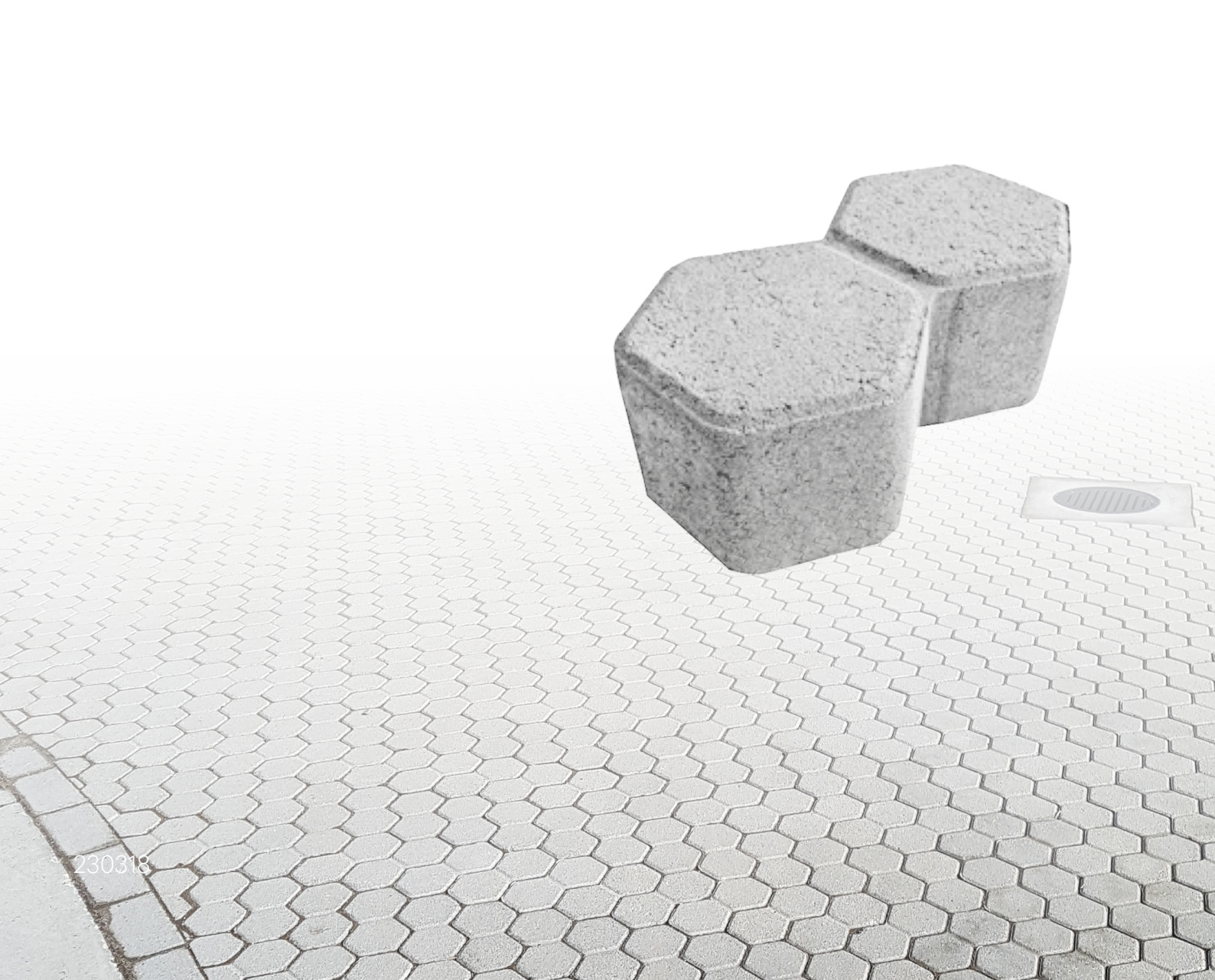


**PREMIER  
PAVERS**

*Superior Driveways  
and Patios*

# TECHNICAL INFORMATION & INSTALLATION GUIDELINES

PREMIER AQUAFLOW PAVING SYSTEM



## INTRODUCTION

It would be fair to say, that many areas throughout New Zealand receive considerable rainfall. Storm-water systems, if they are available, are often overloaded with the deluge that may occur. This is especially true in the larger metropolitan areas where storm-water systems may not have been updated for many years.

In addition to the issues associated with inadequate infrastructure, as mentioned, the significant drift of population to the cities over the past 40 years has meant a drop in section sizes from 1000sqm to as low as 250sqm for each dwelling. This only compounds the problems when managing storm water disposal from 4 dwellings where previously only one existed.

## FUNCTIONALITY

The PREMIER Group are very conscious of the environment, and are continually seeking solutions to problems within the building industry, where our products can assist, and provide good solutions. The AQUA FLOW PAVER has been developed for use in both residential and commercial applications. Rather than just direct surface water into an already overloaded council storm-water system, the AQUA FLOW system can be used to delay storm-water runoff, allowing it to soak into the ground, and evaporate into the atmosphere, dramatically reducing the load on already stretched services. It also has the added benefit of eliminating water from ponding on the service, maximising the use of available land on small sites.

Where council storm-water systems are not available, the AQUA FLOW PAVER system can play a significant part in preventing storm-water flowing from one neighbour's property to the next. The AQUA FLOW PAVER system can also be incorporated into a retention tank design that has the potential to hold a good volume of water and slowly release it into the council reticulation system.

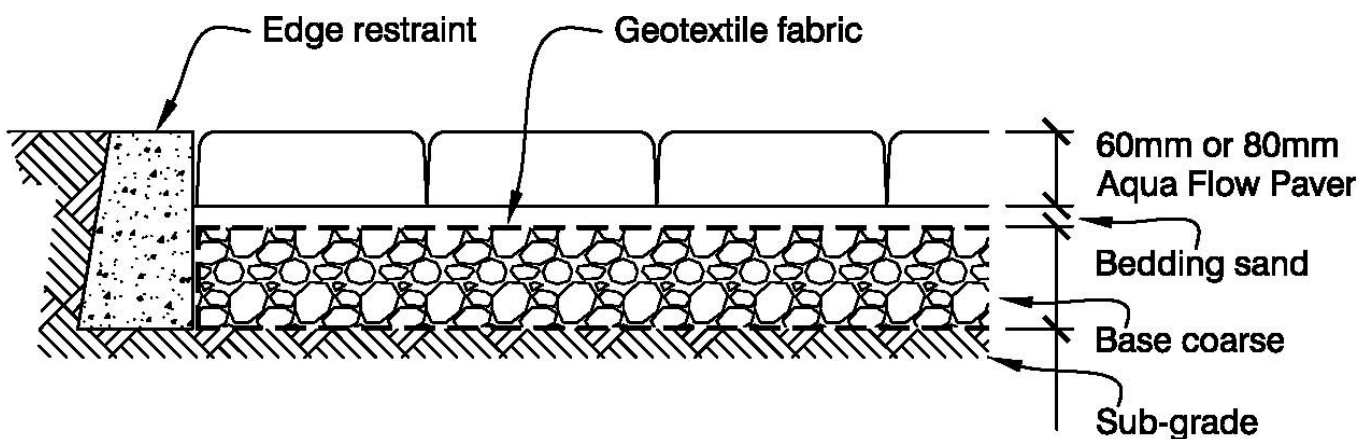
## COUNCIL REQUIREMENTS

This brochure is provided as a guide only, to how the AQUA FLOW PAVER system can be installed, and functions, and is to be used in conjunction with the professionals associated with the project, such as a qualified civil engineer, and/or the landscape architect, to satisfy any requirements that the relevant Territorial Authority may have placed on the project.

## THE PRODUCT

AQUA FLOW PAVERS are an interlocking concrete paver, designed as a flexible paving system, supplied in two thicknesses, 60mm and 80mm, depending on the application required. The sides of the pavers have a slight taper which prevents the pavers from rubbing together and chipping and permitting water to flow through the pavers, and be captured in the sub-base. Generally, 60mm is designed for foot traffic and light vehicular residential use; 80mm is for heavier traffic on drive-ways and commercial applications such as car parks. There are 47 pavers per square metre.

## TYPICAL CROSS-SECTION



## TYPICAL CROSS SECTION

### Sub-grade

This is where the natural ground begins under the AQUA FLOW system. It is important to understand the bearing capacity of the natural ground. The lower the bearing capacity the deeper the base course to support the system and loads.

### Filter cloth

Commonly a non-woven Geotextile polypropylene fabric that allows water to move through the system, but still retain the bedding sand under the pavers. In addition, it can significantly extend the life of the system by preventing surrounding soil/clay particles entering the sub-base reducing its efficiency. It must encapsulate all four sides of the base course.

## Storm-water drain

The normal product used is 65mm or 110mm NOVAFLO which has punched holes along its length. This allows water to enter the drain easily from the sub-base and be directed to a collection/discharge point and is positioned at the lowest point of the system.

## Base course

The compacted base course is the structural layer in the system, that not only supports the system above, but the direct load placed on it. It is important that the aggregate is clean and free of fines to allow free movement of water within the base course- no GAP product to be used. Winstone's WAPP12 is an option that your Civil Engineer would consider specifying. A minimum depth of 100mm is recommended; depending on the bearing capacity of the sub-grade and the purpose and design of the system, this layer could be 300mm – 400mm thick. It is recommended that a blinding layer of WAPP7 be installed across the top of the WAPP12 to help protect the geotextile fabric.

## Bedding Sand

The AQUA FLOW PAVER can be laid on either a 25mm, course bedding sand, or on a fine clean chip that will allow moisture to escape to the base course.

## INSTALLATION

The pavers need to be installed within the guidelines of NZS 3116:2002 and it is important that GAP type aggregates are NOT used in the base material as they contain lots of fine particles that will quickly clog up the system dramatically reducing its efficiency.

It is also important to have a good understanding of the ability of the sub-soils to absorb moisture and the need for filter fabrics to be incorporated into the design adopted.

Please note: The following information does not replace engineering advice and is provided as a guide only.

## Sub-grade Assessment

The strength of the sub-grade is paramount to the performance of the whole system. A simple method for determining this on 'soaked' ground is:

Table 1

SUB-GRADE STRENGTH	TEST ON SOAKED GROUND
Weak	Walking leaves a positive footprint
Medium	Heel pressure makes an imprint
Strong	There is no imprint on the ground

## Sub-grade Specification

This table provides a simple guide when using AQUA FLOW pavers. It is recommended that a Geotextile filter cloth be used in most applications to obtain the maximum benefits of the system.

Table 2 NZS3116: 2002

APPLICATION	SUB-GRADE STRENGTH			PAVER
	WEAK	MEDIUM	STRONG	
All footpath situations, patios and the like.	100mm	100mm	100mm	60mm
Residential single unit driveways.	150mm	125mm	100mm	60mm or 80mm
Residential multi-unit driveways and ALL commercial traffic.	Engineering Design	150mm	125mm	80mm

## Design Considerations

1. In situations where the sub-grade strength is seriously in question, consideration must be given to excavating an additional 150mm – 300mm and installing a GAP 40 or GAP 65 fill prior to installing the sub-base.
2. Where the AQUA FLOW paver system is being used primarily as a system to store and retain larger volumes of water, the depth of the sub-grade will be increased to accommodate the required volume.
3. It is recommended that Winstones WAPP12 is specified for the sub-grade, which has the capacity to store approximately 40 litres/m<sup>2</sup> on a 100mm thick base equating to 400 litres/m<sup>3</sup>. EnviroMix concrete may also be considered which has the capacity to store approximately 250 litres/m<sup>3</sup>.
4. In situations where the sub-grade is very weak, do not use a vibrating compactor, use a static roller and keep the passes to a minimum number to avoid 'livening' of the soft sub-grade. Consult a civil engineer for advice.
5. In heavy traffic locations where the AQUA FLOW pavers are to be laid, and the ground

is suspect, it is likely a Biaxial Geogrid will need to be laid over the sub-grade prior to the GAP40 or GAP65 being installed to the depth the engineer specifies.

6. On sloping sites, water will naturally flow to the lowest point, which can create a problem. To minimise the problem, consideration should be given to constructing concrete weirs across the system to control the flow and direct it into an incorporated drainage system to manage and direct the flow as required.
7. It is important that the AQUA FLOW pavers and support system, is secured by well-designed robust curbing on either side to prevent movement by traffic.

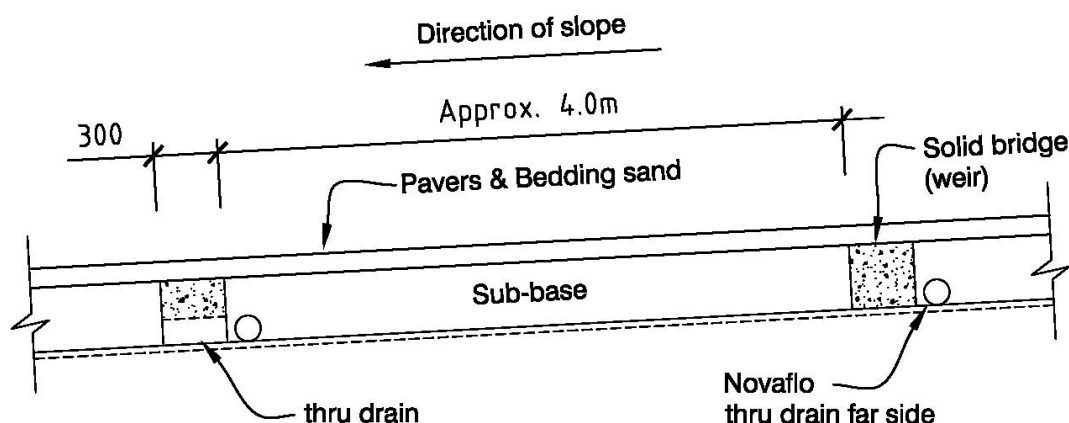
## Bedding & Jointing Material

1. The coarse bedding sand is to be a layer approximately 25mm thick, and to comply with NZS3116:2002 Table 4 Sand category III. As an alternative to using bedding sand, Winstones WAPP7 clean metal chip may be used, which contains chips between 2mm and 7mm. Use a light compaction only.
2. The pavers are designed to interlock in such a manner that the gap around the top of the pavers, is always consistent in width. This gap needs to be filled to help prevent a build-up of dirt particles and reduce the potential for weeds to grow, but still allow water to flow freely through. The gap can be filled with either coarse bedding sand, which may require topping up over the first few months, or alternatively, Winstones WAPP7 drainage chip.

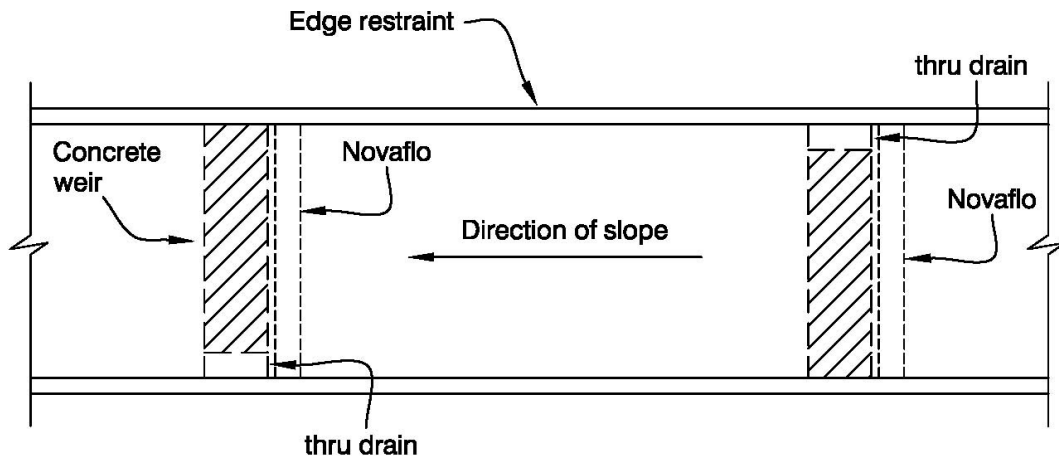
## Sloping Sites

On sloping sites, it is important to take steps in the design of the system to prevent large volumes of water rapidly moving through the whole system discharging and flooding at the lowest point. This can be achieved by installing solid bridging or weirs, concrete poured, approximately 300mm x 300mm, across the paved area, at no more than 4.0m spacings.

At the lower part of each section, install a 'Novaflo' drain next to the weir to allow the free flow of water. At one end of the weir, install a through drain for water to gain access into the next section. The through drains should be on alternate sides going from one section to the next. Engineering advice recommended.



**SLOPING SITE - WEIRS CROSS SECTION**



**PLAN VIEW - SLOPING SITE**

## GENERAL COMMENTS

1. When planning and installing an AQUA FLOW Paving system, it is essential that a thorough investigation of the site is carried out prior to commencing to dig. Check for all services, gas, electrical and drainage to avoid complicated expensive remedial work should they be unearthed.
2. In addition, be aware of trees and tree roots that may be affected by the proposed storm-water system planned.
3. The AQUA FLOW Paving system, correctly installed, has the potential to improve the quality of the run-off water as it permeates through the sub-base. It can retain heavy-metals and nutrients in a process called Cation Exchange Capacity [CEC].
4. How long the system will perform to a high level of efficiency, is difficult to say as every site is different and the amount of sediment entering the system will vary greatly. Keeping the site free of leaves, dirt and other debris is just good site management and will extend the operating life of the system. That said, this type of system has been known to operate efficiently for many years.

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