



Greater Manchester Youth Federation & Innov8

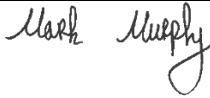
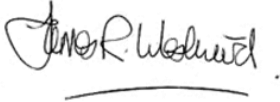
Specification of works for the redevelopment of new natural turf playing fields

STRI Project No: J007286

Prepared By: Mark Murphy

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Contents

SPECIFICANTIONS	
S100 GENERAL SPECIFICANTS	3
S200 DIMENSIONS AND TOLERANCES	6
S300 NEW PLAYING FIELD DEVEOPLMENT	8
S400 INITIONAL MAINATENANCE	16
APPENDICES TO PITCH CONSTRUCTION	
APPENDIX 1	19
APPENDIX 2	20
APPENDIX 3	21
APPENDIX 4	22
APPENDIX 5	23
APPENDIX 6	24

S100
GENERAL SPECIFICATION

S100 GENERAL SPECIFICATION

S101 Introduction

As part of a wider development proposal a new market and social housing will be developed on part of the former Mellands Playing Fields site. This includes the delivery of circa 267 homes and other ancillary uses will include new sports pitches to be built on the existing Mellands Playing Fields site which is located in Gorton, Manchester.

STRI originally carried out a multi-site assessment across two sites in total, namely Mellands Road playing fields and Debdale Park. Please see original multi-site assessment document for further information. To allow for the loss of the unused pitches it was proposed to create two full sized football pitches and a low-level cricket wicket which could be used for community usage.

Proposed formation surface levels have been provided to STRI along with the proposed a restricted outlet. Fencing details will be provided by others as part of the wider development.

The client has proposed that there is MOT layer of material to be uniformly placed under the pitches and that there will be an impermeable membrane laid at 600 mm.

S102 Site location

The existing site is located on the south-east outskirts of the city of Manchester, approximately 4 miles from the city centre.

Vehicular access can be gained of Mount Road (B6178) to the north-west of the site.

The post code for the school site is M18 7SU.

S103 Existing Conditions

During the initial site assessment, the area was noted to be in poor condition, and it was evident that no sporting activities had taken place on the site for some time. The height of the existing surface vegetation was excessive. STRI understand that the playing field surfaces have not been maintained since circa 2019, this leading to high levels of thatch build-up and ingress of undesirable weed grass and weed species.

The site is relatively flat with a general fall from east to west. The direction of the fall is generally consistent across the site, although the local gradients are not uniform, these ranging from -1:85 to -1:156. It was difficult due to the height of the vegetation to assess the surface micro levels. Although the site was noted to be relatively flat with gentle gradients, there was not a uniform and consistent gradient across the area as would be expected on a playing field site.

The topsoil depth ranged from 190 mm in the north-east corner to 290 mm in the south-west corner (proposed location of replacement playing fields). The topsoil was dark, dry, and relatively friable at the time of the site assessment and lacked natural structure. Roots were observed to be penetrating to a maximum depth of 160 mm across all the trial pits excavated. No waterlogging was evident. Thatch accumulation was excessive. Trial pits were noted to be easy to dig until encountering the hard underlying subbase material below. The underlying subsoil / subbase consisted of a hardcore stoney / asphalt layer which was impossible to dig through using hand tools. There was a clear interface between the two layers. Glass was common within the topsoil layer. The existing site topsoil fell into the sandy loam textural classification.

S104 Scope of works

The works consist of developing two full sized football pitches and peripheral grassed areas on graded formation surfaces prepared by others. However, the formation surface provided to the Pitch Contractor will require final grading by the Pitch Contractor upon acceptance. An impermeable membrane will be presented to the Pitch Contractor by others, and the Pitch Contractor shall install the required membrane. The remainder of the pitch profile shall comprise imported layers of subsoil and topsoil and associated works shall include the installation of a primary drainage system, cultivations, sand layer, secondary drainage, seeding and initial maintenance.

The scope of works will include, but not necessarily be limited to, the following main operations:

Site enabling works

- Establish site access (provided by others)

- Establish site compound.

Formation surfaces

- Final trimming of the formation surface prepared by other

Protection membrane & Impermeable membrane

- Supply and install of protection membrane on formation surface
- Installation of impermeable membrane (will be provided by others in rolls)
- Supply and install of protection membrane on top of impermeable membrane

Topsoil & subsoil replacement

- Supply and spreading of imported subsoil and topsoil layers.

Pipe drainage

- Installation of pipe drainage system with lateral drain intervals at 4 m centres.
- Connection of drainage system to a wider drainage scheme developed by others.
- Install of flow control device
- Install of wider drainage scheme chamber S1 in line with V2 – Sewer Connection (S1) – WPI (addendum) method statement and Drawing no: 30571_1_1G_Highway And Drainage Layout).

Cultivations

- Cultivate topsoil layer over working area.
- Stone picking.
- Sand amelioration (pitch area only).

Secondary drainage

- Install sand bands (pitch area only).

Seeding

- Prepare seedbed.
- Supply and sow seed.

Initial 12-month maintenance

- Remove any remaining stones and roll surface.
- Commence mowing when the grass is 60 mm high.
- Apply further dressing of fertiliser as required.
- Sand topdressing.
- Overseeding.
- Selective weed control.
- Verti-draining.

S200
DIMENSIONS AND TOLERANCES

S200 DIMENSIONS AND TOLERANCES

S201 Drainage Pipelines

Where required, lateral and main drains are to be installed in the pitch area with the invert level as shown on the drawings or depths set out in section S300.

The position of the internal face of any pipeline shall not deviate from that shown in the Drawings by more than the tolerance detailed below: -

From the design level and gradient	+ or - 20 mm
From the line of the drain	+ or - 50 mm

Where feasible, pipelines shall be laid at a uniform gradient or shall generally follow the natural gradient of the land.

Overall pipeline gradients shall not differ from the required gradients by more than 10% e.g. for a specified grade of 1 in 50 pipes laid at between 1 in 45 and 1 in 55 will be acceptable provided the other criteria above are also satisfied.

S202 Formation surface

The formation surface for the pitch platform shall be constructed with maximum deviations no greater than 25 mm over 2 m.

The finished level of the pitch platforms shall be constructed in accordance with the design levels and gradients shown on the construction drawings to produce a smooth and even playing surface.

The provisional depths for each layer and the maximum deviation from design levels required on each surface layer are specified in the table below. Any proposed deviation from these depths for the build-up of the profiles shall be confirmed.

Layer	Firmed minimum
Topsoil layer (total)	300 mm
Sand layer (prior to raking)	25 mm

Tolerances of the upper surface of each layer measured using a 2 m straight edge shall conform to the following:

Prepared topsoil layer	Max. 20 mm gap with the finished surface within +20/-20 mm of the designed finished surface heights
Formation surface	Max. 25 mm gap graded to a tolerance of +0/-25 mm of the specified design level

S203 Platform dimensions

The pitch platform shall be a sufficient size to accommodate two full sized adult football pitches sized 100 x 64 m (6,400 m²), with overall dimensions of 106 x 70 m (7,420 m²) per pitch, total playing area (14,840 m²)

Total working area including batters is 16,435 m².

S204 Drawings

The following drawings are included:

Drawing No	Title
J007286-001	Proposed General Layout (By others)
J007286-002	Proposed Finished Levels
J007286-003	Proposed Drainage Layout
J007286-004	Proposed Drainage Profiles
J007286-005	Proposed Earthworks Section
J007286-006	EPG Hydrobrake Flow Control Chamber Detail

S300

NEW PLAYING FIELD DEVELOPMENT

S300 PITCH DEVELOPMENT

S301 Access

1. The Pitch Contractor shall use the access round prepared by the Main Contractor which is gained off Mount Road to the north-west corner of the site. this entrance shall be used throughout the Contract Period for all equipment and materials, together with all necessary traffic and pedestrian management measures including warning signs.
2. The Pitch Contractor shall allow for any reinstatement works necessary which specifically deals with south-western area in which the sports pitch plateau will be constructed.
3. The Pitch Contractor shall provide adequate protection to prevent damage to all structures and infrastructure on the access route to the pitch and adjacent to the working area.

S302 Storage Compound

1. The Pitch Contractor shall provide and maintain throughout the contract period a storage compound for equipment and materials within the site area at a location agreed with the Main Contractor.
2. Allowance shall be made for fencing around the compound for the duration of the works using Heras or other approved site fencing. The Pitch Contractor shall carry out full reinstatement of the compound area to the original condition on completion of the works.

S303 Acceptance and grading of formation surface

1. The Pitch contractor shall satisfy himself of the build-up of the formation and the condition of the graded formation surfaces, as prepared and presented by others. It is essential that any deficiency in the formation is rectified to produce a satisfactory surface prior to continuing with the next phase of work. The Pitch Contractor shall draw the attention of the Main Contractor to any problem areas identified during this initial assessment and preparation works.
2. Upon acceptance of the formation surfaces, the Pitch Contractor shall carry out further light grading the formation surface to the required grade, as laid out on Drawing no. J007286-002. The Pitch Contractor shall carry out final trimming and consolidation using laser guided grading equipment to produce the required finished levels.

The graded formation surface shall be constructed to a finished level with a tolerance of +/- 25 mm.

3. At this point there will be a requirement for the Pitch contractor to excavate the main drain along the western wing as it will drop below the 600 mm depth of subsoil and topsoil into the formation surface. There should be an allowance made to remove this material off-site to a licensed tipping facility. This western main drain will need to be excavated prior to the laying of the protective and impermeable membrane.

S304 Laying of protective membranes and impermeable membrane

1. Protective membranes

There is a requirement to lay a geotextile separator layer over the entirety of the formation surface. This is put in place to prevent the puncture of the impermeable membrane from sharp objects.

All joints shall overlap by a minimum of 300 mm.

There is a requirement for a protective membrane above and below the impermeable membrane.

The geotextile product shall conform to the values stated below:

Geotextile property	Standard	Units	Nominal Values
Tensile strength – Warp	EN103 19	kN/m	12
Tensile strength – Weft	EN103 19	kN/m	12
Elongation at maximum load – Warp	EN 10319	%	28
Elongation at maximum load – Weft	EN 10319	%	16
CBR puncture resistance	EN ISO12236	N	1800
Cone drop penetration	EN91 8	mm	15
Pore size 90% finer than	EN ISO12956	microns	225
Water permeability	EN ISO1 1058	m/sec	0.0 16
Effect of UV light	The Polypropylene used contains a UV inhibitor		
Weight		g/m2	90
Roll size – width		m	4.5
Roll size – length		m	100

2. Impermeable membrane (provided by mains contractor)

The impermeable membrane will be provided by others (mains contractor) and will be installed by the Pitch Contractor.

The impermeable membrane shall be manufactured from Low Density Polyethylene (LDPE), butyl or other approved component with an operational lifespan of at least 20 years and be capable of resisting the chemical action of fertilisers, pesticides, and herbicides.

It shall be sufficiently flexible to accommodate placing around any trenches.

The membrane joints and overlaps shall be fully heat welded to ensure it is 100% impermeable in accordance with the manufacturer's instructions.

There is a requirement to wrap the western main drain as it will drop the formation surface. This is to be carried out prior to the installation of subsoil and topsoil.

The impermeable membrane shall conform to the values stated below or approved equivalent:

Property	Standard	Units	Nominal Values
Thickness	ASTM D 5199	mm	≥ 0.5
Density	ISO 1183-87	g/cm3	≥0.9
Tensile strength	ISO R 527	N/mm2	≥ 16 L; ≥ 16 T
Elongation	ISO R 527	%	≥ 300 L; ≥ 300 T
Tear strength	DIN 53363	N/mm	≥ 100 L; ≥ 100 T
Hardness	ISO 868-85	Shore A79	± 2; 10s
Cold crack temperature	DIN 53372	°C	-25 no cracks
Cold mandrel test	DIN 53361	°C	-25 no cracks
Dimensional stability	DIN 53377	%	≤ 2

Water permeability	CEMAGREF	m/s	< 10 ⁻¹⁴
Burst strength on ø 50 mm	CEMAGREF	kPa	600 1 mm; 700 1.2
Puncture resistance on 20/40 quartzite	CEMAGREF	kPa	800 1 mm; 1300 1.2

S305 Subsoil importation and spreading

1. The Pitch Contractor shall proceed to import and spread subsoil.

This imported subsoil shall be a natural, 'as-dug' material and be free from physical and chemical contamination and should not contain stone or boulders greater than 150 mm in any dimension and as well as no glass, pottery, chemical or other physical contaminants.

The Pitch Contractor shall identify the source of the subsoil.

The subsoil shall be carted and spread using appropriate equipment to minimise soil compaction.

The approved subsoil shall be spread to a nominal depth of 325 mm but shall be a minimum firmed depth of 300 mm at any location on the pitch areas and associated surrounds.

2. Final spreading and grading shall be undertaken using a laser-controlled dozer grader or other suitable method.

S306 Topsoil importation and spreading

1. The upper profile of the new pitch areas and surrounds shall be formed using an approved imported topsoil.

A general requirement of the topsoil is that it should be reasonably free draining, although a degree of natural moisture retention will be desirable to assist normal grass growth during prolonged dry spells of weather in the summer. The topsoil shall have a total sand content of between 45 – 70%, a maximum silt content 35% and a maximum clay content of 20% with a textural classification as defined on the textural triangle included in Appendix 3.

This imported topsoil shall be a natural, 'as-dug' material and be free from physical and chemical contamination and should not contain stone greater than 25 mm in any dimension and no sharp-edged stone as well as glass, pottery, chemical or other physical contaminants.

The topsoil shall have a maximum organic matter content of 8%.

The Pitch Contractor shall identify the source of the topsoil.

2. The approved topsoil shall be spread to a nominal depth of 325 mm but shall be a minimum firmed depth of 300 mm at any location on the pitch areas and associated surrounds.

The Pitch Contractor shall take all necessary precautions to ensure that the topsoil material is not contaminated by any stones, rubble or any other deleterious material.

The topsoil shall be carted and spread using appropriate equipment to minimise soil compaction.

Lightly consolidate and trim the topsoil to the required depth taking care not to disturb the underlying geotextile covered sub-base.

Final spreading and grading shall be undertaken using a laser-controlled dozer grader or other suitable method, including hand raking where appropriate, to achieve the specified finished tolerance.

Cultivate to relieve compaction throughout the full depth of the re-spread topsoil, using power harrows or other approved equipment. The cultivations shall be carried out at a time when the topsoil is dry and in a suitable condition to produce a satisfactory tilth.

The finished surface of the turf areas shall be 25 mm above the edge of any surrounding kerb edging.

S307 Primary drainage system

1. General

Install pipe drainage system with 80 mm lateral drains at 4 m centres on the pitches areas, as shown on Drawing Number: J007286-003 using laser guide trenching equipment. All drain runs shall be tested for line and gradient before backfilling.

The Pitch Contractor shall inspect the site and satisfy himself as to the ground conditions. Lateral drain trenches shall be a minimum width of 150 mm, but the Pitch Contractor shall allow for excavating trenches as wide as necessary with appropriate machinery available to him.

The 150 mm main collector drain along the width of play should be laid at 600 mm deep at the head of the pipe and laid at a -1:150 fall as shown on Drawing Number: J007286-003. The 150 mm main collector drains running along the length of the pitches should be laid at 550 to invert at the head of the pipe and laid with the fall of the platform shown on Drawing Number: J007286-003.

Lateral drains shall be laid at 500 mm to invert and laid with the fall of the platform, although allowance should be made for the bending of the pipes to allow for connection to the main collector drain along the western wing as the drain deepens below the formation surface.

The main drains shall discharge into a silt chamber into a backdrop manhole in the southern corner containing a flow control device (Hydrobrake) as shown on Drawing Number: J007286-006

Perforated plastic pipes shall conform to BS 4962:1989 with the Kite Mark clearly shown.

All joints in the drains and connections between laterals and main drains shall be made using purpose made junctions of appropriate size.

The Pitch Contractor shall allow to keep all drainage arising on-site and can use this material for landscaping around the bank to the west and grade in with existing levels.

The aggregate used for drain trench backfill shall generally be a hard 2-6 mm gauge material, free of fine particles.

The aggregate shall comprise particles that are angular, sub-angular or sub-rounded in shape. The aggregate shall not contain particles that are flaky, laminar or platy in shape, susceptible to breakdown during working by machinery. Any proposed materials shall be approved by the Main Contractor's Agent.

Material for blinding over the aggregate shall be a lime-free sand with a grading curve within the central recommended range of the diagram at Appendix 4.

All backfilling materials shall be adequately firmed to prevent settlement.

2. Drain installation

Excavate topsoil and subsoil to form drain trenches to required depth and shape the trench bed to receive pipes. The spoil shall be loaded as it is excavated and carted to be landscaped.

Backfill drain trenches up to 150 mm from ground level using approved 2-6 mm gauge aggregate. Adequately and evenly firm to prevent settlement leaving surface flat.

Cover the 2-6 mm gauge aggregate to the surface with 150 mm firmed depth of an approved blinding sand (with a particle size distribution within the central section of the grade curve in (Appendix 5) and firm.

3. Silt Chamber

Excavate to required depth and construct chamber at location shown on the Drawing. The minimum inside measurements shall be 900 mm x 600 mm and to a depth of 300 mm below the invert of the outlet pipe except where otherwise specified.

A backdrop manhole is to be installed as per Drawing Number: J007286-006 in the south corner of the plateau. There is a require for a 1500 mm diameter chamber with a 600 mm minimum access lid.

A Hydrobrake flow control device to be fitted to this chamber as per Drawing Number: J007286-006.

Allowance shall be made for building in rigid inlet and outlet pipes and pointing and sealing around all units and pipes to ensure efficient waterproofing. Corrugated plastic pipes shall be sleeved in rigid pipe with a minimum length of 1.5 m fixed securely into the chamber wall.

Following construction of the chambers, the surrounding ground shall be reinstated by placing and consolidating subsoil in 150 mm thick layers. The inlet and outlet pipes shall be maintained at the required gradient and invert levels during backfilling. Topsoil shall be replaced to the minimum consolidated thickness of 150 mm.

The chambers shall be fitted with Grade B cast iron covers and frames to BS EN 124:1994. The frames shall be bedded on and haunched in cement mortar. The covers shall be set 25 mm below the adjacent ground level.

4. Flow control

A Flow control device (Hydrobrake) shall be installed at the location shown on the construction drawings to control the flow of surface water to 8.4 l/s from the pitch plateaus as indicated on Drawing Number: J007286-006. If this flow rate is exceeded, water is then allowed to back up into the main drains and laterals and their associated gravel trenches, and into the lower part of the pitch build-up.

The proposed flow control manhole details can be found in EPG Drawing Number: J007286-003

5. Outlet drain

An outlet drain shall be installed running from the silt chamber located at the southern corner of the plateau, this will then connect with the wider drainage scheme through chamber S2 (by others and labelled on 30571_1_1G_Highway And Drainage Layout). The drain shall comprise a 225 mm diameter unperforated twin wall plastic pipe laid to the invert depth and gradients shown on the Drawing.

When excavating the drain trench, the topsoil shall first be removed and then the subsoil, the materials being preserved separately to one side for replacement.

The Contractor shall be responsible for making good the surface if settlement occurs on the trenches.

Following laying and sealing of the pipe, subsoil shall be replaced first and then the topsoil. Each material shall be adequately firmed to avoid settlement.

Allowance shall be made for breaking in and connecting to the silt chamber with pointing and sealing around all joints to ensure efficient waterproofing.

The client has requested that the Pitch Contractor allows to install chamber S1 on the wider drainage scheme in line with V2 – Sewer Connection (S1) – WPI (addendum) method statement and Drawing no: 30571_1_1G_Highway And Drainage Layout).

S308 Initial cultivations

1. Cultivations

The topsoil shall be cultivated to a minimum depth of 150 mm between and parallel to the lateral drains, taking care not to disturb the backfilling above the drain lines in order to relieve compaction and produce a good tilth.

Allowance shall be made for at least two further passes along or over the lines of the laterals at a maximum depth of 100 mm, taking care not to disturb the underlying gravel backfill.

2. Trimming

The surface shall be trimmed and graded with an approved blade grader to the gradients desired i.e. free from humps, depressions and ruts with a finished grade of ± 20 mm over a 3 m straight edge.

3. Stone picking

All stones and other debris with any dimension greater than 20 mm shall be removed from the upper 50 mm of the topsoil using an approved mechanical stone rake or collector.

S309 Secondary drainage

1. Secondary drains shall be installed over the football pitch only in the form of sand bands using a Koro Top Drain or similar approved machine. The bands shall connect with the gravel backfill within the underlying pipe drains and shall be excavated 40 mm wide at a 500 mm spacing and at least 200 mm deep. A clean connection between the bands and the gravel backfill within the pipe drains must be demonstrated on completion.
2. The bands shall be backfilled to the surface level using medium-coarse sand with a grading curve which lies within the central recommended portion of the approved grading curve complying with the table below. The maximum calcium carbonate content shall be 1%.

Medium-Coarse Sand Grading

Particle Size	% Passing
8 mm	100
4 mm	98-100
2 mm	80-100
1mm	50-85
0.5mm	20-55
0.25mm	5-25
0.125mm	0-3
0.063mm	0-2

3. The arisings from the installation of the sand bands shall be retained on-site for landscaping purposes.

S310 Sand layer

1. Supply and apply a fine to medium grade of sand to the main pitch area and run-off margins, using an approved topdressing unit such as a bulk topdresser or other approved machine. The sand shall comply with the central recommended range on the grading curve in Appendix 5.

The sand shall be applied to provide a uniform 25 mm firmed layer over the whole surface of the pitches and runoff margins. Care must be taken not to cause ruts in the underlying soil and low ground pressure tyres must be used on equipment.

Depth assessments should be checked at regular intervals to ensure that the sand and topsoil have been placed to a uniform depth.

The works shall be carried out in order to produce the minimum amount of compaction of the pitch surfaces.

The sand shall be lightly raked or worked into the immediate soil surface using a BLEC Stonerake or similar approved tractor mounted raking unit.

S311 Seed be preparation

1. Carry out a final seedbed preparation to produce a firm, smooth and evenly consolidated surface with no ruts or wheel marks.
2. Supply and evenly apply 350 kg/ha of granular fertiliser with analysis of 8:12:8 or similar approved and lightly work into the seedbed.

S312 Grass establishment

1. Provide a seeds mixture for sowing at the rate of 400 kg/ha composed by weight of:

100% Perennial ryegrass:	Certified Seed of at least 3 cultivars with a mean rating of not less than 7.4 for live ground cover and visual merit as published in Table S1 of the current Turfgrass Seed Booklet published by STRI/BSBP.
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Note: Alternatives to the cultivars listed will only be approved before the Tender is submitted.

The seeds mixture shall comply with the minimum standards set out in the Seed Regulations at the time of sowing.

2. Seeding shall be carried out during suitable conditions. On the graded platform and adjoining areas, the total quantity of seed shall be divided in half, each half being sown evenly with an approved distributor in transverse direction to provide a total rate of sowing of 400 kg/ha.

S400
INITIAL MAINTENANCE

S400 INITIAL MAINTENANCE

S401 General

1. The Pitch Contractor shall be responsible for the initial maintenance of the natural grassed pitch areas for a 12-month period from the date of sowing (including the winter period) until the grass is sufficiently well established for handover to the school for ongoing maintenance.
2. Maintenance operations shall take account of the prevailing soil and weather conditions, and the maintenance works must be timed to ensure that there are no delays in the establishment of the grass and the specified standards are achieved.
3. During this period the Pitch Contractor shall be expected to undertake all necessary operations to promote rapid establishment of the turf, including any additional overseeding to achieve the specified grass cover. All such work shall be undertaken by skilled and experienced staff.
4. At the time of hand-over, the grass shall be growing vigorously with a good uniform colour and a minimum ground cover of 85% of the sown grass species with when measured with the sward cut at a height of 30 mm no bare areas. The sward shall be substantially free of persistent broad-leaved, or grass weed species.
5. The contractor shall allow in his rates for repairs of areas including damage caused by surface run off, grazing or burrowing animals.
6. All tractors and equipment shall be of appropriate size and shall be fitted with low ground pressure turf tyres to avoid creating ruts or wheel marks in the surface.

S402 Stone removal

1. At time agreed with the Main Contractor, when the grass is 50 mm high remove any stones or other debris with any dimension greater than 20 mm and dispose of to an authorised tipping site. Following stone removal, roll in dry conditions using an approved flat roller.

Provisional

S403 Mowing

1. The grass shall be cut when it has reached a height of 65 mm using a ride-on rotary mower with well-sharpened blades correctly adjusted to the required mowing height removing no more than 25 mm or third of the leaf blade on the first cut. Grass clippings shall be allowed to fly providing they are well dispersed. Accumulated clippings shall be removed immediately following mowing to prevent smothering of the grass.
2. For subsequent cuts the grass shall be maintained at a height of 35 mm during the remainder of grow-in period and up to the time of handover during which the grasses should not be allowed to grow taller than 50 mm between cuts. For the final month of the maintenance period prior to handover, the grassed areas shall be cut with a ride-on mower fitted with cylinder cutting units. Accumulated clippings shall be removed immediately following mowing to prevent smothering of the grass.
3. Allowance shall be made for a total of 30 cuts during the 12-month maintenance period.

S404 Fertiliser

1. Supply and evenly spread fertiliser, in accordance with the following provisional details. Alternative products may be applied subject to prior approval of the Main Contractor's Agent.

The Pitch Contractor should note that the application rates may be varied subject to grass growth, condition and the prevailing weather conditions.

The timing of each of the fertiliser applications shall be agreed with the Main Contractor's Agent prior to application.

- A) Granular fertiliser with analysis 4:10:10 at a rate of 350 kg/ha.
- B) Granular fertiliser with analysis 16:6:6 at a rate of 350 kg/ha.
- C) Granular fertiliser with analysis 16:6:6 at a rate of 350 kg/ha.
- D) Granular fertiliser with analysis 16:6:6 at a rate of 350 kg/ha.

S405 Overseeding

1. The Contractor shall allow for overseeding the graded pitch platforms with the approved seeds mixture at a rate of 200 kg/ha. The seed shall be sown evenly using an approved seeder with three passes in different directions.

Provisional

S406 Verti-draining

1. On completion of the pitch construction when the grass has become established, the Pitch Contractor shall Verti-drain the area of the graded platform to relieve any compaction in the soil profile. This work shall be undertaken using a machine with a minimum working width of 2 m fitted with 25 mm diameter tines at 125 mm centres and to a depth of 250 mm.

The work shall be carried out during suitable ground and weather conditions to ensure a minimum disturbance of surface levels.

S407 Sand top dressing

1. Supply and evenly apply approved medium/fine sand to the pitch area for spreading at a total rate equivalent to 100 tonnes per hectare. The sand shall have a grading curve which lies within the central recommended portion of the diagram at Appendix 5. The lime content of the sand shall be no more than 5%.

Application of sand shall be applied using an approved bulk top dressing unit or other approved equipment.

Care must be taken not to rut the underlying soil and low ground pressure tyres must be used on all equipment. Care must also be taken to avoid piles of sand forming at the start and finish of runs. Allowance shall be made for brushing/drag matting sand into the turf surface using an approved turf brush or drag mat.

S408 Selective herbicide

1. The Pitch Contractor shall allow for supplying and applying a selective herbicide appropriate to the weeds present in accordance with the manufacturer's instructions and all current legislation and as directed by the Main Contractor's Agent.

Provisional

S409 As-built drawing & O&M manual

1. The Pitch Contractor shall instigate a 3D topographic survey to form an "as built" record of the finished levels, location and invert depths of any newly installed pipe drainage including locations of associated chambers, outfalls etc.

The work shall be carried out during suitable ground and weather conditions to ensure a minimum disturbance of surface levels.

APPENDIX 1
SUB CONTRACTORS

Particulars of Works to be sub-let	Name and Address of Sub-Contractor

APPENDIX 2

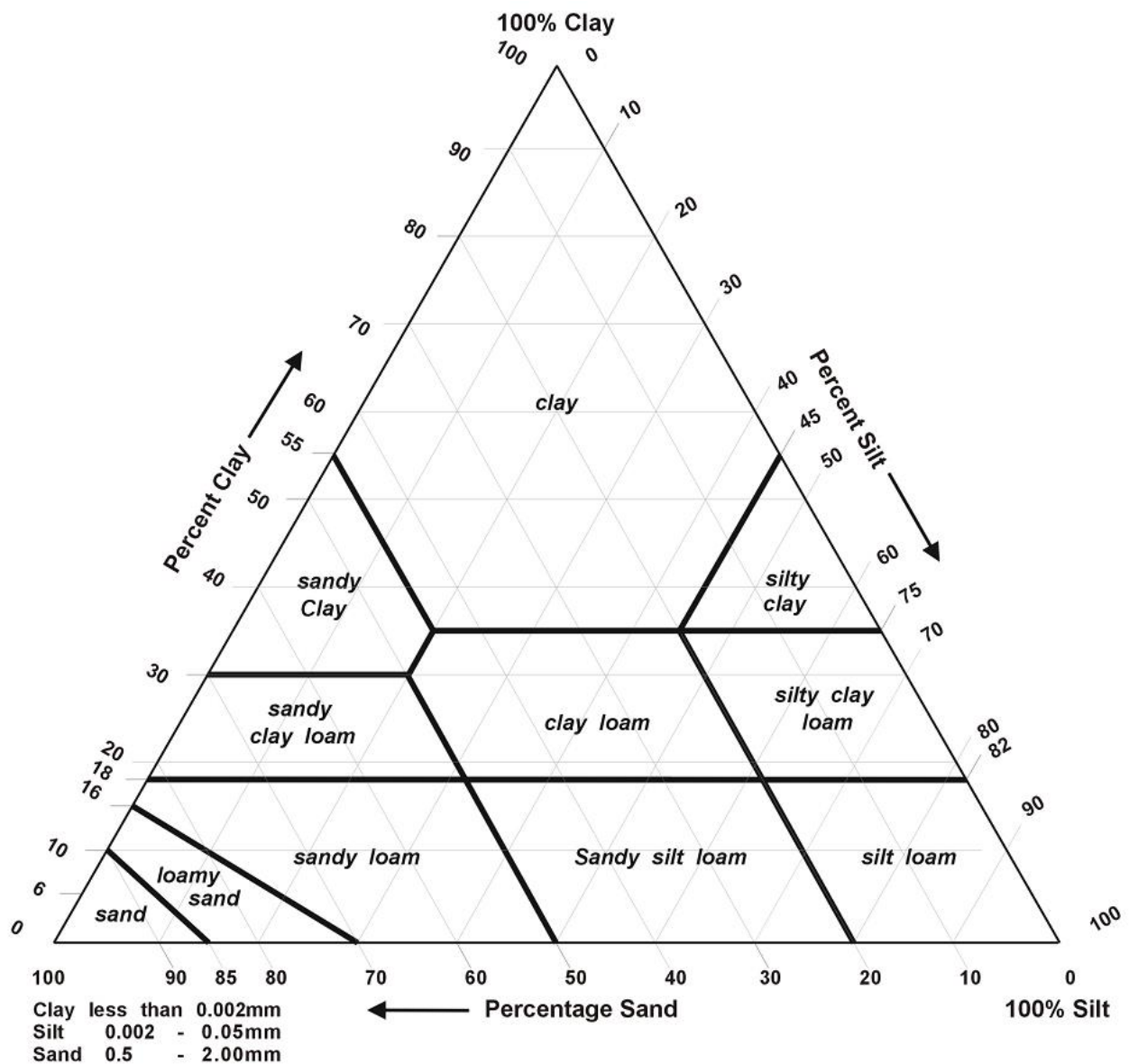
MATERIALS AND SOURCES OF SUPPLY FOR THE WORKS

The Pitch Contractor shall confirm the sources based on the following schedule adding any additional suppliers required.

<i>Materials</i>	<i>Source of supply</i>
<i>Playing Field Construction</i> Silt Chamber Manhole covers Drainage pipe Drainage backfill aggregate Sand for drain backfill Sand for amelioration Seed	

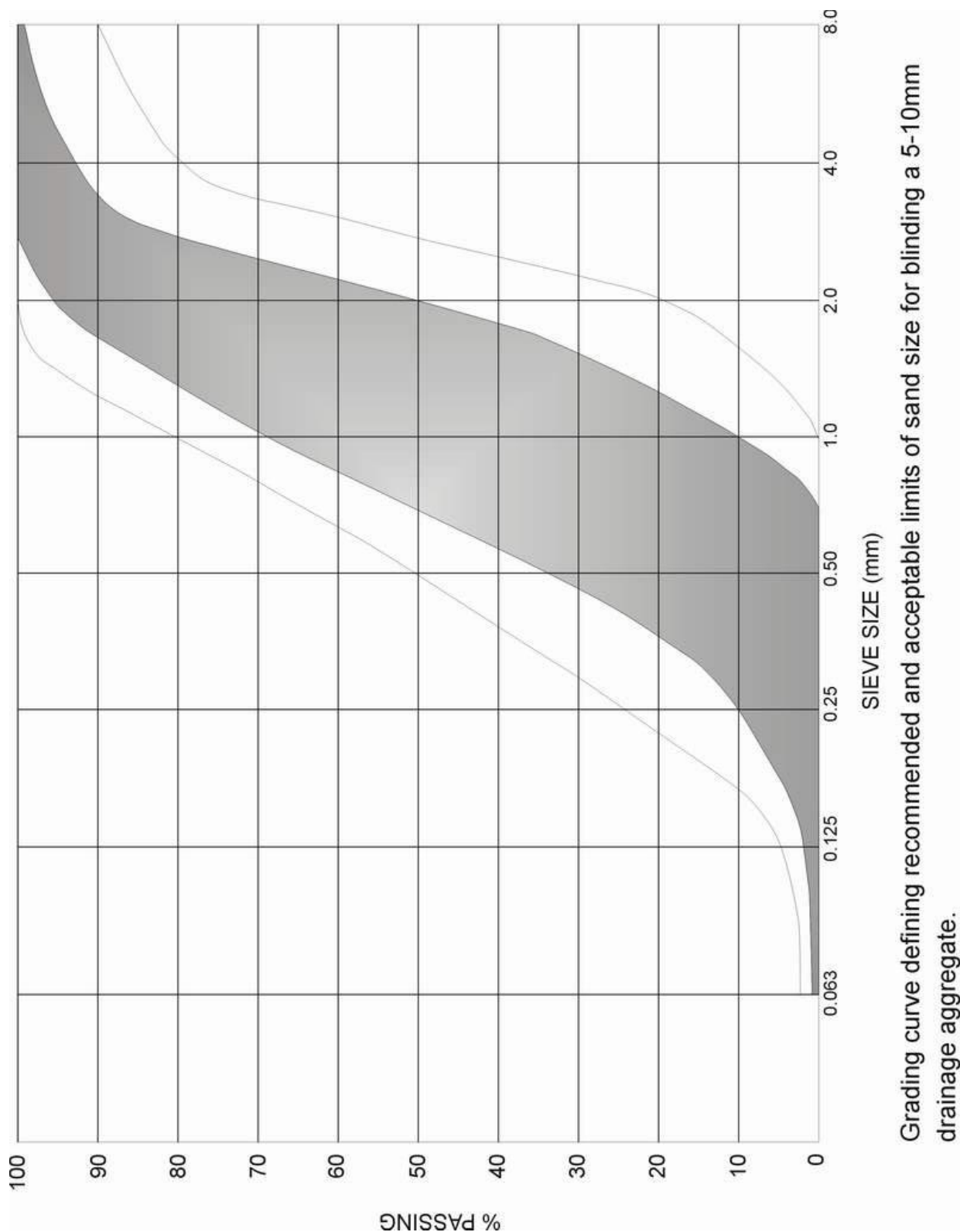
APPENDIX 3

BASIC SOIL TEXTURAL TRINGLE



APPENDIX 4

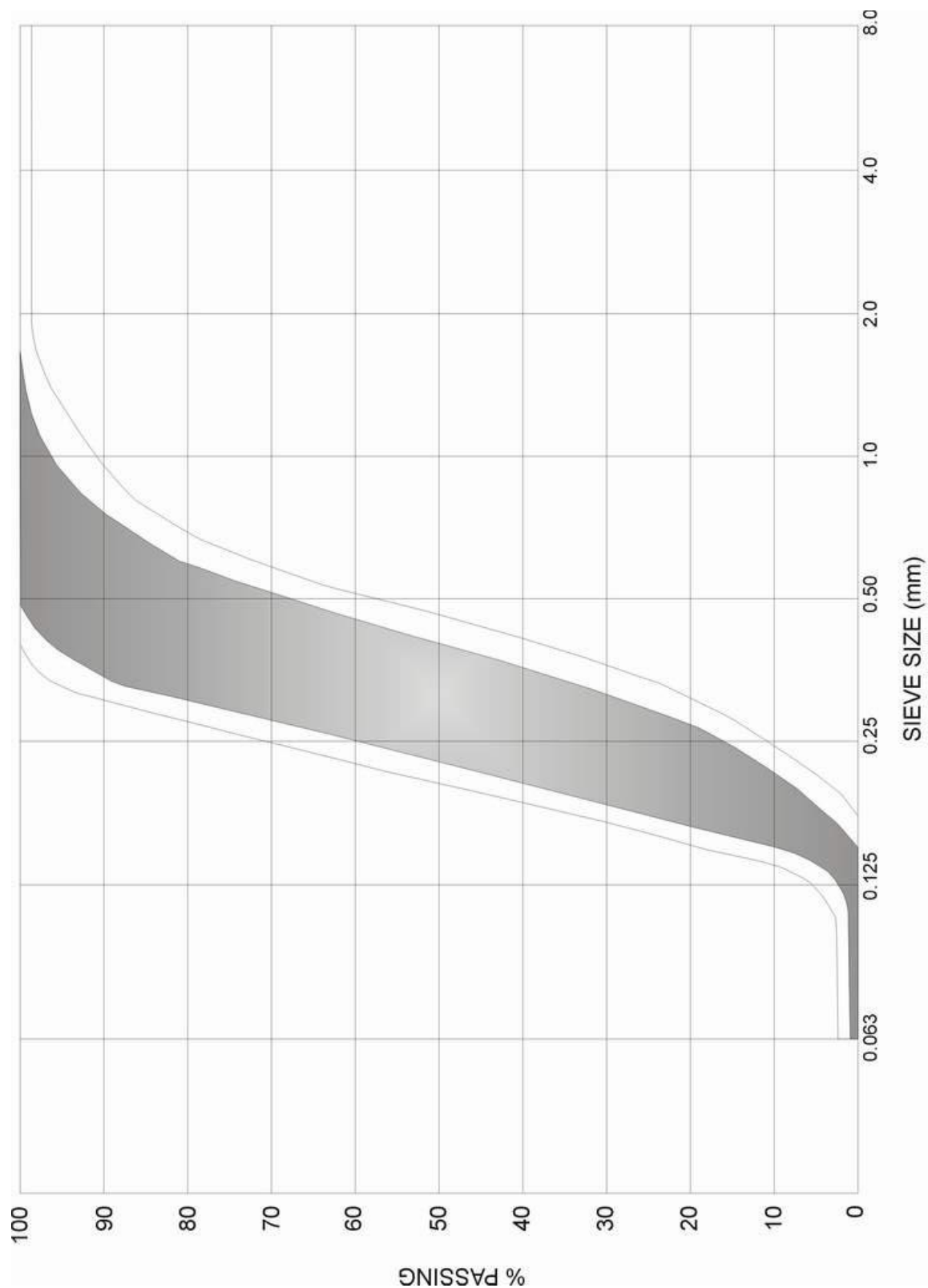
GRADING CURVE - SAND FOR BLINDING GRAVEL IN DRAIN TRENCHES (IF REQUIRED)



Grading curve defining recommended and acceptable limits of sand size for blinding a 5-10mm drainage aggregate.

APPENDIX 5

GRADING CURVE - SAND FOR TOP DRESSING



Grading curve defining recommended and acceptable limits of sand size for soil modification and top dressing of winter games pitches.

APPENDIX 6

PRINCIPAL QUANTITIES

NATURAL GRASSED PLAYING FIELD AREAS

Natural grass playing field area (including football pitch)	14,840 m ²
Total working area	16,435 m ²
Grading (cut)	3,085 m ³
Grading (fill)	7 m ³
Protective geotextile membrane (below and above impermeable membrane)	14,840 m ²
Volume of imported subsoil	4,452 m ³
Volume of imported topsoil	4,452 m ³
80 mm lateral drains (perforated plastic)	3,555 m
150 mm main drain (perforated plastic)	345 m
225 mm twin wall	10 m
80 mm/150 mm junctions	60 no.
Silt chambers (900 x 600 mm)	1 no.
Backdrop manhole chamber (1,500 dia chamber)	1 no.
Flow control device (hydrobrake)	1 no.
Connection into wider drainage scheme (manhole connection)	1 no.
Total area for cultivation/seeding	14,840 m ²
Seeding of landscaped banks	1,595 m ²
Area of Sand Banding	14,840 m ²
Area of Sand layer (25 mm)	14,840 m ²