

Interim Advice Note No. 045/14

Road Gullies, Manhole Covers and Gully Tops Revision No. 0

ADVICE

This Interim Advice Note provides guidelines for Road Gullies, Manhole Covers and Gully Tops. This document must be read in conjunction with:

- Qatar Construction Specification (QCS) 2014
 - Section 6 - Road Works, Part 17 – Road Drainage

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Circulation:

Ashghal Departments, Contractors, Supervision Consultants, Design Consultants.

Application:

This Interim Advice Note (IAN) applies with immediate effect from the date of approval

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Rev	Date	Reason For Issue	Author	Chk	App

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INTERIM ADVICE FOR PWA PROJECTS ONLY

1. Foreword

- 1.1 Interim Advice Notes (IANs) may be issued by Ashghal from time to time. They define specific requirements for works on Ashghal projects only, subject to any specific implementation instructions contained within each IAN.
- 1.2 Whilst IANs shall be read in conjunction with the Qatar Highway Design Manual (QHDM), the Qatar Traffic Manual (QTM) and the Qatar Construction Specifications (QCS), and may incorporate amendments or additions to these documents, they are not official updates to the QHDM, QTM, QCS or any other standards.
- 1.3 Ashghal directs which IANs shall be applied to its projects on a case by case basis. Where it is agreed that the guidance contained within a particular IAN is not to be incorporated on a particular project (e.g. physical constraints make implementation prohibitive in terms of land use, cost impact or time delay), a departure from standard shall be applied for by the relevant Consultant / Contractor.
- 1.4 IANs are generally based on international standards and industry best practice and may include modifications to such standards in order to suit Qatar conditions. Their purpose is to fill gaps in existing Qatar standards where relevant guidance is missing and/or provide higher standards in line with current, international best practice.
- 1.5 The IANs specify Ashghal's requirements in the interim until such time as the current Qatar standards (such as QHDM, QTM, etc.) are updated. These requirements may be incorporated into future updates of the QHDM, QTM or QCS, however this cannot be guaranteed. Therefore, third parties who are not engaged on Ashghal projects make use of Ashghal IANs at their own risk.
- 1.6 All IANs are owned, controlled and updated as necessary by Ashghal. All technical queries relating to IANs should be directed to Ashghal's Manager of the Designs Department, Infrastructure Affairs.

Signed on behalf of the Designs Department:

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2. Ashghal Interim Advice Note (IAN) – Feedback Form

Ashghal's IANs represent the product of consideration of international standards and best practice against what would work most appropriately for Qatar. However, it is possible that not all issues have been considered, or that there are errors or inconsistencies in an IAN.

If you identify any such issues, it would be appreciated if you could let us know so that amendments can be incorporated into the next revision. Similarly, we would be pleased to receive any general comments you may wish to make. Please use the form below for noting any items that you wish to raise.

Please complete all fields necessary to identify the relevant item			
IAN title:			
IAN number:		Appendix letter:	
Page number:		Table number:	
Paragraph number:		Figure number:	
Description comment:			
Please continue on a separate sheet if required:			
Your name and contact details (optional):			
Name:		Telephone:	
Organisation:		Email:	
Position:		Address:	

Please email the completed form to:

Abdulla Ahin AA Mohd Manager of Designs Department Designs Department Public Works Authority aahin@ashghal.gov.qa
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We cannot acknowledge every response, but we thank you for contributions. Those contributions which bring new issues to our attention will ensure that the IANs will continue to assist in improving quality on Ashghal's infrastructure projects.

3. Introduction

3.1 This Interim Advice Note takes immediate effect and shall be read in conjunction with:

- Qatar Construction Specifications (QCS) 2014 and in particular:
 - Section 6 - Road Works, Part 17 – Road Drainage

4. Withdrawn / Amended Standard

4.1 This Interim Advice Note (IAN) shall take immediate effect and supersedes the following:

- The relevant subsections of Qatar Construction Specifications (QCS) 2014 and in particular:
 - Section 6 - Road Works, Part 17 – Road Drainage, clause 17.4 – Road Gullies
 - Section 6 - Road Works, Part 17 – Road Drainage, clause 17.5 – Manhole Covers and Gully Gratings

5. Implementation

5.1 This IAN shall be implemented with immediate effect on projects as follows:

- All Ashghal infrastructure projects in design stage,
- Relevant Ashghal Design & Build projects,
- All Ashghal infrastructure projects in tender stage.

5.2 Ashghal infrastructure projects in construction stage shall be reviewed by the Supervision Consultant and Contractor and the implications of adoption of this Interim Advice Note discussed with the respective Ashghal's Project Manager. This shall include an assessment on the current design to determine whether it complies with this Interim Advice Note and the practicalities of modifying the design and construction in order to achieve compliance.

5.3 The only exceptions are:

- Projects already in construction, where a significant portion of construction and procurement has already occurred and design modification would not be economic or practicable.

5.4 If in doubt, Consultants / Contractors should seek guidance from their respective Ashghal Project Manager or the Engineer on a scheme specific basis.

6. Disclaimer

This Interim Advice Note and its recommendations or directions have been provided for application on Ashghal's infrastructure projects within Qatar only and they are not warranted as suitable for use on other roads, highways or infrastructure with Qatar or elsewhere. Should any third party, consultant or contractor choose to adopt this Interim Advice Note for purposes other than Ashghal's infrastructure projects, they shall do so at their own risk.

7. Amendments to Qatar Construction Specifications (QCS) 2014

The following amendments are related to the Section 6 - Road Works, Part 17 – Road Drainage, Subsection 17.4 – Road Gullies and to Section 6 - Road Works, Part 17 – Road Drainage, Subsection 17.5 – Manhole Covers and Gully Gratings.

- Within Section 6 - Road Works, Part 17 – Road Drainage, clause 17.4 is replaced with the following:

17.4 ROAD GULLIES

1. *The type, position, dimensions and clear openings of gullies will be as designated on the drawings or in the project specifications.*
2. *Gullies shall be rated for D400 loading category.*
3. *Gullies shall be constructed so that no part of the spout or trap has a cross sectional area less than 2/3 that of the outlet pipe.*
4. *Precast concrete gullies shall comply with BS 5911 Part 6 and coated on all surfaces with two coats of solvent free epoxy paint with a minimum $(\bar{x} - 2\sigma)$ DFT of 250 μ m.*
5. *Gully tops shall be kerb type entry complying with EN 124 unless otherwise shown on the Contract Drawings.*
6. *Gully connections shall be a minimum 200mm diameter.*
7. *The pipeline connection between the gully and manhole having cover depth less than 1.2m from the final road surface shall be protected by bedding surround and backfilled with flowable concrete up to road formation level.*
8. *Where shown on the drawings, the remaining length of gully connections shall be bedded and surrounded with C20 SRC concrete with movement at the joints permitted by the insertion of compressible material which shall extend to the outside of the concrete surround.*

- Within Section 6 - Road Works, Part 17 – Road Drainage clause 17.5, is replaced with the following:

17.5 MANHOLE COVERS AND GULLY TOPS

17.5.1 General

1. *Products shall be designed, developed, and manufactured within an EN ISO 9001 quality, an EN ISO 14001 environmental and an EN ISO 45001 occupational health and safety management system, which has been assessed by an international organisation with accreditation to EN ISO 17021.*

2. All manholes covers and gully tops shall be Kite-marked or marked as certified conforming to EN 124-1 and EN 124-2 by an International accredited third-party assessment body for materials, design, performance and testing compliance with accreditation to EN ISO 17065. The mark shall be displayed on each cover.
3. EN 124-1 and EN 124-2 standards shall be referred to for the purposes of technical requirements, testing methods and frequencies for manhole covers and gully tops.
4. The products shall have been type tested by a third-party international testing organisation that has accreditation to EN ISO 17025 and EN 124 within its scope. The assessment shall be made by an organisation with accreditation to EN ISO 17065. The sampling plan shall be in accordance with ISO 2859.
5. Manhole covers and gully tops shall be manufactured from ductile cast iron grade EN-GJS-500-7 to EN 1563.
6. Covers, tops and frames shall be kept together as a supplied unit and interchangeability between covers and frames shall not be permitted. Covers and frames shall be supplied stacked on pallets and securely restrained to prevent movement and damage during handling.
7. Manhole covers in the road carriageway shall be located out of the wheel tracks of each lane, wherever possible.
8. Class E600 manhole covers shall be used where the manhole is located in a road carriageway with a posted speed limit above 80km/hr. Class D400 manhole covers shall be used where the posted speed limit is ≤ 80 km/hr and in hard shoulders, parking areas and other areas as designated on the drawings or project specification.

17.5.2 Manhole Covers and Frames

1. Manhole covers for sewerage, surface ground water and treated sewage effluent systems shall have the following words embossed in both English and Arabic:
 - (a) Sewerage: Drainage
Foul Sewer
 - (b) Surface ground water: Drainage
Surface Water
 - (c) Treated sewage effluent: Drainage
Treated Sewage Effluent
2. The size and coverage of the lettering and pattern shall be meet the skid resistance criteria of Clause 7.4 of EN 124-1.
3. All man-entry manhole covers shall be circular, hinged and lockable with a 700mm diameter clear opening. Maintenance access covers to chambers and shafts shall be as designated on the drawings or project specification.

4. *The manhole frames shall provide a minimum clear access opening of 700mm diameter and have a square frame bedding flange reinforced by ribs or trapezoidal gussets.*
5. *The minimum frame depth for D400 covers shall be 100mm and 150mm for E600 covers.*
6. *The minimum depth of insertion of manhole top and gully top of classes D400 and E600 shall be 50mm.*
7. *Frames weighing more than 15 kg shall be provided with lifting holes or hooking points located to permit a balanced horizontal lift and shall be marked accordingly.*
8. *The frame bearing area shall be designed to give a nominal bearing pressure, in relation to the test loads in EN 124, not exceed 2.1N/mm^2 . Frames shall have an overall minimum bedding width of 50mm of metal with enlarged corner seating areas and strengthening ribs and incorporate bedding mortar slots or holes. Ribs and gussets shall terminate a minimum of 25mm from the top of the frame. The bedding flange shall have a minimum thickness of 5mm.*
9. *Seating of manhole covers and gully tops within frames shall be manufactured in such a way as to ensure that long-term stability and quietness are achieved when trafficked. The contact surfaces between manhole covers and frames shall be machined to ensure quietness and stability in use. The machining shall also ensure that the raised pattern provided for skid resistance and marking of the cover is level with the top of the frame on all sides. Covers and frames shall be paired at the machining stage and kept together through to installation.*
10. *The vertical displacement of the cover Δh_k above the upper edge of the frame in Annex D Tilt Test shall not exceed 2mm.*
11. *Hinged manhole covers shall open to a minimum of 110° with safety blocking at 90° when closing and be removable from the frame at 90° . If the design incorporates a separate hinge pin, the pin shall be manufactured from 316L stainless steel. The hinge shall be designed such that the hinge pin or cast hinge stubs when closed will carry no traffic load. The cover shall incorporate a traffic direction arrow with the hinged side facing the direction of the traffic.*
12. *Locking mechanisms, springs, hinges, washers, locking pins and hooks shall be stainless steel Grade 316L. Bolted covers shall be secured by 316L stainless steel bolts and incorporate an anti-vibration and anti-rotation device. The mechanisms and bolts shall have a minimum in-service life of a minimum of 20 years.*
13. *Foundry Industry practice shall be applicable for weight variance and the cover weight variance shall not exceed 2% of nominal weight disclosed by the manufacturer at the approval stage.*

14. *The covers and frames on foul sewers shall incorporate a removable self-sealing GRP or similar corrosion resistant plate meeting the requirements of Part 7 of this Section. The plate shall fit between the cover and the frame such that no surface area of the frame shall be exposed to the atmosphere within the manhole. This shall be achieved by the inclusion of a neoprene sealing ring or by a similar approved method. The plate shall be complete with a lifting handle on the upper surface. The design of the frame, cover and plate shall be subject to the approval of the Engineer.*
15. *A heavy grease seal shall be formed in all cases between the cover and frame to prevent the ingress of sand and egress of insects.*
16. *The Contractor shall supply one pair of manhole keys and a manhole cover lifter with each 30 covers, with a minimum of one tool for each type of cover. Keys and manhole cover lifter shall be of an approved design to match the different cover configurations. Keyways in manhole covers shall be of the closed type.*

17.5.3 Gully Tops

1. *All top entry gully tops shall be D400, hinged and lockable.*
2. *The upper surface of top entry gully tops shall be flat except where otherwise designated. Slots in gratings or between gratings and frames shall not be orientated parallel to the direction of traffic, except where the slots are less than 170 mm long and between 16 to 32 mm wide.*
3. *The gully top shall incorporate a traffic direction arrow and the edge with the hinge facing the direction of the traffic.*
4. *Hinged gully tops shall open to a minimum of 110° with safety blocking at 90° and be removable from the frame at 90°. The hinge shall be designed such that no traffic load will be carried by the hinge pin or cast hinge stub when closed.*

17.5.4 Coating

1. *All castings shall be blast cleaned and coated on all surfaces with an epoxy primer and black solvent free epoxy paint finish with a minimum $(\bar{x} - 2\sigma)$ DFT of 300µm for Foul Sewer manholes and a minimum $(\bar{x} - 2\sigma)$ DFT of 200µm for Treated Sewage Effluent covers and Surface Ground Water manholes and gully tops.*
2. *Where the Manufacturer is offering a factory applied alternative paint or enamel finish and DFT, the Manufacturer shall demonstrate through long-term third-party testing by an international testing body with ultimate accreditation by IAF, that the offered coating provides an equivalent specification in terms of corrosion resistance, asset life and durability to the specified epoxy primer and paint finish.*
3. *The coating on Foul Water manhole covers and frames shall meet the requirements of QCS Section 08, Part 01, Clause 1.2.2 100 Day Acid Test.*

4. Prior to the coating process, the surface to be coated shall be substantially clean and free of oil, grease and moisture. The surface to be coated shall comply at least with the level Sa 2½ of EN ISO 8501-1. Blasted covers and frames shall only be handled with appropriate tools to prevent surface contamination.
5. The blasted surface of the covers and frames shall be checked using replica tape test method for measuring surface profile as per EN ISO 8503-5.
6. Coating shall meet the Table 17.2 requirements through testing by an ISO 17025 - accredited third-party testing body.

Test Name	Test Category	Requirement	Specification
40 days UV weathering test	Type Test	No rusting, discoloration and flaking. Non-porosity - Low voltage as required below. Adhesion pull-off as required below.	ISO 16474-3 (Method A Cycle 1)
40 days salt spray test	Type Test	Same as above	ISO 9227
100-days acid test (Foul Sewer only)	Type Test	No degradation and discoloration	QCS 08.01 1.2.2
Dry film thickness	Routine Test / 3No. per cover & 4No per frame	Minimum $(\bar{x} - 2\sigma) \geq 300\mu\text{m}$ (Foul Sewer) or Minimum $(\bar{x} - 2\sigma) \geq 200\mu\text{m}$ (Other) or as accepted in 17.5.4.2	ISO 2808-6A or ISO 19840
Adhesion pull-off	Routine Test / 1/100 Nos	Average $\geq 8\text{MPa}$ and Minimum single value $\geq 6\text{MPa}$	ISO 4624
Holiday detection	Routine Test / 1/10 Nos	To be non-porous	ISO 29601
Impact resistance (5N.m)	Routine Test / 1/Month	No visible cracks and / or peeling are observed in the coating. To remain non-porous after the test	ISO 6272-2

Table 17.2 Coating Tests by the Manufacturer

7. Any damage to the coating in transit and storage on site shall be repaired on site prior to installation in accordance with the coating Manufacturer's recommendations.

17.5.5 Installation

1. *Asphalt laying and road rolling equipment shall not be permitted to cross over the manhole covers, gully tops and frames.*
2. *The installation of all manhole covers and top entry gully grates and frames in the carriageway shall take place after the final compaction of the wearing course.*
3. *The opening in the manhole cover slab and top entry gully pot shall be temporarily steel plated while the basecourse and wearing course are laid and compacted. The asphalt shall then be neatly cut back to expose the temporary steel plate. Seating rings and the frame shall be installed and bedded on a ready-to-use fast-setting low shrink fibre reinforced filling mortar, with a tensile strength >5 Mpa at 3 hours and a compressive strength >25 Mpa at 3 hours. Final adjustment of the seating ring level shall take place and the frame bedded on the bedding material, ensuring no voids are trapped in the material, and tamped to the adjacent road level. The frame bedding flange shall not over-hang the inside or outside faces of the seating rings. An additional layer of bedding material shall be placed over the bedding flange ensuring that all holes are filled, to give a minimum thickness of 10mm over the flange.*
4. *The area around the frame shall be filled to no higher than 40mm of the finished road surface with the ready-to-use fast-setting low shrink fibre reinforced filling mortar mixed with 3/8 aggregate to form a micro concrete. The top surface of the micro-concrete shall be left rough to provide a key. When the bedding material and fill has hardened, cold joint sealer shall be applied to the asphalt edge and exposed frame and the remaining wearing course installed, taking care to ensure that no roller or compaction device comes into contact with the frame.*
5. *Installed manhole covers with rocking sound, improperly aligned top surface and / or damaged shall be rejected and replaced with a new cover and frame at the Contractor's expense, and to the satisfaction of the Engineer.*