

**Sir Robert
McALPINE**



Co-op Academy
Belle Vue

Sustainable Drainage Report

Introduction

This report details the design & provides the evidence of sustainable drainage construction at the Belle Vue Co-Op Academy Project, Manchester. Designed by BDP & constructed by Sir Robert McAlpine the report highlights several areas of the project where drainage attenuation & flow restriction has been utilised in order to slow & control the outflow of surface water into the wider mains drainage system.

Design

- BDP - Project drainage design
- Environmental Sustainable Solutions LTD - Specialist design of attenuation tanks
- J Mallison (Ormskirk) – Sports pitch design

Full suite of drainage design drawings evidenced within report appendix.

Attenuation Tanks

2no Eco-Cell modular attenuation tanks have been installed within the project located as circled below. Designed & manufactured by Environmental Sustainable Solutions LTD, installed by XXXX



Tank 1 - (in line attenuation) 12m L x 11m W x 1.6m D – Max volume 200.6m³

Tank 2 - (offline attenuation) 5m L x 3.5m W x 0.8m D – Max Volume 11.4m³

Both tanks have been wrapped with impermeable membrane & heat welded seals by specialist contractor with certification provided to main contractor.

Tank 1



Tank 2



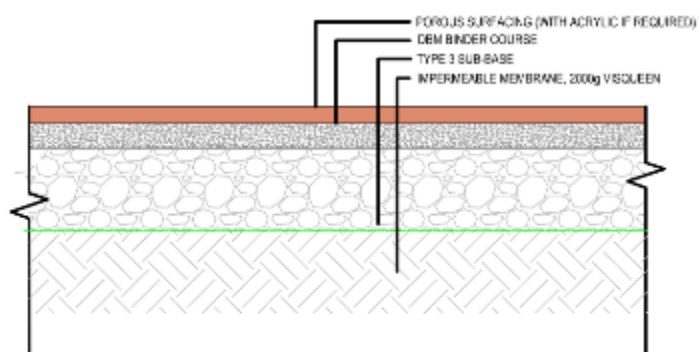
MUGA Pitch

200m² permeable surface with circa 93m³ attenuation capacity.

1no outlet for full MUGA - Permavoid rainwater diffuser unit into PPIC with flow control (54mm diameter orifice).



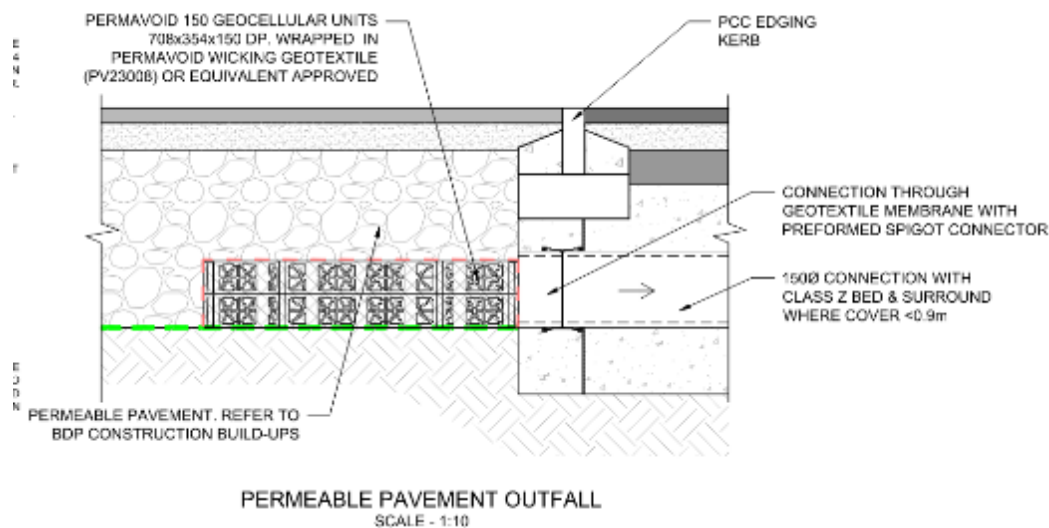
MUGA construction build-up



1C -POROUS MACADAM - MUGA

LAYER	MATERIAL	BINDER	THICKNESS	SPECIAL REQUIREMENTS
SURFACE COURSE	OPEN TEXTURED POROUS MACADAM OPEN TEXTURED MIN AGGREGATE	10MMS	25mm	BS EN 1264 4, PD 6681
BINDER COURSE	OPEN GRADED BINDER COURSE AC 20 OR EQUIV	NA	53mm	
SUB-BASE	TYPE 3 OPEN GRADED GRANULAR SUBBASE	NA	150mm - 300mm	8% WIDE ROTS REFER TO ORGANISATION FOR CHARACTERISTICS OF SUBBASE
IMPERMEABLE LAYER	PREFABRICATED MEMBRANE 2000g VISQUEEN	NA		TO BE LAPPED, TAPED AND SEALED ACCORDINGLY

Permeable surface outlet diffuser detail







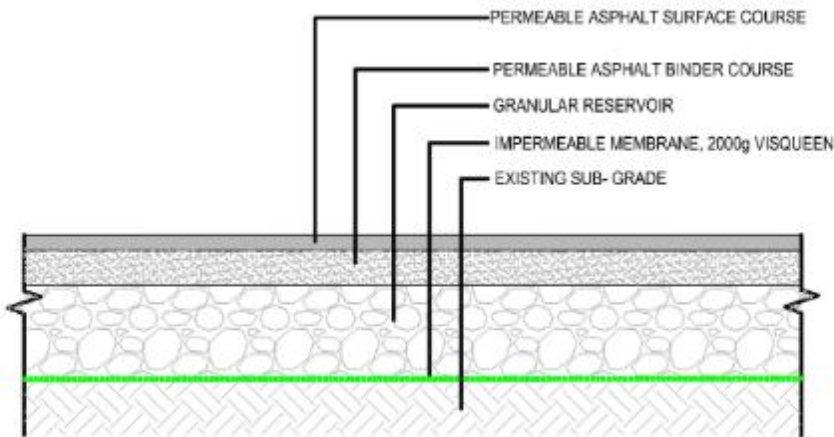
Permeable Parking Bay

1065m² permeable surface with circa 88m³ attenuation capacity.

Multiple outlets in each area - Permavoid rainwater diffuser units with flow control restricted orifices 15mm & 35mm.



MUGA construction build-up



1A - PERMEABLE CAR PARKING
PERMEABLE ASPHALT

LAYER	CLAUSE	MATERIAL	BINDER	THICKNESS	SPECIAL REQUIREMENTS
SURFACE COURSE	-	PERMEABLE ASPHALT SURFACE COURSE	N/A	35mm	
BEDDING AND JOINTING	-	PERMEABLE ASPHALT BINDER	N/A	80mm	
GRANULAR STORAGE	-	GRANULAR RESERVOIR - SINGLE SIZE AGGREGATE	N/A	400mm	DEPTH BASED ON 30% VOID RATIO
MEMBRANE	-	2000 GRADE IMPERMEABLE LINER (OR SIMILAR APPROVED)	N/A		







Sports Pitch(s)

3no sports pitches constructed to Sports England standard.

Each pitch discharges into its own outlet with restricted orifice to restrict discharge to 5L/sec. Pitch build up on top of impermeable membrane to fully isolate them & protect them from ingress of ground water.



MUGA construction build-up

