



CHAPTER V BRIDGE REPORTS AND LAYOUTS

SECTION 5-05

BRIDGE REHABILITATION AND MISCELLANEOUS STRUCTURES

5-05.1 GENERAL. Surveys for structures other than normal bridges are frequently required. Depending on the nature of the proposed construction, specialized data may be required in addition to the usual bridge survey data. Pre-survey planning is essential to assure that adequate survey data is obtained for the preparation of accurate structure plans. Seldom are existing elevations and dimensions the same as shown on original structure plans.

5-05.2 BRIDGE REHABILITATION SURVEYS. Bridge rehabilitation may include widening, redecking, lengthening, repairing or other work necessary to restore an existing bridge to serviceable condition. When bridge rehabilitation of any type is proposed, consideration should be given to total structure rehabilitation. Once the scope of the project is decided, the design form entitled "Checklist for Rehabilitation Work on Existing Bridges" must be completed and sent to GHQ Bridge along with any additional descriptions and photographs of deteriorated members. This will aid GHQ Bridge in recommending repairs and in estimating repair costs. The form "Checklist for Rehabilitation Work on Existing Bridges" can be found in the Bridge Forms category of the Design Forms on the computer system.

Significant historical bridges proposed for rehabilitation will need to have the proposed work coordinated with FHWA, SHPO, and ACHP. A Memorandum of Agreement (MOA) executed by MoDOT between these three agencies will be required. GHQ Design will coordinate this.

The following guidelines should assist in developing bridge rehabilitation survey reports for bridge widening and bridge deck replacement projects.

5-05.2 (1) BRIDGE WIDENING.

- Stationing at bridge ends and at the centerline of each intermediate substructure unit.
- Deck elevations at 10 ft. [2 m] intervals at the centerline and gutterlines. The centerline elevations may be omitted if high traffic volumes are present and would represent a hazard to survey personnel.
- Substructure bearing beam elevations at each end of each substructure unit.
- Groundline profiles at the centerline of the roadway and right and left at the approximate location of new footings.
- Details of existing geometrics and improvements.
- Profile of existing roadway for 100 ft.± [30 m±] from each end of the existing bridge.

5-05.2 (2) BRIDGE DECK REPLACEMENT

- Bottom of top flange elevations (for steel stringers) for each stringer at each substructure unit.
- Appropriate data from (1).

5-05.3 SURVEYS FOR MISCELLANEOUS STRUCTURES

5-05.3 (1) RETAINING WALLS. Surveys for all retaining walls shall be submitted to GHQ Bridge to determine design features. Sufficient geometric and profile information shall be included on the survey sheets to locate the proposed structure in relation to an adjacent roadway, including right of way and/or permanent easement information which might affect the location of the proposed retaining wall. Existing and proposed ground line profiles immediately in front of and behind the proposed retaining wall shall be part of the required survey. Cross-sections taken at 25 ft.± [10 m±] intervals showing existing and proposed sections and location of the proposed retaining wall with respect to the referenced roadway or right of way shall be included when submitting surveys for a retaining wall to be designed by GHQ Bridge.

Plans for mechanically stabilized earth walls, "L" type retaining walls and "cantilever" type retaining walls will be developed by GHQ Bridge. For L and cantilever type retaining walls 5 ft. [1.5 m] or less in height, GHQ Bridge will furnish typical design sections with reinforcing steel and joint details sufficient for development of remaining details by the district. Plans developed by the district shall include all plan views, elevations,

sections and quantities similar to a retaining wall designed by GHQ Bridge.

When the use of retaining walls along the shoulder line of roadways is required, either in the cut or fill sections, the same type of wall through the entire structure length is preferable rather than incorporating an "L" type at each end when height permits. In fill sections, a concrete safety barrier curb shall be provided and shall be tied into a concrete shoulder as a roadway item. In cut sections, a type B concrete traffic barrier shall be provided as a roadway item and placed against the retaining wall at the shoulder line. Provisions shall be made to attach standard bridge anchor section (thrie beam) to eliminate point obstacles where retaining walls end in cut or fill sections.

- 5-05.3 (1) (a) "L" TYPE RETAINING WALLS.** The "L" type takes its name from being shaped like the letter "L." The footing of the wall may be placed under the proposed fill or as part of a paved shoulder and may or may not have a concrete safety barrier curb for traffic safety. Walls greater than 5' [1.5 m] in height are to be identified by a bridge number, which can be acquired from the structural resource manager in GHQ Bridge.
- 5-05.3 (1) (b) "CANTILEVER" TYPE RETAINING WALLS.** This is a conventional reinforced concrete type wall supported by a spread footing or pile footing. "Cantilever" type walls greater than 5' [1.5 m] in height are to be identified by a bridge number which can be acquired from the structural resource manager in GHQ Bridge.
- 5-05.3 (1) (c) MECHANICALLY STABILIZED EARTH (MSE) WALL SYSTEMS.** Mechanically stabilized earth wall systems consist of a reinforced soil mass placed behind facing units. Types of MSE walls include small block and large block (panel). Information concerning the types, appropriate uses and design of MSE walls can be found in the [Bridge Manual Section 3.62.2](#). Contractors are responsible for performing the design of MSE walls. Only the wall systems shown in the bridge prequalified products listing will be available for use by the contractor. The bridge prequalified products listing is available through GHQ Bridge or on MoDOT's website.

Plans for MSE walls will be developed by GHQ Bridge. Under certain circumstances, the district may develop MSE wall plans. These plans are to be submitted to GHQ Bridge for review at least four (4) weeks before the PS&E date. Each MSE wall is to be identified by a bridge number which can be acquired from the structural resource manager in GHQ Bridge.

- 5-05.3 (2) OTHER MISCELLANEOUS STRUCTURES.** Elevations and geometric data sufficient to develop plans for the proposed structure, including special footings such as for high mast tower lights, should be provided. Any subsurface investigation required will be coordinated by GHQ Bridge. Right of way and/or permanent easement limits expected to affect the location or dimensions of the structure should be provided.
- 5-05.3 (3) GUIDELINES FOR THE DESIGN OF MISCELLANEOUS FOUNDATIONS.** Examples of miscellaneous foundations, other than bridges, requiring geotechnical surveys and specific design are sign trusses, high mast lighting, etc. The district should submit the following information to GHQ Bridge when a foundation design is required. Providing this information as outlined below, and in a timely manner, will allow GHQ Bridge to produce cost-efficient designs and details for structural foundations.

Foundation designs for tubular span supported highway signs will be designed as shown in the standard plans. Foundation designs for box trusses (i.e., aluminum, butterfly and cantilever, and structural steel) will be determined by GHQ Bridge relative to cost-effectiveness.

GHQ Design personnel will be available to serve as a liaison between the district and involved functional units.

- 5-05.3 (3) (a) TIME PERIOD.** GHQ Bridge will need 22 weeks to design any miscellaneous structure foundations and it is essential that all required information be submitted no later than 22 weeks prior to the due date. Within this 22 week timeframe, the Soils and Geology Section will need 10-12 weeks to perform the following:
- Put the geotechnical survey into the drilling schedule.

- Allow time for inclement weather conditions.
- Drill and sample the foundation materials.
- Perform strength and classification tests on the soil and rock encountered in the drilling operations.
- Interpret the geotechnical data and report findings and recommendations for the foundation design.

5-05.3 (3) (b) DISTRICT REQUEST. Unless a drilled shaft foundation is specifically requested by the district to be the only option considered, GHQ Bridge will choose the most cost-efficient foundation (spread footing or drilled shaft foundation). Value engineering proposals, after award of the project, for the foundation design will not be considered and will be stated as such in the Bridge special provisions.

5-05.3 (3) (c) LAYOUT. The district is to provide stationing and offsets for foundation locations to GHQ Bridge so that the miscellaneous foundation layouts can be sent to GHQ Project Operations with other structure layouts from GHQ Bridge. This procedure allows for surveying, utility marking and dispatching of drilling equipment and personnel in the most efficient manner.

5-05.3 (3) (d) GEOTECHNICAL REPORT TO GHQ BRIDGE. GHQ Project Operations will provide geotechnical parameters for design of the foundations to GHQ Bridge, with a copy to the district.

5-05.3 (3) (e) LOCATION AND SIGN INFORMATION LAYOUT. The district will provide detailed information about each structure. The information typically shown on the data sheet and the cross section for each structure in a set of roadway plans is necessary for the proposed foundation design computations. The quantity for footing and pedestal concrete, normally shown on the D-32, D-33, and D-34 truss data sheets, is not required with this submittal.

5-05.3 (3) (f) GHQ BRIDGE DESIGN INFORMATION SUBMITTAL. The district will receive foundation details, quantities and a cost estimate from GHQ Bridge to incorporate into the final project design.