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## WALSHAM LE WILLOWS AGROSTIS

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*Agrostis* Sports Surface Consulting aims to assist clients in matters concerning sports surfaces. All recommendations are offered free of bias. *Agrostis* has no commercial connections or obligations to any manufacturer, supplier or contractor.

19 November 2014

RJGO





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**WALSHAM LE WILLOWS AGROSTIS  
FEASIBILITY STUDY**

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# 1 INTRODUCTION

## 1.1 Background

A substantial area of crop trial fields on the north western perimeter of Cambridge has been proposed for development. The site is set to include a new primary school with associated hard and soft landscaping. In the vicinity of the primary school is an area which is planned to accommodate the main sports facilities. This report investigates the development possibilities for this area and provides a cost estimate for the suggested work.

## 1.2 Contacts

The main contact, and Agrostis' employer, is Tim Lodge, Senior Design Manager, Agrostis Construction.

21 Grove Park  
Walsham le Willows  
Bury St Edmunds  
IP31 3AE

Tel: 01359 259361  
Mob: 07725629492

### 1.3 Location

The site is at: Howes Place, Cambridge.

The nearest postcode is is: CB3 0LD

National Grid Reference: TL 43262 60326

Ordnance Survey X & Y: 543377, 260281

The location of the site is indicated in Figure 1-1.

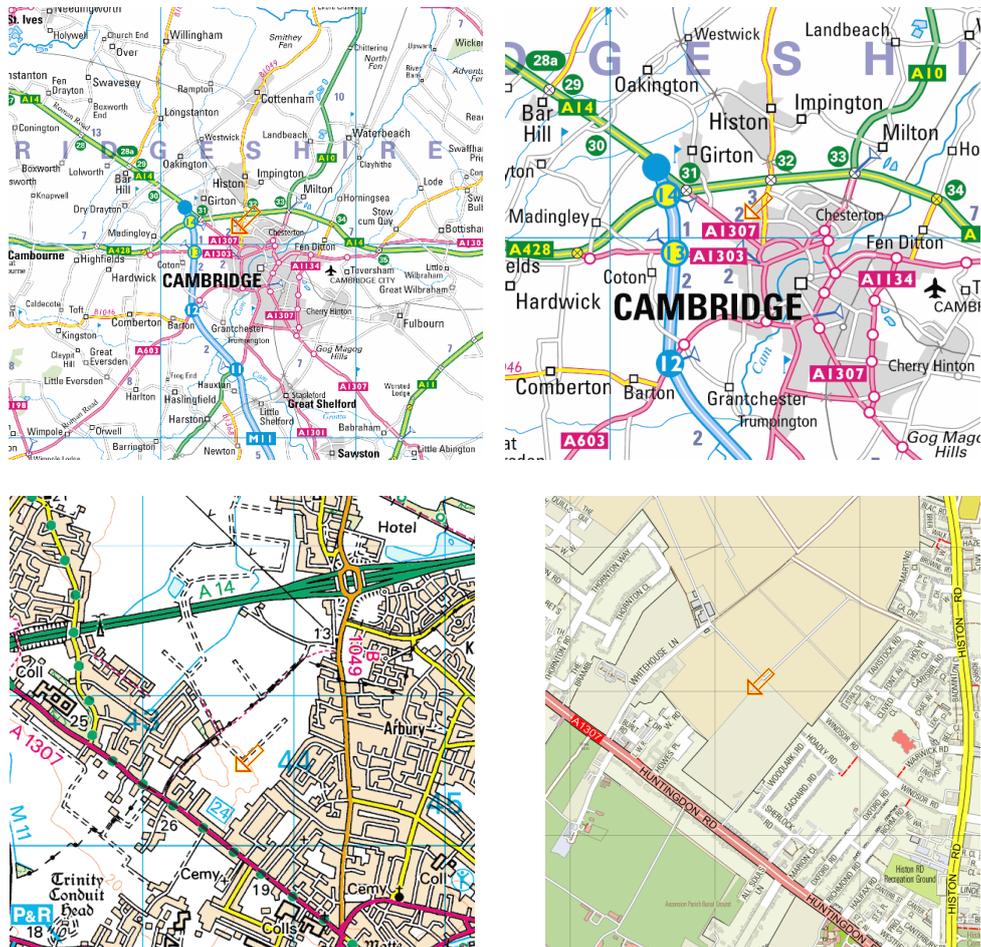


Figure 1-1 Site location maps

## 2 SITE CONDITIONS

### 2.1 Area and layout

The site measured approximately 2.29 ha, the proposed pitch development area measured approximately 1.13 ha, presented in Figure 2-1.



Figure 2-1 Area of proposed site and sports pitches indicated by red and yellow outline respectively

### 2.2 Surroundings & Boundaries

A well-established hedgerow ran northeast to southwest dividing the site approximately in half. A telegraph pole was located roughly halfway along this hedge shown in Figure 2-4. Beyond fencing and a hedge to the south and southwest of the site lay residential housing. To the northeast of south section of the site a hedgerow formed the boundary. The north section of the site was unbound on all sides.



Figure 2-2 North eastern hedgerow (left) and south and southeast boundaries (right)



**Figure 2-3 Northern section of the site facing northwest**

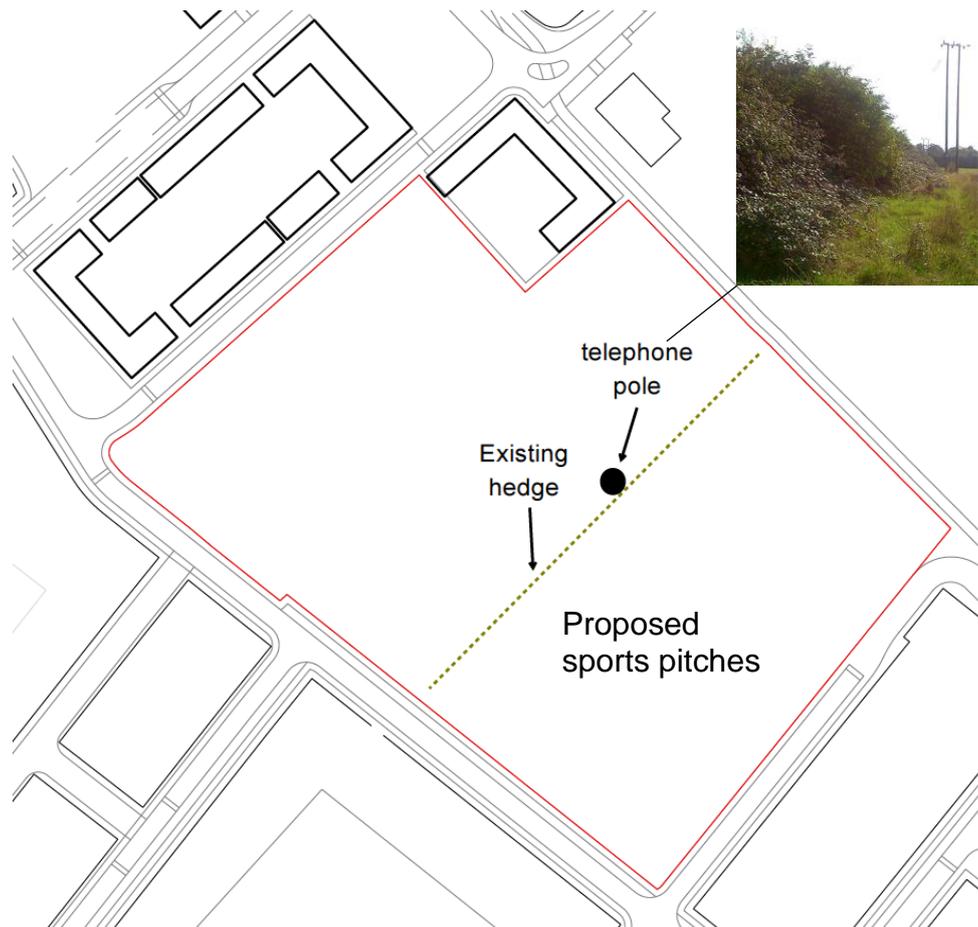


Figure 2-4 Location of existing hedge and telegraph pole with the site

## 2.3 Access

Vehicular access is obtained via the car park from Howes Place located to the south west of the site.

## 2.4 Groundcover

The site was unmaintained at the time of the visit and used intermittently for various operations by WALSHAM LE WILLOWS. The area was dominated by weed species, including thistle, dandelion and plantain. Grass species were also observed these included; timothy, fescue and annual meadow grass.



Figure 2-5 Groundcover and species diversity facing south within the southern section of the site

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## 2.5 Levels

### 2.5.1 Spot Heights

These were recorded using a tripod mounted laser and staff with receiver at the locations shown in Figure 2-6. The results were subsequently referenced to OD for display purposes.

### 2.5.2 Slope

The site fell by approximately 0.5 metres southward creating an average slope of 0.22% or 1 in 453. An average fall of 0.08% or 1 in 1200 was recorded from northwest to the south east. Northeast to southwest an average fall westward of 0.20% or 1 in 500 was observed.

### 2.5.3 Undulation

Deviation under a 2 metre was estimated to be 50 mm on average.



Figure 2-6 Spot heights

## 2.6 Drainage

At the time of the visit no man-made drainage features were observed within the proposed development area.

## 2.7 Rocks and Soils

### 2.7.1 Rocks

#### i Solid Geology

The solid geology of the site is of the Gault Formation. This Formation is described by the BGS as 'pale to dark grey or blue-grey clay or mudstone, glauconitic in part, with a sandy base. Discrete bands of phosphatic nodules (commonly preserving fossils), some pyrite and calcareous nodules. In places thin, variable junction beds at the base include some limestones.'

#### ii Drift Geology

River Terrace Deposits, 4 have been recorded by the BGS over the eastern section of the site. These are comprised of sand and gravel, locally with lenses of silt, clay or peat.

## 2.7.2 Soil

### i Classification

The soils of the area are classified by the Soil Survey of England and Wales as being of the Hanslope Association. This is typical of much of the surrounding area. The soil type is formed over chalky till and is described as *'slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soil. Slight risk of water erosion.'*

### ii Excavation

#### i Topsoil

One pit was excavated at the location indicated in Figure 2-8. Topsoil was estimated to be 230 mm deep. Texture was that of a clay loam soil with a high organic content and dark greyish brown colour. A thick thatch/fibre layer was observed of approximately 40 mm thickness. Beneath the thatch layer soil structure appeared to have been compromised though some degree of compaction. A very small number of tiny stones were observed, mostly in the form of chalk and flint fragments.

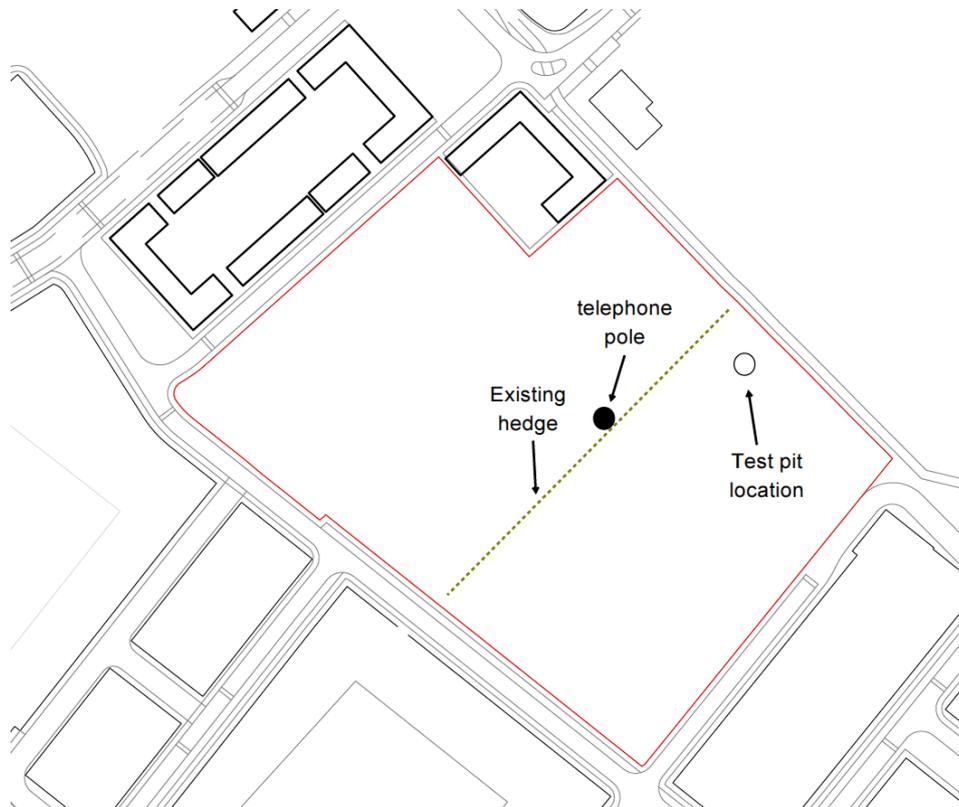
#### ii Subsoil

At 230 mm below the surface material was light olive-brown in colour with yellowish red mottles. Texture was clay loam to clay. This material is expected to extend to approximately 600 mm below the surface. Below which will lay the parent material. This is highly likely to be a clay loam or clay with chalk fragments.



Figure 2-7 Soil profile

The test pit location is indicated in Figure 2-8.



**Figure 2-8 Location of test pit**

### 3 DISCUSSION

The site investigation has indicated that for this field to be brought into use as a sports facility special consideration needs to be paid to the following items:

- Undulation
- Drainage
- Creation of a surface suitable for sporting use

A proposal for the development of the site has been put forward, which incorporates school buildings, hard and soft play areas, dedicated sports pitches and environmental features.

The current field is relatively flat and does not pose any concerns with regard to slope. However, with the significant undulations observed and the extent of the proposed associated works, it is suggested that the sports field is completely stripped of topsoil in suitable conditions and this material stock piled. Subsequently the subsoil should be laser graded to produce an approximately 1 in 200 south facing slope as indicated in Figure 3-1. This will marginally increase the slope of the field. By removing the topsoil and levelling within the subsoil a patchwork of topsoil distribution can be avoided. Once subsoil grading is complete topsoil should be replaced in suitable conditions. Note that for the specification for these works and to achieve a more precise definition of the intended platform, 3D levels survey data at at least 10 metre centres will be required.

On heavy soil such as this it is recommended that a pipe drainage and soakaway system is installed into the sports surfaces. The system should drain into a soak-away chamber in the lowest corner of the site. A catch-water drain is incorporated into the proposed design situated along the south eastern site boundary. This will reduce the risk of surface water inundating the adjacent road. Lateral drains over the sports pitches would ideally be installed at 5 metre centres. A plan of how the drainage features may be incorporated into the design based on the above recommendation is presented in Figure 3-1.

In addition to a drainage system a 50 mm sand carpet is recommended. This will further improve pitch performance both in terms of drainage and wear tolerance, most particularly by allowing the surfaces to recover more rapidly from recent rainfall events.

Once prepared the sports pitches should be seeded with a seed mixture suitable for sporting use and the proper procedures for early management of establishing turf adopted.

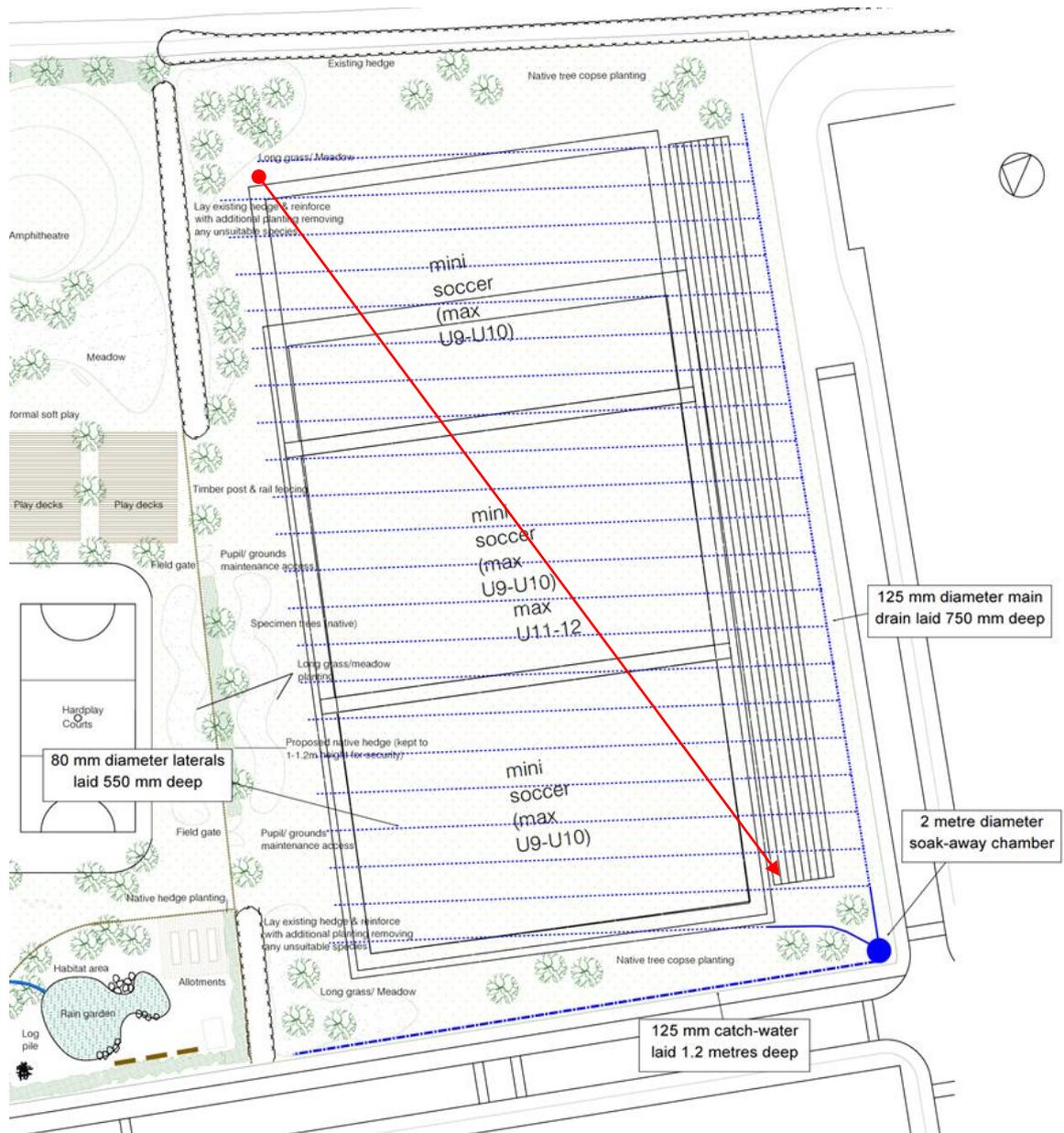


Figure 3-1 Proposed drainage layout, red arrow indicates direction of field slope after laser grading

# 4 PRELIMINARY PROCEDURES

## 4.1 Office procedures

It is hoped that on the basis of this report, the reader will be able more accurately to decide what should happen next. This will largely be determined by what funding is available. Having explained your conclusions to us, Agrostis will then be able to take the project forward for you.

### 4.1.1 Design, Specification and Bill of Quantities

The most successful approach will be to prepare a detailed design drawing and specification of works with bills of quantities.

### 4.1.2 Tendering

Once approved, this documentation should then be used to go out to tender. Contractors can vary by as much as 30 % when bidding for the same work so this method, approaching at least 5 known and reputable contractors, is invariably the most cost effective.

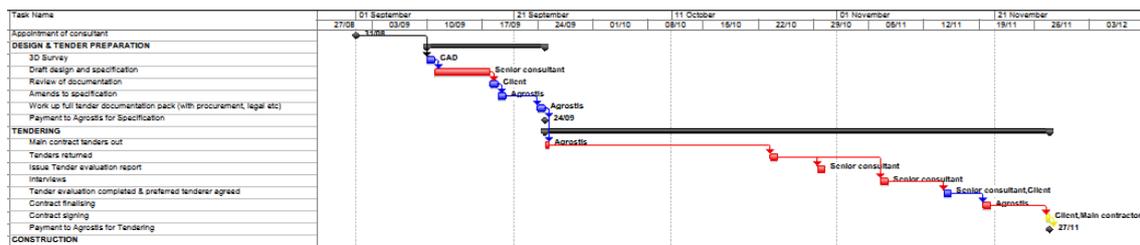


Figure 4-1 Extract from project timescale showing design and procurement phase

### 4.1.3 Supervision and aftercare

The works should be supervised by an experienced sports turf consultant as they take place. In addition, the contractual aspects of the project, including CDM requirements, should also be managed by the consultant.

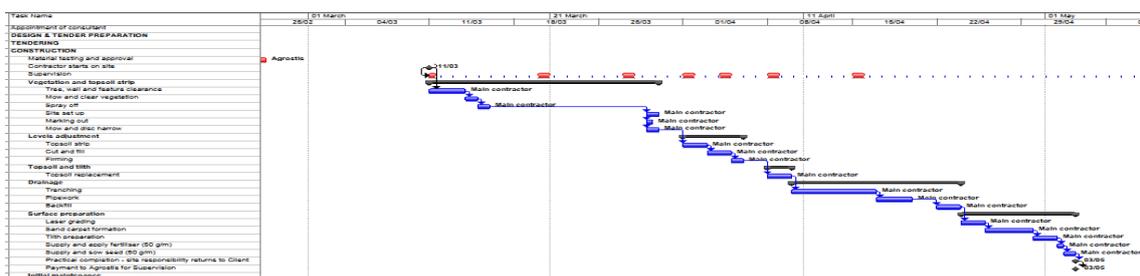


Figure 4-2 Extract from project timescale showing main earthmoving elements of the construction work, commencing spring 2014

### 4.1.4 Maintenance plan

On completion of the works, it would be appropriate to prepare a management plan indicating the ongoing maintenance needs of the site. This would entail monitoring of the surfaces during their use and of the maintenance work carried out on them.

Agrostis provides all of the services described above.

## **4.2 Site specific issues**

### **4.2.1 Timing**

Works involving topsoil stripping and/or re-cultivation should ideally be timed to achieve the sowing of grass seed in late August or September. This removes the need to be concerned with irrigation and can greatly reduce weed ingress. Alternatively, sowing could take place in spring, say in April or May. Leaving it later than this will increase the risk of losing the new grasses due to drought and heat.

### **4.2.2 Access**

Vehicular access will need to be clarified among all concerned before any work commences. It will also be necessary to establish an area to serve as a compound for the sports ground contractor during the course of the works.

### **4.2.3 Tree protection**

Trees and other features to be protected will need to be identified prior to the commencement of the works.

## 5 PRACTICAL PROCEDURES

Having undertaken the design procedures described above; the project itself, defined in the specification, will comprise the following key operations.

### 5.1.1 Topsoil strip

All topsoil will be stripped and replaced using an approved method. An area shall be put aside for topsoil storage within the site. Soil and weather conditions are crucial to this stage of the project. Both should be dry.

### 5.1.2 Sub-soil grading

Grading will be undertaken in suitable conditions and using appropriate machinery within the sub-soil to form a 1:200 southward sloping plane.

### 5.1.3 Topsoil replacement

Once operations are complete the topsoil should then be replaced. The topsoil will be laser graded to form one single sloping plane flush with the surrounding and existing ground surface.



**Figure 5-1 Spreading topsoil over subsoil**

### 5.1.4 Drain installation

Use a drain trencher to incorporate main drains and outfalls and then install lateral drains as specified. The backfill materials should be appropriate gravel followed by a very coarse, lime free sand. The selection of these materials is highly specific and samples should be approved for use by the Engineer prior to incorporation.

The subsequent ground preparation will then provide the mechanism by which the sand in the drain lines may be blended to an appropriate degree with the topsoil. This procedure needs to be carefully monitored but the end result should be a surface that is not prone to drain line shrinkage and subsidence and the grass over the drain lines does not discolour or suffer unduly during dry periods.

### 5.1.1 Tilth preparation

Subsequently a seedbed will be formed through topsoil cultivation and grading. Usually the cultivation is achieved using a stone burier and the tilth achieved by combining this with a grader, Cambridge roller and whatever stone removal operations, if any, may also be required.



**Figure 5-2 Preparation of the seedbed**

### **5.1.2 Sand carpet**

The sand carpet is a crucial component of the pitch construction and though it is expensive it makes the difference between a good and resilient playing surface and one that is merely adequate. In particular the ability to play on the surface very soon after rain is one of the benefits.



**Figure 5-3 Sand carpeted pitch awaiting grass establishment**

The appropriately specified sand should be spread and then blended with the top 25 to 50 mm of the topsoil in order to improve the germination and establishment of the grass. This is a critical operation that is very much dependent upon the exact nature of the topsoil at the time and so needs expert supervision.

### **5.1.3 Seeding**

Seed should be sown using a disc seeder delivering the specified seed mix at a rate of 50 g m<sup>-2</sup> to the working area. At least two passes should be made with the machine to achieve this.

### **5.1.4 Fertiliser**

In October, apply a slow release fertiliser at a rate of 25 g/m<sup>2</sup>. Suitable products contain between 14 and 26 % nitrogen.

In spring, apply a 20:10:10 fertiliser at the same rate.

### **5.1.5 Seed and sowing**

A specified seed mix appropriate for the location and mode of construction will contain good cultivars of perennial ryegrass, smooth stalked meadow grass and fescues. A sowing rate no less than 35 g/m<sup>2</sup> should be employed. This should be sown in 3 passes with a dimple seeder. The application of a suitable pre-seeding fertiliser should take place before sowing.

### **5.1.6 Growing in**

The contract should include the maintenance operations required during the growing in period which should extend to at least the 5th mowing operation on the new surface and preferably for a full year following sowing. Those operations will include mowing, the type of mower and the height of cut being specified, fertiliser applications, weed control measures and stone removal.

Note that it may be necessary to retain a quantity of sand/soil mix to form backfill material for topping up of lateral drain lines which can subside, particularly during the first summer after installation. A supply of seed should also be made available and sown by hand along the drain lines as their levels are corrected in this way.

## **6 ESTIMATE OF COSTS**

A guideline for the cost of the development as described is provided in Table 6-1. These are estimates based on an examination of the available survey data and on volumetric calculations of the existing levels. The specification put out to tender would of course provide accurate figures.

It would be expedient to allow an additional figure of 10 % for contingencies in the contract documentation. Prices do not include VAT.

WALSHAM LE WILLOWS AGROSTIS

Description	Unit	Qty	Typical rate	Item cost	Sub-Total
<b>Preliminary (Agrostis Turf Consultancy Ltd)</b>					
Design & Specification	%	1	-	£1,500.00	<b>£4,500.00</b>
Tendering & administration	%	1	-	£250.00	
Project management	%	1	-	£2,750.00	
<b>Contractor preliminaries</b>					
Access	Item	1	300.00	£300.00	<b>£1,550.00</b>
Insurances	Item	1	250.00	£250.00	
Storage compound	Item	1	800.00	£800.00	
Welfare facilities	Item	1	200.00	£200.00	
<b>Earthworks</b>					
Spray off	sq m	11050	0.05	£552.50	<b>£24,089.00</b>
Strip topsoil (200 mm)	cu m	2210	2.20	£4,862.00	
Balanced cut & fill (inc. firming and laser grading)	cu m	5525	2.50	£13,812.50	
Replace & spread topsoil	cu m	2210	2.20	£4,862.00	
<b>Pipe drainage</b>					
Main drain - perforated 125 mm diameter	m	125	15.00	£1,875.00	<b>£28,603.84</b>
Discharge to attenuation chamber solid 125 mm diameter	m	30	25.00	£750.00	
Laterals	m	2143	9.50	£20,354.67	
Attenuation chamber	Item	1	2500.00	£2,500.00	
Spoil bund formation to 0.5 metres high	sq m	329	9.50	£3,124.17	
<b>Sand carpet</b>					
Supply sand	tns	874	27.00	£23,591.87	<b>£26,272.15</b>
Spread sand	sq m	10721	0.25	£2,680.28	
<b>Sward establishment</b>					
Pre-seeding fertiliser - supply and apply	kg	536	2.20	£1,179.33	<b>£4,682.44</b>
Seed purchase - Pitches	kg	536	4.40	£2,358.65	
Seed purchase - Bund	kg	16	4.40	£72.35	
Roll	sq m	10721	0.10	£1,072.11	
<b>Early maintenance</b>					
Stone pick	sq m	10721	0.02	£214.42	<b>£4,630.96</b>
Roll	sq m	10721	0.02	£214.42	
Rotary mowing	Item	1	180.00	£180.00	
Cylinder mowing	Item	4	180.00	£720.00	
Post establishment fertiliser - supply and apply	kg	375	2.20	£825.53	
Subsequent fertiliser applications	No	3	825.53	£2,476.58	
				<b>Total</b>	<b>£94,328.39</b>

Table 6-1 Estimate of project costs

**Signed:**

A handwritten signature in black ink, appearing to read 'Richard Overton', written in a cursive style.

**Mr Richard Overton  
Consultant  
Agrostis Sports Surface Consulting**