

Structures Technical Approval Guidance Note

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1 Introduction

- 1.1 This Note is produced to provide guidance on the Technical Approval procedures to consultants and contractors conducting design and assessment of structures on or near the South Gloucestershire Council (SGC) network that may affect the highway.
- 1.2 The Note is to be read in conjunction with BD2/12 'Technical Approval of Highway Structures'.
- 1.3 The objectives of the Technical Approval procedures are to give increased assurance for the required construction, refurbishment or demolition so that the proposals are safe to implement, and that any new structures procured are serviceable in use, economic to build and maintain, comply with the objectives of sustainability, have due regard for the environment, and that they satisfactorily perform their intended functions. The TA procedures also ensure, as far as reasonably practicable, the highway users and any others who may be affected are protected from any adverse effects resulting from any work carried out to any Highway Structure, and that there is adequate provision for safety under all circumstances.
- 1.4 Technical Approval (TA) applies to all proposals, including private development, to construct, assess, modify, repair or demolish a structure within the highway boundary. It shall also be applied to proposals for structures that are outside the highway boundary, where either:
- The design, construction, maintenance or demolition of the structure may affect the highway, highway structure or the safety of the highway user including temporary works; or
 - The structure will be adopted by SGC.
- 1.5 South Gloucestershire Council (SGC) acts as the Technical Approval Authority (TAA) with the Structures Manager administering the process.
- 1.6 SGC adopts the Highways Agency Standards for the design, construction, maintenance and operation of highway structures, including the Design Manual for Roads and Bridges (DMRB), Manual of Contract Documents for Highway Works (MCHW) and other supplementary Standards for specific project requirements.
- 1.7 TA must be obtained from the TAA for all qualifying proposals prior to commencement of construction.
- 1.8 TA does not in any way modify or reduce the contractual and statutory responsibilities of any party for the work carried out, the legal responsibilities of professional engineers or confer any other approval of the proposals.

2 Technical Approval Requirements

- 2.1 The key to a successful adoption of a highway structure is early engagement between the TAA and the designer via the appropriate development control or estate roads officer.
- 2.2 Early consultation with the TAA is advisable so that structural form, design parameters, standards and level of technical approval can be agreed and abortive design work thus avoided.
- 2.3 Designers of new highway structural works shall make reference to South Gloucestershire Council specific TAA design requirements for new highway structures detailed in clauses 4.2 to 4.10 inclusive.
- 2.4 Unless agreed otherwise with the TAA, two sets of documents (AIP and Certificates) with original manuscript signatures shall be submitted.
- 2.5 Electronic documentation must also be submitted in PDF format. Any electronic report copy in PDF format submitted must be bound with all appendices in one PDF file.
- 2.6 Drawings forming part of submission proposals should be specific and relevant and clearly show the general arrangement and key dimensions of the proposed structure. The content of the general arrangement drawing is detailed in Appendix A.
- 2.7 For each proposal, a single organisation shall assume responsibility for the whole of each activity; the design, assessment, checking or construction compliance. Where sub-consultants or sub-contractors have been used to undertake the work, the lead consultant or contractor for the scheme is required to endorse the submission as if it were their own submission.

Proposal Category

- 2.8 The proposal shall be placed in one of four Categories: 0, 1, 2 or 3, according to criteria in BD2/12. These range from Category 0 for minor structures which conform in all aspects of design, assessment and construction to DMRB and MCHW Standards and contain no departures from Standards to Category 3 for larger complex structures which require sophisticated analysis, design or construction techniques or require departures from Standards.
- 2.9 The structure category dictates the level of technical approval and independent checking required.

Independent Checking

- 2.10 The majority of structures proposed for TA will fall into Category 0 or 1. In this case the complete design package requires a check by another engineer who can be from the same design or assessment team.
- 2.11 Structures in category 2 or 3 are subject to a more complicated checking regime which should be agreed by consultation with the TAA.

Departure from Standards

- 2.12 Circumstances may arise where it is not appropriate or practical to adhere to the standards in the DMRB. In these circumstances the details of the proposed Departures from Standards, together with reasons and justifications, shall be submitted to the TAA for consideration.
- 2.13 The reasons and justification for the Departures should be presented in the Approval in Principle (AIP) and the form contained in: Departures from Standards: Procedures for Local Highway Authorities published by the UK Roads Liaison Group.

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3 Technical Approval Procedure

The following technical approval procedure guidance notes shall be read in conjunction with the flow chart diagram illustrating the procedure contained in Appendix A.

Early Stage Consultation and Outline Proposal Submission

- 3.1 The proposal category shall be proposed by the designer according to the criteria described in BD2/12 for agreement by the TAA.
- 3.2 The category boundaries are not rigid and the TAA will assess each proposal on its merits, having regard to potential consequences of failure and design complexity.
- 3.3 Designers shall prepare a preliminary outline proposal for submission to the TAA which should include sufficient information to allow the TAA to agree the proposed proposal category.
- 3.4 The outline proposal submission shall typically take the form of information appended to email correspondence and shall include the following:
 - brief description of the proposed works;
 - location plan;
 - draft general arrangement drawing identifying key geometry pertaining to proposal categorisation;
 - preliminary geotechnical information;
 - preliminary risk assessment for the whole life of the structure, i.e. construction, operation, maintenance and demolition;
 - details of any potential departures from standards.
- 3.5 Proposals for modification works to existing highway structures may require the proposer to undertake load carrying capacity assessment of the existing structure in accordance with BD 21/01 'The Assessment of Highway Bridges and Structures'. The TAA shall advise if assessment is necessary as part of the early stage consultation process.

Approval in Principle Submissions for Category 1, 2 and 3 Structures

- 3.6 For structures in Category 1, 2 and 3, an Approval in Principle (AIP) is required to be submitted to the TAA for approval. The AIP submission shall be a record of all matters agreed at the outline proposal stage. Model AIP forms are to be found in Annex A of BD2/12.
- 3.7 The AIP shall provide sufficient information to demonstrate compliance with design requirements, and shall include as an appendix a Technical Approval Schedule (TAS) listing all relevant Standards and other documents proposed for use in the design. Notes for compiling the TAS are to be found in Annex B of BD2/12.
- 3.8 The AIP shall include as an appendix a complete and fully detailed general arrangement drawing.
- 3.9 The method of analysis and modelling of the structure or works is to be described in the AIP. An idealised structure diagram providing clarification on the proposed analysis shall be included as an appendix to the AIP.

- 3.10 The proposer must provide evidence that appropriate consultation has taken place with all relevant parties and that full and proper consideration has been given to the Construction (Design and Management) Regulations and the identification of risks and hazards which may affect the highway, highway structure or the safety of the highway user.
- 3.11 Potential risks and hazards during the whole life of the structure such as construction, operation, maintenance and demolition, shall be identified, assessed and considered, with a view of eliminating or minimising them as far as reasonably practicable.
- 3.12 BD2/12 specifies the required authority for the AIP signatories according to the type of document and stage of the process.
- 3.13 When satisfied with the Proposals, the TAA will sign off the AIP to confirm its agreement. The proposer should not proceed with any design or assessment work prior to receiving a signed copy of the AIP confirming TAA agreement.
- 3.14 Calculations should therefore not be submitted at AIP submission stage.
- 3.15 The endorsement of the AIP may be subject to conditions or amendments, which will be listed on a separate comments sheet by the TAA.
- 3.16 The TAA will require minimum 28 working days review period for each submission and each resubmission.

Category 0 Structure Submissions

- 3.17 Category 0 proposals do not require formal Approval in Principle submissions however technical approval shall only be granted by the TAA if all information specified in BD 2/12 is submitted with the completed Design and Check certificate.

Design, Assessment and Checking Certification

- 3.18 On completion of the detailed design or assessment, the proposer shall submit the appropriate design/check certificates to the TAA confirming that the design or assessment is accurate, has been checked and is fully in compliance with the requirements of the AIP.
- 3.19 Model certificates are contained in Appendix C of BD2/12. If the completed certificates consist of more than one page, each page should be identifiable by the name of the project and by the name and reference number of the structure and the date of preparation.
- 3.20 Category 0 and 1 structures require a combined Design/Assessment and Check Certificate.
- 3.21 Category 2 and 3 structures require separate Design/Assessment and Check Certificates.
- 3.22 For Category 2 and 3 structures where Structural Eurocodes are used, information on 'Choices and Options' required in accordance with IAN 124/11, should be attached to the certificate.
- 3.23 The Design/Check Certificates must have been endorsed as accepted by the TAA before construction will be allowed to commence.

Detailed Design Submission

- 3.24 The TAA request that a detailed design submission shall accompany the design, assessment and checking certification.
- 3.25 The detailed design submission shall include the following documentation:
- Detailed design construction drawings and schedules
 - Contract specific specification
 - Copy of the design or assessment calculations

The calculations do not form part of the approval process but can be a useful source of comments from the TAA to the designer or assessor.

Technical Approval

- 3.26 Technical Approval shall be deemed to have been granted following the acceptance of the Design and Check Certificate(s) drawings etc. by the TAA.
- 3.27 Copies of the endorsed Certificates will be sent to the relevant Project Managers or scheme proposer for record purposes and onward distribution as required.
- 3.28 The Designer / Contractor shall submit any revisions to design and drawings during construction for the TAA acceptance.

Construction Compliance Certificate

- 3.29 On completion of the Works the Construction Compliance Certificate shall be submitted for acceptance by the TAA confirming compliance with the AIP and the design as certified.

4 Design Requirements

- 4.1 The technical requirements for the design of highway structures shall generally comply with the relevant standards and advice notes in the DMRB, and relevant British or European Standards including Published Documents, Product Standards and Non- Contradictory Complementary Information (NCCI) and shall be constructed in accordance with the Specification for Highway Works (SHW) and Execution Standards. Other Standards, departures from Standards and methods of dealing with aspects not covered by Standard etc. shall be agreed with the TAA through the Technical Approval process.

South Gloucestershire Council TAA specific design requirements for new highway structures

- 4.2 Highway structures designed and constructed by South Gloucestershire County Council have common features that enhance durability and appearance. Structures proposed for adoption will be expected to incorporate these features.
- 4.3 Exposed concrete surfaces are to be clad with locally sourced stone masonry in a style approved by the TAA.
- 4.4 Retaining walls are to be designed as gravity structures and constructed in plain concrete. This form of construction will minimise maintenance and thus reduce the commuted sum payable on adoption. Gabion or crib wall solutions shall not be permitted.
- 4.5 Attenuation tanks shall be constructed from precast concrete boxes. Boxes to be minimum 1m high x 1m wide and to have access points every 30m and at every change in direction.
- 4.6 The minimum requirements for structural concrete shall be:
- Minimum strength class C32/40
 - Minimum cement content 325kg/m³ · Maximum aggregate size 20mm
 - Maximum free water cement ratio 0.45
- The minimum cover to reinforcement shall be 40mm, including pre-cast concrete elements.
- Only 1.2mm diameter stainless steel tie wire shall be used for tying reinforcement. All buried concrete services shall receive 2 coats of an approved below ground waterproofing system.
- 4.7 Proprietary metal parapet systems shall be aluminium.
- 4.8 Anti-theft (or anti-vandal) holding down bolts shall be provided at all vehicular and pedestrian parapet post locations. An anti-theft fixing shall be provided for each rail section.
- 4.9 Anti-climb mesh shall be provided on the face of post and rail type vehicular parapets where these are located adjacent to a footway. This mesh shall be attached in such a manner as to facilitate simple replacement.
- 4.10 All protective paint systems shall be designated for 'inland difficult access', with no maintenance up to 12 years, minor maintenance after 12 years and major maintenance after 20 years. The paint system colour adopted shall be Midnight Green XXXXX.

5 Construction

- 5.1 Construction shall not proceed until the technical approval procedure has been completed. The Proposer should be aware that South Gloucestershire Council may not adopt structures that have been constructed before the technical approval procedure has been completed.
- 5.2 During construction the TAA (South Gloucestershire Council Structures Team) will undertake site monitoring to ensure compliance with standards and the approved design.
- 5.3 The Proposer shall submit to the TAA a works programme.

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Appendix A

Composition of General Arrangement Drawings for Highway Structures

To ensure a common method of producing Bridge General Arrangement Drawings, the following guidance should be noted:

A1 General

- i. A general arrangement (GA) drawing(s) giving existing and proposed structure details should be provided.
- ii. Drawings should be fully dimensioned and to scale. Scales should be in accordance with those recommended in BS EN ISO 5455.
- iii. A1 size drawings should generally be provided. Due to the ease of electronic issue of drawings each drawing should be clearly marked with the original paper size to aid printing.
- iv. Details of statutory undertaker's apparatus in the vicinity of the site that may be affected by the works should be clearly marked on plan and section. Where there is a significant amount of apparatus a separate drawing may be required for clarity.

A2 Location Plan

This should be positioned adjacent the Title Block, clearly labelled and with a scale (preferably 1:2500 or 1:1250) smaller scales may be used with the agreement of the Project Sponsor.

It should include Northings, Eastings and North Point and contain sufficient information to locate the structure in proximity to local landmarks such as roads, rivers, buildings, boundaries, etc. Any boreholes should also be shown and labelled in their approximate positions (provided plan is of a suitable scale).

A3 Elevations – Scale 1:100 or 1:200

Where possible, this should be positioned to form the main focal point and be directly below the plan.

This elevation should be viewed in the direction of the road, rail or river under, and should comprise of the following:

- i. Abutments, Wingwalls, Bank Seats, Piers, Deck/Parapet Beams etc., all dimensioned to indicate the spans or length. Both square and skewed dimensions should be given.
- ii. The type and extent of the Road Restraint System should be shown, with any infill panels indicated and labelled. Details of any connections between different systems should be given.
- iii. If there is any street furniture, they should be shown.
- iv. The road and verges, etc. under the structure should be shown at the levels adjacent to the structure. Similarly, any embankments should be shown and the fall indicated.
- v. All hidden detail, such as foundations, should be clearly dotted to indicate the cover below finished ground and road levels.

- vi. If any major service pipework is known and is to be maintained in the road under, it should be indicated.
- vii. Any specific architectural details such as fins, brickwork, pavements, feature grooves, etc. should be clearly shown.
- viii. Any special requirements with regard to clearances should be indicated e.g. high load clearances for roads/navigation clearances for rivers.
- ix. River bridges and walls should have the mean water level shown and the datum for work measured above/below water.
- x. Proposed finishes for permanently exposed and buried surfaces.
- xi. Existing ground line.
- xii. Deck articulation.
- xiii. Abutment and pier foundation levels.
- xiv. Longitudinal fall.
- xv. Substructure drainage proposals.

A4 Plan on Structure – Scale 1:100 or 1:200

Care should be taken to ensure that the plan does not have too much dotted hidden detail of the road and fences under etc. The plan should be located at the top of the drawing and comprise the following information:

- i. A Setting Out Point (SOP), labelled with Northings and Eastings, from which all dimensions should emanate. Preferably, this should be located on the centre line of the structure and in the case of a bridge the centre of the bearings on either of the abutment shelves.
- ii. Dimensions should be shown from the SOP to any supporting piers, etc. shown dotted under, to confirm the true spans of the bridge.
- iii. The widths of the road over and extent of any kerbing should be clearly defined.
- iv. The parapet beam should also be clearly shown with the extent of the parapets.
- v. The outline of the abutment and wingwalls should be shown dotted as applicable and the outline of the foundations also shown dotted, in a finer line type if possible.
- vi. Any services, both existing and new, should be indicated and labelled.
- vii. North sign.
- viii. Arrows on carriageway giving directions, if over a watercourse direction of flow or direction of travel of trains.
- ix. Embankments adjacent to the structure.
- x. Location of the boreholes close to the structure.

- xi. The location of the fixed, free and guided bearings, where present, should be shown.
- xii. Location of street furniture (including stats cover, drainage, gullies, etc) if applicable.
- xiii. Skew angle.
- xiv. Position and type of deck joints, where present.
- xv. Clearance to faces of structure supports from edge of carriageway/tracks etc.
- xvi. Type and position of road restraint system and their clearance from the structures supports.

A5 Cross-Section through Structure Deck

This section is primarily used to indicate the width of the structure, its depth, and the location of the carriageway. It should also contain the following:

- i. Form of structure existing and/or proposed. (separate drawings may be required for both existing and proposed details)
- ii. Construction and profile of the carriageway and footway if present.
- iii. The widths and falls on the verges (if any) and their proximity in relation to the edge beams.
- iv. Complete Road Restraint System details.
- v. Services or ducts to be carried by the structure and position of any lighting columns.
- vi. Details of `drips` and asphalt tucks, etc. in the edge beam.
- vii. Parapet containment, heights and working widths.
- viii. Deck finishes including type of waterproofing, thickness of surfacing, height of kerbing, etc.
- ix. Forms of drainage proposed.

A6 Section through Abutments, Walls and Supports

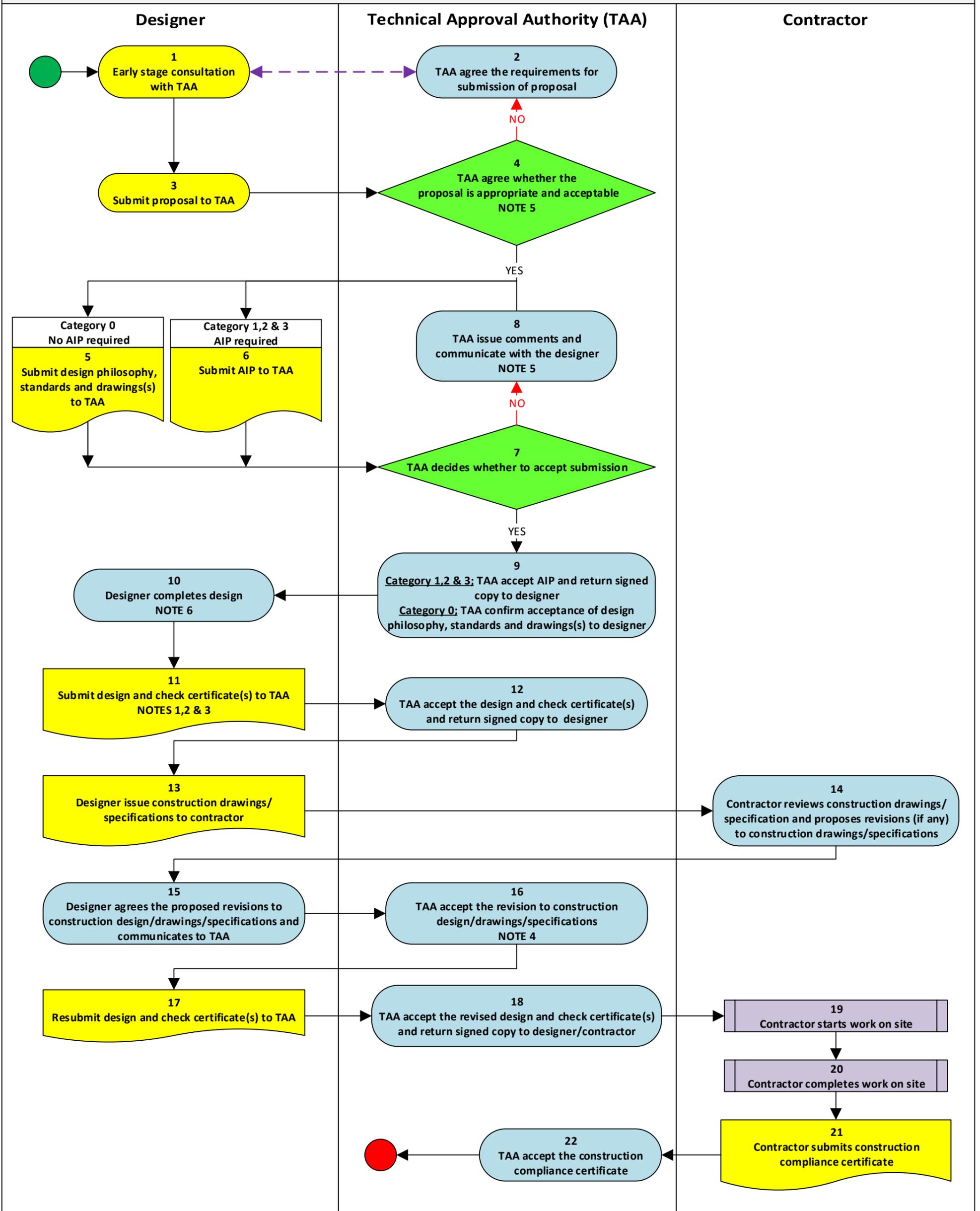
Primarily to indicate the size of the abutment, wall or support and the earthworks behind it. Section should include:

- i. Drainage holes and weep holes through the structure.
- ii. Waterproofing and drainage to rear of structure.
- iii. Earthworks behind structure.
- iv. Details of any observation chambers.
- v. Bearing plinths.
- vi. Proximity of the footings to the carriageway.

- vii. Fill definitions for measurement purposes.
- viii. Dimension of the carriageway from the support and its retained height if applicable.
- ix. Proposed impregnation to exposed concrete surfaces.

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TECHNICAL APPROVAL PROCEDURE



- NOTES:**
1. Category 0 & 1; Combined design and check certificate.
 2. Category 2 & 3; Separate certificates.
 3. Design philosophy, relevant standards and general arrangement drawing(s) to be included with category 0 design and check certificate.
 4. TAA may reject or ask to submit and addendum for the proposed changes to construction design/drawings/specifications.
 5. Each submission to TAA shall require a minimum 28 working day review period.
 6. Changes to design/additional information to be submitted throughout the design period.

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