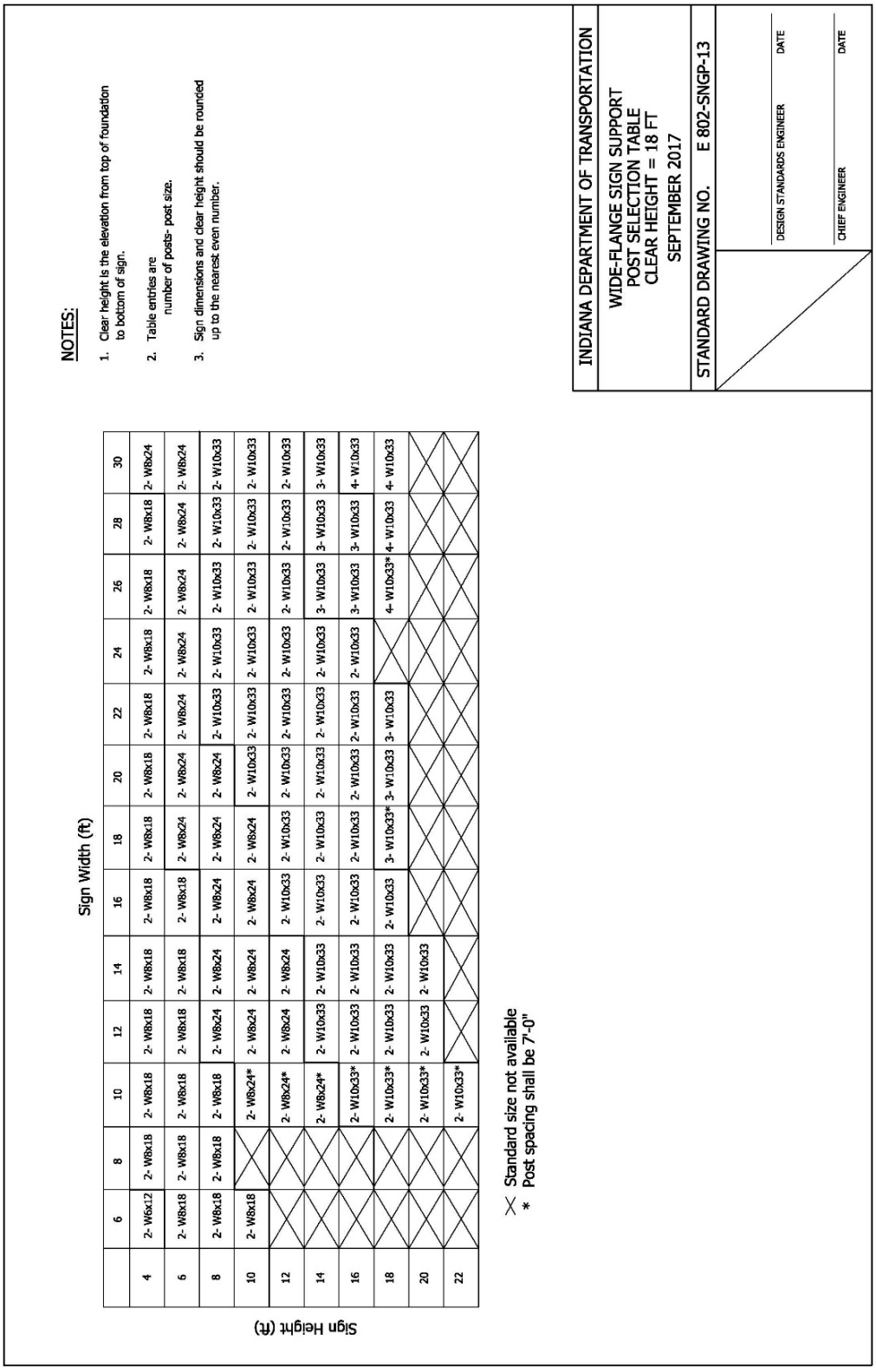
Sign Height (ft)	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W6x12	2- W6x12	2- W6x12	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18
6	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24
8	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33
10	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
12	2- W8x18		2- W8x24*	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
14			2- W8x24*	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33
16			2- W8x24*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33	3- W10x33
18			2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33	3- W10x33	3- W10x33	4- W10x33
20			2- W10x33*	2- W10x33	2- W10x33	2- W10x33	3- W10x33*	3- W10x33	3- W10x33		4- W10x33*	4- W10x33	4- W10x33
22			2- W10x33*	2- W10x33	2- W10x33								
24			2- W10x33*										

X Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION	
WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT = 16 FT SEPTEMBER 2017	
STANDARD DRAWING NO. E 802-SNGP-12	DESIGN STANDARDS ENGINEER DATE
	CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-13 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=18 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Width (ft)

Sign Height (ft)	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W6x12	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24
6	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24
8	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
10	2- W8x18	X	2- W8x24*	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
12	X	X	2- W8x24*	2- W8x24	2- W8x24	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33
14	X	X	2- W8x24*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33	3- W10x33
16	X	X	2- W10x33*	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	2- W10x33	3- W10x33	3- W10x33	4- W10x33
18	X	X	2- W10x33*	2- W10x33	2- W10x33	2- W10x33	3- W10x33*	3- W10x33	3- W10x33	X	4- W10x33*	4- W10x33	4- W10x33
20	X	X	2- W10x33*	2- W10x33	2- W10x33	X	X	X	X	X	X	X	X
22	X	X	2- W10x33*	X	X	X	X	X	X	X	X	X	X

X Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 18 FT
SEPTEMBER 2017

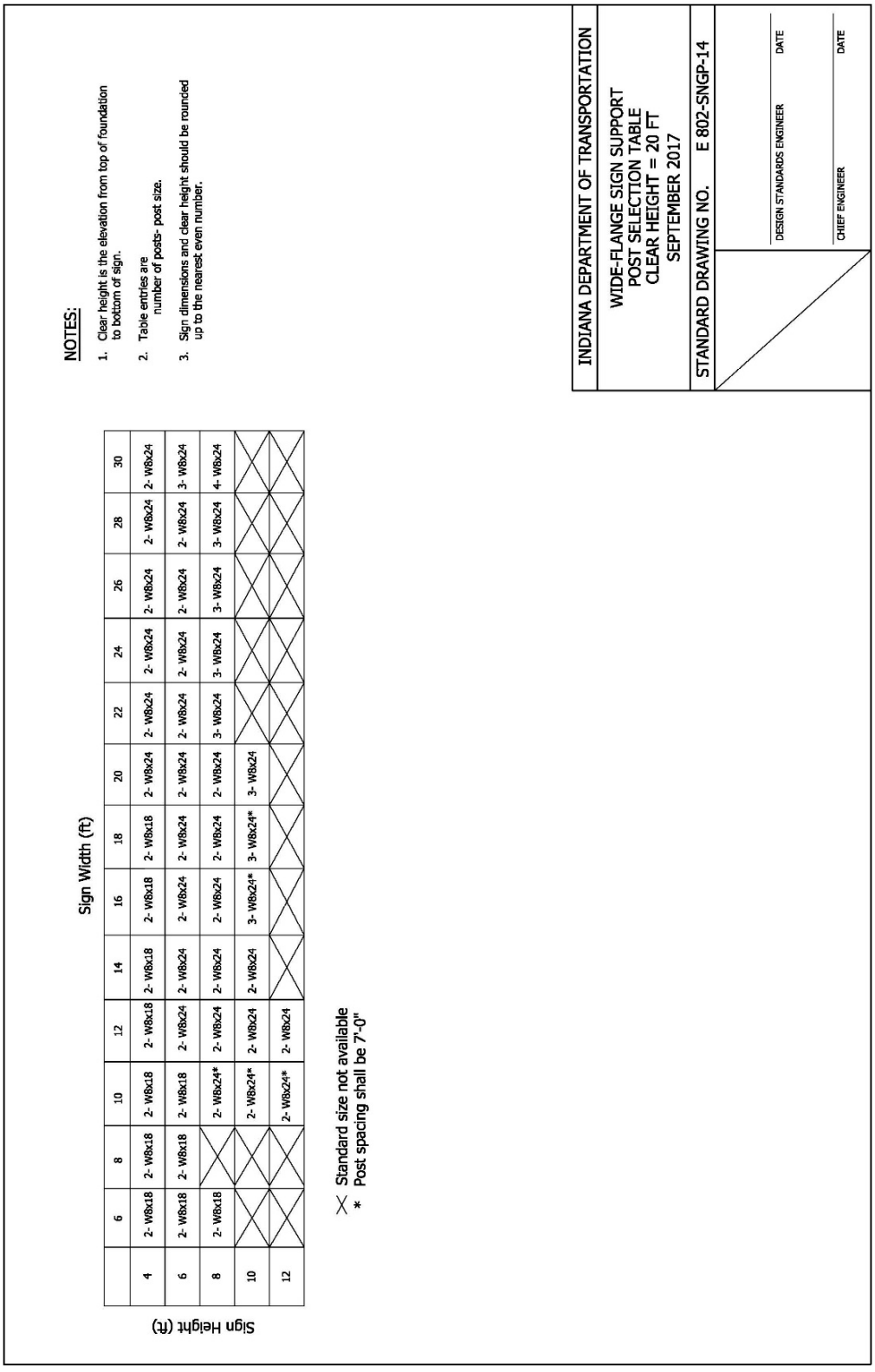
STANDARD DRAWING NO. E 802-SNGP-13

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-14 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=20 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Height (ft) / Sign Width (ft)

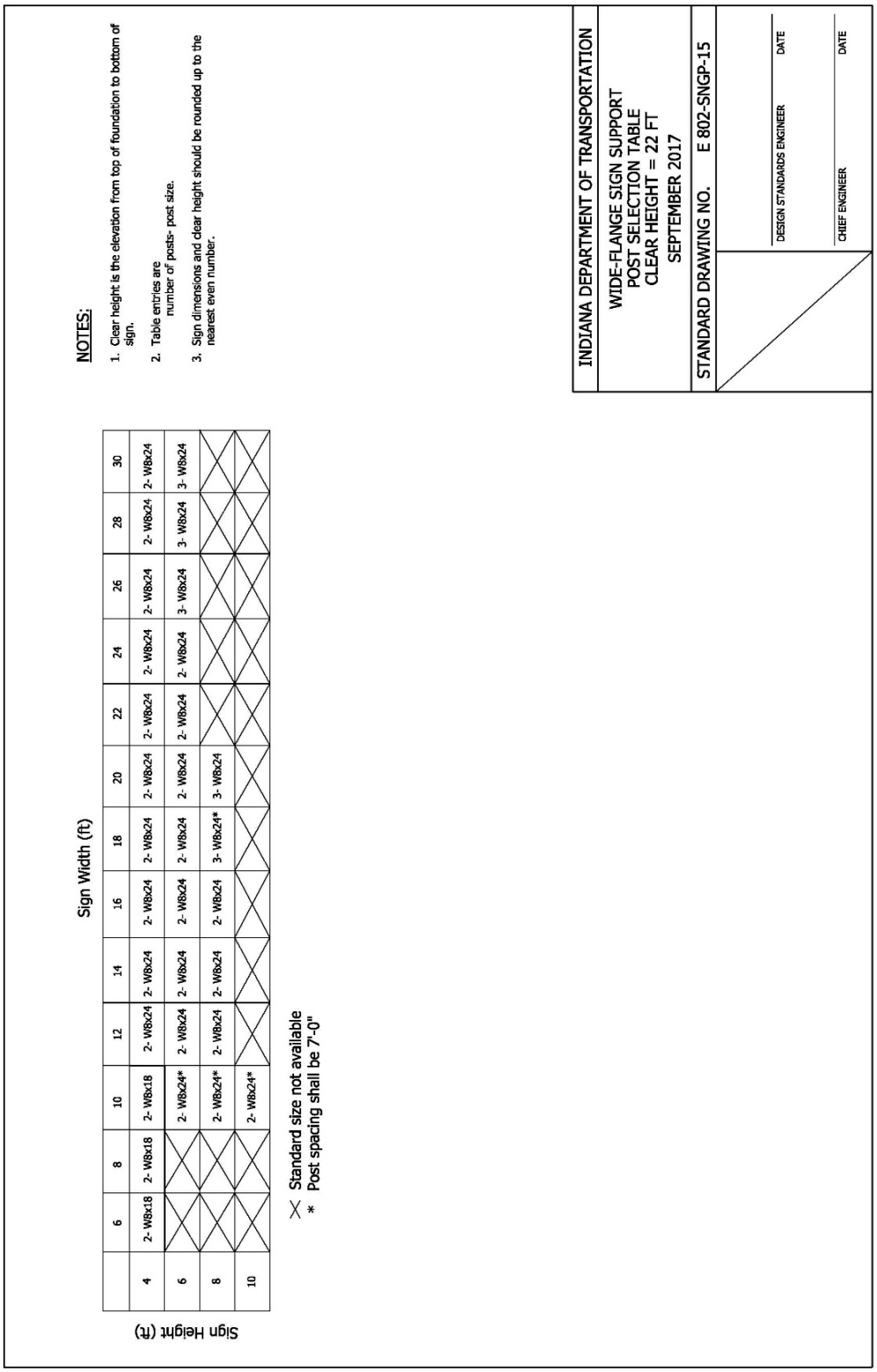
	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24
6	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	3- W8x24
8	2- W8x18	X	2- W8x24*	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	3- W8x24	3- W8x24	3- W8x24	3- W8x24	4- W8x24
10	X	X	2- W8x24*	2- W8x24	2- W8x24	3- W8x24*	3- W8x24*	3- W8x24	X	X	X	X	X
12	X	X	2- W8x24*	2- W8x24	X	X	X	X	X	X	X	X	X

X Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION	
WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT = 20 FT SEPTEMBER 2017	
STANDARD DRAWING NO. E 802-SNGP-14	DESIGN STANDARDS ENGINEER DATE CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGP-15 WIDE-FLANGE SIGN SUPPORT POST SELECTION TABLE CLEAR HEIGHT=22 FT (DRAFT)



NOTES:

1. Clear height is the elevation from top of foundation to bottom of sign.
2. Table entries are number of posts- post size.
3. Sign dimensions and clear height should be rounded up to the nearest even number.

Sign Width (ft)

Sign Height (ft)	6	8	10	12	14	16	18	20	22	24	26	28	30
4	2- W8x18	2- W8x18	2- W8x18	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24
6			2- W8x24*	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	2- W8x24	3- W8x24	3- W8x24	3- W8x24
8			2- W8x24*	2- W8x24	2- W8x24	2- W8x24	3- W8x24*	3- W8x24					
10			2- W8x24*										

X Standard size not available
* Post spacing shall be 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

WIDE-FLANGE SIGN SUPPORT
POST SELECTION TABLE
CLEAR HEIGHT = 22 FT
SEPTEMBER 2017

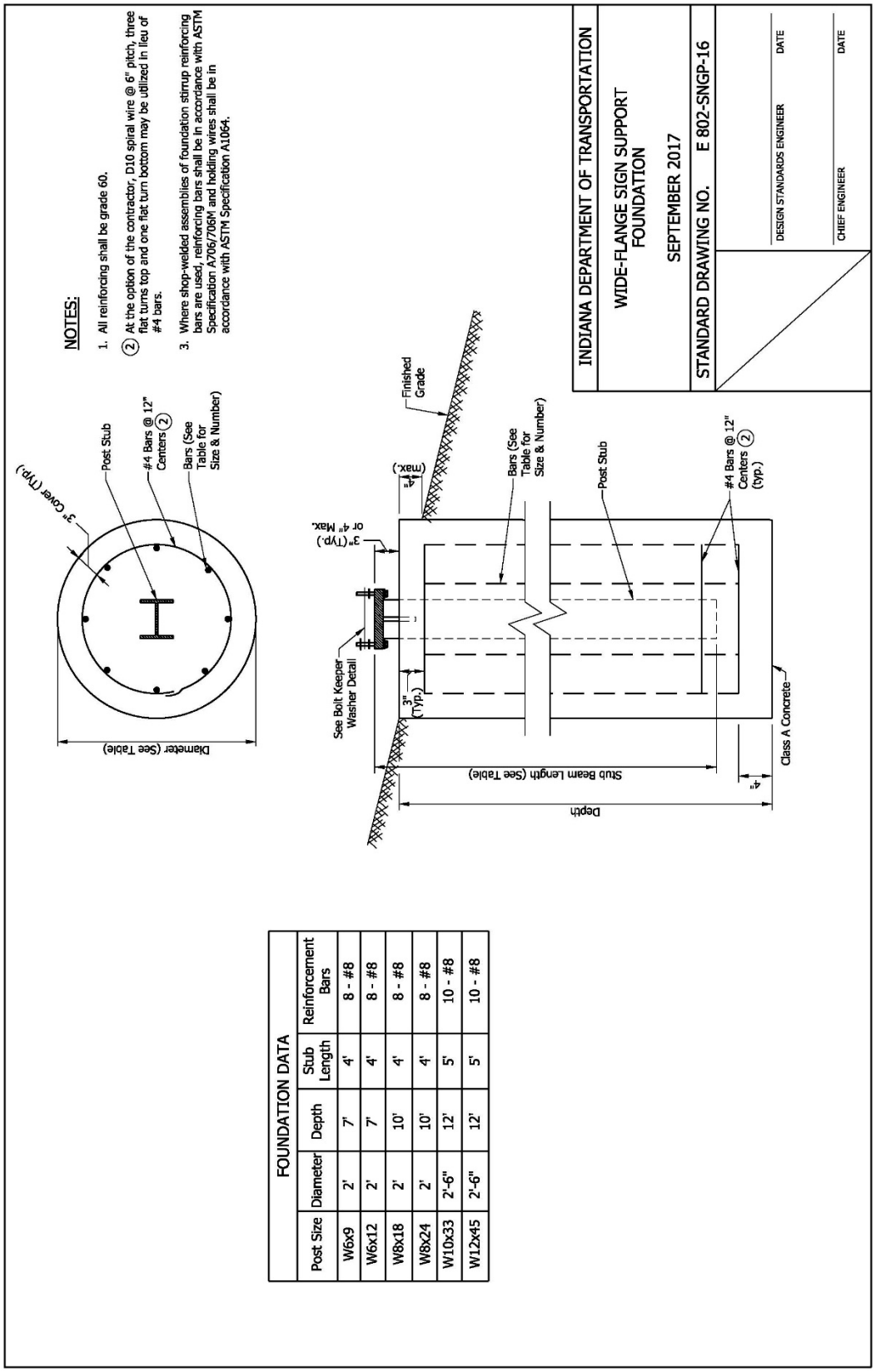
STANDARD DRAWING NO. E 802-SNGP-15

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

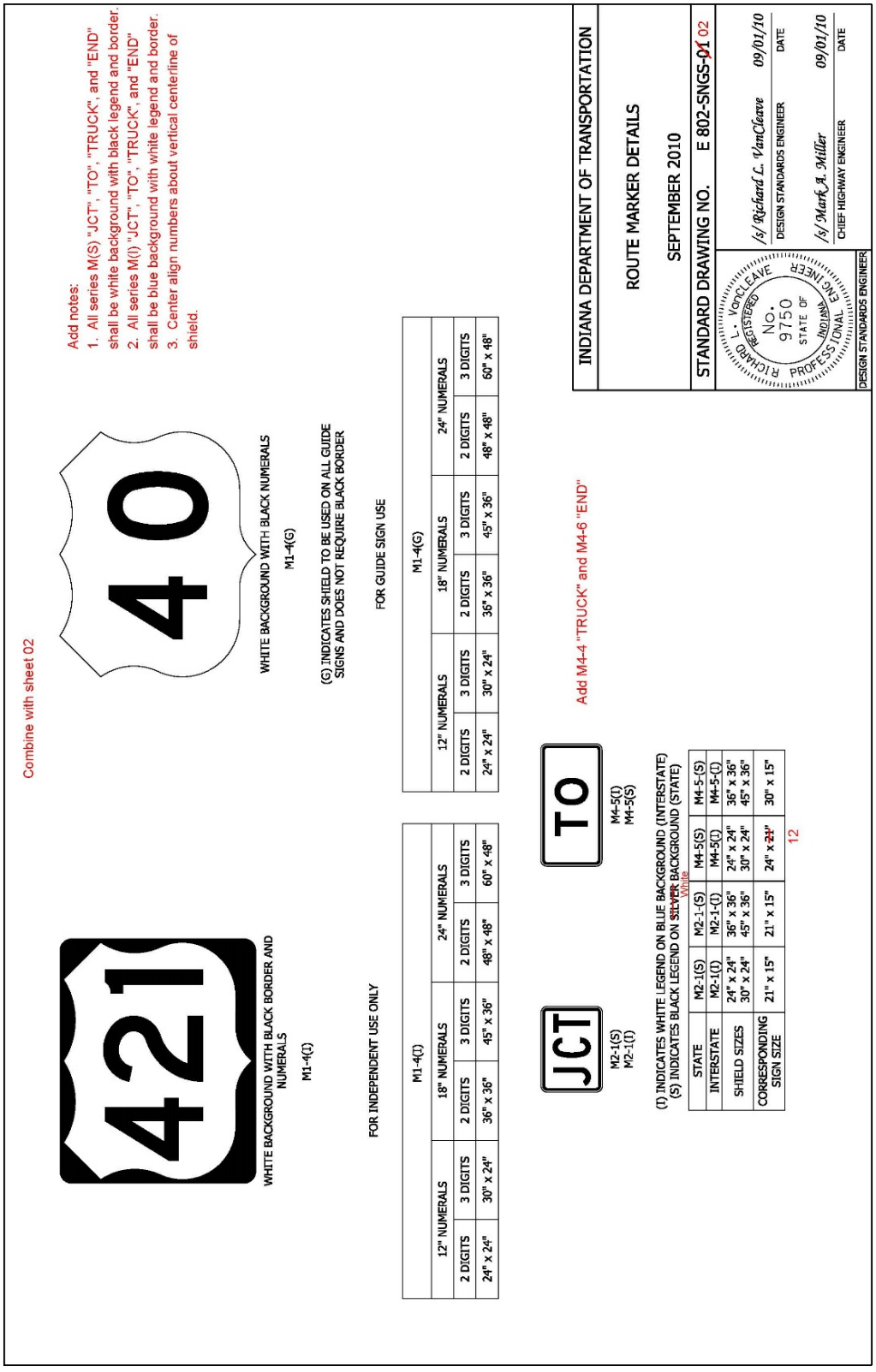
802-SNGP-16 WIDE-FLANGE SIGN SUPPORT FOUNDATION (REVISED DRAFT)



FOUNDATION DATA				
Post Size	Diameter	Depth	Stub Length	Reinforcement Bars
W6x9	2'	7'	4'	8 - #8
W6x12	2'	7'	4'	8 - #8
W8x18	2'	10'	4'	8 - #8
W8x24	2'	10'	4'	8 - #8
W10x33	2'-6"	12'	5'	10 - #8
W12x45	2'-6"	12'	5'	10 - #8

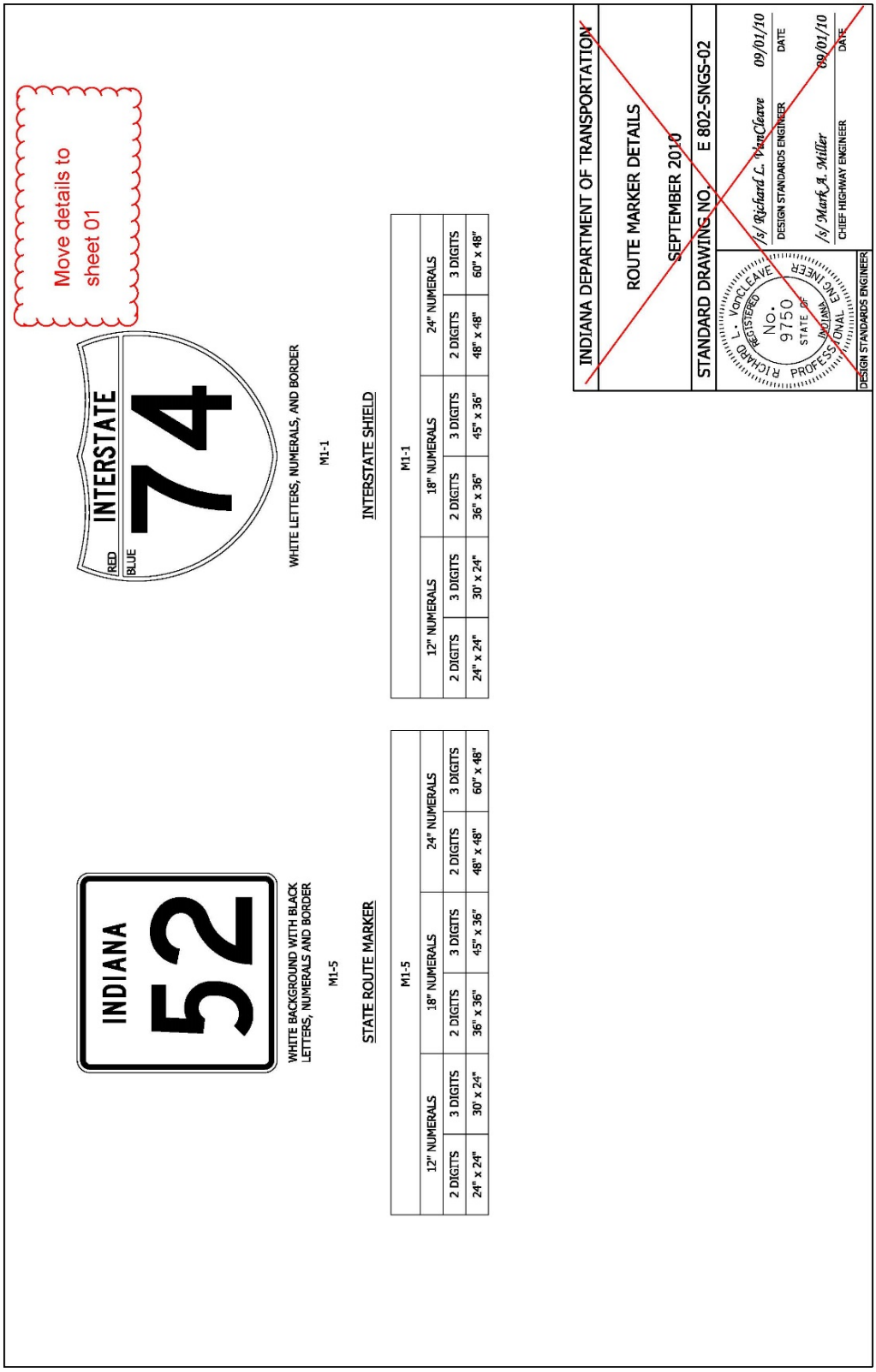
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-01 ROUTE MARKER DETAILS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-02 ROUTE MARKER DETAILS (WITH MARKUPS)

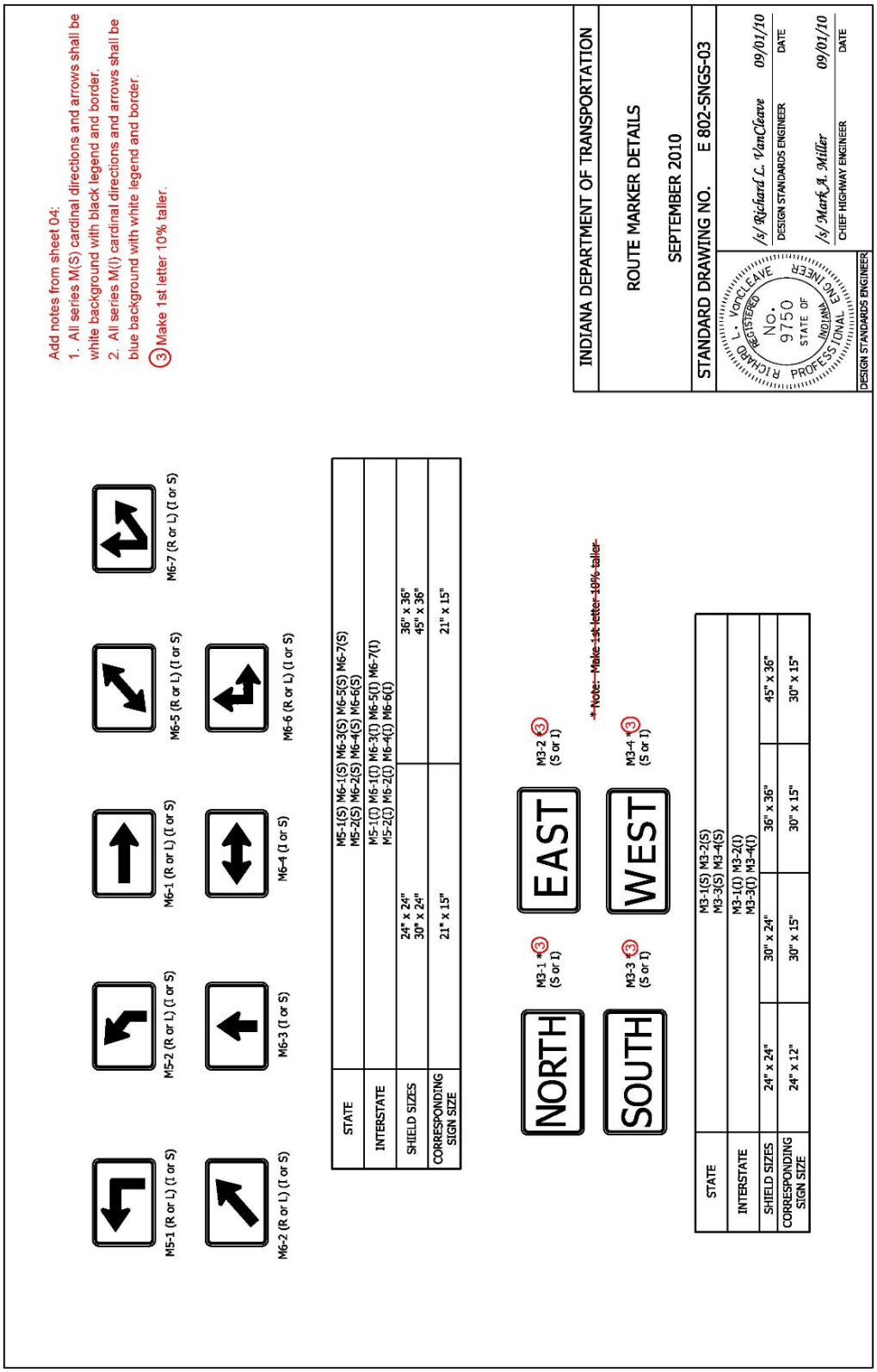


M1-5				
12" NUMERALS		18" NUMERALS		24" NUMERALS	
2 DIGITS	3 DIGITS	2 DIGITS	3 DIGITS	2 DIGITS	3 DIGITS
24" x 24"	30" x 24"	36" x 36"	45" x 36"	48" x 48"	60" x 48"

M1-1				
12" NUMERALS		18" NUMERALS		24" NUMERALS	
2 DIGITS	3 DIGITS	2 DIGITS	3 DIGITS	2 DIGITS	3 DIGITS
24" x 24"	30" x 24"	36" x 36"	45" x 36"	48" x 48"	60" x 48"

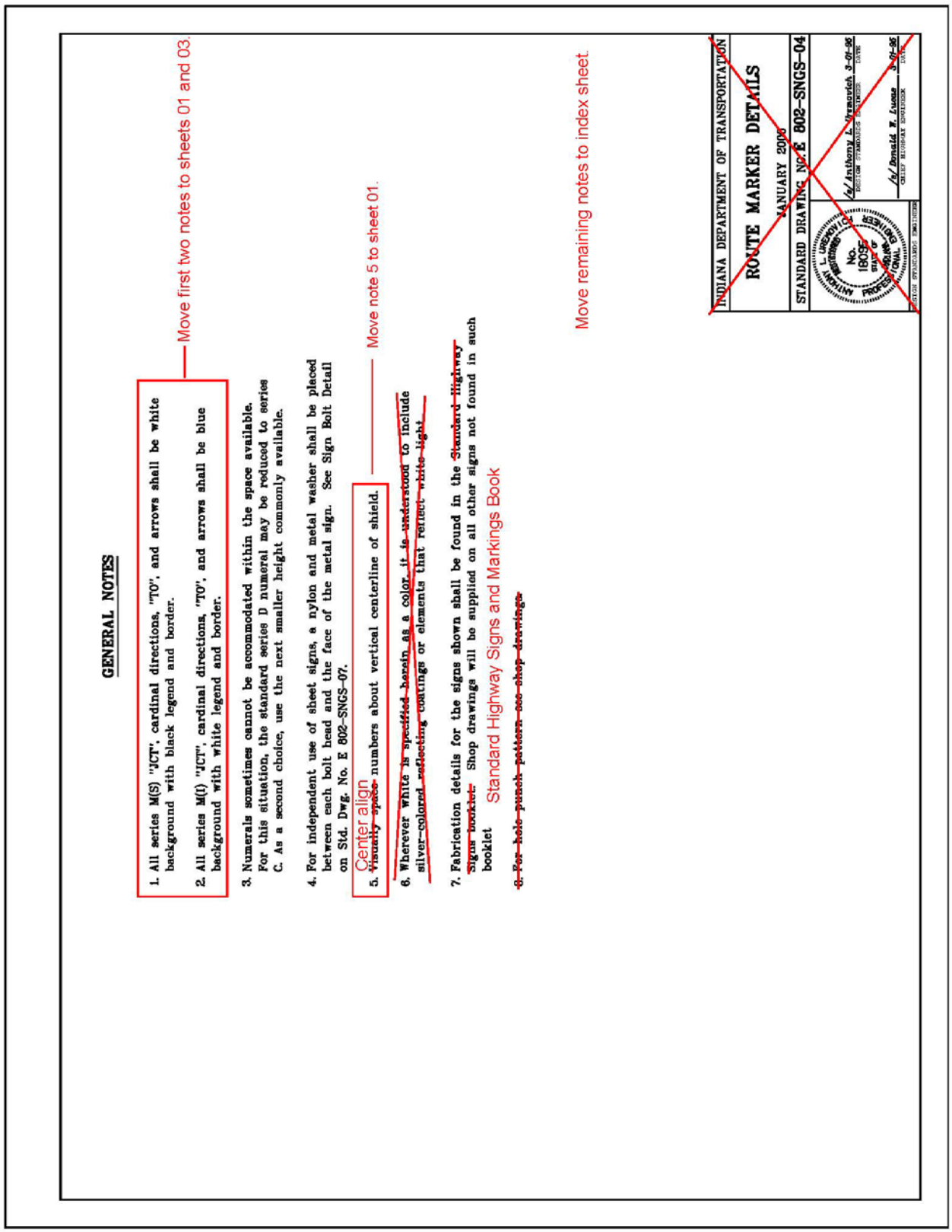
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-03 ROUTE MARKER DETAILS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-04 ROUTE MARKER DETAILS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-05 SIGN REFLECTORIZATION SCHEDULE (WITH MARKUPS)

SIGN	REMARKS	BACKGROUND	COPY & BORDER
IGD, GD	Directional	S-3-H	B
IGDO, GD	Directional	S-3-H	B
IGI	Information	S-3-H	B
IGS	Services	S-4-H	B
IGS	Services	S-6-H	S-2-H
IGDO, GDO Special - Panel	Warning Panel	S-10-H S-1-H	A
R1-1	Stop	S-5-H	S-2-H
R1-2	Yield	S-2-H	S-5-H
R1-3, R1-4	4-Way, All-Way	S-5-H	S-2-H
R2-3	Night Speed	0-1-H	S-2-H
R3-1, R3-2, R3-4	No Right, Left, or U Turns	S-2-H	S-5-H, 0-1-H
R5-1	Do Not Enter	S-5-H	S-2-H
R5-1a	Wrong Way	S-5-H	S-2-H
R5-2, R5-6	No Trucks, Bicycles	S-2-H	S-5-H, 0-1-H
R7-1, R7-4, R7-107, R7-201	No Parking (Urban)	S-2-H	S-5-H
R7-2a, R7-107a	No Parking (Urban)	S-2-H	S-5-H, 0-1-H
R7-5, R7-5a, R7-108	Restricted Parking	S-2-H	S-7-H
R7-8	Reserved Parking	S-2-H	S-7-H, S-6-H
R8-1, R8-1a, R8-2, R8-3, R8-3b, R8-3c, R8-8	No Parking (Rural)	S-2-H	S-5-H
R8-3a	No Parking (Rural)	S-2-H	S-5-H, 0-1-H
R9-3a, R9-4a	Pedestrian Signs	S-2-H	S-5-H, 0-1-H
All other regulatory signs		S-2-H	0-1-H
W3-1a, W3-2a	Stop & Yield Ahead	S-10-H S-1-H	S-2-H, S-5-H, 0-1-H
W3-3	Signal Ahead	S-10-H S-1-H	S-5-H S-7-H, 0-1-H
All other warning signs	Except Construction Signs, School Warning Signs, and Signs labeled as "PF"	S-10-H S-1-H	0-1-H
Warning Signs labeled as "PF"		S-10-H	0-1-H
All School Warning Signs		S-11-H	0-1-H
M1-1	Interstate Shields	S-8-H	S-2-H
M1-2, M1-3	Business Shields	S-7-H	S-2-H
M1-4	U.S. Shields	S-2-H	0-1-H
M1-5	County Shields	S-4-H	S-1-H
M1-6	State Shields	S-2-H	0-1-H
M1-7	National Forest	△	S-2-H

KEY

CODE	DESCRIPTION
0-1-H	Paint (Black) for use with prismatic reflective sheeting
S-1-H	Reflective sheeting (Yellow) prismatic
S-2-H	Reflective sheeting (Silver) prismatic
S-3-H	Reflective sheeting (Green) prismatic
S-4-H	Reflective sheeting (Blue) prismatic
S-5-H	Reflective sheeting (Silver with reverse screen transparent Red) prismatic
S-6-H	Reflective sheeting (Silver with reverse screen transparent Blue) prismatic
S-7-H	Reflective sheeting (Silver with reverse screen transparent Green) prismatic
S-8-H	Reflective sheeting (Silver with reverse screen transparent Red and Blue) prismatic
S-9-H	Reflective sheeting (Orange) prismatic (Fluorescent Orange)
S-10-H	Reflective sheeting (Fluorescent Yellow), prismatic
S-11-H	Reflective sheeting (Fluorescent Yellow-Green), prismatic
A	Cut - Out letters which are painted black ~~or as per specifications~~
B	~~Copy as per specifications~~ Cut -Out Letters and Border - White Prismatic Reflective Sheeting
△	Brown background with prismatic reflective sheeting

SIGN IDENTIFICATION CODES

IGDO	Interstate guide directional overhead
IGD	Interstate guide directional
IGS	Interstate guide service and rest area
IGI	Interstate guide information
GDO	Guide directional overhead
GD	Guide directional
R	Regulatory Sign
W	Warning, construction, & maint. signs
M	Route markers and aux. markers for assemblies
D	Destination sign
I	Information

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN REFLECTORIZATION SCHEDULE

SEPTEMBER 2012

STANDARD DRAWING NO. E 802-SNGS-05 04

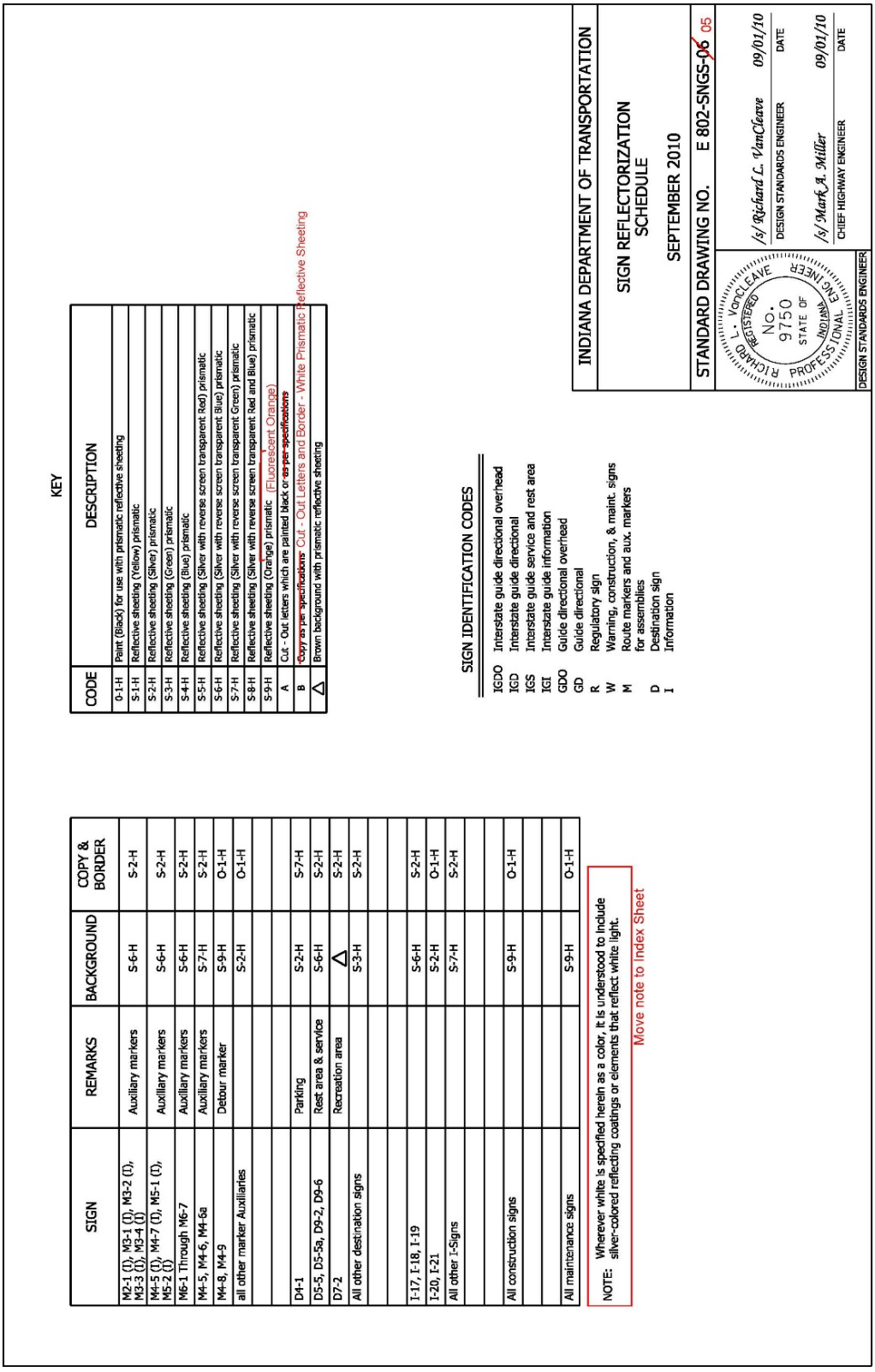
REGISTERED RICHARD L. VANCLEAVE No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-06 SIGN REFLECTORIZATION SCHEDULE (WITH MARKUPS)



SIGN	REMARKS	BACKGROUND	COPY & BORDER
M2-1 (†), M3-1 (†), M3-2 (†), M3-3 (†), M3-4 (†)	Auxiliary markers	S-6-H	S-2-H
M4-5 (†), M4-7 (†), M5-1 (†), M5-2 (†)	Auxiliary markers	S-6-H	S-2-H
M6-1 Through M6-7	Auxiliary markers	S-6-H	S-2-H
M4-5, M4-6, M4-8a	Auxiliary markers	S-7-H	S-2-H
M4-8, M4-9	Detour marker	S-9-H	O-1-H
all other marker Auxiliaries		S-2-H	O-1-H
D4-1	Parking	S-2-H	S-7-H
D5-5, D5-5a, D9-2, D9-6	Rest area & service	S-6-H	S-2-H
D7-2	Recreation area	△	S-2-H
All other destination signs		S-3-H	S-2-H
I-17, I-18, I-19		S-6-H	S-2-H
I-20, I-21		S-2-H	O-1-H
All other I-Signs		S-7-H	S-2-H
All construction signs		S-9-H	O-1-H
All maintenance signs		S-9-H	O-1-H

NOTE: Wherever white is specified herein as a color, it is understood to include silver-colored reflecting coatings or elements that reflect white light.

Move note to Index Sheet

KEY

CODE	DESCRIPTION
0-1-H	Paint (Black) for use with prismatic reflective sheeting
S-1-H	Reflective sheeting (Yellow) prismatic
S-2-H	Reflective sheeting (Silver) prismatic
S-3-H	Reflective sheeting (Green) prismatic
S-4-H	Reflective sheeting (Blue) prismatic
S-5-H	Reflective sheeting (Silver with reverse screen transparent Red) prismatic
S-6-H	Reflective sheeting (Silver with reverse screen transparent Blue) prismatic
S-7-H	Reflective sheeting (Silver with reverse screen transparent Green) prismatic
S-8-H	Reflective sheeting (Silver with reverse screen transparent Red and Blue) prismatic
S-9-H	Reflective sheeting (Orange) prismatic (Fluorescent Orange)
A	Cut - Out letters which are painted black ~~or as per specifications~~
B	~~Copy as per specifications~~ Cut - Out Letters and Border - White Prismatic Reflective Sheeting
△	Brown background with prismatic reflective sheeting

SIGN IDENTIFICATION CODES

IGDO	Interstate guide directional overhead
IGD	Interstate guide directional
IGS	Interstate guide service and rest area
IGI	Interstate guide information
GDO	Guide directional overhead
GD	Guide directional
R	Regulatory sign
W	Warning, construction, & maint. signs
M	Route markers and aux. markers for assemblies
D	Destination sign
I	Information

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN REFLECTORIZATION SCHEDULE

SEPTEMBER 2010

STANDARD DRAWING NO. E 802-SNGS-06 05

REGISTERED R. L. VanCLEAVE No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

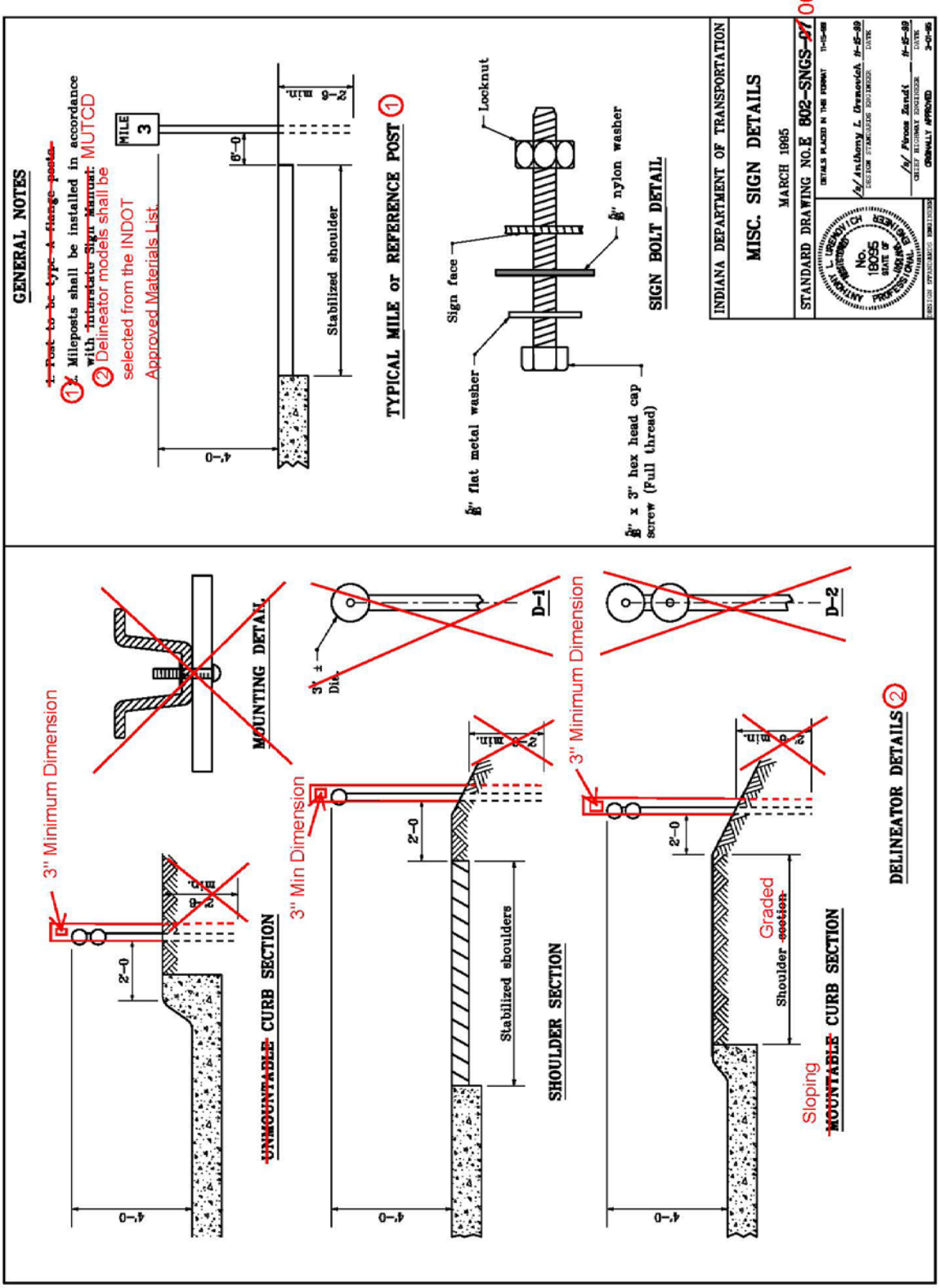
/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

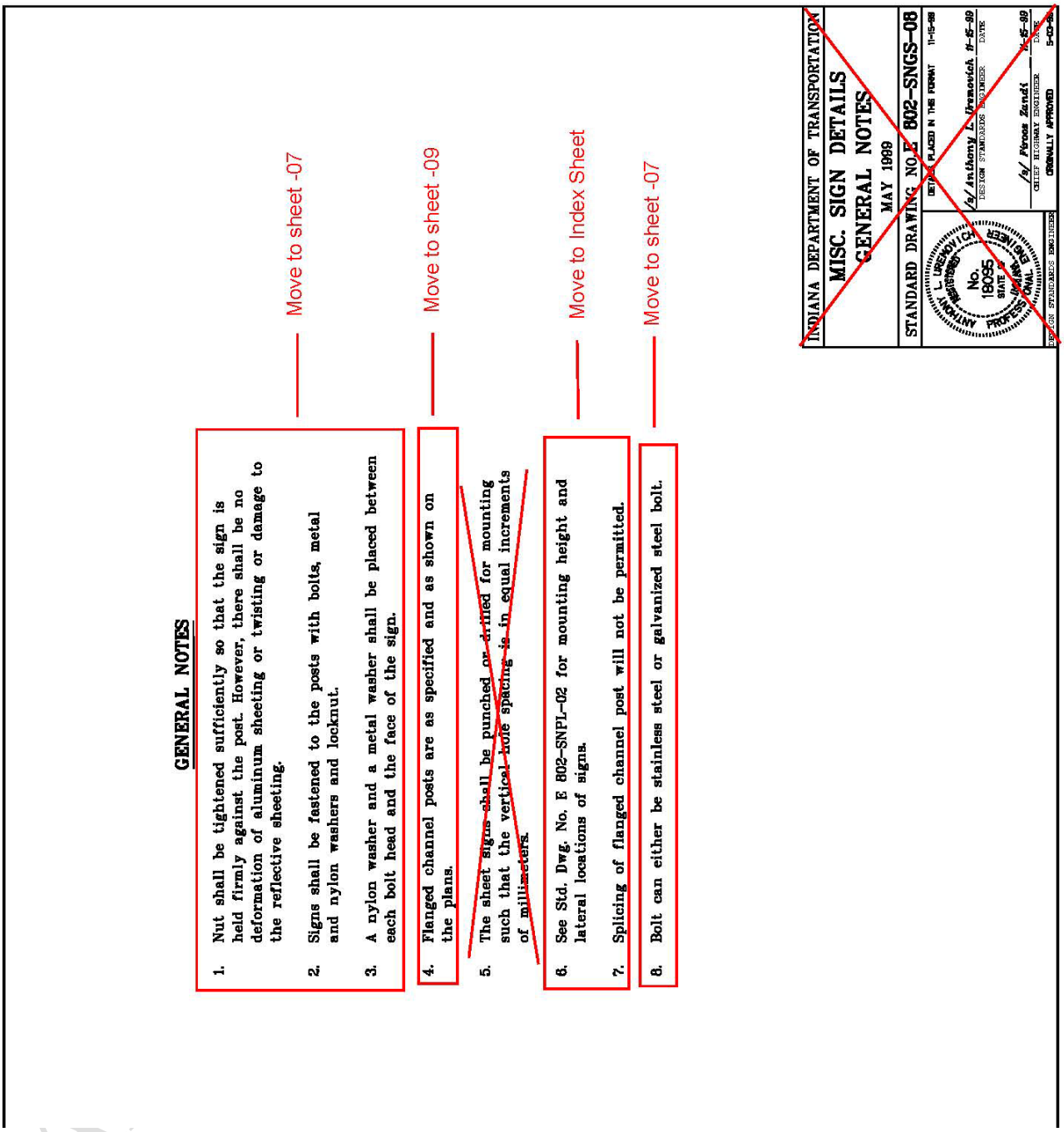
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-07 MISC. SIGN DETAILS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-08 MISC. SIGN DETAILS GENERAL NOTES (WITH MARKUPS)



INDIANA DEPARTMENT OF TRANSPORTATION
MISC. SIGN DETAILS
GENERAL NOTES
MAY 1999
STANDARD DRAWING NO. E 802-SNGS-08
DETAILS PLACED IN THIS FORMAT 11-15-99
/s/ Anthony L. Ivanovich 11-15-99
DESIGN STANDARDS ENGINEER DATE
/s/ Pravas Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 5-03-99
DESIGN STANDARDS ENGINEER

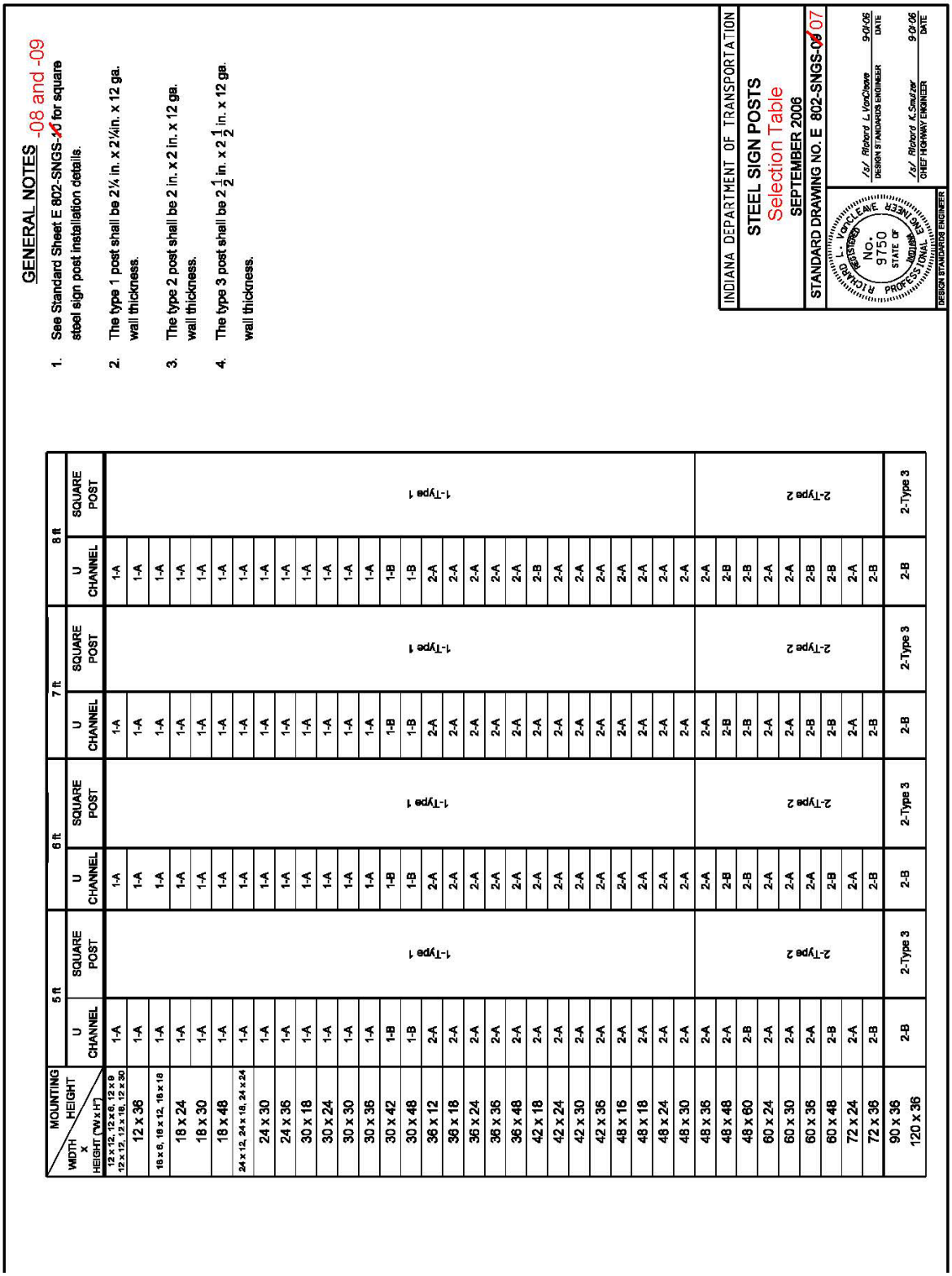
GENERAL NOTES

1. Nut shall be tightened sufficiently so that the sign is held firmly against the post. However, there shall be no deformation of aluminum sheeting or twisting or damage to the reflective sheeting.
2. Signs shall be fastened to the posts with bolts, metal and nylon washers and locknut.
3. A nylon washer and a metal washer shall be placed between each bolt head and the face of the sign.
4. Flanged channel posts are as specified and as shown on the plans.
5. The sheet signs shall be punched or drilled for mounting such that the vertical hole spacing is in equal increments of millimeters.
6. See Std. Dwg. No. E 802-SNFL-02 for mounting height and lateral locations of signs.
7. Splicing of flanged channel post will not be permitted.
8. Bolt can either be stainless steel or galvanized steel bolt.

Move to sheet -07
Move to sheet -09
Move to Index Sheet
Move to sheet -07

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-09 STEEL SIGN POSTS (WITH MARKUPS)



GENERAL NOTES -08 and -09

1. See Standard Sheet E 802-SNGS-~~10~~09 for square steel sign post installation details.
2. The type 1 post shall be 2¼ in. x 2¼in. x 12 ga. wall thickness.
3. The type 2 post shall be 2 in. x 2 in. x 12 ga. wall thickness.
4. The type 3 post shall be 2 $\frac{1}{2}$ in. x 2 $\frac{1}{2}$ in. x 12 ga. wall thickness.

MOUNTING HEIGHT / WIDTH x HEIGHT ("W x H")	5 ft		6 ft		7 ft		8 ft	
	U CHANNEL	SQUARE POST	U CHANNEL	SQUARE POST	U CHANNEL	SQUARE POST	U CHANNEL	SQUARE POST
12 x 12, 12 x 6, 12 x 8 12 x 12, 12 x 18, 12 x 30	1-A	1-Type 1	1-A	1-Type 1	1-A	1-Type 1	1-A	1-Type 1
12 x 36	1-A		1-A		1-A		1-A	
18 x 6, 18 x 12, 18 x 18	1-A		1-A		1-A		1-A	
18 x 24	1-A		1-A		1-A		1-A	
18 x 30	1-A		1-A		1-A		1-A	
18 x 48	1-A		1-A		1-A		1-A	
24 x 12, 24 x 18, 24 x 24	1-A		1-A		1-A		1-A	
24 x 30	1-A		1-A		1-A		1-A	
24 x 36	1-A		1-A		1-A		1-A	
30 x 18	1-A		1-A		1-A		1-A	
30 x 24	1-A		1-A		1-A		1-A	
30 x 30	1-A		1-A		1-A		1-A	
30 x 36	1-A		1-A		1-A		1-A	
30 x 42	1-B		1-B		1-B		1-B	
30 x 48	1-B		1-B		1-B		1-B	
36 x 12	2-A		2-A		2-A		2-A	
36 x 18	2-A		2-A		2-A		2-A	
36 x 24	2-A		2-A		2-A		2-A	
36 x 36	2-A		2-A		2-A		2-A	
36 x 48	2-A		2-A		2-A		2-B	
42 x 18	2-A		2-A		2-A		2-A	
42 x 24	2-A		2-A		2-A		2-A	
42 x 30	2-A		2-A		2-A		2-A	
42 x 36	2-A		2-A		2-A		2-A	
48 x 16	2-A		2-A		2-A		2-A	
48 x 18	2-A		2-A		2-A		2-A	
48 x 24	2-A		2-A		2-A		2-A	
48 x 30	2-A		2-A		2-A		2-A	
48 x 36	2-A	2-Type 2	2-A	2-Type 2	2-A	2-Type 2	2-A	2-Type 2
48 x 48	2-A		2-B		2-B		2-B	
48 x 60	2-B		2-B		2-B		2-B	
60 x 24	2-A		2-A		2-A		2-A	
60 x 30	2-A		2-A		2-A		2-B	
60 x 36	2-A		2-A		2-B		2-B	
60 x 48	2-B		2-B		2-B		2-B	
72 x 24	2-A		2-A		2-A		2-A	
72 x 36	2-B		2-B		2-B		2-B	
90 x 36 120 x 36	2-B	2-Type 3	2-B	2-Type 3	2-B	2-Type 3	2-B	2-Type 3

INDIANA DEPARTMENT OF TRANSPORTATION

STEEL SIGN POSTS
Selection Table
SEPTEMBER 2006

STANDARD DRAWING NO. E 802-SNGS-0~~8~~07

REGISTERED L. VONCLEAVE No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

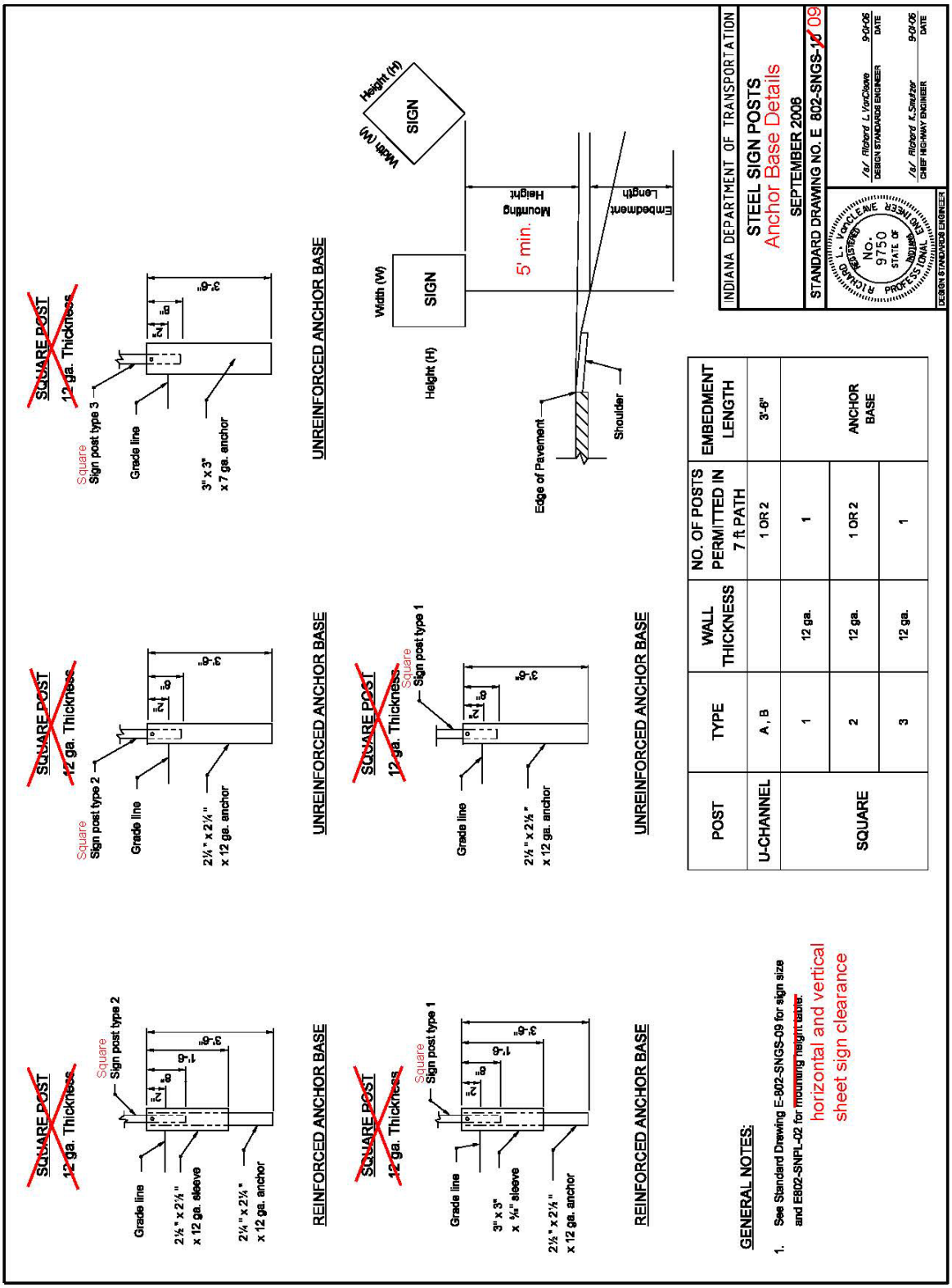
/s/ Richard L VonCleave 9-01-06
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K.Smelser 9-01-06
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

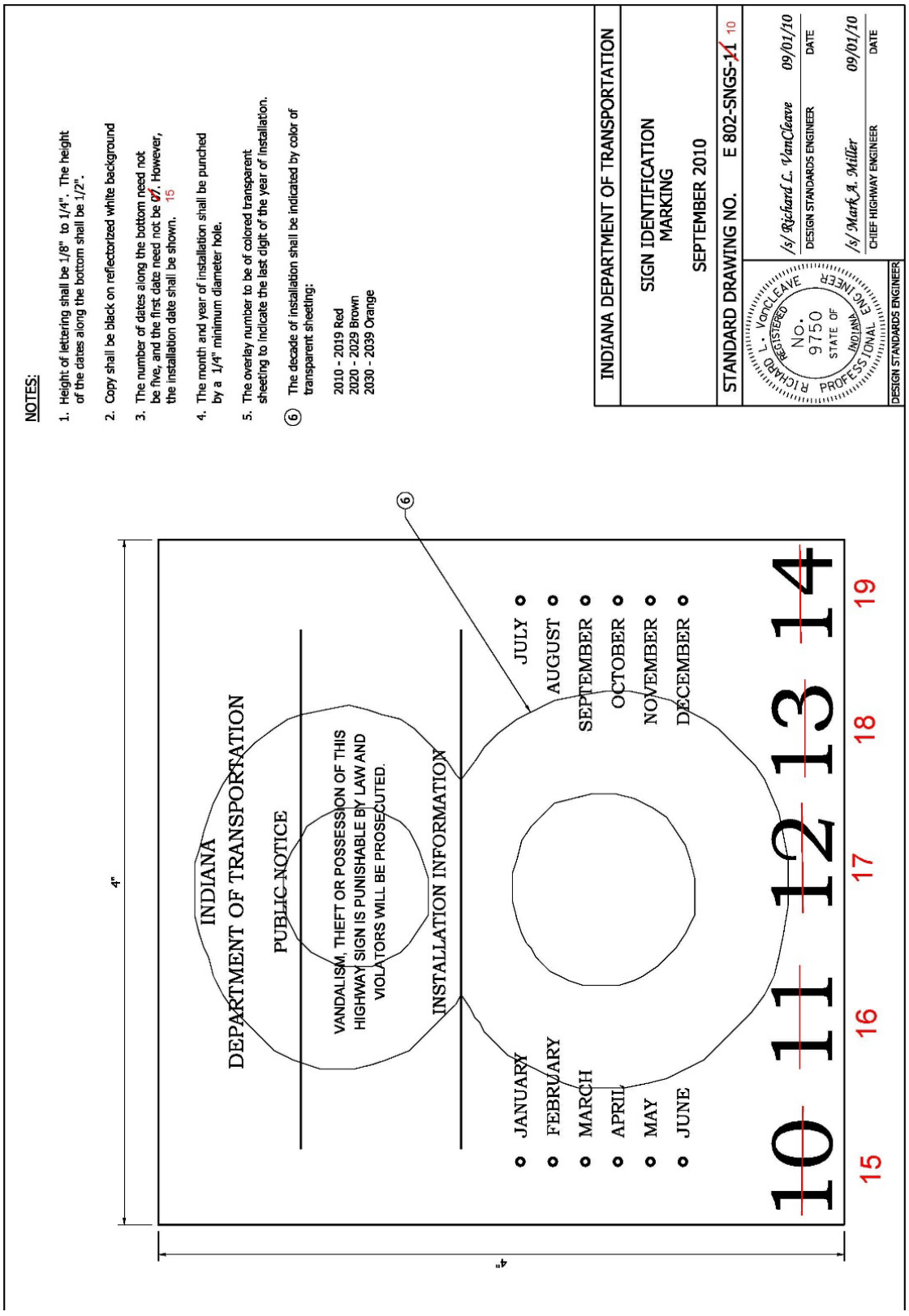
802-SNGS-10 STEEL SIGN POSTS (WITH MARKUPS)



POST	TYPE	WALL THICKNESS	NO. OF POSTS PERMITTED IN 7 ft PATH	EMBEDMENT LENGTH	
U-CHANNEL	A, B		1 OR 2	3'-6"	ANCHOR BASE
SQUARE	1	12 ga.	1		
	2	12 ga.	1 OR 2		
	3	12 ga.	1		

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-11 SIGN IDENTIFICATION MARKING (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-12 WIDE FLANGE POST SELECTION TABLE (WITH MARKUPS)

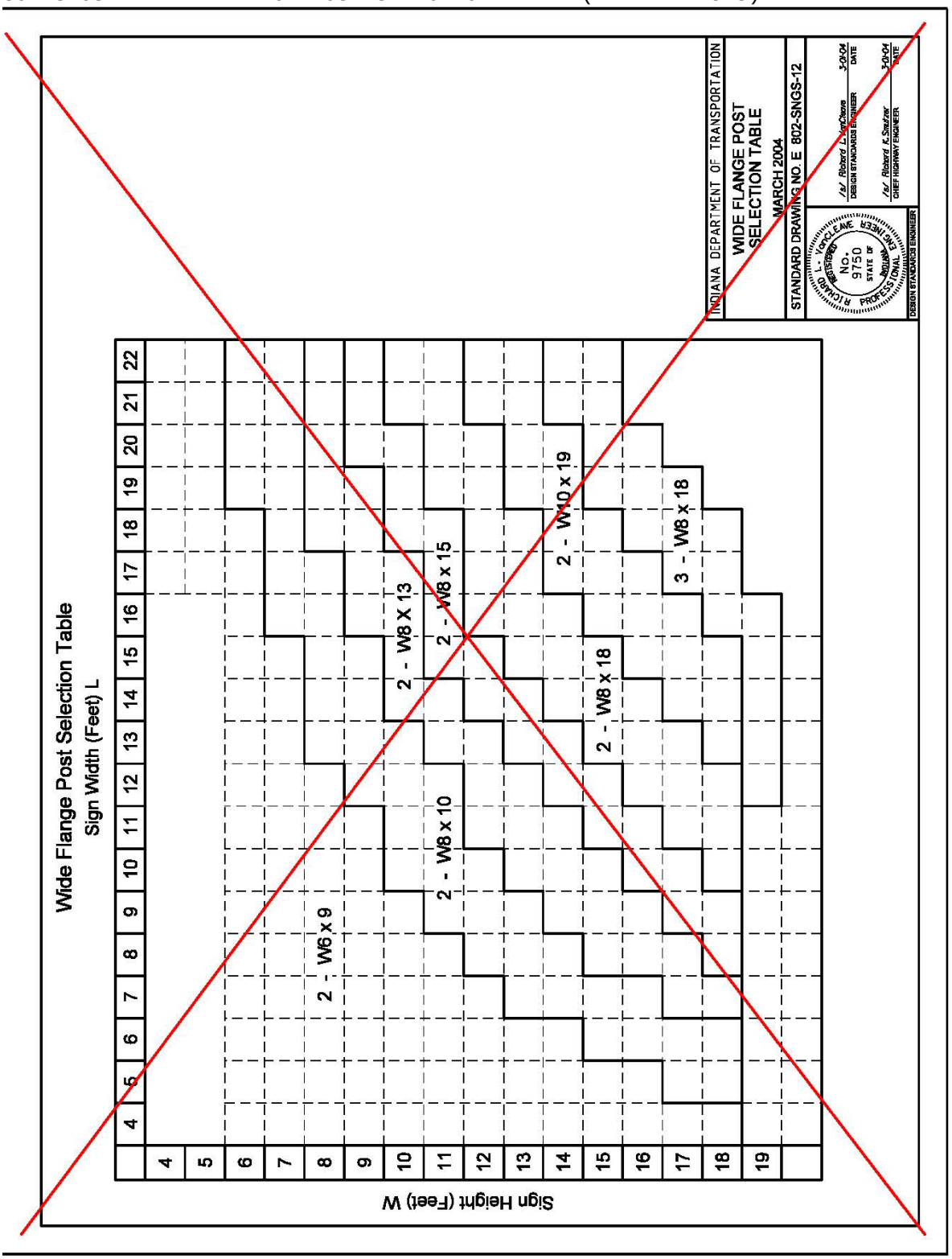
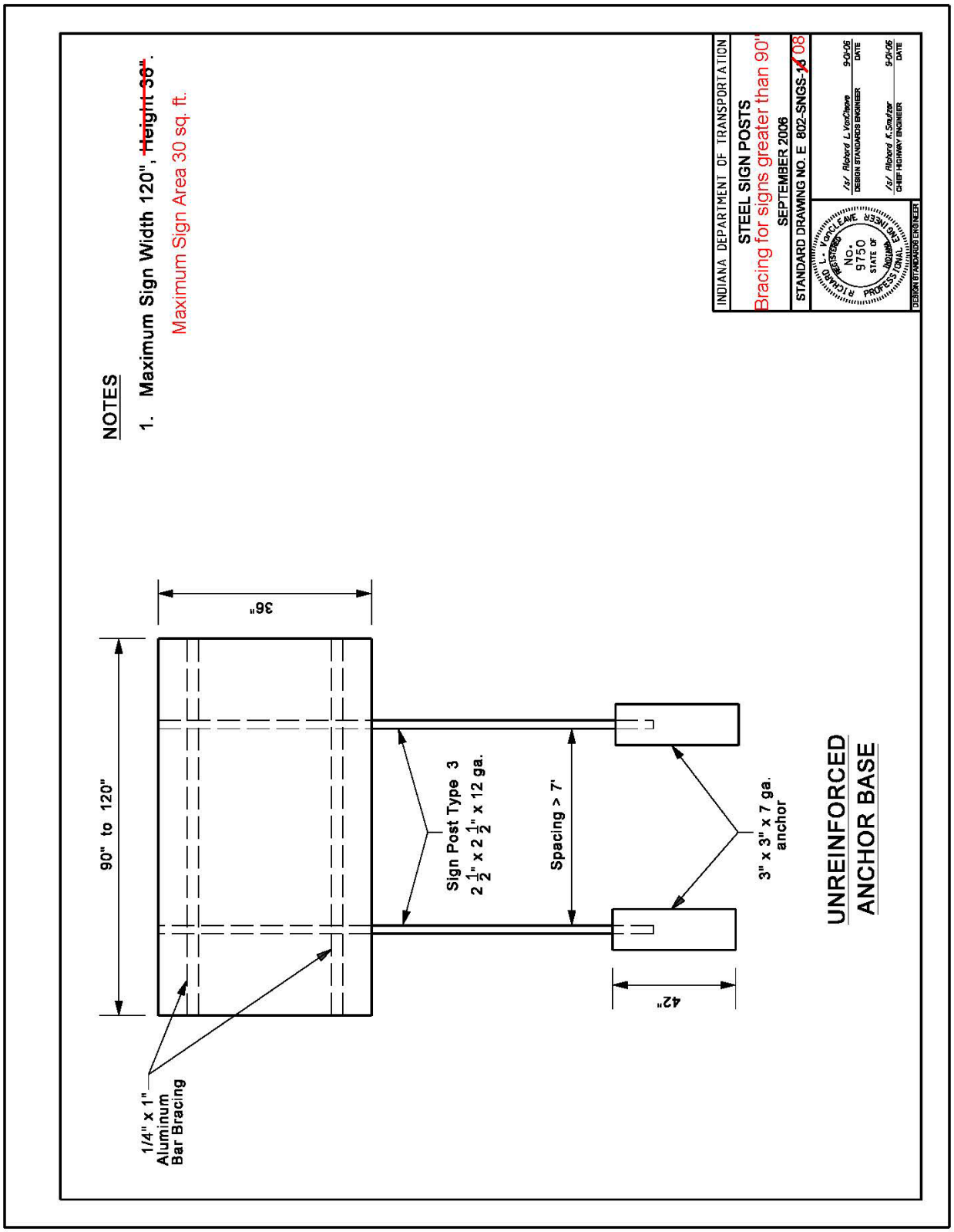


Table will be moved to 802-SNGP

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-13 STEEL SIGN POSTS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-01 SIGNS DRAWING INDEX AND GENERAL NOTES (DRAFT)

INDEX

SHEET NO.	SUBJECT
1	Signs Drawing Index and General Notes
2	Route Marker Details
3	Route Marker Details
4	Sign Reflectorization Schedule
5	Sign Reflectorization Schedule
6	Miscellaneous Sign Details
7	Steel Sign Posts, U-Channel and Square
8	Steel Sign Posts, Bracing for Signs Greater Than 90"
9	Steel Sign Posts, Anchor Base Details
10	Sign Identification Marking

GENERAL NOTES:

1. Numerals sometimes cannot be accommodated within the space available. For this situation, the standard series D numeral may be reduced to series C. As a second choice, use the next smaller height commonly available.
2. For independent use of sheet signs, a nylon and metal washer shall be placed between each bolt head and the face of the metal sign. See Sign Bolt Detail on Standard Drawing E 802-SNGS-06.
3. Fabrication details for the signs shown shall be found in the Standard Highway Signs and Markings Book. Shop drawings will be supplied on all other signs not found in the publication.
4. See Standard Drawing E 802-SNPL-02 for mounting height and lateral locations of signs.
5. Splicing of flanged channel post will not be permitted.
6. Wherever white is specified as a color, it is understood to include silver-colored reflecting coatings or elements the reflect white light.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGNS
DRAWING INDEX AND GENERAL NOTES
SEPTEMBER 2017

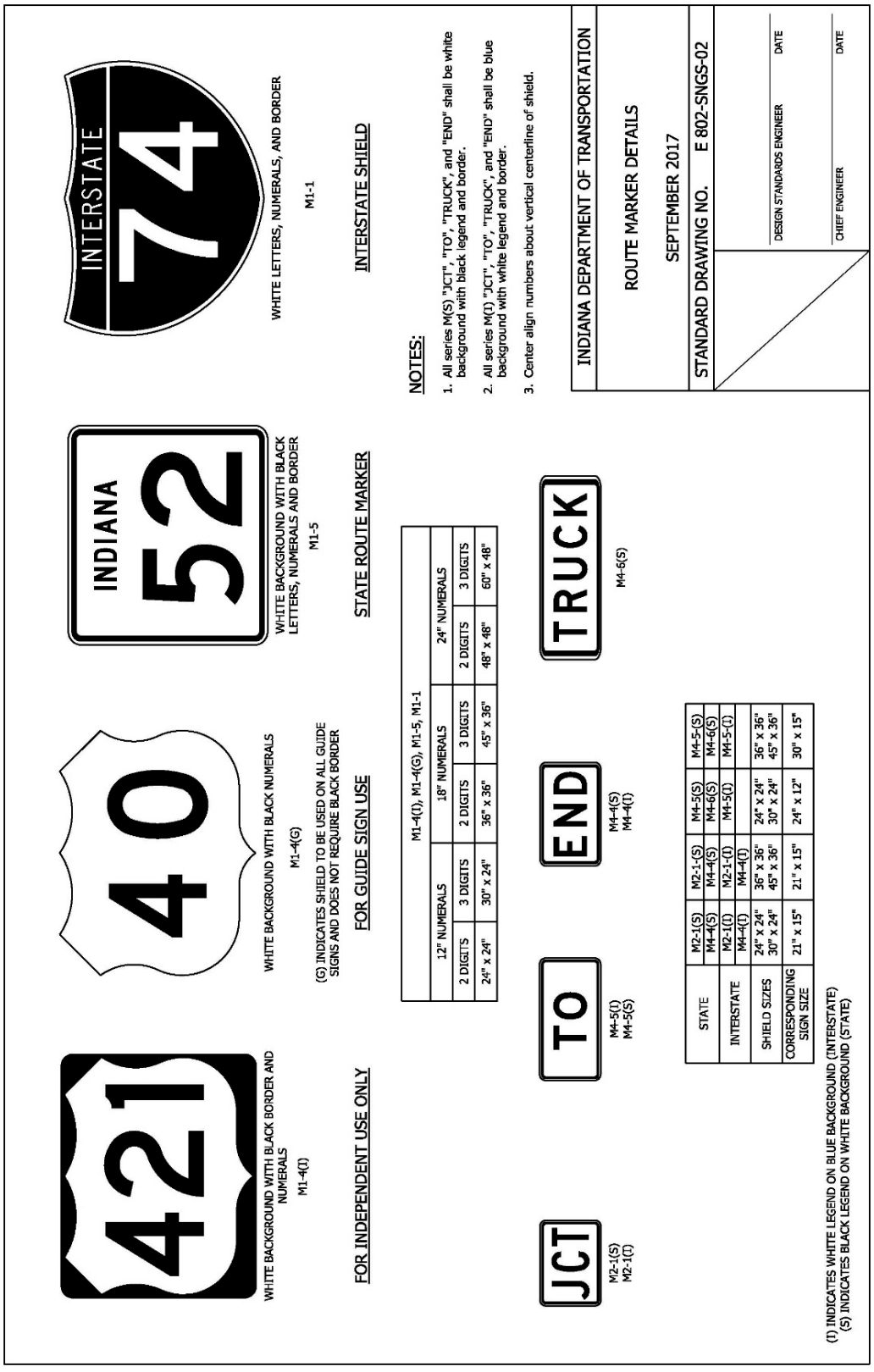
STANDARD DRAWING NO. E 802-SNGS-01

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-02 ROUTE MARKER DETAILS (DRAFT)



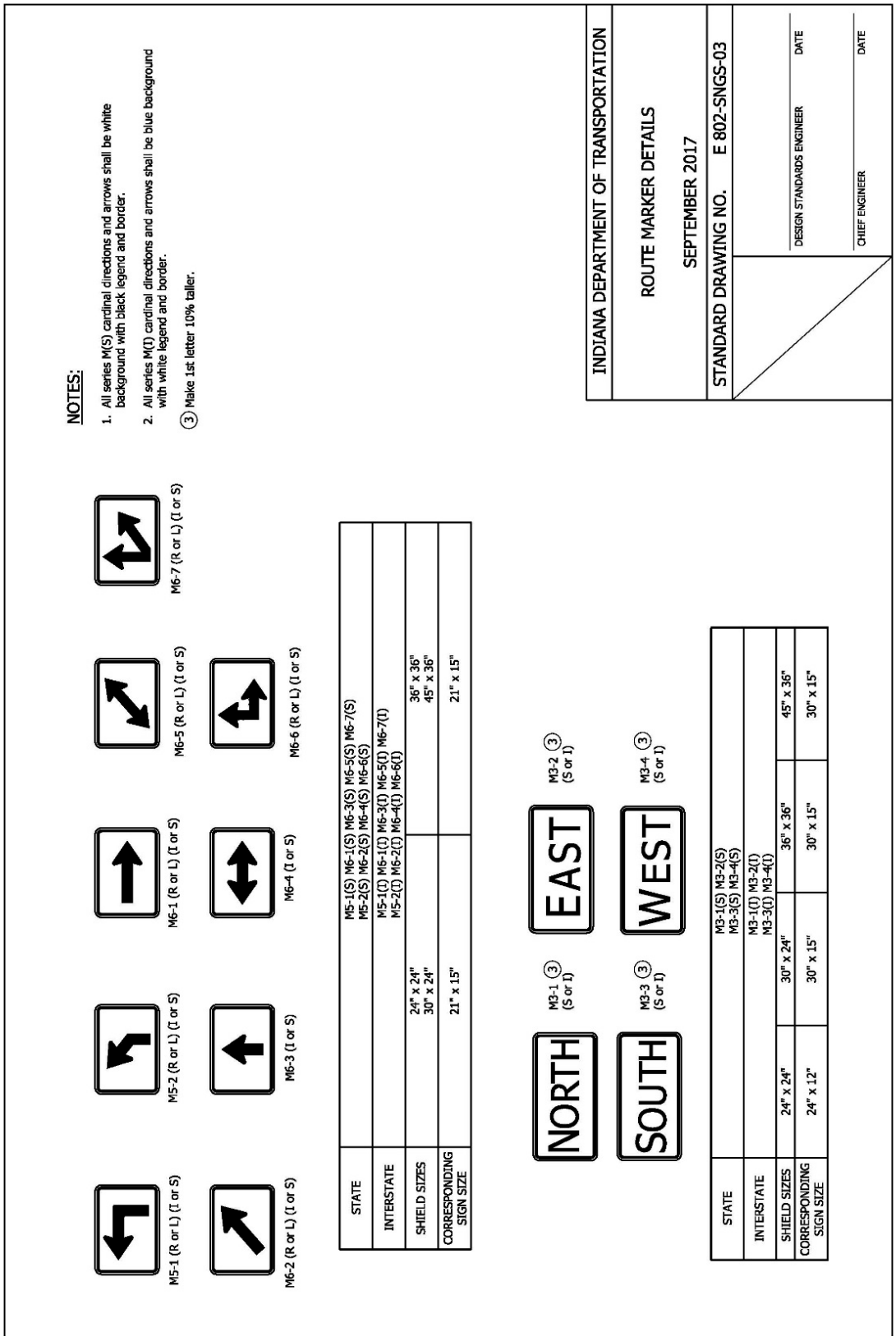
M1-4(I), M1-4(G), M1-5, M1-1				
12" NUMERALS		18" NUMERALS	24" NUMERALS	
2 DIGITS	3 DIGITS	2 DIGITS	3 DIGITS	2 DIGITS	3 DIGITS
24" x 24"	30" x 24"	36" x 36"	45" x 36"	48" x 48"	60" x 48"

STATE	M2-1(S) M4-4(S)	M2-1(S) M4-4(S)	M4-5(S) M4-6(S)	M4-5(S) M4-6(S)
INTERSTATE	M2-1(I) M4-4(I)	M2-1(I) M4-5(I)	M4-5(I)	M4-5(I)
SHIELD SIZES	24" x 24" 30" x 24"	36" x 36" 45" x 36"	24" x 24" 30" x 24"	36" x 36" 45" x 36"
CORRESPONDING SIGN SIZE	21" x 15"	21" x 15"	24" x 12"	30" x 15"

(I) INDICATES WHITE LEGEND ON BLUE BACKGROUND (INTERSTATE)
(S) INDICATES BLACK LEGEND ON WHITE BACKGROUND (STATE)

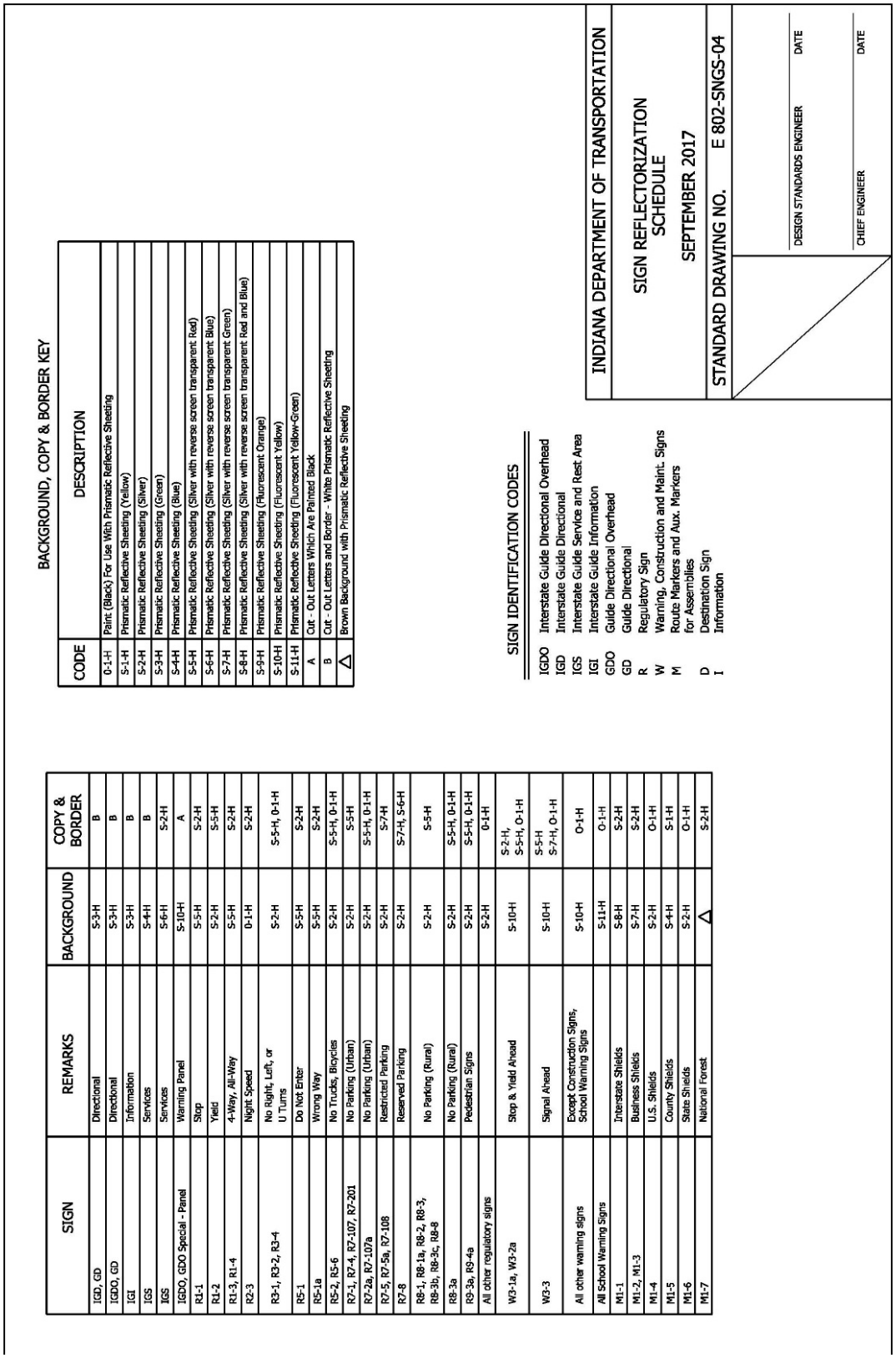
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-03 ROUTE MARKER DETAILS (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-04 SIGN REFLECTORIZATION SCHEDULE (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-05 SIGN REFLECTORIZATION SCHEDULE (DRAFT)

SIGN	REMARKS	BACKGROUND	COPY & BORDER
M2-1 (1), M3-1 (1), M3-2 (1), M3-3 (1), M3-4 (1)	Auxiliary Markers	S-6-H	S-2-H
M4-5 (1), M4-7 (1), M5-1 (1), M5-2 (1)	Auxiliary Markers	S-6-H	S-2-H
M6-1 Through M6-7	Auxiliary Markers	S-6-H	S-2-H
M4-5, M4-6, M4-6a	Auxiliary Markers	S-7-H	S-2-H
M4-8, M4-9	Detour Marker	S-9-H	O-1-H
All Other Marker Auxiliaries		S-2-H	O-1-H
D4-1	Parking	S-2-H	S-7-H
D5-5, D5-5a, D9-2, D9-6	Rest Area & Service	S-6-H	S-2-H
D7-2	Recreation Area	△	S-2-H
All Other Destination Signs		S-3-H	S-2-H
I-17, I-18, I-19		S-6-H	S-2-H
I-20, I-21		S-2-H	O-1-H
All Other I-Signs		S-7-H	S-2-H
All Construction Signs		S-9-H	O-1-H
All Maintenance Signs		S-9-H	O-1-H

BACKGROUND, COPY AND BORDER KEY

CODE	DESCRIPTION
O-1-H	Paint (Black) For Use With Prismatic Reflective Sheeting
S-1-H	Prismatic Reflective Sheeting (Yellow)
S-2-H	Prismatic Reflective Sheeting (Silver)
S-3-H	Prismatic Reflective Sheeting (Green)
S-4-H	Prismatic Reflective Sheeting (Blue)
S-5-H	Prismatic Reflective Sheeting (Silver with reverse screen transparent Red)
S-6-H	Prismatic Reflective Sheeting (Silver with reverse screen transparent Blue)
S-7-H	Prismatic Reflective Sheeting (Silver with reverse screen transparent Green)
S-8-H	Prismatic Reflective Sheeting (Silver with reverse screen transparent Red and Blue)
S-9-H	Prismatic Reflective Sheeting (Fluorescent Orange)
A	Cut - Out Letters Which Are Painted Black
B	Cut - Out Letters And Border - White Prismatic Reflective Sheeting
△	Brown Background With Prismatic Reflective Sheeting

SIGN IDENTIFICATION CODES

IGDO	Interstate Guide Directional Overhead
IGD	Interstate Guide Directional
IGS	Interstate Guide Service and Rest Area
IGI	Interstate Guide Information
GDO	Guide Directional Overhead
GD	Guide Directional
R	Regulatory Sign
W	Warning, Construction and Maint. Signs
M	Route Markers and Aux. Markers for Assemblies
D	Destination Sign
I	Information

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN REFLECTORIZATION SCHEDULE

SEPTEMBER 2017

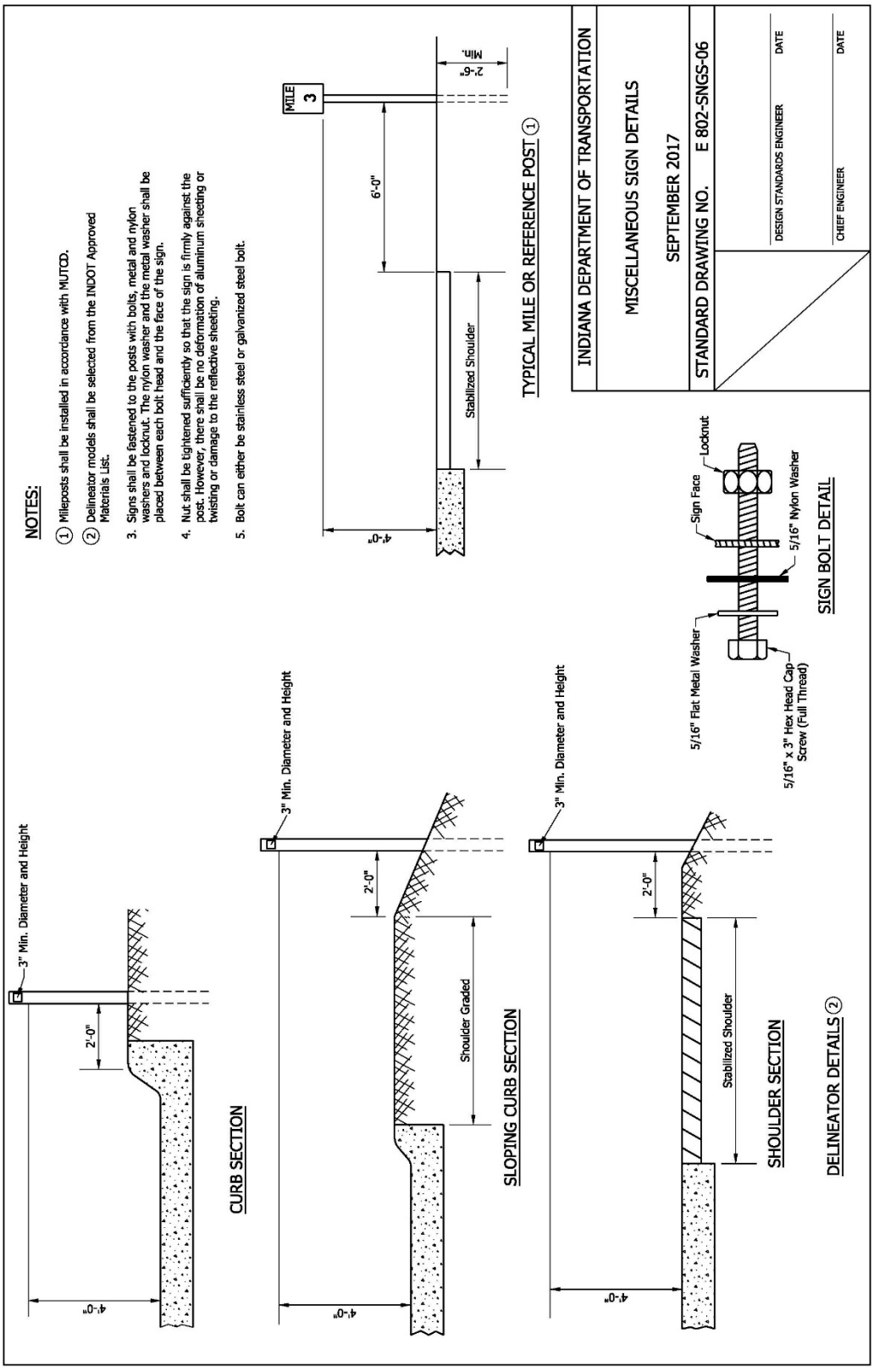
STANDARD DRAWING NO. E 802-SNGS-05

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-06 MISCELLANEOUS SIGN DETAILS (REVISED DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-07 STEEL SIGN POST SELECTION TABLE (DRAFT)

WIDTH X HEIGHT ("W X H")	MOUNTING HEIGHT 5 FT U CHANNEL	5 FT SQUARE POST	6 FT U CHANNEL	6 FT SQUARE POST	7 FT U CHANNEL	7 FT SQUARE POST	8 FT U CHANNEL	8 FT SQUARE POST
12 x 12, 12 x 6, 12 x 9 12 x 12, 12 x 18, 12 x 30	1-A	1-Type 1	1-A	1-Type 1	1-A	1-Type 1	1-A	1-Type 1
12 x 36	1-A		1-A		1-A		1-A	
18 x 6, 18 x 12, 18 x 18	1-A		1-A		1-A		1-A	
18 x 24	1-A		1-A		1-A		1-A	
18 x 30	1-A		1-A		1-A		1-A	
18 x 48	1-A		1-A		1-A		1-A	
24 x 12, 24 x 18, 24 x 24	1-A		1-A		1-A		1-A	
24 x 30	1-A		1-A		1-A		1-A	
24 x 36	1-A		1-A		1-A		1-A	
30 x 18	1-A		1-A		1-A		1-A	
30 x 24	1-A		1-A		1-A		1-A	
30 x 30	1-A		1-A		1-A		1-A	
30 x 36	1-A		1-A		1-A		1-A	
30 x 42	1-B		1-B		1-B		1-B	
30 x 48	1-B		1-B		1-B		1-B	
36 x 12	2-A		2-A		2-A		2-A	
36 x 18	2-A		2-A		2-A		2-A	
36 x 24	2-A		2-A		2-A		2-A	
36 x 36	2-A		2-A		2-A		2-A	
36 x 48	2-A		2-A		2-A		2-A	
42 x 18	2-A		2-A		2-A		2-B	
42 x 24	2-A		2-A		2-A		2-A	
42 x 30	2-A		2-A		2-A		2-A	
42 x 36	2-A		2-A		2-A		2-A	
48 x 16	2-A		2-A		2-A		2-A	
48 x 18	2-A		2-A		2-A		2-A	
48 x 24	2-A		2-A		2-A		2-A	
48 x 30	2-A		2-A		2-A		2-A	
48 x 36	2-A	2-Type 2	2-A	2-Type 2	2-A	2-Type 2	2-A	2-Type 2
48 x 48	2-A		2-B		2-B		2-B	
48 x 60	2-B		2-B		2-B		2-B	
60 x 24	2-A		2-A		2-A		2-A	
60 x 30	2-A		2-A		2-A		2-A	
60 x 36	2-A		2-A		2-B		2-B	
60 x 48	2-B		2-B		2-B		2-B	
72 x 24	2-A		2-A		2-A		2-A	
72 x 36	2-B		2-B		2-B		2-B	
90 x 36 120 x 36	2-B	2-Type 3	2-B	2-Type 3	2-B	2-Type 3	2-B	2-Type 3

NOTES:

1. See Standard Drawing E 802-SNGS-08 and -09 for square steel sign post installation details.
2. The Type 1 post shall be 2 1/4 in. x 2 1/4 in. x 12 ga. wall thickness..
3. The Type 2 post shall be 2 in. x 2 in. x 12 ga. wall thickness.
4. The Type 3 post shall be 2 1/2 in. x 2 1/2 in. x 12 ga. wall thickness.
5. Flanged channel posts are as specified and as shown on the plans.

INDIANA DEPARTMENT OF TRANSPORTATION

STEEL SIGN
POST SELECTION TABLE

SEPTEMBER 2017

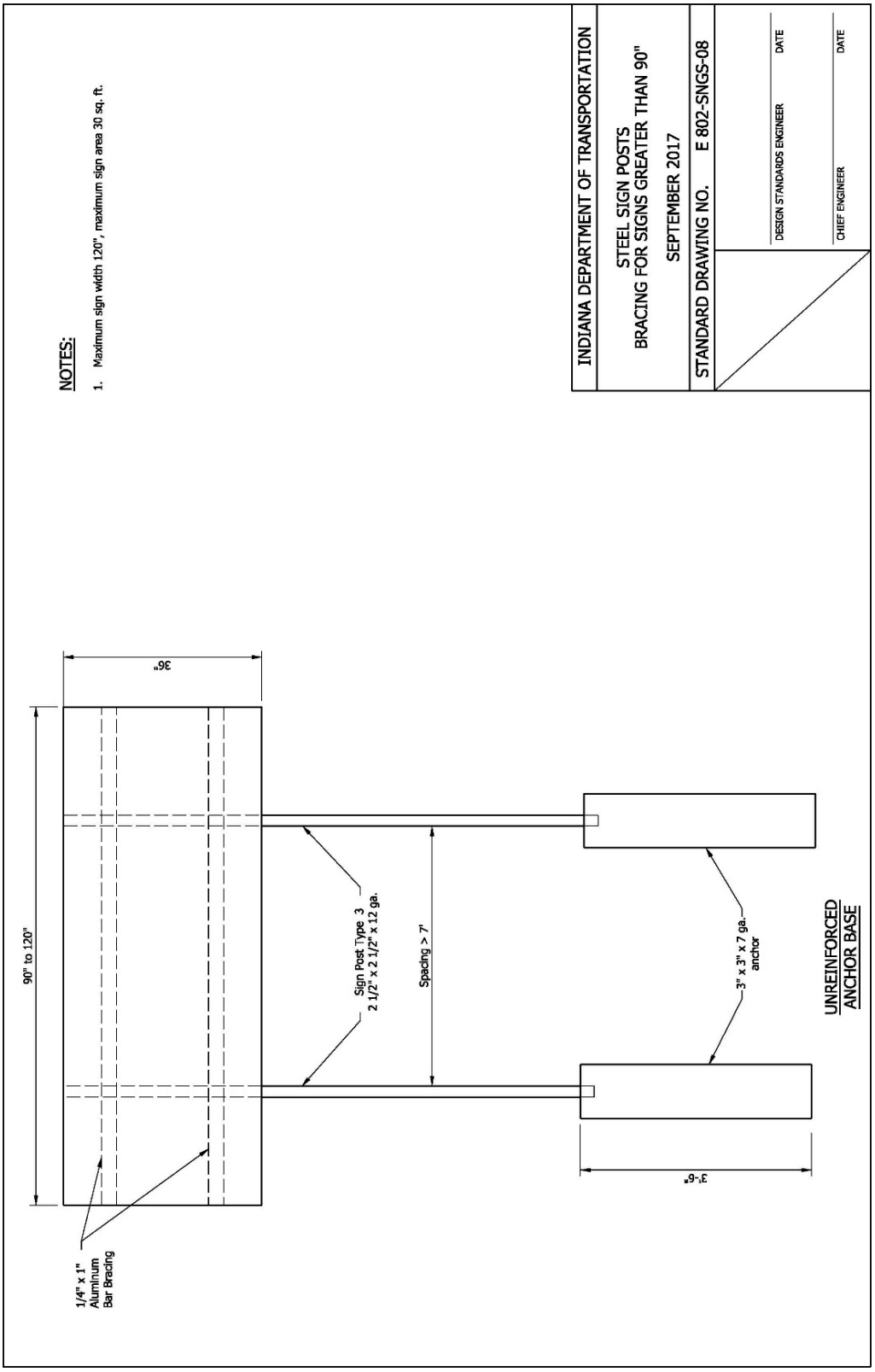
STANDARD DRAWING NO. E 802-SNGS-07

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

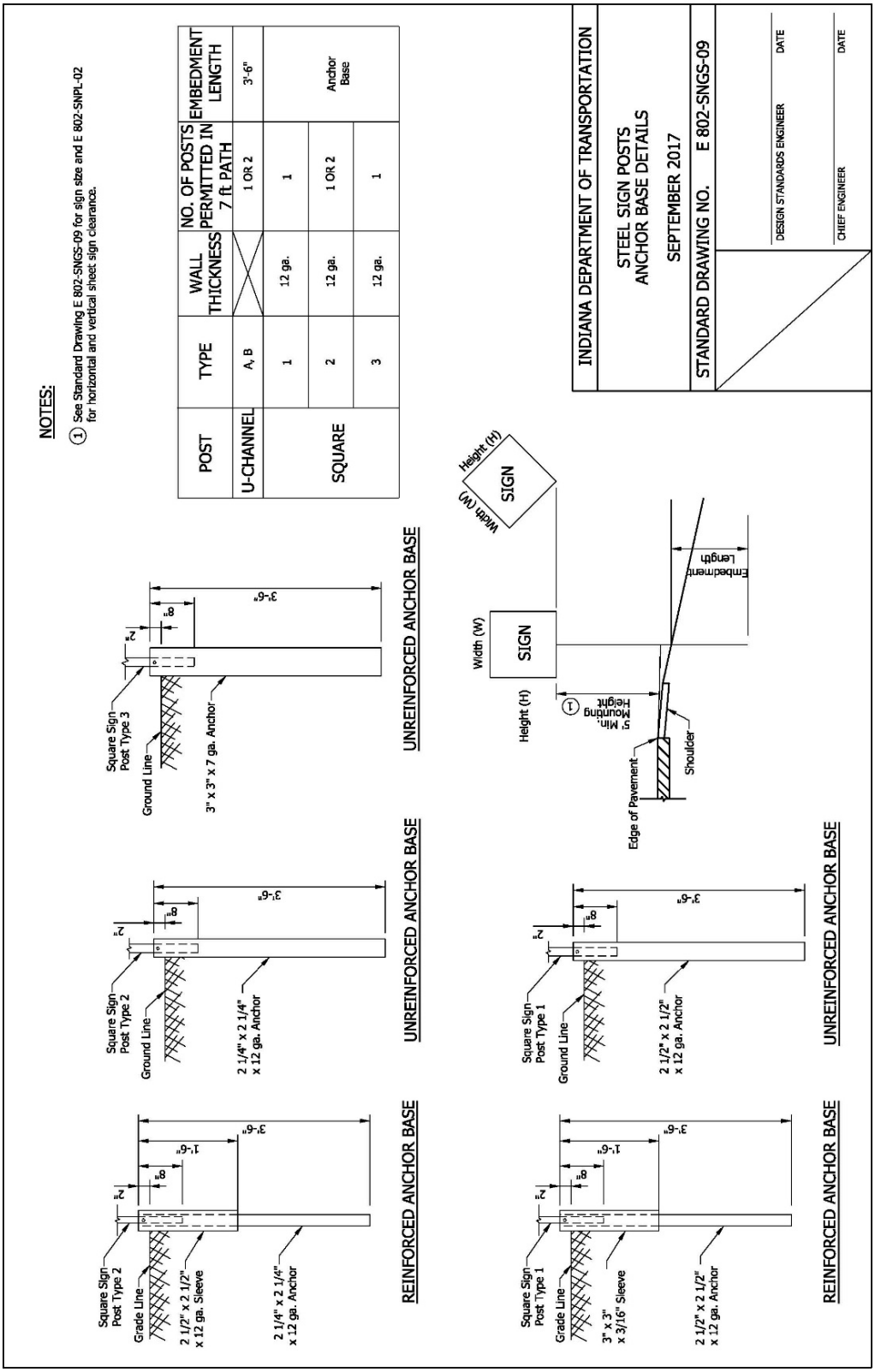
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-08 STEEL SIGN POSTS BRACING FOR SIGNS GREATER THAN 90" (DRAFT)



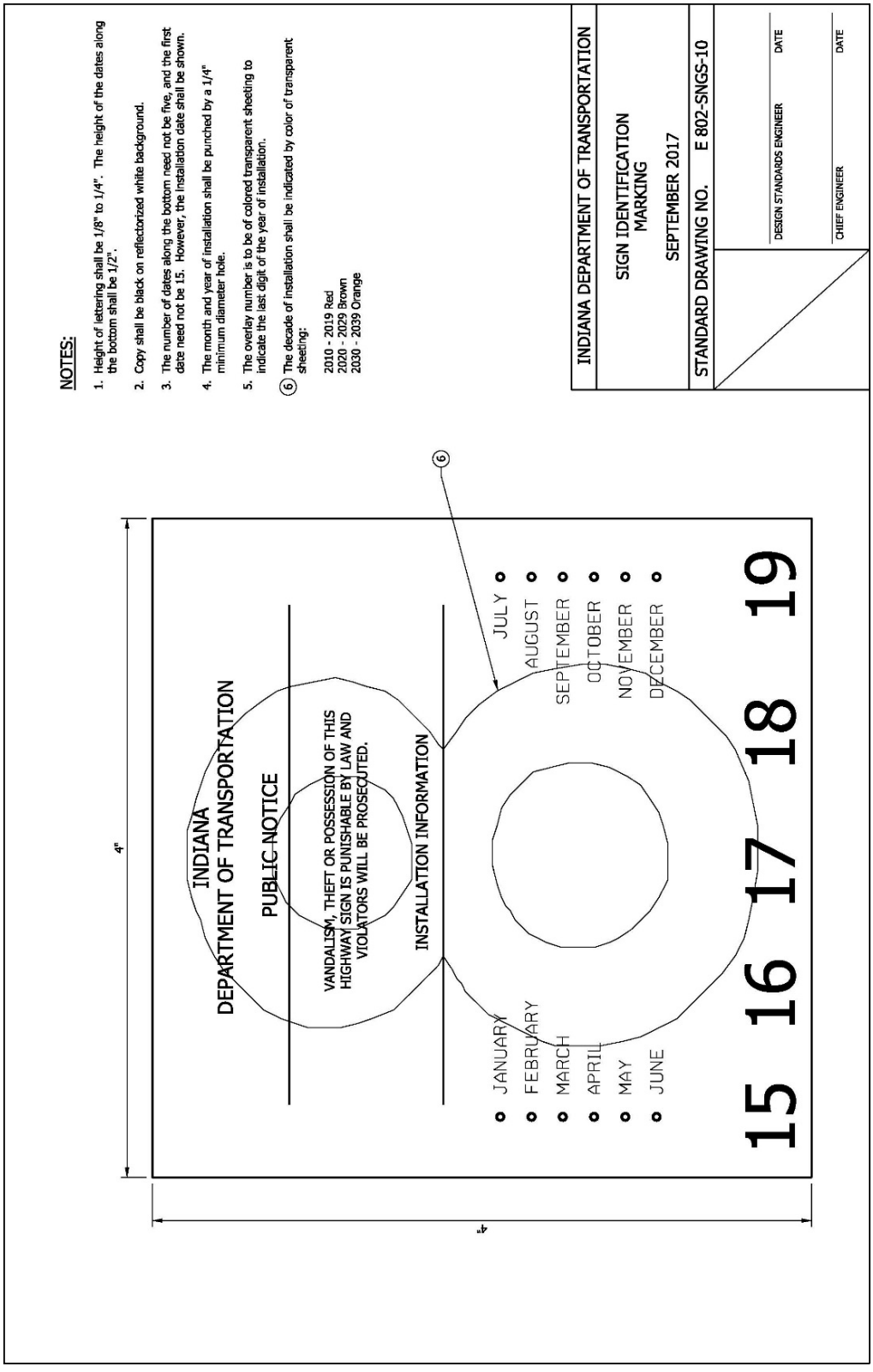
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-09 STEEL SIGN POSTS ANCHOR BASE DETAILS (DRAFT)



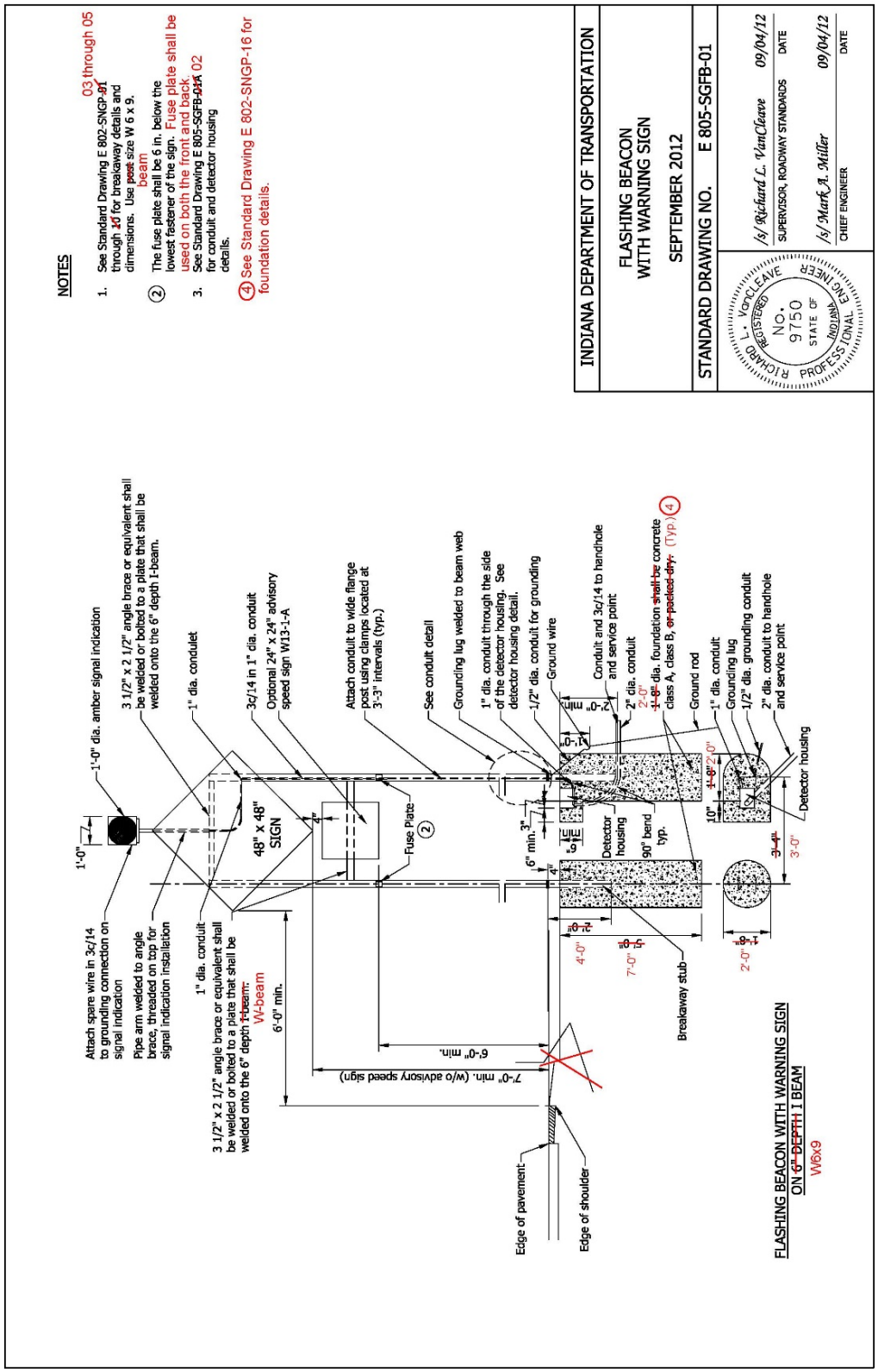
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

802-SNGS-10 SIGN IDENTIFICATION MARKING (DRAFT)



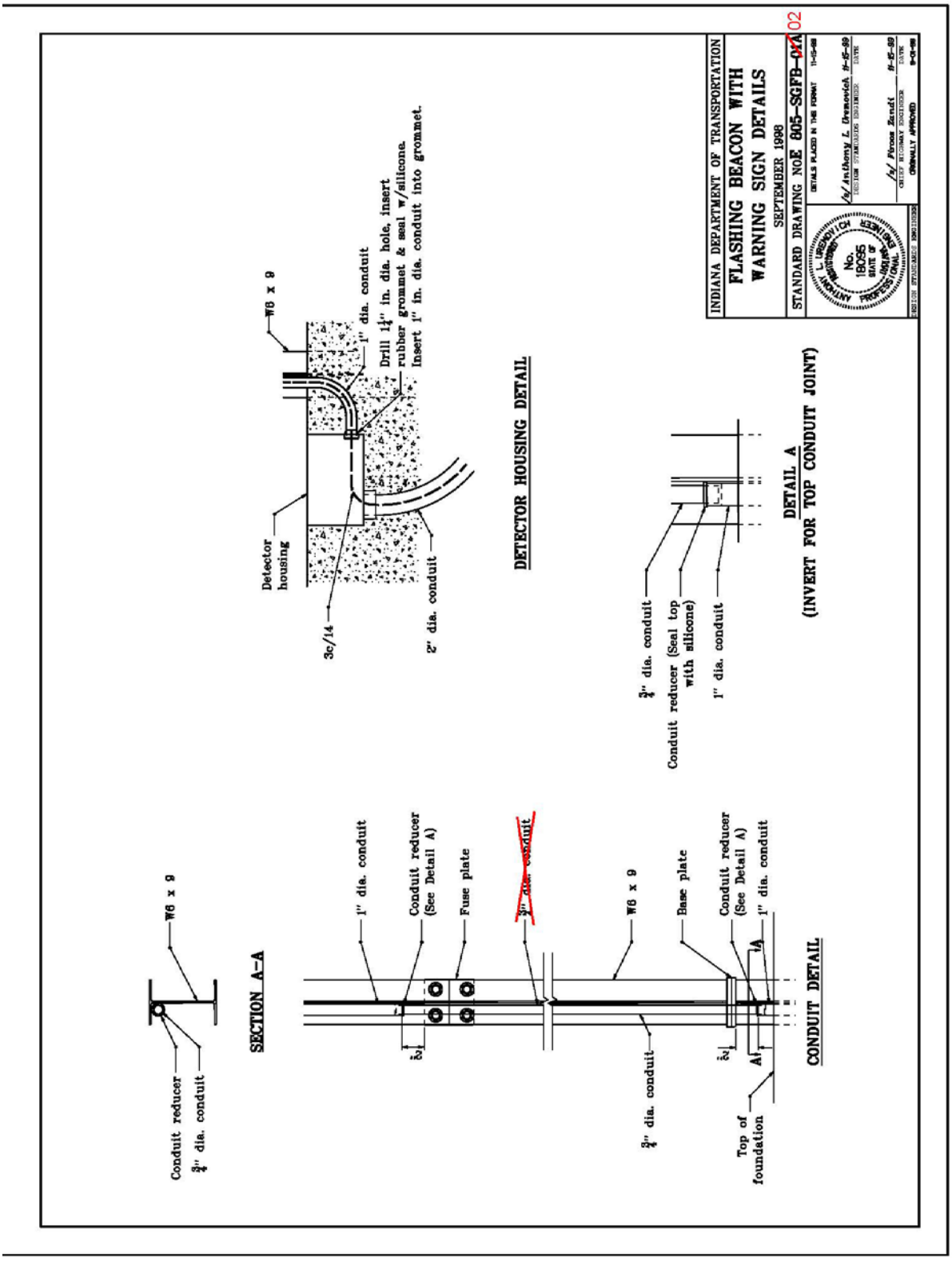
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-01 FLASHING BEACON WITH WARNING SIGN (WITH MARKUPS)



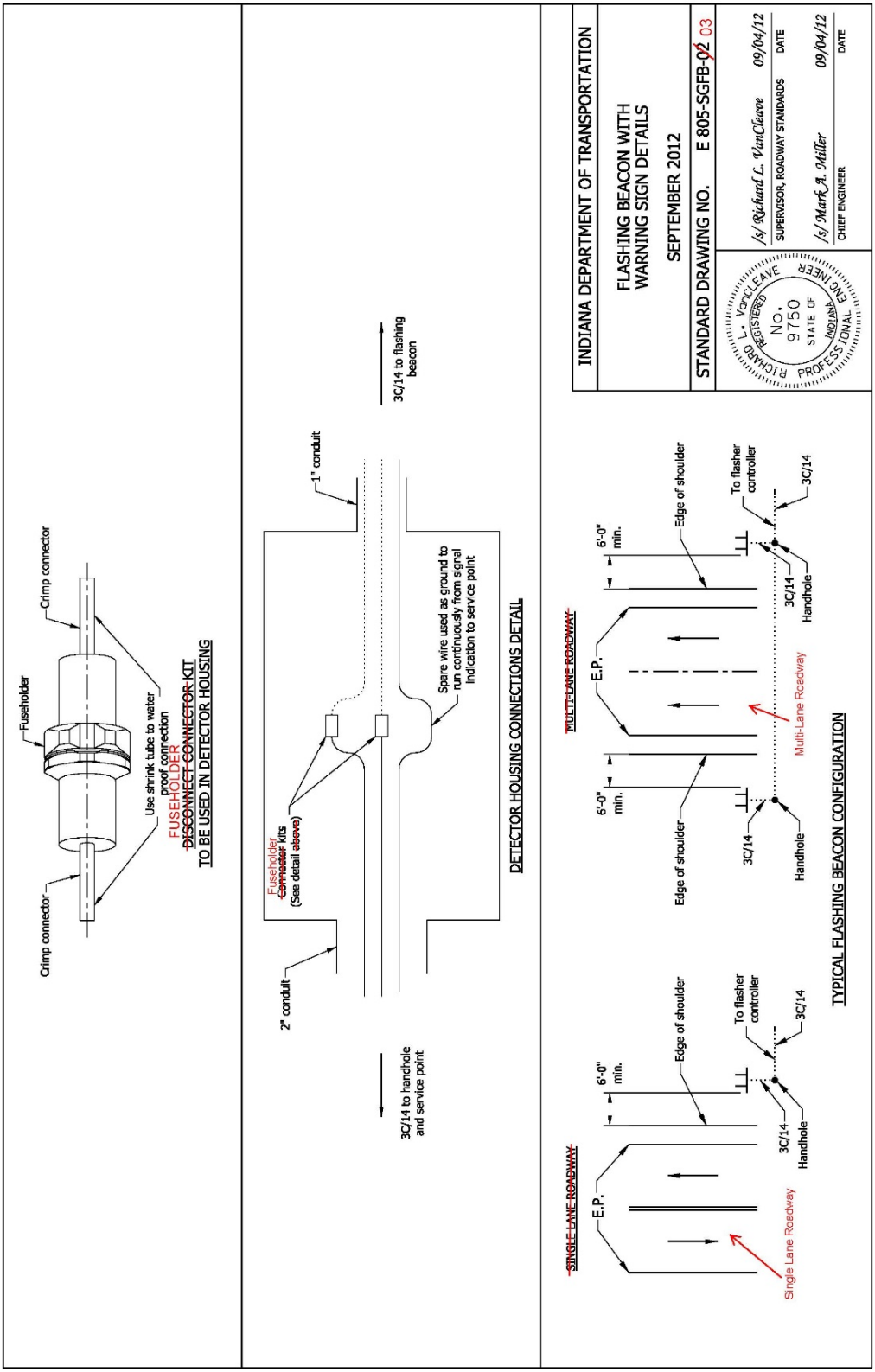
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-01A FLASHING BEACON WITH WARNING SIGN DETAILS (WITH MARKUPS)



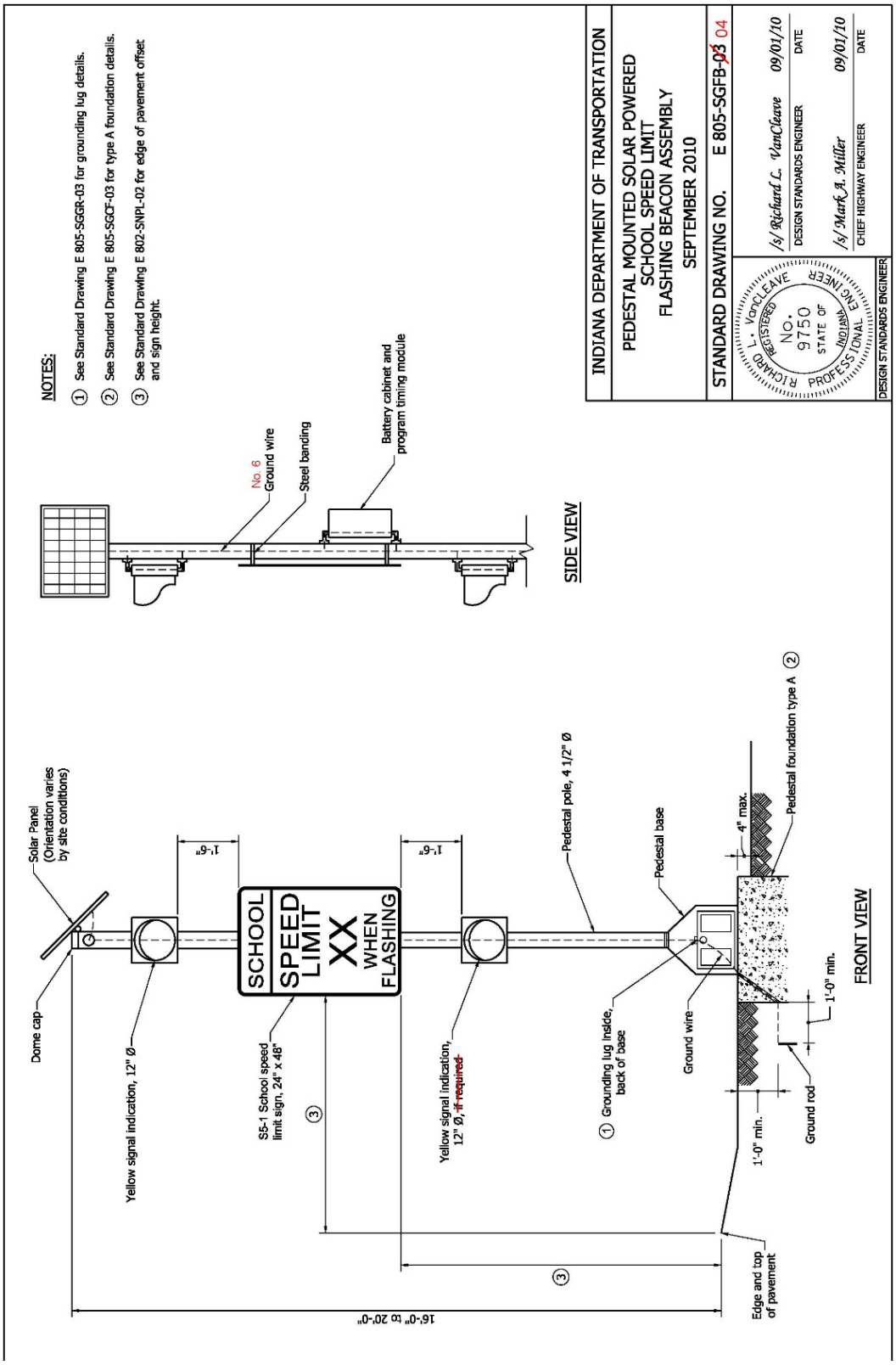
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-02 FLASHING BEACON WITH WARNING SIGN DETAILS (WITH MARKUPS)



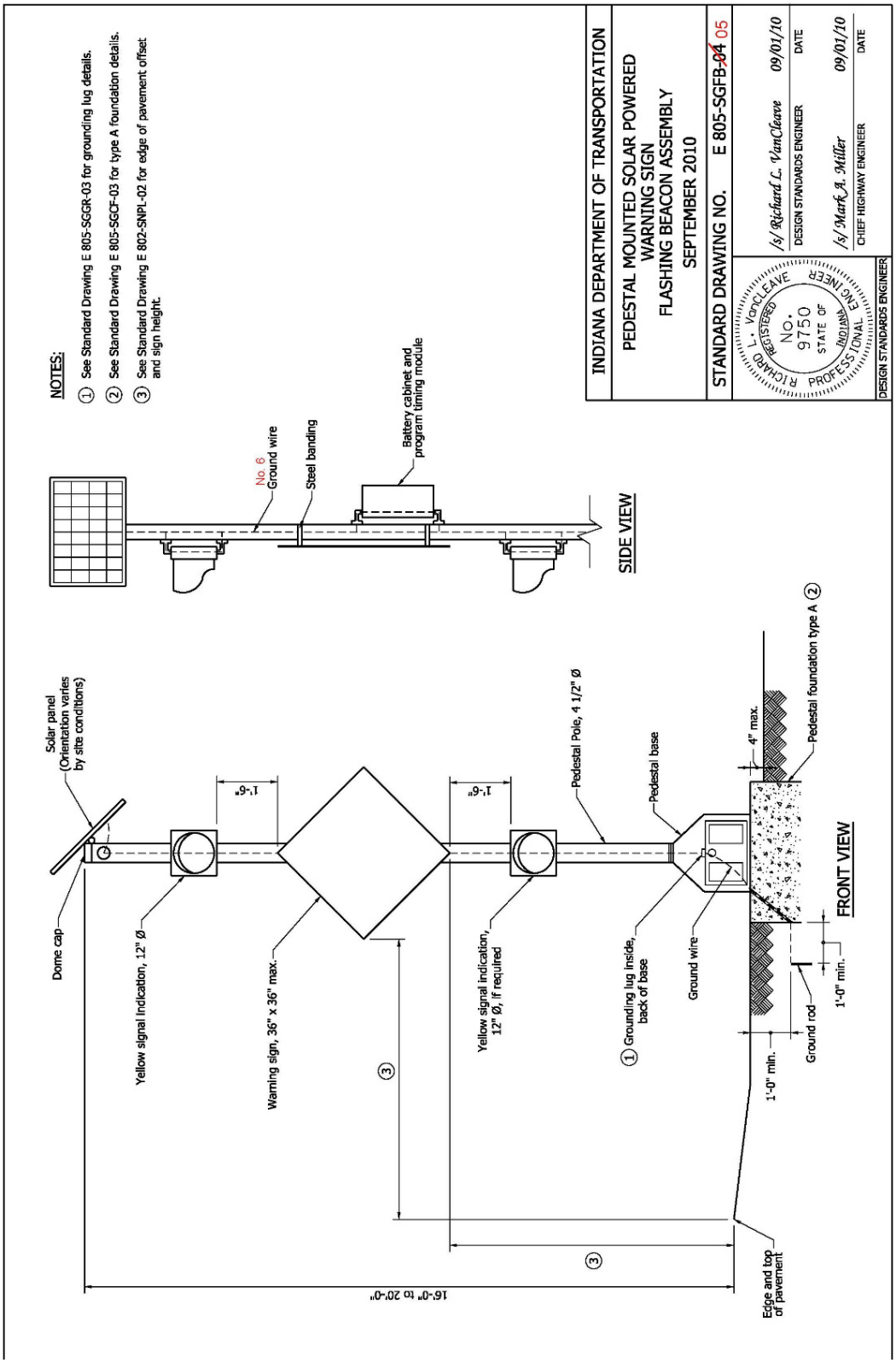
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-03 PEDESTAL MOUNTED SOLAR POWERED SCHOOL SPEED LIMIT FLASHING BEACON ASSEMBLY (WITH MARKUPS)



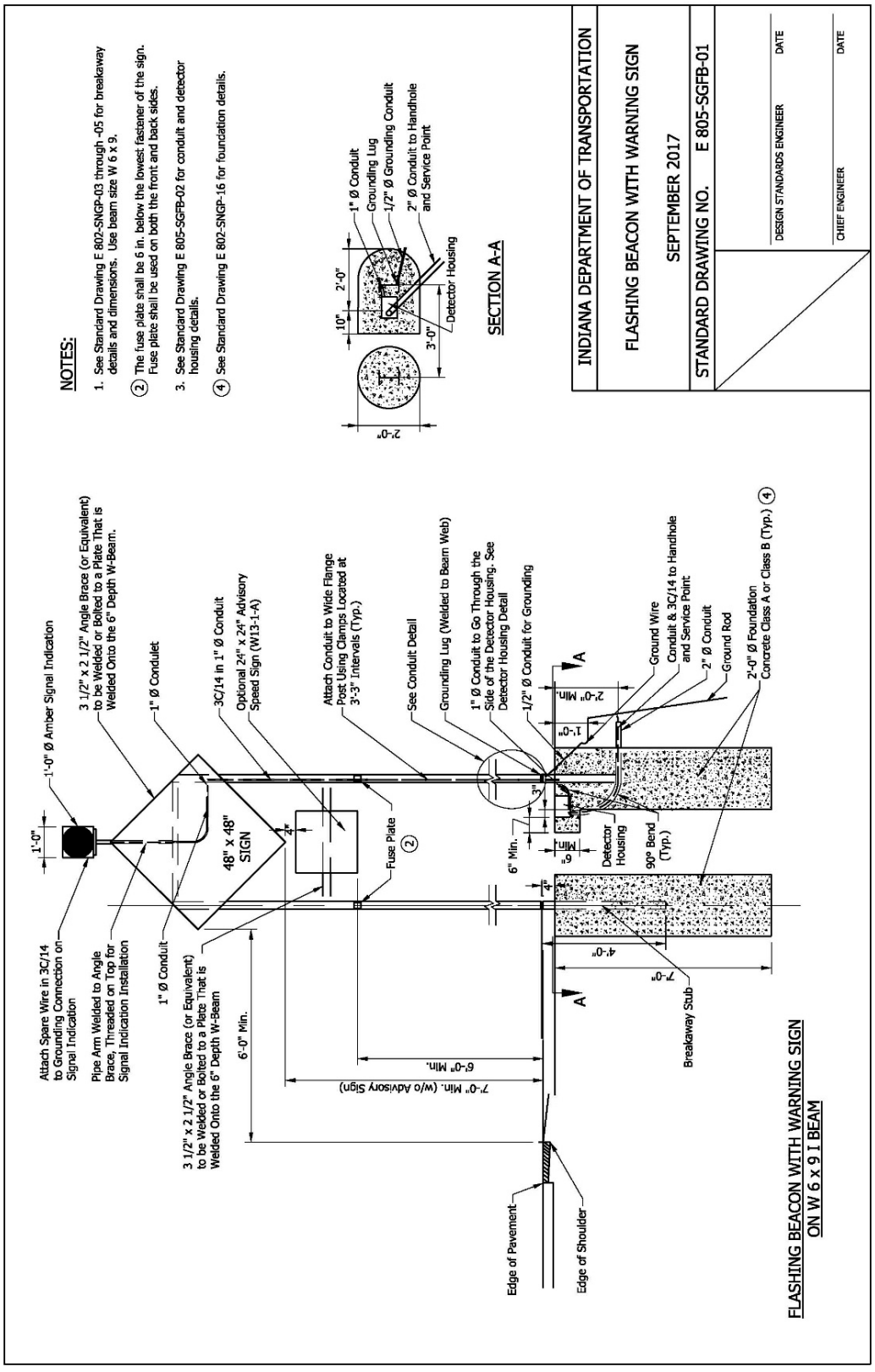
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-04 PEDESTAL MOUNTED SOLAR POWERED WARNING SIGN FLASHING BEACON ASSEMBLY (WITH MARKUPS)



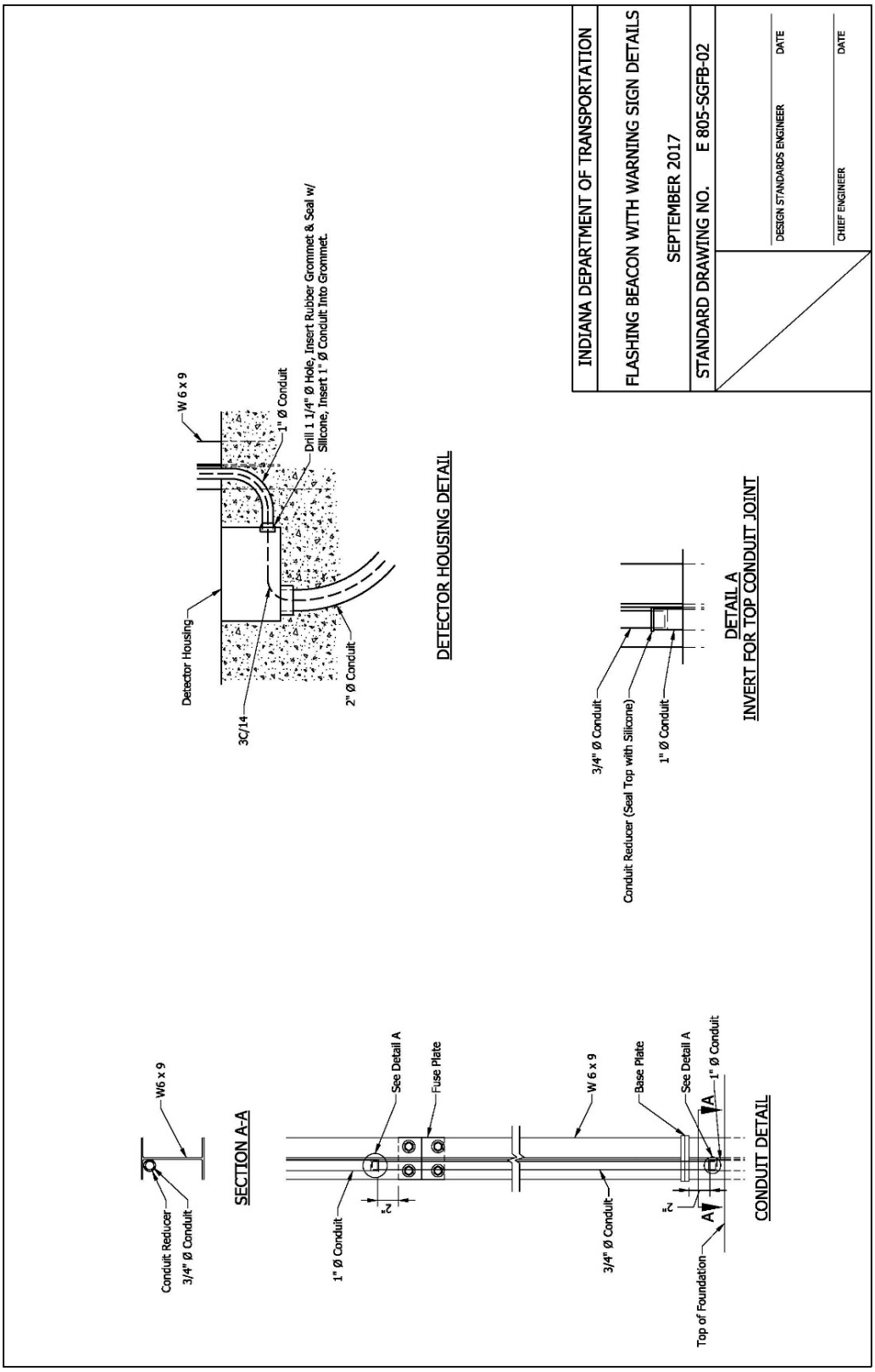
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-01 FLASHING BEACON WITH WARNING SIGN (DRAFT)



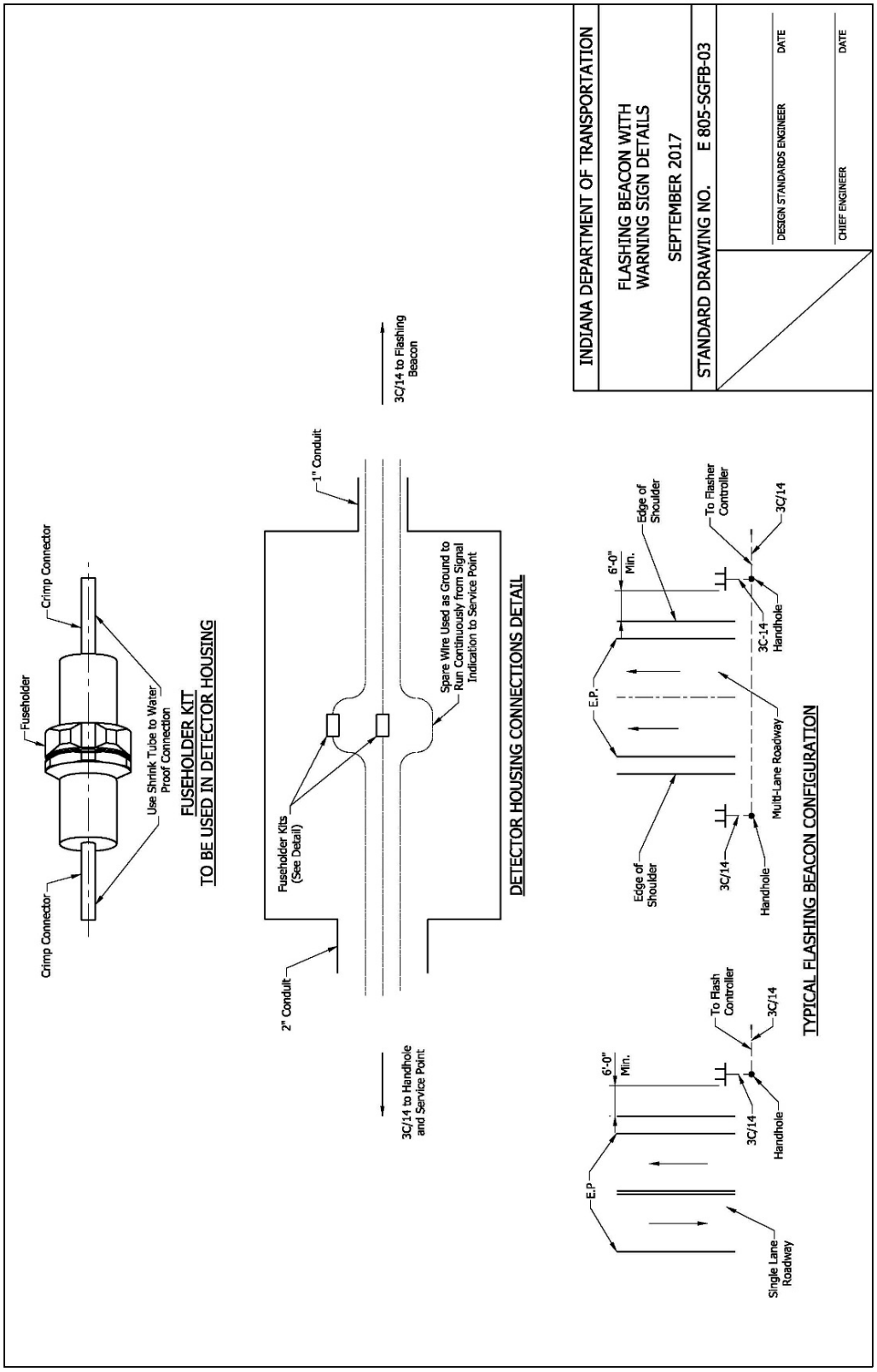
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-02 FLASHING BEACON WITH WARNING SIGN DETAILS (DRAFT)



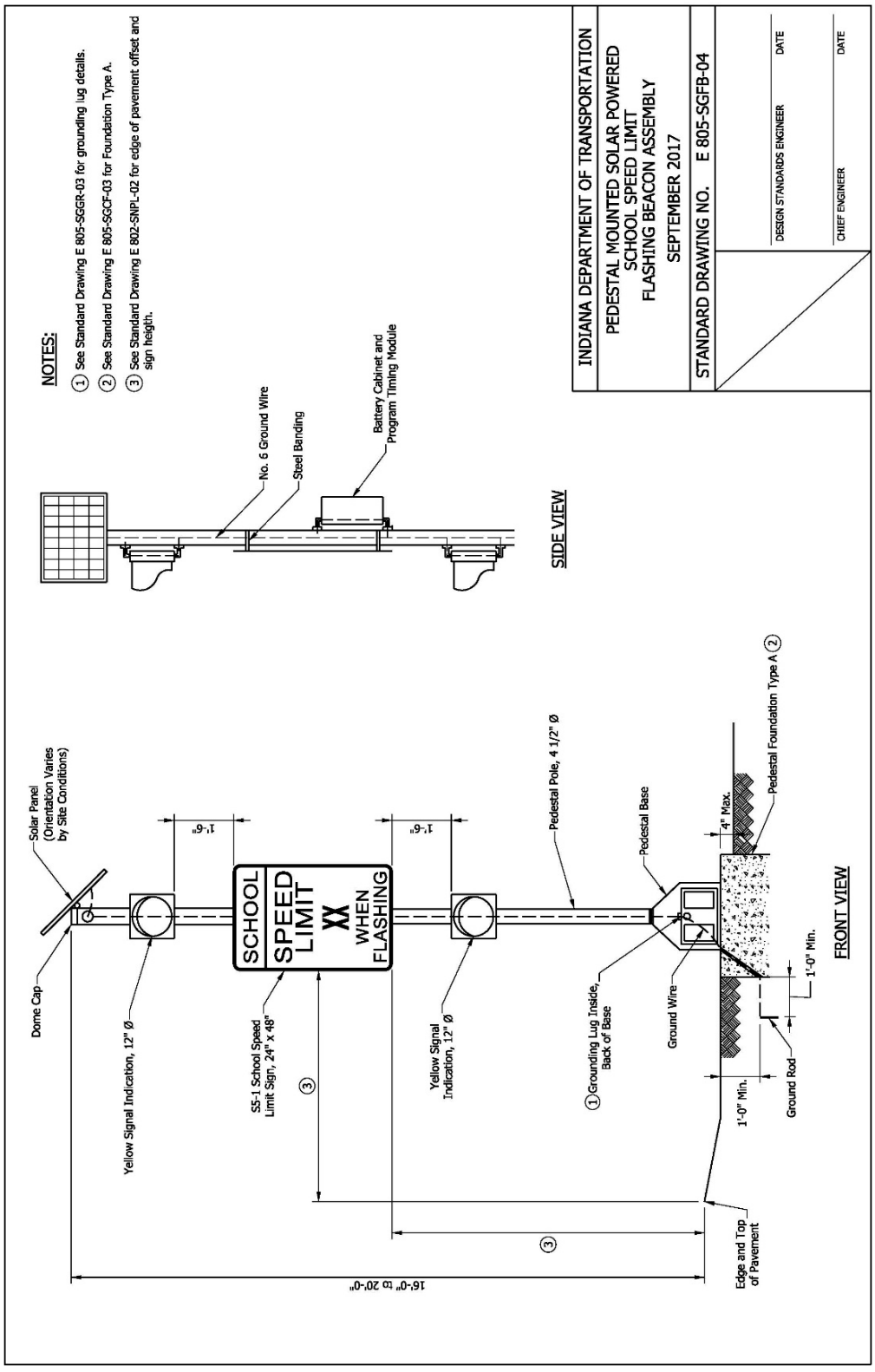
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-03 FLASHING BEACON WITH WARNING SIGN DETAILS (DRAFT)



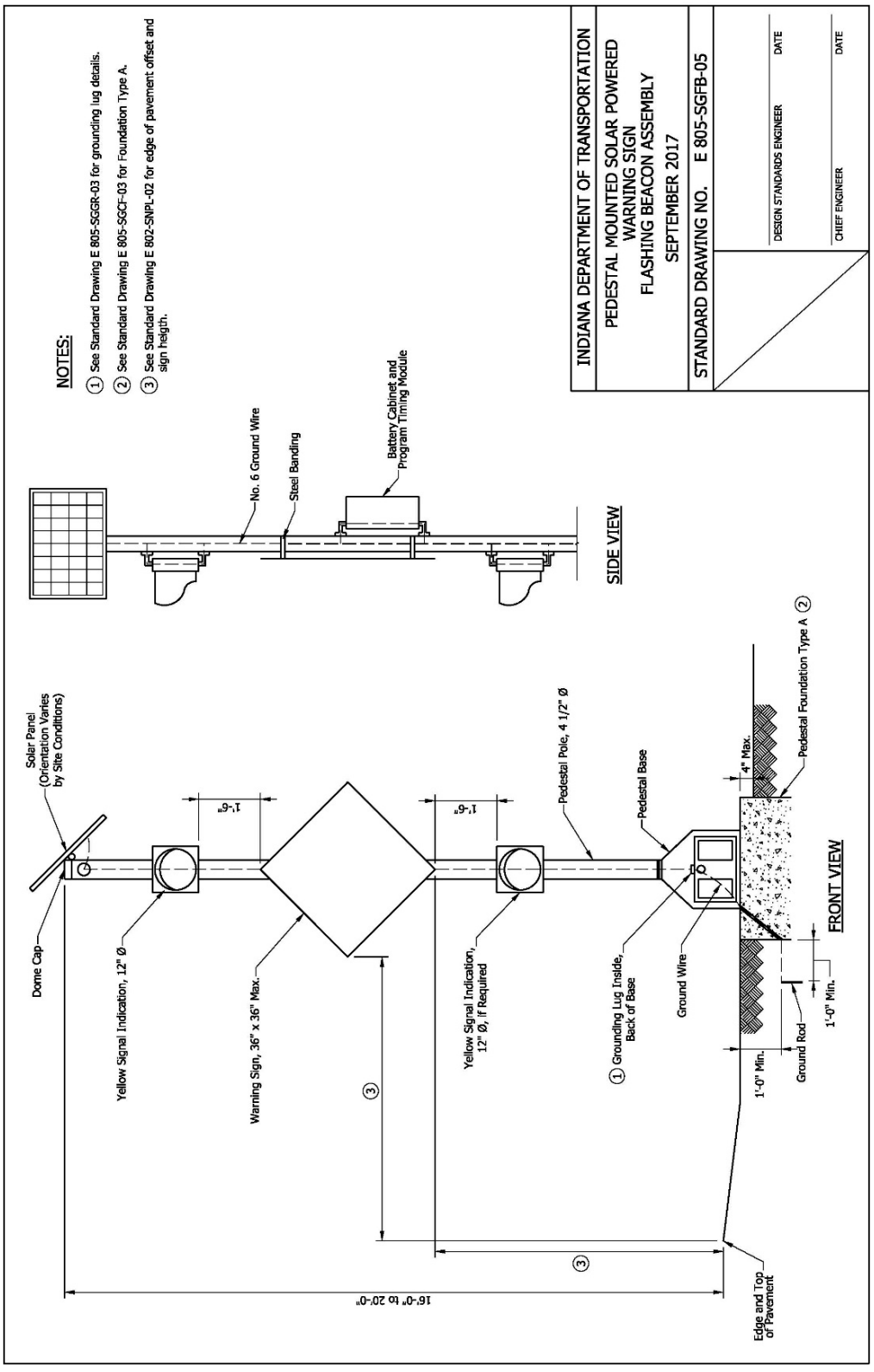
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-04 PEDESTAL MOUNTED SOLAR POWERED SCHOOL SPEED LIMIT FLASHING BEACON ASSEMBLY (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

805-SGFB-05 PEDESTAL MOUNTED SOLAR POWERED WARNING SIGN FLASHING BEACON ASSEMBLY (DRAFT)



BACKUP 01

PROPOSED REVISION TO IDM CHAPTER 502 PANEL SIGN SUPPORTS

502-1.01(05) Roadside Safety

Chapters 49 and 55 describe the Department's criteria for clear zone, roadside barriers, impact attenuators, and other roadside safety issues. These are also applicable to roadside signs. The following should also be considered.

1. Ground-Mounted Sheet-Sign Support. The support for each ground-mounted sign should be made breakaway or yielding within the clear zone. Posts should be of the square cross section type shown on the INDOT *Standard Drawings* for sheet signs. Support types I and II should be in accordance with district traffic office preference, with unreinforced or reinforced anchor base. Support type III shall be an unreinforced anchor base only. Criteria for use of support type I, II, or III are based on sign dimensions and are provided on the INDOT *Standard Drawings*.

   For a local agency project, channel posts may be used if desired by the local agency. A new sign support behind guardrail should have adequate clearance to the back of the guardrail post to provide for the guardrail's dynamic deflection (see Chapter 49).

2. Ground-Mounted Panel-Sign Support. A sign with an area of over 50 ft^2 on slipbase breakaway supports should not be placed where the opportunity exists for it to be struck at a point that is more than 9 in. above the normal point of vehicular bumper impact. Normal bumper height is 1'-8". To avoid being struck at an improper height, a sign should be placed in accordance with the INDOT *Standard Drawings* and as follows.

   a. Fill Slope Flatter than 4:1. A sign should be located at a desirable offset of 30 ft from the edge of the travel lane to the nearest edge of the sign. The minimum offset should be 6 ft from the edge of shoulder or 12 ft from the edge of the travel lane, whichever is greater.

   b. Fill Slope 4:1 or Steeper. The nearest sign edge should be located minimum a 6 ft from the edge of shoulder or 12 ft from the edge of the travel lane, whichever is greater.

   c. Cut Slope 3:1 or Steeper. Vertical clearance between the ground and the bottom of the sign shall be a minimum of 5 ft for the length of the sign. The desirable horizontal offset shall be adjusted as needed to allow for appropriate post lengths.

   The following guidance should be applied when determining the appropriate W-beam sizes and for providing proper plan detailing for ground mounted panel signs:

BACKUP 01

PROPOSED REVISION TO IDM CHAPTER 502 PANEL SIGN SUPPORTS

1. Determining sign area. The entire area of the sign, including any exit number panels, should be considered when selecting the W-beam size. Exit panel sizes may be converted into an equivalent area (partial height over the entire width of the sign) or more conservatively by considering that the panel width matches the width of the main part of the sign).

2. Beam length and exit panels. Exit panels should be supported by at least one W-beam (at least one W-beam should extend to the top of the exit panels).

3. Supplemental signs. Supplemental signs should not be mounted below the fuse plate/hinge plate connection.

4. Other attachments. The equivalent surface area of any flashing beacons or other attachments should be added to the height and or width.

5. Foundation Placement on Steep Slopes. Foundations on steep slope 2:1 or steeper should be located at least 2.5 ft. from edge of ditch.

Using the post selection tables. To select a post size the designer first needs to determine the height and width of the sign and the clear height (elevation difference between the top of the foundation and bottom of the sign). Selection tables for clear heights ranging from 8 ft to 20 ft on 2 foot increments are available in the standard drawings. The clear height used should be that for the post with the lowest elevation. Should a post size not be indicated for the sign dimensions and clear height combination then the designer may contact the Traffic Design Office for recommendations on how to proceed.

The elevation of the ground in the area of the sign should be no more than 33’ above the adjacent property/land particularly if there is no barrier (e.g. woods, buildings) to impede winds. Elevations differences greater than 33’ need a special analysis to determine whether larger the wind loading which necessities larger posts- see ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures*, for additional guidance.

For median or non-divided highways installation of bi-directional upper joint should be noted on the plans. The bi-directional upper joint consists of a perforated fuse plate on both the sides of structure and is detailed in the standard drawings.

BACKUP 02

PROPOSED REVISION TO GIFE SECTION 26 TRAFFIC CONTROL DEVISES AND LIGHTING

26.x GROUND MOUNTED PANEL SIGN SUPPORTS *(Adop. xx-xx-17)*

The W-beam structural steel supports for ground mounted panel signs are designed to meet the 2015 AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. As detailed in INDOTs Standard Specifications they are also compliant with FHWA's crash test requirements. Proper installation is necessary for supports to withstand the design wind loadings and to breakaway during impact from a vehicle in such a manner that the vehicles occupants have a significantly reduced chance of being seriously injured or killed.

Particular attention should be paid to the following:

There should be no perceivable gap between the upper and middle beam sections at the fuse/hinge plate - the allowable tolerance for this fit is 0 to 1/16 in. Also, the fuse plate/hinge plate attachment hardware should be fully tightened to the specification requirements. Excessive gaps and loose hardware results in premature fatigue in the fuse plates which can result in structural failures. The fuse plates are intentionally weakened via the perforated holes - this feature facilitates breakaway performance during impact.

The perforated fuse plate must be installed on the front (traffic approach) side of the sign and the hinge plate on the back side for the supports.

The hardware at the base plate must be properly tightened within the range provided in the specification. The specified torque values are sufficient so that the structure should not "walk-off" the base and foundation but not so great as to prevent the breakaway slip mechanism from engaging when the structure is impacted.

The beams must extend through the entire height of the sign; for signs with an exit panel at least one of the beams must extend to the top of the sign.

Properly installed sign clips allow an even distribution of the forces transmitted from the sign to the beams improving the service life of the structure. See section 802.09(b) of the SS and the Standard Drawings.

COMMENTS AND ACTION

206.02(b) EXCAVATION FOR FOUNDATION OF TRAFFIC SUPPORT STRUCTURES
206.11 BASIS OF PAYMENT
802.07 INSTALLING SUPPORTS
910.14(b) WIDE FLANGE POSTS
919.01(c) LETTERS, NUMBERS, SYMBOLS, AND ACCESSORIES
802-SNGP; 802-SNGS; 805-SGFB.

DISCUSSION:
Mr. Boruff, once again, introduced this item and proposes to revise the 802-SNGP drawing series and Standard Specifications by: 1) Updating the structural and foundation design per the current 2015 LRFD AASHTO Design Specifications. In doing so, the post selection tables will be expanded to account for larger sign sizes and variations in elevation differences between the top of the foundation and the bottom of the sign, referred to as "clear height". 2) Changing the detail for the connection of the middle and upper beam sections by specifying a non-perforated hinge plate on the back side. This plate is stronger than the perforated fuse plate currently specified but still meets FHWA breakaway requirements. 3) Allowing the use of direct tension indicators, hardware, at the upper fuse plate joint. DTI's are an inexpensive option that facilitates proper tightening. 4) Update the cost for excavation of class X material in 206.11; in 206.02 clarify which foundation types require full depth foundations when class X material is encountered.

The dollar amount revisions to 206.11 will remain unchanged at this time pending further review, as suggested by Mr. Pankow and agreed to by Mr. Boruff.

Mr. Pelz asked if we need to define the direct tension indicator, DTI, process.
Mr. Pankow agreed that language may need to be added to the GIFE for this process. Mr. Pelz suggested cross referencing DTI requirements to another applicable standard. Mr. Garg pointed out that this reference is already in 711.65. Much discussion ensued concerning this issue. That language was revised and instructions will be added to the GIFE concerning DTI methods.

The 805-SGFB drawing series is included in the proposal as it contains references to the SNGP series that needs to be changed. Additional notes will be added as suggested by Mr. Koch. Mr. Boruff explained the revisions made to each drawing. Further revisions will be incorporated as recommended by Mr. Pankow regarding foundations and snag concerns with exposed foundations.

The 802-SNGS series is revised to call for fluorescent yellow sign sheeting for all warning signs including those placed overhead.

Also revised is 919.01 to remove the reference to button copy demountable letters as they are no longer used on panel signs.

COMMENTS AND ACTION

206.02(b) EXCAVATION FOR FOUNDATION OF TRAFFIC SUPPORT STRUCTURES
206.11 BASIS OF PAYMENT
802.07 INSTALLING SUPPORTS
910.14(b) WIDE FLANGE POSTS
919.01(c) LETTERS, NUMBERS, SYMBOLS, AND ACCESSORIES
802-SNGP; 802-SNGS; 805-SGFB.

(CONTINUED)

Motion: Mr. Boruff Second: Mr. Koch Ayes: 9 Nays: 0 FHWA Approval: YES	Action: ____ Passed as Submitted _X_ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: 206.02 pg 192; 206.11 pg 197, 802.07 pg 769, 910.14 pg 943 and 919.01 pg 1014-1015. Recurring Special Provision affected: NONE Standard Drawing affected: SERIES: 802-SNGP; 802-SNGS and 805-SGFB. Design Manual Sections affected: CHAPTER 502. GIFE Sections cross-references: SECTION 26.	_X_ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _X_ Standard Drawing Effective September 01, 2017 _____ Create RPD (No. _____) Effective _____ Letting _X_ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Update material acceptance and payment criteria.

PROPOSED SOLUTION: Incorporate stiffness material acceptance and adjust 301 payment method from tons to cys.

APPLICABLE STANDARD SPECIFICATIONS: 301, 302, 303, and 610

APPLICABLE STANDARD DRAWINGS: na

APPLICABLE DESIGN MANUAL SECTION: 304-8.02(05) Compacted Aggregate Base

APPLICABLE SECTION OF GIFE: section 7

APPLICABLE RECURRING SPECIAL PROVISIONS: na

PAY ITEMS AFFECTED: Yes.

- Phase out payment by TON

301-07448	COMPACTED AGGREGATE NO. 53 BASE	TON
303-05738	AGGREGATE NO. 5	TON

- Create new 301 items for:
  - Compacted Aggregate No. 53 Base CYS
  - Compacted Aggregate No. 2 Base CYS
  - Compacted Aggregate No. 5 Base CYS

APPLICABLE SUB-COMMITTEE ENDORSEMENT: na

IMPACT ANALYSIS (attach report): na

Submitted By: Michael Koch

Title: Area Engineer

Organization: INDOT

Phone Number: 574-612-2224

Date: Dec 14th 2016

Mr. Koch
Date: 01/19/17

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

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? no

Will this proposal improve:

Construction costs? na

Construction time? na

Customer satisfaction? na

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? na

Will this change provide the contractor more flexibility? na

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? na

Is this item editorial? no

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

REVISION TO STANDARD SPECIFICATIONS

SECTION 301 AGGREGATE BASE
301.02 MATERIALS
301.03 PREPARATION OF SUBGRADE
301.05 SPREADING
301.06 COMPACTION
301.09 METHOD OF MEASUREMENT
301.10 BASIS OF PAYMENT
SECTION 302 - SUBBASE
302.05 SPREADING
SECTION 303 - AGGREGATE PAVEMENTS OR SHOULDERS
303.03 PREPARATION OF SUBGRADE
303.05 SPREADING
303.06 COMPACTING
SECTION 610 - APPROACHES AND CROSSOVERS
610.05 METHOD OF MEASUREMENT

The Standard Specifications are revised as follows:

SECTION 301, BEGIN LINE 9, DELETE AS FOLLOWS:

301.02 Materials

Materials shall be in accordance with the following:

Coarse Aggregate, Class D or Higher~~, Size No. 53~~ 904

CONSTRUCTION REQUIREMENTS

301.03 Preparation of Subgrade

Subgrade shall be compacted in accordance with 207.04, ~~except for shoulders where the subgrade shall be compacted in accordance with 203.23 or 207.04 as shown on the plans~~. In areas of 500 ft or less in length, or for temporary runarounds, proofrolling will not be required. Proofrolling will not be required in trench sections where proofrolling equipment cannot be used.

SECTION 301, BEGIN LINE 28, DELETE AND INSERT AS FOLLOWS:

301.05 Spreading

The moisture content of the aggregate shall be between 4% and the optimum moisture content prior to placement when the aggregate is delivered to the project. Water shall not be added to the aggregate on the grade. The aggregate shall be spread in uniform lifts with a spreading and leveling device approved by the Engineer. The spreading and leveling device shall be capable of placing aggregate to the depth, width, and slope specified. The compacted depth of each lift shall be a minimum of 3 in. and a maximum of 6 in.~~, except where utilized as a base under shoulder pavement. The compacted depth of each lift under shoulder pavement shall be a minimum of 3 in. and a maximum of 9 in~~. The aggregate shall be handled and transported to minimize segregation and the loss of moisture. In areas inaccessible to mechanical equipment, approved hand spreading methods may be used.

301.06 Compacting

Aggregates shall be immediately compacted to achieve the maximum allowable deflection with light Weight Deflectometer, LWD, testing in accordance with ITM 508. Compaction of

REVISION TO STANDARD SPECIFICATIONS

SECTION 301 AGGREGATE BASE
301.02 MATERIALS
301.03 PREPARATION OF SUBGRADE
301.05 SPREADING
301.06 COMPACTION
301.09 METHOD OF MEASUREMENT
301.10 BASIS OF PAYMENT
SECTION 302 - SUBBASE
302.05 SPREADING
SECTION 303 - AGGREGATE PAVEMENTS OR SHOULDERS
303.03 PREPARATION OF SUBGRADE
303.05 SPREADING
303.06 COMPACTING
SECTION 610 - APPROACHES AND CROSSOVERS
610.05 METHOD OF MEASUREMENT

aggregate shall not occur if the moisture content of the aggregate is greater than 6.0%. The maximum allowable deflection will be determined from a test section or will be specified. Test sections shall be constructed in accordance with ITM 514 for other materials not included in Table 1 to determine the maximum allowable deflection. The optimum moisture content will be determined by in accordance with 203.24 (a).

Samples for moisture content testing shall be taken on the grade from the first truck of the day. The frequency of the moisture content test for aggregates will be one test for each day of aggregate placement. The maximum allowable deflection for aggregate over chemically modified soils shall be in accordance with the following:

Material Type	*Maximum allowable deflection (mm)*
Aggregates over Lime Modified Soil	*0.30*
Aggregates over Cement Modified Soil	*0.27*

Table 1

Acceptance of the compaction of aggregates will be determined by averaging three LWD tests obtained at a random station determined in accordance with ITM 802. The location of the three tests will be at 2 ft from each edge of the construction area and at 1/2 of the width of the construction area. The average deflection shall be equal to or less than the maximum allowable deflection allowed in Table 1 or determined by the test section. The frequency of the LWD testing will be three tests for each 800 t for compacted aggregate.

As an alternate, ~~A~~aggregates shall be ~~immediately~~ compacted to a minimum of 100% of the maximum dry densities in accordance with AASHTO T 99. ~~Compaction equipment shall be in accordance with 409.03(d). Density of the compacted aggregate~~*In situ density* will be determined in accordance with 203.24(b). The aggregate shall meet the compaction requirements at the time subsequent courses are placed. In areas inaccessible to compaction equipment such as private drives, mailbox approaches, and temporary runarounds, the compaction requirements may be accepted by visual inspection.

All displacement or rutting of the aggregates shall be repaired prior to placing subsequent material.

REVISION TO STANDARD SPECIFICATIONS

SECTION 301 AGGREGATE BASE
301.02 MATERIALS
301.03 PREPARATION OF SUBGRADE
301.05 SPREADING
301.06 COMPACTION
301.09 METHOD OF MEASUREMENT
301.10 BASIS OF PAYMENT
SECTION 302 - SUBBASE
302.05 SPREADING
SECTION 303 - AGGREGATE PAVEMENTS OR SHOULDERS
303.03 PREPARATION OF SUBGRADE
303.05 SPREADING
303.06 COMPACTING
SECTION 610 - APPROACHES AND CROSSOVERS
610.05 METHOD OF MEASUREMENT

Coarse aggregates shall be compacted in accordance with 203.25.

SECTION 301, BEGIN LINE 59, DELETE AND INSERT AS FOLLOWS:

301.09 Method of Measurement

Compacted aggregate base will be measured by the ~~ton in accordance with 109.01(b)~~*cubic yard based on the theoretical volume to the neat line as shown on the plans.*

301.10 Basis of Payment

The accepted quantities of compacted aggregate base will be paid for at the contract unit price per ~~ton~~*cubic yard*, complete in place.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Compacted Aggregate, No. 53~~_____~~, Base	~~TON~~*CYS*
~~*size*~~	
Compacted Aggregate, No. 2, Base	*CYS*
Compacted Aggregate, No. 5, Base	*CYS*

The cost of placing, compacting, water, *aggregates placed outside neat lines as shown on the plans,* and necessary incidentals shall be included in the cost of the pay item.

SECTION 302, BEGIN LINE 33, DELETE AND INSERT AS FOLLOWS:

302.05 Spreading

The moisture content of the aggregate shall be between 4% and the optimum moisture content prior to placement when the aggregate is delivered to the project. Water shall not be added to the aggregate on the grade. The aggregate shall be spread in uniform lifts with a spreading and leveling device approved by the Engineer. The spreading and leveling device shall be capable of placing aggregate to the depth, width, and slope specified. The compacted depth of each lift shall be a minimum of 3 in. and a maximum of 6 in. The aggregate shall be handled and transported to minimize segregation and the loss of moisture. In areas inaccessible to mechanical equipment, approved hand spreading methods may be used.

REVISION TO STANDARD SPECIFICATIONS

SECTION 301 AGGREGATE BASE
301.02 MATERIALS
301.03 PREPARATION OF SUBGRADE
301.05 SPREADING
301.06 COMPACTION
301.09 METHOD OF MEASUREMENT
301.10 BASIS OF PAYMENT
SECTION 302 - SUBBASE
302.05 SPREADING
SECTION 303 - AGGREGATE PAVEMENTS OR SHOULDERS
303.03 PREPARATION OF SUBGRADE
303.05 SPREADING
303.06 COMPACTING
SECTION 610 - APPROACHES AND CROSSOVERS
610.05 METHOD OF MEASUREMENT

SECTION 303, BEGIN LINE 18, DELETE AND INSERT AS FOLLOWS:

303.03 Preparation of Subgrade

Subgrade shall be compacted in accordance with 207.04~~, except for shoulders where the subgrade shall be compacted in accordance with 203.23 or 207.04 as shown on the plans~~. In areas of 500 ft or less in length, or for temporary runarounds, proofrolling will not be required. Proofrolling will not be required in trench sections where proofrolling equipment cannot be used.

SECTION 303, BEGIN LINE 30, DELETE AND INSERT AS FOLLOWS:

303.05 Spreading

The moisture content of the aggregate shall be between 4% and the optimum moisture content prior to placement when the aggregate is delivered to the project. Water shall not be added to the aggregate on the grade. The aggregate shall be spread in uniform lifts with a spreading and leveling device approved by the Engineer. The spreading and leveling device shall be capable of placing aggregate to the depth, width, and slope specified. The compacted depth of each lift shall be a minimum of 3 in. and a maximum of 6 in., except where utilized as a shoulder. The compacted depth of a lift for a shoulder shall be a minimum of 3 in. and a maximum of 9 in. The aggregate shall be handled and transported to minimize segregation and the loss of moisture. In areas inaccessible to mechanical equipment, approved hand spreading methods may be used.

303.06 Compacting

~~Aggregates shall be immediately compacted to a minimum of 100% of the maximum dry densities in accordance with AASHTO T 99. Compaction equipment shall be in accordance with 409.03(d). Density of the compacted aggregate will be determined in accordance with 203.24(b). The aggregate shall meet the compaction requirements at the time subsequent courses are placed. In areas inaccessible to compaction equipment such as private drives, mailbox approaches, and temporary runarounds, the compaction requirements may be accepted by visual inspection.~~ *Compaction shall be in accordance with 301.06*

All displacement or rutting of the compacted aggregate shall be repaired prior to placing subsequent material.

SECTION 610, BEGIN LINE 30, DELETE AND INSERT AS FOLLOWS:

610.05 Method of Measurement

REVISION TO STANDARD SPECIFICATIONS

SECTION 301 AGGREGATE BASE
301.02 MATERIALS
301.03 PREPARATION OF SUBGRADE
301.05 SPREADING
301.06 COMPACTION
301.09 METHOD OF MEASUREMENT
301.10 BASIS OF PAYMENT
SECTION 302 - SUBBASE
302.05 SPREADING
SECTION 303 - AGGREGATE PAVEMENTS OR SHOULDERS
303.03 PREPARATION OF SUBGRADE
303.05 SPREADING
303.06 COMPACTING
SECTION 610 - APPROACHES AND CROSSOVERS
610.05 METHOD OF MEASUREMENT

Compacted aggregate base will be measured ~~by the ton~~ in accordance with ~~109.01(b)~~*301.09*. HMA mixture for approaches will be measured by the ton of the type specified, in accordance with 109.01(b). Dense graded subbase will be measured in accordance with 302.08. PCCP for approaches will be measured by the square yard of the thickness specified. Subgrade treatment will be measured in accordance with 207.05.

HMA patching in accordance with 610.04, will be measured by the ton in accordance with 304.06. PCCP patching in accordance with 610.04, will be measured by the square yard in accordance with 305.06.

Prime coat will be measured in accordance with 405.09. Tack coat will be measured in accordance with 406.06. Seal coat will be measured in accordance with 404.13.

Item No.07 01/19/17 (2016 SS)
Mr. Koch
Date: 01/19/17

COMMENTS AND ACTION

301.02 MATERIALS
301.03 PREPARATION OF SUBGRADE
301.05 SPREADING
301.06 COMPACTION
301.09 METHOD OF MEASUREMENT
301.10 BASIS OF PAYMENT
302.05 SPREADING
303.03 PREPARATION OF SUBGRADE
303.05 SPREADING
303.06 COMPACTING
610.05 METHOD OF MEASUREMENT

DISCUSSION:
Mr. Koch introduced and presented this item proposing to incorporate stiffness material acceptance and adjust the 301 payment method from tons to cys as shown above.

Very minor editorial revisions are as shown.

Following some detailed discussion, the 301 pay item will become obsolete and two new pay items will be created. The stone sizes that will be utilized are already defined in 904.

Mr. Koch chose to withdraw this item for now in order to incorporate further edits and clarifications, and bring this back for the February 2017 standards committee meeting.

Motion: Mr. Koch Second: Ms. Phillips Ayes: Nays: FHWA Approval:	Action: _____ Passed as Submitted _____ Passed as Revised __X__ Withdrawn
Standard Specifications Sections referenced and/or affected: 301 pg 232-233; 302 pg 234; 303 pg 235-236 and 610.05 pg 428. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: 304-8.02(05) Compacted Aggregate Base. GIFE Sections cross-references: SECTION 7.	_____ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The diameter (3/8”) of the suspension cables for high mast tower's ring assembly shown in the current standard drawing 807-LTHI-05 is not correct per industry standards. Details of the head frame assembly are outdated. Additionally the minimum breaking strength of the suspension cables indicated in the Standard Specification is incorrect.

The standards contain no option for alternative shapes for tower foundation retaining walls.

Details for high mast towers are contained in three different series of standard drawings.

PROPOSED SOLUTION: Correct the diameter and strength of the cables in standard drawing and updating the head frame assembly details.

Combine standard drawing series 807-LTHI, 807-LTHM, and 807-LTPD into one series. Add option for a semi--trapezoidal retaining wall.

Move standard drawing 807-LTHI-06 and 07 for temporary highway illumination details from 807-LTHI series to a new series- 807-THID.

APPLICABLE STANDARD SPECIFICATIONS: 920.01(b)4

APPLICABLE STANDARD DRAWINGS: 807-LTHI -01 thru 07 ; 807-LTHM-01 thru 04; 807-LTPD-01-02

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

IMPACT ANALYSIS (attach report): yes

Submitted By: David Boruff
Title: Manager, Office of the Traffic Administration
Organization: INDOT
Phone Number: 317-234-7975

Date: 12/30/16

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

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? No

Will this proposal improve:

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

Will this proposal reduce operational costs or maintenance effort? No

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? No
- Design process? No

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

Will this proposal provide clarification for the Contractor and field personnel? N/A

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:

Item No.08 01/19/17 (2016 SS)
Mr. Boruff
Date: 01/19/17

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

SECTION 920 - HIGHWAY ILLUMINATION MATERIALS
920.01(b)4 LUMINAIRE RING ASSEMBLY

The Standard Specifications are revised as follows:

SECTION 920, BEGIN LINE 296, DELETE AND INSERT AS FOLLOWS:

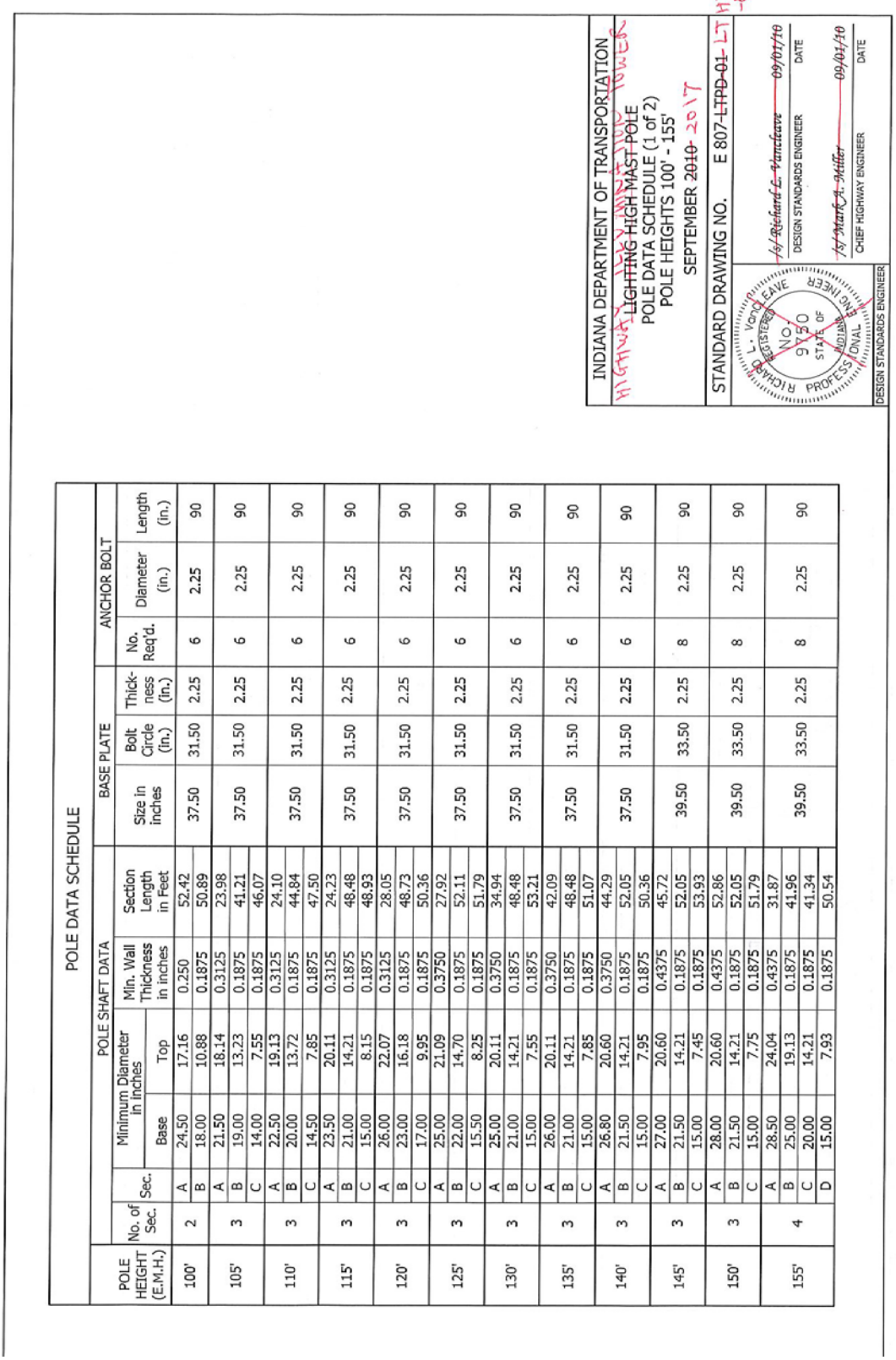
4. Luminaire Ring Assembly

The ring shall be fabricated from ASTM A 666, type 201 or 304 stainless steel and shall have a removable raceway cover. The ring shall be fabricated as an enclosed wire raceway to provide for the symmetrical mounting of the luminaires. All structural connections shall be made with bolts and nuts.

The luminaire ring shall be supported by means of stainless steel aircraft cables of seven strands with 19 wires per strand with a minimum breaking strength of ~~3,900~~*3,700* lb.

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTPD-01 LIGHTING HIGH MAST POLE POLE DATA SCHEDULE (WITH MARKUPS)



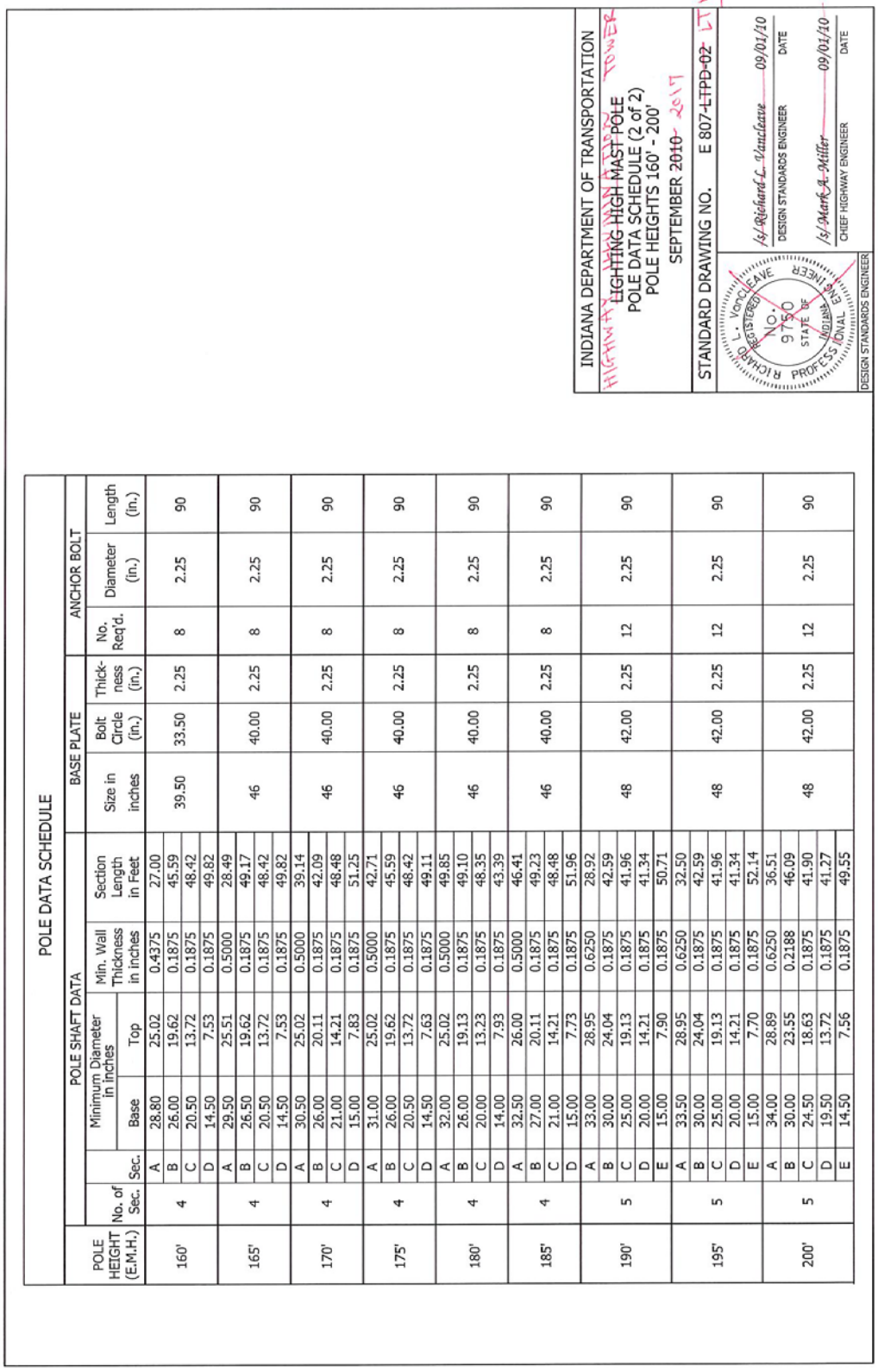
INDIANA DEPARTMENT OF TRANSPORTATION
LIGHTING HIGH MAST POLE
POLE DATA SCHEDULE (1 of 2)
POLE HEIGHTS 100' - 155'
SEPTEMBER 2010 2017
STANDARD DRAWING NO. E 807-LTPD-01 LT
/s/ Richard L. Furnivare 09/01/10
DESIGN STANDARDS ENGINEER DATE
/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER

POLE DATA SCHEDULE

POLE HEIGHT (E.M.H.)	POLE SHAFT DATA					BASE PLATE			ANCHOR BOLT		
	No. of Sec.	Sec.	Minimum Diameter in inches		Min. Wall Thickness in inches	Section Length in Feet	Size in inches	Bolt Circle (in.)	Thick-ness (in.)	No. Req'd.	Diameter (in.)	Length (in.)
			Base	Top								
100'	2	A	24.50	17.16	0.250	52.42	37.50	31.50	2.25	6	2.25	90
		B	18.00	10.88	0.1875	50.89						
105'	3	A	21.50	18.14	0.3125	23.98	37.50	31.50	2.25	6	2.25	90
		B	19.00	13.23	0.1875	41.21						
		C	14.00	7.55	0.1875	46.07						
110'	3	A	22.50	19.13	0.3125	24.10	37.50	31.50	2.25	6	2.25	90
		B	20.00	13.72	0.1875	44.84						
		C	14.50	7.85	0.1875	47.50						
115'	3	A	23.50	20.11	0.3125	24.23	37.50	31.50	2.25	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	8.15	0.1875	48.93						
120'	3	A	26.00	22.07	0.3125	28.05	37.50	31.50	2.25	6	2.25	90
		B	23.00	16.18	0.1875	48.73						
		C	17.00	9.95	0.1875	50.36						
125'	3	A	25.00	21.09	0.3750	27.92	37.50	31.50	2.25	6	2.25	90
		B	22.00	14.70	0.1875	52.11						
		C	15.50	8.25	0.1875	51.79						
130'	3	A	25.00	20.11	0.3750	34.94	37.50	31.50	2.25	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	7.55	0.1875	53.21						
135'	3	A	26.00	20.11	0.3750	42.09	37.50	31.50	2.25	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	7.85	0.1875	51.07						
140'	3	A	26.80	20.60	0.3750	44.29	37.50	31.50	2.25	6	2.25	90
		B	21.50	14.21	0.1875	52.05						
		C	15.00	7.95	0.1875	50.36						
145'	3	A	27.00	20.60	0.4375	45.72	39.50	33.50	2.25	8	2.25	90
		B	21.50	14.21	0.1875	52.05						
		C	15.00	7.45	0.1875	53.93						
150'	3	A	28.00	20.60	0.4375	52.86	39.50	33.50	2.25	8	2.25	90
		B	21.50	14.21	0.1875	52.05						
		C	15.00	7.75	0.1875	51.79						
155'	4	A	28.50	24.04	0.4375	31.87	39.50	33.50	2.25	8	2.25	90
		B	25.00	19.13	0.1875	41.96						
		C	20.00	14.21	0.1875	41.34						
		D	15.00	7.93	0.1875	50.54						

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTPD-02 LIGHTING HIGH MAST POLE POLE DATA SCHEDULE (WITH MARKUPS)



POLE DATA SCHEDULE

POLE HEIGHT (E.M.H.)	POLE SHAFT DATA					BASE PLATE			ANCHOR BOLT		
	No. of Sec.	Sec.	Minimum Diameter in inches		Min. Wall Thickness in inches	Section Length in Feet	Size in inches	Bolt Circle (in.)	Thick-ness (in.)	No. Req'd.	Diameter (in.)	Length (in.)
			Base	Top								
160'	4	A	28.80	25.02	0.4375	27.00	39.50	33.50	2.25	8	2.25	90
		B	26.00	19.62	0.1875	45.59						
		C	20.50	13.72	0.1875	48.42						
		D	14.50	7.53	0.1875	49.82						
165'	4	A	29.50	25.51	0.5000	28.49	46	40.00	2.25	8	2.25	90
		B	26.50	19.62	0.1875	49.17						
		C	20.50	13.72	0.1875	48.42						
		D	14.50	7.53	0.1875	49.82						
170'	4	A	30.50	25.02	0.5000	39.14	46	40.00	2.25	8	2.25	90
		B	26.00	20.11	0.1875	42.09						
		C	21.00	14.21	0.1875	48.48						
		D	15.00	7.83	0.1875	51.25						
175'	4	A	31.00	25.02	0.5000	42.71	46	40.00	2.25	8	2.25	90
		B	26.00	19.62	0.1875	45.59						
		C	20.50	13.72	0.1875	48.42						
		D	14.50	7.63	0.1875	49.11						
180'	4	A	32.00	25.02	0.5000	49.85	46	40.00	2.25	8	2.25	90
		B	26.00	19.13	0.1875	49.10						
		C	20.00	13.23	0.1875	48.35						
		D	14.00	7.93	0.1875	43.39						
185'	4	A	32.50	26.00	0.5000	46.41	46	40.00	2.25	8	2.25	90
		B	27.00	20.11	0.1875	49.23						
		C	21.00	14.21	0.1875	48.48						
		D	15.00	7.73	0.1875	51.96						
190'	5	A	33.00	28.95	0.6250	28.92	48	42.00	2.25	12	2.25	90
		B	30.00	24.04	0.1875	42.59						
		C	25.00	19.13	0.1875	41.96						
		D	20.00	14.21	0.1875	41.34						
		E	15.00	7.90	0.1875	50.71						
195'	5	A	33.50	28.95	0.6250	32.50	48	42.00	2.25	12	2.25	90
		B	30.00	24.04	0.1875	42.59						
		C	25.00	19.13	0.1875	41.96						
		D	20.00	14.21	0.1875	41.34						
		E	15.00	7.70	0.1875	52.14						
200'	5	A	34.00	28.89	0.6250	36.51	48	42.00	2.25	12	2.25	90
		B	30.00	23.55	0.2188	46.09						
		C	24.50	18.63	0.1875	41.90						
		D	19.50	13.72	0.1875	41.27						
		E	14.50	7.56	0.1875	49.55						

INDIANA DEPARTMENT OF TRANSPORTATION

LIGHTING HIGH MAST POLE
POLE DATA SCHEDULE (2 of 2)
POLE HEIGHTS 160' - 200'
SEPTEMBER 2010 2017

STANDARD DRAWING NO. E 807-LTPD-02

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

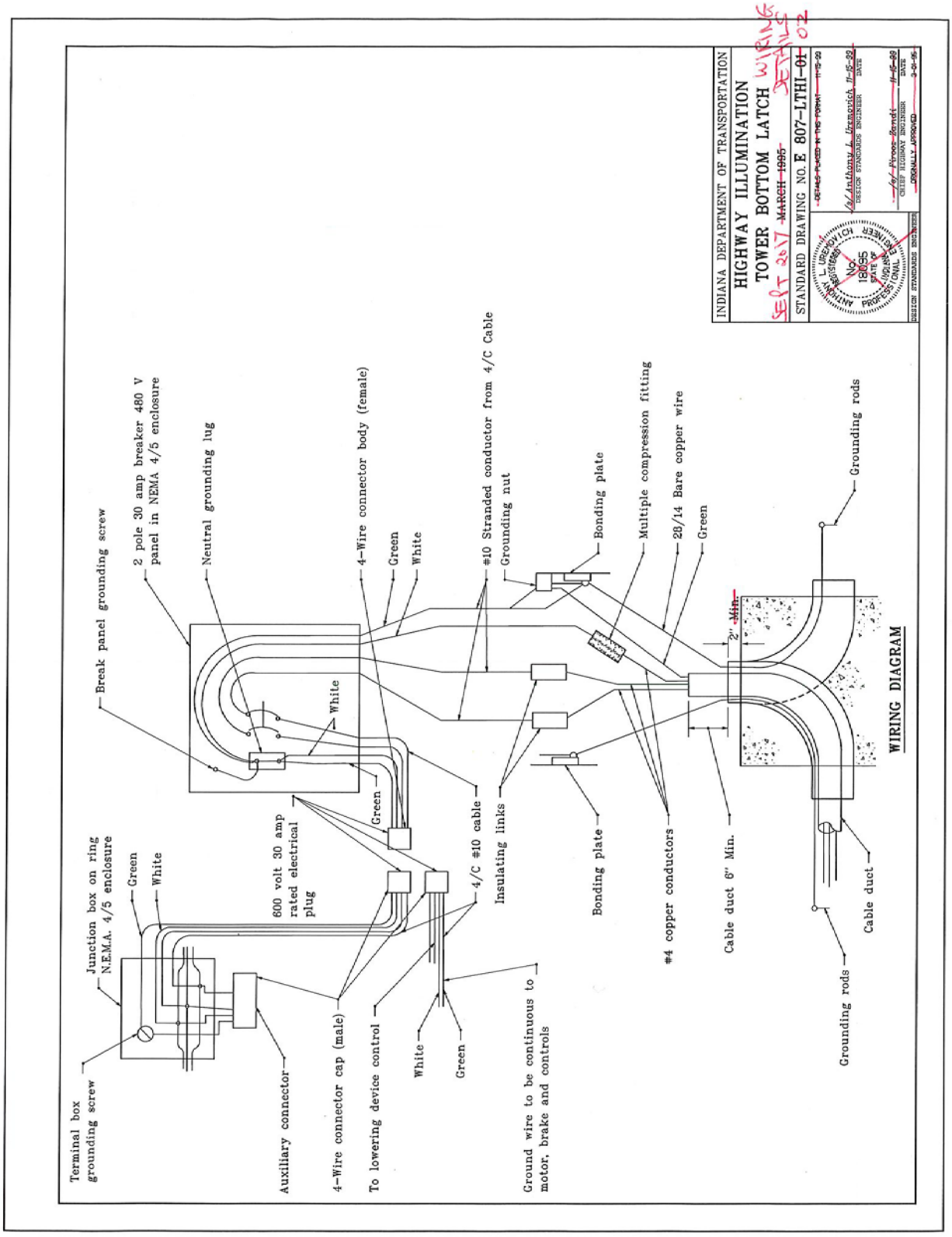
/s/ Richard L. Vancleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

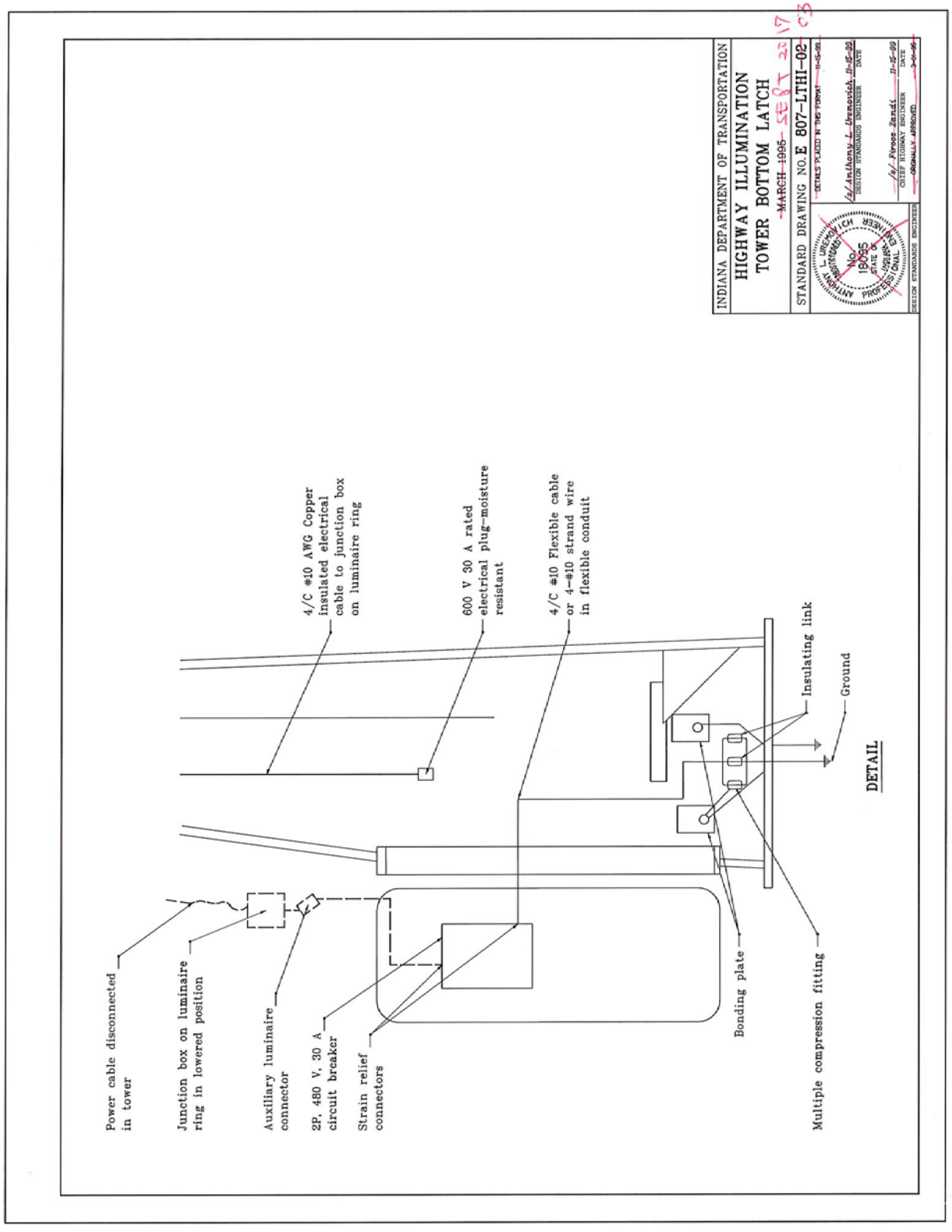
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-01 HIGHWAY ILLUMINATION TOWER BOTTOM LATCH (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

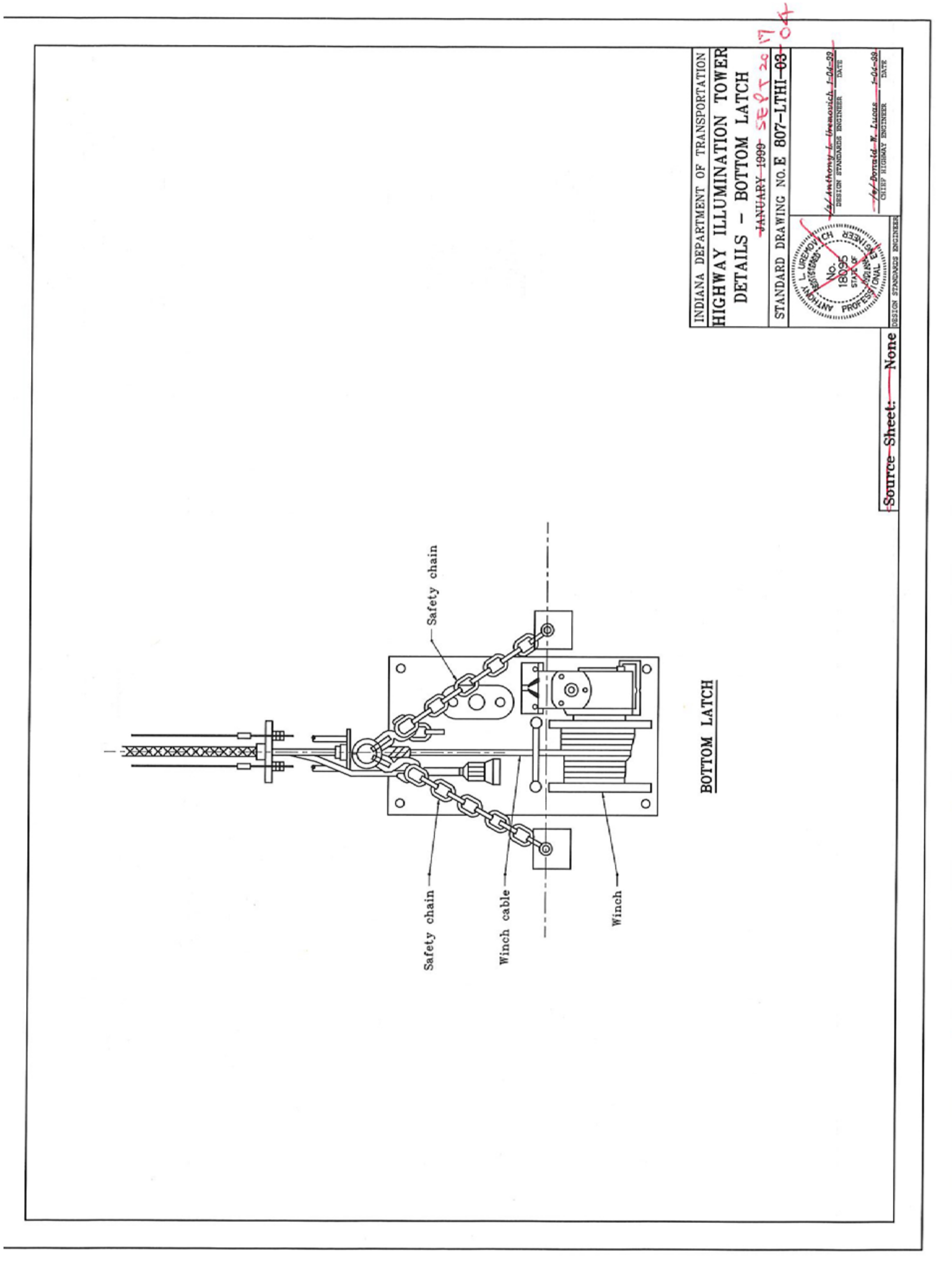
807-LTHI-02 HIGHWAY ILLUMINATION TOWER BOTTOM LATCH (WITH MARKUPS)



Item No.08 01/19/17 (2016 SS) (contd.)
Mr. Boruff
Date: 01/19/17

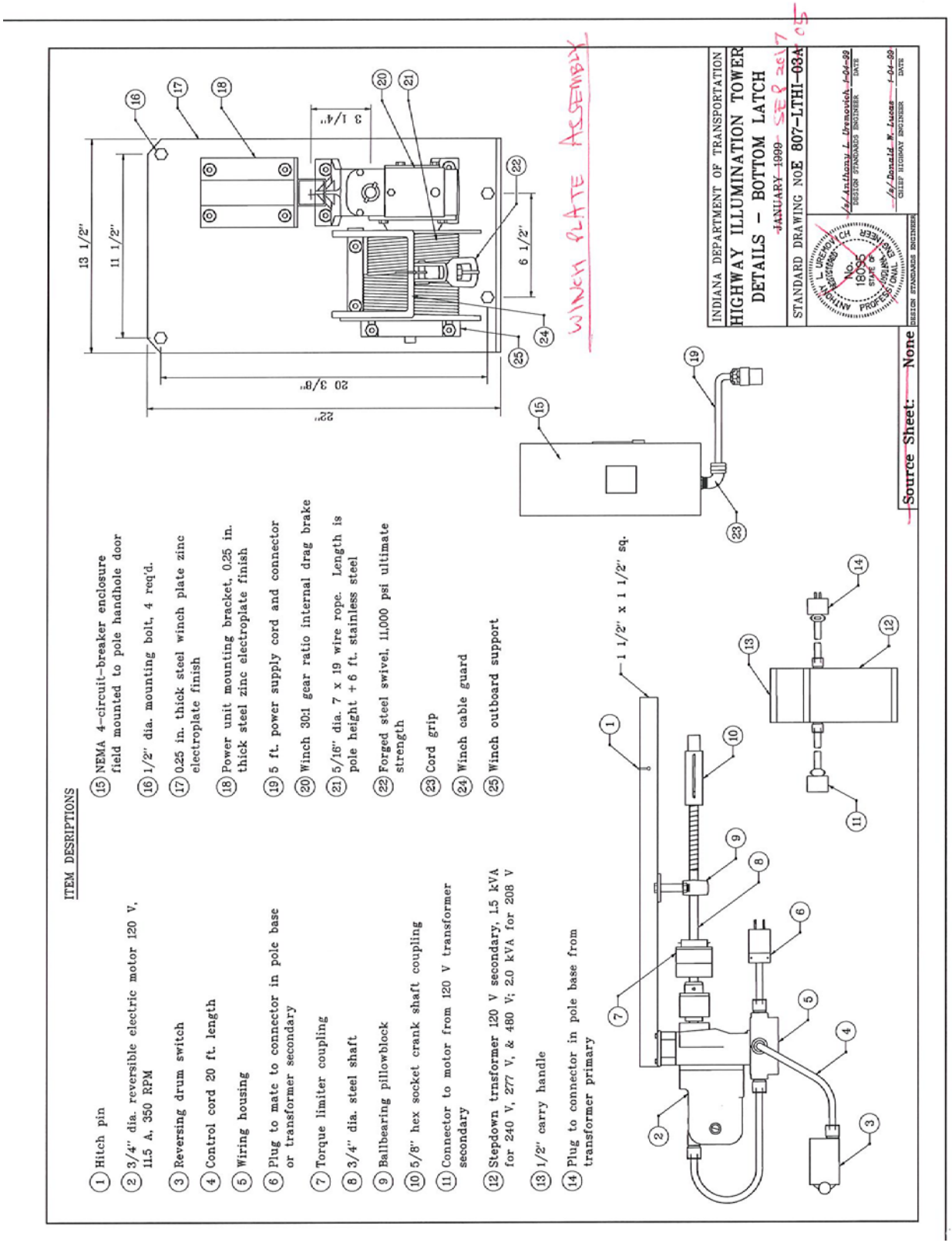
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-03 HIGHWAY ILLUMINATION TOWER DETAILS - BOTTOM LATCH (WITH MARKUPS)



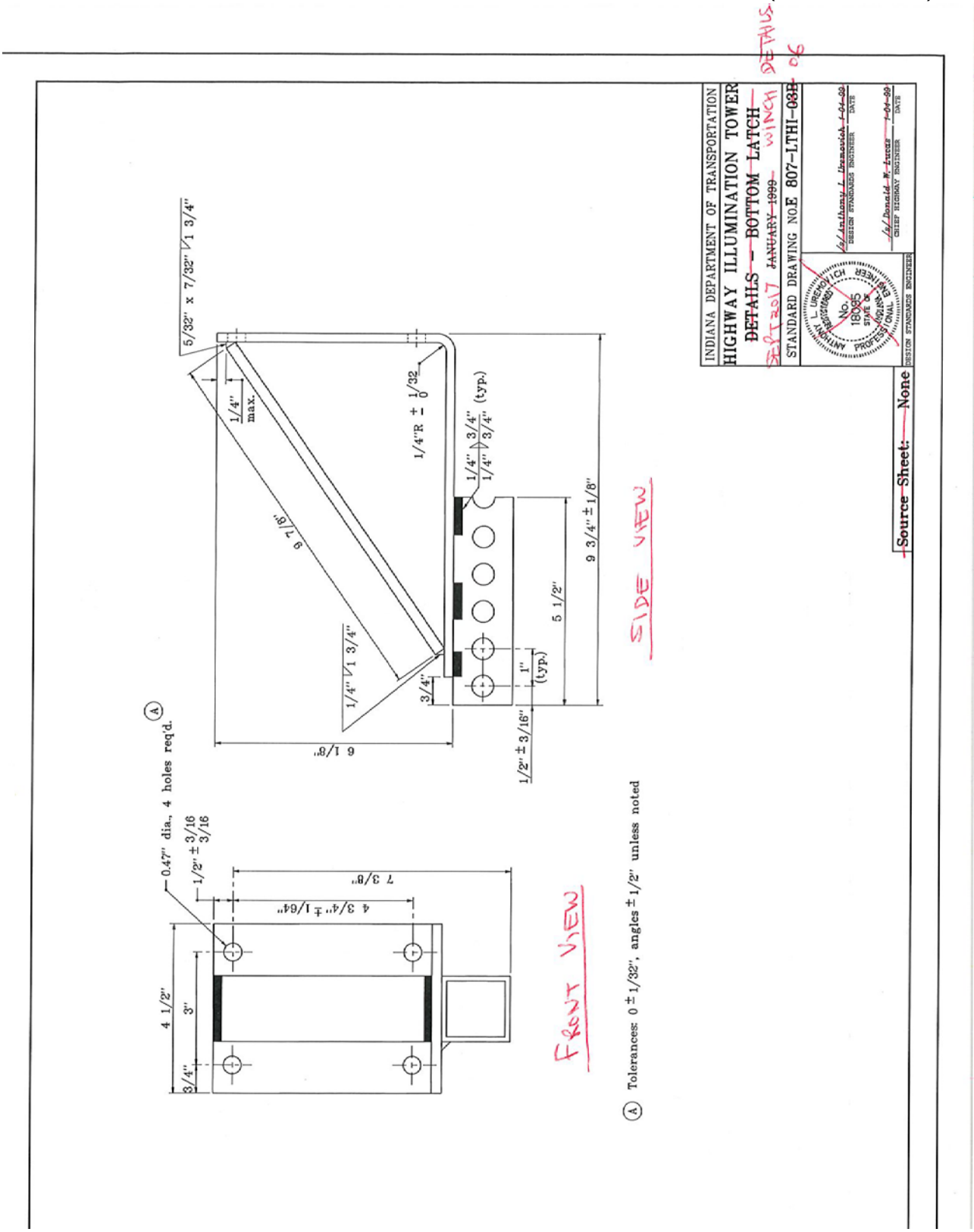
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-03A HIGHWAY ILLUMINATION TOWER DETAILS - BOTTOM LATCH (WITH MARKUPS)



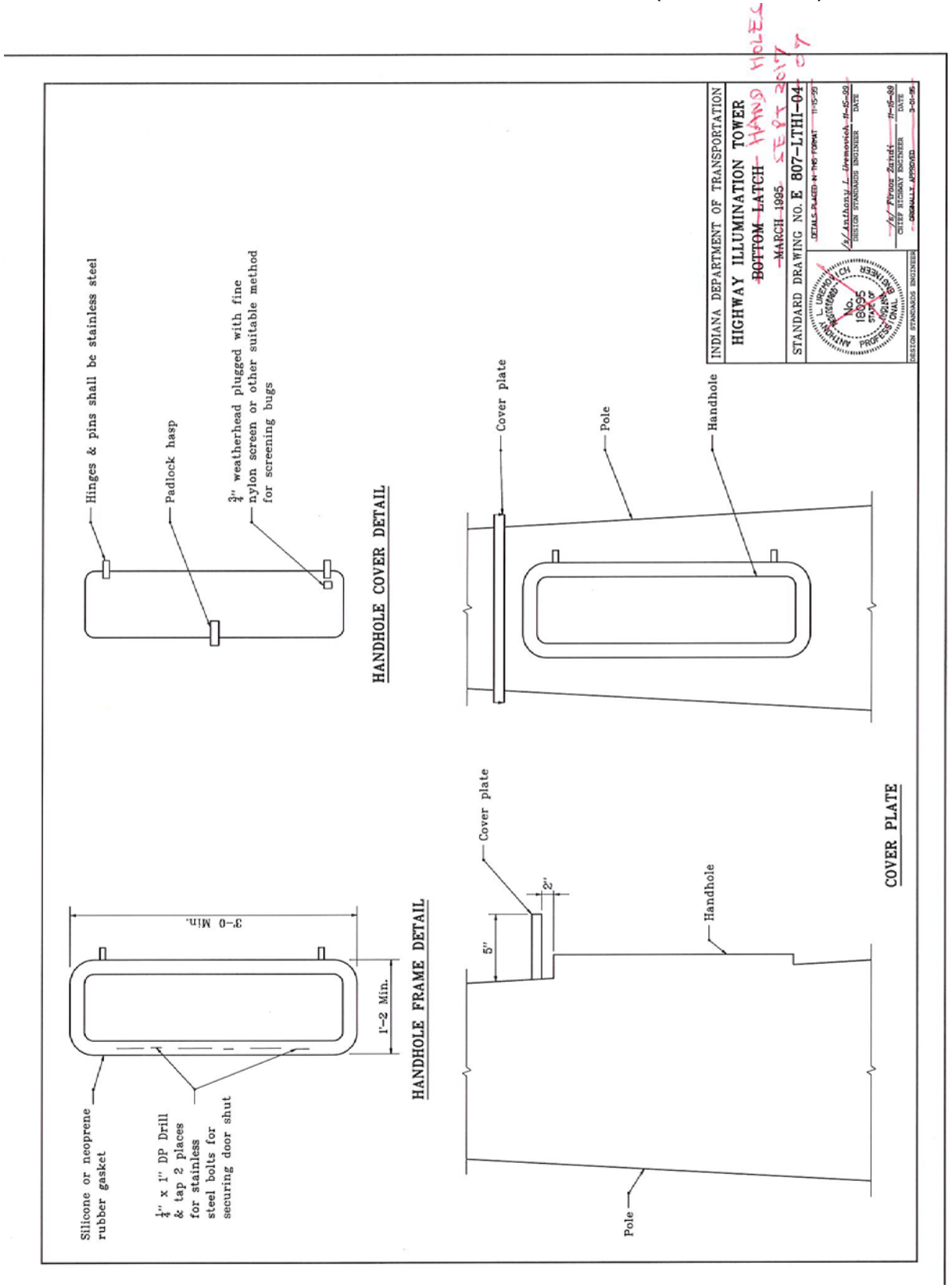
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-03B HIGHWAY ILLUMINATION TOWER DETAILS - BOTTOM LATCH (WITH MARKUPS)



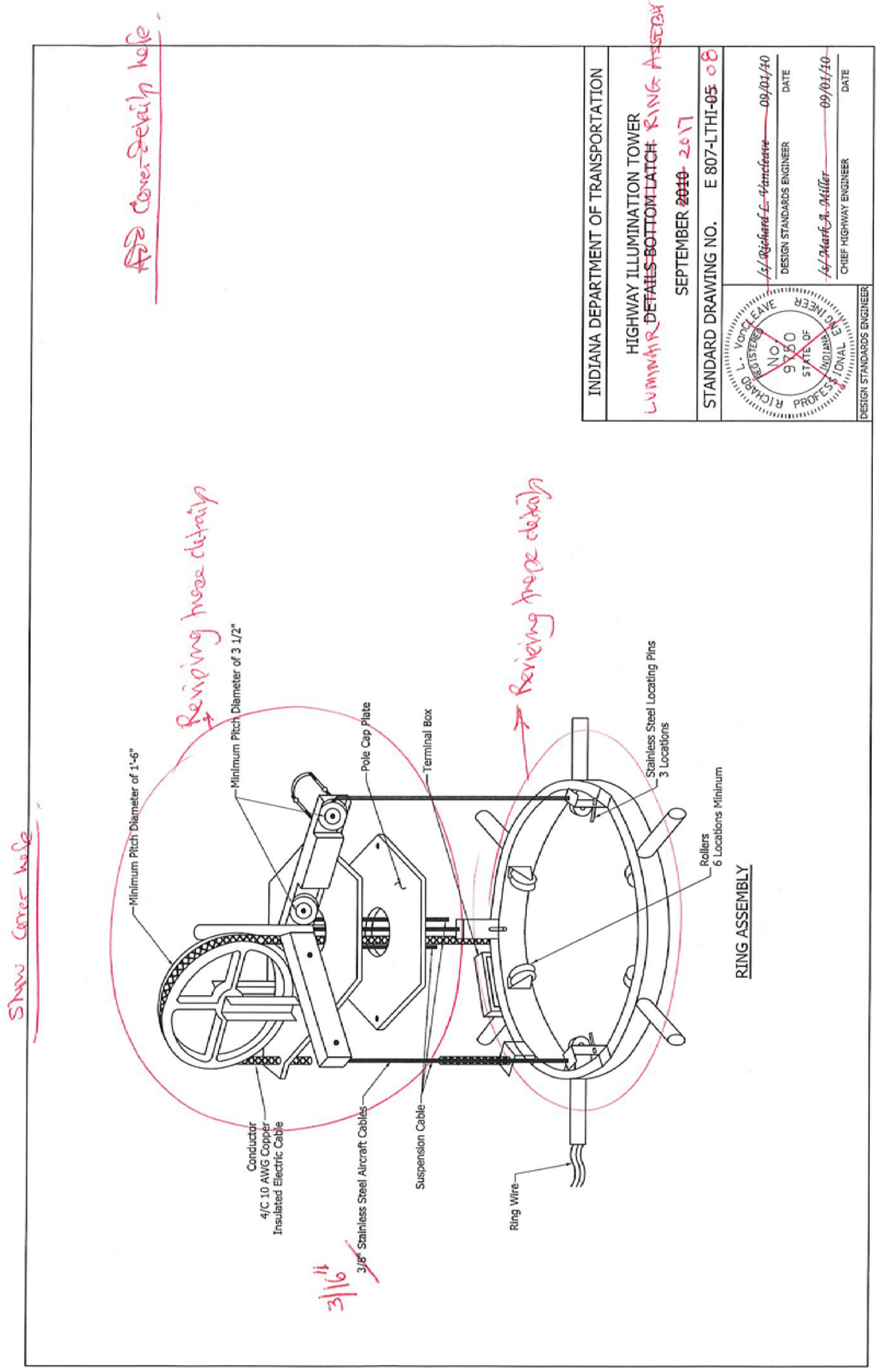
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-04 HIGHWAY ILLUMINATION TOWER BOTTOM LATCH (WITH MARKUPS)



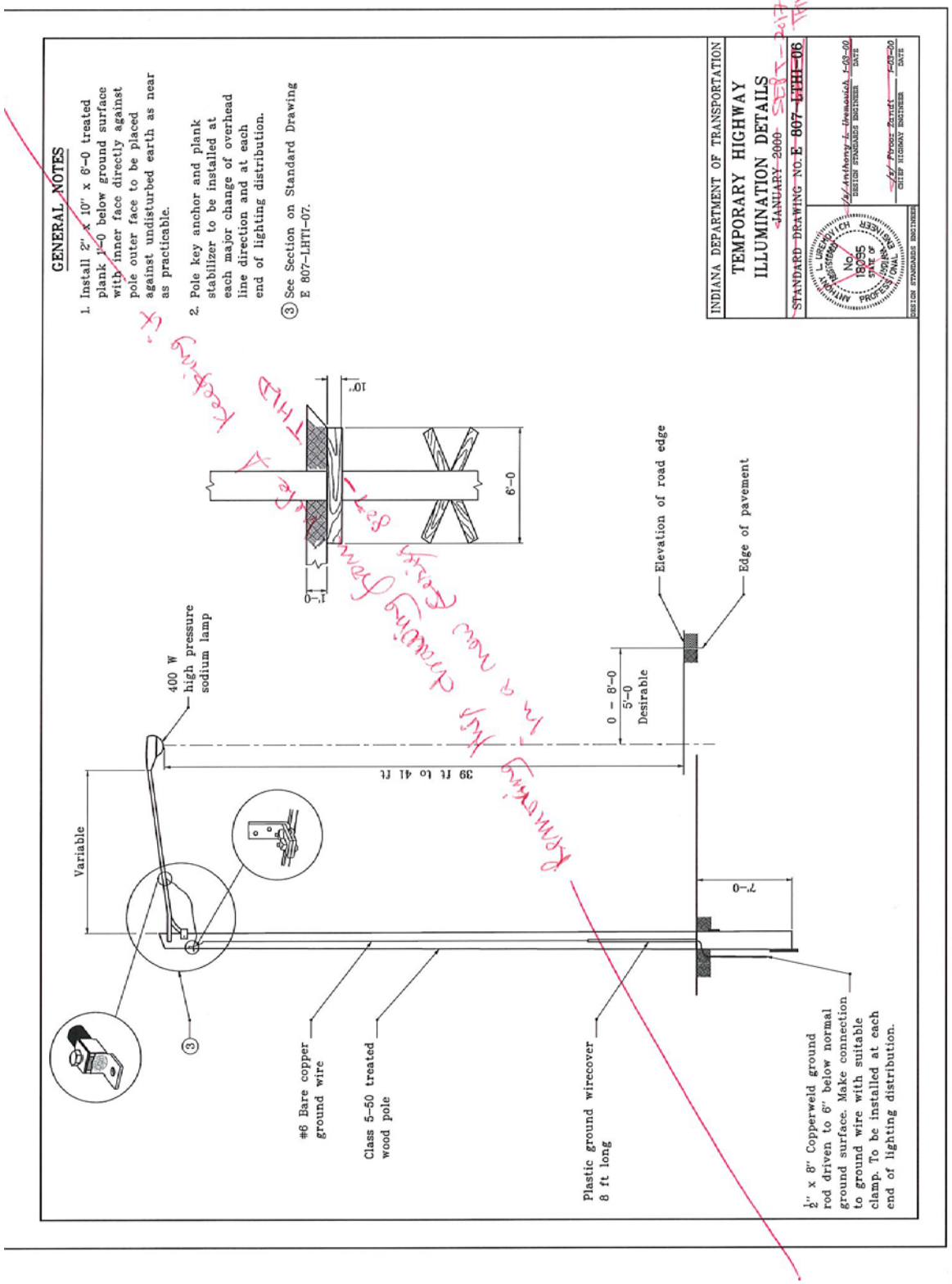
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-05 HIGHWAY ILLUMINATION TOWER DETAILS BOTTOM LATCH (WITH MARKUPS)



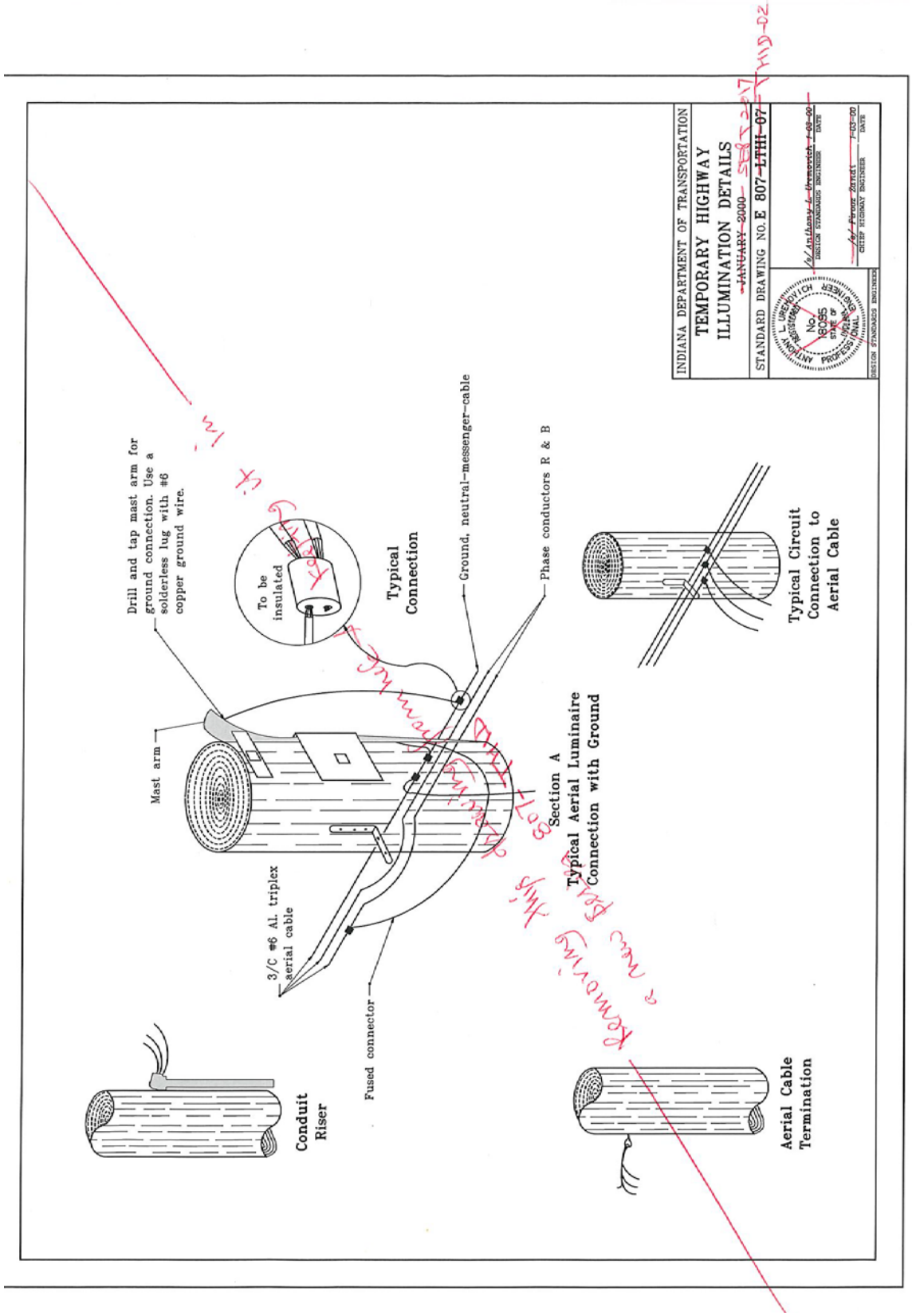
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-06 TEMPORARY HIGHWAY ILLUMINATION DETAILS (WITH MARKUPS)



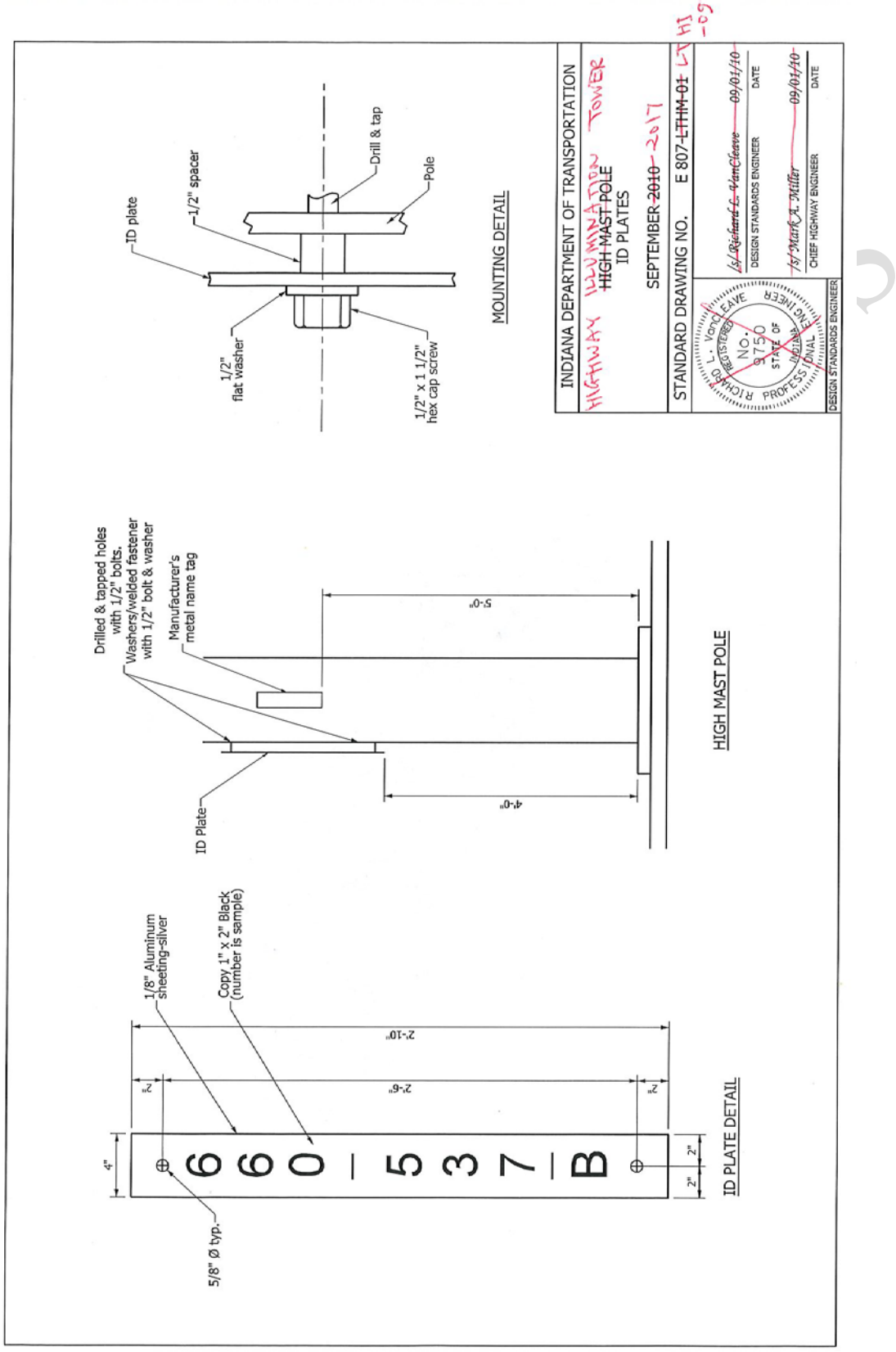
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-07 TEMPORARY HIGHWAY ILLUMINATION DETAILS (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHM-01 HIGH MAST POLE (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHM-02 HIGH MAST POLE PERFORATED ALUMINUM SKIRT (WITH MARKUPS)

INDIANA DEPARTMENT OF TRANSPORTATION

HIGH MAST LIGHTING TOWER
HIGH MAST POLE
PERFORATED ALUMINUM SKIRT

SEPTEMBER ~~2010~~ 2016

STANDARD DRAWING NO. E 807-~~LTHM-02~~ LT-111-10

RICHARD L. VONCLEAVE — REGISTERED — NO. 9750 — STATE OF INDIANA — PROFESSIONAL ENGINEER

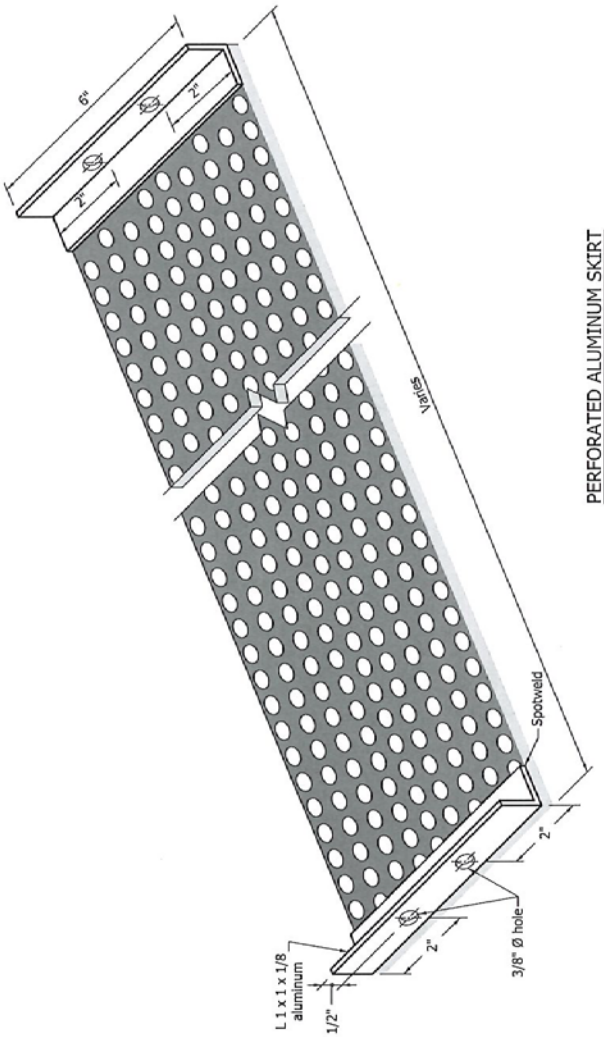
/s/ ~~Richard L. Vancleave~~ 09/01/10
DESIGN STANDARDS ENGINEER — DATE

/s/ ~~Mark A. Miller~~ 09/01/10
CHIEF HIGHWAY ENGINEER — DATE

DESIGN STANDARDS ENGINEER

NOTES:

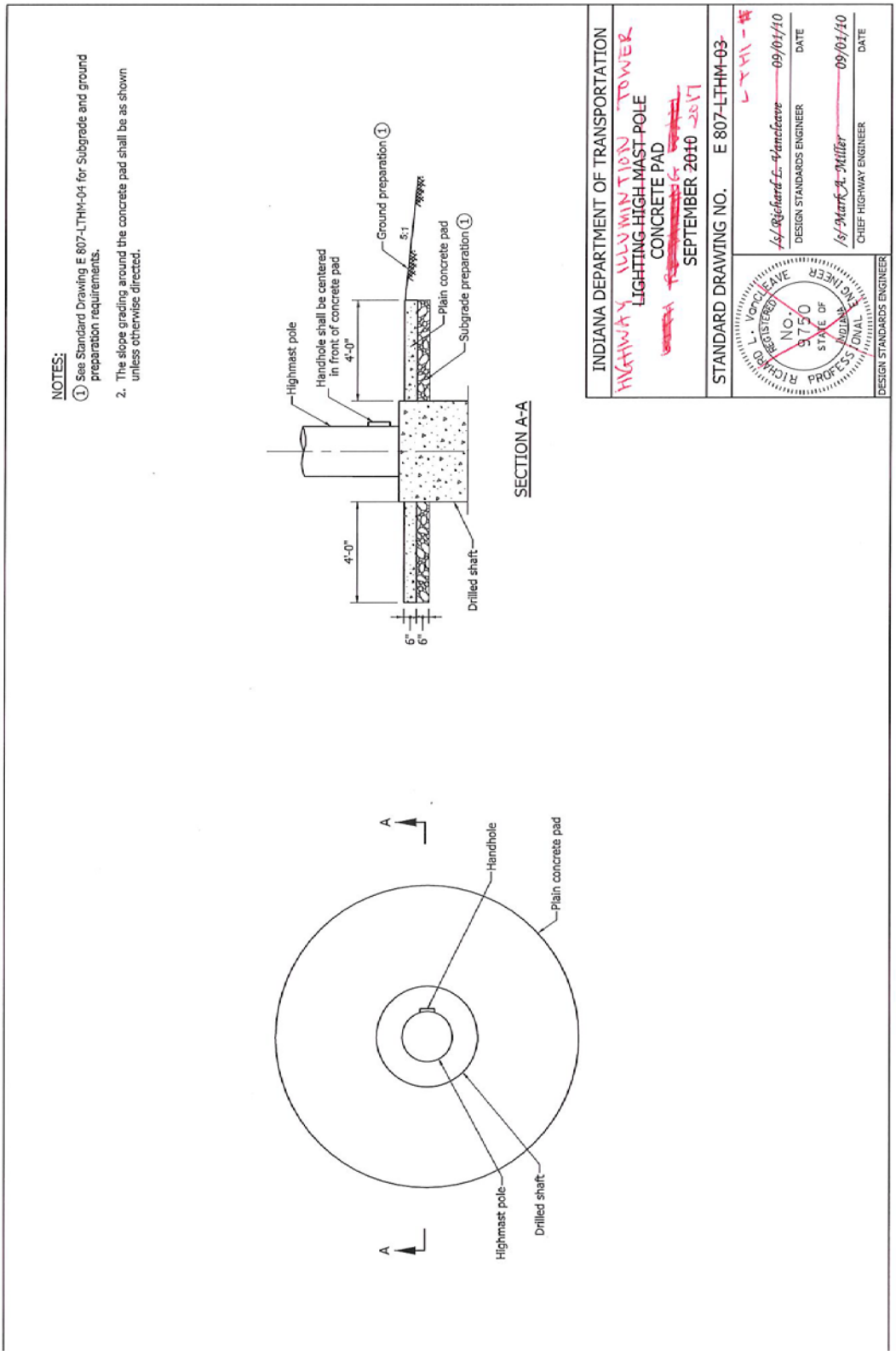
1. Holes shall be 3/8" dia., 1/2" outer circle, staggered.
2. The base plate of the high mast pole and exposed anchor bolts shall be enclosed by the aluminum skirt.



PERFORATED ALUMINUM SKIRT

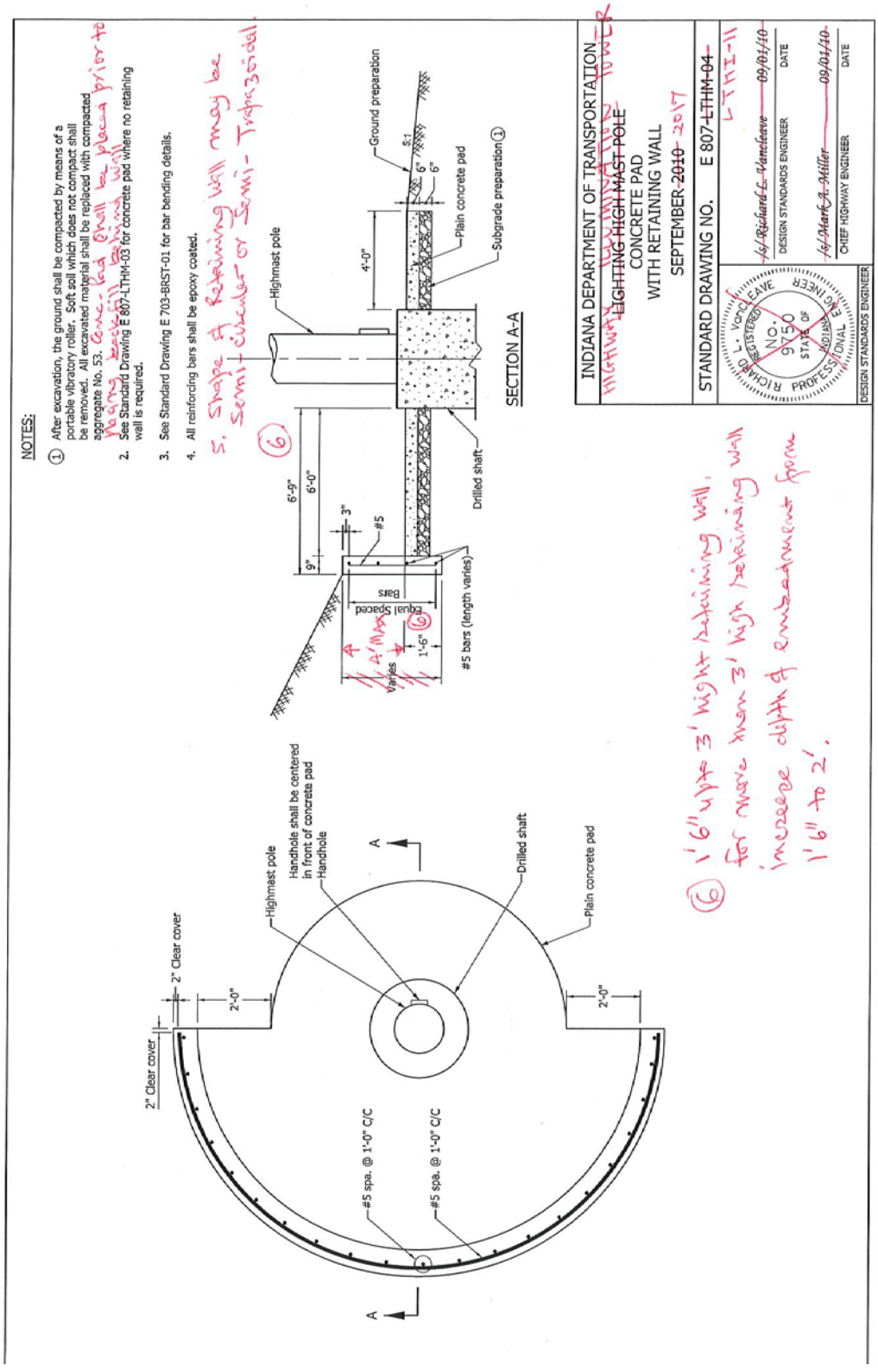
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHM-03 LIGHTING HIGH MAST POLE CONCRETE PAD (WITH MARKUPS)



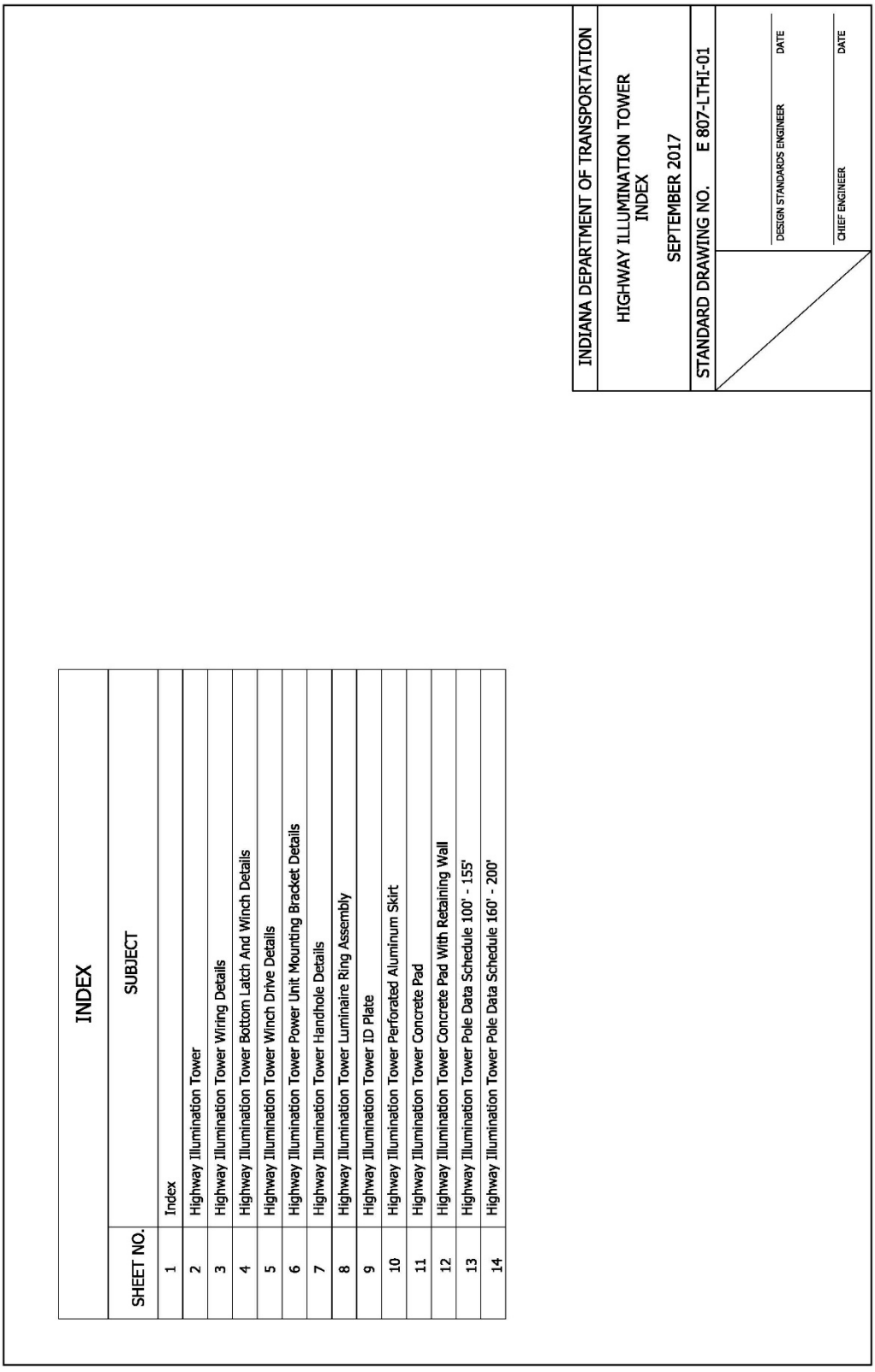
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHM-04 LIGHTING HIGH MAST POLE CONCRETE PAD WITH RETAINING WALL (WITH MARKUPS)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-01 HIGHWAY ILLUMINATION TOWER INDEX (DRAFT)



INDEX

SHEET NO.	SUBJECT
1	Index
2	Highway Illumination Tower
3	Highway Illumination Tower Wiring Details
4	Highway Illumination Tower Bottom Latch And Winch Details
5	Highway Illumination Tower Winch Drive Details
6	Highway Illumination Tower Power Unit Mounting Bracket Details
7	Highway Illumination Tower Handhole Details
8	Highway Illumination Tower Luminaire Ring Assembly
9	Highway Illumination Tower ID Plate
10	Highway Illumination Tower Perforated Aluminum Skirt
11	Highway Illumination Tower Concrete Pad
12	Highway Illumination Tower Concrete Pad With Retaining Wall
13	Highway Illumination Tower Pole Data Schedule 100' - 155'
14	Highway Illumination Tower Pole Data Schedule 160' - 200'

INDIANA DEPARTMENT OF TRANSPORTATION

HIGHWAY ILLUMINATION TOWER
INDEX
SEPTEMBER 2017

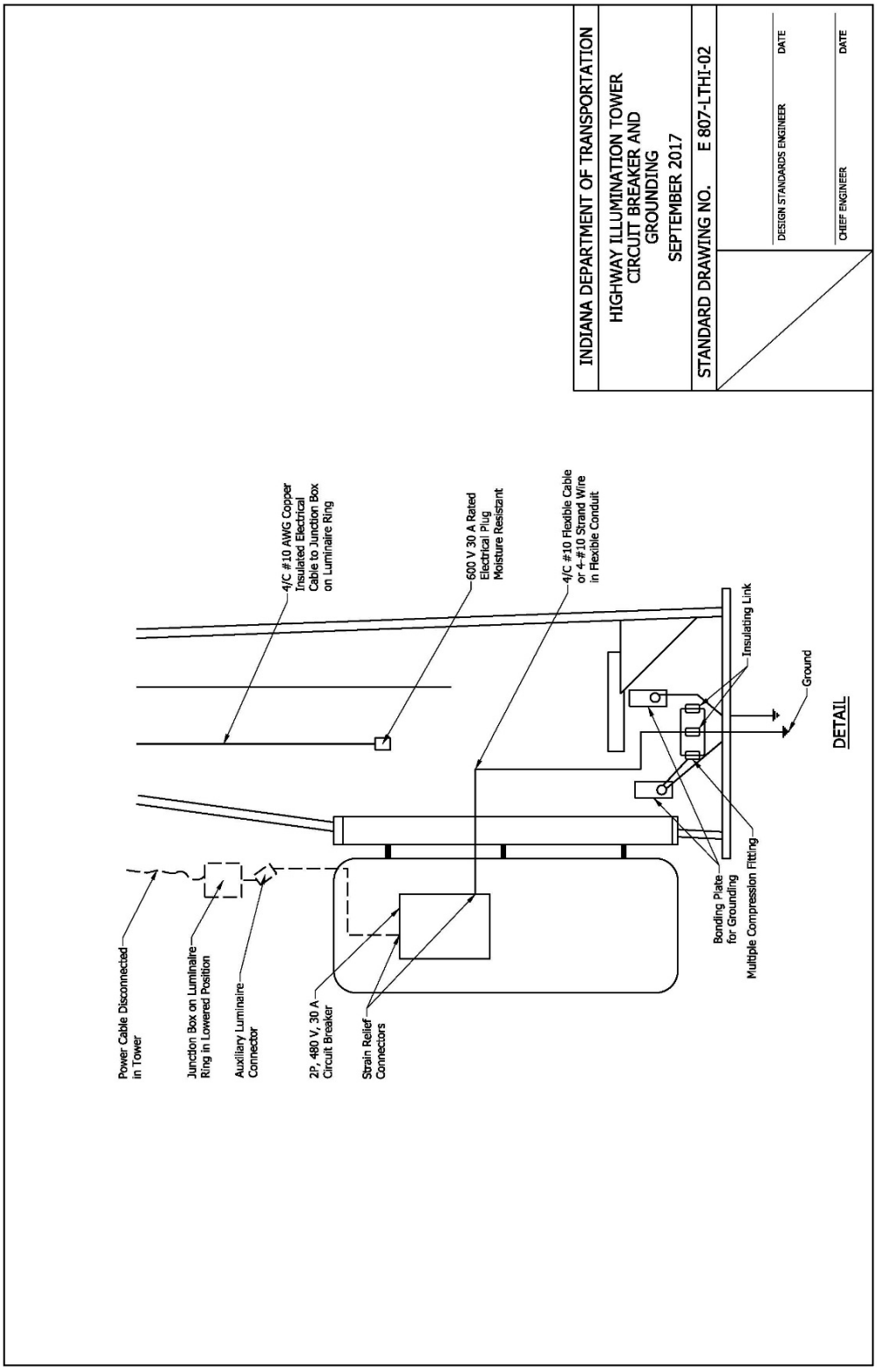
STANDARD DRAWING NO. E 807-LTHI-01

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

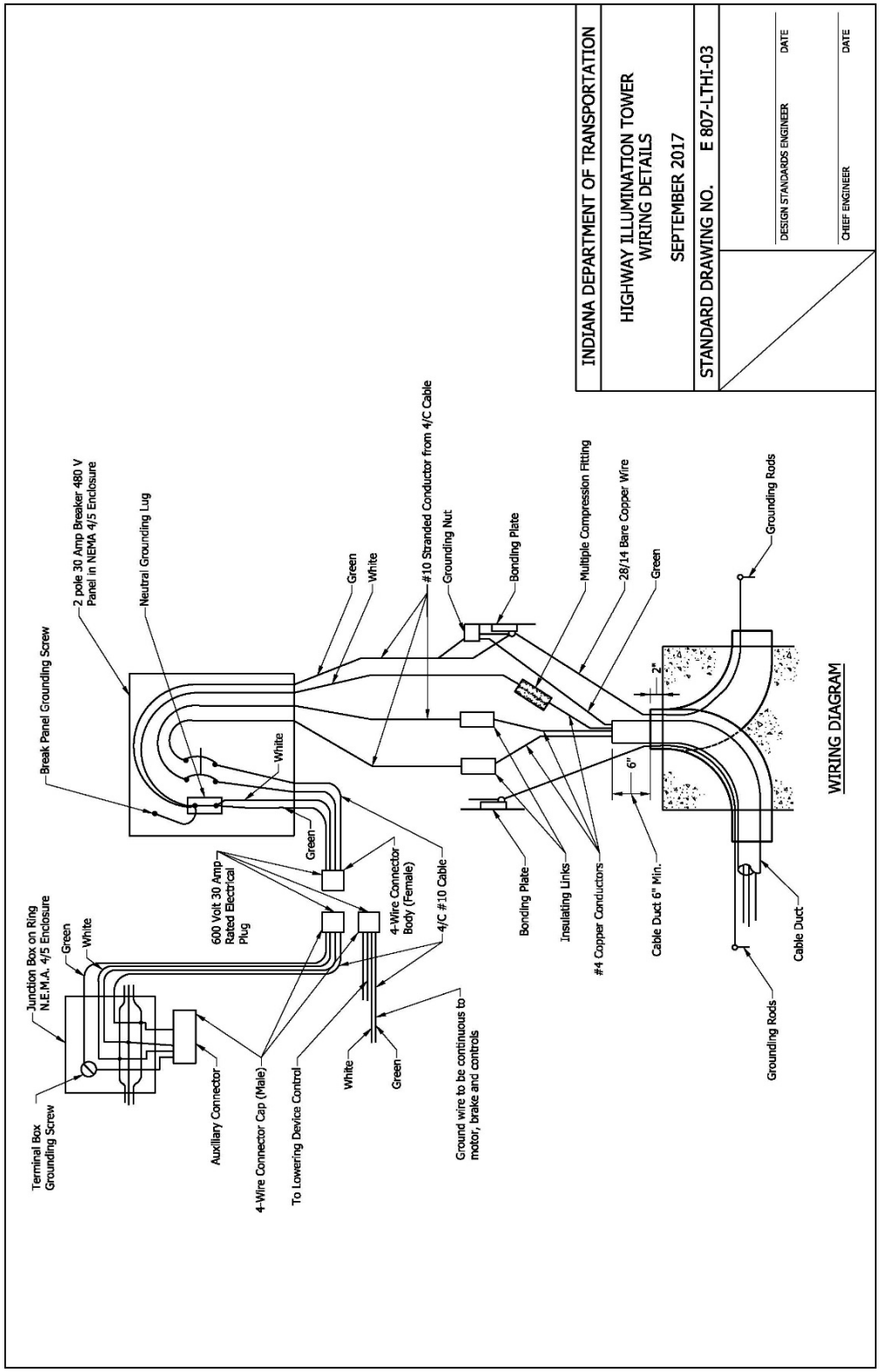
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-02 HIGHWAY ILLUMINATION TOWER CIRCUIT BREAKER AND GROUNDING (DRAFT)



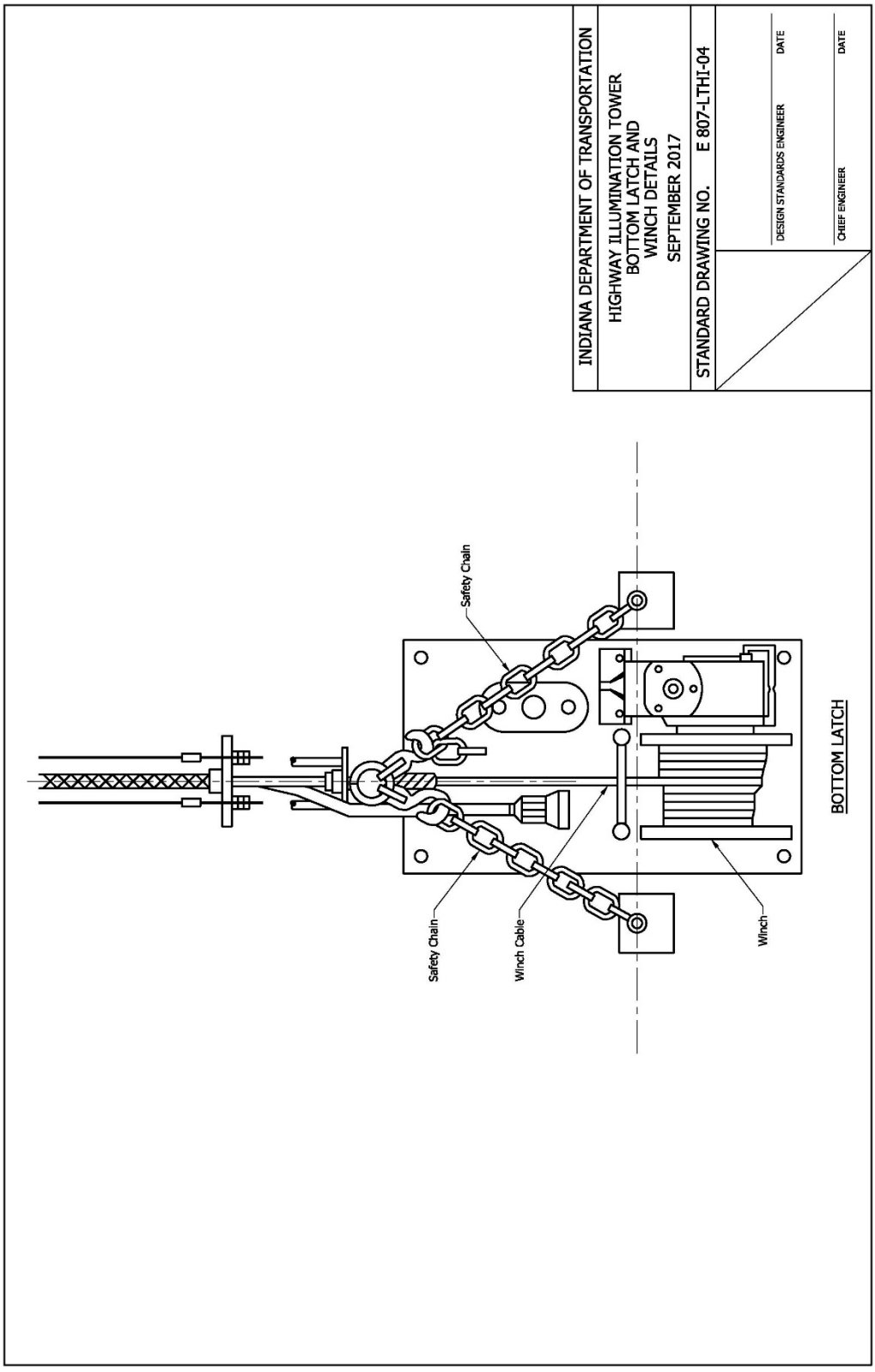
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-03 HIGHWAY ILLUMINATION TOWER WIRING DETAILS (DRAFT)



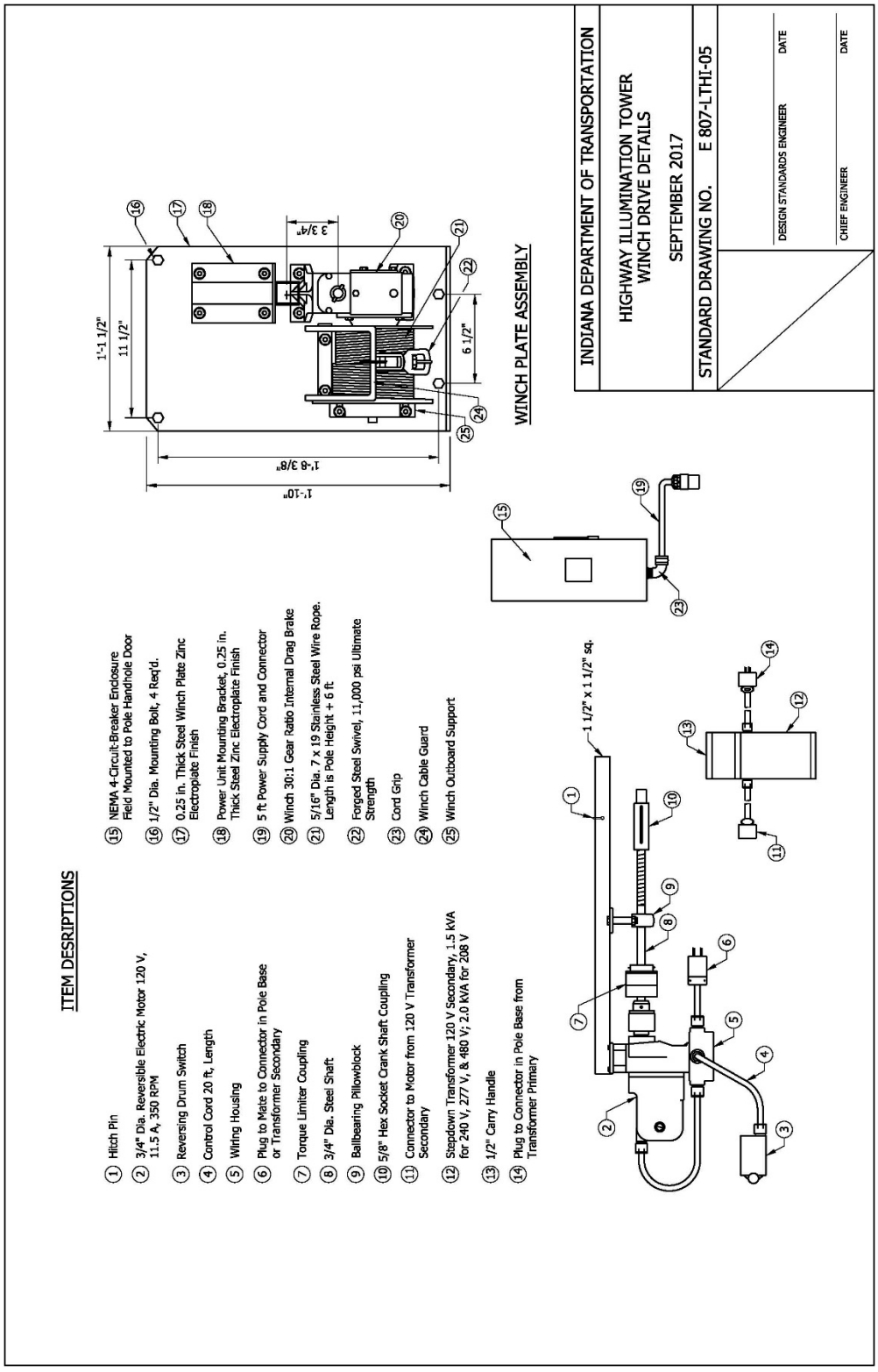
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-04 HIGHWAY ILLUMINATION TOWER BOTTOM LATCH AND WINCH DETAILS (DRAFT)



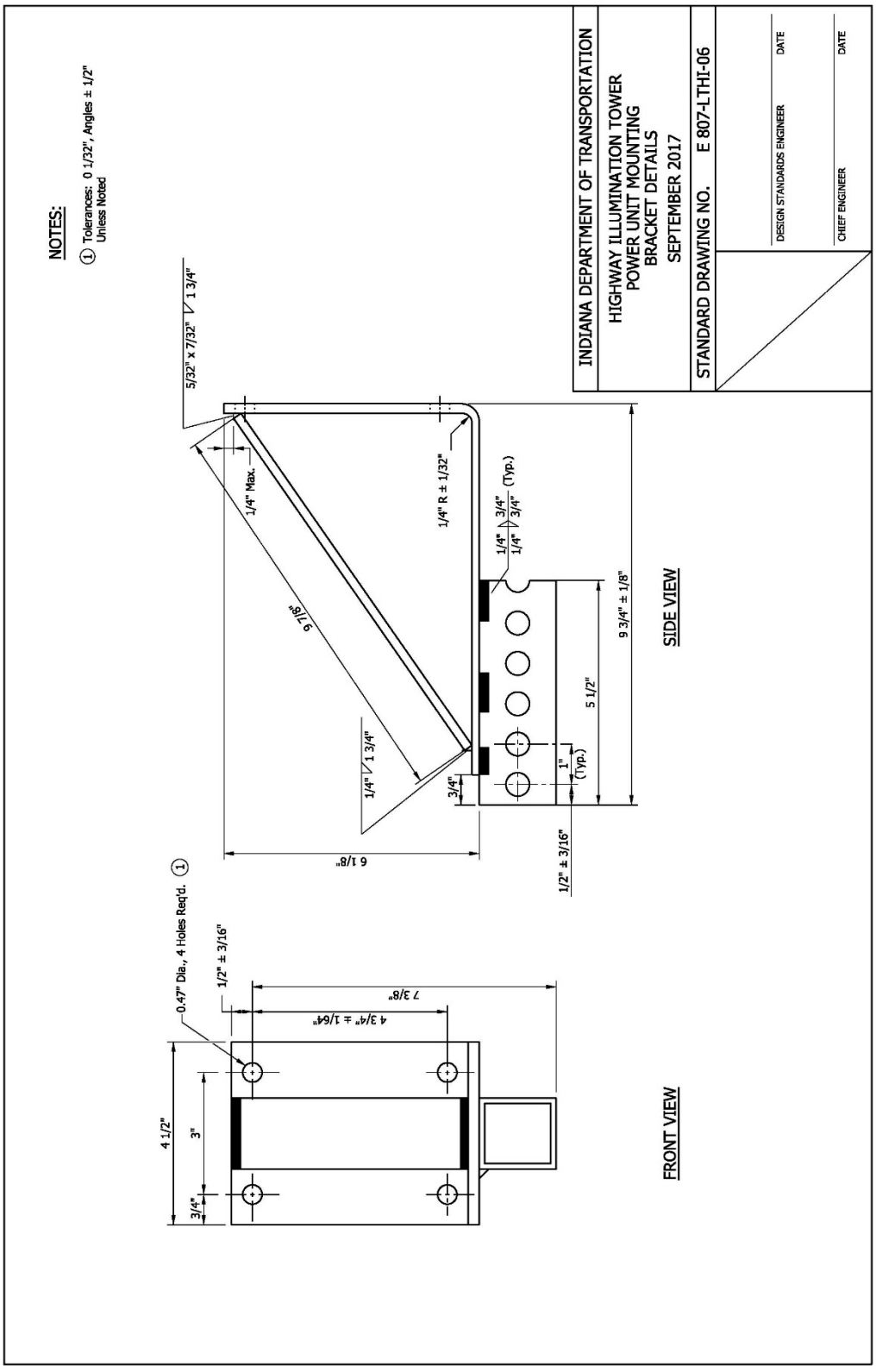
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-05 HIGHWAY ILLUMINATION TOWER WINCH DRIVE DETAILS (DRAFT)



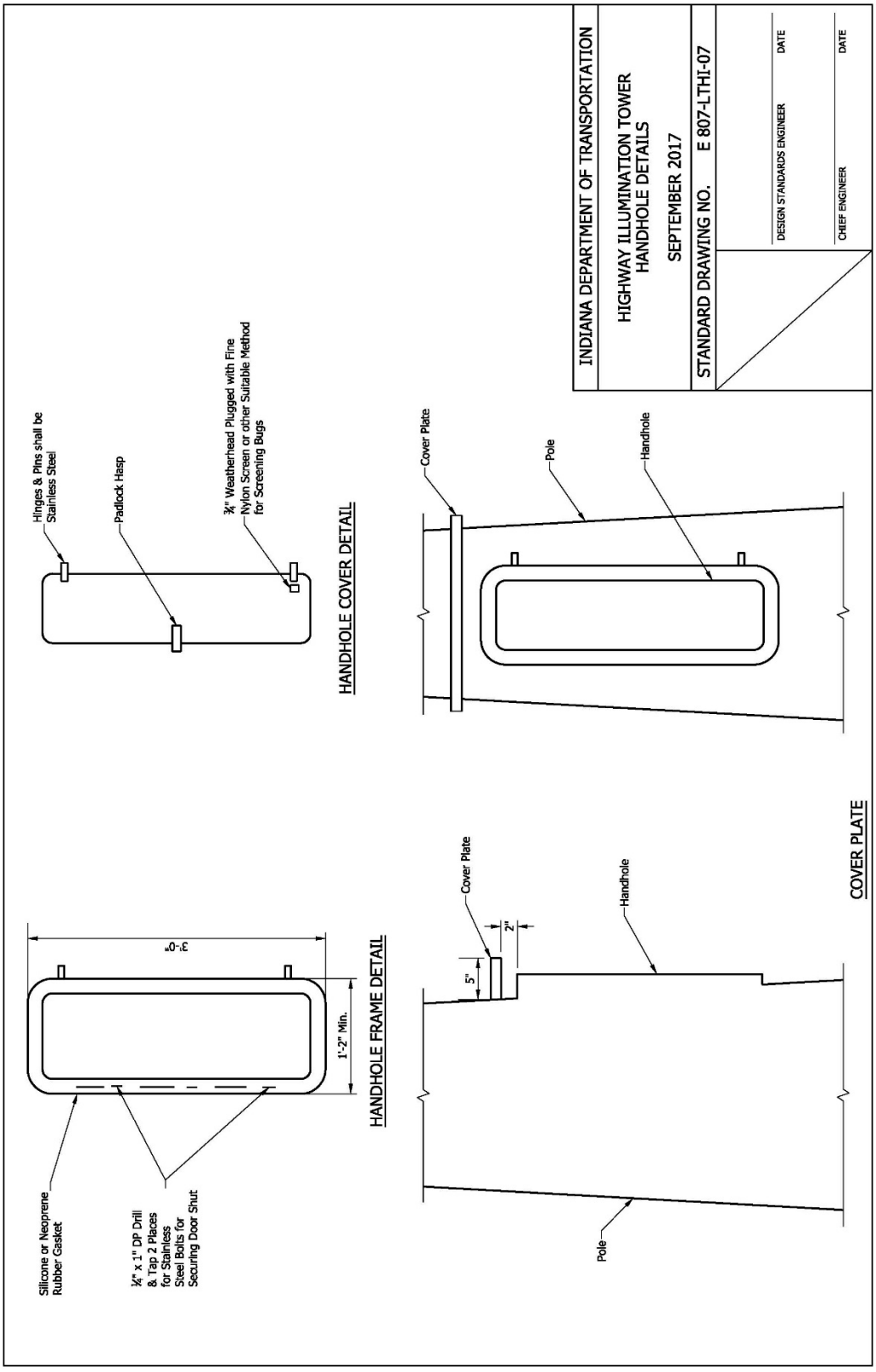
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-06 HIGHWAY ILLUMINATION TOWER POWER UNIT MOUNTING BRACKET DETAILS (DRAFT)



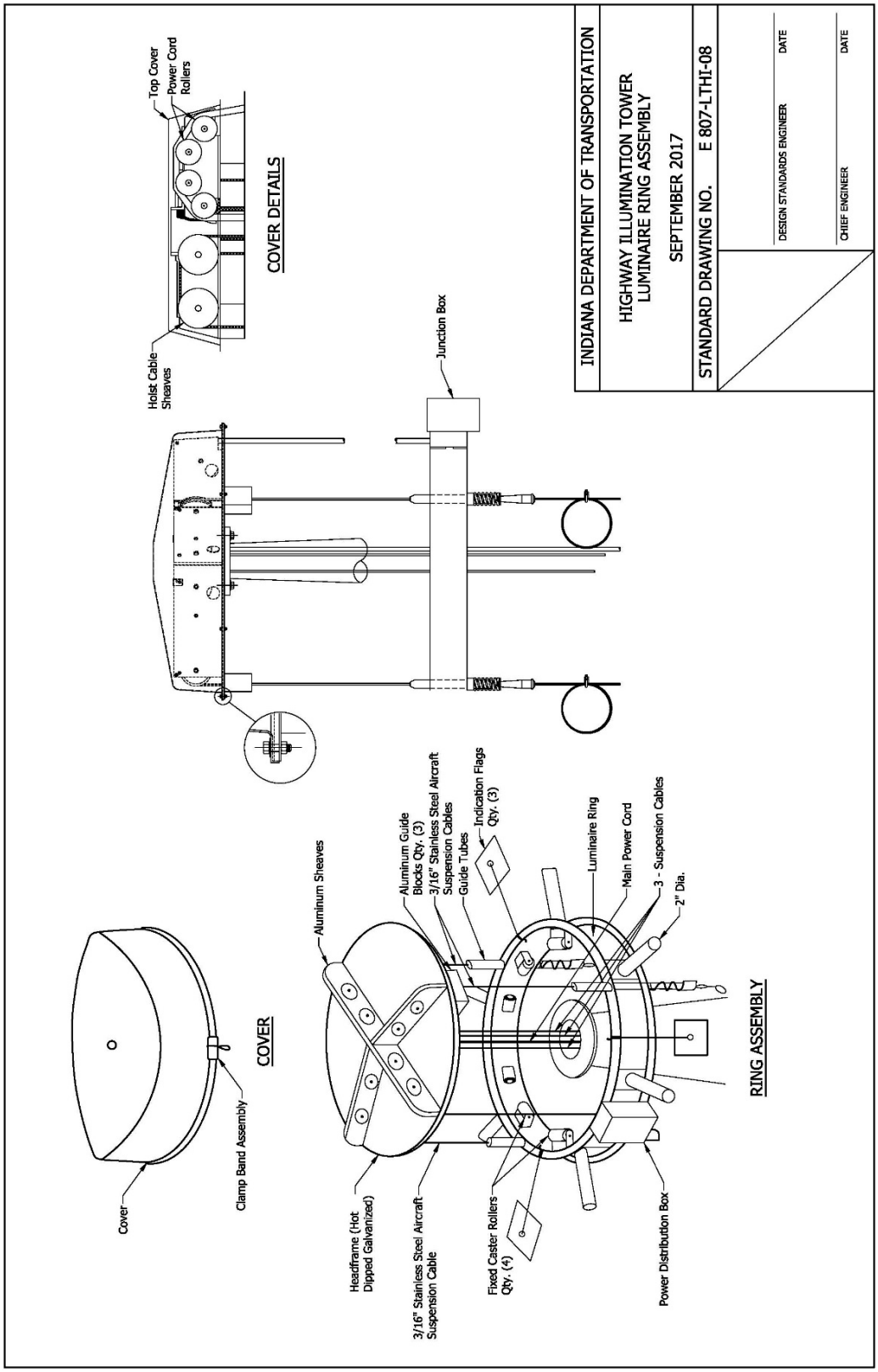
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-07 HIGHWAY ILLUMINATION TOWER HANDHOLE DETAILS (DRAFT)



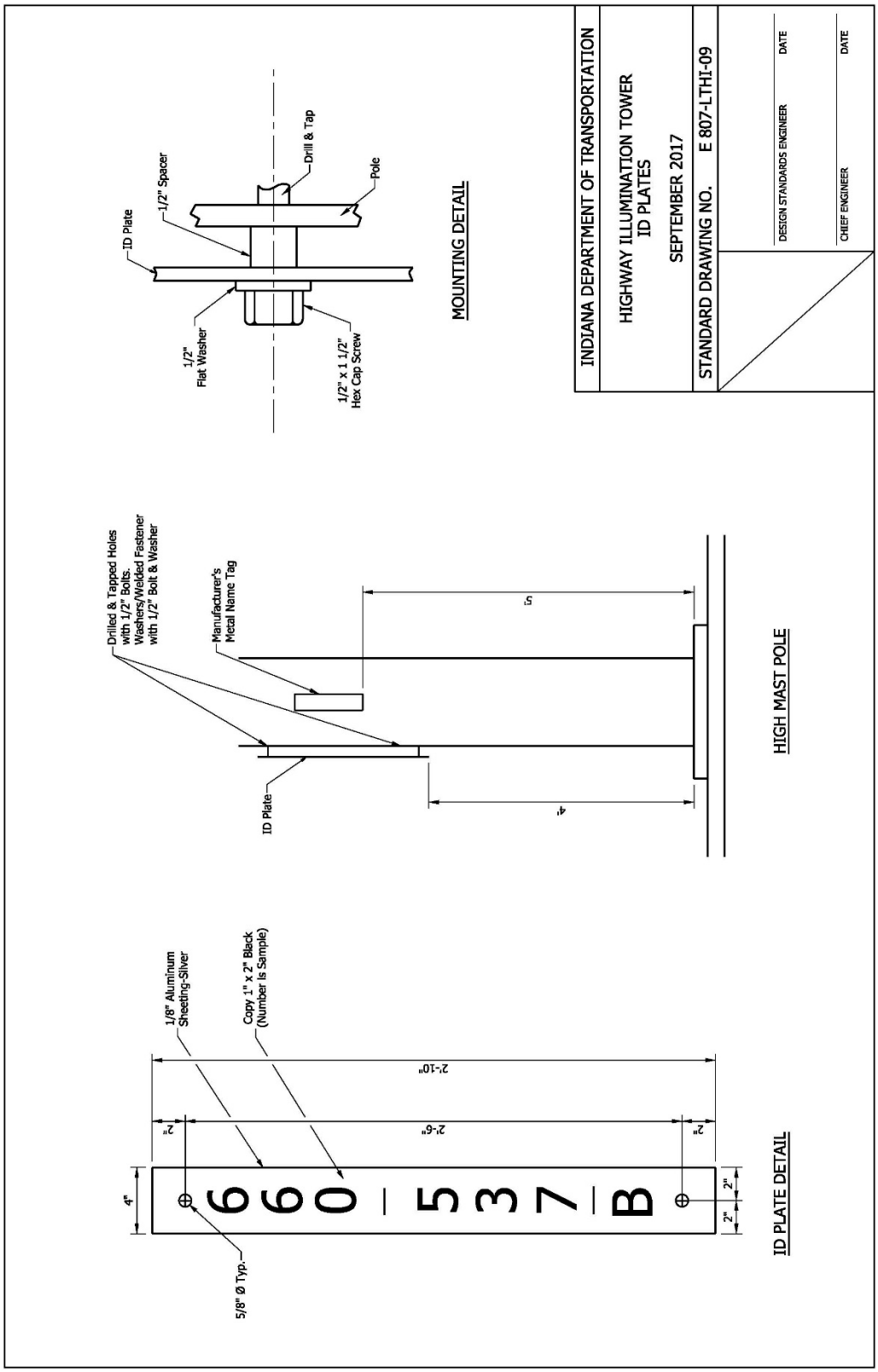
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-08 HIGHWAY ILLUMINATION TOWER LUMINAIRE RING ASSEMBLY (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-09 HIGHWAY ILLUMINATION TOWER ID PLATES (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-10 HIGHWAY ILLUMINATION TOWER PERFORATED ALUMINUM SKIRT (DRAFT)

INDIANA DEPARTMENT OF TRANSPORTATION

HIGHWAY ILLUMINATION TOWER
PERFORATED ALUMINUM SKIRT

SEPTEMBER 2017

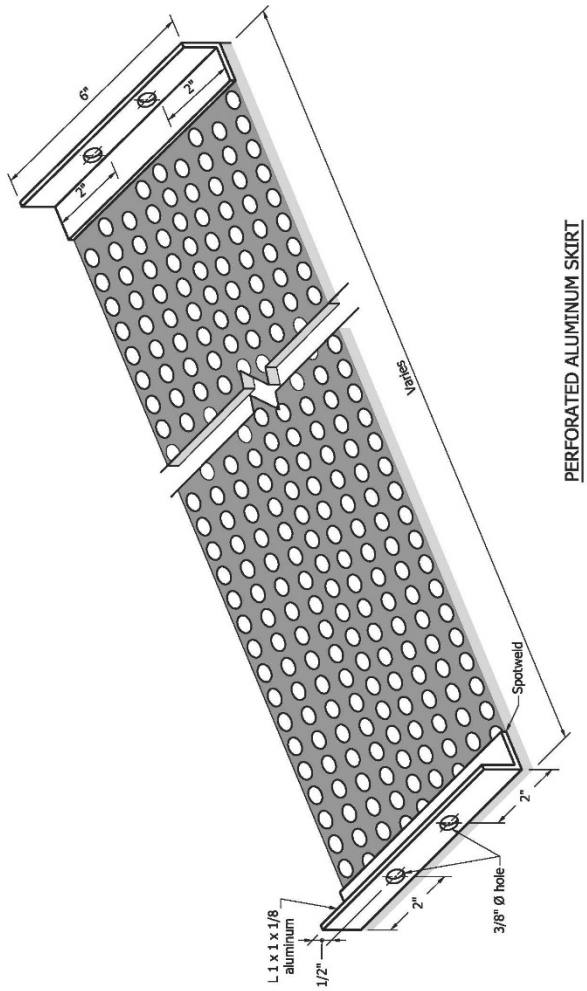
STANDARD DRAWING NO. E 807-LTHI-10

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

NOTES:

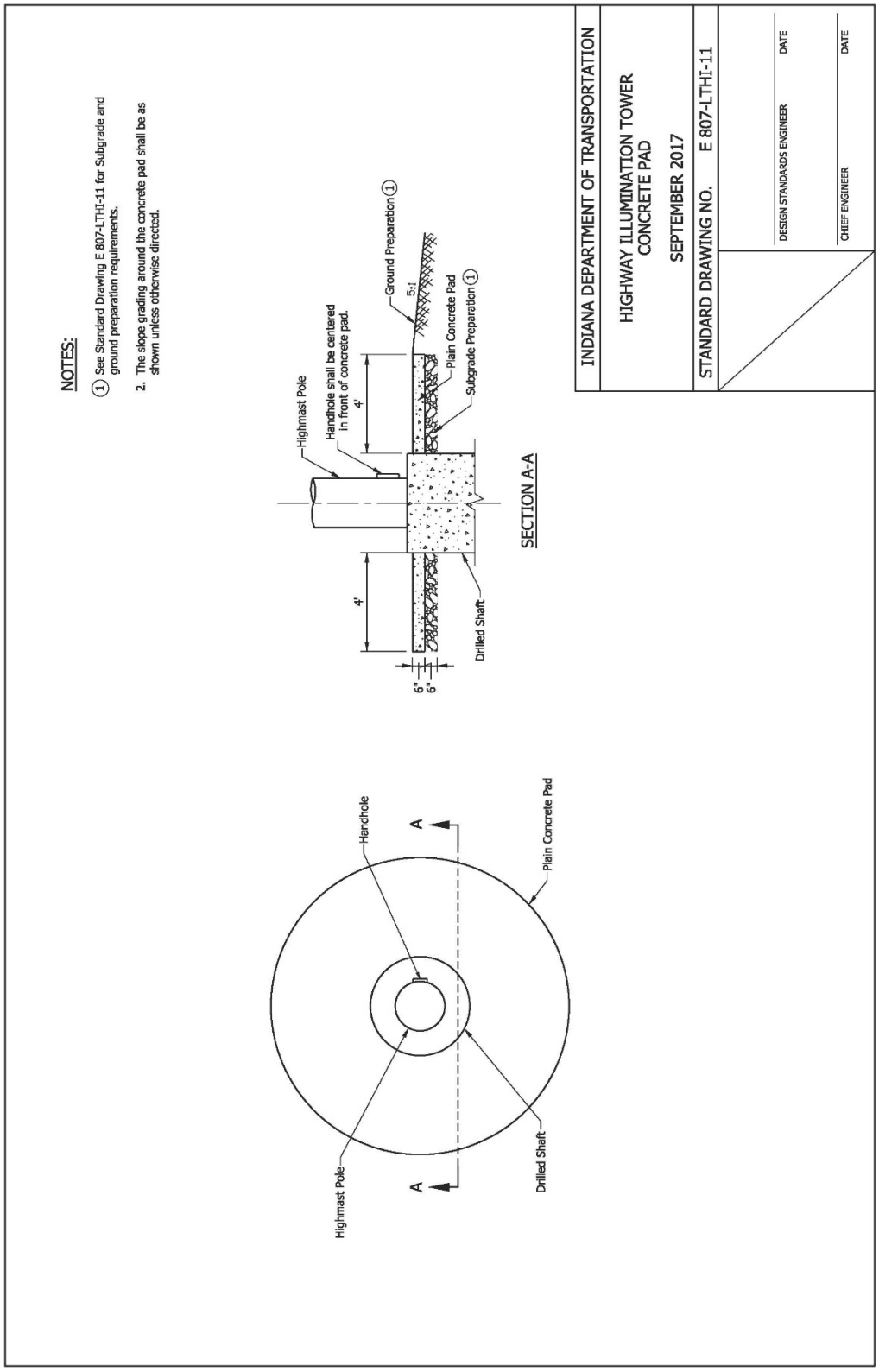
1. Holes shall be 3/8" dia., 1/2" outer circle, staggered.
2. The base plate of the high mast pole and exposed anchor bolts shall be enclosed by the aluminum skirt.



PERFORATED ALUMINUM SKIRT

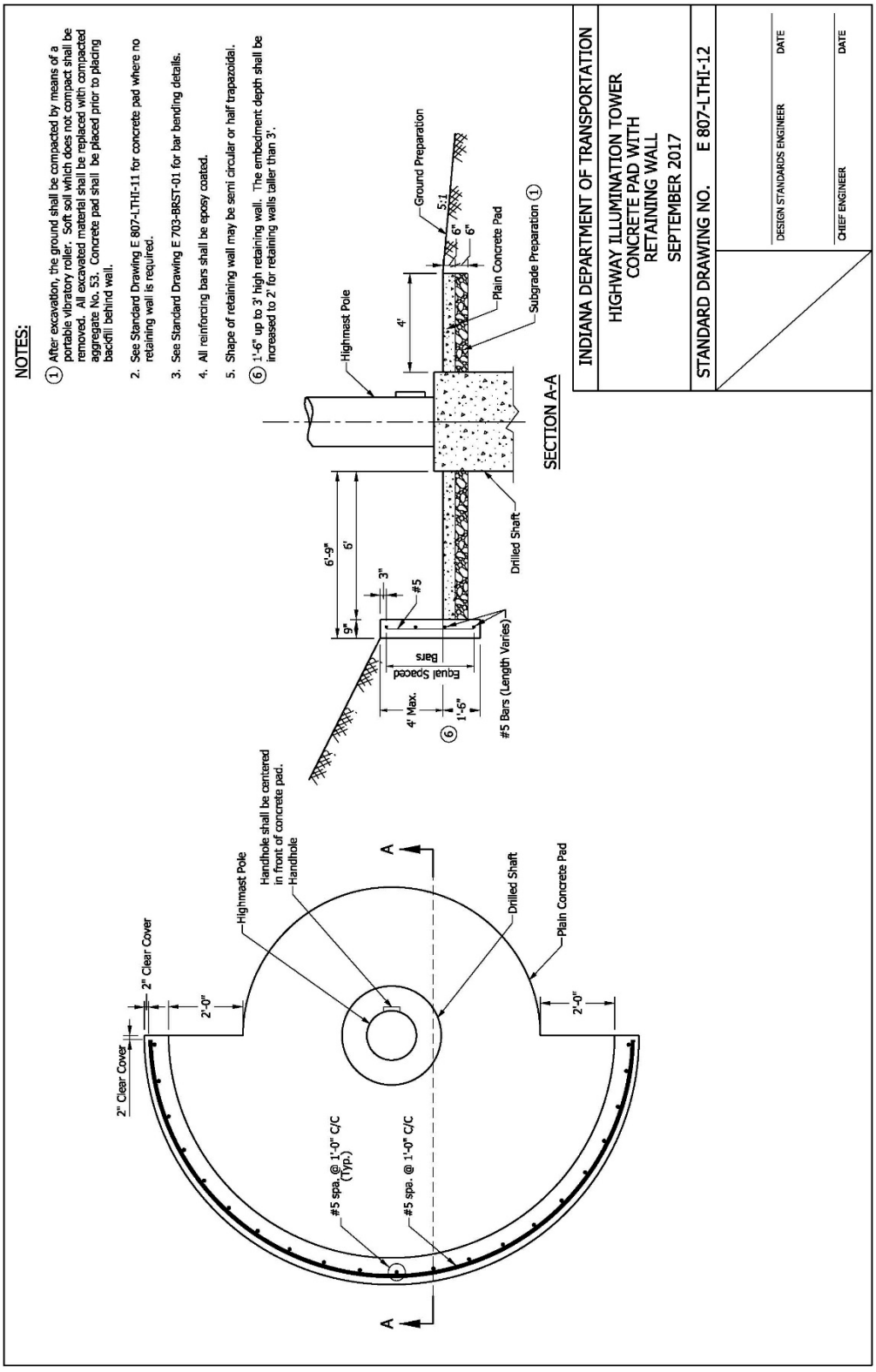
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-11 HIGHWAY ILLUMINATION TOWER CONCRETE PAD (DRAFT)



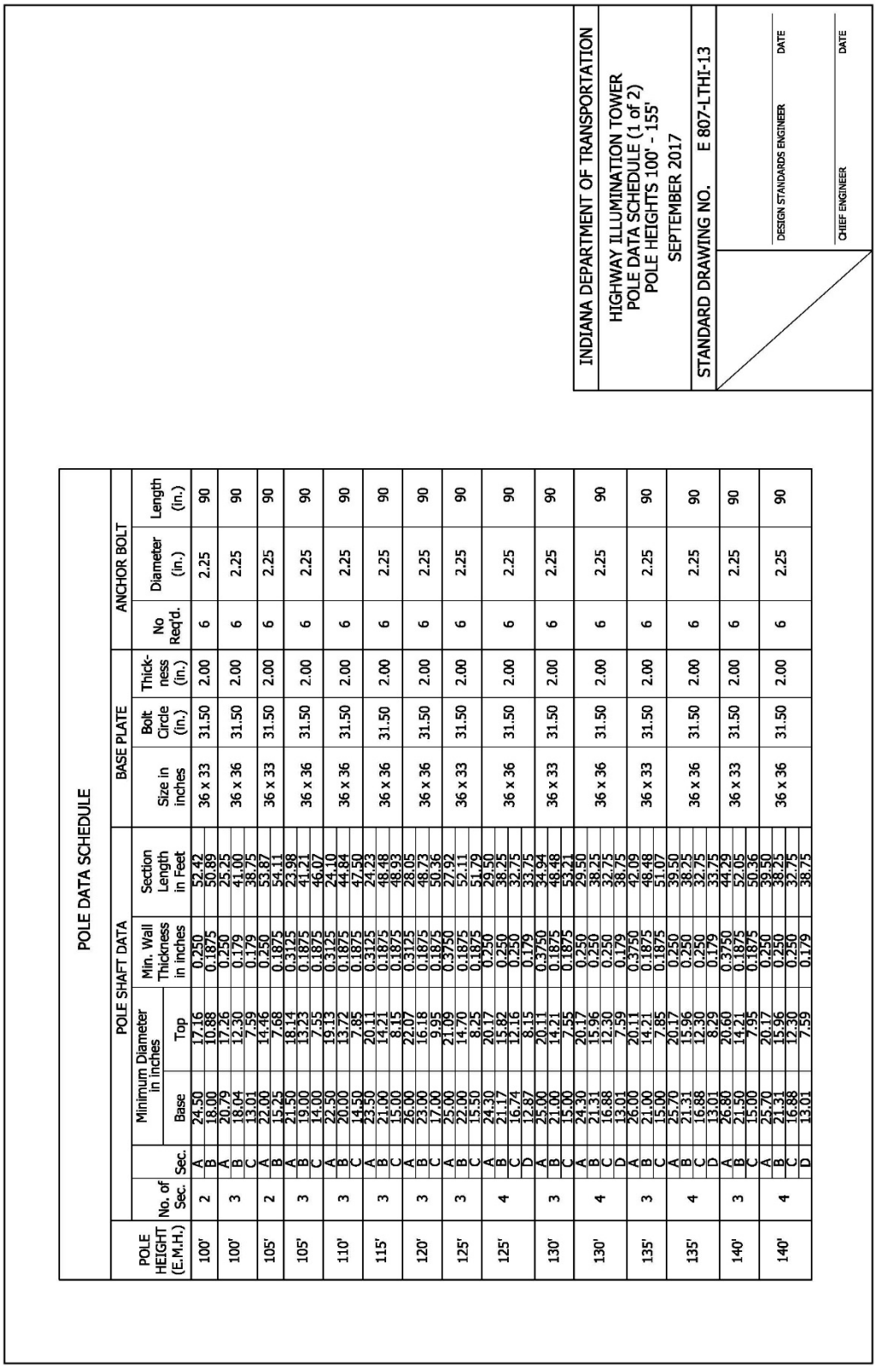
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-12 HIGHWAY ILLUMINATION TOWER CONCRETE PAD WITH RETAINING WALL (DRAFT)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-13 HIGHWAY ILLUMINATION TOWER POLE DATA SCHEDULE (DRAFT)



POLE DATA SCHEDULE

POLE HEIGHT (E.M.H.)	POLE SHAFT DATA						BASE PLATE			ANCHOR BOLT		
	No. of Sec.	Sec.	Minimum Diameter in inches		Min. Wall Thickness in inches	Section Length in Feet	Size in inches	Bolt Circle (in.)	Thick-ness (in.)	No Req'd.	Diameter (in.)	Length (in.)
			Base	Top								
100'	2	A	24.50	17.16	0.250	52.42	36 x 33	31.50	2.00	6	2.25	90
		B	18.00	10.88	0.1875	50.89						
100'	3	A	20.79	17.26	0.250	25.25	36 x 36	31.50	2.00	6	2.25	90
		B	18.04	12.30	0.179	41.00						
		C	13.01	7.59	0.179	38.75						
105'	2	A	22.00	14.46	0.250	53.87	36 x 33	31.50	2.00	6	2.25	90
		B	15.25	7.68	0.1875	54.11						
105'	3	A	24.50	18.14	0.3125	23.98	36 x 36	31.50	2.00	6	2.25	90
		B	19.00	13.23	0.1875	41.21						
		C	14.00	7.55	0.1875	46.07						
110'	3	A	22.50	19.13	0.3125	24.10	36 x 36	31.50	2.00	6	2.25	90
		B	20.00	13.72	0.1875	44.84						
		C	14.50	7.85	0.1875	47.50						
115'	3	A	23.50	20.11	0.3125	24.23	36 x 36	31.50	2.00	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	8.15	0.1875	48.93						
120'	3	A	26.00	22.07	0.3125	28.05	36 x 36	31.50	2.00	6	2.25	90
		B	23.00	16.18	0.1875	48.73						
		C	17.00	9.95	0.1875	50.36						
125'	3	A	25.00	21.09	0.3750	27.92	36 x 33	31.50	2.00	6	2.25	90
		B	22.00	14.70	0.1875	52.11						
		C	15.50	8.25	0.1875	51.79						
125'	4	A	24.30	20.17	0.250	29.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.17	15.82	0.250	38.25						
		C	16.74	12.16	0.250	32.75						
		D	12.87	8.15	0.179	33.75						
130'	3	A	25.00	20.11	0.3750	34.94	36 x 33	31.50	2.00	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	7.55	0.1875	53.21						
130'	4	A	24.30	20.17	0.250	29.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.31	15.96	0.250	38.25						
		C	16.88	12.30	0.250	32.75						
		D	13.01	7.59	0.179	38.75						
135'	3	A	26.00	20.11	0.3750	42.09	36 x 33	31.50	2.00	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	7.85	0.1875	51.07						
135'	4	A	25.70	20.17	0.250	39.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.31	15.96	0.250	38.25						
		C	16.88	12.30	0.250	32.75						
		D	13.01	8.29	0.179	33.75						
140'	3	A	26.80	20.60	0.3750	44.29	36 x 33	31.50	2.00	6	2.25	90
		B	21.50	14.21	0.1875	52.05						
		C	15.00	7.95	0.1875	50.36						
140'	4	A	25.70	20.17	0.250	39.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.31	15.96	0.250	38.25						
		C	16.88	12.30	0.250	32.75						
		D	13.01	7.59	0.179	38.75						

INDIANA DEPARTMENT OF TRANSPORTATION

HIGHWAY ILLUMINATION TOWER
POLE DATA SCHEDULE (1 of 2)
POLE HEIGHTS 100' - 155'
SEPTEMBER 2017

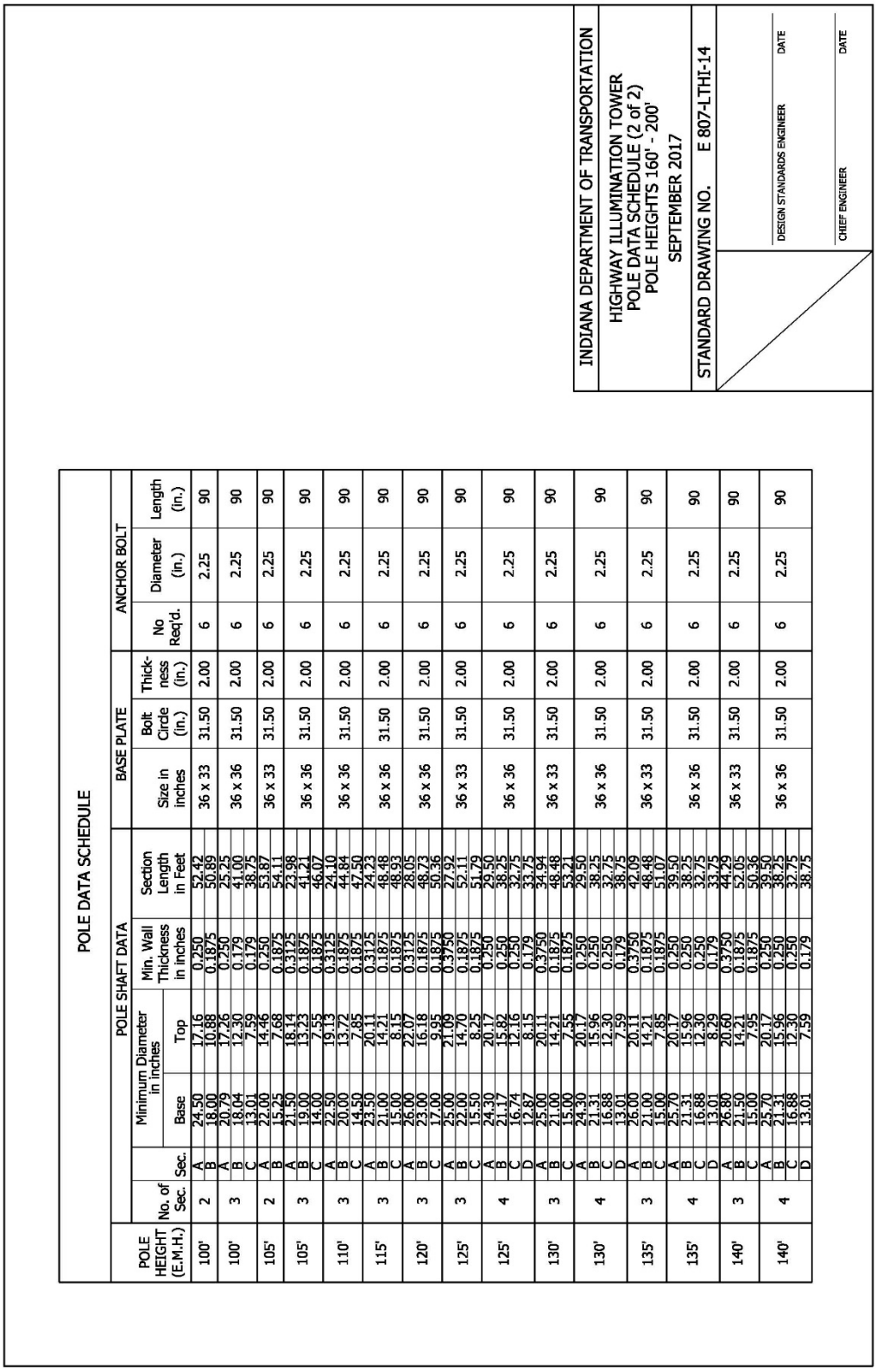
STANDARD DRAWING NO. E 807-LTHI-13

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-LTHI-14 HIGHWAY ILLUMINATION TOWER POLE DATA SCHEDULE (DRAFT)



POLE DATA SCHEDULE

POLE HEIGHT (E.M.H.)	POLE SHAFT DATA					BASE PLATE			ANCHOR BOLT		
	No. of Sec.	Sec.	Minimum Diameter in inches		Min. Wall Thickness in inches	Section Length in Feet	Size in inches	Bolt Circle (in.)	Thick-ness (in.)	No Req'd.	Diameter (in.)	Length (in.)
			Base	Top								
100'	2	A	24.50	17.16	0.250	52.42	36 x 33	31.50	2.00	6	2.25	90
		B	18.00	10.88	0.1875	50.89						
100'	3	A	20.79	17.26	0.250	25.25	36 x 36	31.50	2.00	6	2.25	90
		B	18.04	12.30	0.179	41.00						
		C	13.01	7.59	0.179	38.75						
105'	2	A	22.00	14.46	0.250	53.87	36 x 33	31.50	2.00	6	2.25	90
		B	15.25	7.68	0.1875	54.11						
105'	3	A	21.50	18.14	0.3125	23.98	36 x 36	31.50	2.00	6	2.25	90
		B	19.00	13.23	0.1875	41.21						
		C	14.00	7.55	0.1875	46.07						
110'	3	A	22.50	19.13	0.3125	24.10	36 x 36	31.50	2.00	6	2.25	90
		B	20.00	13.72	0.1875	44.84						
		C	14.50	7.85	0.1875	47.50						
115'	3	A	23.50	20.11	0.3125	24.23	36 x 36	31.50	2.00	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	8.15	0.1875	48.93						
120'	3	A	26.00	22.07	0.3125	28.05	36 x 36	31.50	2.00	6	2.25	90
		B	23.00	16.18	0.1875	48.23						
		C	17.00	9.85	0.1875	50.36						
125'	3	A	25.00	21.09	0.3750	27.92	36 x 33	31.50	2.00	6	2.25	90
		B	22.00	14.70	0.1875	52.11						
		C	15.50	8.25	0.1875	51.79						
125'	4	A	24.30	20.17	0.250	29.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.17	15.82	0.250	38.25						
		C	16.74	12.16	0.250	32.75						
		D	12.87	8.15	0.179	33.75						
130'	3	A	25.00	20.11	0.3750	34.94	36 x 33	31.50	2.00	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	7.85	0.1875	53.21						
130'	4	A	24.30	20.17	0.250	29.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.31	15.96	0.250	38.25						
		C	16.88	12.30	0.250	32.75						
		D	13.01	7.59	0.179	38.75						
135'	3	A	26.00	20.11	0.3750	42.09	36 x 33	31.50	2.00	6	2.25	90
		B	21.00	14.21	0.1875	48.48						
		C	15.00	7.85	0.1875	51.07						
135'	4	A	25.70	20.17	0.250	39.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.31	15.96	0.250	38.25						
		C	16.88	12.30	0.250	32.75						
		D	13.01	8.29	0.179	33.75						
140'	3	A	26.80	20.60	0.3750	44.29	36 x 33	31.50	2.00	6	2.25	90
		B	21.50	14.21	0.1875	52.05						
		C	15.00	7.95	0.1875	50.36						
140'	4	A	25.70	20.17	0.250	39.50	36 x 36	31.50	2.00	6	2.25	90
		B	21.31	15.96	0.250	38.25						
		C	16.88	12.30	0.250	32.75						
		D	13.01	7.59	0.179	38.75						

INDIANA DEPARTMENT OF TRANSPORTATION

HIGHWAY ILLUMINATION TOWER
POLE DATA SCHEDULE (2 of 2)
POLE HEIGHTS 160' - 200'
SEPTEMBER 2017

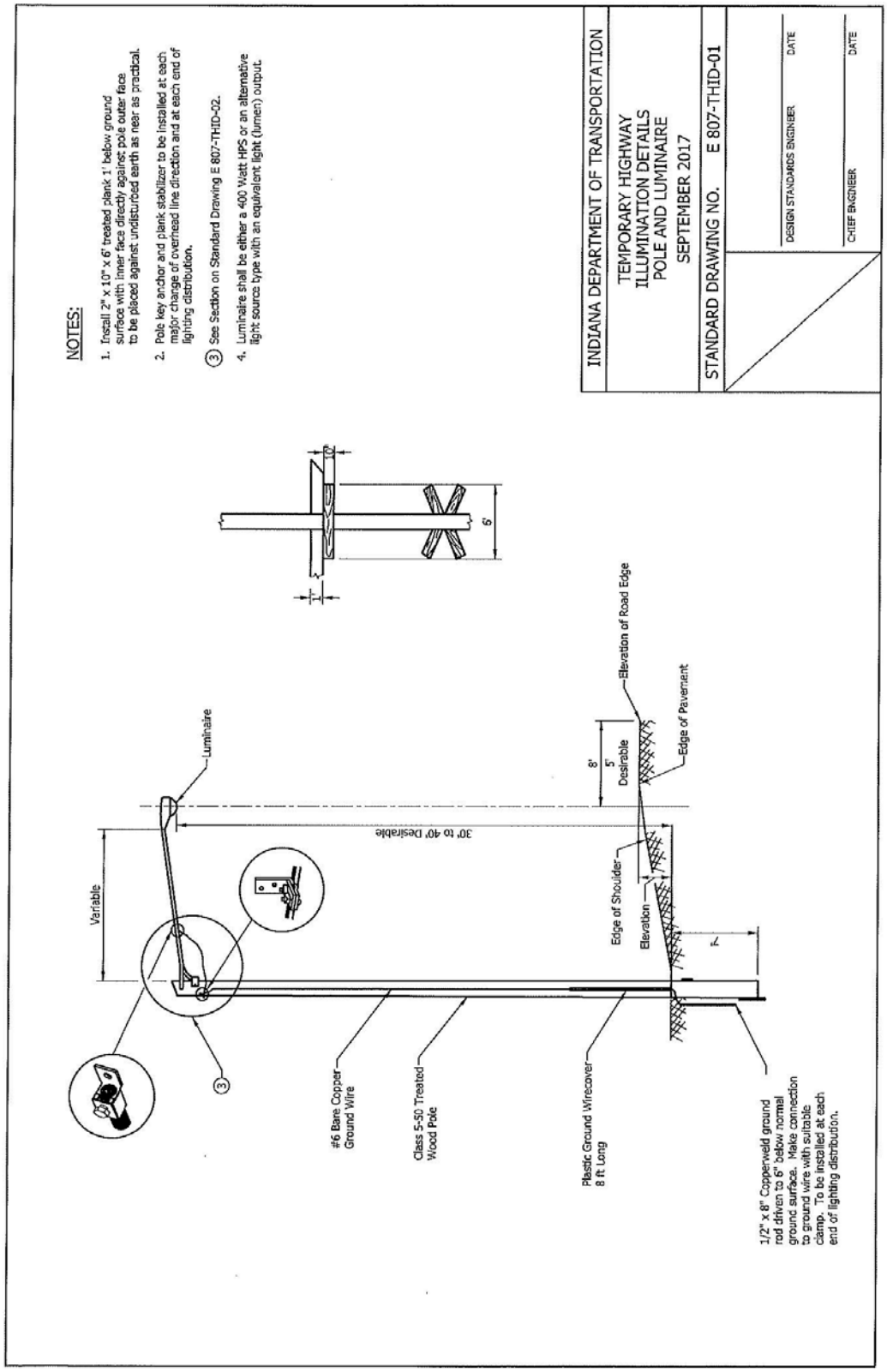
STANDARD DRAWING NO. E 807-LTHI-14

DESIGN STANDARDS ENGINEER DATE

CHIEF ENGINEER DATE

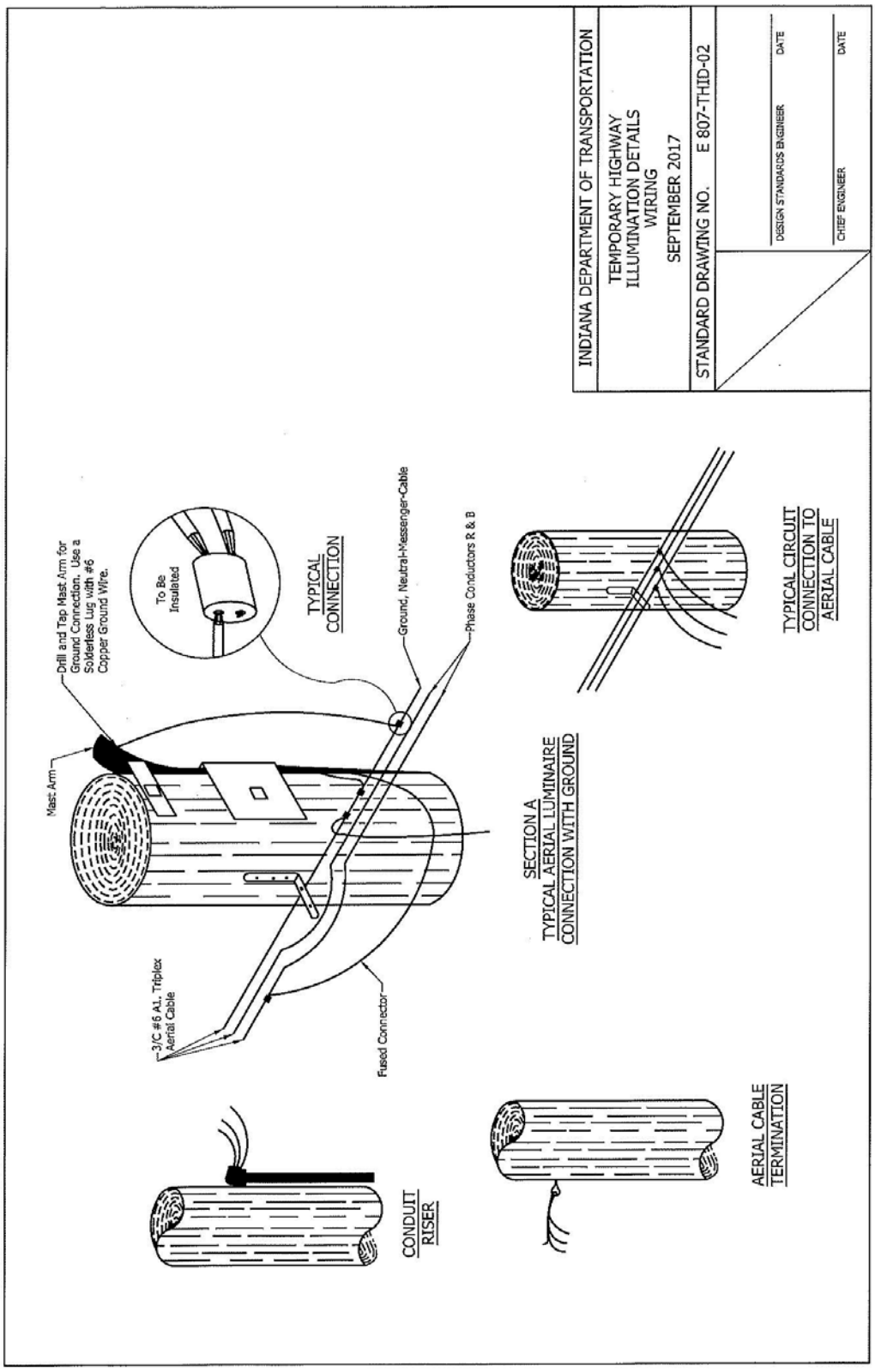
REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-THID-01 TEMPORARY HIGHWAY ILLUMINATION DETAILS POLE AND LUMINAIRE (PROPOSED NEW)



REVISION TO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS

807-THID-01 TEMPORARY HIGHWAY ILLUMINATION WIRING (PROPOSED NEW)



COMMENTS AND ACTION

920.01(b)4 LUMINAIRE RING ASSEMBLY
STANDARD DRAWINGS SERIES: 807-LTPD, 807-LTHI, 807-LTHM, AND 807-THID

DISCUSSION:
This item was introduced and presented by Mr. Boruff who stated that the 3/8 inch diameter of the suspension cables for high mast tower ring assemblies shown on standard drawing 807-LTHI-05 does not match current industry standards. Also, the breaking strength shown in 920.01.4 is incorrect. Mr. Boruff proposed to correct the diameter and strength of the cables as shown above. Mr. Boruff also proposed to combine standard drawings 807-LTHI, LTHM and LTPD into one series and add an option for a semi-trapezoidal retaining wall. Mr. Boruff further proposed to move standard drawings 807-LTHI-06 and 07 to the new series 807-THID drawings.

There was no further discussion and this item passed as submitted.

Motion: Mr. Boruff Second: Ms. Phillips Ayes: 9 Nays: 0 FHWA Approval: YES	Action: __X__ Passed as Submitted _____ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: SECTION 920.01 pg 1022. Recurring Special Provision affected: NONE Standard Drawing affected: (*SEE* PROPOSAL SHEET) Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	__X__ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: __X__ Standard Drawing Effective September 01, 2017 _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED:

Over the past few years INDOT has found many examples of poor tie bar placement along the longitudinal joint (i.e. too high, too low, near D-1 joint). Chairs/baskets are used in some situations, but it is not economically or logistically practical to require them exclusively in all applications. This matter was reviewed on 9/20/16 at the IACPA-INDOT working committee and industry acknowledged that there have been some poor practices utilized in the past involving hand placement or non-secure placement. The best practice is to require that tie bars for longitudinal joints only be placed by chairs or mechanical equipment.

PROPOSED SOLUTION:

Revise section 503.03(b) to eliminate the phrase “or other approved methods”.

APPLICABLE STANDARD SPECIFICATIONS: 503.03(b)

APPLICABLE STANDARD DRAWINGS: none

APPLICABLE DESIGN MANUAL SECTION: none

APPLICABLE SECTION OF GIFE: none

APPLICABLE RECURRING SPECIAL PROVISIONS: none

PAY ITEMS AFFECTED: none

APPLICABLE SUB-COMMITTEE ENDORSEMENT: This proposal was reviewed by the INDOT-IACPA working committee on 9/20/16.

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson

Title: State Materials Engineer

Organization: INDOT Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: 12-7-16

Mr. Beeson
Date: 01/19/17

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

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? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? N/A

Congestion/travel time? N/A

Ride quality? N/A

Will this proposal reduce operational costs or maintenance effort? No

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? Yes

Design process? N/A

Will this change provide the contractor more flexibility? No

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

Can this item improve/reduce the number of potential change orders? No

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: N/A

REVISION TO STANDARD SPECIFICATIONS

SECTION 503 - PCCP JOINTS
503.03(b) LONGITUDINAL JOINT

The Standard Specifications are revised as follows:

SECTION 503, BEGIN LINE 67, DELETE AS FOLLOWS:

(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 ft. Tie bars shall be placed by mechanical equipment in accordance with 508.04(a), or rigidly secured in place ~~by chairs, or other approved methods~~.

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. Joint sealing shall be in accordance with 503.05.

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

COMMENTS AND ACTION

503.03(b) LONGITUDINAL JOINT

DISCUSSION:
This item was introduced and presented by Mr. Prather, sitting in as proxy for Mr. Beeson, who explained the issues as shown on the proposal sheet and proposed to revise standard specification section 503.03(b) to eliminate the phrase “or other approved methods”.

A minor revision is as shown.

This provision will be utilized as a RSP until the publication of the 2018 SS book.

Motion: Mr. Prather (for Mr. Beeson) Second: Mr. Dave Ayes: 9 Nays: 0 FHWA Approval: YES	Action: ____ Passed as Submitted _X_ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: 503.03 pg 364. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_X_ 2018 Standard Specifications _____ Revise Pay Items List _X_ Create RSP (No.503-R-654) Effective May 01, 2017 Letting RSP Sunset Date: 2018 book _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED:

INDOT's current construction practice does not allow bridge approaches to be placed in a continuous pour with the bridge deck. This practice was formalized in construction memo 07-23, but has never been incorporated into the standard specifications.

PROPOSED SOLUTION:

Revise section 704.04 to clarify that bridge approaches cannot be placed in the same pour with the bridge deck.

APPLICABLE STANDARD SPECIFICATIONS: 704.04

APPLICABLE STANDARD DRAWINGS: none

APPLICABLE DESIGN MANUAL SECTION: none

APPLICABLE SECTION OF GIFE: none

APPLICABLE RECURRING SPECIAL PROVISIONS: none

PAY ITEMS AFFECTED: none

APPLICABLE SUB-COMMITTEE ENDORSEMENT: N/A

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson

Title: State Materials Engineer

Organization: INDOT Office of Materials Management

Phone Number: 317-610-7251 x 204

Date: 12/7/16

Mr. Beeson
Date: 01/19/17

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

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? No

Will this proposal improve:

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

Will this proposal reduce operational costs or maintenance effort? No

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? Yes
- Design process? N/A

Will this change provide the contractor more flexibility? No

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

Can this item improve/reduce the number of potential change orders? No

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: N/A

REVISION TO STANDARD SPECIFICATIONS

SECTION 704 - CONCRETE FLOOR SLABS
704.04 PLACING REINFORCEMENT AND CONCRETE

The Standard Specifications are revised as follows:

SECTION 704 BEGIN LINE 32, INSERT AS FOLLOWS:

704.04 Placing Reinforcement and Concrete

Applicable provisions of 703 shall apply to placing reinforcing bars. No concrete shall be placed until the reinforcement is entirely and securely in place and has been inspected and approved. Walkways shall be in accordance with 702.20(a). Placing of reinforcement during placing of concrete will not be allowed without prior written approval. Splices, when allowed, shall be at locations of least tension in the steel.

The concrete deck pour sequence and procedure shall be submitted for approval a minimum of 14 days prior to the planned deck pour. The submittal shall include the following information:

(a) the contract number;
(b) the Contractor's name;
(c) the bridge file number;
(d) the Contractor's proposed pour sequence;
(e) the Contractor' proposed pour rate;
(f) the approved concrete mix design; and
(g) the delivery time from the concrete batching location to the jobsite.

Bridge approaches shall not be poured continuous with deck pours ~~for structures with integral, semi-integral, or non-integral end bents unless specifically shown on the plans by the designer~~.

If, during the pour, the approved pour rate is not achieved, placement of transverse construction joints may be directed as shown on the plans. Placement of concrete shall be continuous between joints. Horizontal joints will not be allowed.

Floor drains shall be placed in gutters at locations shown on the plans and fastened securely before placing the surrounding concrete. The tops of the floor drains shall be no more than 1/2 in. below the adjacent gutter grade. The drains shall be constructed so drainage water is not discharged against portions of the structure.

Expansion joints shall be constructed as shown on the plans and the material shall be in accordance with 906.01.

COMMENTS AND ACTION

704.04 PLACING REINFORCEMENT AND CONCRETE

DISCUSSION:
Mr. Prather introduced this item stating that the Department's current construction practice does not allow bridge approaches to be placed in a continuous pour with the bridge deck. This practice was formalized in Construction Memo 07-23, but has never been incorporated into the standard specifications. Mr. Prather therefore recommends to revise 704.04 to clarify that bridge approaches cannot be placed in the same pour with the bridge deck, as shown above. Further explanation was provided by Mr. Hunter concerning why we do not want continuous pours at this time. Discussion ensued regarding when it is okay to pour the approach continuous with the bridge deck.
As a result, the language was revised as shown.

Mr. Prather revised his motion and this item passed as revised.

Motion: Mr. Prather Second: Ms. Phillips Ayes: 9 Nays: 0 FHWA Approval: YES	Action: ____ Passed as Submitted _X_ Passed as Revised __ __ Withdrawn
Standard Specifications Sections referenced and/or affected: 704.04 pg 554. Recurring Special Provision affected: NONE Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	_X_ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _TBD_ GIFE Update _____ SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Our microsurface specification requires the asphalt emulsion has as residue by distillation test in accordance with AASHTO T59. T59 assumes a temperature of 500F for non-polymer modified emulsions. Microsurface emulsion is polymer modified and we need to specify the distillation temperature of 350F so the polymers are not damaged.

It was also noticed that the design mix formula characteristic table language was slightly incorrect and redundant. The "integrity SB" test is labeled wrong and should be "compatibility classification" per the referenced TB-144. The "saturated abrasion compatibility" test is already incorporated in the previous TB-144 requirement.

PROPOSED SOLUTION: Edit RSP 411-R-432. Specify the distillation temperature of 350F for a polymer modified emulsion. Modify the language in the characteristics table.

APPLICABLE STANDARD SPECIFICATIONS: 411, 411-R-432

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Mike Prather, Larry Galehouse (Director, National Center for Pavement Preservation)

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson

Title: State Materials Engineer

Organization: INDOT

Phone Number: 317-610-7251 x204

Date: 01/03/17

Mr. Beeson
Date: 01/19/17

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIAL PROVISIONS

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? N
- Customer satisfaction? N
- Congestion/travel time? N
- Ride quality? N

Will this proposal reduce operational costs or maintenance effort? N

Will this item improve safety:

- For motorists? N
- For construction workers? N

Will this proposal improve quality for:

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

Will this change provide the contractor more flexibility? N

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

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? Y

Is this item editorial? N

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

REVISION TO SPECIAL PROVISIONS
411-R-635 WARRANTED MICRO-SURFACING

Basis for Use: "Required for all contracts with 411 pay items.")

411-R-635 WARRANTED MICRO-SURFACING

(Adopted 12-17-15)

The Standard Specifications are revised as follows:

SECTION 411, BEGIN LINE 28, DELETE AND INSERT AS FOLLOWS:

Characteristics	Test Method	Requirement
Residue by Distillation, % *(see Note 1)*	AASHTO T 59	62+
Softening Point, °F (°C)	AASHTO T 53	140+ (60+)
Viscosity @140°F (60°C)	AASHTO T 202	8000+
Elastic Recovery @ 77°F (25°C), %	AASHTO T 301	60
Note 1: The distillation temperature for this test shall be 350°F (175°C).		

SECTION 411, BEGIN LINE 60, DELETE AND INSERT AS FOLLOWS:

(i) results for the tests in the following:

Characteristic	Test Method ISSA*	Requirement
Wet Cohesion 30 minutes, min. (set time) 60 minutes, min. (traffic)	TB-139**	 12 kg-cm 20 kg-cm
Wet Stripping, min.	TB-114	> 90%
~~*Integrity SB*~~*Compatibility Classification*	*TB-144*	*11 pts min.*
Wet Track Abrasion Loss 60 minutes soak, max. *6 day soak, max.*	TB-100	 ~~536~~*538* g/sq m *807 g/sq m*
~~Saturated Abrasion Compatibility, max.~~	~~TB-144~~	~~3g loss~~
Mix Time @ 77°F (25°C)	TB-113**	controllable to 120 s
Mix Time @ 104°F (40°C)	TB-113**	controllable to 35 s
Excess Binder	*TB-109*	*538 g/sq m*
Deformation, max.	*TB-147*	*5%*

* International Slurry Surfacing Association

** The TB-139 (set time) and TB-113 (mix time) tests shall be checked at the highest temperature expected during construction. For the TB-113 test at 104°F (40°C), all ingredients and containers shall be preheated.

SECTION 411, BEGIN LINE 86, INSERT AS FOLLOWS:

411.06 Preparation of Surfaces

The Contractor shall be responsible for all surface preparation necessary to meet the performance requirements for warranted micro-surfacing. All castings and detector housings shall be protected prior to the application of material in accordance with 404.07, except that raised pavement markers shall be removed.

REVISION TO SPECIAL PROVISIONS

411-R-635 WARRANTED MICRO-SURFACING

Any existing durable pavement markings shall be removed in accordance with 808.10 prior to placement of warranted micro-surfacing.

Cracks in the pavement in excess of 1/4 in. shall be filled in accordance with 408 prior to placement of warranted micro-surfacing.

The pavement surface shall have tack coat applied in accordance with 406 prior to placement of warranted micro-surfacing.

COMMENTS AND ACTION

411-R-635 WARRANTED MICRO-SURFACING

DISCUSSION:
This item was introduced by Mr. Prather who stated that RSP 411-R-635 requires the asphalt emulsion to have a residue by distillation test in accordance with AASHTO T59, which assumes a temperature of 500°F for non-polymer modified emulsions. Microsurface emulsion is polymer modified and we need to specify the distillation temperature of 350°F so the polymers are not damaged. It was also noticed that the design mix formula characteristic table language was slightly incorrect and redundant.

Mr. Prather therefore requests to edit RSP 411-R-635 to specify the distillation temperature of 350°F for a polymer modified emulsion and revise the language in the characteristics table, as shown, and incorporate these revisions into the 2018 SS book only.

There was no further discussion and this item passed as submitted.

Motion: Mr. Prather Second: Mr. Dave Ayes: 9 Nays: 0 FHWA Approval: YES	Action: __X__ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections referenced and/or affected: 411.02 pg 315. Recurring Special Provision affected: 411-R-635 WARRANTED MICRO-SURFACING Standard Drawing affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	__X__ 2018 Standard Specifications _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ Create RPD (No. _____) Effective _____ Letting _____ GIFE Update _____ SiteManager Update