

Materials and Specification

7.2 ~ Drainage...

Introduction

Efficient, well integrated and unobtrusive drainage design is an essential component of any high quality public realm scheme. When designing new public realm schemes it will be essential to work with the council's highway and drainage engineers and streetscene, in order to fully understand existing arrangements and the likely costs involved in making modifications.

General Principles

- All drainage must be designed and agreed with the council highways department and streetscene. In particular the size and locations of gullies need to be discussed and agreed with the council.
- Consideration must be given as to whether the existing main sewer network can cope with additional drainage connections from the public realm.
- All pipe work must be vitrified clay. Plastic pipes must not be used.
- Minimum pipe gradients must be 1:60.
- Trapped gullies should always be used where the connection is onto a sewer or drain (to stop gullies smelling). Trapped gullies should be used in all other instances unless there is insufficient depth.

Where the depth is insufficient, catch pit or chute gullies can be used, as long as they are not connected to another catch pit. Chute gullies should not be installed in areas at risk of flooding or areas that experience excessive leaf fall.

- If a new gully is located more than 4-5 metres from the existing drainage system, then a new connection should be made direct to the sewer system (it is essential the council's highway engineers are consulted). Where the distance is less than 4-5 metres, the new pipe should be connected to the existing with a 'Y' pipe connection, rather than directly into the gully pot.
- If the gully is to connect onto a sewer the drainage authority needs to give consent as well as the highway engineer. If the connection is onto a highway drain (uncommon in the city centre) then consent is only required from the highway engineer.

- Gully gratings should be placed directly over the gully pot so that access for cleansing and maintenance is possible.
- For further information on the design and specification of gullies and other drainage details see Cheshire West and Chester's highway engineers' standard details (drawing numbers: Chester 38 – 56 and 58-62).
- Consideration should be given to the use of sustainable urban drainage techniques in order to reduce surface water run-off.



slotted drainage channel, outside station in Chester

Drainage of footways:

Traditional kerb and point drainage

- The general aim should be to drain water from footways onto carriageways or areas of soft landscape, using a minimum gradient of 1:60. The principle of draining onto carriageways can be successfully employed in all instances where a traditional kerb upstand is used, which will guide the water to road gullies.

Linear Drainage System

- In situations where a flush carriageway is proposed or in the drainage of larger pedestrianised areas the preference is for a fluted channel to be used to convey run off to a gully set into the line of the channel. Where it is considered that a fluted channel does not have the capacity needed, a wider flush channel (slightly recessed) should be used. For accessibility reasons dished channels should not be used.

- Fluted or flush channels should be specified to match the quality of the surrounding surface materials.
- Generally, gullies located in footways should have galvanised steel flush grates with fixed hinges. Grates must be specified that are suitable for anticipated vehicle loading. In order to be DDA compliant slots within the grate should be no wider than 13mm and the grate should be orientated to be at right angles to the main pedestrian flow.
- Gully locations must be located at suitable intervals to meet capacity and maintenance requirements. Gullies should not be located at points where the carrying out of maintenance operations might be considered unsafe or where street closures might be required (locations should be agreed with the council's highway maintenance and streetscene departments).
- Further information on gully products suitable for use in Chester is provided in the table overleaf. The Aquaslot DPB 1 block infill point drainage offers an alternative to a traditional gully and could be used in conjunction with fluted/flush channel where there are concerns regarding aesthetics and accessibility.
- Ideally all building down pipes should continue into the ground and connect with the existing drainage system (which will require the building owner's permission), or otherwise drain directly into a square gully. Where this is not possible a fluted channel should be used that runs across the footway and drains into the carriageway or main drainage channel (see illustration opposite).

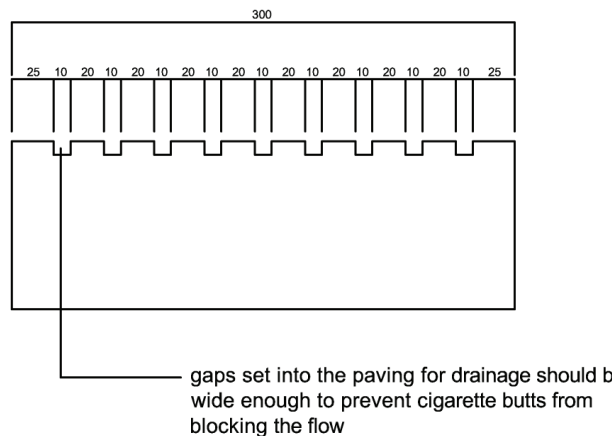
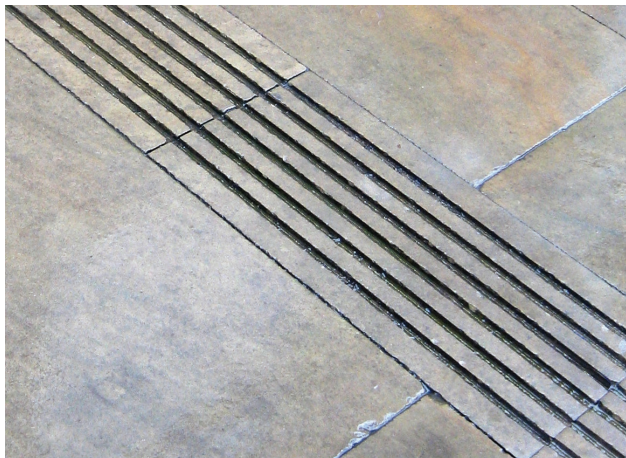
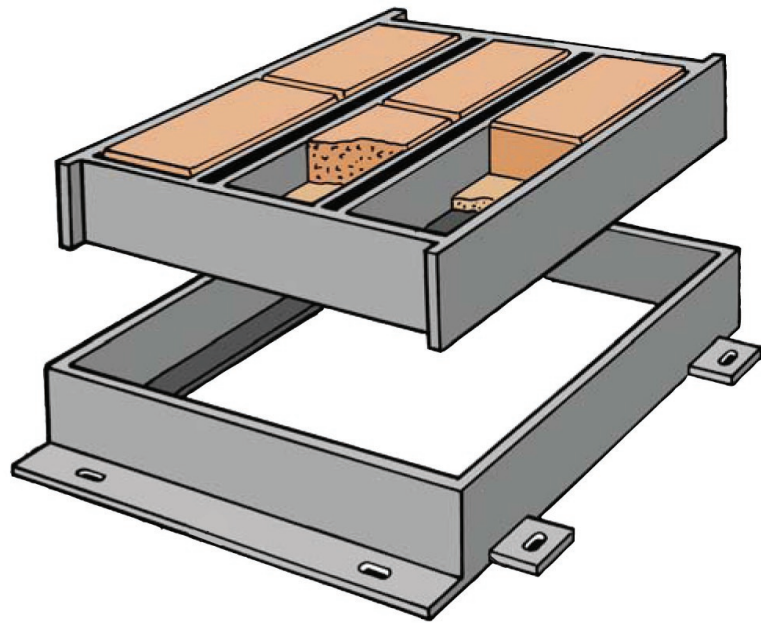


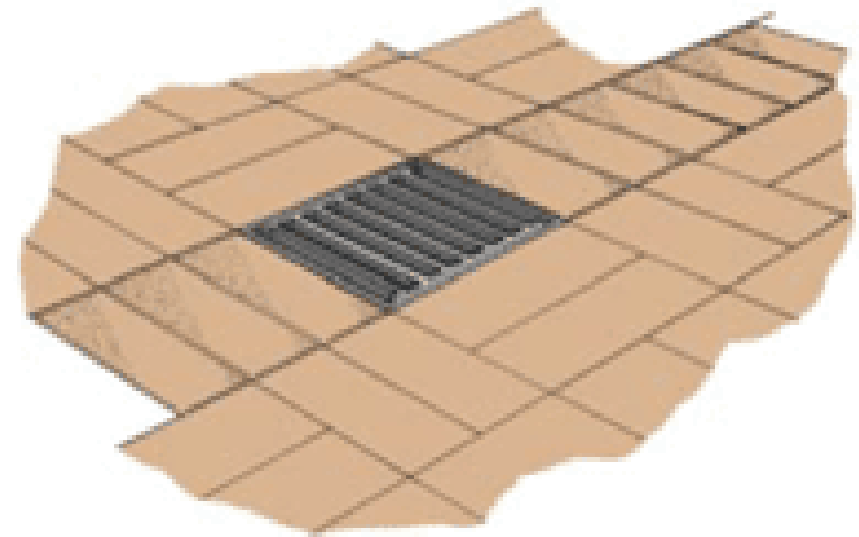
Photo example and section through fluted channel

Proposed Gullies for Use in Chester:

Product (or equal approved)	Material	Size	Location
Jones of Oswestry Aquaslot Single Leaf Block Infill Point Drainage (ref. DPB1).	Galvanised steel with paving infill material to match surrounding surfacing.	Various sizes depending on the number of 200x100mm blocks used.	DDA compliant for use in pedestrian areas. Use with fluted or flush channel. High profile/prestigious pedestrian areas where discrete drainage required. Vehicle loading up to class C250. Covers are removable for regular access and maintenance. The AQUASLOT cover simply drops back in.
Jones of Oswestry Aquadrain Slotted Hinged Flush Grating (ref. DSB1)	Galvanised steel	200mm wide, length can vary 200 - 600mm.	DDA compliant for use in pedestrian areas. Use with fluted or flush channel. Use where greater capacity needed. Vehicle loading up to class C250.

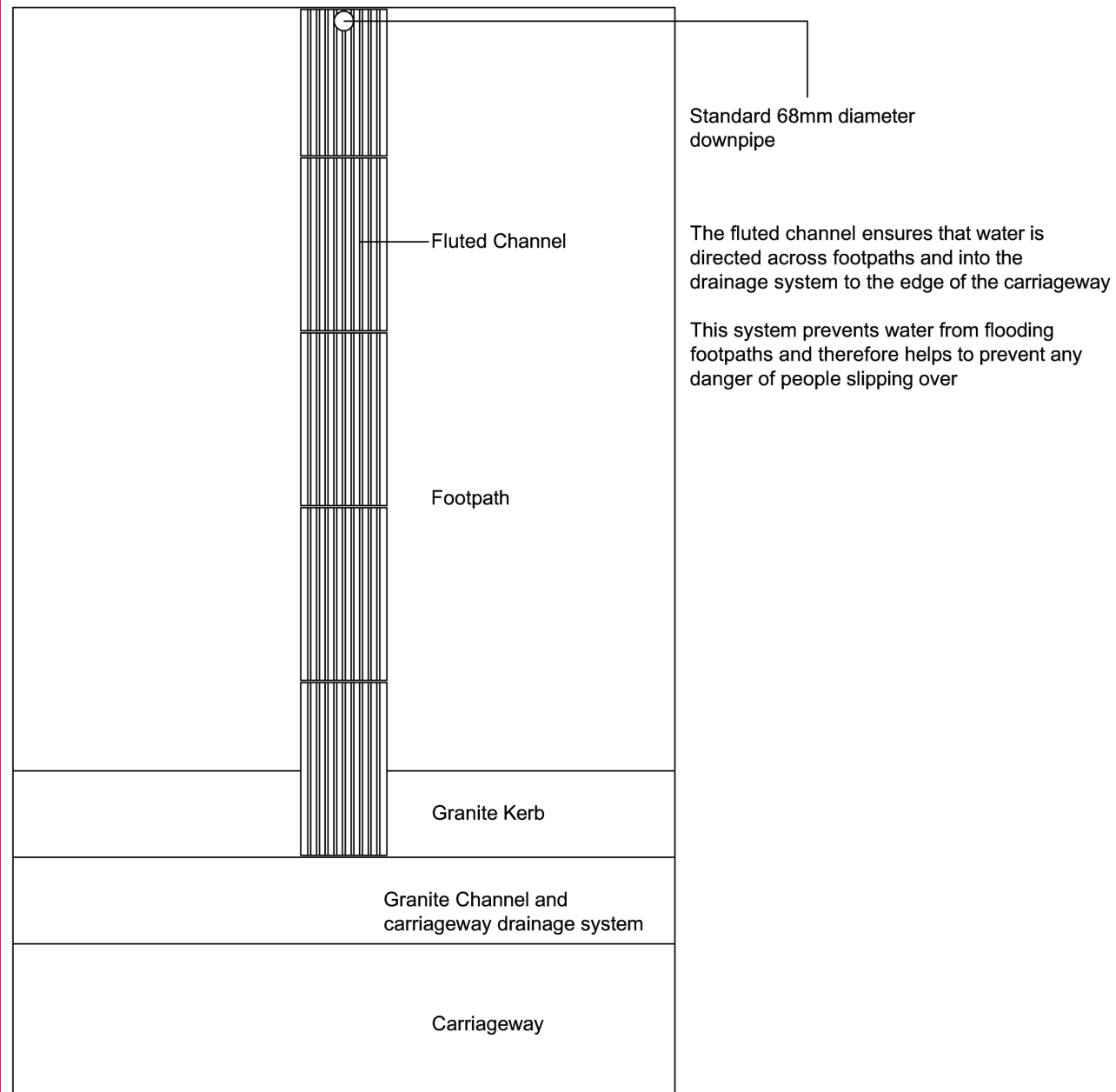


Jones of Oswestry Aquaslot Single Leaf Block Infill Point Drainage (ref. DPB1)



Jones of Oswestry Aquadrain Slotted Hinged Flush Grating (ref. DSB1)

Figure 7.9 – Plan view of fluted channel discharging into carriageway



Alternative Linear Drainage Systems

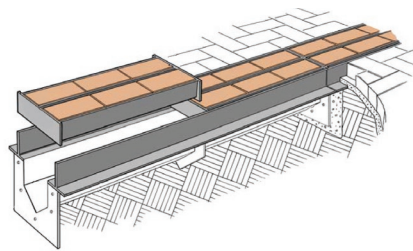
- In some instances, linear slot or Aco-type channel drain will need to be used where it is not possible to use fluted/flush channels (e.g. in order to intercept contaminated run-off).
- Linear slot drains should not be used where there is a risk of soil or other debris washing into the drain, as this narrower type of channel is liable to block-up.
- Due to maintenance implications, a method statement/risk assessment should be provided to cover maintenance requirements at the specific location slot or channel drains are used. This should highlight issues, such as closure of access routes whilst cleansing is carried out.
- Linear slot or channel drains must be specified that are suitable for anticipated vehicle loading.
- Further information on products suitable for use in Chester is provided in the table overleaf.

Proposed Linear Drainage Products for Use in Chester:

Product (or equal approved)	Material	Size	Location
Marshalls Slot Drain Duo (with Birco 100 Channel Unit base)	Galvanised steel slot drain top with precast concrete channel base	10mm wide slots, 100mm wide channel (below ground)	High profile/prestigious pedestrian areas where fluted/flush channel not suitable and discrete drainage required. Vehicle loading up to Class E600.
Jones of Oswestry Aquaslot DPB2 Continuous Longitudinal	Galvanised steel with paving infill material to match surrounding surfacing	Width varies depending on number of 200x100mm blocks used. 1 block (2 slots): 153mm wide, 2 blocks (3 slots): 282mm wide, 3 blocks (4 slots): 411mm and 4 blocks (5 slots): 540mm. Can also be fabricated to suit.	High profile/prestigious pedestrian areas where fluted/flush channel not suitable and discrete drainage required. Use where greater capacity needed than single slot drain. Vehicle loading up to Class C250. All cover sections are also removable for regular and immediate access to individual sections of the channel for maintenance purposes. The covers drop back in afterwards with no remedial work required.
Marshalls Birco 100 with Cast Iron Heelsure grating (see Cheshire West and Chester highway engineers' standard detail – drawing Number: 'Chester 10' for further detail on construction).	Cast iron grating with precast concrete channel base	100mm wide	In less high profile pedestrian areas/where higher capacity required and where fluted/flush channel not suitable. Vehicle loading up to Class E600.



Marshalls Slot Drain Duo



Jones of Oswestry Aquaslot DPB2



Marshalls Birco 100 with Cast Iron Heelsure grating

Sustainable Urban Drainage

- It may be feasible in some locations (such as waterside routes and within green spaces) to use sustainable urban drainage techniques to reduce surface water run-off.
- This could include paving falls into areas of soft landscaping, the collection of surface water to irrigate planting areas and the use of permeable surfacing materials to footpaths.



Sustainable Urban Drainage techniques already in use along the Riverside Promenade