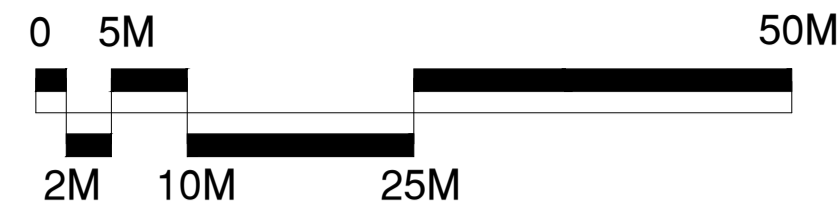


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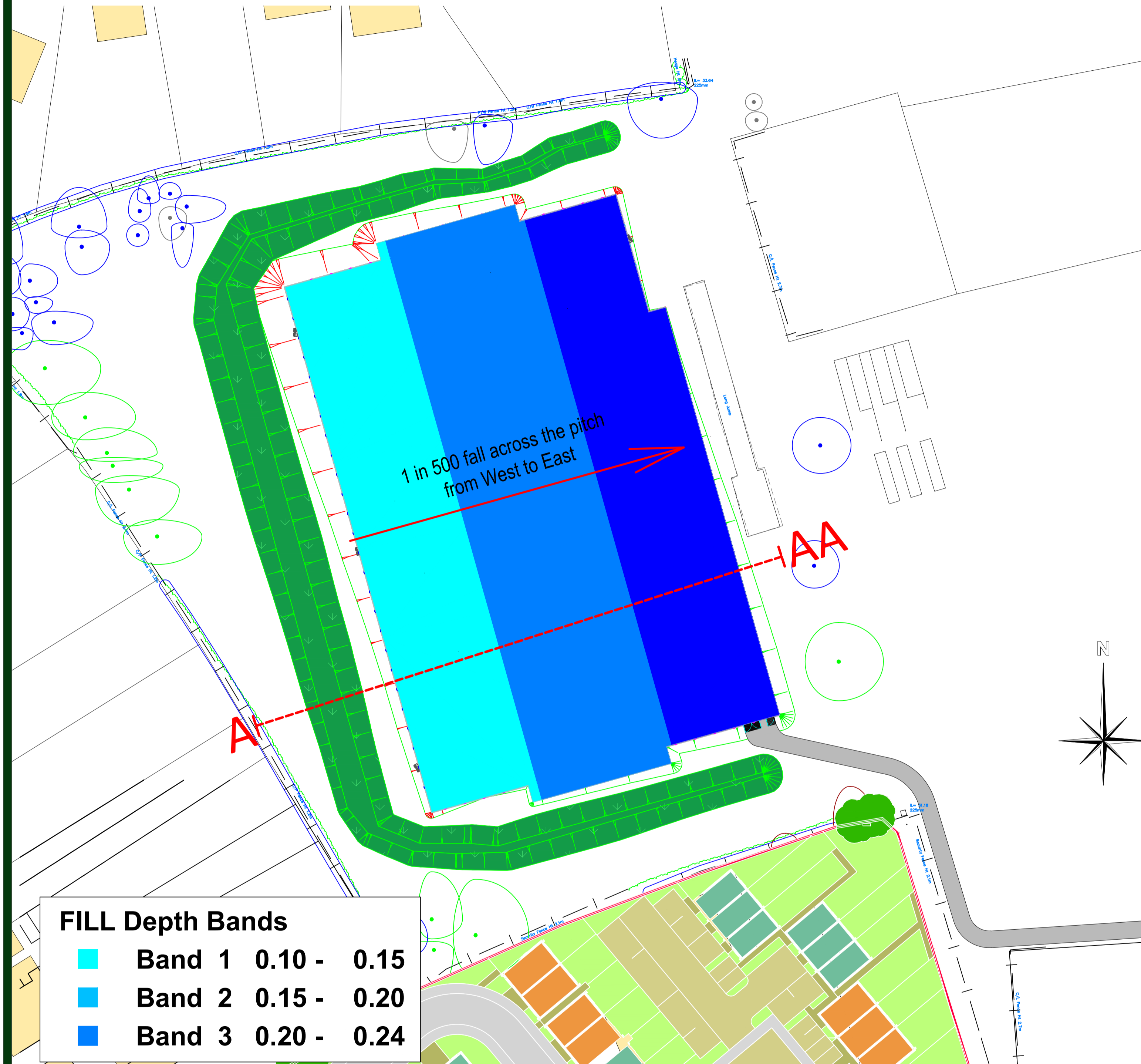
Creation of an AGP



SSS
SURFACE WATER SOLUTIONS

CONSULTANTS
Surface Standards LTD
Office 2, Enterprise House,
Aston Road, Springfield, LE15 9AY
01530 400 012

1. ALL DIMENSIONS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS.
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FILL Depth Bands

■	Band 1	0.10 - 0.15
■	Band 2	0.15 - 0.20
■	Band 3	0.20 - 0.24

Attenuation Scheme - Scale 1:500

Surface Water Drainage Design
The proposed design of the AGP development is for a permeable surface construction. The surface of the synthetic turf area shall be permeable with the underlying stone sub-base acting as an attenuation/storage area for surface water. The stone base will act as an attenuation system to increase attenuation capabilities of the playing field area. This is combined with a perforated drainage system being installed underneath the pitch base to connect to the existing watercourse to the south east of the development.

It is intended that a positive drainage scheme (land drainage); shall be installed beneath the development area comprising UPVC perforated carrier and lateral pipe drains.
The granular pitch substrate (typically consisting of Type 3 unbound (SHW 800 Series) to comply with BSEN 13285) is intended to provide onsite containment and attenuation within the granular sub-base, before surface water enters an outfall.

- The designed surface water drainage solution should be based upon the following criteria, to maintain satisfactory system performance:
- Provide adequate functionality over a period of twenty years.
 - Ensure that surface water is removed from the surface area at a rate necessary to prevent surface flooding experienced during acute rainstorms and to ensure the facility will not be lost through rain at the highest intensity which may be expected to occur either once every five years or through continuous rainfall of 50mm over a 24 hour period.
 - Ensure that surface water is effectively removed from the facility construction to ensure that load bearing capacity of the substrate is not weakened by an increase in moisture content or becomes more susceptible to frost damage.
 - Protect the installation from influences of groundwater or surface water from surrounding areas.
 - Prevent the risk of uncontrolled flooding elsewhere (to land adjacent to the development).
 - Comply with all applicable Sustainable Urban Drainage System (SUDS) requirements with attenuated flows (containment within the granular pitch sub-base) incorporated wherever necessary, without affecting the performance of the pitch.

Only natural surface water is being dealt with. The new development will not increase to the volume of water that the existing site area is currently subjected to.
The area is in a Category 1 flood zone and as such is at a low risk of flooding. Water discharging from the playing field area currently reaches the existing surface water drainage system, without any control or restrictions.

The collector drainage pipe to the synthetic pitch will connect to the existing surface water chamber within the site with a restricted outfall rate.
In terms of the proposed restricted outfall rate, where one restricted discharge rate is proposed for all events, the Qbar (average annual) greenfield runoff rate should be used, or 2.0 litres per second (l/s), whichever is the greater. The QBAR for this site is 1.02 l/s. We have, therefore, used 1.02l/s as the suggested limited discharge rate. Calculations have been based on a 1 in 100 year storm event with a 40% allowance for climate change.

- Surface water discharge rate will be restricted and the installation of the new drainage system to this area of the site will provide a more careful, managed control of discharge than the current arrangement.
- The foundations of the new synthetic turf area includes:
- 150mm deep layer of type 3 stone
 - 40mm macadam
 - 10mm shockpad
 - 40mm artificial grass surface

The minimum 240mm deep aggregate base construction offers a wedge for surface water attenuation prior to filling and flooding the pitch surface or surrounding grassed areas. The available volume of the wedge is created through the following calculations:

- The pitch layer constructed at a 1 in 500 gradient offers a volume and capacity of 1114.7m³
- Based on a voidage space of 37% this offers 412m³ of water attenuation.
- The drainage system, shown in drawing 'SC104 07 - Proposed AGP Drainage Layout', can also attenuate an additional 70m³

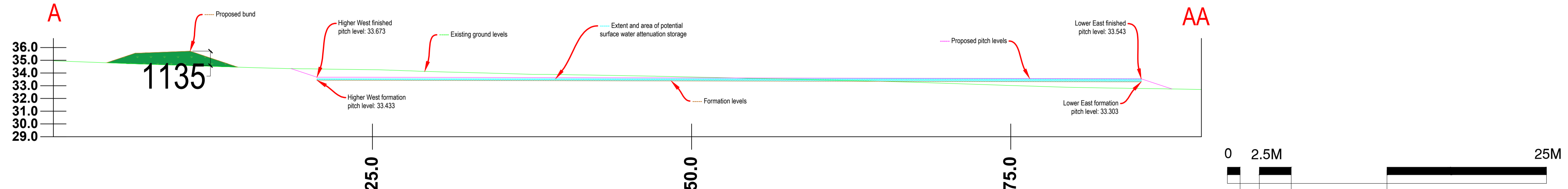
The surface water attenuation calculations as per the table below shows the following:
1 in 100 year storm event + 40% allowance for climate change at run off restricted to 1.02 l/s - would require 471m³ of attenuation

Therefore, attenuation provided by the pitch design (482m³) will cater for a 1 in 100 storm event +40% (4713) without flooding either the pitch surface or surrounding areas

Minimum Storage Required:	471 m ³	incl cc allowance		
FACTOR	VALUE	SOURCE	FACTOR	VALUE
Return Period (yrs):	100	Environment Agency, Water Authority, etc.	Additional Inflow (l/s):	0
Limiting Discharge (l/s):	1.02	Environment Agency, Water Authority, etc.	Calculate/Specify PR:	Calculate
Contributing Area (ha):	0.638	Site plans	Specify PR:	100
Impervious, PIMP (%):	100	Site plans		
M5-60min (mm):	20	Volume 3 maps and site location	Climate Change Allowance	40
SAAR (mm/yr):	627	Volume 3 maps and site location		
Ratio, r:	0.4	Volume 3 maps and site location		
Soil Type:	2	Volume 3 maps and site location		
SOIL:	0.3	Soil Type and Volume 1, Section 7.4		
UCWI:	62	SAAR and Volume 1, Figure 9.7		
Calculated PR	74.55			
Percentage Runoff =	74.55			

Duration, D (min)	M5-60 (mm)	Z1 for r=0.40	M5-D (mm)	Z2 for M100	M100-D (mm)	incl climate change	Area C (ha)	PR (%)	Runoff (m ³)	Add. Runoff (m ³)	Total Runoff (m ³)	Limiting Discharge (m ³ /min)	Limiting Runoff (m ³)	Storage Required (m ³)
5	20	0.38	7.6	1.86	14.2	19.8	0.64	75	94.2	0.0	94.2	0.06	0.3	93.9
10	20	0.54	10.8	1.93	20.8	29.1	0.64	75	138.5	0.0	138.5	0.06	0.6	137.9
15	20	0.63	12.6	1.96	24.7	34.5	0.64	75	164.3	0.0	164.3	0.06	0.9	163.4
30	20	0.80	16.0	2.00	32.0	44.8	0.64	75	212.9	0.0	212.9	0.06	1.8	211.0
60	20	1.00	20.0	2.03	40.6	56.8	0.64	75	270.3	0.0	270.3	0.06	3.7	266.7
120	20	1.20	24.0	2.01	48.3	67.7	0.64	75	321.9	0.0	321.9	0.06	7.3	314.5
240	20	1.46	29.2	1.98	57.8	80.9	0.64	75	384.6	0.0	384.6	0.06	14.7	369.9
360	20	1.60	32.0	1.95	62.5	87.5	0.64	75	416.4	0.0	416.4	0.06	22.0	394.3
480	20	1.70	34.0	1.94	65.9	92.2	0.64	75	438.8	0.0	438.8	0.06	29.4	409.4
600	20	1.83	36.6	1.91	70.1	98.1	0.64	75	466.5	0.0	466.5	0.06	36.7	429.7
720	20	1.85	37.0	1.91	70.8	99.1	0.64	75	471.6	0.0	471.6	0.06	44.1	427.5
840	20	1.90	38.0	1.91	72.4	101.4	0.64	75	482.3	0.0	482.3	0.06	51.4	430.9
1440	20	2.28	45.6	1.84	84.0	117.6	0.64	75	559.3	0.0	559.3	0.06	88.1	471.2
2880	20	2.70	54.0	1.78	96.3	134.8	0.64	75	641.0	0.0	641.0	0.06	176.3	464.8

AGP Attenuation Volume Calculations



Section A-AA Showing Surface Water Attenuation Storage - Scale 1:200

S&C SLATTER

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