

CONSULTANT QUALITY ASSURANCE/QUALITY CONTROL

The purpose of the quality assurance and quality control (QA/QC) procedure is to improve the quality of the structural designs, plans, and other deliverables. ITD Bridge Section requires consultants to complete a design, design check, and senior independent review on all submittals for all phases of the project including reports, plans, calculations, specifications, estimate, and other deliverables. The design, design check, and senior independent review shall each be completed by a different qualified individual. QA/QC activities shall be completed and documented prior to submitting to ITD for review.

Either the designer or checker shall be licensed as a professional engineer in Idaho. Both the design calculations and check calculations shall be submitted to ITD. The design calculations of record shall be stamped by a professional engineer in Idaho unless it was completed by a non-licensed engineer. If the design was completed by a non-licensed engineer, the check calculations shall be stamped by a professional engineer in Idaho and will become the design calculations of record. Independent calculations will be required unless a line by line check is approved by ITD.

Quality Assurance

Quality Assurance consists of the steps needed to verify quality and to document procedures were followed. This should be a defined set of procedures, with measurable and verifiable actions. The quality assurance manager or project manager will ensure the QA/QC procedures were followed, properly documented, and the documentation is submitted to ITD.

Quality Control

Quality Control consists of a complete design check and a separate senior independent review of the design, calculations, plans, specifications, reports, estimate, and other aspects of a submittal. Quality control should be thorough, appropriate to the project, and documented.

The primary purpose of the design check is to ensure that the design has not produced an unsafe or inadequate design through an error in mathematics, misunderstanding of the specifications, or other cause. Checking consists of a detailed verification of the design and details. This includes detailed checking of the design calculations, plans, quantities, reports, estimates, and specifications. The complete check shall be carried out by an engineer other than the engineer responsible for the design.

This design check shall be carried out by another consultant when the design consultant does not have adequate in-house capabilities to provide this check. If a non-licensed engineer performs design or checker duties, the corresponding designer or checker must be an experienced professional engineer in Idaho with at least 10 years of experience (unless approved by ITD Bridge Section) to ensure a safe, quality design.

The senior independent review consists of verifying general conformance of the design with project objectives. This includes general features of design, constructability, and presentation of the design. The senior independent review shall be carried out by a professional engineer separate than the individuals responsible for the design and design check. The senior independent review shall be carried out by another consultant when the design consultant does not have adequate in-house capabilities to provide this review. Unless approved by ITD Bridge Section, the senior independent reviewer must have a minimum of 15 years of bridge design experience and familiar with ITD Bridge design standards.

Responsibilities

Designer

The designer's primary responsibilities include but are not limited to:

- Preparing design criteria for inclusion in the front of the design calculations
- Determining the number and titles of plan sheets
- Obtaining roadway horizontal alignment, profile grade, and typical section
- Coordinating with the geotechnical engineer
- Developing the bridge concept and layout
- Completing the structural design
- Preparing complete and legible calculations
- Coordinating the plan sheet detailing
- Producing a complete set of plans and specifications
- Calculating the bridge bid item quantities

- Preparing the quantity and cost estimate, construction schedule CPD chart, and special provisions
- Load rating new/replacement bridges and bridge rehabilitation projects in accordance with the latest version of the AASHTO Manual for Bridge Evaluation and the ITD Manual for Bridge Evaluation.

Design Checker

The design checker's primary responsibilities include but are not limited to:

- Verifying the design theory and correct interpretation of the design code
- Confirming accuracy and completeness of the design calculations to confirm the structural adequacy of the components
- Verifying that the details are in agreement with the approved design calculations
- Completing an independent check of the geometric layout and all geometry. Checking conformance of grades, alignments, and other data between roadway and bridge plans.
- Checking the typical section for conformance to the roadway width and bridge railing curb-curb requirements.
- Checking the girder spacing and type, and slab thickness for conformance to the typical section and ITD standards
- Verifying the plans are clear, constructible, accurate, free of errors, meet the intent of the project, portray all required information necessary for construction, and are in accordance with ITD standards
- Verifying the accuracy and completeness of the load rating

Senior Independent Reviewer

The Senior Independent Reviewer's primary responsibilities include but are not limited to:

- Checking the bridge design and details against interfacing disciplines (e.g. roadway plans, drainage plans, hydraulic report/ design, geotechnical engineering report, etc.)
- Reviewing the plans for completeness, constructability, and agreement with ITD standards and practices
- Reviewing the reports, specifications, and estimate for completeness, consistency, and for agreement with ITD standards and practices
- Verifying that the bid items, bid item names, and quantities are consistent between the plans and estimate
- Reviewing the PS&E documents for completeness and for agreement with ITD standards and practices
- Reviewing the load rating for completeness and agreement with ITD standards and practices

Project Manager/Structures Lead

The Project Manager's or Structures Lead's responsibilities include but are not limited to:

- Coordinating with ITD Bridge
- Identifying tasks and planning order of work
- Developing and obtaining ITD Bridge concurrence of the design criteria before start of design
- Reviewing the Situation and Layout to assure that the most cost-effective and appropriate structure type is selected for a particular bridge site
- Monitoring the design and detailing process and providing guidance and assistance as required
- Determining the appropriate engineer for checking by considering the complexity of the structure and the skill of the designer
- Obtaining concurrence or approval from ITD Bridge whenever deviating from approved office standards and practices
- Informing ITD Bridge of any areas of the design that should receive special attention during review
- Facilitating resolution of major project design issues.

Revisions:

July 2009	Added new article.
Oct 2016	Changed Article number from 0.9 to 0.09.
May 2021	Added clarification to the QA/QC procedures and individual responsibilities