

Artificial Grass For Sport

Part 7 of 8

Re-Surfacing and Replacement

Note: With minor alterations, this section has been taken from the UK-based trade association, The Sports and Play Construction Association's

(SAPCA) publication, The SAPCA Code of Practice for the Construction and Maintenance of Synthetic Turf Sports Pitches (2009). Visit: www.sapca.org.uk



7.1 General considerations

When consideration is being given to resurfacing an existing pitch that has an artificial grass carpet of some type, it should be recognised that the requirements of the client, the sports' governing bodies, Australian Standards and the local authority may have changed considerably in the years since the pitch was originally constructed.

In addition, the technology of artificial

grass systems is constantly changing and may have advanced significantly since the first installation. In the absence of a copy of the original design and specification, it is essential that a comprehensive investigation be carried out to establish the basis of the original design and its relevance to the design being proposed for the resurfaced facility.

7.2 Design considerations

Playing characteristics

Different sports require different playing characteristics and their respective governing bodies stipulate precise requirements. It may be that the sport to be given priority on the resurfaced pitch is different from that played on the original pitch, or that the requirements of the sport's governing body may have changed since the original pitch was constructed. In any case, the design items detailed in Section 3 of this guide should, where possible, be followed.

Where it is not possible or practical to comply with these requirements, this fact must be pointed out by the contractor to the client prior to commencement of re-construction works.

Dealing with the existing surface

The most common reason for resurfacing an existing facility is that the playing surface is no longer suitable for the standard of play required from the pitch. It follows that this surface must be removed and disposed of prior to any reconstruction work taking place. This removal process must be undertaken in a manner that will not damage the existing structure below the playing surface. These layers may include a shock pad, unbound layers, and geotextile membranes and asphalt bases. Subsoil drains may also exist at a depth which could make them vulnerable to damage by heavy vehicular traffic.

The existing surface, and perhaps the shock pad, must be disposed of off-site and careful thought should be given to environmental considerations when disposing of this material. In the case of hard porous materials (such as redgra,

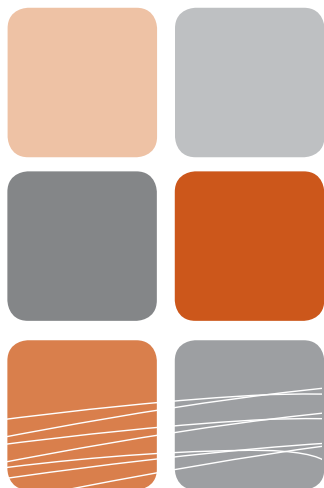
olisett, blaes and similar) disposal will not normally present a problem in landfill sites. However, the disposal and handling of artificial grass carpets, silica sand fill, rubber fill and rubber shock pads may present problems in certain areas and will carry a price premium on disposal. In some instances, recycling companies will collect the unwanted materials at a lower cost than land fill disposal. Additionally, depending on its condition the artificial grass carpet could be sold to another user.

Top Tip

An alternative to removing the sand-filled carpet and pad is to leave them in place, add a layer of crushed stone to take out low spots, and place the new carpet and pad over the top. This option saves on demolition, cartage and disposal fees. Hockey clubs at Toorak (Melbourne) and Orange (NSW) have utilised this process in recent years, and it is a technique used in tennis court upgrades also. Think about the potential altered levels of playing surface, spoon drains and kerbs, and, for tennis projects, check on the likely affect on ball bounce.

Dealing with the existing shock pad and base

Until the entire surface layer has been removed from an existing pitch, it is difficult to be confident of the condition of the layers below. Cores or cross-sectional samples can be taken but this can only provide an indication at a few locations of the condition of the



substructure layers. Lifting the corners is an often used quick technique but in these areas little wear will have occurred.

On removal of the surface the remaining layers of the existing construction should be checked as to their suitability for incorporation into the new construction.

Top Tip

It is important to avoid damage during removal, or to spill old fill into the substructure (and therefore clogging a porous system).

Shock pad

If the existing pitch was constructed using a shock pad (refer Section 3.5) as a resilient layer to provide player comfort and to comply with the playing requirements for various sports, this existing pad must be checked to ensure that it will perform satisfactorily in the new design. This may require performance testing of the combined pad and new surface system by an approved test house before reconstruction begins.

The condition of the existing resilient layer is likely to vary over the area of the pitch and care must be taken to ensure that any inspection or survey is comprehensive.

Experience has shown that prefabricated shock pads that are not either stuck down to the base or seamed together have a tendency to move under the carpet. If the existing pad is found to be otherwise satisfactory, the contractor should ensure that it is either stuck down to the base or seamed using an acceptable tape before re-use.

During a resurfacing process it might be necessary to do regulating works to either an asphalt or stone type base. Where pre-fabricated shock pads have been used it has been found to be very difficult to roll up and re-use the rolls of shock pad and it may be necessary to dispose of them and to install a new shock pad.

If specific areas of shock pad are found to be unsuitable, it is permissible to reinstate these areas with a pad of equal thickness, resilience and density or as near as can be achieved.

If doubt remains about the suitability of an existing pad, it should not be incorporated in the new surface system but should be removed from site and a new shock pad installed.

Unbound layers

Where the existing pitch has been constructed using an unbound base of loose rock or sand (see Section 3.3) and it is the intention to retain this design in the new facility, the top layer of the unbound construction may need to be re-levelled using new material and then re-compacted to specification. The amount of re-levelling or compacting will depend on the mobility of the existing unbound material; the amount of disturbance, if any, caused by the removal of the surface layers, along with the degree of protection the upper geotextile layers have given the structure during its life. This course of action will also apply where lava or rubber mixes have been used in the existing facility and it is the intention to continue with this form of resilient layer.

If the design of the new pitch is to incorporate a bound base, (i.e. using one or two layers of bituminous asphalt with a shock pad as a resilient layer), the material which constituted the unbound layers, which may be frost susceptible and impede drainage, should be removed down to the dry stone sub-base.

Bound base

If the existing pitch has been constructed with a bound base of one or more layers of bituminous asphalt on a dry stone sub-base layer (see Section 3.3), the client should be given the option of adding a further layer of macadam if thought to be advantageous.

The porosity of the exposed asphalt base should be checked by an appropriate method, eg. flooding the pitch to check for impervious areas which may then be drilled to improve the flow of surface water through the system. All drill holes should be filled with pea gravel and compacted prior to installation of subsequent layers.

Note: Insitu laid shockpads do help regulate the top of the macadam layer, but may result in varying thickness shockpad (not ideal if it varies too much).

The final surface level tolerance will be difficult to achieve unless the top surface of the macadam base is also laid to this tolerance. Careful checks on the surface of any previously laid macadam should be carried out to ensure compliance.

Sub-base

Checks, by excavating trial holes, should be made to ensure adequate thickness of sub-base material and that the material has not become contaminated in any way, eg. from the migration of fines from an overlying unbound base.

Drainage

The existing drainage system should be checked for compliance with required standards. It may be necessary to 'prove' the existing drains by rodding or carrying out a standard drain test. The presence of silt collection chambers should be checked along with the presence of rodding eyes. Resurfacing the pitch may be seen as an opportunity to install such facilities where they do not exist in adequate numbers.

Any soakaways should be checked for efficiency of operation and opportunity taken to connect to surface water outlets, if now available, as alternatives to soakaways.

Perimeter edging

The existing edging which retains the pitch construction should be checked

for line and level as well as structural integrity of the materials, including the backing. Any areas that do not comply with the requirements should be rectified prior to installation of the new surface. This may mean total replacement of the perimeter edging, particularly where the finished level is going to vary substantially from the original profile.

New surface

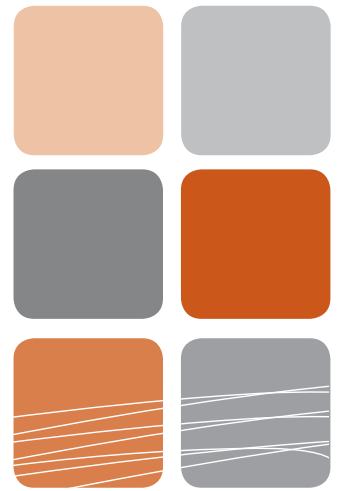
The design and specification of a new surface should comply with the requirements of the relevant sport's parent bodies and with issues raised in Section 1.3 of this guide.

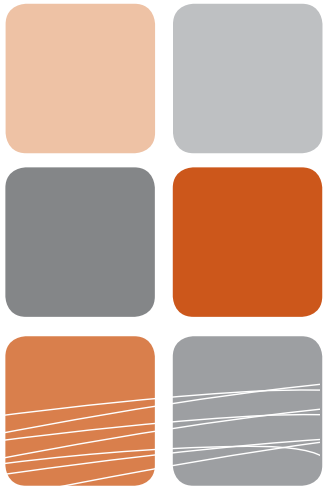
Fittings

All existing fitted equipment, including inset sockets should be checked and replaced where required as part of the contract for the new pitch facility.

Surround fencing

As part of the upgrading program, the surrounding fencing should be inspected and repaired or replaced, as required (refer Section 3.10 of this guide).





College Rifles RUFC, Auckland, New Zealand



College Rifles RUFC, Auckland, New Zealand

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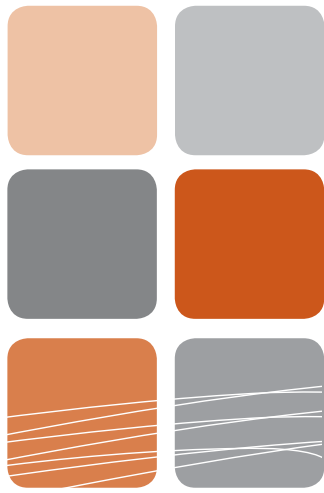
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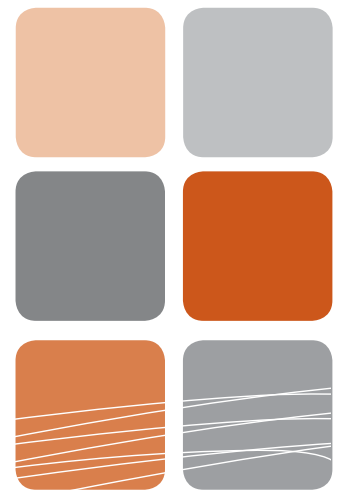
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Appendix 2: Case Studies

The case studies listed below represent best practice examples located in Victoria.

The Darebin International Sports Centre (DISC) Soccer Facilities

DISC was developed in 2004 and includes state-level facilities for the Football Federation of Victoria (FFV), Cycling Victoria and the Royal Victorian Bowls Association.

FFV's facilities at this Fairfield site include three FIFA two-star third generation pitches two natural grass pitches, and office accommodation. The artificial grass pitches have been an outstanding success with the Melbourne soccer community, and local schools. The pitches are programmed extensively (9am to 10pm, seven days), and add up to more than 60 hours of use per pitch per week without ongoing promotion.

Each pitch is groomed once a month and a major service is undertaken twice a year. Maintenance costs are in the order of \$8,000 AUD per year.

Lessons learned from the operation of these facilities include:

- The lack of vandalism to date is put down to the high usage rate and the fact that the facility is supervised (this is despite only low-level fencing around the facility).
- Full-field training is not normally essential, so the FFV is currently reviewing training use with the view of offering half pitch rental opportunities. This will both save users rental fees, and generate the operator more income.



Darebin International Sports Centre

The Footscray Hockey Centre

The Footscray Hockey Club (FHC) moved to its location at the McIvor Reserve in Yarraville in 1994. Since that time it has established a world-class facility that features two artificial grass pitches (an international standard 'wet' pitch and a recently resurfaced sand-dressed pitch), a large basketball court sized specialist training/warm-up

area (featuring an experimental elite playing level 'dry' carpet), and a large clubhouse.

The secret to FHC's ability to develop these facilities has been its preparedness to develop shared, multi-sport facilities. For example, the club's first pitch at the Yarraville site was a sand-filled field which was also marked for netball. The club's initiative to cater for other sports playing at its venue generated income, but more importantly made the project more appealing to government funding sources - which support the establishment of shared, high participation number facilities.

The club repeated this initiative when establishing its second artificial grass pitch in 2000, an international standard 'wet pitch'. Prior to submitting its plan to government agencies, the club established tenancy agreements (some of which included multi-year up-front rental payments that could be used to reduce capital works borrowings) with the sports of lacrosse and American football (gridiron), as well as with a co-tenant hockey club. The field was made larger to accommodate lacrosse and features the major lacrosse line markings permanently installed.

In addition to these usage and design initiatives, the club developed a unique 'Service Agreement' (an adjunct to its lease) which described in detail the club's commitment to service non-hockey markets. Targets were established, (and have been met every year since), around making significant 'peak-time' hours available for non-hockey activities.

Learnings from this facility:

- Think about who else could use your facility. Utilising available spare time to maximise use and participation enhances the community value of your project, and its chances of receiving financial support.
- Think about adding a Service Agreement to your standard lease, or some other means by which you can provide surety to possible external funding agencies, that broader community benefits will be achieved. Flesh-out the 'promised' community benefits with a plan of how the benefits/targets will be achieved.

St Monica's College, Epping

Showing foresight in 2003, college leaders invested in two artificial grass pitches, one a specialist third generation soccer pitch, and the other a combined hockey/tennis model. These facilities (especially the soccer pitch) are used extensively – 60/70 hours per week – for soccer, hockey, tennis, Australian rules football, cricket, rugby, American football and general play.

Lessons learned from the operation of these facilities include:

- Their use is almost limitless.
- Regular maintenance is important. Strict attention by college staff means that only \$2,000 AUD needs to be spent annually on specialist maintenance purposes.
- The base preparation is the key phase. There has been some expansion and settlement under the soccer field, leading to minor depressions in some places, but it is manageable.
- The growth of weeds into the artificial grass matting along the surface edging has been a minor issue, as has that of general litter.
- Some spray painting incidences have been overcome by painting over the vandalised area with green paint (it is suggested that you speak to your artificial grass supplier for specific advice about graffiti removal).
- The college's soccer coach notes that there have been no major differences observed in the performance of balls or player injury on the artificial grass field compared with natural turf.

Harvest Home Road Soccer Complex, Epping

In 2007/08 the City of Whittlesea developed a third generation artificial grass pitch at its soccer complex at Epping. Council developed a very innovative management plan which established that the facility's usage was substantially determined by the Whittlesea Soccer Group (WSG), a group that involves representation from all seven of the municipality's soccer clubs. These clubs include both senior and junior organisations. The facility's aim is to help with the overall growth and development of soccer across the municipality, and therefore no one club was allocated the facility, instead it is shared between all of

the clubs, local schools and the Football Federation of Victoria.

The WSG met fortnightly, following which Council was advised of issues raised and of the recommended training schedule for the following few weeks for both the Harvest Home Road pitch, and the two new pitches at the Mill Park Secondary College.

Mill Park Secondary College

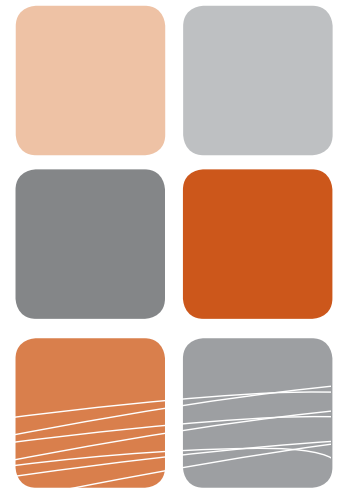
The Mill Park Secondary College (MPSC) artificial grass sporting complex is a joint development between the City of Whittlesea, Mill Park Secondary College, Sport and Recreation Victoria and the Department of Education and Early Childhood Development.

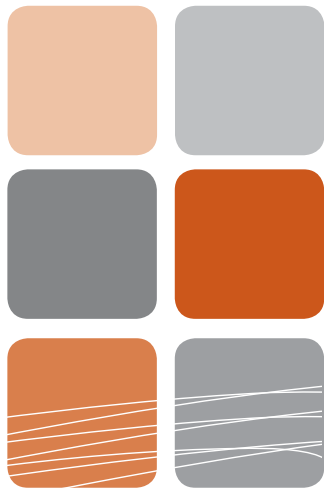
Constructed in 2008/09 at a cost of approximately \$1.7 million AUD, the all artificial grass complex features two adjacent senior-size third generation soccer fields, a cricket pitch located in between those fields, a warm-up/specialist practice area, and, encompassing the soccer fields, an Australian rules football field. The complex is floodlit to training level and also includes toilets, storage and basic shelter. The soccer fields are rated as FIFA 1 Star, and the entire complex covers 20,000 m². It is said to be the largest synthetic surface in the southern hemisphere, and it is estimated by Council to be saving six million litres of water a year (they require no watering at all).

Just like Whittlesea Council's Harvest Home Road artificial grass soccer field, the MPSC complex is unaligned with any specific sporting clubs. Instead its emphasis is on training, junior matches, senior practice matches and if necessary (and approved) senior matches.

Use of the facility is split between the MPSC (8am to 4.30pm each weekday) and broader community use which is determined by Council via consultation with relevant parties. Priority use is directed towards clubs that might be affected by ground closures or ground maintenance, followed by clubs that have overflow issues. Casual bookings are also taken when times are available, but not at the expense of community access.

All clubs are allocated one set of keys to the facility, and all users are required to exercise due care while at the complex, and to complete a maintenance checklist prior to its use. Maintenance issues have to be reported to Council as soon as possible.





This partnership development is under an initial 30-year joint-use agreement, with a 15-year extension available.

Learnings from these City of Whittlesea projects (HHRSC and MPSC):

- The management principles, operational practices and shared usage principles that underpin these facilities are 'leading edge' in terms of municipal leisure practice.
- These arrangements allow for better ground maintenance and management.
- The location adjacent to a school enables maximum daytime use.



Mill Park Secondary College

City of Moreland Artificial Grass Soccer Facilities

At the time of publication Moreland Council is implementing the second half of its artificial grass soccer facility strategy which will result in a 'no resident club' shared third generation artificial grass field being available in each of the northern (Fawkner) and southern (Brunswick) parts of the municipality. The already existing northern field is being used extensively by several local soccer clubs and four Australian rules football clubs for pre-season training, and is being heavily used by the students from Fawkner Secondary College where the pitch is located. The facility is managed by the adjacent Council-controlled Fawkner Leisure Centre.

The planned second pitch at Brunswick will be within a Council reserve, but will also be managed by a nearby Council leisure centre.

Learnings from Moreland's approach:

- Council's approach of developing its artificial grass fields at locations that do not involve existing, strong tenant clubs has provided it with the ability to maximise the use of the fields.
- Moreland is a linear north-south municipality. Strategically locating these fields, they can each service

sporting demand in their respective northern or southern precinct represents insightful strategic planning by Council.

- Using local leisure centres to supervise and manage these facilities provides an independent, experienced facility manager to maximise the use of the facility. This can be an efficient and cost-effective option.

Victoria Park Tennis Club, Kew

In conjunction with the neighbouring Kew Tennis Club, Victoria Park Tennis Club (VPTC) undertook a redevelopment program in early 2008 that included fence replacement, court lighting upgrades, and the replacement of en-tout-cas courts with sand-filled artificial grass courts.

The court change-over has been an outstanding success for the club.

Key outcomes include:

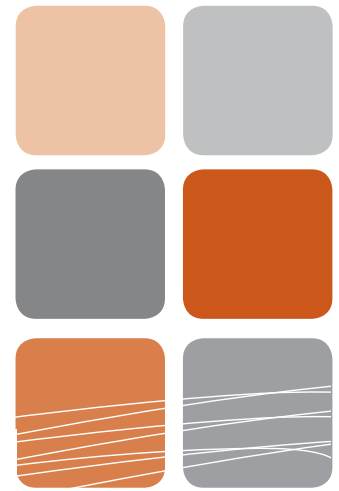
- Court maintenance time has all but disappeared.
- More than \$4,000 AUD in water cost has been saved in the last 18 months since the conversion.
- Working bees to repair lines, etc, have been eliminated.
- The winter coaching program has been expanded.
- Play continues virtually immediately after rain.
- The standard of play has improved across the board because the new surface gives players a greater degree of confidence.
- Usage of the courts has more than doubled in the 18 months following the re-build.
- And most significantly, membership, which has hovered about the 80 person mark for many years has jumped to more than 200 with another 100 children being associated with the club coach's programs.

Key learnings include:

- The club expects that its 10-year loan will be paid out in less than five years.
- Employ a recognised contractor, not necessarily the least expensive.
- Thoroughly understand the clients needs before commissioning the project. Avoid changes during construction.

- Keep members well informed about progress and enthusiastic about the benefits.
- Ball usage has increased slightly due to the extra friction experienced with this type of surface.
- Improved court lighting has been a key access factor, allowing more mid-week evening opportunities.

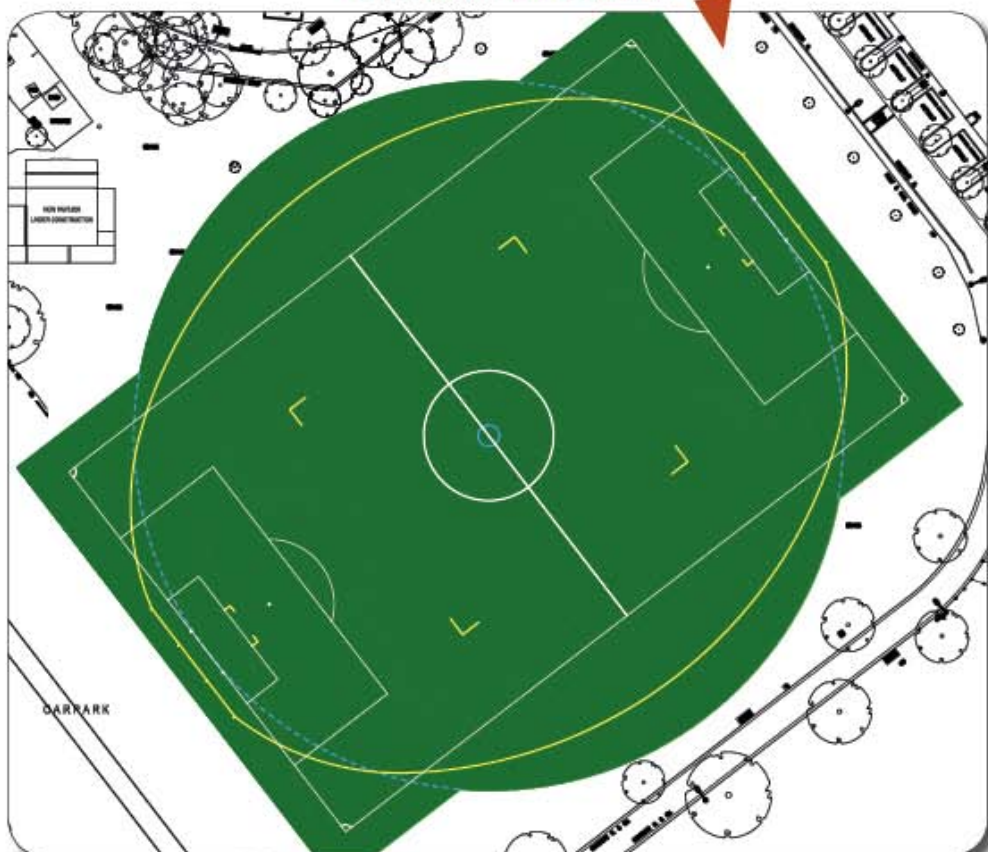
of Melbourne has just completed a combined soccer/cricket/Australian rules football pitch at the J.J. Holland Reserve in Kensington which features the first AFL/Cricket Australia authorised artificial grass surface. This facility is the size of a soccer pitch, but with rounded edges on each 'wing' to allow for a more circular cricket field in summer. The pitch will also be available to the adjacent junior Australian rules football club for training activities.



Multi-Sport Facility, Kensington
At the time of publication The City

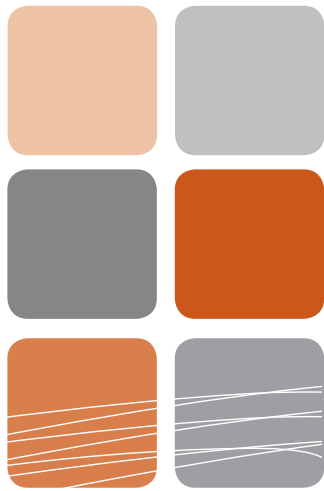


JJ Holland Reserve, Kensington



Line marking detail.

Note that the Australian Rules Football posts are safely away from the soccer playing field.



AFL/Cricket Facility Planned For Point Cook

The City of Wyndham is one of the fastest growing communities in Australia, which has placed significant pressure on its active sporting spaces. One of Council's strategies to meet demand and overcome its lack of sporting grounds and address drought and water restrictions, has been to get a number of artificial grass fields in key locations across the municipality.

Liaising with the Australian Football League (AFL), Cricket Australia (CA), and Sport and Recreation Victoria, Council has planned a large sporting precinct in Point Cook Road, Point Cook which

will contain a variety of sporting facilities, including Australia's first full-sized AFL/CA approved Australian rules football/cricket synthetic turf field.

The football oval will feature a Teamsports "Enviroturf" surface, which has met the specific AFL/CA performance specification and will differ from the planned nearby Truganina third generation artificial grass soccer pitch with rubber infill, in that it will have a shock pad base. The pile height of the carpet will be in the order of 40mm, with rounded sand infill up to approximately 20mm, leaving about 20mm of exposed fibre.

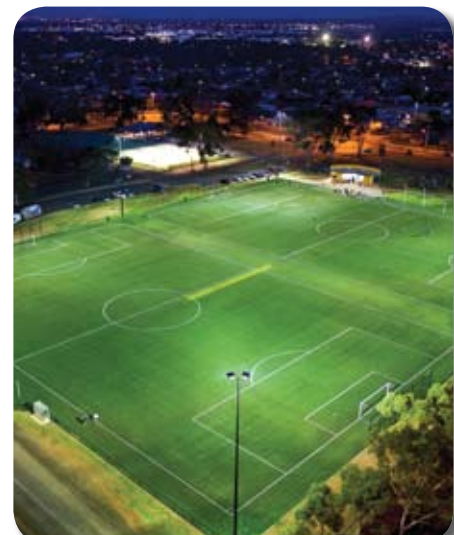


Point Cook Road Reserve, Point Cook

Shire of Melton Facilities

Another rapid-growth community in Melbourne's outer western suburbs, Melton Shire now possesses several innovative and flexible artificial grass facilities. Both Kuranjang Recreation Reserve at Melton (photo page 38) and Brookside Central Reserve at

Caroline Springs (photo page 6) feature small extensions which allow Australian rules football and cricket usage as well as their predominant use for soccer. There is also a running track around the soccer field at Brookside. See also Caroline Springs College photo (Page 83).



Ivanhoe Grammar School

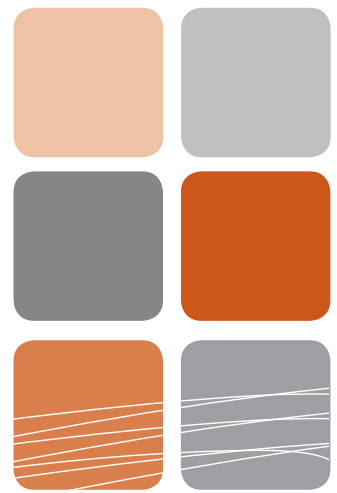
In 2010 Ivanhoe Grammar School installed an 8,500m² artificial grass surface on its North Ground oval, a substantial space that includes marked areas for soccer, hockey, softball, netball, basketball, volleyball, hand tennis, long jump and an 80m eight lane running track.

An innovative component of the project is the installation of a giant underground dam beneath the playing surface that can store up to 1.1 million litres of rain water. This dam was constructed in a unique manner in that a 3,300m³ hole was created under the field (typically 3m deep), and the edges were lined with layers of waterproof bentonite clay/geomembranes to create a water-tight membrane for water storage. The hole was then

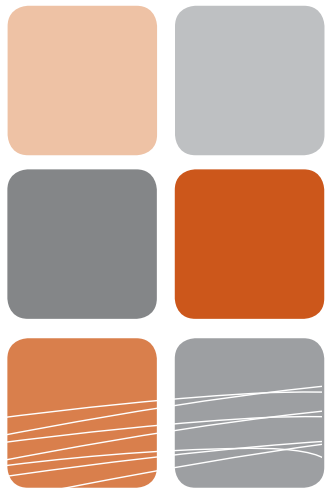
filled with rocks of various sizes which acts as a support for the artificial grass as well as a natural filter for the rain water so as to avoid sediment build up. The dam will collect stormwater from across the senior school section of the campus.

The rock-fill idea overcomes the problem sometimes associated with the traditional method of achieving underground water storage (the burying of a series of interconnected hollow cellular plastic cubes), being the settlement of backfill around the plastic tanks with the resultant settlement/low spots on the playing surface above the tanks.

It is anticipated that the underground dam will lead to water savings per year of between 2 and 2.5 million litres.



Ivanhoe Grammar School



Appendix 3: Sample Specification (Primary School Installation)

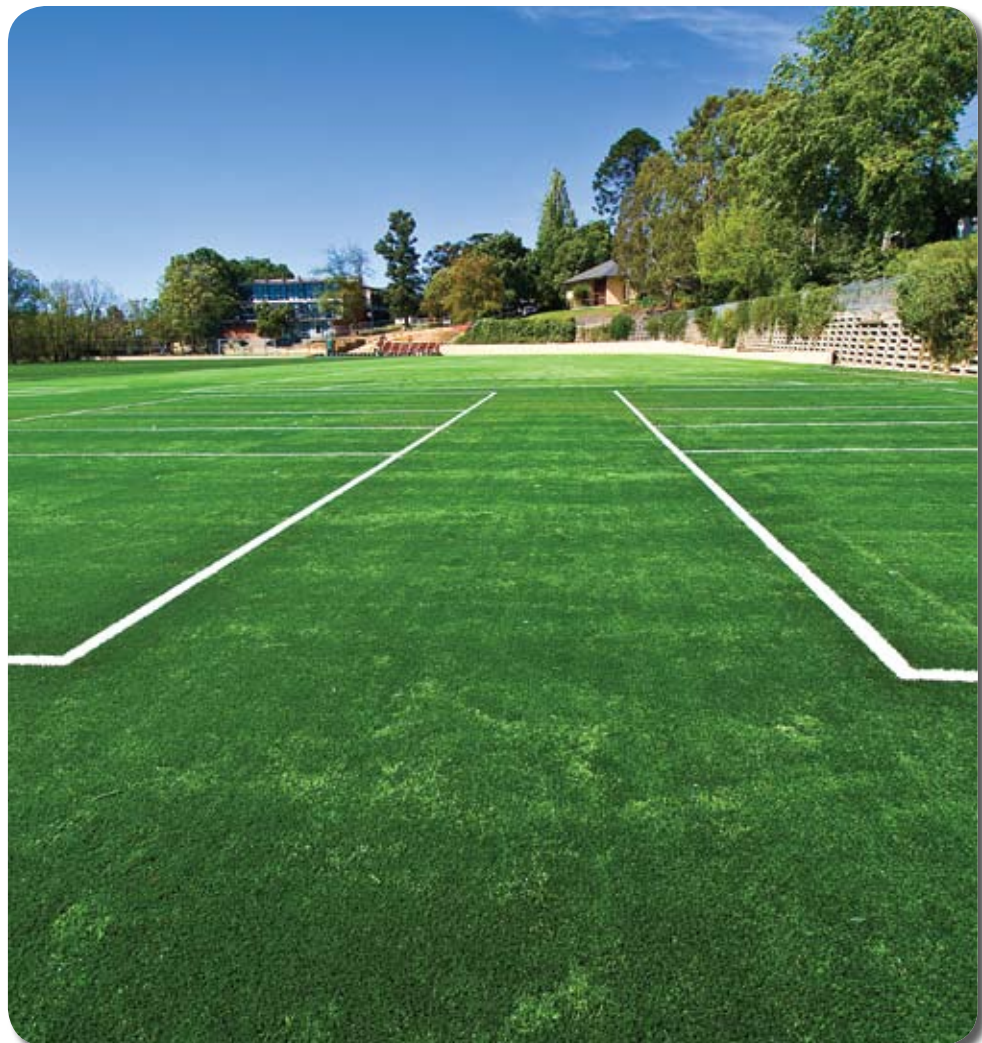
For many projects that fail to reach their full potential, an inadequate brief/specification is often the source of their problems. A number of documents provide guidance on how to develop good briefs and specifications, with the following examples all relating to artificial grass sporting surfaces:

- 'Towards A Level Playing Field: A Guide to the Production of Playing Pitch Strategies' (2003). Sport England. See Appendix 'D' – 'Consultants Brief' www.sportengland.org
- 'Guideline Template: Design Brief for Artificial Grass Pitches (Version 2) January 2010 Football Association. See Part 3: Outline Design Brief www.thefa.com/GetIntoFootball
- 'Specification for Construction of Synthetic Playing Surfaces in Primary Schools' (2009). Sport and Recreation Victoria (attached overleaf).

The specification that follows is an actual specification developed and used by SRV during 2009 for the State Government project involving the installation of artificial grass activity spaces in 13 nominated primary schools. As a guide to the type of issues that need to be covered in a good brief, the specification is reproduced here in full.

Please note:

The activity spaces to be provided in schools funded through this project are basically for informal, semi-structured play/sport, not organised higher-level sport. Therefore the level of specification is reduced accordingly (for this project the pitches are built over an unbound base and have no shockpad). Should you wish to use your artificial grass pitch for a reasonable level of community sport, then a higher level of specification may be required.



Specification for Construction of Synthetic Playing Surfaces in Primary Schools

TENDER SPECIFICATION

CONSTRUCTION OF SYNTHETIC PLAYING SURFACES IN PRIMARY SCHOOLS

1 GENERAL SCOPE OF WORKS

The following document details the scope of work and specification for the supply and installation of synthetic playing surfaces in primary schools in metropolitan and regional Victoria. The specification relates to artificial grass area to be used at a recreational level only, not for competitive, higher-level sport.

Scope of Work

- 1.1 Strip the site, cut and fill to level, grade and compact base foundation, to cross fall 1:100, in the direction specified in the drawing, and to levels indicated on each site plan.
- 1.2 Remove and dispose of any existing tree root/stumps obstructing the site.
- 1.3 Remove and relocate existing bins, unless otherwise stated in the drawing.
- 1.4 Supply and install drainage pipes and connect to an existing collection system unless otherwise stated in the drawing.
- 1.5 Supply and install base (compacted crush rock), to provide a stable platform for the turf.
- 1.6 Supply and install rock dust.
- 1.7 Provide 250mm x 50mm treated pine timber edge strip and a root barrier.
- 1.8 Supply and install artificial turf according to manufacturer's installation guidelines.
- 1.9 Supply and install linemarking as per detail supplied in the relevant project drawings.
- 1.10 Supply and install infill system (sand and sand/rubber crumb) designed to suit the performance characteristics required for the specified activity, according to specified manufacturer's recommendation.
- 1.11 Leave the site clean and fit for purpose as a school play field with no dangerous, protruding or remaining objects and material.
- 1.12 Maintain the surface for a period of up to two years from the date of practical completion.

2 GENERAL REQUIREMENTS

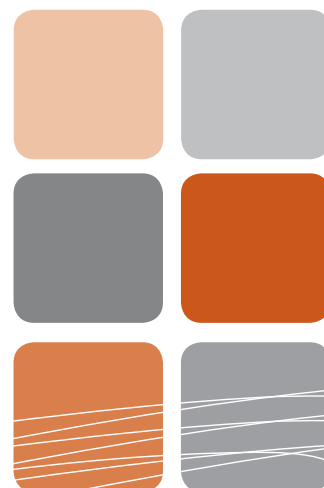
2.1 Materials – Workmanship - Procedures

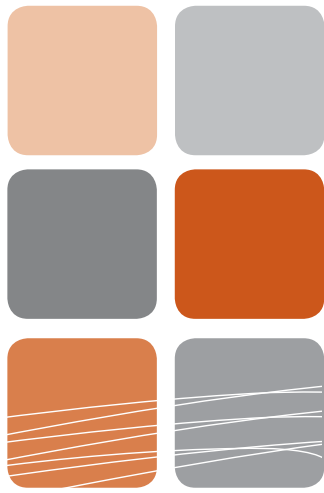
All materials, workmanship and procedures shall comply with the relevant requirements of all current Standards, Codes of Practice and Specifications promulgated by Standards Australia, including but not limited to:

- AS 3541.1 (1988) Synthetic Sporting Surfaces – Part 1 General Principles**
- AS 2983 (1988) Synthetic Sporting Surfaces – Test Procedures only**
- AS/NZS 2455.1 Textile Floor coverings – Installation Practice – General**
- AS/NZS 2455.2 Textile Floor Coverings – Installation Practice – carpet tiles**

All work shall conform to the relevant product manufacturer's installation guidelines and be quality control compliant to AS/NZS ISO 9001:2000 requirements. Where required, all materials, workmanship and procedures shall comply with other appropriate international standards, including but not limited to:

- DIN18035.6 (1986) German industry norm for outdoor sports surfaces**
- BS 7044.4 (1991) British industry norm for multi-sports use of artificial surfaces**
- ISO/DIS 9239 International norm for fire hazard rating by critical radiant flux**





Where not covered under any standard, the materials and workmanship shall be suited to a play field for children and general community use.

2.2 Measurements

All measurements are to be verified on-site before starting any work or ordering materials.

2.3 Site and construction constraints

The following construction constraints will be imposed on this contract:

- Prior to construction, the School Principal shall nominate the areas he/she wishes to maintain access to during the period of the contract.
- The areas to which the contractor's activities shall be confined will be specified by the school and the Project Manager prior to the construction date.

Possession of site will be as agreed at time of contract or no later than one (1) month from time of contract.

The contractor may be required to carry out some site work during school holiday periods.

2.4 Site Meetings

A senior representative of the Contractor shall attend regular on-site meetings with representatives from the Principal, Project Manager and Project Director.

The Project Manager will chair the meetings and provide minutes to all parties within one week of the meeting.

2.5 Manufacturer's installation, operation and maintenance literature

Before the date of practical completion, the contractor shall provide two (2) copies of a manual containing manufacturer's installation, operation and maintenance literature, for the specified playing surfaces systems supplied under this contract.

The information is to be compiled in a clear and orderly manner, fully indexed and bound into a durable hard covered manual. The manual is to be submitted to the Project Manager.

2.6 Care of Pavements and Existing Grassed and Landscaped areas

Construction methods and traffic shall be limited to prevent damage to existing pavements, grassed and landscaped areas and constructions. The contractor shall be liable for the repair and making good of all damage caused by the construction works and traffic.

The pavements are to be promptly cleaned of any materials resulting from the carting of materials and other operations to the approval of the Project Manager.

2.7 Setting out

Arrange and bear all cost associated with the proper setting out of relevant athletic tracks and sport pitches/fields/ovals etc, to ensure compliance with their specific requirements.

The general positioning and siting of the relevant athletic running track(s) and relevant sport pitches/courts/fields/ovals shall match the existing configuration shown on the contract drawings provided as attachments to this tender specification – refer attachment B. Please note that the drawings provided are only preliminary tender plans and may be subject to alteration before construction drawings are issued.

2.8 Safety, Protection, Nuisance etc

Assume responsibility for safety at all times including:

- Provide and maintain suitable measures to ensure the safety of the public, contractor personnel and property.
- Minimise dust rising from the works by adequate watering or other suitable approved method.
- Control dust noise, vibration etc to avoid nuisance to nearby properties, school lessons and facilities.

2.9 Services

Co-ordinate the location of all below ground services.

Arrange for disconnecting, cutting, sealing off any redundant services affected by the works.

Prevent damage or interference to existing services above and below ground.

Immediately rectify any damage or interference of these services.

2.10 Contingent work

Before commencing work, verify the location of existing services by going on-site to confirm their locations. Should any unforeseen conditions, constructions and services be encountered, the Project Manager shall be informed and his instructions obtained before proceeding.

Any damage to services caused by the Contractor is to be repaired at their own expense.

Prepare shop-drawings (required to provide stitching/pattern details for approval by Project Manager prior to manufacture).

2.11 Care of site works

Accept responsibility for the proper retention of sub-grade, formation, materials of construction and site-work constructions making good to the approval of the Project Manager.

Plan the works so that works in progress are not subjected to excessive loading likely to cause damage to sub grades or construction work in progress.

2.12 Quality

2.12.1 Project Quality System

The contractor shall provide at time of tender, inspection and test criteria that shall be carried out as well as the reporting method to be adopted during installation.

The contractor shall nominate a Project Quality Manager (in some projects this may be an external consultant) who shall be responsible for the implementation of a quality system for this project.

The minimum requirement for the quality system is a system of Inspection and Test Plans (ITP's) that:

1. Identifies the project.
2. Lists all hold points during construction, (including supply of materials), that will require verification before the works are covered up or installed.
3. Identifies the criteria for verification of quality at these hold points.
4. For each hold point, records that the quality has been verified, the date the work was verified, and is signed off by the project Quality Manager. Prepare ITP's for a minimum of 10 significant items, including works by the subcontractors, and submit to the Project Manager for approval within one (1) week of acceptance of the Tender. Failure to submit the ITP's in accordance with the above program, and in a form acceptable to the Project Manager, may give cause to the Project Manager to withhold the certificate for any portion of the works until approved ITP's are submitted.
5. Prior to practical completion, the Project Quality Manager must certify that all materials and workmanship comply with the contract documents and with the specified product manufacturer's installation guidelines, and that all non-compliance or deficiencies have been rectified.

ITP's shall be identified/notified with the Project Manager prior to signing of contract.

3. DETAILED REQUIREMENTS

3.1 Demolition

3.1.1 General

Removal of all redundant surfaces, fencing and concrete works, etc, as nominated in the documents and drawings.

The site is to be stripped, levelled and prepared for the application of new synthetic playing surfaces. Ensure no "soft spots" in base work by localised compaction, removal, and/or replacement.

Care shall be exercised to protect all adjoining existing construction.

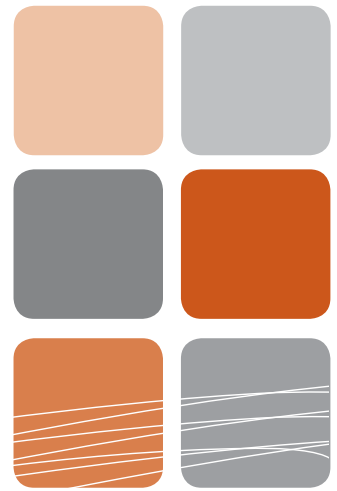
3.1.2 Materials resulting from demolition

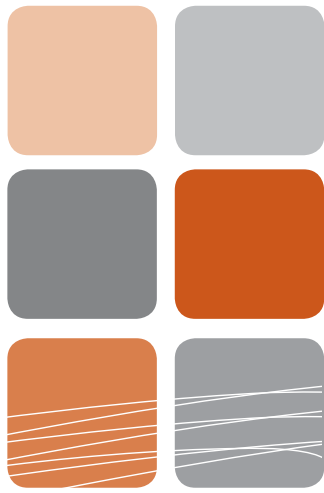
All materials resulting from demolition work shall become the property of the contractor.

Remove such materials from the site regularly and progressively.

Should it become necessary to store or stockpile any such material on the site, it shall only be undertaken in approved locations.

Do not re-use such material in new work, unless authorised by the Project Manager.





3.1.3 Demolition to be contained within the site

Carry out demolition in a manner to prevent the encroachment of any demolished materials onto adjoining property.

3.1.4 Clean up site

On completion of the demolition work, remove all debris, clean up site and leave in a tidy condition.

3.2 Excavation

3.2.1 Excavation

Consists of the excavation and disposal of all surplus materials, as specified and in conformity with the design intent shown on the drawings and to achieve end compliance with the specified playing surface profile, slope and smoothness requirements.

In acceptance of this document, the contractor understands and accepts the conditions of the site. No additional payment will be made for rock or other problem or unexpected material encountered.

3.2.2 Definitions

Formation – is defined as the finished surface, after completion of earthworks.

Subgrade – is defined as the trimmed or prepared proportion of the formation on which the pavement is to be constructed.

3.2.3 Construction Review by the Project Manager

Give three (3) working days notice to the Project Manager so that he may, as he deems necessary review the excavations in which construction work has been completed prior to any backfill.

3.2.4 Site clearing

Strip topsoil/root mat layer (100mm nominal) from the area of the works.

Remove roots, vegetation, existing footings, drains, pits and solid obstructions, within the area of the works.

3.2.5 Excavation requirements

Keep faces of the excavations free from loose earth and fill.

Dress off bottom of trench excavations to provide solid bearing for pipes and their sockets. Unless otherwise specified or shown on the drawings, excavate pipe trenches 150mm wider than the outside diameter of the pipe or service.

Finish subgrade surface to reasonably smooth surface, free from ruts and loose excavated material with a minimum cross fall of 1:100, graded to the appropriate drainage discharge points.

Take care when excavating near existing footings not to disturb the soil below such footings. Make good any damage.

3.2.6 De-watering

Keep water from excavations by pumping or other suitable means. Provide adequate means for disposal of such water without causing nuisance to adjoining properties or the public including the prevention of contamination to local watercourses.

i. Proof Rolling

On completion of compaction give the Project Manager a minimum of one (1) working days notice before commencing proof rolling.

Proof roll the cleared area with a vibrating flat drum roller of at least 200kN centrifugal force.

ii. Preparation of Subgrade

Trim the subgrade so that on completion of compaction, the lines and levels comply with the following tolerances:

- The finished level is not to be more than 10mm above or 20mm below the specified levels, and no point in the general surface deviates more than 10mm from a 3m straight edge laid parallel to the grade.
- The finished width is not less than the specified width or more than 150mm greater than the specified width.

iii. Surplus Materials

Remove from the site, all surplus material.

3.3 Filling and Backfilling

3.3.1 Fill within Pavement Perimeter

Fill shall be used as make up fill from top of topsoil strip to underside of pavement.

Fill shall be excavated material, free of any organic matter, bricks, pottery etc.

3.3.2 Placement and Compaction

Placing of fill shall be in 150mm maximum loose layers, compacted using minimum of 10 passes of a vibrating flat drum roller of at least 200kN centrifugal force. Add water as required to assist the compaction process.

3.3.3 Crushed Rock Backfill

Crushed rock backfilling shall be Class 3 Fine Crushed Rock, compacted to 98% of modified maximum dry density (MMDD).

3.4 Pitch Base works

3.4.1 General

The slope and flatness of the existing pitch bases are to be restored and re-levelled to achieve specified playing surface tolerances. Make good the base pavement to match existing, including bituminous spray seals. Technical data detailing the proposed material shall be submitted with the Tender.

3.4.2 Crushed Rock

Crushed rock in the base layer shall be Class 2 Fine Crushed Rock compacted to 98% of modified maximum Dry Density (MMDD).

3.4.3 Finished Tolerances

Surface of the sprayed rock base shall be finished to level within a tolerance of ± 5 mm of the required levels, and no point shall lie more than 6mm below a 3m straight edge laid on the finished surfaces, in any direction. The graded areas of the base shall be finished to comply with the tolerance requirements of the nominated sport and required playing surface.

3.5 Synthetic Grass Surface

3.5.1 Technical Requirements

The contractor shall employ specialist and experienced installers to install the synthetic surfaces in accordance with the manufacturer's recommendations and to the satisfaction of the Project Manager.

Contractors shall submit full details of the synthetic surface system with the tender to enable the Tender Evaluation Team to fully appraise the offer and provide additional information where requested by the Tender Evaluation Team.

The surface systems offered shall meet the performance requirements and be compliant to AS/NZS ISO 9001:2000.

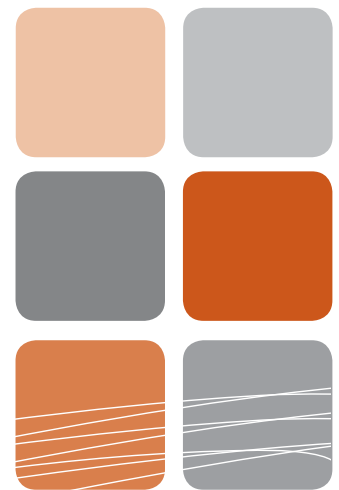
It is highly desirable that the product system offered is product compliant to Australian Standards and preferably Australian manufactured and complies with other appropriate international standards – refer section 2.1.

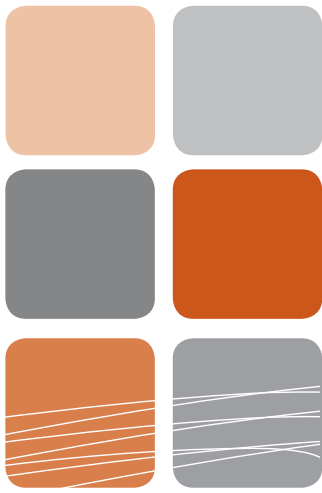
3.5.2 Synthetic Surface

The multipurpose playing grounds are to be surfaced with new premium grade synthetic turf manufactured to a high quality standard and suitable for primary school level competition play.

	Athletic Track, Cricket Pitch and Courts	Play Fields and Ovals
Colour	Surface and border colour, as specified in the drawings (to be approved).	Surface and border colour, as specified in the drawings (to be approved)
Pile material	U.V stabilised Polypropylene	U.V resistant Polyethylene
Pile height	19 -23mm pile height Nominal	35 - 50mm pile height Nominal
Pile weight	900 - 1200g/sqm Nominal	1250 - 1400g/sqm Nominal
Total product/ yarn weight	1500 - 1700g/sqm Nominal	2500g/sqm Nominal
Infill type	100% Sand - graded quartz sand, round, washed and dried. Sand size/range between 0.2mm – 1.0mm	Sand and rubber-crumble (Sand) Siliceous 80% round, washed and dried. (Rubber) Recycled
Infill height	15 – 19mm nominal	(Sand) Minimum 15 - 25mm (Rubber) Minimum 8 - 13mm
Stitch rates	Minimum 285 per metre	Minimum 200 per metre

Note: The athletics track requirements are not to be confused with International Amateur Athletics Federation track specifications.





3.5.3 Lines

The track, field, pitch, court dimensions and locations shall be in accordance with the current requirement of primary school level competition play.

All line marking shall be white, unless specified in the drawings. Line marking shall be stitched 'tufted' material (painted lines are not acceptable).

As per the relevant drawings, the synthetic surface shall be line marked in accordance with the specified sport noted in the drawings.

The laying of the synthetic grass shall be planned so that the maximum number of lines is tufted in during manufacture of the product. The number of lines to be cut in shall be minimised. Join lines shall be arranged to be away from high use zones.

Line Tolerances:

1	Straightness	Within ± 10mm over any 10m length
2	Location (Line markings)	Within ± 20mm

3.5.4 Plan of Synthetic Grass Installation

Before commencing, the manufacturer of the synthetic grass shall submit to the Project Manager for approval a plan of the proposed synthetic grass installation showing directions and lengths of cut lengths, and extent of lines to be tufted or cut in.

3.5.5 Sand Infill

Sand infill shall be an approved washed and graded quartz sand, with sand size/ range between 0.2mm -1.0mm, with a sub angular to rounded particle shape and of consistent colour. Infill operations shall only be undertaken with the sand and surface being dry. Sand infill is to be applied on the following playing surfaces: athletic tracks, basketball and netball courts, cricket pitch, handball courts - refer to drawings.

3.5.6 Sand and rubber-crumbs Infill

Fine washed and graded sand and granulated rubber at a ratio of 2:1 (sand: granulated rubber – measured by volume). Infill operations shall only be undertaken with the sand and rubber-crumbs and surface being dry. Sand and rubber-crumbs infill is to be applied on the following playing surfaces: soccer field, football oval – refer to drawings.

3.5.7 Installation

Commencement of the base work and synthetic grass installation shall only begin after total acceptance of the underlying base. Acceptance of the underlying base shall not be considered as grounds for invalidating any of the conditions of warranty on the surface system.

Lay grass in long lengths. No lateral join lines in the main field of play will be permitted.

Fixing method shall be by all weather adhesives, with sufficient adhesive to ensure that the surface is permanently fixed in position. Joins shall be butt joined with continuous adhesive on both sides of the join.

An appropriate adhesive shall be determined through the advice or recommendation of the specified manufacturer/supplier and approved by the Project Manager prior to installation.

Installation method shall also follow the specified manufacturer/supplier's installation guidelines.

3.5.8 Warranty

The supplier/manufacturer of the synthetic grass, shall provide a warranty in favour of the Principal, warranting that the product installed will not fade or fail due to ultraviolet degradation (minimum seven years) and that any faults due to poor workmanship in manufacture and installation will be rectified, (minimum of five years).

3.5.9 Maintenance

The contractor is responsible for the routine maintenance of the synthetic surface for a minimum of two (2) years after the date of practical completion.

During the maintenance period, the contractor is responsible to provide maintenance instruction and training of ground staff of the school, in order for the school to continue maintenance of the product

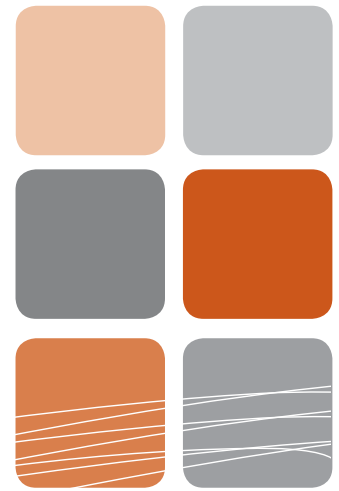
The contractor is to provide two (2) copies of maintenance manuals giving full details of the maintenance procedures required to keep the synthetic surface in sound and good condition.

3.5.10 Information to be submitted with the Tender

Submit all technical information necessary for the Tender Evaluation Panel to appraise the offer.

The information shall include:

- Complete lists of the sub-contractors and suppliers proposed to be used which must include the manufacturer, supplier and installer– refer Schedules 9 & 10 Part D Tenderers Response.
- Technical details of the synthetic surface system - refer Schedule 17 Part D Tenderers Response.
- Details of similar installations completed by the synthetic grass supplier and installer - refer Schedule 9 Part D Tenderers Response.
- Technical details of the adhesives proposed to be used - refer Part D Tenderers Response Schedule 17.
- Details of the sand infill - refer Schedule 17 Part D Tenderers Response.
- Details of the sand and rubber-crumbs infill - refer Schedule 17 Part D Tenderers Response.
- Drafts of the warranties offered - refer Schedule 18 Part D Tenderers Response.



4 SITE SAFETY

4.1 Suitable Contractor / Tradespersons

The head Contractor must ensure that all contractors or sub-contractors on site have the appropriate registration/licence for their work.

Where the legislation provides that a certificate of compliance/safety/etc may or should be provided, the head Contractor will ensure that all such certificates are provided and that a copy is made available to the Project Manager.

4.2 Site Safety Requirements & Contractor's Performance Review

The Contractor is required to maintain a daily site safety checklist using construction industry organisation OH&S checklist pro-formas (for example, the MBAV Form 18 is suitable). These checklists are to be appended to the Contractor's regular site meeting status report.

The Department of Education & Early Childhood Development requires the main contractor to IMMEDIATELY notify by telephone and then in writing DEECD Facilities Branch, the Project Manager and Project Director if a significant OH&S incident occurs on their construction site. By "significant" this means:

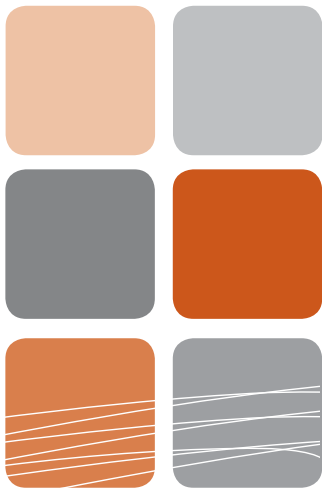
- WorkSafe notifiable injury to person(s) and/or damage to school property (including services) as a result of a workplace incident.
- Any event related to the construction works which requires the evacuation of any school.
- Any accident involving a major item of construction equipment (eg.; crane, hoist, vehicle).
- Collapse of any building element, excavation or temporary scaffolding or shoring.
- Injury to any student, staff member or visitor to the school due to construction works; or,
- having the site closed down for OH&S reasons by WorkSafe, Federal Government inspectors or trade union representatives.

The Site Safety Requirements & Contractor's Performance Review checklist is to be completed by the Contractor and submitted to the Project Manager each month with their monthly progress claim. Refer to Site Safety Requirements & Contractor's Performance Review checklist.

4.3 Safety

The Contractor shall carry out the whole of the works in a thoroughly safe manner and in particular shall:

- Ensure that on site safety is maintained in accordance with the Occupational Health and Safety Act, the Victorian Building Industry Safety Code and all other relevant legislation.
- Ensure that Sub-Contractors conform to the requirements of the relevant Acts of Statutes of Parliament, Regulations and By-laws or orders relating to the safety of persons on or about the site.
- Ensure that all workers on site are insured for Workcare in accordance with relevant legislation, and have current registration with the relevant Construction Industry Long Service Leave Authority.



- Ensure that all tools and tackle, gear, stagings, scaffolding, ladders, machines, winding arrangements and other equipment used by the Contractor in connection with the works are of adequate strength and safe for use.
- Immediately discontinue any practice or remove any equipment, which becomes or is likely to become unsafe.
- Ensure the removal from the works promptly of any of his employees or representatives or those of any Sub contractors who conduct tends to create danger to themselves or others or to the work.

Provide all hoardings, etc as required by local regulations and maintain all such hoardings, barriers, etc in a neat, tidy appearance.

4.4 Working with Children Check (WWCC)

The Agency may require that all workers attending the site in relation to the works, possess a working With Children Check (“WWCC”) as defined under the Working with Children ACT (Vic) 2005 (“The Act”).

The Contractor acknowledges and accepts responsibility in all respects regarding compliance with the Act and procuring WWCC’s for all its employees and sub-contractors’ employees entering the Site and shall take all responsible steps to ensure compliance with this clause, if requested by the Agency.

The contractor shall have no entitlement to claim additional costs, expense of damage whatsoever arising out of compliance with this clause and shall protect and hold harmless the Agency in the event of a breach of this clause or the act by the Contractor, its employees or subcontractors.

During the period of the contract, contractor movements shall be confined within the nominated areas, which will be clearly specified by the school and by the Project Manager prior to construction date. School buildings, classrooms and school toilets are restricted areas and under no circumstances are to be accessed by contractor personnel.

5 FINAL COMPLETION

5.1 Final cleaning/clean project site

At the hand-over stage, all discharge drains shall be clean of all spoil and debris resulting from construction works. The final cleaning is to be done to a normal ‘clean’ condition.

Sweep paved areas to a broom clean condition. Remove debris and other foreign deposits.

Be responsible for maintaining clean roads and access.

Remove and clean away mud, building/construction debris from footpaths, gutters, drains etc, when such occurs.

5.2 Maintenance

As mentioned in section 3.5.9 Maintenance, the contractor is responsible for the routine maintenance of the synthetic surface for a minimum of two (2) years after the date of practical completion.

The contractor is required to provide within the two year maintenance period, three (3) sessions of chemical weed and moss control, and brush and revitalise during each 12 month period.

During the maintenance period, the contractor is responsible to provide maintenance instruction and training of ground staff of the school, in order for the school to continue maintenance of the product.

The contractor is to provide two (2) copies of maintenance manuals giving full details of the maintenance procedures required to keep the synthetic surface in sound and good condition.

5.3 Product and installation Warranty

Approval process of product:

To test the durability of the product and the reliability of the performance characteristic of the synthetic turf, independent testing and inspections may be requested by the Project Manager. This testing and inspection may need to be undertaken in the laboratory, as well as when installed, to identify that the product matches what was tested and to guarantee that the supplied product performs to its specified application as a “safe” play field for children.

Factors that need to be considered:

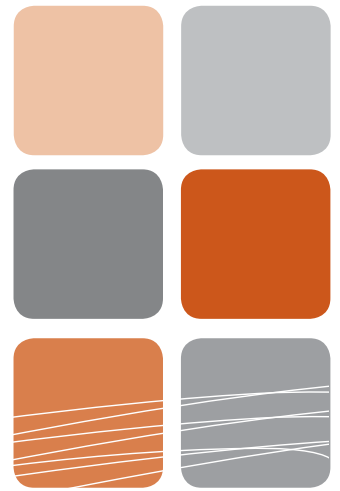
- Fibre strength.
- Pile weight.
- Abrasion resistance and joint strength.

(these characteristics will also need to be further examined once exposed to UV, water and extreme temperatures).

Product is to be warranted for 10 years (nominal).

Installer should warrant installation work for period of equal warranty of the synthetic turf, including seam and stitching.

Note: The original of this specification did not call for any insitu testing to check on the performance of the facility at handover. Although a slightly expensive exercise, it is recommended that you have your activity area tested before taking formal delivery of the artificial grass surface, and you should also consider having it tested again at the end of the first maintenance period (if your arrangement is similar to that described in item 5.2 above).



Brighton Primary School - Before



Brighton Primary School - After