



Structures Design Guide

Design guidance relating to
structures that support the highway

Revision 1 – August 2012

Transport, Waste and Environment Service

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1.0 Introduction

- 1.1 The topography of development sites in Cornwall often leads to situations where a structure, usually a retaining wall, is required to support the highway. In such cases the structure must be designed and constructed to the standards published by the Highways Agency and contained in the Design Manual for Roads and Bridges (DMRB). These are national standards that are widely adopted by local highway authorities of which Cornwall Council is one.
- 1.2 These standards apply equally to structures that support the highway that are:
- commissioned by private individuals as part of alterations to their property and
 - developer promoted structures which may be subject to agreements under Section 38 or 278 of the Highways Act 1980.
- 1.3 Where Section 38 or 278 agreements apply Cornwall Council (the Council) will seek to adopt structures that support the highway provided that they have been designed and constructed in accordance with the standards referred to in this guidance. In some situations, such as at the toe of a highway embankment, the Council will seek to adopt structures that may potentially affect support to the highway but are not subject to highway loading.

2.0 Technical Approval

- 2.1 In order to ensure that the appropriate standards are applied designers are required to follow the procedure contained in BD2/12 Technical Approval of Highway Structures. This standard requires the developer's design engineer to demonstrate and certify that reasonable professional skill and care has been used in the design and checking of the structure. Cornwall Council acts as the Technical Approval Authority (TAA) with the Structures Manager administering the process. Early consultation with the TAA is advisable so that design parameters, standards and the level of technical approval can be agreed thus avoiding abortive design work.
- 2.2 Technical Approval (TA) will generally be required for:
- bridges and culverts that carry the highway with a clear span or internal diameter greater than 0.9m
 - bridges that span over the highway
 - structures supporting the highway with a height of 1.5m and above
 - structures supporting land above the highway

- structures outside the highway boundary that are proposed for adoption by Cornwall Council.

The purpose is to ensure that all structures associated with the highway are safe, durable and, in the case of structures proposed for adoption, designed for minimum maintenance.

2.3 Section 167 of the Highways Act deals with retaining walls that are built within 3.7m (12 feet) of the highway and which retain more than 1.4m (4' 6") of soil. Walls in this category will be subject to Technical Approval although they will not normally be part of an adoption agreement.

2.4 The key to the successful adoption of a highway structure is early engagement between the TAA and the developer's design engineer via the appropriate development control or estates roads officer.

Structure Category

2.5 The proposed structure shall be placed into one of the four categories below which dictate the level of independent checking required. The category boundaries are not fixed and in cases of doubt the category is to be decided in consultation with the TAA having regard to the potential consequences of failure, design complexity and whole life costs.

Category 0

Minor structures that conform in all respects to DMRB and the Manual of Contract Documents for Highway Works (MCHW) and which also conform to one of the following:

- Single span simply supported structures with a span of less than 5m.
- Earth retaining structures with an effective height of less than 2m.
- Buried structures of less than 3m clear span/diameter and having more than 1m cover.
- Multi-cell buried structures, where the cumulative span is less than 5m, and having more than 1m cover.

The full list of Category 0 structures can be found in Chapter 3 of BD 2/12.

Category 1

Simple structures that can be analysed by statical methods and where all aspects of the design and construction are in accordance with DMRB and MCHW. For example:

- Structures with a single simply supported span of less than 20m and having less than 25° skew
- Buried concrete box and corrugated steel buried structures with less than 8m clear span.
- Earth retaining structures with an effective retained height of less than 7m.

The full list of Category 1 structures can be found in Chapter 3 of BD 2/12.

Category 2

Intermediate structures which have some degree of redundancy in the analysis and may contain Departures from Standards i.e. all those not within the parameters of categories 0, 1 and 3.

Category 3

Complex structures which require sophisticated analysis or with any one of the features referred to in Chapter 3.4.4 of BD 2/12.

Structural Design

- 2.6 In March 2010 Eurocodes became the principal codes for structural design for all publicly procured structures. Cornwall Council requires the design of all structures that support, or impinge in any way, upon the highway to be carried out to Eurocodes.

Departures from Standards

- 2.7 Circumstances may arise where it is not appropriate or practical to adhere to the standards in DMRB. In these circumstances the details of the proposed Departures from Standards, together with reasons and justification, shall be submitted to the TAA for consideration.
- 2.8 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.

Checking Procedure

- 2.9 The majority of structures proposed for Technical approval 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.

- 2.10 Structures in Category 2 or 3 are subject to a more complicated checking regime which should be agreed by consultation with the TAA.

Submission for Technical Approval

- 2.11 For Category 0 structures the Council requires a location plan, a complete and fully detailed General Arrangement drawing and a design and check certificate signed by appropriate engineers from the design organisation. Model certificates with explanatory notes are to be found in Annex C of BD 2/12.
- 2.12 For structures in Categories 1,2 and 3 an Approval in Principle (AIP) and Technical Approval Schedule (TAS) are required in addition to drawings and a Design and Check certificate. Model AIP and notes for compiling the TAS are to be found in Annex A and Annex B of BD 2/12.
- 2.13 A copy of the design calculations shall be submitted for all categories of structure. The calculations do not form part of the approval process but can be a useful source of comments from the TAA to the designer.
- 2.14 Highway structures designed and constructed by Cornwall Council have common features that enhance durability and appearance. Structures proposed for adoption will be expected to incorporate these features. For example and where appropriate:
- Exposed concrete surfaces are to be clad with locally sourced masonry in a style approved by the TAA.
 - 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.
- 2.15 Early consultation with the TAA over design standards, materials, finishes and other aspects of the proposal will facilitate the approval process and minimise abortive work.

3.0 Construction

- 3.1 Construction of any highway structure is not to commence until the AIP and the Design and Check Certificate have been signed by the TAA and returned to the design engineer.
- 3.2 Inspection by staff from the Council's Structures Group is required at various stages during construction. The first inspection will be of the finished excavation for foundations prior to any blinding concrete. The timing of further inspections is to be agreed with the

TAA. Two working days notice will be required for attendance to inspect.

- 3.3 On completion the structure will be subject to an Acceptance Inspection to identify any remaining defects that are to be rectified in the maintenance period. Details of the Acceptance Inspection are to be agreed with the TAA. A Construction Compliance Certificate is to be submitted to the TAA for acceptance. A model form of certificate can be found in Appendix C of BD2/12.

4.0 As Built Records

- 4.1 Where the project is notifiable to the HSE under the CDM Regulations construction records for the structure are to be included in the Health and Safety File. Guidance on the contents of the Health and Safety File can be found in: 'Managing Health and Safety in Construction' published by the HSE. The Health and Safety File will contain the documents referred to in Paragraph 22.
- 4.2 Where the project is not notifiable to the HSE the developer is to provide:
- The signed Approval in Principle document (if applicable)
 - The signed Design and Check certificate
 - The signed Construction Compliance certificate
 - Drawings including as a minimum: a location plan, General Arrangement and all construction drawings modified to show the structure as built.
- 4.3 Original signed copies of the AIP, Design and Check and Construction Compliance certificates are required. The format of copies of these documents and other as built records is to be agreed with the TAA.

5.0 Useful Links

Useful links:

Technical Approval Process:

[DMRB Volume 1 Section 1 Approval Procedures and General Design](#)

Departures from Standards

[Departures from Standards; Procedures for Local Highway Authorities](#)

As Built Records

[Managing health and safety in construction](#)

Structures Manager, Cornwall Council

[Highway Structures \(Bridges and Retaining Walls\)](#)

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