

CONCRETE BLOCK PAVING

Drainage of Concrete Block Paving



*A walk-over in cost, looks and
durability for Concrete Block Paving*



BACKGROUND

Concrete Block paving (cbp) differs from other forms of surfacing in that it comprises small segments and therefore is criss-crossed 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 world wide 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 is 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:

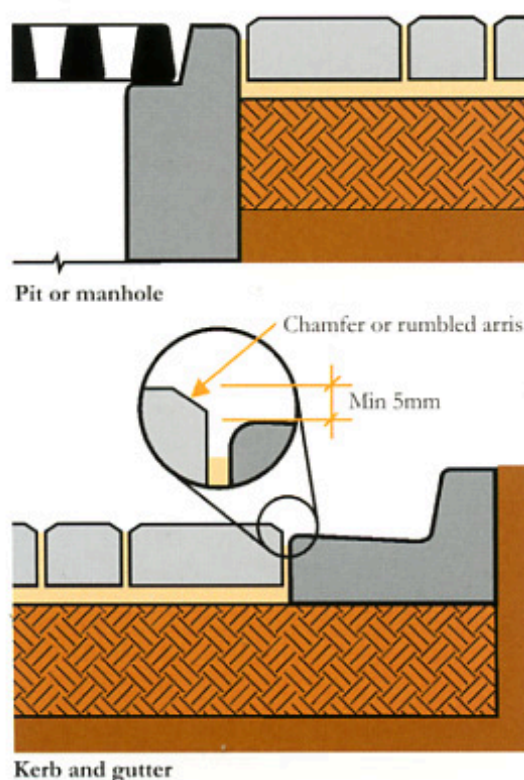
- Climatic conditions, particularly rainfall.
- Ground water levels and seasonal influence ie. flood or tidal conditions.
- Soil profile.

Key detailing notes

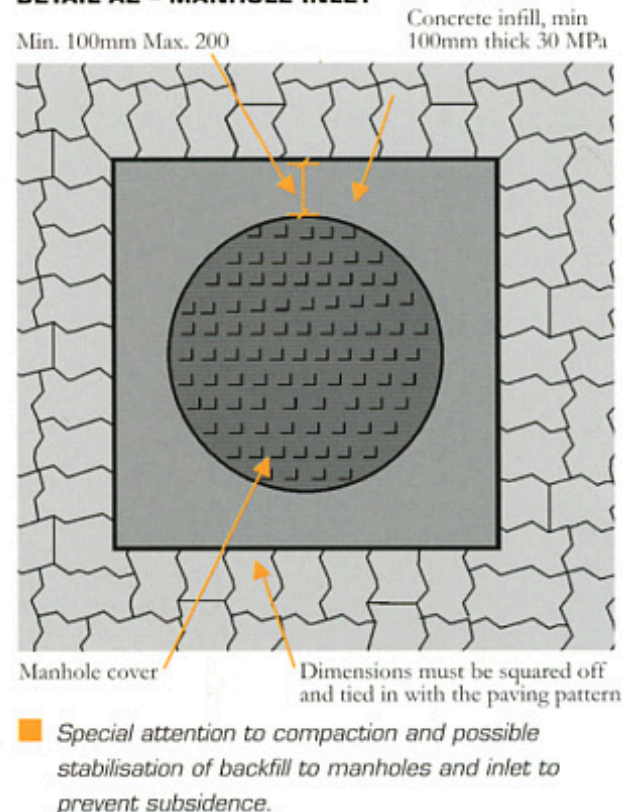
- Min longitudinal fall of 1% and a crossfall of 2%.
- Paving should be set at a min. 5mm higher at drains, gutters and manhole inlets.

Surface drainage details

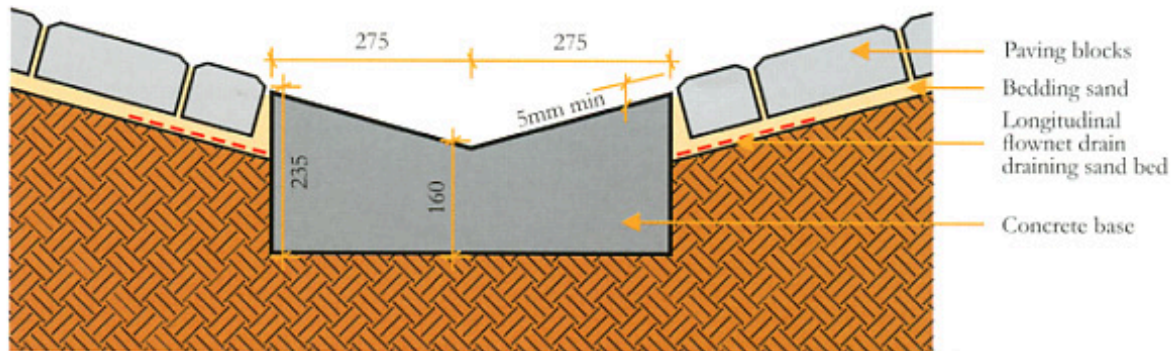
DETAIL A1 - DRAINS AND GUTTER



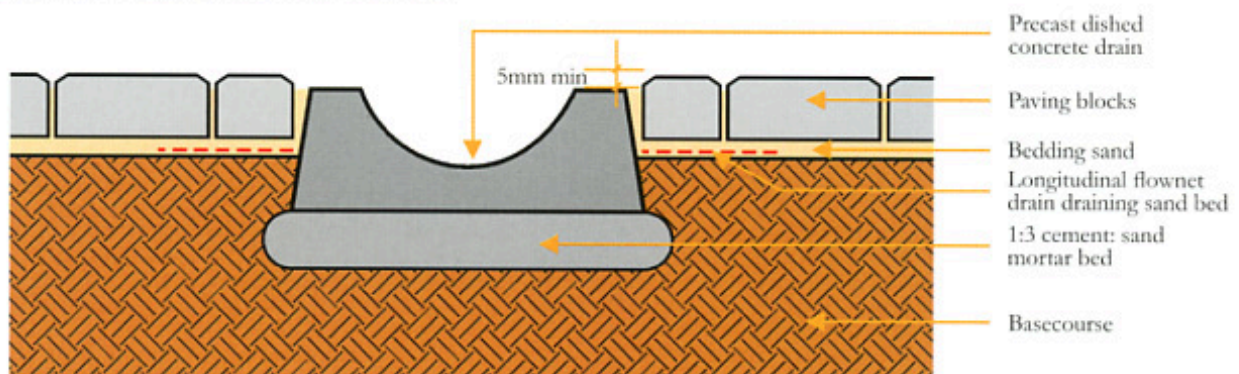
DETAIL A2 - MANHOLE INLET



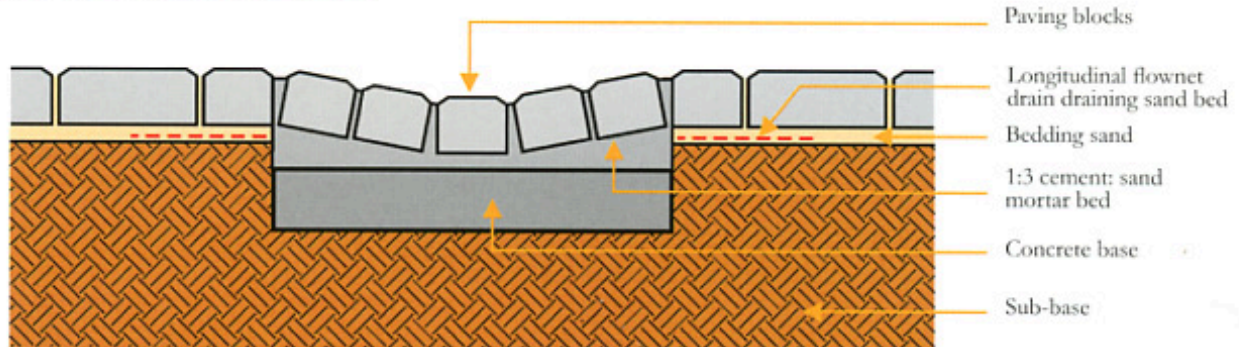
DETAIL A3 - INSITU CONCRETE DRAIN



DETAIL A4 PRECAST CONCRETE DRAIN



DETAIL A5 BLOCK PAVING DRAIN



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 build up 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.

2.1 Bedding sand grading

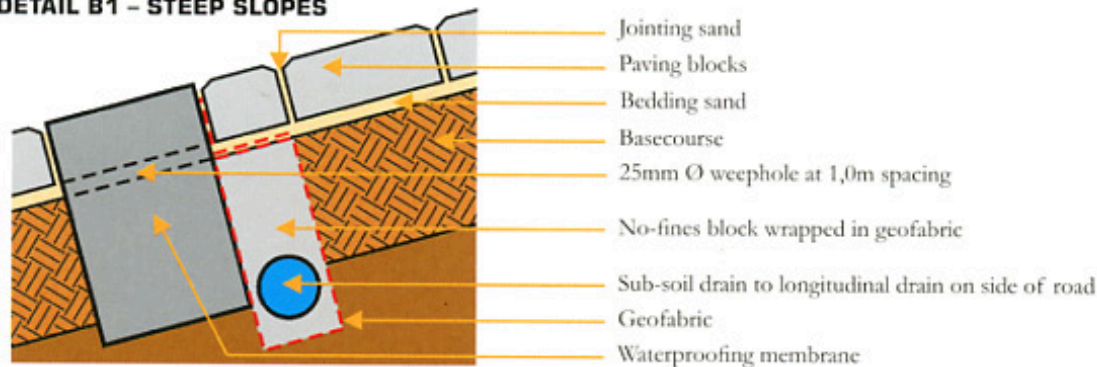
(Nom sieve size mm)	% Passing
9,52	100
4,75	95-100
2,36	80-100
1,18	50-85
0,600	25-60
0,300	10-30
0,150	5-15
0,075	0-10

2.2 Jointing sand

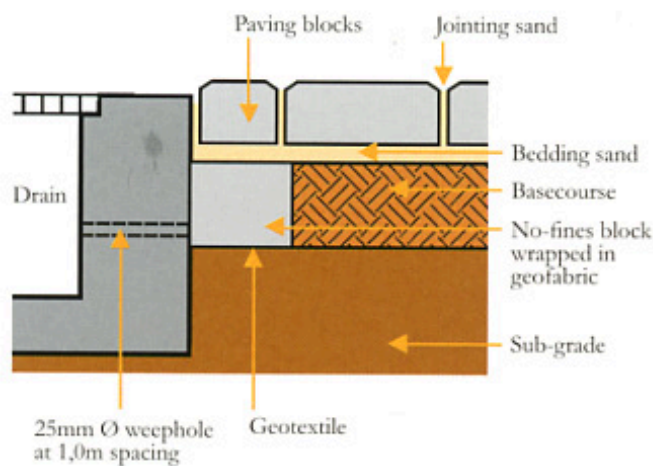
■ Sand should pass 1 18mm sieve and contain 10% - 50% of material passing a 0,075 sieve.

Sand bed drainage details

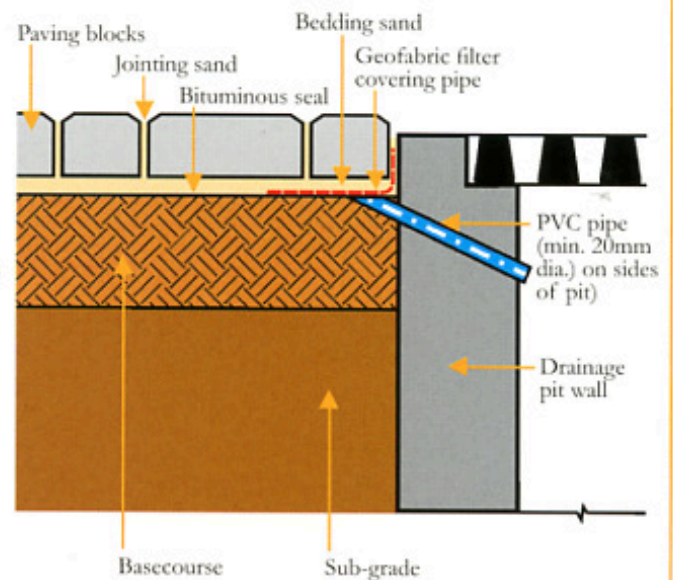
DETAIL B1 - STEEP SLOPES



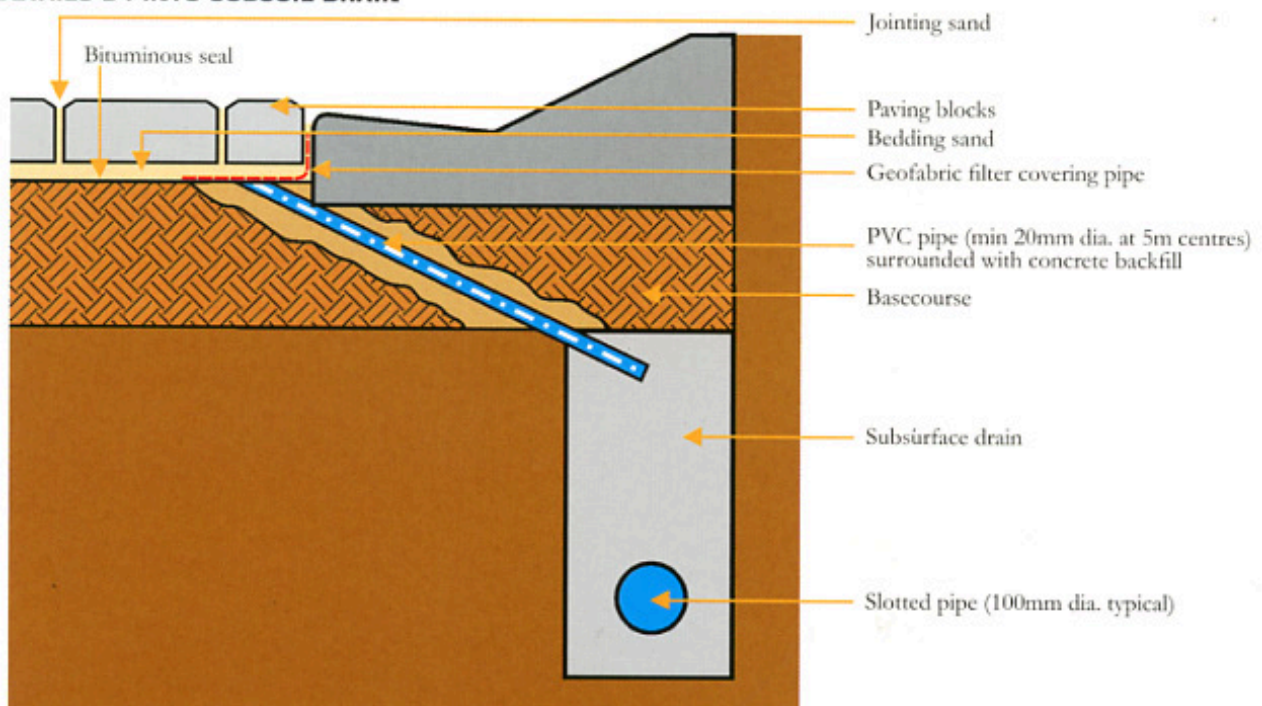
DETAIL B2 - INTO DRAINAGE PITS USING SUB SOIL DRAINS



DETAILS B3 - INTO DRAINAGE PITS

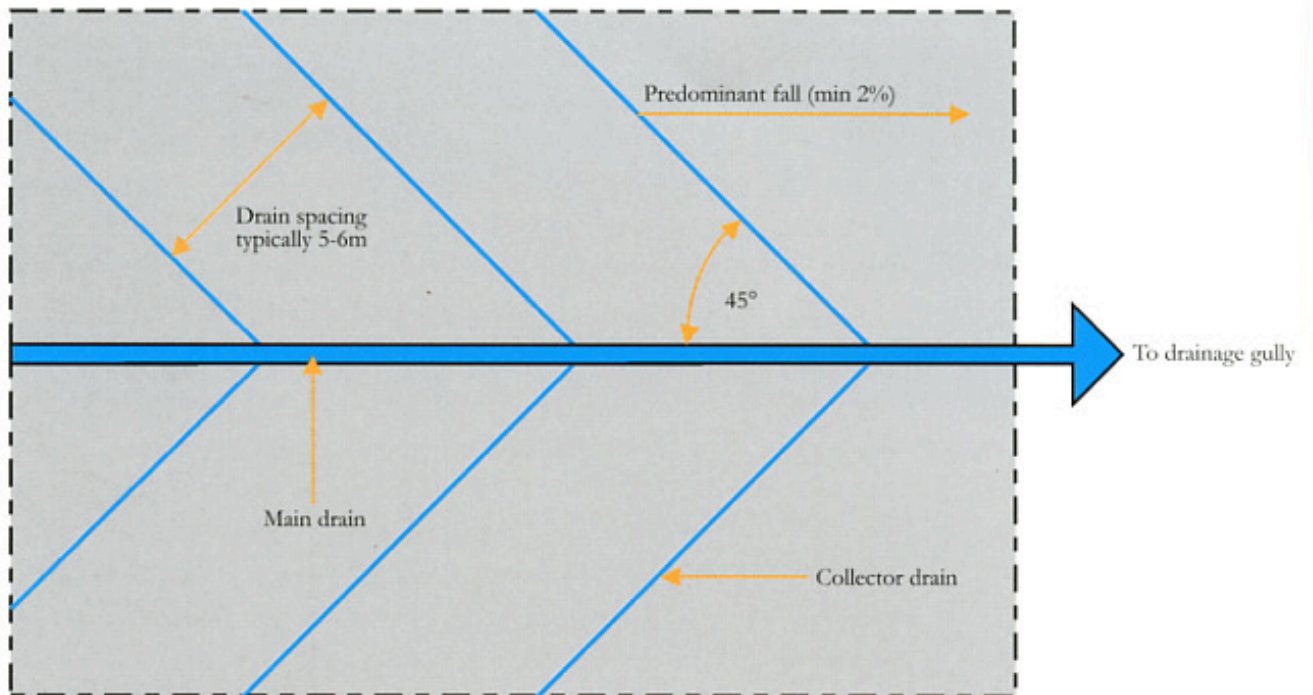


DETAILS B4 INTO SUBSOIL DRAIN



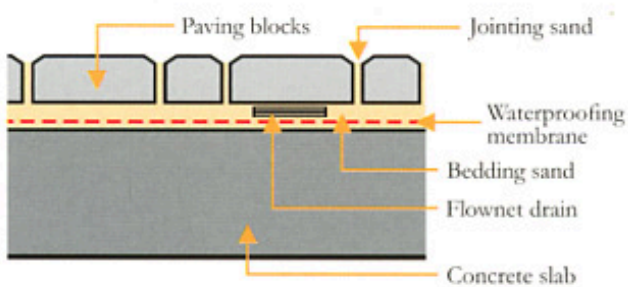
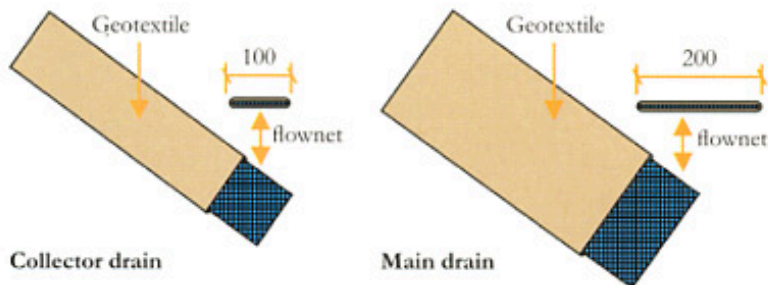


DETAIL B5 - PAVING OVER CONCRETE SLAB

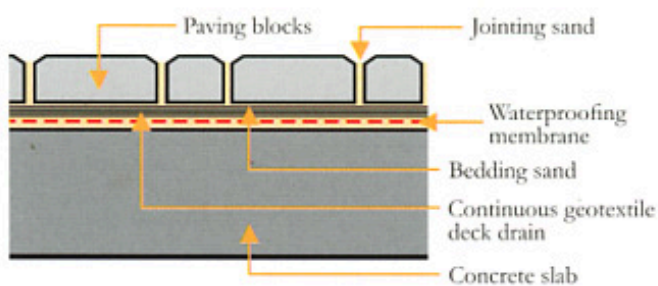


Plan view of fishbone drainage below paving

FLOWNET DRAINS



ALTERNATIVE DETAIL



PAVING DIVISION MEMBERS (FEBRUARY 2009)

PRODUCER MEMBERS

Bafokeng Concor Technicrete	014 538 0818
Baybrick	035 792 5218
Bosun Brick Midrand	011 310 1176
Brick & Concrete Industries (Namibia)	0026 461 321 3009
Brickcast Industries	031 507 5525
Brickbuild T/A Panda (Botswana)	0026 724 42106
Cape Brick	021 511 2006
C.E.L. Paving Products	022 905 5998
Cast Industries	011 316 2375
Columbia DBL	021 905 1665
Concor Technicrete	011 495 2200
Concor Technicrete P.E.	041 372 2230
Conframat	016 987 3381
Corobrik	031 560 3911
Deranco Paving	041 933 2755
Inca Concrete Products	021 904 1620
Inca Masonry Products	043 745 1215
Infrasat Gauteng	011 652 0000
KZN	031 569 6900
Kopano	016 363 0340
Mobicast Mossel Bay	044 874 2268
MVA Bricks	012 386 0050
Neat Contech	046 624 3377
Stanger Brick & Tile	032 457 0237
Stone Age Concepts	011 740 0910
Vanstone Precast	012 541 2056
Watson Concrete	011 704 0910
West End Bricks	011 851 1828
Zenzele Brix	012 803 6884

ASSOCIATE MEMBERS

Inca (Cape)	021 904 1620
Smartstone	011 310 1161

CONTRACTOR MEMBERS

Daron Construction	034 955 1333
Galaxy Paving	011 815 1175
Mondo Paving & Retaining Walls	011 467 1111
PYW Paving	031 763 5771
Roadstone Civil & Paving	011 683 7080
S A Paving Gauteng	031 705 5123
The Paving Creations	031 765 4083
Vesles Civils	012 662 3030/1
Valcal International	011 867 2471



**CONCRETE
MANUFACTURERS
ASSOCIATION**
Quality cast in concrete

Block D, Lone Creek, Waterfall Office Park, Bekker Road, Midrand.
PO Box 168 Halfway House 1685
Tel +27 11 805 6742, Fax +27 86 524 9216
e-mail: main.cma@gmail.com website: www.cma.org.za