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Section 29:

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SECTION 29 – SHOP DRAWINGS, FALSEWORK PLANS, AND MSE WALL DESIGN

29.1 GENERAL

To make the review process more efficient, the Department encourages the Contractor to submit electronic copies of shop drawings and design calculations for approval in lieu of printed copies. Every submittal must include the contract number, Contractor's name, and the contact person with their contact information. All drawings and calculations must be submitted in the units used for the contract. Regardless of the submittal process described below, Contractors shall communicate directly with the PEMS to keep them informed of the status of submittals.

29.2 SHOP DRAWING AND FALSEWORK PLAN REVIEW *(rev. 03-26-26)*

29.2.1 LPA Contracts

For LPA contracts, the review of all shop drawings and other items listed in 29.2.3 of these instructions are the responsibility of the LPA or their designated representative. Contractors on LPA projects are to submit shop drawings and falsework plans as directed by the LPA. Questions about LPA procedures are to be directed to the District Local Projects Administrator.

a. Structural Members and Items

Shop drawings for structural members and components are to be submitted to the LPA or their designated representative for review and approval. Since the Department is responsible for fabrication inspection of structural members, upon completion of the shop drawing review, the LPA or their representative must forward an electronic copy of the approved shop drawings to the Department's Bridge Design section, at BridgeDesignOffice@indot.IN.gov.

b. Approval of Pile and Driving Equipment

The Contractor shall submit to the LPA or designated representative, a completed pile and driving equipment data form IC-740 at least 15 calendar days prior to driving piles. The EOR shall review the IC-740 form for acceptance. The IC-740 form is available on the Department's website at: https://erms12c.indot.in.gov/fcrdocuments/. The Contractor will be notified by the LPA or designated representative, of the acceptance of the proposed pile driving system within 15 calendar days of the receipt of the IC-740. Acceptance of pile and driving equipment does not relieve the Contractor of the responsibility to provide equipment suitable for driving the specified piling to the required bearing without damage. The LPA or designated representative shall notify GS, at geotech@indot.in.gov, and the PEMS of the acceptance of the proposed pile driving system.

29.2.2 Alternative Delivery Contracts: Design-Build (DB), Progressive Design-Build (PDB), and Construction Manager General Contractor (CMGC)

Responsibilities and procedures for shop drawing review and approval are typically described in the alternative delivery contract documents. If not described, the procedures or portions described in 29.2.3 of these instructions are to be followed.

Structural Members and Components
Once the shop drawings for structural members and components are approved by the responsible party designated in the contract documents, the Contractor must submit the drawings directly to Burgess & Niple, Inc. at shopplanreview@burgessniple.com for contract document management and archival within ERMS.

Depending on the alternative delivery contract documents, either the Department or the Contractor will be responsible for fabrication inspection of structural members and components. If inspection is the responsibility of the Department, the Contractor must email StructuralMemberQAInspection@indot.in.gov prior to shop drawing approval. This will ensure inspection services are coordinated and available, as fabrication cannot begin without them.

29.2.3 State Contracts
The following procedures have been implemented for submittal and review of shop drawings, falsework plans, and related items as described below. If the DO has any concerns about the structural integrity of any shop drawings submitted with a professional engineer's stamp, they should contact their CM FE for further assistance.

a. Structural Members and Items

Shop drawings for the following items are to be submitted by the fabricator or supplier directly to Burgess & Niple, Inc. for review and approval. Shop drawings must be in accordance with the applicable specifications. These items do not require a professional engineer's stamp for submittal. Any Request for Information (RFI) correspondence between the fabricator/supplier and EOR that occurred post bid must be submitted with the shop drawings.

- Structural steel and structural concrete members
- Modular expansion joints
- S-S joints
- Elastomeric bearings.

Shop drawings must include the following:

- Contract number with prefix
- DES/Project number and lead DES number
- Bridge file number
- County
- State
- Location description.

Shop drawings are to be sent to Burgess & Niple at shopplanreview@burgessniple.com. Their office phone number is (317) 237-2760. Burgess & Niple will send approved shop drawings to the Department's Bridge Design section at: BridgeDesignOffice@indot.IN.gov for distribution to the District Construction office.

b. Mechanically Stabilized Earth (MSE) Retaining Walls

Shop drawings and design calculations for MSE retaining walls must be stamped by a professional engineer and submitted by the Contractor electronically to GS at MSEWallShopDrawings@indot.in.gov and the EOR for review and approval. The contract number shall be part of the subject line.

The EOR, as part of review, must complete the MSE Wall Shop Drawing Review Checklist. An editable copy of the MSE Wall Shop Drawing Review Checklist is available from the Department's Editable Documents webpage, under Geotechnical.

The EOR will attach a cover letter and send a copy of approved shop drawings to the Contractor/submitter and to the District Construction office for further distribution.

c. Post Tensioning Systems

Shop drawings and design calculations are to be submitted by the Contractor for all post tensioned structural members and components. Shop drawings and design calculations must be stamped by a professional engineer and submitted to the PEMS by the Contractor. The PEMS will send the shop drawings and calculations directly to the EOR for review and approval and copy the Bridge Design section at BridgeDesignOffice@indot.IN.gov. The EOR will send approved shop drawings to the PEMS for distribution to the Contractor. Copy the Bridge Design section on the approval.

d. Sound Barrier Systems

Shop drawings and calculations for sound barrier systems are submitted by the Contractor or fabricator directly to the EOR for review and approval. The plans and calculations must be stamped by a professional engineer. The designer will attach a cover letter and send a copy of approved plans and calculations to the submitter and to the District Construction office for further distribution.

e. Precast Concrete Three-Sided Structures and Box Culverts

Shop drawings and design calculations must be in accordance with the applicable SS for three-sided and box structures.

Shop drawings and design calculations must be stamped by a professional engineer. Shop drawings for three-sided structures must include details to provide sufficient horizontal restraint (prior to backfill being placed) unless the design demonstrates such restraint is not required.

Plans and calculations are to be submitted by the Contractor to the PEMS. The PEMS will send the shop drawings directly to the EOR for review and approval. The EOR will send approved shop drawings to the PEMS for distribution to the Contractor.

For structures requiring load rating, the Contractor must copy the EOR on the submittal to the PEMS. The EOR must also submit a New Design request in the Load Rating Request Application (LRRA) through ITAP. The EOR must upload the shop drawings, load rating calculations, and load rating summary (*see* RPD 700-B-301d) with the New Design LRRA request. An automated email notification will be sent from LRRA to the EOR when the load rating review has been completed. If the EOR's review requires revisions to the shop drawings that affect the load rating, a resubmittal within LRRA is required.

f. Welded Wire Reinforcement

Shop drawings must be stamped by a professional engineer. Shop drawings and design calculations are to be submitted to the PEMS for locations where the Contractor proposes to substitute welded wire reinforcement in lieu of the reinforcing bars shown on the plans.

The PEMS must send the drawings and calculations directly to the EOR for review and approval and copy the Bridge Design section at BridgeDesignOffice@indot.IN.gov. The EOR will send approved shop drawings to the PEMS for distribution to the Contractor.

g. Traffic Items

Shop drawings for signing, signals, and lighting will be reviewed and approved by the Department's Traffic Design and Review Group. These items typically include all overhead sign structures, signal strain poles and cantilevers, high mast lighting, luminaries, and light poles. Plans and calculations must be submitted by the Contractor to the PEMS and forwarded to the Traffic Design Manager at TrafficDesignReview@indot.IN.gov for review and approval.

The Traffic Design Manager will distribute approved shop drawings to the PEMS for distribution to the Contractor.

h. Falsework and Cofferdam Drawings

Falsework plans for the following items are to be submitted to the PEMS. Each sheet must include the contract number, Contractor's name and must be stamped by a professional engineer.

- Cofferdams and Dikes
- Deck Falsework - temporary
- Coping falsework
- Falsework for reinforced concrete slab superstructures
- Falsework for hammerhead pier caps.

The PEMS will review drawings for compliance with the specifications and the specific job conditions only. Questions should be directed through the AE and District Construction office.

i. Temporary Bridges

Load rating is required for temporary bridges to ensure safety under live traffic loadings and accurate structural evaluation for oversize-overweight (OSOW) vehicle permits while the bridge is in use. For temporary bridges and other temporary structures open with total spans greater than or equal to 20 ft that will be open to traffic, the Contractor must submit a shop drawing package to the PEMS and the EOR that includes the following:

- Maintenance of Traffic plans
- Initial traffic phasing schedule
- Stamped Temporary Bridge shop drawings
- Stamped design calculations.

Once the EOR has reviewed the submittal and taken no exceptions, the EOR must forward the submittal to INDOT Load Rating at LoadRating@indot.IN.gov. All initial recipients should be included in the notification. Within 30 working days of notification, INDOT Load Rating will reply with final ratings. The PEMS will update INDOT Load Rating on exact dates for when the temporary bridge will be open to traffic and phase changes. To align with OSOW permit approval windows, these updates need to be made 14 calendar days ahead of each traffic change in the field. The PEMS, or other delegated district representative, will also update CARS entries as traffic phasing changes.

j. Permanent Metal Deck Forms

Shop drawings submitted by the Contractor must be stamped by a professional engineer. Shop drawings for permanent metal deck forms are to be submitted by the Contractor to the PEMS for review for compliance

with the SS and the specific job conditions only. CM maintains a deck form calculation spreadsheet that can assist in review of metal deck forms if concerns arise. Reference can be made to Section 5.9 of these instructions.

k. Foundation Seals and Deck Pour Sequences

Requests for use of foundation seals not shown on the plans are to be submitted to GS at geotech@indot.in.gov for review and approval. The submittal must include the contract number, Contractor's name and indicate the location and dimensions of the seal. GS will distribute approved requests.

Planned deck pour sequences are to be submitted by the Contractor to the PEMS. The PEMS must send the deck pour sequence directly to the EOR for review and approval and copy the Bridge Design section at BridgeDesignOffice@indot.IN.gov. The EOR will send approved shop drawings to the PEMS for distribution to the Contractor.

l. Approval of Pile and Driving Equipment

The Contractor shall submit a completed electronic pile and driving equipment data form (IC-740) at least 15 calendar days prior to driving piles to GS. A copy shall also be furnished to the PEMS. The IC-740 form is available on the Department's website at https://erms12c.indot.in.gov/fcrdocuments/. The Contractor will be notified of the acceptance of the proposed pile driving system within 15 calendar days of the receipt of the IC-740 form. Acceptance of pile and driving equipment does not relieve the Contractor of the responsibility to provide equipment suitable for driving the specified piling to the required bearing without damage.

m. Temporary Causeways (timber mat bridge, culverts)

Proposals for stream crossings, causeways, and work bridges for construction traffic are to be submitted to the PEMS, prior to construction, as part of the SWQCP or written site plan developed by the Contractor. The proposals will be reviewed and will be eligible for acceptance if found to be in compliance with the requirements of the Department's Design SWP3, the CSGP, and all applicable waterway permits. If the proposal varies from any of the contract's waterway permit conditions, the Contractor is required to submit a permit modification request to the PEMS. The request must include:

- The scope of the proposed changes to the permit
- The reason for the added impacts any avoidance or minimization that has been considered
- Contract plans marked with the location of all proposed changes.

Accepted modification requests will be forwarded to the appropriate regulatory agency by the Department's Office of Ecology, Waterway Permits, and Stormwater.

Work on the revised causeway details is not to progress until the approved permit modification request has been received and posted at the worksite.

n. Retaining Walls

Shop drawings and design calculations are to be submitted by the Contractor for all structural retaining walls and components including cast in place, precast concrete tee or bin walls, modular block, cut wall, and temporary wire faced MSE wall. Shop drawings and design calculations must be stamped by a professional engineer. Shop drawings and calculations are to be submitted by the Contractor to the PEMS. The PEMS must send the shop drawings and calculations directly to the EOR for review and approval and copy the Bridge Design section at BridgeDesignOffice@indot.IN.gov. The EOR will send approved shop drawings to the PEMS for distribution to the Contractor.

o. Miscellaneous

Shop drawing and design calculation submittals for miscellaneous items not covered by the above sections must be submitted thru the PEMS. The PEMS should work thru the District Construction office and CM to determine the approval process for these items.

29.3 MECHANICALLY REINFORCED EARTH (MSE) WALL INSTALLATION

29.3.1 Design Components

Internal, external, and compound stability design components are the responsibility of the Contractor. The Contractor shall submit working drawings and design calculations. The design factors used shall be current and acceptable to the Department. The design will be approved prior to the construction of the wall in accordance with 29.2.3 of these instructions. Questions on wall design information, including working drawings and design calculations should be directed to the EOR and to GS.

The top of the leveling pad elevation is required to be a minimum of 1.0 ft above the ordinary high water mark, OHWM, or groundwater table elevation, whichever is higher. The leveling pad dimensions are required to be 12 in. wide and 6 in. thick and shown on the shop drawings.

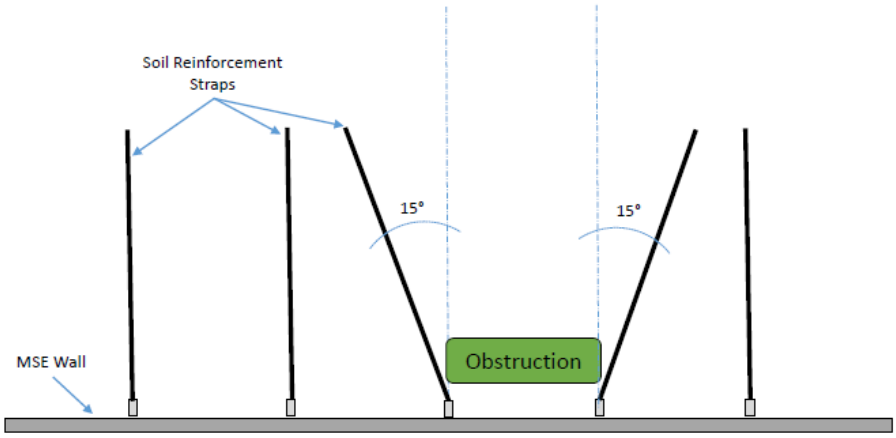
29.3.2 Reinforcing Straps

Reinforcement straps are required to be straight and level when placed. There should not be vertical gaps between the wall connection and the end of the ground reinforcement strap. Straps must be the correct length for the location.

Contractor supplied shop drawings and working drawings are required to be checked for

information concerning the ground reinforcement strap location, type, and length. Ground reinforcement is required to splay no more than 15° from a line perpendicular to the wall face (*see* diagram below). This angling of ground reinforcement is typically used to avoid obstructions, such as drainage structures, which may be located just inside the MSE wall structure.

Field changes to ground reinforcement to avoid obstructions should not be made unless shown on the approved drawings. The figure below illustrates the concept.



MSE Wall Plan View

Grading around and backfilling of the wall must be carefully inspected to ensure proper, uniform, and level lift placement. Improper grading around the wall can cause component failures. Careless placement and improper compaction methods used in constructing the backfill can cause undesirable wall deflections and reduce overall retaining capacity.

A comprehensive instructional presentation of MSE installation in located at https://www.in.gov/indot/doing-business-with-indot/files/MSEWall.pptx