



This document is periodically revised to ensure compliance with the latest technical standards. Developers and/or their agent/s are advised to ensure that they use the latest revision of this documents before developing their detailed proposals.

HIGHWAY DESIGN GUIDE

Highway Structures

STRUCTURAL PROCEDURES

Procedure Guidelines

for the Design and Construction of Highway Structures requiring the consent of Highway Authority

November 2021

1.0 Introduction

- 1.1. Due to the significant design, safety, inspection and maintenance considerations associated with highway structures and their impact on highway users and the local communities, it is a strict requirement that Technical Approval procedures must be followed for the design and construction of all new or modified highway structures in compliance with the Department for Transport's Departmental Standard CG 300 - Technical Approval of Highway Structures. Technical Approval procedures also apply to proposal for structures outside the highway boundary where the design, construction, maintenance, or demolition of the structure may affect the highway structure or the safety of the highway user.
- 1.2. The Technical Approval Procedural requirements impose a discipline on the process that encourages good practice and is intended to reduce the possibility of errors affecting structural fitness for purpose. Most importantly however, the procedures minimise the possible risks to highway users and others who may be affected.
- 1.3. The Technical Approval Authority (TAA) for the purpose of approving new highway structures, modifications to existing highway structures or other liable structures shall be the Bridges and Structures Manager or their delegated representative in Kirklees Council.
- 1.4. The Technical Approval Procedures as described CG 300 require the proposer to consult the TAA at the earliest opportunity and submit outline proposals to enable the proposals to be placed in one of four categories, depending upon factors such as design complexity, potential consequences of failure and whole life costs, prior to submitting an Approval in Principle (AIP) to the TAA and to receive endorsement of the AIP before proceeding with any design work. Any detailed design work undertaken before the AIP is agreed by the TAA will be at the developer's risk. An AIP consideration fee will be payable for the technical approval.
- 1.5. Following the approval of the AIP and the completion of detailed design, the proposer shall be expected to submit a "Design and Check Certificate" in accordance with CG 300 for acceptance by the TAA, at least 2 weeks prior to the commencement of construction works on site.
- 1.6. Upon the completion of works on site the proposer will be required to submit a "Construction Compliance Certificate" in accordance with CG 300 certifying that the works have been implemented in compliance with the agreed AIP and the design.

2.0 Definition of a Highway Structure

2.1. Highway structures for the purpose of these guidelines are defined as:

Any structure built over or under the highway with a clear span or internal diameter greater than 0.9m. This includes bridges, culverts, footbridges, cycleway bridges, service bridges, tunnels, chambers, cellars, shafts, mine shafts caps, soakaways, surface water attenuation tanks/ pipes/ manholes/ access chambers (Refer to Drawing No SWAP/GA/21/01 for permitted size and arrangements), sign gantries, traffic signal mast arms and high mast lighting columns etc.

- a. Earth retaining structures such as retaining walls, burr walls, headwalls, basements and cellars etc. built in the highway, or otherwise potentially affecting the stability or safety of the highway with a minimum retained height of 1.35m at any cross-section.

(Note: the above is not intended to be an exhaustive list of highway structures liable to a formal technical approval, refer to CG 300 for further guidance)

- b. In the particular case of walls supporting land above the highway (Section 167 of the Highways Act), and which are within 3.66m (4 yards) of the highway boundary, then a minimum retained height exceeding 1.35m (4 feet 6 inches) shall be used for the purpose of these guidelines (see Figure 1).

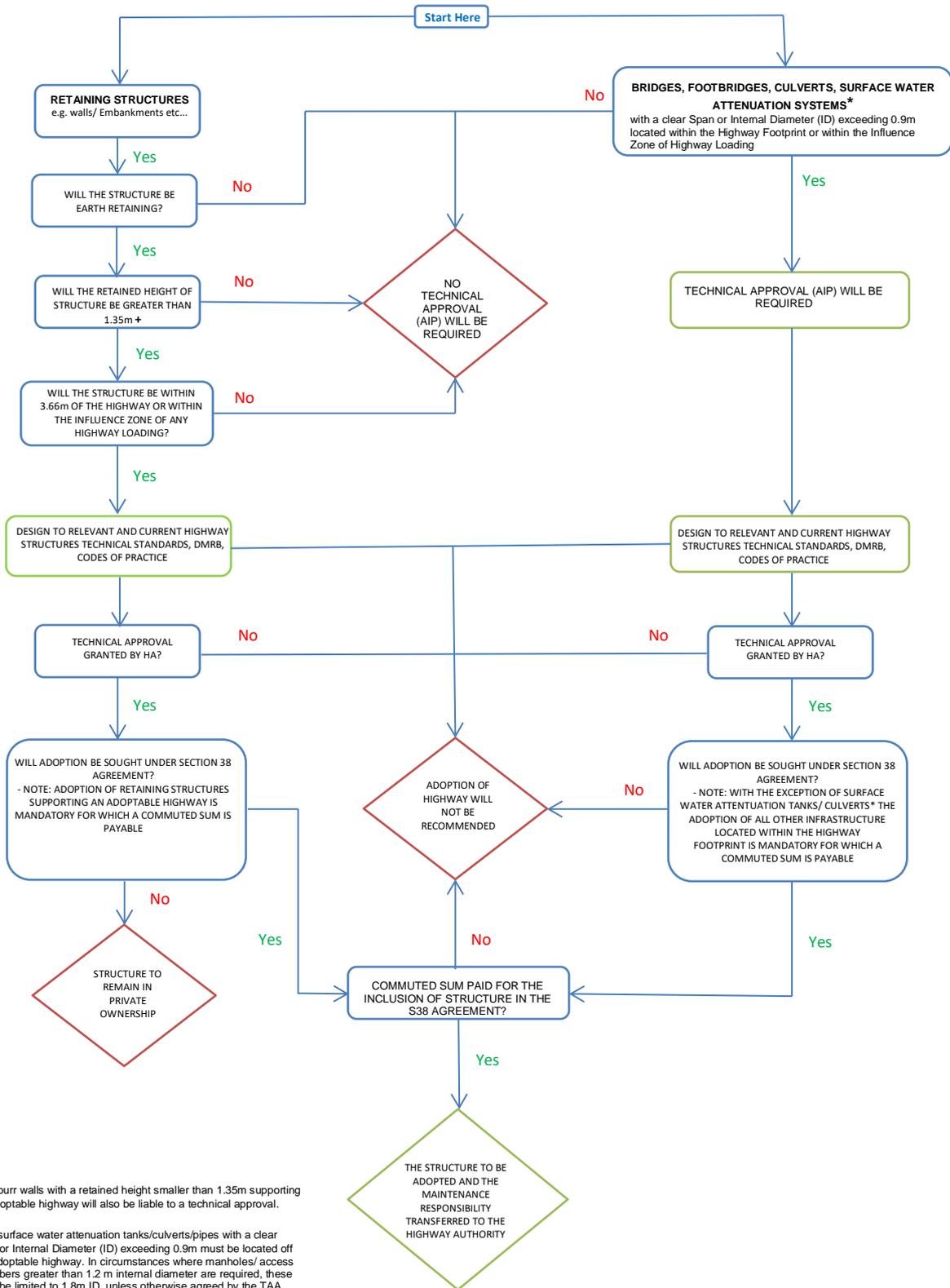
The definition of a 'highway' includes the carriageway, footway or verges adjacent to the structure which are maintainable at public expense, or for which the Developer is seeking adoption under Section 38 or 278 of the Highways Act 1980.

2.2. For clarity this Highway Authority uses the term "Retaining" wall for walls that support the land above the highway and "Burr" wall for walls supporting the highway itself.

3.0 Adoption Policy

- 3.1. In general, subject to compliance with the procedure defined in the Councils Adoption Policy document (See also Figure 1), the Highway Authority will only consider the adoption of highway structures defined in 2.1(a) and 2.1(b) which either carry an adopted highway or support an adopted highway. Any structure spanning over the highway will not be adopted unless the structure itself carries a highway, or forms an integral part of the highway, such as a footbridge or traffic sign gantry.
- 3.2. Retaining walls supporting private land adjacent to a public highway will not be adopted and as such these must be located outside the highway boundary.
- 3.3. Surface water attenuation tanks/ pipes/ manholes will not be adopted by the Highway Authority.
- 3.4. The Highway Authority will only adopt burr walls constructed to support the highway if an embankment is not practicable.
- 3.5. For new highway structures, a 3m horizontal easement strip adjacent to retaining structures and 5m horizontal easement strip adjacent to carrying structures will normally be required for the purpose of future maintenance/ reconstruction. This requirement also applies to proposals entailing the construction of new building/s adjacent to existing highway structures.
- 3.6. All structures earmarked for adoption must specifically be written into the Section 30, 38 or 278 Agreements and be clearly shown on the relevant adoption drawings.
- 3.7. When a highway structure is to be adopted, a commuted sum for future maintenance and renewal of the structure will be required by the Highway Authority.
- 3.8. Inspection and Maintenance Agreement for private structures including surface water attenuation systems, liable for technical approval, will be required by the Highway Authority.
- 3.9. Structures **will not** be adopted if the correct procedures have not been followed.

Figure 1: Highway Structures Liabile for Technical Approval



+ All burr walls with a retained height smaller than 1.35m supporting an adoptable highway will also be liable to a technical approval.

* All surface water attenuation tanks/culverts/pipes with a clear span or Internal Diameter (ID) exceeding 0.9m must be located off the adoptable highway. In circumstances where manholes/ access chambers greater than 1.2m internal diameter are required, these must be limited to 1.8m ID, unless otherwise agreed by the TAA. These will be classed as highway structures and be liable for a systematic inspection regime and therefore will have to be accompanied by a legally binding agreement from Yorkshire Water (adopting authority) in relation to their regular inspection by either YW or their agents in compliance with CS 450- Inspection of Highway Structures.

Notes:

1) Surface water attenuation systems comprising 1no pipe with an internal diameter not exceeding 0.9m will only be permitted subject to strict compliance with the configurations as shown on drawing no. SWAP/GA/21/01.

2) The requirement for simplified technical approval for oversize Precast Concrete Manholes and Components with internal diameter (ID) ≤ 3.0m is stated in the guidance below.

Simplified technical approval for oversize Precast Concrete Manholes and Components with internal diameter (ID) ≤ 3.0m

In order to mitigate the need for the submission of an Approval in Principle (AIP) for oversize precast concrete manholes with circular cover slabs with internal diameter **up to and including 3.0m**, for use in conjunction with surface water attenuation systems and mine shafts intended for installation in the highway, an additional simplification of the technical approval process will be possible subject to strict compliance with the following conditions:

- 1) Submission of a satisfactory “Design & Check Certificate” (Category 0) in compliance with CG 300- Technical Approval of Highway Structures to confirm that the design and specification of all oversize precast concrete manhole circular vertical units and cover slabs including all ancillary concrete products are in full compliance with **“BS EN 1917” & “BS 5911-3 +A1”**.
- 2) Confirmation of Design Chemical Class (DC-Class) of concrete in the precast concrete manhole circular vertical units and cover slabs including all ancillary concrete products for an intended working life of 100 years (min).
- 3) Proof that the precast concrete manhole shaft units, circular cover, reducing, landing and corbel slabs together with all other ancillary concrete units intended for installation in the highway are marked with **“BS EN 1917” & “BS 5911-3” R** to confirm that the products represent a manufacture’s declaration that their products meet the requirement of these standards. Photographic evidence will be needed as part of this requirement.
- 4) Cover slabs are installed with a minimum of 300 mm cover to finished levels to comply with National Specifications.
- 5) Submission of a satisfactory “Construction Compliance Certificate” in accordance with CG 300 - Technical Approval of Highway Structures upon the completion of works.

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4.0 Design Approval Procedure

4.1. Technical approval of all highway structures will be required in accordance with Department of Transport Standard CG 300 and the following:

- All structures including retaining walls with a minimum retained height of 1.35m shall be classified as at least Category 1 (see CG 300). The classification of retaining walls with a retained height less than 1.35m shall be subject to agreement but will normally be Category 0.

4.2. STAGE 1- Preliminary Design

Application for Approval in Principle (AIP) for each structure should be submitted electronically in draft form as early as possible in the design process. The AIP submission shall include:

- a. Location plan,
- b. General Arrangement drawing of the proposed structure.
- c. Site plan with appropriate cross-sections and long-sections.
- d. Completed AIP including all design parameters, loading, assumptions and method of analysis.
- e. Design statements on sustainability, buildability, durability environmental impact, whole life costing and compliance with the current Construction Design Management (CDM) Regulations 2015.
- f. Completed Technical Approval Schedule (TAS) in Appendix A of the AIP- highlight all relevant design codes and specifications to be used in conjunction with the design of proposed structure.
- g. Appropriate and relevant Site Investigation Report with site investigation information and suitable drawings as well as the completed relevant section in the AIP form.
- h. Specification
- i. Detailed Calculations and drawings are not normally required at this stage pending the conditional approval of the AIP (i.e. subject to the submission of satisfactory documents and certificates detailed in stages 2&3).

Following the approval of the AIP, any material changes to the proposals should be submitted for approval as an Addendum to the AIP in accordance with CG 300.

4.3. STAGE 2- Detailed Design

Following the successful completion of stage 1, additional documents in full compliance with the agreed AIP to be submitted shall include:

- a. A copy of checked structural design calculations including all assumptions and justifying all input data.
- b. Design and Check Certificates with original signatures
- c. Checked Construction Issue drawings and bar bending schedules (2 copies)
- d. The Specification Appendices if any, and a copy of the design calculations.

The above documents shall be submitted and accepted by the TAA prior to any works starting on site.

4.4. STAGE 3- Post Construction

Following the successful construction of agreed structure, additional documents to be submitted shall include:

- a. "Construction Compliance Certificate" in accordance with CG 300
- b. "As Built" Drawings
- c. Completed Health & Safety File
- d. A Maintenance Manual for the completed structure in compliance with CG 302 - "As Built, Operational and Maintenance Records for Highway Structures".

5.0 Design Requirements

- 5.1. All highway structures shall be designed in accordance with the latest relevant British Standards and Codes of Practice and the Standards in the Department of Transport (DoT) Design Manual for Roads and Bridges (DMRB). Where conflict arises DoT Design Standards and Advice Notes take precedence over British Standards and Codes of Practice.
- 5.2. All Highway structures including bridges, buried structures and retaining walls must be designed for a design working life of 120 years (min) in compliance with CD 350 - The design of highway structures.
- 5.3. Submission of an Approval in Principle document will not be required for walls with an effective retained height of less than 1.35m. However, the proposer shall still be expected to submit structural calculations and drawings for review and approval by the TAA.
- 5.4. Grouted cavity walls (sometimes referred to as reinforced masonry wall) where the reinforcement is placed in the middle of wall cavity, cannot be used to retain carriageways nor earthworks supporting carriageways.
- 5.5. All highway retaining walls must be located outside the influence zone of loading from adjacent buildings or other structures.
- 5.6. All highway burr walls shall be provided with an appropriate parapet to withstand vehicular impact/ pedestrian and wind loading in compliance with BS 6779 or the DfT "Guidance on the Design, Assessment and Strengthening of Masonry Parapets on Highway Structures". All highway retaining walls supporting private and above the highway will also need to be provided with a suitable pedestrian parapet 1.15m high (min) in accordance with BS 7818 and should the area be accessible to vehicles, the parapet will have to be upgraded to withstand vehicular impact, as stated above.
- 5.7. The minimum surcharge loading to be applied to walls (whether the wall retains the highway or not) shall be 10kN/m^2 plus the appropriate earth pressures. Retaining walls which support footways/ cycleway/private land and can be demonstrated to be inaccessible by vehicular traffic shall be designed using the appropriate earth pressures plus a surcharge of 5.0 KN/m^2 . A higher surcharge loading may be required if heavy vehicle loading is likely directly behind the wall. (BS 8002:2015 –Table 7).
- 5.8. The overall stability of an earth retaining structure should be verified in accordance with BS EN 1997-1:2004 + A1:2013, 9.7.2
- 5.9. The Ultimate limit state design of an earth retaining structure should conform to BS EN 1997-1:2004 + A1:2013, 2.4.7,9.2 and 9.7
- 5.10. In the global stability calculations passive resistance in front of the toe of the wall or any downstand (shear key) where the ground may be disturbed by future "unplanned excavation" shall not be permitted.

6.0 Specifications

- 6.1. Unless otherwise agreed, materials and workmanship shall be specified in accordance with the DoT Specification for Highway Works (SHW).
- 6.2. Reference to the SHW, or other specification if appropriate, shall be made on the drawings. Where materials and workmanship are not fully specified on the drawings, Specification Appendices shall be prepared by the designer and submitted for approval as described in paragraph 4.2.
- 6.3. The Specification Appendices shall include testing requirements. The minimum acceptable testing requirements shall be a) testing of backfill materials to ensure compliance with the specification and the assumed designed parameters, b) concrete test cubes and c) cover meter surveys of all concrete surfaces.
- 6.4. The Specification Appendices shall be issued to the contractor along with the final checked drawings.
- 6.5. Due to durability considerations all reinforced concrete structures shall have a specified minimum 28 days compressive cube strength of at least 40 N/mm².
- 6.6. All reinforcement in reinforced concrete structures shall be high yield reinforcement and have a min cover, as defined by an appropriate exposure class in accordance with BS 8500-1 for an intended working life of at least 100 years.
- 6.7. All buried reinforced concrete surfaces shall be treated with waterproofing membrane in compliance with Specification for Highway Works (SHW) 2 coats of tar or bituminous waterproofing is permitted for plain concrete surfaces.
- 6.8. All facing stonework shall be natural stone and conform to BS EN 1996-2 and tied to the structure using stainless steel wall ties.
- 6.9. All granular fill to rear of walls to be class 6N in accordance with SHW.
- 6.10. Unless agreed otherwise, all exposed concrete surfaces on structures to be adopted shall be treated with appropriate impregnation systems (e.g. hydrophobic impregnation) in compliance with CD 373- Impregnation of reinforced and prestressed concrete highway structures.
- 6.11. Unless the design allows for hydrostatic pressure, all retaining walls shall be provided with weep pipes and back of wall longitudinal drainage connected to a positive drainage system and with facilities for rodding.

7.0 Construction

- 7.1. The construction of agreed design for highway structures shall not commence until the TAA is in receipt of all relevant certified confirmation that construction issue drawings and specifications are accurate and fully compliant with the agreed AIP.
- 7.2. The Developer shall arrange for supervision of the construction of the works by a suitably qualified person to ensure that the structure is constructed in a safe manner and in accordance with the drawings and specification.
- 7.3. The Council's Bridges and Structures Manager and any person authorised by him/her shall be allowed access to the site at any time subject to compliance with the Contractor's site safety regulations.
- 7.4. The Developer shall afford the Council's Bridges and Structures Manager or delegated representative the opportunity to examine foundations and any work which is to be covered. A minimum notice period of 24 hours shall be provided and the examination will be carried out without unreasonable delay unless it is considered unnecessary when the Developer will be advised accordingly. Notice of concrete pours in reinforced concrete structures shall be not less than 48 hours.
- 7.5. Delivery tickets for all materials incorporated within the structure shall be retained for inspection and copies provided to the Council's Bridges and Structures Manager if requested.
- 7.6. The Developer shall arrange for testing of material to be carried out in accordance with the specification, at the Developer's expense.
- 7.7. Upon completion of the structure, the Developer shall request a final structural inspection which will be carried out by a representative of the Council's Bridges and Structures Manager. Access equipment shall be provided by the Developer, where necessary, to allow all areas of the structure to be inspected. The Developer will be provided with a list of outstanding works or remedial works identified during the inspection.
- 7.8. A Provisional Certificate in accordance with the Section 38 Agreement will not be issued for the structure and the associated highway until the outstanding and remedial works to the structure are completed.

8.0 As-Built Records

- 8.1. On completion of a highway structure which is to be adopted, the Developer shall provide the Highway Authority with a Maintenance Manual in accordance with CG 302- "As Built, Operational and Maintenance Records for Highway Structures".

The Maintenance Manual shall include as a minimum:

- Location plan showing the structure and road name
- "As Built" drawings and bar bending schedules
- Names and addresses of contractors, sub-contractors, materials and component suppliers etc
- Test certificates
- Health and Safety File

9.0 Completion Certificate

- 9.1. Approximately 11 months after issue of the Provisional Certificate, a representative of the Council's Bridges and Structures Manager will carry out an acceptance inspection of the structure. Access equipment shall be provided by the Developer, where necessary, to allow all areas of the structure to be inspected. The Developer will be provided with a list of remedial works identified during the inspection.
- 9.2. A Completion Certificate in accordance with the Section 38 Agreement will not be issued for the structure and associated highway until the remedial works to the structure have been satisfactorily completed and the corresponding Maintenance Manual has been received by the Highway Authority.

10.0 Further Information

10.1. If any further information or guidance is required, it can be obtained from the Council at the address given below. If in any doubt, developers are advised to contact the Council at an early stage to confirm that a proposal is acceptable.

Kirklees Council
Highways and Streetscene
Highways Structures Section
Flint Street, Fartown,
Huddersfield
HD1 6LG

Contact: - Mr Farhad Khatibi
Bridges and Structures Manager
Telephone number: 01484 221000
Email: farhad.khatibi@Kirklees.gov.uk