



Chapter Twenty-three
PLAN DEVELOPMENT

BUREAU OF LOCAL ROADS AND STREETS MANUAL

Chapter Twenty-three
PLAN DEVELOPMENT - Federal Funds

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Chapter Twenty-three

PLAN DEVELOPMENT – Federal Funds

23-1 PLAN PREPARATION

The designer is responsible for preparing the plans so that they can be accurately constructed in the field. Chapter 23 discusses the procedures for plan preparation of federally funded projects.

23-1.01 Initiation

To properly prepare the plans, the designer must have a well defined scope of work. Section 11-1.01 discusses the required information and procedures for initiating a project.

23-1.02 Plan Types

Section 11-1.02 discusses the various plan types that are typically used to prepare a set of construction plans.

23-1.03 Plan Content

The designer should prepare the contract plans as simply as practical. Avoid the use of duplicated data and unnecessary cross-references. Section 11-1.03 presents guidelines for the various plan sheets used in the contract plans.

For State-let projects, include the contract number on each plan sheet.

23-1.04 Drafting Guidelines

See the *IDOT CADD Roadway Drafting Reference Guide* (CADD Manual) and Section 11-1.04 for a description on IDOT's drafting guidelines.

23-2 PLAN REVIEW

23-2.01 Preliminary Plan Review

This is the most appropriate design stage for IDOT and other agencies that may have a role in the project to conduct a major review of the plans. This also may include a plan-in-hand field review, if deemed necessary. The preliminary plan review will occur after the designer has essentially completed the plans including the Cover Sheet, Plan and Profile Sheets, Detail Sheets, Cross Section Sheets, determination of pay items, special provisions, etc. During this stage, the designer should address any utility conflicts and determine if adjustments and/or agreements are necessary. The purpose of the preliminary plan review is to ensure that the plans are compatible with the approved Project Development Report and are in conformance with the design criteria presented in this *Manual*, other IDOT and local agency documents, and are appropriate for the site. All major comments must be made during this review period. Section 11-2.01 discusses the information and procedures required for the preliminary plan review.

23-2.02 Pre-Final Plan Review

Pre-final plans should be considered as final plans for review. If there are no preliminary review comments, these plans may be finalized, sent to the district, and then forwarded to the Central BLRS and BDE for letting. Prior to this review, the designer should:

- incorporate and/or address all comments made during the preliminary plan review,
- set up a plan-in-hand field review, if necessary, and
- determine the cost participation arrangements (e.g., federal, State, and local shares). These cost breakdowns should be noted on the Summary of Quantities Sheet.

IDOT and other agencies should be given the opportunity to review the pre-final plans to ensure that:

- their comments from the preliminary plan review have been incorporated or addressed in the disposition memorandum,
- the changes to the preliminary draft do not conflict with their commitments, and
- the plans still conform to the design criteria.

23-2.03 Final Plan Review

The purpose of the final plan review is to ensure that the reviewer's comments from the pre-final plan review have been addressed. Revisions or changes should not be necessary. If changes are deemed necessary, the reviewer should contact the designer directly.

23-2.04 **Final Plan Approval and Release**

Section 11-2.04 details the final plan approval and release.

23-3 SPECIFICATIONS AND SPECIAL PROVISIONS

23-3.01 General

Section 11-3 provides guidance on:

- *IDOT Standard Specifications for Road and Bridge Construction* (IDOT Standard Specifications).
- Supplemental Specifications,
- Recurring Special Provisions,
- BDE Special Provisions,
- Guide Bridge Special Provisions,
- Contract Special Provisions,
- preparation of project specific Special Provisions,
- patented or proprietary items,
- guaranty/warranty clauses, and
- specifying material.

23-3.02 Experimental Projects or Features

When an experimental feature is included in a federally funded project, the local agency must prepare an Experimental Features Work Plan for approval by the Central Bureau of Materials and Physical Research (BMPR) according to Section 11-3.06. FHWA approval or concurrence must be obtained prior to the submission of the plans for approval. The Central BMPR or the appropriate Project Development Engineer from the Central BLRS will obtain approval or concurrence from FHWA.

23-4 HIGHWAY STANDARDS

The *IDOT Highways Standards* are developed by the Bureau of Design and Environment (BDE) in collaboration with other Bureaus, and are approved for general use by BDE. Districts and local agencies may submit ideas and details for the *IDOT Highways Standards* to BDE.

The *IDOT Highways Standards* provide details on various design elements that are consistent from project to project. They provide information on how to construct the various design elements. Design data and/or specifications are not included on the highways standards. The designer is responsible for providing a copy of the standard in the proposal for local-let projects.

If plans are prepared as Abbreviated Contract Plans (8.5 in x 11 in (216 mm x 279 mm) sheets), a copy of each standard shall be included in the proposal for local and State let projects.

23-5 QUANTITY ESTIMATES

In addition to preparing clear and concise plans, as described in Section 23-2 and Section 11-1, the designer must compile an accurate summary of the project quantities. This information leads directly to the Engineer's Estimate, which combines the computed quantities of work and the estimated unit bid prices. An accurate summary of quantities is critical to prospective contractors interested in submitting a bid on the project. Section 11-5 and Chapter 64 of the *BDE Manual* presents guidelines on calculating quantities for highway construction projects.

23-6 COST ESTIMATES

An estimate is the predicted project cost at the time of receipt of bids developed from a knowledge of cost of labor, materials, equipment, overhead, profit, and incidental items. See Section 11-6 for guidance on local let projects. The following guidance applies to State let projects. Individual cost estimates are to be prepared by both the local agency and the district for all State awarded and local day labor projects.

23-6.01 Local Agency Requirements

23-6.01(a) Project Estimates

Section 11-6.01 provides guidance on preparing project cost estimates.

23-6.01(b) Specialty Items

Certain items will require additional details. These items may include the following:

1. Estimates for Utility Adjustments. Prior to beginning work, a written agreement must be made between the local agency and utility defining the work responsibilities and estimate of cost. See Section 5-8 for guidance on preparing utility agreements and Section 41-11 for guidance on utility adjustments.
2. Cattle Passes. On projects involving the construction of cattle passes, the local agency is responsible for providing the following information:
 - the estimated cost of the stock passes,
 - estimated land value taken from the property owner plus any damages to the land not taken, if any,
 - the amount paid to the owner for the land, either in cash or other considerations, and
 - the estimated value to the traveling public because the stock crossing is underneath the roadway rather than at grade.

Because cattle passes are generally constructed as a right-of-way consideration, FHWA will not participate in their construction cost unless federal participation is involved in the acquisition of the right-of-way. If federal funds are not involved in the acquisition of right-of-way for cattle pass located on a waterway or natural channel for water, federal participation will be limited to the cost of a drainage structure sized for the anticipated runoff.

Where the improvement is on an existing road or street, the property owner will be responsible for the entire cost of the cattle pass. However, where the crossing is located on a waterway or natural channel for water, the owner will only be required to pay the additional cost required to increase the crossing beyond the cost of a drainage structure sized for the anticipated runoff. In special cases, the local agency may elect to join in the cost of the cattle crossing if it is more appropriate than an at-grade crossing. Where new or additional right-of-way is necessary, the value of the right-of-way can be considered as an offset on all or part of the cost.

3. Alternative Deliveries (Day Labor). On Federal-aid day labor projects, material proposals providing for the receipt of bids for a particular material for two or more alternative deliveries must have set forth therein unit price cost differentials for the purpose of determining the lowest bid favorable to the awarding authority.

This can be accomplished by predetermining and stipulating a certain unit price for unloading and a certain unit price for hauling the material in the material proposal. These unit prices, although estimated, should be as accurate as practical and be based on the best available estimate of cost for unloading and hauling.

23-6.01(c) Estimating Forms

Standard forms are available from each district for use by local agencies in preparing cost estimates for those pay items normally encountered during project construction (Form BDE-213). The information required to complete the forms can be obtained from the plans, material quotations, wage rates for the area, and the individual's knowledge of existing conditions.

23-6.02 IDOT Requirements

The local agency is required to prepare and transmit an "independent" estimate for the project to the district estimating engineer. The district estimator will review the local agency estimate and prepare a district estimate. This may be, but is not required to be, an independent estimate. If the district estimate is within 1% of the local agency's estimate, it will be entered into IDOT's Contract Management System (ECM). If the difference is greater than 1%, the district estimator will contact the local agency and negotiate an acceptable estimate for both parties. For guidance on IDOT's estimating procedures, see Chapter 65 of the *BDE Manual*.

23-7 PLANS, SPECIFICATIONS, AND ESTIMATES (PS&E) PROCESSING

23-7.01 PS&E Submittal

The local agency will submit PS&E for all improvements, including traffic signal and illumination improvements, to the district for review and approval. All highway plans must be sealed by an Illinois licensed professional engineer, which includes the licensee’s written signature, date of signing, and expiration date of the license. The plans must also be signed by an appropriate local agency official.

23-7.02 Approval of Bridge Plans

Bridge plans that are included in PS&E will be approved as follows:

1. Structural Engineer’s Seal, Signature, and Certification. The following applies to the requirements for a structural engineer’s seal, signature, and certification:
 - a. Plans Prepared by a Structural Engineer. For plans prepared by an Illinois licensed structural engineer, the seal of the structural engineer responsible for the design must be affixed to the plans. The plans must include the licensee’s written signature, date of signing, and expiration date of the license. The seal of a licensed professional engineer is not an acceptable substitute to the structural engineer’s seal.
 - b. Plans Prepared by the County Engineer (Non-Standard). The Engineer of Bridges and Structures will seal structure plans for counties, provided the plans have been prepared by a county engineer who is an Illinois licensed professional engineer. Sufficient time must be allowed for the review by the Bureau of Bridges and Structures (BBS). The county engineer will place the following statement on the General Plan and Elevation Sheet of the structure plans:

These plans were prepared by me or by a full-time member of my staff working under my personal supervision.

(P.E. Seal) Date: _____

Date of License
Expiration: _____

County Engineer
Illinois Licensed Professional Engineer #

If the design is found to be structurally adequate, the structural engineer’s seal of the Engineer of Bridges and Structures will then be affixed to the plans.

- c. Certified Bridge/Box Culvert Plans. Local agency simple span bridges, continuous span bridges, and multiple box culverts are considered structurally

adequate by IDOT when the plans are appropriately certified by an Illinois licensed structural engineer. These certified structures should follow the design, standard details, and guidelines shown in the *IDOT Bridge Manual* and other Manuals maintained by the Bureau of Bridges and Structures (BBS). Review by BBS for structural adequacy and economical design will still be required for structures of unusual or complicated design, or for structures involving a State highway.

Place the following certification on the first sheet of the bridge plans:

I certify that to the best of knowledge, information and belief, this bridge/box culvert design is structurally adequate for the design loading shown on the plans. The design is an economical one for the style of structure and complies with requirements of the current *AASHTO Standard Specifications for Highway Bridges*.

The designer's Illinois structural engineer seal, as well as the written signature, date of signing, and expiration date of the license must accompany the above certification. This certification does not limit the responsibilities of the designer under 225 ILCS 325.

- d. IDOT's Standard Bridge Plans. IDOT's standard bridge plans have been accepted as structurally adequate and do not normally require a structural engineer's seal or certification. However, when the standard plans have been altered (e.g., modification of the substructure for use with a standard superstructure plan), a structural engineer's seal and certification must be affixed to the individual plan sheets of the special design. The licensee's written signature, date of signing, and expiration date of the license must also be included.
- e. Foundations Review. A foundation review by the BBS Foundations Unit is performed for all structures using IDOT's Standard Bridge Plans, unless the local agency elects to have this review performed by an Illinois licensed structural engineer. The foundations review includes consideration of pile type, negative skin friction, seismic affects, liquefaction, settlement, and slope stability. In order to facilitate this review, submission of foundation borings must be included with the Preliminary Bridge and Hydraulic Report.

If, in order to expedite review, a local agency elects to employ an Illinois licensed structural engineer to perform the foundations review of the structure, the structural engineer must be identified at the time of the Preliminary Bridge Design and Hydraulic Report (Form BLR 10210) submission. The structural engineer should take into account the issues above that are normally included in the BBS Foundations Unit review. Place the following certification statement next to the structural seal, signature, and date on the Standard Plan GP&E sheet.

I certify these Standard Bridge Plans for foundation treatment only.

- f. Seismic Review. For multi-span bridges in Items 1.b. and 1.c., a complete seismic analysis is required to ensure adequacy of the substructure and of the superstructure to substructure connection under seismic forces. This review may be performed, by request, by BBS. The local agency may use a qualified Illinois licensed structural engineer to perform this review. If so, place the following certification statement next to the structural seal, signature, and date on the Standard Plan GP&E sheet:

I certify these Standard Bridge Plans for seismic adequacy.

If the structural engineer is sealing the Standard Plans for both seismic and foundations, use the following certification statement:

I certify these Standard Bridge Plans for seismic adequacy and foundation treatment.

2. Hydraulic Responsibility. The responsibility for hydraulic and hydrological analyses and the geometrics of a bridge/box culvert lies with an Illinois licensed professional engineer. Therefore, all structure plans (including certified and standard bridge plans) require a professional engineer's seal, signature, date of signing, and expiration date of the license. The local agency and the designer are responsible for ensuring that PS&E conform to the Division of Water Resources construction permit and the approved Preliminary Bridge Design and Hydraulic Report.
3. Modifications to Approved Submittals. Revisions to the structure type, loading, hydraulic opening, profile grade, geometry, or other pertinent items from those shown in the approved Preliminary Bridge Design and Hydraulic Report may require resubmittal and approval from BBS.

Certain modifications, left unapproved, may invalidate the previous permit or approval. The BBS Local Bridge Unit should be contacted to determine the materials necessary for resubmittal and approval.

4. Preliminary Bridge Design and Hydraulic Report (Form BLR 10210) Approval. After IDOT approval of form BLR 10210, the local agency will not be required to submit the design plans for review and approval except for the following situations:
- when the plans are to be signed and sealed by the Engineer of Bureau of Bridges and Structures, for local agencies who have prepared the plans using a non-structural engineer;
 - for complex, unique, or major bridges, and/or
 - for city streets over State highways.

23-7.03 Approval of Contract Plans

The district will review and approve the plans and specifications and the local agency's estimate without prices for all projects, excluding railroad crossing improvements. The Central BLRS will review and approve the PS&E documentation for all railroad crossing improvements.

Some structures require the approval of the Engineer of Bridges and Structures, see Section 23-7.02. For these structures, the local agency should submit the original mylar of the General Plan and Elevation (GP&E) Sheet only after the final plans and special provisions have been reviewed and approved by BBS, and the licensed professional structural engineer stamp and signature has been obtained.

The seal, certification, and signature of the Illinois licensed structural engineer that is responsible for the project must be provided on the GP&E sheet prior to submittal to IDOT. Additionally, provide a space approximately 4 in x 4 in (100 mm x 100 mm) on the GP&E sheet for BBS approval.

23-7.04 Approval of Traffic Signal Plans

District One will review and approve the traffic signal PS&E for projects on the State Highway System. For other districts, submit the respective traffic signal PS&E for local agency projects to the Central BLRS for review and concurrence by the Central Bureau of Operations. After the Central Bureaus have completed their reviews, the district will approve plans. The district may approve all project plans based on the previously approved traffic signal prints after the review by Central Bureau of Operations.

23-7.05 Approval of Lighting Plans

See Section 11-2.01(c) and Section 11-7.04.