Wythenshawe Sports Ground

Creation of 4 Artificial Grass Pitches

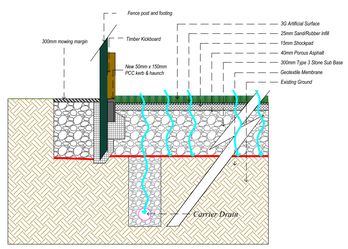
Scale: 1:20 — 0, 0.4, 1.2, 2m / 0.8, 1.6

Scale: 1:200 — 0, 4, 12, 20m / 8, 16

Scale: 1:1000 — 0, 20, 60, 100m / 40, 80

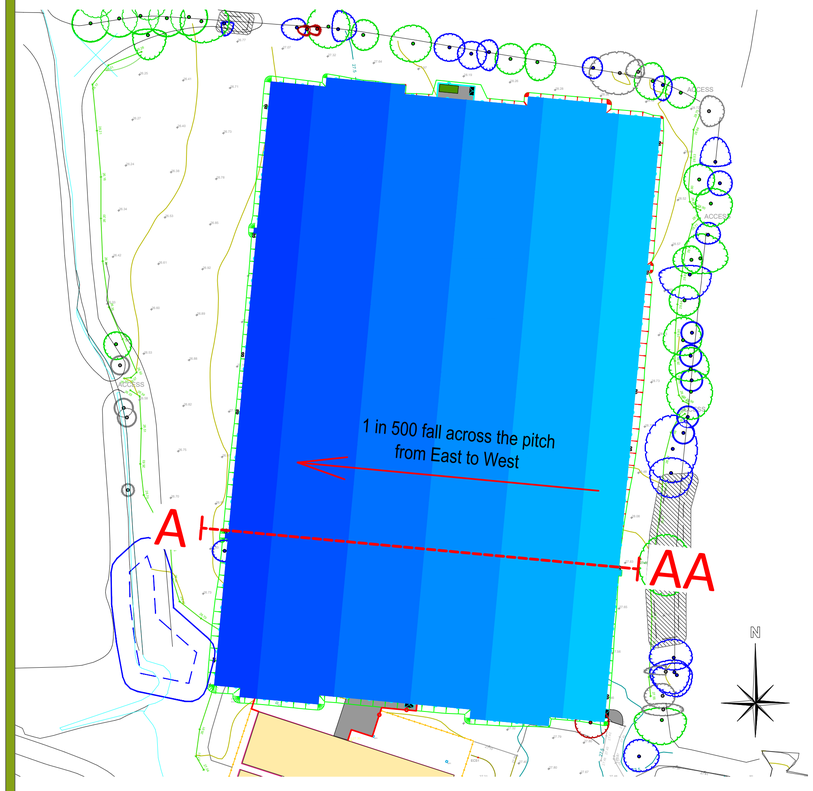
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AGP Section - Scale 1:20

Attenuation			
Number	Minimum Elevation	Maximum Elevation	Colour
1	0.10	0.15	
2	0.15	0.20	
3	0.20	0.25	
4	0.25	0.30	
5	0.30	0.35	
6	0.35	0.38	



AGP 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 Hydroway Strip drainage system being installed underneath the pitch bases. The strip drains will connect into the perforated carrier drains around the perimeter of the AGPs, connecting to a restricted manhole to the southwest of the site. The outfall pipe then connects into the existing outfall chamber further south which then connects into the watercourse to the west.

It is intended that a positive drainage scheme; 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 an watercourse, 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. The QBAR for this site is 5.7 l/s. We have, therefore, used 5.7 l/s as the suggested limited discharge rate. Calculations have been based on a 1 in 100 year storm event with a 45% 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 (shown left) includes:

- 300mm deep layer of type 3 stone
- 40mm macadam
- 15mm shockpad
- 25mm infill of sand and rubber on the carpet

The minimum 380mm 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 6405m3
  - Based on a voidage space of 37% this offers **2369m3** of water attenuation.

The surface water attenuation calculations as per the table below shows the following;

- 1 in 100 year storm event + 45% allowance for climate change at run off restricted to 5.7 l/s - would require **2090m3** of attenuation

The attenuation provided by the pitch design (2369m3) will comfortably cater for a 1 in 100 storm event + 45% (2090m3) without flooding either the pitch surface or surrounding areas

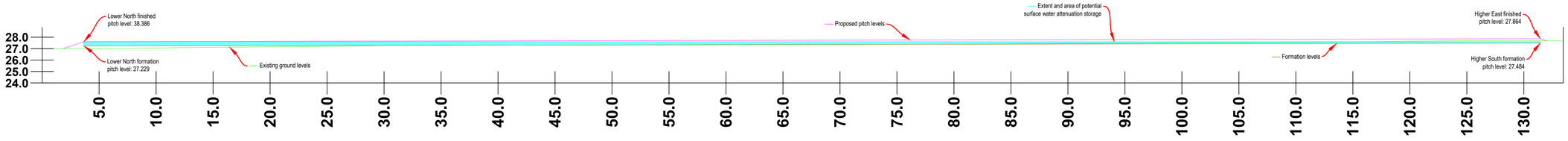
Minimum Storage Required: **2090 m³**

FACTOR	VALUE	SOURCE
Return Period (yrs):	100	Environment Agency, Water Authority, etc.
Limiting Discharge (l/s):	5.7	Environment Agency, Water Authority, etc.
Contributing Area (ha):	2.5772	Site plans
Impervious, PIMP (%):	100	Site plans
M5-60min (mm):	20	Volume 3 maps and site location
SAAR (mm/yr):	860	Volume 3 maps and site location
Ratio, r:	0.4	Volume 3 maps and site location
Soil Type:	4	Volume 3 maps and site location
SOIL:	0.45	Soil Type and Volume 1, Section 7.4
UCWI:	94	SAAR and Volume 1, Figure 9.7
Calculated PR	80.81	
Percentage Runoff =	80.81	

FACTOR	VALUE
Additional Inflow (l/s):	0
Calculate/Specify PR:	Calculate
Specify PR:	100
Climate Change Allowance	45

Duration, D (min)	M100-D (mm)	incl climate change	Area C (ha)	PR (%)	Runoff (m3)	Add. Runoff (m3)	Total Runoff (m3)	Limiting Discharge (m3/min)	Limiting Runoff (m3)	Storage Required (m3)
15	23.7	34.4	2.58	81	716.9	0.0	716.9	0.34	5.1	711.8
30	31.3	45.4	2.58	81	945.8	0.0	945.8	0.34	10.3	935.6
60	39.6	57.4	2.58	81	1195.3	0.0	1195.3	0.34	20.5	1174.8
120	45.9	66.6	2.58	81	1387.3	0.0	1387.3	0.34	41.0	1346.3
240	53.8	78.0	2.58	81	1623.8	0.0	1623.8	0.34	82.1	1541.7
360	59.1	85.7	2.58	81	1785.1	0.0	1785.1	0.34	123.1	1661.9
480	63.5	92.0	2.58	81	1917.0	0.0	1917.0	0.34	164.2	1752.9
600	67.2	97.5	2.58	81	2029.7	0.0	2029.7	0.34	205.2	1824.5
720	70.5	102.2	2.58	81	2128.7	0.0	2128.7	0.34	246.2	1882.5
840	73.4	106.5	2.58	81	2217.8	0.0	2217.8	0.34	287.3	1930.5
1440	84.9	123.0	2.58	81	2562.4	0.0	2562.4	0.34	492.5	2069.9
2160	93.7	135.8	2.58	81	2829.0	0.0	2829.0	0.34	738.7	2090.3
2880	100.0	145.0	2.58	81	3019.0	0.0	3019.0	0.34	985.0	2034.0
3000	100.8	146.2	2.58	81	3045.3	0.0	3045.3	0.34	1026.0	2019.3
3300	102.9	149.1	2.58	81	3106.3	0.0	3106.3	0.34	1128.6	1977.7
3600	104.7	151.9	2.58	81	3163.1	0.0	3163.1	0.34	1231.2	1931.9
3900	106.5	154.4	2.58	81	3215.6	0.0	3215.6	0.34	1333.8	1881.8
4200	108.1	156.8	2.58	81	3264.8	0.0	3264.8	0.34	1436.4	1828.4
4500	109.7	159.0	2.58	81	3311.6	0.0	3311.6	0.34	1539.0	1772.6
4800	111.1	161.1	2.58	81	3355.7	0.0	3355.7	0.34	1641.6	1714.1

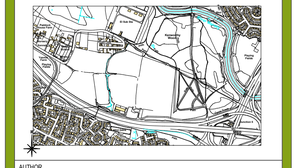
AGP Attenuation Volume Calculations



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

REV	DESCRIPTION		CK	DATE
00	PLANNING ISSUE	ME		05/03/26

Surfacing Standards Limited
SPORTS PITCH CONSULTANTS



AUTHOR: ME

TITLE: Wythenshawe Sports Ground
Creation of 4 Artificial Grass Pitches
Proposed AGP Drainage Strategy

PROJECT	SCALE	SIZE
G-229824	Varies	A1

DRAWING No	REVISION
11	00