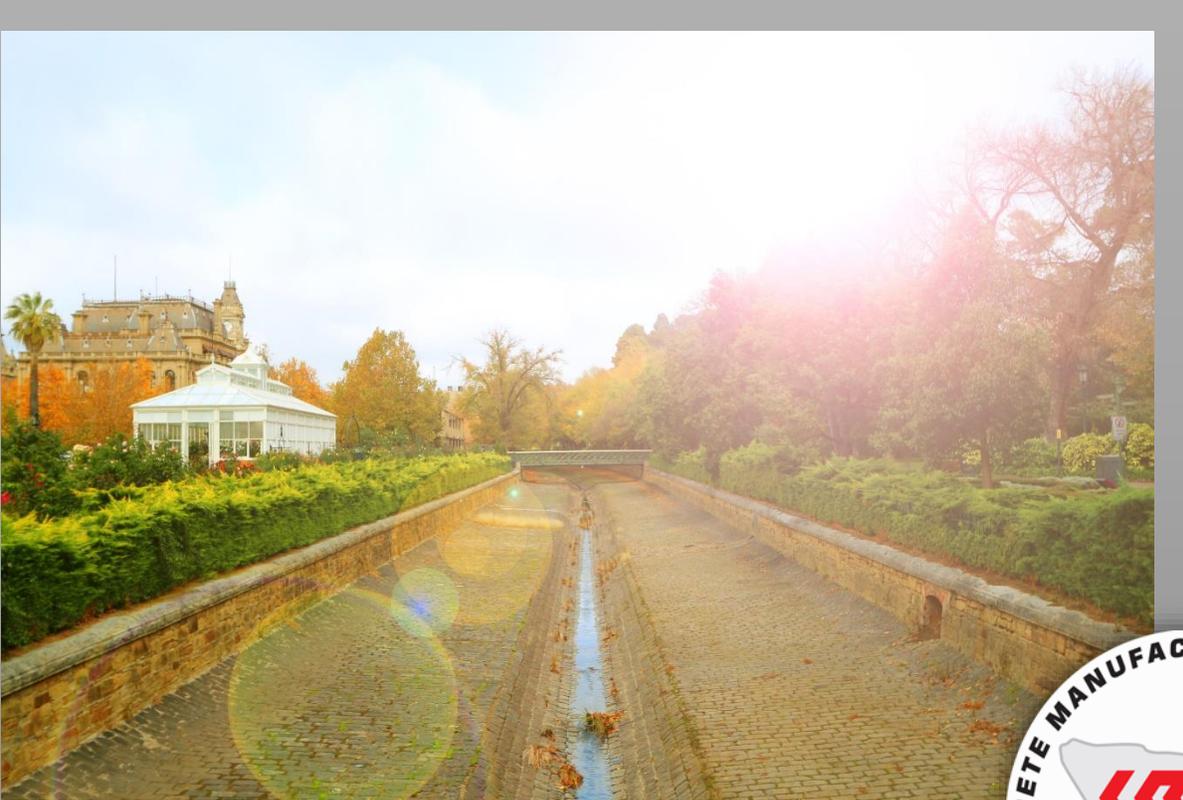


CONCRETE BLOCK PAVING



Drainage of Concrete Block Paving

Concrete Block Paving

An overview of cost, looks and durability

Background on Concrete Block Paving

Concrete Block paving (CBP) differs from other forms of surfacing in that it comprises small segments and therefore is crisscrossed by a network of close spaced joints filled with sand. This means CBP is permeable and drainage of the surface and underlying layers is important. There is limited full scale testing worldwide but from a study conducted by Dr Brian Shackel of the University of New South Wales, Australia, the following conclusions were drawn: -

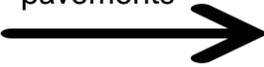
- Between 30% to 35% of rainfall will penetrate newly laid, untrafficked, and unsealed block pavements.
- Increase in pavement crossfall will increase surface runoff. (Recommended min. slopes of 2%.)
- The permeability of the joints can be reduced by up to 50% with an application of a water based acrylic sealer. Similarly, infiltration can be inhibited by using 10% of lime or 6% bentonite to the jointing sand.

Generally, no attempt is made to seal the joints hence attention should be directed towards reducing the consequences of water infiltration, particularly during the early life of the pavement. In practice care must be taken to select bedding sands not susceptible to water or seal the base if it comprises unbound

granular materials or select base materials bound and waterproofed with cement, lime or bitumen. The management of water runoff and infiltration becomes therefore a critical aspect that will affect the performance and integrity of the CBP. Good surface and subsoil drainage are essential for satisfactory pavement performance. Drainage needs to be considered during the design, specification construction phases of a project. The following recommendations and detailing, although not new, but seldom practiced, are paramount for a trouble free and structurally sound CBP.

1. Surface Drainage

Surface drainage should be designed and installed as thoroughly as for other pavements noting local site conditions such as:



- Climatic conditions, particularly rainfall.
- Ground water levels and seasonal influence i.e. flood or tidal conditions.
- Soil Profile.

Key detailing notes:

- Min longitudinal fall of 1% and a crossfall of 2%.
- Paving should be set at a min. 5mm higher at drains, gutters and manhole inlets.

Surface drainage details

DETAIL A1 - DRAINS AND GUTTER

Pit or manhole

Chamfer or rumbled aris

Min 5mm

Kerb and gutter

DETAIL A2 - MANHOLE INLET

Min. 100mm Max. 200

Concrete infill, min 100mm thick 30 MPa

Manhole cover

Dimensions must be squared off and tied in with the paving pattern

Special attention to compaction and possible stabilisation of backfill to manholes and inlet to prevent subsidence.

DETAIL A3 - INSITU CONCRETE DRAIN

275

275

5mm min

235

160

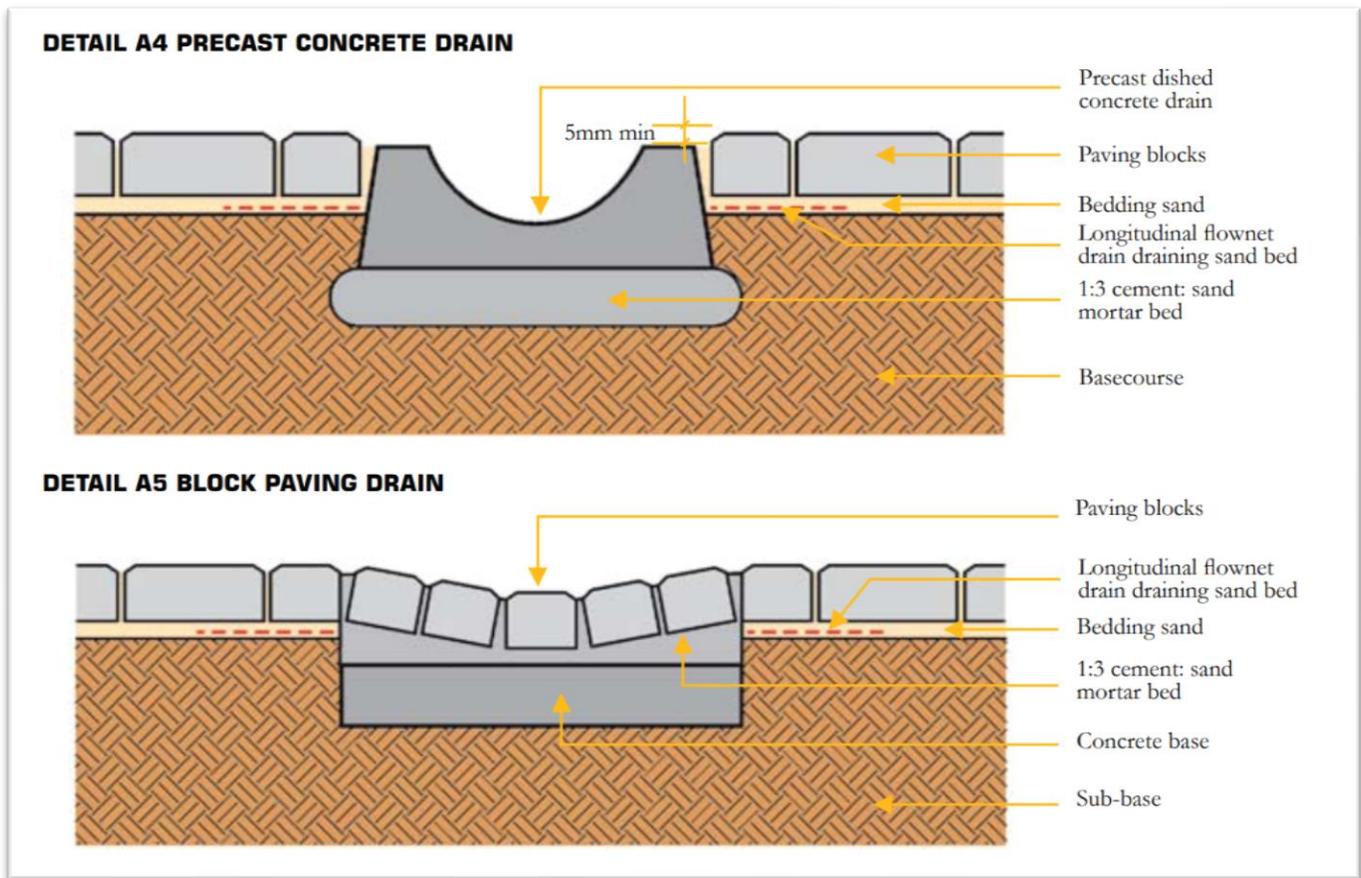
Paving blocks

Bedding sand

Longitudinal flownet drain

draining sand bed

Concrete base



2. Bedding Layer Drainage

The drainage of the bedding sand is crucial particularly where stabilised bases are used and up against kerbs, edge beams and manhole inlets. This aspect is often neglected and leads to a buildup or “boxing” of water, which pumps under traffic washing out the jointing and bedding sand leading to progressive failure. Select bedding sand not susceptible to water and to the correct grading.

NB: Bituminous seal should be considered for all unbound base material before placing bedding sand.

a. Bedding and Sand grading

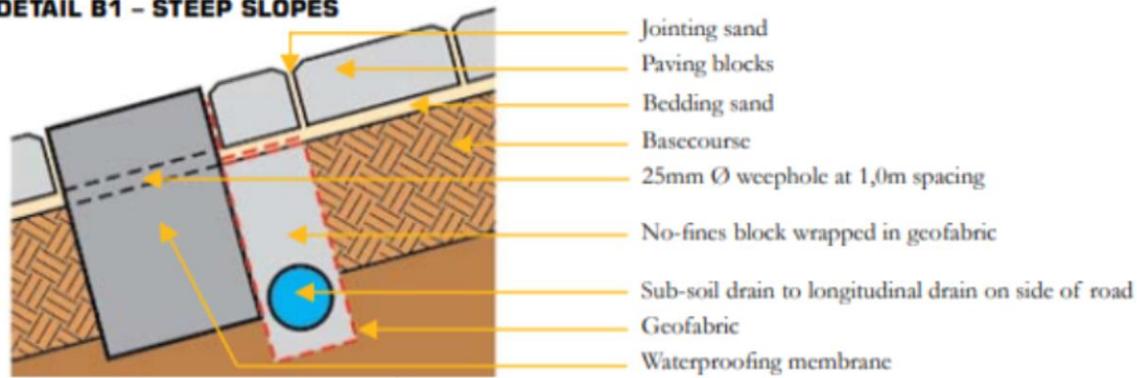
<i>Non sieve size (mm)</i>	<i>% Passing</i>
9.52	100
4.75	95 – 100
2.36	80 – 100
1.18	50 – 85
0.600	25 – 60
0.300	10 – 30
0.150	5 – 15

b. Jointing sand

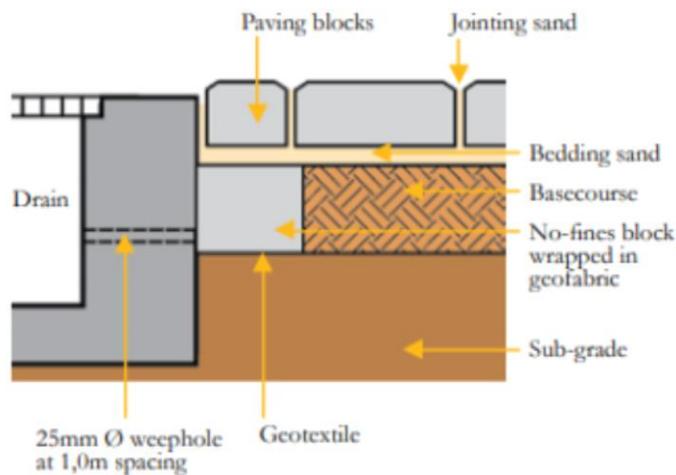
Sand should pass 1 18mm sieve and contain 10% - 50% of material passing a 0,075 sieve.

Sand bed drainage details

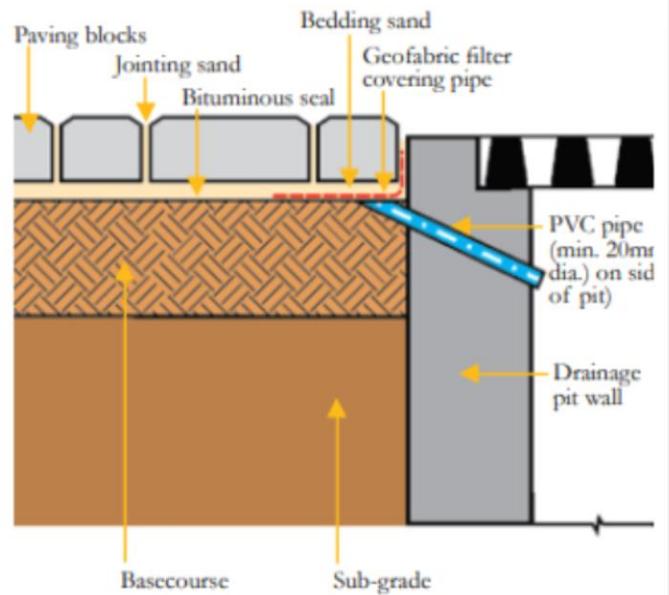
DETAIL B1 - STEEP SLOPES



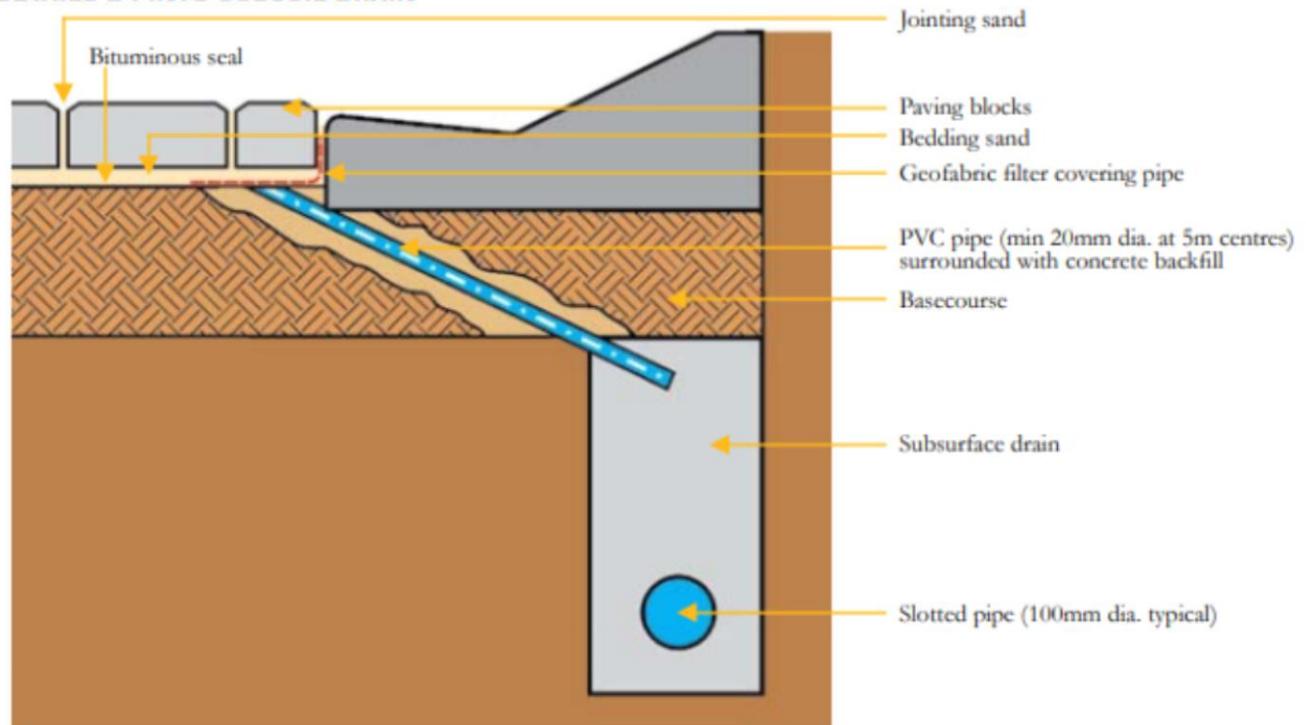
DETAIL B2 - INTO DRAINAGE PITS USING SUB SOIL DRAINS



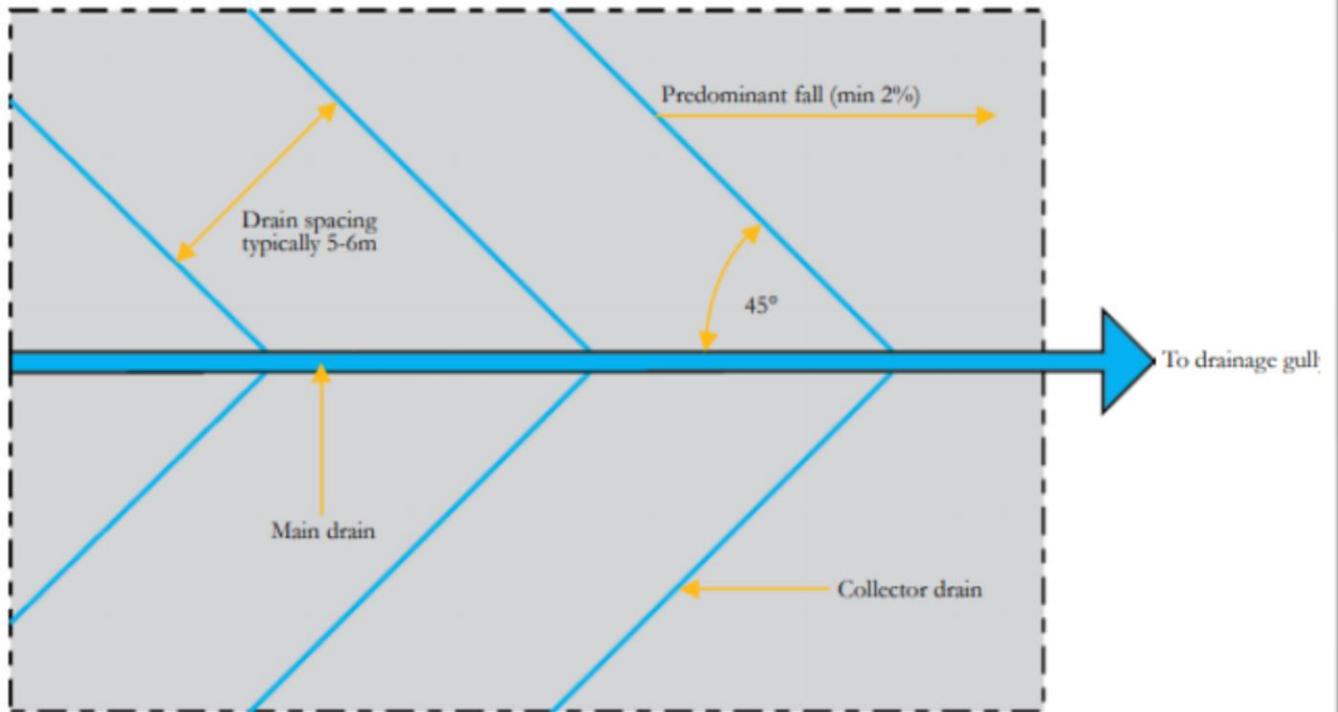
DETAILS B3 - INTO DRAINAGE PITS



DETAILS B4 INTO SUBSOIL DRAIN

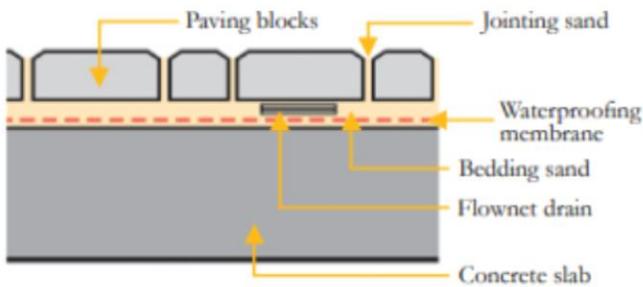
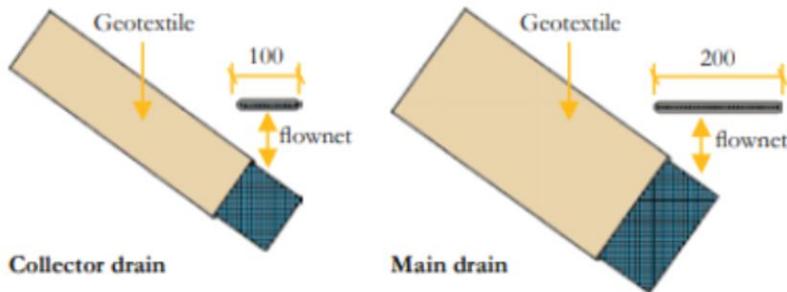


DETAIL B5 - PAVING OVER CONCRETE SLAB

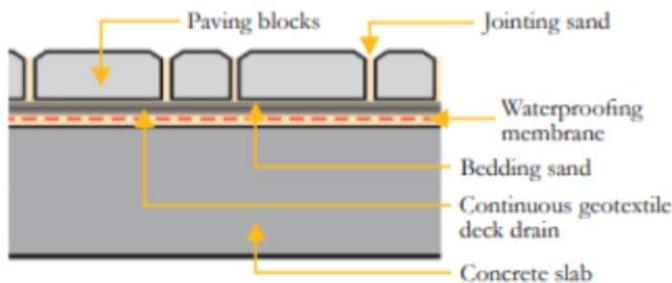


Plan view of fishbone drainage below paving

FLOWNET DRAINS



ALTERNATIVE DETAIL



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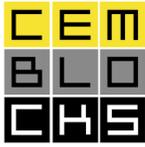
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