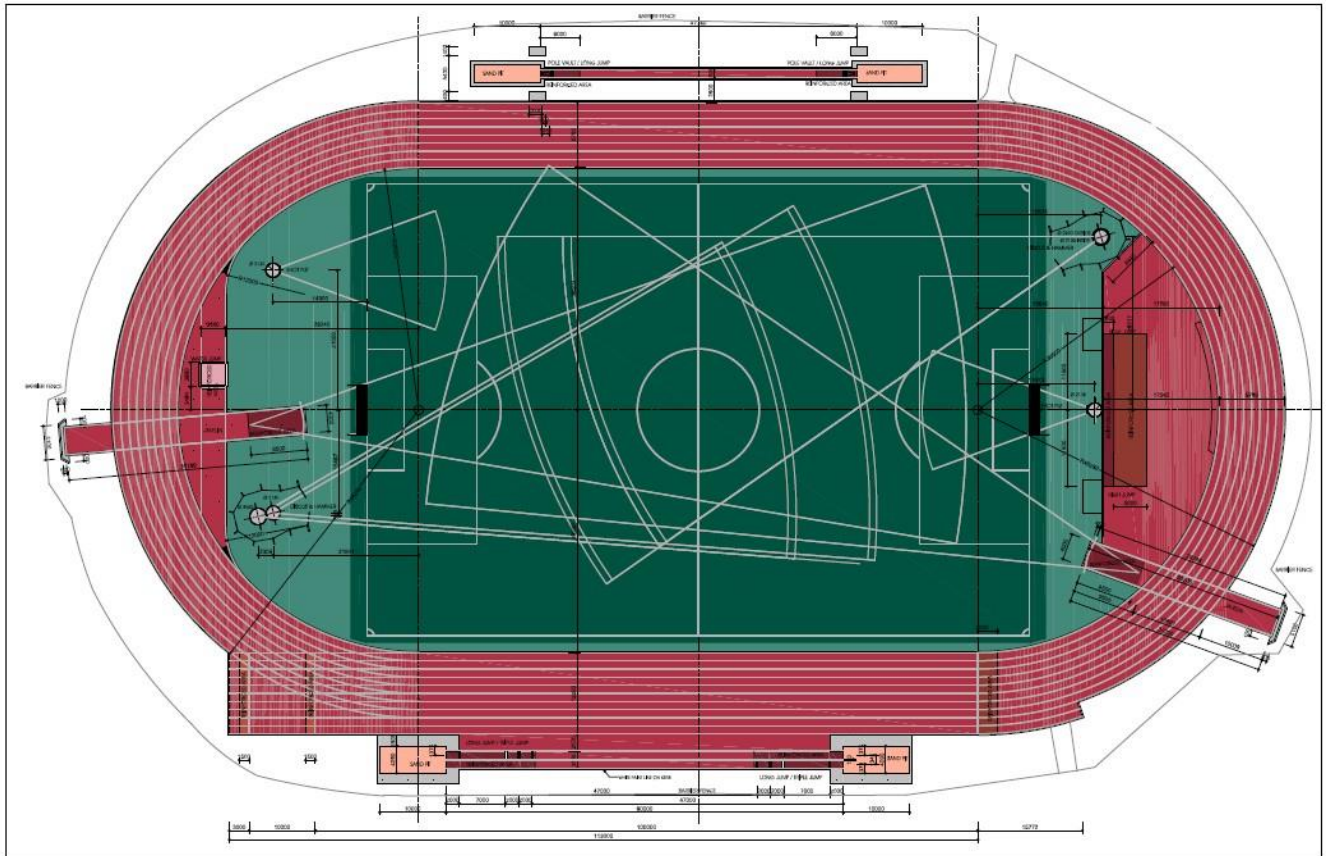


1. ADDITIONAL TECHNICAL SPECIFICATIONS

EXISTING FACILITY

EXISTING ATHLETICS TRACK GEOMETRY



- **SYNTHETIC SURFACING**

The existing shock-pad construction consist of recycled rubber granules embedded in a Elastogran Iso 136/90 pre-polymer based binder, a single component moisture cure, rubber crumb binder, topped with a thin layer water based spray. The surface is completely permeable and deterioration is taking place at a rapid rate, especially in the high wear areas.

- **THE FOLLOWING ITEMS ARE NOTED:**

The existing permeable shock-pad results in water draining to the level of the asphalt surfacing. Drainage will then take place either through permeable asphalt layers or along the surface of impermeable asphalt towards the drainage channels. The existing crushed stone base and C2 crushed stone subbase were not designed as open-graded drainage layers. Insufficient drainage rates will result in premature deterioration of the shock-pad.

Information obtained indicate that the existing asphalt layers, although not dense-graded, may lack sufficient void content to accommodate a completely permeable synthetic surface. The existing layer works design is suitable for a sandwich system, which consists of a 10mm permeable shock-pad and a 3 mm impermeable topping.

It is recommended that test cores be drilled for confirmation of permeability of existing asphalt layers since original records of the design mixes are not available.

Care need to be taken to ensure that the existing shock-pad is dry prior to sealing the surface and / or placing re-topping materials to prevent bubbling as a result of trapped moisture.

- **REJUVENATION OF THE EXISTING SYNTHETIC SHOCK-PAD**

- **REJUVENATION ON THE EXISTING SHOCK-PAD WILL BE CARRIED OUT AS FOLLOWS, AS PER DETAILED SPECIFICATIONS:**

- **STEP 1: LEVEL CORRECTIONS**

It is recommended that the installation of the new drainage channel be completed prior to carrying out level corrections. The drainage channel placed at level '0' will serve as a guide for achieving the best possible results.

Minor level corrections and removal of high spots will be carried out by grinding over the total area of the existing shock-pad, to varying depths between 0 and 5mm using a suitable grinding machine.

Note that only minimal level corrections are required over the majority of the track surface and can be achieved over these areas using this method.

Level corrections over low areas will be achieved through the placement of the first synthetic layer using SBR granules.

Where current slopes are 1.1% over the outer half the width of the track, grinding should be carried out as follows:

Grinding from 0 mm along the track centre line to maximum 5 mm along kerbs to allow for maximum slope decreasing. This will allow the installation of a minimum of 5mm re-topping on top of kerbs as kerb seals and level corrections over total track width of between 0 and 5 mm.

High areas along the existing drainage channel will be grinded down to the original synthetic design levels.

Flat slopes along outer kerb to track centre line:

Limit grinding from 0 mm along kerbs and existing channel to maximum possible depth along track centre line in limited areas to allow for maximum slope increase.

Special attention is required to obtain maximum slopes along a portion of the existing bend adjacent to the 110mm start line and at the jut-out of the northern javelin run-up.

- **STEP 2: SHOCK-PAD SURFACE REJUVENATION**

Spray with PUR Binder & Acetone mixture

- **STEP 3: SEALING EXISTING SHOCK-PAD**

Sealing of existing shock-pad with Polyurethane coating & EPDM powder

- **STEP 4: RE-TOPPING**

- First Layer: 5mm Polyurethane coating with SBR granules (level correction)
- Final Layer 5mm Retopping - Full Polyurethane Construction Surfacing. Colour RAL 5010 blue

- **STEP 5: UV PROTECTION SEALANT (10 YEAR GUARANTEE)**

- Sealant: PUR elastic sealing lacquer

- **STEP 6: LINE MARKINGS AND SYMBOLS**

- Setting-out and painting of line markings, symbols and stencil markings by an IAAF accredited surveyor

- **FIELD EVENTS MINIMAL UPGRADE**

Provision is made to replace the following items during phase 1 to enable athlete use of these facilities, as required between upgrading phases of the project:

- **LONG JUMP AND TRIPLE JUMP FACILITY WEST**

The existing take-off boards for long – and triple jump require removal and replacement, including new drainage connection pipes to ensure sufficient drainage. The geometry of the run-up lanes, take-off board positions and sandpit width will be adjusted to comply with IAAF regulations. The survey indicates that the width of the existing sandpits are not to standard for the current two- lane run-up configuration. This item will be confirmed on site.

- **LONG JUMP AND POLE VAULT FACILITY EAST**

The existing long jump take-off boards and pole vault boxes require removal and replacement, including new drainage connection pipes to ensure sufficient drainage.

- **ATHLETICS OVAL & STRAIGHT**

- The existing facility comprises of an eight lane oval and a ten lane straight.
- The bend radius is 36.5m.
- The existing run-out follows the bend to a distance of 16m and does not conform to IAAF standards.

- RECOMMENDATIONS FOR THE 10 LANE STRAIGHT:

Minimal upgrade option:

- Extend the run-out of the 10 lane straight to a minimum of 17m beyond the finish line.

Requirements for new 24 m2 run-out area:

Demolitions:

- Kerb removal

Earthworks:

- Boxcut, roadbed, selected layers

New layer works:

- Subbase
- New kerb installation
- Base
 - Double layer asphalt

Synthetic surfacing:

- 24 m2 new 13mm sandwich system synthetic surfacing

- STEEPLECHASE

- The steeplechase facility is located inside the northern bend.
- The water jump position is not as per the standard IAAF track.
- The kerb radius to the steeplechase measures 12m in comparison with 16m as per the IAAF standard track.

- RECOMMENDATIONS FOR THE WATER JUMP:

- Maintain the current water jump position due to budget constraints
- Adjust the existing water depth to comply with current standards (concrete infill)

- JAVELIN NORTH

The North-western javelin run-up has a length of 36.2m and a width of 4.0 m between kerbs. The start of the run-up, over an average length of 7.2m has a low cross fall.

The javelin run-up coincides with the standard IAAF position for the water jump.

- **MINIMUM REMEDIAL WORKS:**

- Extend the run-up length to 36.5 m and provide sufficient synthetic surfaced areas at the end of the run-up for the painting of the throwing arc and sector lines as per IAAF regulations. This will require the addition of 9 m² of new synthetic surfacing (sandwich system), including earthworks, layer works, asphalt surfacing and kerb installation including the removal of a 6m length of existing kerb.

- **JAVELIN RUN-UP SOUTH-WEST**

- The South-western javelin run-up has a total length of 30.05m and a width of 4.0 m, resulting in an actual run-up length below the minimum of 30m as per IAAF regulations.
- The overall inclination of the run-up does not conform to IAAF regulations.
- Due to the placement of the run-up, the safety area is insufficient and the landing sector reaches lane 1 along the western straight.

- **RECOMMENDATIONS FOR SOUTH-WESTERN JAVELIN RUN-UP:**

Minimal upgrade option:

- Remove the existing run-up.
- Provide a new run-up on the center line of the track, within the existing high jump D-area.
- This option will require minimal remedial work and allow for a recommended actual run-up length of minimum 30m as per IAAF regulations.
- This option requires the addition of 19 m² of new synthetic surfacing (sandwich system), including earthworks, layer works, asphalt surfacing and kerb installation, including the removal of a 4.2m length of existing kerb.

- **HAMMER AND DISCUS FACILITY SOUTH-EAST**

- The placement of the facility is not as per the safety regulations of the IAAF.
- The concrete surfaces and circles require renewal.

- **RECOMMENDATIONS FOR HAMMER & DISCUS FACILITY SOUTH-EAST:**

Minimal upgrade option:

- Remove the existing facility
- Install a new discus facility only in a new position with sufficient safety distances
- Install a new discus safety cage to current standards.

- **HAMMER AND DISCUS FACILITY NORTH-WEST**

- The placement of the facility is not in the position recommended by IAAF.

- The placement obscures the view onto the steeplechase and javelin facilities
- The concrete surfaces and circles require renewal.
- The safety distances to the cage verticals do not comply with IAAF regulations
- RECOMMENDATIONS FOR HAMMER & DISCUS FACILITY NORTH-WEST:
 - Move the hammer and discus facility to the recommended position close to the eastern straight.
 - Install a new hammer & discus safety cage to current standards.
- SHOT PUT
 - The concrete surfaces, stop boards and circles require renewal.
 - The current placement is where alternative facilities should be placed.
- RECOMMENDATIONS FOR SHOT PUT FACILITIES:
 - Move the shot put facilities to the new recommended positions
 - Install new stop boards and circles including drainage connections to existing drainage points.
- LONG – AND TRIPLE JUMP FACILITY WEST
 - This is a double facility, not suitable for simultaneous use.
 - The total run-up length is 60m.
 - The sandpits are 3.9m wide by 9.92 m long.
 - The sandpit surround is a 500mm deep concrete slab with synthetic turf cover.
 - The triple jump take-off boards are placed at distances of 9m, 11m and 13m from the sandpits.
 - The long jump take-off boards are placed at a distance of 2m from the sandpits.
 - The as built 3.9m widths of the sandpits are too narrow for this configuration.
 - The take-off boards along the pavilion side are placed too close to the western edge of the sandpit
 - The take-off boards along lane 10 are placed too far from the eastern edge of the sandpit
- MINIMUM RECOMMENDATIONS FOR LONG- AND TRIPLE JUMP FACILITY:
 - Install new take-off boards and drainage connections pipes in correct positions.
 - Adjust the width of the sandpit slightly to conform to IAAF standards.

- **POLE VAULT & LONG JUMP FACILITY EAST**

- The existing facility is a single lane run-up with landing areas at both ends.
- The total run-up as-built length measures 47.5m.
- The sandpits are 2.75m wide by 10 m long.
- The sandpit surround is a concrete slab.
- The long jump take-off boards are placed at a distance of 1,8m from the sandpit.

- **MINIMUM RECOMMENDATIONS FOR POLE VAULT & LONG JUMP FACILITY:**

- Replace existing pole vault boxes and take-off boards complete with new drainage pipes
- Demolish existing outdated pole vault stands
- Construct new pole stands in new positions to receive new sliding rails

- **HIGH JUMP AREA SOUTH**

- The high jump area is designed to accommodate two high jump facilities
- The width along the track center line is 17.56m, suitable for school tracks where a demountable kerb is optional
- For senior events, it will be required to remove portions of the demountable kerb to obtain a minimum of 20 m to 25 m maximum run-up, start on the track oval.

- **MINIMUM RECOMMENDATIONS FOR HIGH JUMP AREA:**

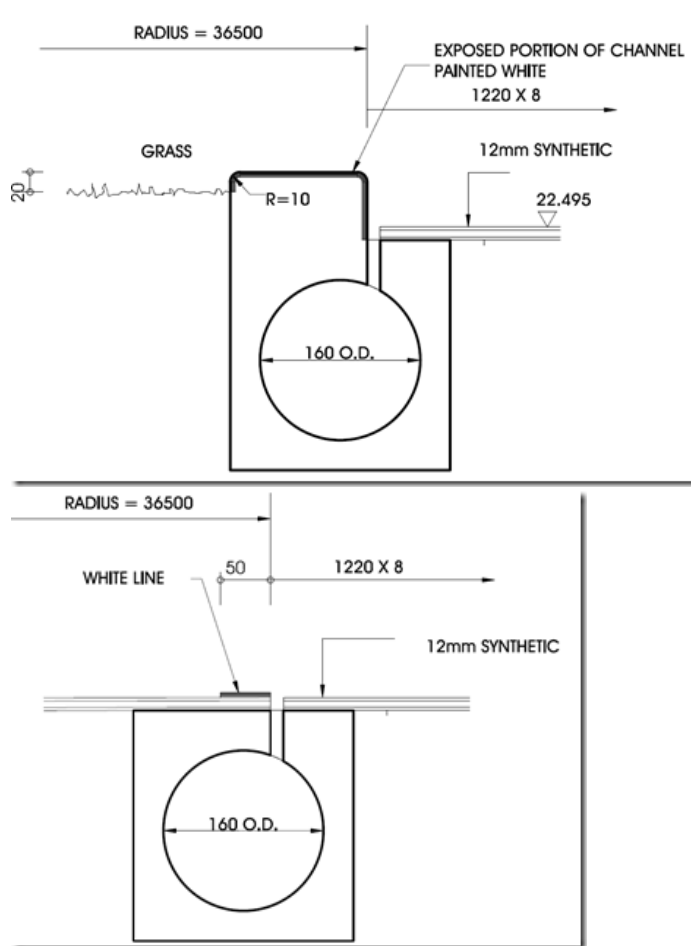
- Refer to recommendation listed under javelin south

SERVICES

- The existing storm water system will be evaluated and cleaned to ensure that it remains in perfect working order. Note that proper drainage is of utmost importance to extend the life of the facility.

- **TRACK DRAINAGE CHANNEL**

The construction of the existing drainage channel is as follows:



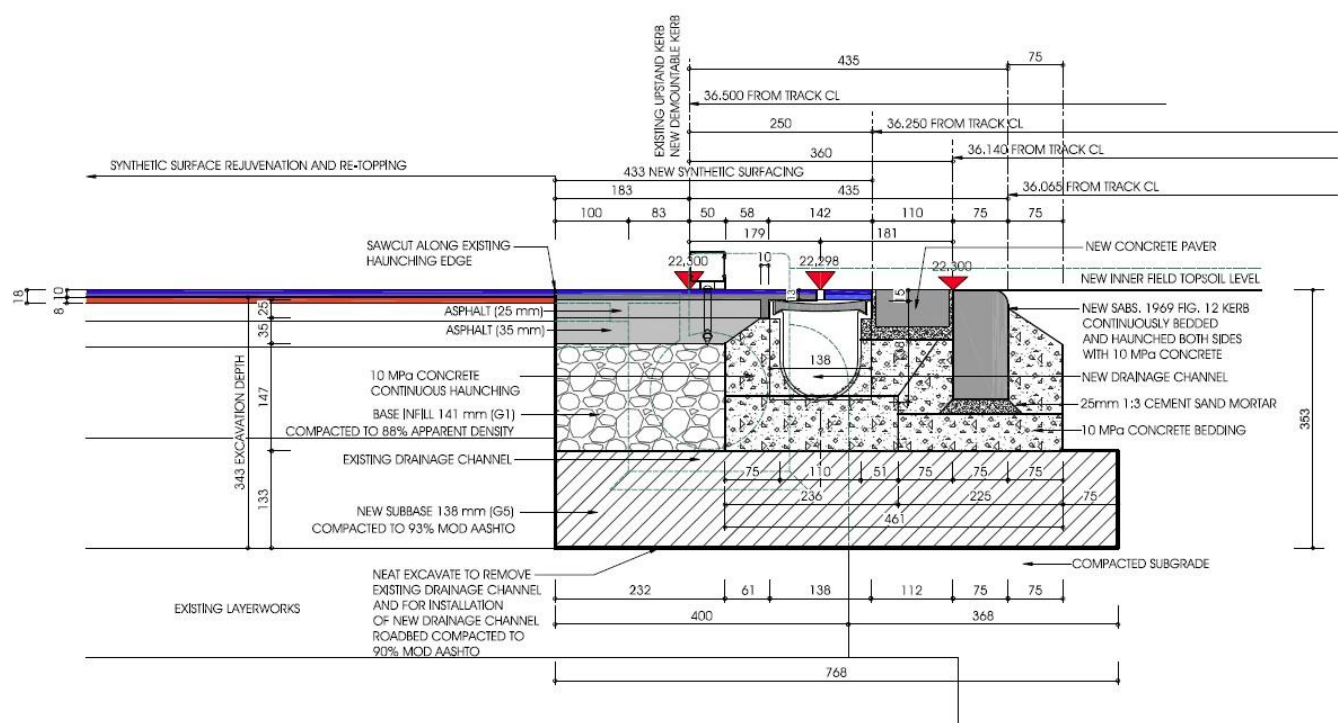
Channel 1: Drainage channel synthetic to grass
synthetic to synthetic

Channel 2: Drainage channel

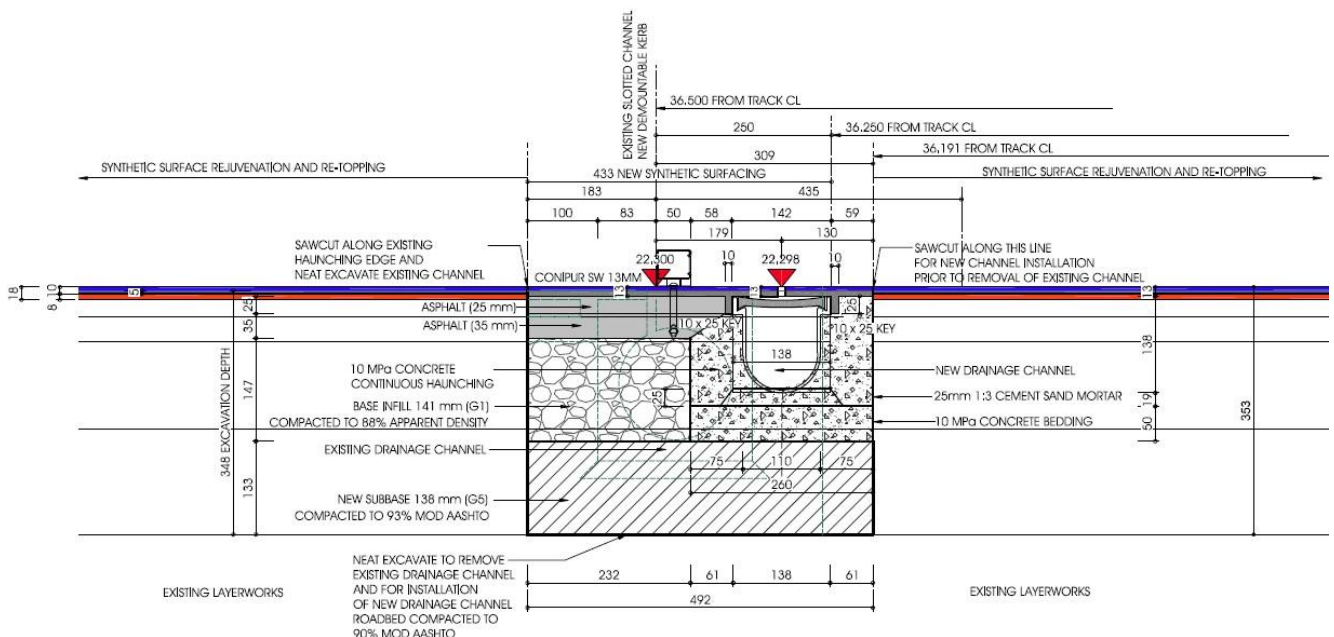
- The drainage slot is placed inside lane 1
- Water flowing from the infield cannot flow into this drainage channel as a result of the fixed upstand portion with no allowance for surface drainage to flow towards the drainage slots
- A demountable upstand kerb required along the northern and southern bends where channel 2 is installed was omitted
- Installation of a demountable kerb can only be carried out by drilling into the 40mm thick concrete in the top of the channel, which may cause damage to the channels as a result of the limited edge distance to the slot and will leave the locating devices protruding into the drainage channel.

Channel 2: Drainage channel synthetic to synthetic, perpendicular slots cut through synthetic surfacing

- The drainage channel needs to be exposed by removing the synthetic around the perpendicular slots to investigate the reasoning behind these peculiar slots, extending into lane 1, around the bends.
- All drainage slots require reinstatement
 - RECOMMENDATIONS FOR DRAINAGE CHANNELS:
- Remove existing drainage channels
- Install a local supply slotted drainage channel with stainless steel covers and slots, modified by a specialist synthetic contractor to obtain an affordable solution in lieu of importing new drainage channels.
- Install an aluminium demountable kerb
- Install a narrow width of paving along the inner drainage channels and kerbs adjoining the inner field grass as protection of the channels and synthetic surfacing.



• FIG 1 PROPOSED NEW DRAINAGE CHANNEL ALONG GRASSED AREAS



•

• FIG 2 PROPOSED NEW DRAINAGE CHANNEL WITHIN SYNTHETIC AREAS

• INNER FIELD AND OUTER FIELD

- The infield grass levels appears not to be within IAAF regulations as a result of years of topdressing.
- This current infield levels will be confirmed by the contractor on site prior to carrying out remedial work.

Remedial work will include the minimal requirements to achieve suitable levels on the inner field:

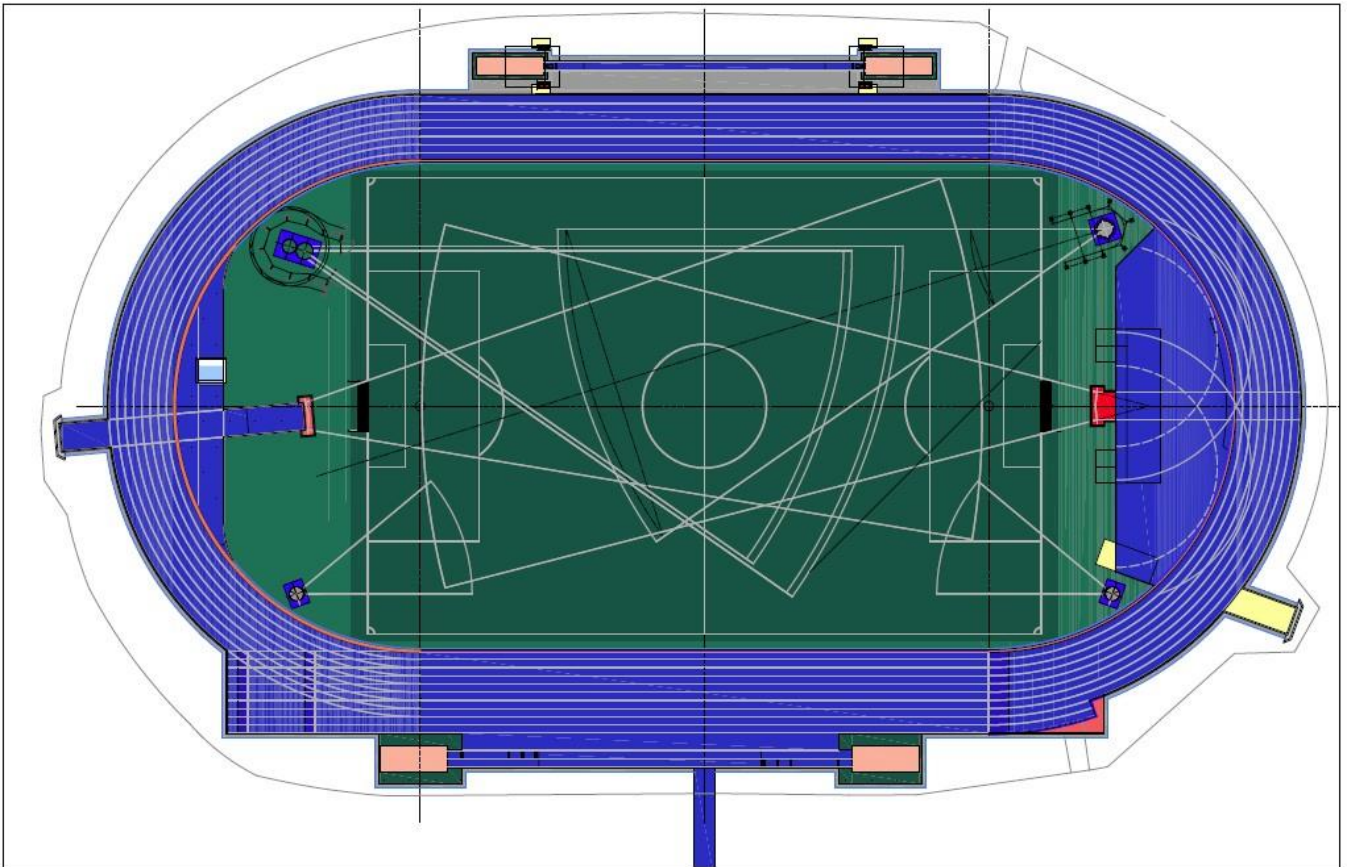
- Removal of sods and maintenance thereof for re-use on the inner field
- Topsoil shaping and leveling
- Fertilizing
- Placing of existing sods
- Maintenance of grass until sod establishment

• OUTER FIELD (RECOMMENDED BUT NOT AN ESSENTIAL REQUIREMENT)

- Construct a paving strip along the outer circumference of the athletics track, minimum width 600mm.
- Modify low grid inlet levels along the outer perimeter kerbs to prevent injury to athletes.

- **CERTIFICATION**

- The proposal is to obtain a final product complying to minimum IAAF Class 2 standard track requirements under a construction category V.
- Provision is made for the IAAF certification application and IAAF required survey by an IAAF accredited surveyor



- **FIG 3 PROPOSED MINIMAL UPGRADE**

- **PHASING PROPOSAL:**

- **PHASE 1**

The recommended construction step sequences are set out below in order to limit the total project costs.

1. Carry out an infield survey to determine the extent of infield level corrections required in accordance to IAAF standards
2. Saw-cut through asphalt and neat excavate to remove existing drainage channels and sumps
3. Remove existing kerbs where required for limited field item upgrades

4. Complete earthworks and layer works to upper selected layer prior to Fig 5 kerb installation.
5. Complete earthworks and layer works to subbase layer prior to Fig 12 kerb installation.
6. Install new kerbs
7. Install new drainage channel. The drainage channel installed at 'level 0' will be a guide for level corrections required along the oval, steeplechase and high jump area.
8. Complete subbase, base & asphalt areas
9. Remove cage vertical in high jump area prior to surface grinding
10. Grinding of existing shock-pad
11. Complete installations of new take-off boards and pole vault boxes
12. Complete surface rejuvenation, level correction layer and re-topping
13. Line markings

- **PHASE 2**

1. Hammer and discus upgrades
2. Shot put upgrades
3. Inspection of existing storm water system for damage and blockage, cleaning and repairs as required

- **PHASE 3**

1. Inner field level corrections to comply with IAAF regulations for landing sectors
2. IAAF Certification

- **PHASE 3 OR PHASE 4 – RECOMMENDED ITEMS, NOT ESSENTIAL**

1. Inner circumference synthetic edge paved maintenance protection
2. Paving around outer circumference of athletics track

SYNTHETIC ATHLETICS TRACK

To be read with Preliminaries & General.

1 PRELIMINARIES

This document contains the performance specification for works to be undertaken by both a Specialist Synthetic Athletics Track Contractor and a Specialist Civil Subcontractor (refer to clause 1.1 in particular). It is the responsibility of the Specialist Synthetic Athletics Track Contractor to define the exact final split between works packages or construction items and agree same with the Subcontractor at Tender Stage. This will include the level of coordination expected from the Specialist Synthetic Athletics Track Contractor as well as the exact determination of works to be included within the Athletics Track Contract.

1.1 GENERAL SCOPE OF THE WORKS

The main items of work included in the Contract are:

1. Limited areas of site clearance, bulk earthworks and layer works to levels indicated on the drawings by the Specialist Civil Subcontractor.
2. The final preparation of the subgrade to receive layer works, preparation and installation of the layer works and asphalt or concrete to the athletics track to relevant SANS 1200 Standards and IAAF Standards by the Specialist Civil Subcontractor.
3. Installation of limited new areas of an all-weather IAAF certified athletic track surfacing complete to minimum Class 2 standard in accordance with the IAAF Guidelines by the Specialist Athletics Track Contractor.
4. Surface preparation by Specialist Synthetic Athletics Track Contractor on existing shock-pad, including surface grinding, rejuvenation, sealing, level corrections, re-topping and 10 year guarantee sealant, all items as per project specifications.
5. Installation of new field event equipment including take-off boards and inserts for long-and triple jump, pole vault boxes with inserts, discus, hammer and shot put circles, javelin run- up upgrades, water jump upgrade including new adjustable hurdle in accordance with IAAF Guidelines by the Specialist Synthetic Athletics Track Contractor.
6. Loose equipment such as landing mats, high jump and pole vault bars, hurdles, timing equipment and the like will be supplied by the Employer unless noted otherwise herein. All standard fixed or built in equipment; including sockets will be supplied by the Specialist Synthetic Athletics Track Contractor.
7. Civil works will be carried out by the Specialist Civil Subcontractor. The Specialist Synthetic Athletics Track Contractor will be responsible for coordinating civil works in adjacent areas with the installation of the synthetic surfacing and field event facilities.
8. The Construction of outfield areas and general paved areas are the responsibility of the Specialist Civil Subcontractor.

9. Installation of new field item drainage connections to existing storm water system will be installed by the Specialist Civil Subcontractor.
10. The Specialist Synthetic Athletics Track Contractor will work and cooperate with the Design consultant, including gaining approval of the Specialist Synthetic Athletics Track Contractor proposals in advance of starting on site, the taking of samples and testing for compliance with IAAF Guidelines.

- PHASE 1 SYNTHETIC

SURFACING

The existing shock-pad construction consist of recycled rubber granules embedded in a Elastogran Iso 136/90 pre-polymer based binder, a single component moisture cure, rubber crumb binder, topped with a thin layer water based spray.

- REJUVENATION OF THE EXISTING SYNTHETIC SHOCK-PAD

Rejuvenation on the existing shock-pad will be carried out as follows, as per detailed specifications:

- STEP 1: LEVEL CORRECTIONS

Grinding of existing shock-pad surface to a total average depth of 5 mm using a suitable grinding machine

- STEP 2: SHOCK-PAD SURFACE REJUVENATION

Spray with a moisture curing, solvent free, un-pigmented PUR binder of medium viscosity & Acetone mixture

- STEP 3: SEALING EXISTING SHOCK-PAD

Sealing of existing shock-pad with Pore Sealer & EPDM powder

- STEP 4: RE-TOPPING

- First Layer: level correction layer: 5mm layer with two component self-levelling polyurethane coating and recycled rubber granules
- Final Layer 5mm Full Pour Re-topping, Polyurethane coating with EPDM granules (RAL 5010 Colour Dark Blue & RAL 5012 Colour Light Blue)

- STEP 5: UV PROTECTION SEALANT (10 YEAR GUARANTEE)

- Sealant: Weathering resistant, highly elastic, pigmented sealing lacquer (RAL 5010 Colour Dark Blue & RAL 5012 Colour Light Blue)

- STEP 6: LINE MARKINGS AND SYMBOLS

- Setting-out and painting of line markings, symbols and stencil markings by an IAAF accredited surveyor

- FIELD EVENTS UPGRADE PHASE 1

The following items are included under phase 1:

- LONG JUMP AND TRIPLE JUMP FACILITY WEST

Removal and replacement of existing take-off boards for long – and triple jump, including new drainage connection pipes to ensure sufficient drainage.

- LONG JUMP AND POLE VAULT FACILITY EAST

Removal and replacement of existing long jump take-off boards and pole vault boxes, including new drainage connection pipes to ensure sufficient drainage.

- UPGRADE ITEMS INCLUDED UNDER PHASE 2:

Note that the numbering order of the various phases do not predict the construction order of these items.

4. Extending the western straight run-out

5. Extending the northern javelin run-out

6. Removing existing southern javelin run-up and incorporation of javelin run-up in the existing high-jump area

7. New hammer and discus facility north-east

8. New discus facility south-east

9. New shot put facilities

10. New drainage channel, sumps and connections to existing stormwater points

11. New demountable aluminium kerb

- ITEMS TO BE ADDRESSED DURING PHASE 3 UPGRADE:

3. Inner field level corrections to ensure compliance with IAAF regulations for landing sectors

4. Inner circumference synthetic edge paved maintenance protection

5. Paving around outer circumference of athletics track

6. Inspection of existing storm water system for damage and blockage, cleaning and repairs as required

7. IAAF Certification

1.2 SPECIALIST SYNTHETIC ATHLETICS TRACK CONTRACTOR'S RESPONSIBILITIES

1. The Specialist Synthetic Athletics Track Contractor will undertake the design and full detailing of all materials, components, fittings and fixings to ensure compliance with the specified Standards / Requirements and the Performance specification.
2. The Specialist Synthetic Athletics Track Contractor is responsible for the design and performance of all elements described herein.
3. The Specialist Synthetic Athletics Track Contractor is to provide details at Tender stage of any builder's work requirements to be carried out by others, and not included within his tender.
4. The Specialist Synthetic Athletics Track Contractor will be responsible for the performance of the Installation, supply, off-loading, setting out, erection warranties, preparation of maintenance manuals relevant to the installed products.
5. The Specification and the Contract Drawings establish the design criteria, which the specialist Contractor will use to prepare design details as may be necessary for the execution of the works. Design criteria issued to the Specialist Synthetic Athletics Track Contractor will not be varied without express approval. The Specialist Synthetic Athletics Track Contractor will submit to the Sport Consultant such additional design criteria as he may propose to use.
6. The Specialist Synthetic Athletics Track Contractor is to ensure all elements described in this specification are designed to the latest revisions of all of the following: Manufacturers' instructions & recommendations and the requirements of the IAAF.
7. The Specialist Civil Subcontractor will be responsible for undertaking all accurate survey checks and tests upon the permanent works carried out previously (as built information), prior to commencing the Works, and formally accepting the permanent works meet with their satisfaction as being suitable for the construction of additional new areas, installation of field events and resurfacing of the track. This will include the testing of the surface drainage and storm water system, undertaking shock pad, kerb and channel level tolerances and tests and a detailed survey of the existing grassed infield.
8. The Specialist Synthetic Athletics Track Contractor will be responsible for the fixing of all permanently fixed athletics equipment as well as modifications to the sand filled landing pits for the long and triple jump events where applicable.
9. The Specialist Synthetic Athletics Track Contractor shall coordinate with the Sport Consultant in respect of producing information for Operation and Maintenance Manuals, test certification and the like.
10. For the above the Specialist Synthetic Athletics Track Contractor will submit for approval such drawings, specifications calculations and other data as necessary to satisfy the Sport Consultant of the adequacy of the design to meet the performance specifications set out hereinafter. The approval of the specification or other documentation being part of the Contractor's Design will not in any way relieve the Contractor of his responsibilities in the matter.

1.3 DESIGN LIFE OF SUB-STRUCTURE: NEW SYNTHETIC SURFACED AREAS

The substructure, including any sub-structure supporting the edges, kerbs and drainage channels, to the synthetic surfaced areas will be constructed to resist the effects of drought, rain and frost on a 25 year return cycle together with the effects of all machines and plant to be used in the initial construction and subsequent maintenance such that the finished surface levels and gradients remain within the following limits, subject to current requirements:

1. Surface Regularity -The deviation beneath a 4.00m straight edge is to be no greater than 6mm in any position and direction and the deviation beneath a 1.00m straight edge will be no greater than 3mm in any position and direction.
2. Gradients will not exceed: -
3. In the direction of throwing or running, 1:1000.
4. At right angles to the direction of running or throwing, 1:100.
5. For the high jump fan, from the outer edge to the positions of the corners of the landing area 1:250.

1.4 QUALITY OF NEW DRAINAGE WORKS

All new drainage channels and drainage connections will conform to the relevant clauses of the SANS 1200 and that of the IAAF.

1.5 DRAINAGE TO SYNTHETIC SURFACED AREAS

The Specialist Civil Subcontractor will install additional drainage channels where indicated.

1.6 SURFACE OF SUBGRADE

The Contractor will construct the layer works as per the drawings provided for such works to the sub grade to ensure a uniform sub grade density and stability.

SUBSTRUCTURE TO SYNTHETIC SURFACED AREAS

The substructure to all new synthetic surfaced areas consist of layers of bound and unbound impermeable and frost resistant materials to a total depth suitable for the site conditions such that sub-substructure achieves the resistance to movement and damage hereinbefore stated. Any surface layers of bound material will be capable of resisting deformation and damage by any equipment used in placing the synthetic surface or any subsequent constructional operations and will be topped off with 2 layers of open-graded Asphalt to a minimum depth of 60mm. The hot mix asphalt may be placed with a mechanical paver or by hand, if the Contractor elects. The finished course must not vary more than 6 mm over a 3.00 m straight edge.

1.7 FIELD ITEM DETAILS AND SPECIFICATIONS

The Contractor will provide general and detailed drawings from the manufacturers of the items which he is required to install and will submit these to the Sport Consultant for information and approval but such approval will not relieve the Contractor of any responsibility for the performance of those items which will fully comply with any design and performance criteria as

defined. The Contractor will confirm all specifications in respect of the construction and the materials to be used together with specifications for the quality of workmanship and the methods of quality control to be adopted to ensure that the prescribed performance requirements and the quality requirements of his specification in respect of materials and workmanship are fully met.

1.8 PERIOD FOR EMPLOYER'S DECISION

The Contractor will plan the production of additional details in conjunction with the Sport Consultant for his programme of operations on site so that the Employer will have a minimum of seven days in which to answer any Contractor's queries and fourteen days to give any approval to the Contractor's additional proposals. The Employer's Sport Consultant's approval of all details, specifications and other proposals is for a matter of information and liaison and will not in any way relieve the Contractor of his responsibilities under the Terms and Conditions of the Contract.

1.9 CONTRACTOR TO CHECK DRAWINGS

The Contractor will check all dimensions where given and will notify the Sport Consultant of any error which may be discovered. Figures marked on the drawings will be followed in preference to scale measurements. Large scale drawings will over-ride small scale drawings.

1.10 DRAWINGS TO BE FOLLOWED

When checked by the Contractor and any discrepancies have been eliminated from the drawings, together with the Contractor's details and such further information as may be supplied by the Contractor will be rigidly followed by the Contractor.

1.11 DETAILS CONFIDENTIAL

The Contractors will treat the drawings and specifications and everything contained therein as private and confidential and will not publish or allow to be published any information or drawing concerning the works. The Contractor's attention is particularly drawn to the ownership of the copyright and he will not in any way permit or condone any breach of any such copyright.

1.12 SETTING OUT THE WORKS

All particulars for setting out will be taken on site in conjunction with the drawings. The Contractor will accurately perform all setting out from bases established by such methods as will be approved and the Contractor will provide all instruments, templates, rods etc. as may be necessary for this purpose and where required will maintain them for reference until completion of the works. The Contractor will provide the all necessary assistance in checking the setting out of the works and in interpreting any marks made for the purpose of setting out. The Contractor will establish the radii points to the athletics track, by approved means, with secure rotary central point markers with means for securely attaching a steel band or other tape zeroed over the exact centre point of the radii. The marker plates to remain in position until the track markings have been completed and the dimensions certified by an Independent Surveyor.

1.13 PROVISION OF INSTRUMENTS

The Contractor will provide and keep upon the site an approved level, tripod and staff; 100 metre NPL certified steel band, constant tension handle, tape thermometer and scientific calculator. An

approved five second electronic double face theodolite and EDM or Total Station will be made available for checking the prime setting out of the track and the track markings. All instruments will be kept in proper adjustment by the Contractor who will also provide all necessary certificates of accuracy and all attendance and assistance.

1.14 STORAGE OF MATERIALS

All materials will be carefully stored and those liable to deterioration will be adequately protected against weather. Cement will be kept dry and used in rotation of deliveries. Aggregates will be stored separately at mixer positions on drained areas with divisions between different sizes and types of aggregate. Bricks will be properly stacked on a level and hard standing and be adequately protected from inclement weather. Precast concrete sections will be supported on timbers to ensure that the mating, bedding or exposed faces of sections are not damaged or chipped. Toxic and flammable materials will be kept in locked and secure flameproof stores.

1.15 SPECIAL STORAGE

The Contractor will provide and maintain as necessary, within a secure, fenced compound, dry fireproof stores for the storage of all flammable or toxic materials and will exhibit warning notices as to the nature of the products stored therein. A notice explaining decontamination procedures to be adopted in the event of spillage of hazardous compounds is to be prominently displayed in both English and in the principal language of the operatives if this is different. Materials required for such decontamination processes will be readily accessible at all times and to be clearly identified within both the storage and the mixing areas.

Where acetylene, oxygen, propane or other gas cylinders are used on site these will be stored in a securely fenced compound marked with an international red hazard warning sign displaying a flame motif and the words "Flammable Gas". Where other flammable or toxic materials are used on site these will be stored in secure flameproof storage buildings bearing approved "Hazchem" warning signs.

See also the clause "Special Storage."

1.16 NOTICE FOR INSPECTION

The Contractor will give to the Sport Consultant 72 hours' notice in writing when the following works are to be fully completed and ready for inspection or testing:

1. Graded and compacted sub-grade to all new areas to receive a synthetic surface.
2. Graded and compacted layer works to all new areas to receive a synthetic surface.
3. Finished asphalt paving ready to receive a synthetic surface.
4. Finished synthetic surface.
5. Fully completed works and marked synthetic surfaced areas and all the Field event facilities for completion, by an Independent Surveyor, of the IAAF Questionnaire for a Grading Certificate.

2 ATHLETICS FACILITIES

2.1 OTHER PREAMBLES TO APPLY

2.1.1 EXCAVATION GENERALLY

Excavations throughout will be accurately formed to the lengths, breadths depths, contours, inclinations and curvatures as indicated on the drawings. The Sport Consultant will have the power to prescribe the area of subsoil that the Specialist Civil Subcontractor may have exposed at any one time. Such excavation will be carried out in earth, shale, sand, gravel, peat, clay and silt, made up ground or in any other type of material except rock.

2.1.2 PLANT FOR EXCAVATION

All plant used for excavating and transporting excavated material will be approved by the Sport Consultant or his Representative and will be either tracked machines fitted with low ground bearing pressure tracks or wheeled machines fitted with low pressure agricultural balloon tyres. Such plant will be operated by methods which ensure the minimum damage and disturbance of the ground beneath the excavations. All excavated formation surfaces beneath areas to receive synthetic surfaces will be protected against damage and disturbance by plant and vehicles.

2.1.3 UNAUTHORIZED EXCAVATIONS

The contractor is prohibited from making any excavations other than those approved by the Sport Consultant as necessary for the works. In the event of the contractor making unauthorized excavations he will be required to backfill such excavations with selected excavated or imported granular materials, in consolidated layers, to the satisfaction of the Sport Consultant and entirely at his own expense.

2.2 PRECAST CONCRETE KERBS, CHANNELS AND EDGES

Precast concrete kerbs, quadrants, channels and edgings will comply with SANS 1200, manufactured with granite aggregate natural coloured unless otherwise described. They will be of the sections, profiles and dimensions given on the drawings and approved by the Sport Consultant prior to order.

2.2.1 SHOT ARRESTER BOARDS

Provide high pressure impregnated marine ply stop boards 1210 mm long with width varying from 112 mm to 300mm wide as per IAAF standards x 80 mm high and place out on concrete fan to shot puts, total height 100 mm above level of shot put circle.

2.3 ATHLETICS TRACK AND OTHER SYNTHETIC SURFACING

2.3.1 NEW SYNTHETIC SURFACING SPECIFICATIONS (PHASE 2)

Tenderers to submit detailed specifications and consumption rates for their proposed products, to be IAAF certified and approved. Development, manufacture and sale of reactive liquid plastics, pastes and solid plastics based on polyurethane, epoxy resins and rubber for synthetic outdoor sports flooring as well as construction and industry to comply with the following standards / regulations: SN EN ISO 9001: 2008 AND SN EN ISO 14001 : 2004. Products to meet the requirements of the EC directive 2004/42/EC

The Synthetic Surface to new synthetic athletics track surfaced areas shall be a Sandwich system, 13mm thick, Colour: RAL 5010 DARK BLUE and will be to the colours and thicknesses to IAAF Guidelines. In high stress areas for the athlete – the extended areas of the javelin runway - a 7mm thick underlay will be installed, bringing these areas to a minimum thickness of 20mm. The combined material should be suitable for the higher stresses and will help protect the athlete from injury, according to the requirements of the International Amateur Athletics Federation and as hereinafter set out.

Concrete Primers

Concrete Primer on precast concrete
Consumption
Concrete Primer on precast elements
Primer: Moisture curing, solvent containing, single component PUR primer with low viscosity @ 0.2 kg / m ²

Concrete Primer on new concrete bases (raw concrete)
Consumption
Solvent free, low viscosity, two component epoxy resin based primer
1st Coat Epoxy Concrete Primer @ 0.5kg / m ²
2nd Coat Epoxy Concrete Primer @ 0.4kg / m ²
Oven dried silica broadcasting sand (0.3-0.8mm) for use with 2nd coat of Epoxy Concrete Primer applied while wet @ 1kg/m ²

Sealants

UV PROTECTION: weathering resistant, highly elastic sealing lacquer - a pigmented solvent containing, low viscous, highly elastic, two component PUR satin finish sealing lacquer. Polyurethane sealer, 10-year product insurance guarantee (RAL 5010 Colour Dark Blue & RAL 5012 Colour Light Blue)
Consumption
Final Sealant Synthetic Surfaces
COMPONENT A @ 0.25 kg/m ²
COMPONENT B @ 0.05 kg/m ²

New athletics track areas

13mm Sandwich system (RAL 5010 Colour Dark Blue)
Consumption
Asphalt primer @ 0.15kg/m ² - moisture curing, solvent containing, single component PUR primer with low viscosity
Base mat of 10mm thickness: Binder: A moisture curing, solvent free, unpigmented PUR binder of medium viscosity for recycled granules for in situ base mats @ 1.4 kg/m ²
Recycled rubber granules (1-4mm) @ 6.5 kg / m ²)
Pore Sealer: A solvent free, elastic, self-levelling, two component polyurethane coating @ 1kg / m ²
EPDM powder 0.0-0.5mm high quality @ 0.4kg / m ²
Top Layer of 3 mm thickness:
Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating part A @ 1.13 kg/m ²
Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating part B @ 1.07 kg/m ²
EPDM granules (1-4mm): durable, flexible, high quality EPDM granules @ 2.8 kg / m ² - net quantity excluding excess)
Excess: EPDM granules (1-4mm): durable, flexible, high quality EPDM granules @ 1.2 kg / m ²

New athletics track reinforced areas

20mm Sandwich system (RAL 5010 Colour Dark Blue)
Consumption
Asphalt primer @ 0.15kg/m ² - moisture curing, solvent containing, single component PUR primer with low viscosity
Base mat of 17mm thickness: Binder: A moisture curing, solvent free, unpigmented PUR binder of medium viscosity for recycled granules for in situ base mats @ 2.38 kg/m ²
Recycled rubber granules (1-4mm) @ 11.05 kg / m ²)
Pore Sealer: A solvent free, elastic, self-levelling, two component polyurethane coating @ 1kg / m ²
EPDM powder 0.0-0.5mm high quality @ 0.4kg / m ²
Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating part A @ 1.13 kg/m ²
Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating part B @ 1.07 kg/m ²
EPDM granules (1-4mm): durable, flexible, high quality EPDM granules @ 2.8 kg / m ² - net quantity excluding excess)
Excess: EPDM granules (1-4mm): durable, flexible, high quality EPDM granules @ 1.2 kg / m ²
Asphalt Scabbling to 7mm depth

Synthetic Keys

20mm x 25mm key along kerbs
Consumption
20 wide x 25 deep key
25 mm thickness: Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating @ 15.0 kg/m ²
10mm x 25mm key along channels
Consumption
10 wide x 25 deep key
25 mm thickness: Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating @ 15.0 kg/m ²

Kerb seal

5mm Surfacing on kerb seal
Consumption
Re-topping (5mm)
5 mm thickness: Polyurethane coating: a solvent free, elastic, self-levelling, two component polyurethane coating @ 3.0 kg/m ²
EPDM granules (1-4mm) @ 2.8 kg / m ² - net quantity excluding excess)
Excess: EPDM granules (1-4mm) @ 1.2 kg / m ²

2.3.2 EXISTING SHOCK-PAD RE-TOPPING SPECIFICATIONS (PHASE 1)

2.3.2.1 STEP 1: LEVEL CORRECTIONS

Grinding over total existing shock-pad area of existing athletics track to an average total depth of 5 mm using a suitable grinding machine

2.3.2.2 STEP 2: SHOCK-PAD SURFACE REJUVENATION

Spray with A moisture curing, solvent free, un-pigmented PUR binder of medium viscosity for recycled granules for in situ base mats Binder & Acetone mixture

BINDER SPRAY ON EXISTING SHOCKPADS
Butyl Acetone: @ 0.375 kg/m ²
Binder: A moisture curing, solvent free, un-pigmented PUR binder of medium viscosity for recycled granules for in situ base mats @ 0.375 kg/m ²

2.3.2.3 STEP 3: SEALING EXISTING SHOCK-PAD

Pore sealing of existing shock-pad with Polyurethane coating & EPDM powder

PORE SEALING
Pore Sealer: Polyurethane coating - a solvent free, elastic, self-levelling, two component polyurethane coating @ 1kg / m ²
EPDM powder 0.0-0.5mm high quality @ 0.4kg / m ²

2.3.2.4 STEP 4: RE-TOPPING

- First Layer: 5mm Polyurethane coating with SBR granules
- Final Layer 5mm Re-topping - Full Polyurethane Construction Surfacing. Colour RAL 5010 dark blue and RAL 5012 light blue

First Layer
Consumption
5 mm black granular base
1 x 5 mm thickness: Polyurethane coating - a solvent free, elastic, self-levelling, two component polyurethane coating @ 3.0 kg/m ²
1 x 5 mm thickness: Recycled rubber granules (1-4mm) @ 2.5 kg / m ² - net quantity excluding excess)
1 x 5 mm thickness: Excess: Recycled rubber granules (1-4mm) @ 0.5 kg / m ²

Final Layer
Consumption
5mm Full Pour System Re-topping
2nd (Top) Layer of 5 mm thickness: Polyurethane coating - a solvent free, elastic, self-levelling, two component polyurethane coating @ 3.0 kg/m ²
EPDM granules (1-4mm) @ 2.8 kg / m ² - net quantity excluding excess)
Excess: EPDM granules (1-4mm) @ 1.2 kg / m ²

Concrete Primers

Concrete Primer on precast concrete
Consumption
Concrete Primer on precast elements
Primer: Moisture curing, solvent containing, single component PUR primer with low viscosity @ 0.2 kg / m ²

Concrete Primer on new concrete bases (raw concrete)
Consumption
Solvent free, low viscosity, two component epoxy resin based primer
1st Coat Epoxy Concrete Primer @ 0.5kg / m ²
2nd Coat Epoxy Concrete Primer @ 0.4kg / m ²
Oven dried silica broadcasting sand (0.3-0.8mm) for use with 2nd coat of Epoxy Concrete Primer applied while wet @ 1kg/m ²

2.3.2.5 STEP 5: UV PROTECTION SEALANT (10 YEAR GUARANTEE)

Sealants

UV PROTECTION: weathering resistant, highly elastic sealing lacquer - a pigmented solvent containing, low viscous, highly elastic, two component PUR satin finish sealing lacquer. Polyurethane sealer, 10-year product insurance guarantee (RAL 5010 Colour Dark Blue & RAL 5012 Colour Light Blue)
Consumption
Final Sealant Synthetic Surfaces
COMPONENT A @ 0.25 kg/m ²
COMPONENT B @ 0.05 kg/m ²

2.3.2.6 STEP 6: LINE MARKINGS AND SYMBOLS

- Setting-out and painting of line markings, symbols and stencil markings by an IAAF accredited surveyor

2.4 TENDER PARTICULARS

With his tender the Sub-Contract Tenderer will submit the following information:

1. The arrangements the tenderer proposes to ensure no deterioration of the materials delivered to the site.
2. Full details of the methods to be used for installing the synthetic surfaces including checking the thickness and accuracy of the finished levels and gradients and the methods for adjusting and rectifying inaccurate levels and gradients. Also details of priming operations, and the temperature and relative humidity limits within which the surfaces must be installed.
3. The frequency and types of quality control tests and checks to be performed.
4. The extent and type of any weather protection, heating etc., proposed to permit the Works to continue under adverse weather conditions.
5. The methods to be adopted to monitor and control any toxic or other hazards.
6. Documentary evidence in the form of the materials IAAF certificate stating clearly the thickness at which it is certified.

2.5 TENDER SAMPLES

Prior to the acceptance of the tender the tenderer will be required to submit to the Sport Consultant the following samples:

1. 300 x 300 x 13mm thick sample of the synthetic construction surface on which the tender is based. 13mm Sandwich construction - Full Polyurethane Construction Surfacing. Colour: RAL 5010 DARK BLUE
2. 300 x 300 x 20 mm thick of the reinforced synthetic construction surface on which the tender is based. 20mm Sandwich construction - Full Polyurethane Construction Surfacing. Colour: RAL 5010 DARK BLUE

3. 300 x 300 x 25 mm thick of the reinforced synthetic construction surface on which the tender is based. 20mm Sandwich construction - Full Polyurethane Construction Surfacing. Colour: RAL 5010 DARK BLUE
4. 300 x 300 x 10mm thick sample of the re-topping synthetic construction surface to be applied to the existing shock-pad on which the tender is based. 10mm Sandwich construction - Full Polyurethane Construction Surfacing. Colour: RAL 5010 DARK BLUE
5. These samples will be used as reference samples against which installation and daily quality control samples will be checked for:
 6. Composition
 7. Colour
 8. Texture depth
 9. Friction
 10. Impact response
 11. Tensile strength and elongation at break

2.6 QUALITY CONTROL

2.6.1 SITE SAMPLES

The Contractor will have IAAF certification for the manufacture of the product. The Specialist Athletics Track Contractor will prepare one sample for every 1 000sqm and these will be kept for testing. The samples will be used for checking the finished thickness of the installed material. There should not be more than a 1mm variance between samples taken anywhere on the track.

Notwithstanding that any sample has initially been accepted by the Sport Consultant such sample may subsequently be rejected if he will decide that the quality of the sample has deteriorated in any way. Any delays consequential upon the rejection of any sample will not relieve the Specialist Athletics Track Contractor of his responsibility for completing his Contract works within the Contract Period. The Specialist Athletics Track Contractor will remove and replace, at his own expense, all rejected materials and will bear the costs and expenses incurred in re-testing all replacement materials.

2.6.2 QUALITY OF THE SYNTHETIC SURFACES (refer to section 4)

The finished installed synthetic surface will comply in all respects with the approved reference samples submitted by the Specialist Athletics Track Contractor prior to acceptance of his tender and will be within the following limits and requirements:

- a) Colour: The finished installed synthetic surfaces will be RAL 5010 DARK BLUE and will match the colour of the reference samples within one shade on the Methuen Colour Atlas.

- b) Thickness: The thickness will be nowhere less than 13mm and 20mm respectively.
The thickness will be determined by the test method given in the IAAF Handbook Appendix 1 and the thickness will be the minimum stated thickness.
- c) Surface Texture: The surface texture will be uniform and will be within the range 1.5 to 2.5mm when measured by the sand patch method (TRRL Road Note 27 Appendix 1). No single measurement of texture depth will differ from the mean of all the texture depth measurements by more than 0.2mm.
- d) Friction: The coefficient of friction between the surface and a standard rubber compound under wet conditions will not be less than 47 units when measured by the method given in Method A in Appendix 4 of the IAAF Handbook.
- e) Modified Vertical Deformation: When tested using the method described in Appendix 3 of the IAAF Handbook, the modified Vertical Deflection will be between 0.6 and 1.8mm at any temperature between 10°C and 40°C. 15
- f) Impact Response: When tested using the method described in Appendix 2 of the IAAF Handbook the Force Reduction will be between 35% and 50% at any temperature between 10°C and 40°C.
- g) Tensile properties: The tensile strength of the material will be not less than 0.4N/mm² and its elongation at break will be not less than 40%. The determination of the tensile strength and elongation at break will be carried out in accordance with Appendix 5 of the IAAF Handbook. Because of the destructive nature of this test it will be performed on the sample trays prepared in accordance with the requirements of clause 2.6.3 above. In the event of any failure of this test, or in the event of any dispute, the Specialist Athletics Track Contractor will have the right to have samples cut from the surface area/s represented by the samples for further testing.
- h) Force Reduction: When measured using the method described in the International Amateur Athletics Federation Performance Specification (Berlin Athlete) the force reduction of the synthetic surface, compared to an inflexible substrate (concrete) will be between 35% and 50%.

2.7 WEATHER RESTRICTIONS

Installation of the synthetic surface will not take place when the air temperature at the site or the surface temperature of the substrate is outside the range 5 - 40 degrees Centigrade, nor when the asphalt or shock-pad surface is wet.

2.8 HANDLING OF MATERIALS

The unloading, handling, stacking, storing, mixing and placing of materials will be by suitable methods to prevent damage to materials or danger to persons on the site. All storage and mixing will be on sites approved by the Sport Consultant and transportation will be by routes and methods to prevent damage to the works or danger to persons.

2.8.1 SURPLUS WASTE MATERIAL

All toxic and flammable surplus and waste materials and containers are to be regularly removed and disposed of by methods approved by the Main Contractor. Toxic waste will only be disposed of at licensed sites.

2.9 TOLERANCES

The Contractor shall check the existing installations for conformance with the criteria set out below prior to commencing construction. Non-conforming items to be reported to the Sport Consultant for the issuing of additional correcting design elements as required. Refer to the as built survey and slope analysis included with the tender drawings.

2.10 GRADIENTS OF THE 400M STANDARD TRACK

The new drainage channel of the 400m Standard Track must be laid horizontally throughout. The lateral inclination of the track shall not exceed 1.0% inwards and the overall inclination in the running direction shall not exceed 0.1% downwards. Areas where the existing as built lateral inclination may exceed 1%, based on the new synthetic level along the new drainage channel, as a result of the installed height of the existing outer perimeter kerbs will be identified, marked and reported to the Sport Consultant.

2.10.1 LEVEL CORRECTIONS ON EXISTING SURFACES

Level corrections will be carried out by grinding over the total area of the existing shock-pad, to varying depths between 0.5 and 5mm using a suitable grinding machine.

Note that only minimal level corrections are required over the majority of the track surface and can be achieved over these areas using this method.

Level corrections over low areas will be achieved through the placement of the first self-levelling synthetic layer using SBR granules.

Special attention is required to obtain maximum slopes along a portion of the existing bend adjacent to the 110mm start line and at the jut-out of the northern javelin run-up, without removal and reinstallation of kerbs.

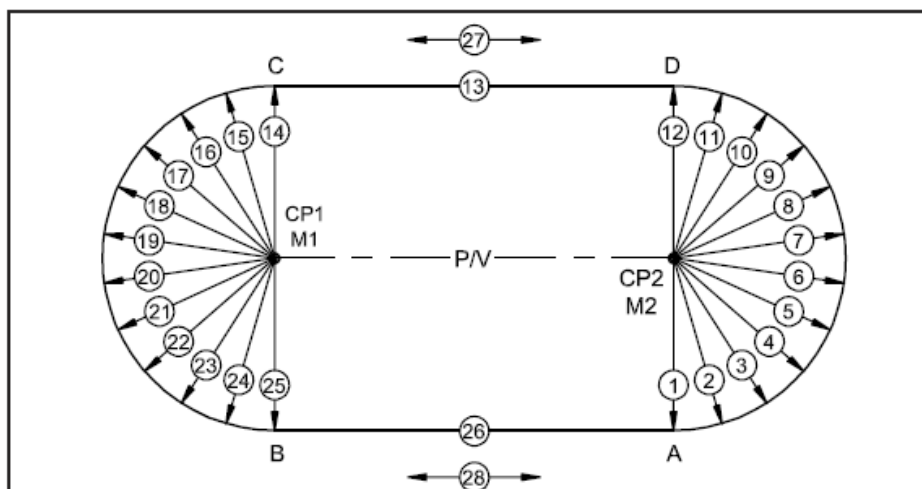
2.11 DIMENSIONAL ACCURACY OF THE 400M STANDARD TRACK

The dimensional accuracy required for all classes of competition is deemed fulfilled if the following set values are attained in the "28-point control measurement"

On the outside edge of the inner track border:

- $84.390\text{m} \pm 0.005\text{m}$ for each of the two straights (2 readings)
- $36.500\text{m} \pm 0.005\text{m}$ for 12 points per semicircle (including kerb) on the arc of the circle approximately 10.42m apart (24 readings)
- Alignment of the kerb in the area of the two straights: no deviations greater than 0.01m (2 readings). The length of the kerb in the straight and the length of the outer lane measured along the outside edge of the lane should be equal.

The 28-point control measurement should be carried out and the readings recorded. The average of the deviations must not exceed + 0.040m nor be less than 0.000m.



For the construction of the arcs and for the 28-point control readings, the centres of the two semicircles must be marked by permanent non-corrodible metal tubes placed 84.39m apart.

The maximum tolerances within which the athletics track is to be constructed are as follows:

1. Length of circuit on running line 400m: Tolerance is +40mm as per the IAAF rule
2. Surface level regularity of new asphalt: Deviation beneath a 4.0 metre straight edge to be no greater than 6mm in any position and direction and the deviation beneath a 1.0 metre straight edge will be no more than 3mm in any position and direction, as per the IAAF requirement and procedure outlined in the manual.
3. Flatness tolerance of finished running surface: Deviation beneath a 4.0 metre straight edge to be no greater than 6mm in any position and direction and the deviation beneath a 1.0 metre straight edge will be no more than 3mm in any position and direction as per the IAAF requirement and procedure outlined in the manual.
4. All facilities and line marking will comply with the latest requirements and regulations of the International Amateur Athletics Federation. The tenderer's attention is drawn to the following requirements: Gradients will not exceed:
 - a) In the direction of throwing or running, 1:1000.
 - b) At right angles to the direction of running or throwing, 1:100.
 - c) For the high jump fan, from the outer edge to the positions of the corners of the landing area 1:250.

Gradients will be determined locally over distances not exceeding 10 metres, half the width of the circuit or the width of any runway as appropriate. Surface water runoff when flooded with water and allowed to drain for 20 minutes there will be no area of the synthetic surface where the depth of the surface water exceeds the texture depth of the surface. No local depression in any synthetic surface or spray textured hard surface area, exceeding 6.0mm beneath a 4.0 metre straight edge in any position will be accepted.

2.12 MAINTENANCE

All completed works will be maintained in accordance with good practice from the time of actual completion until the date of practical completion and handover to the Employer.

2.13 LINE MARKINGS

The Specialist Athletics Track Contractor will set out for and accurately apply two coats of durable line marking paint in recognised colour codes for the following:

- a. Running Lanes
- b. Steeple chase circuit
- c. 50, 60, 80, 75, 100 metres sprints
- d. 70, 75, 80, 90, 100, 110, 150, 200, 400 meter hurdles
- e. 200, 400, 800, 1,500, 3,000 and 5,000 metres
- f. 1,500, 2,000, 3,000 metres steeple chase
- g. 1 mile
- h. 4x100, 4x200, 100m-, 200m-, 300m-, 400m Medley relay, 4x400, 4x800, 1200m-, 400m-, 800m-, 1600m Distance Medley Relay, 4 x 1500 m relay with acceleration and handover zones
- i. Javelin arcs
- j. Diameter and arc for shot, discus and hammer circles together with the 400 throwing sector on the paved or surfaced areas surrounding the circles.
- k. 1 No. pole vault runways
- l. 1 No. long and triple jump runways.

Generally, all markings for events up to 300 metres will be 10mm over length for every 100m and for all other events proportionally within the limits set in clause 2.12.

The Specialist Athletics Track Contractor will include preparing for and painting all metal circles with two coats durable external matt finish paint on the appropriate primer.

2.14 EVENT IDENTITY MARKINGS

The start lines will be identified by stencilling the distance or event on the synthetic surface according to the IAAF requirements.

2.15 GUARANTEE FOR SYNTHETIC SURFACES

The Specialist Athletics Track Contractor will provide a written guarantee that after ten years' service the properties of the synthetic surface will be retained within the following limits:

- a) Colour will not have changed from colour of the original reference sample by more than two positions in the Methuen Colour Atlas.
- b) Thickness will not be less than 9mm at any position when determined by the method of test given in the IAAF Handbook, in Appendix 4. The thickness of all 20mm reinforced areas will be not less than 16mm when determined by this same method.
- c) Surface texture depth will be not less than 0.4mm or more than 4mm when measured by the sand patch method. (TRRL Road Note 27 appendix 1)
- d) Friction: the coefficient of friction between the surface and a standard rubber compound under wet conditions will not be less than 40 units when measured by the method given in Method A in Appendix 4 of the IAAF Handbook.
- e) Modified Vertical Deformation: When tested using the method described in Appendix 2 of the IAAF Handbook, the modified Vertical Deflection will remain between 0.6 and 1.8mm at any temperature between 10°C and 40°C.
- f) Impact Response -When tested using the method described in Appendix 2 of the IAAF Handbook the
Force Reduction will remain between 25% and 50% at any temperature between 10°C and 40°C.
- g) Surface Regularity -The deviation beneath a 4.00m straight edge is to be no greater than 10mm in any position and direction and the deviation beneath a 1.00m straight edge will be no greater than 7mm in any position and direction.
- h) Multi-layer construction: Where the synthetic surface is constructed using more than a single layer the Specialist Athletics Track Contractor will undertake under his written guarantee to make good within fourteen days* of notification in writing any delamination or blistering which may occur between the layers.
- j) There will be no loss of adhesion of the synthetic surface to the base or to the kerb or channel edges.
- k) The Specialist Athletics Track Contractor will further guarantee that all repairs will be carried out at such times and by such methods as may be approved by the Specialist Main Contractor within not more than twenty-eight* days (except as previously stated) from receipt of notice in writing that repairs under guarantee that repairs under warranty are required and that such repairs will be executed with identical materials to those of the original installation and at times so as not to interfere with the planned athletics programme. * Subject only to suitable prevailing weather conditions. Where repairs under Warranty are called for because the surface levels have not been retained within the limits set out here in the remedial works will be such as to restore the Surface Regularity to the standard set out in clause 2.12

2.16 CONCRETE THROWING BASES

Each concrete throwing base will have 4 No. 25mm diameter equally spaced drainage holes formed using short lengths of stainless steel tube which will finish flush with the surrounding concrete on completion. The cement mortar surfacing to the discus and shot-put circle will be

finished 20mm from the top of the metal ring by screeding to level with a wooden screed and approximately two hours after placing the surface, will be lightly textured by stippling with a yard broom. Any high spots will be removed and the finished surface will be uniformly rough, but without any ribs or ridges. The granolithic rendering surface to the hammer throwing circle will be finished 20mm from the top of the metal ring by screeding to level with a wooden screed and be finished smooth by wood float. The mortar and granolithic finishes need to be placed integrally with the concrete base whilst it is still green and workable. On completion, the exposed face of the metal ring will be prepared, primed and painted as described.

2.17 SAND FILLING TO LONG AND TRIPLE JUMP PITS

Filling to long jump and triple jump pits will be lightly compacted clean, non-staining, washed soft sand which, when slightly damp, will hold a clean profile to an indentation 75mm deep formed by a heel entering at an angle of 60 degrees to the horizontal. If necessary, a small amount of powdered rock salt may be added to assist in retaining the moisture at the surface. The salt will be broadcast over the surface and raked into the top 100mm of sand.

2.18 HAMMER, DISCUS AND SHOT PUT CIRCLES

The Specialist Athletics Track Contractor is to construct concrete bases as indicated on the drawings to the circles, reinforced to protect against cracking with the finished surface of the concrete being in accordance with the requirements of clause 2.17, Concrete Throwing Bases, all to the requirements and satisfaction of the Sport Consultant. Any bases set within any grass area will be of sufficient size such that any supporting metal work to the cage is within the concrete base and no closer than 150mm to the edge of the concrete.

2.19 COMPETITION SHOT PUT FAN

The Specialist Athletics Track Contractor will construct a hard porous water bound surfaced competition shot put fan to the positions and dimensions shown on the drawings. The fan will be surfaced in accordance with the requirements of clause 2.2, Hard Porous Water bound Surface. The hard porous water bound surface will be finished at the same level as the concrete inside the throwing circle and nominally 20mm below the level of the surrounding synthetic textured sprayed areas. The Specialist Athletics Track Contractors design will include for a suitable edge, which will not be damaged by impact from the shot, to the hard porous water bound surface.

2.20 PROTECTIVE CAGES

The Specialist Athletics Track Contractor will design, set out for and construct suitable foundations to support the protective cages surrounding the hammer and discus circles. The cages and their ground sockets will be provided by the Specialist Athletics Track Contractor. The cages will be in accordance with the requirements of the IAAF and will have rear netting 7m in height with 10m gates. The Specialist Athletics Track Contractor will provide and fix sockets to hold the gates to the cages in the open and closed positions.

2.21 POLE VAULT FACILITIES

The Contractor will construct foundations for the Pole vault boxes. The trough will be supplied by the Specialist Athletics Track Contractor and when set into the runway in their foundation there will be provision to ensure that no water will remain in the pole vault box. The trough will be set at such a level that the depth of the box beneath the adjoining synthetic surface is in accordance with the Rules and Requirements of the IAAF. The box will be complete with blanking off-boards which will be covered with 13mm synthetic surface with the surface finishing at the same level as the adjoining surface.

IAAF SYNTHETIC SURFACE SPECIFICATIONS: EFFECTIVENESS

All requirements in this Specification are those for the installed surface.

2.22 PERFORMANCE REQUIREMENTS

2.22.1 IMPERFECTIONS

Surface imperfections such as bubbles, fissures, delamination etc must be rectified as a matter of priority.

2.22.2 EVENNESS

On a localised level, there shall be no bumps or depressions beneath a 4m straightedge exceeding 6mm, or beneath a 1m straightedge exceeding 3mm, at any position and in any direction. There shall be no step-like irregularities greater than 1mm in height, for instance at the bay joints in the in-situ surfaces.

2.22.3 THICKNESS

The thickness of the surface shall be determined to meet force reduction and vertical deformation requirements hereunder. The IAAF Product Certificate for a synthetic surface material indicates the absolute thickness at which a sample of the material, tested in a laboratory at laboratory temperature, complied with the specifications in the IAAF Track Facilities Testing Protocols. The total area over which the absolute thickness falls more than 10% below the absolute thickness given in the IAAF Product Certificate for the material used shall not exceed 10% of the total surface area. The high stress areas with a deliberately thickened surface shall not be taken into account in computing these percentages.

2.22.4 FORCE REDUCTION

The IAAF stipulates that the force reduction of the surface at any temperature within this range shall be between 35% and 50%. The stipulated values are those for the installed facility. Where greater thicknesses of synthetic surface are installed, such as at the ends of runways, the force reduction values may fall outside the range quoted.

2.22.5 VERTICAL DEFORMATION

The range of deformation values stipulated by the IAAF, of between 0.6mm and 2.5mm, is with the surface at any temperature between 10° C and 40° C. The comment about areas of greater thickness giving values outside the stipulated range, also applies for this parameter.

2.22.6 FRICTION

Tests yield a coefficient of dynamic friction, which the IAAF stipulates shall be no less than 0.5 under wet conditions.

2.22.7 TENSILE PROPERTIES

The minimum values stipulated by the IAAF for tensile strength are 0.5MPa for non-porous surfaces and 0.4MPa for porous surfaces. For all surfaces, the minimum elongation at break shall be 40%.

2.22.8 COLOUR

If colour changes occur as a result of weathering of the surface, these should also be uniform. If they are not, for reasons perhaps of differing effects on different batches of the materials used, and hence on different areas of the facility, then it may be necessary to resurface the track. There are a number of different assessment systems for colour. Any system used for assessing colour must be capable of identifying and if necessary quantifying, the consistency of the colour of the surface over the facility.

2.22.9 DRAINAGE

The IAAF stipulates that when completely covered with water and allowed to drain for 20 minutes, there shall be no area of synthetic surface where the depth of residual water exceeds the texture depth of the surface. Porous surfaces should rarely give problems of this nature. If such problems do occur, they are invariably the result of either the excessive application of the texturized paint coating, or of inadequate porosity in the base foundations for the facility or in the drainage system taking water away from the base construction.

2.23 TESTING

2.23.1 IMPERFECTIONS

Requirement

No surface imperfections such as bubbles, fissures, delamination, uncured areas etc., shall be acceptable.

2.23.2 EVENNESS

Requirement

The surface shall be installed so that on a localised level, there shall be no high spots or depressions beneath a 4m straightedge exceeding 6mm. Depressions beneath a 1m straightedge shall not exceed 3mm. There shall be no step-like irregularities greater than 1mm in height.

Particular attention is to be paid to seams and joints in the surface. The intent is to ensure the safety of the athlete and provide an even running surface.

2.23.3 THICKNESS

Requirement

There will be specifically designed areas such as in the Javelin runway or other high stress areas where the safety of the athlete and the durability of the surface will dictate that the thickness will be greater than the minimum. This additional thickness shall not affect the flatness of the surface.

The thickness of the surface shall be determined to meet force reduction and vertical deformation requirements hereunder. The IAAF Product Certificate for a synthetic surface material indicates the absolute thickness. The total area over which the absolute thickness falls more than 10% below the absolute thickness given in the IAAF Product Certificate for the material used shall not exceed 10% of the total surface area. The high stress areas with a deliberately thickened surface shall not be taken into account in computing these percentages.

2.23.4 FORCE REDUCTION

Requirement

The force reduction shall be between 35% and 50%, at any surface temperature between 10°C and 40°C. If, at the time of measurement, the temperature of the surface is outside this range, it shall be permissible for the results obtained to be corrected for temperature, by interpolation from a graph of force reduction against temperature for the precise surfacing system installed, previously obtained by laboratory testing. If no graph is available then testing outside the surface temperature range shall not be undertaken.

Because of the fact that it is required to install greater thicknesses of synthetic surface at take-off areas and at the ends of runways, it is possible that results obtained in these areas may fall outside the above range.

2.23.5 VERTICAL DEFORMATION

Requirement

The vertical deformation shall be between 0.6mm and 2.5mm, at any surface temperature between 10°C and 40°C. If, at the time of measurement, the temperature of the surface is outside this range, it shall be permissible for the results obtained to be corrected for temperature, by interpolation from a graph of vertical deformation against temperature for the precise surfacing system installed, previously obtained by laboratory testing. Because of the fact that it is usual to install greater thicknesses of synthetic surface at take-off areas and at the ends of runways, it is possible that results obtained in these areas may fall outside the above range.

2.23.6 FRICTION

Requirement

When measured using either the British Transport and Road Research Laboratory Portable Skid Resistance Tester or the apparatus and method described below, the synthetic surface friction shall be nowhere less than 0.5 when wet.

2.23.7 TENSILE PROPERTIES

Requirement

The synthetic surface shall have a minimum tensile strength of 0.5MPa for non-porous surfaces and 0.4MPa for porous surfaces. For all surfaces, the elongation at break shall be a minimum of 40%.

2.23.8 COLOUR

Requirement

The colour must be consistent within the design of the surface and when fading occurs, this must occur evenly. The colour shall be uniform to within one position on the recognised colour reference card or plate system used. For deliberately designed multi-colour facilities each discrete colour shall be similarly uniform.

2.23.9 DRAINAGE

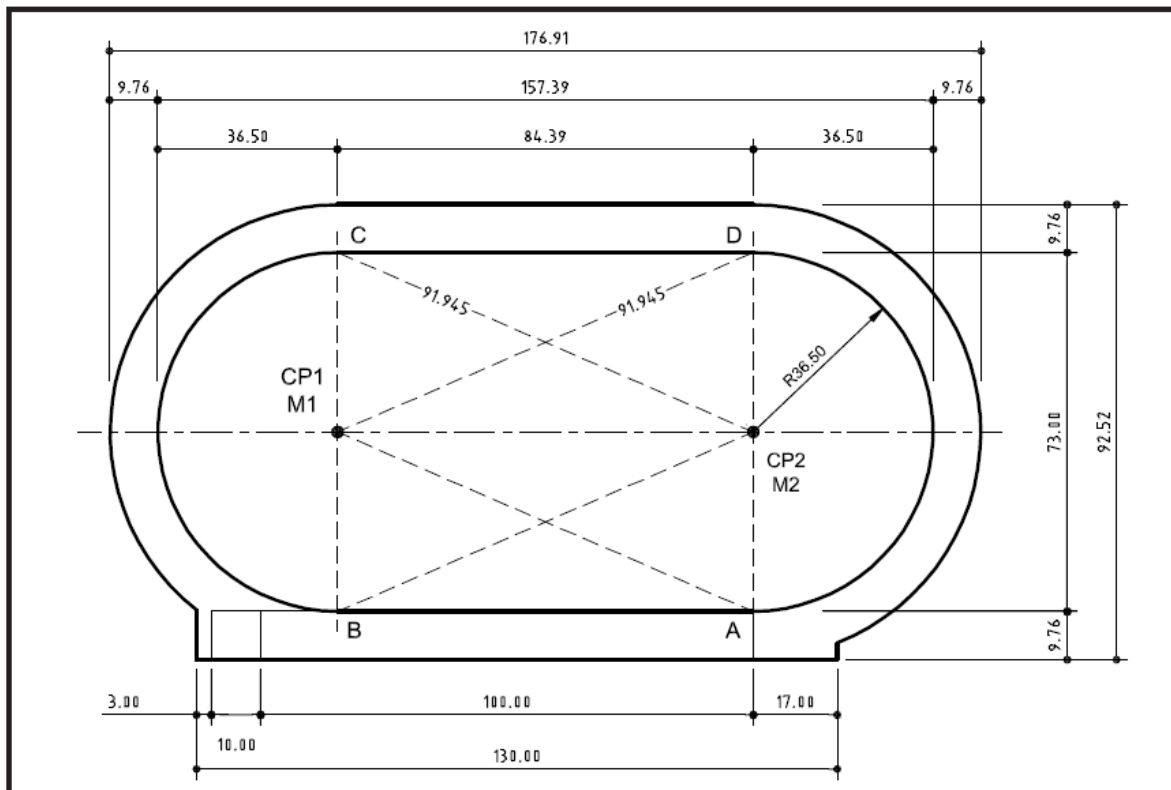
Requirement

When completely covered with water and allowed to drain for 20 minutes, there shall be no area of synthetic surface where the depth of residual water exceeds the texture depth of the surface.

3 SETTING OUT THE STANDARD TRACK

The inside and outside kerb lines of a standard eight-lane, 400-metre track are established using the dimensions illustrated in Fig 1. It is essential that the tangent points A, B, C and D and also the centres of radii, RAD 1 and RAD 2, are permanently located for ease of checking the length of the running line and re-marking the track in future years.

3.1.1 FIGURE 1 SETTING-OUT DIMENSIONS OF A STANDARD 400-METRE, EIGHT-LANE TRACK



These dimensions allow for a theoretical running line (measurement line) at a distance of 300mm from the inside kerb. The running line (measurement line) of each of the other lanes is assumed to be on a theoretical line at a distance of 200mm from the outer edge of the adjacent inside lane.

The required dimensional accuracy of the setting out is as follows:

- 84.39m \pm 0.005m for each of the two straights
- 36.50m \pm 0.005m for the radius of the semicircle, taken at 12 points on each semicircle

The net effect of these dimensional tolerances must not result in a measurement, on the running line, which is less than 400.0m or greater than 400.04m.

All of these dimensions are taken to the outside edge of the inner track border.

The existing inside kerb is fixed precast element forming part of the existing drainage channel. No provision was made for removable kerbs at the steeple chase and high jump areas. An alternative option is included for pricing purposes for the removal of the existing drainage channel and installation of a new slotted drainage channel combined with a aluminium kerb, fixed to the track surface on the inside lane line of lane No 1, demountable at the steeplechase lanes.

3.2 GRADIENTS

The inside kerb line on a standard track must be laid at the same horizontal level throughout the circuit. The inclination in the running direction shall not exceed 0.1% (1:1000) downwards and the lateral inclination (cross-fall) shall not exceed 1.0% (1:100) inwards (towards the infield).

3.3 OBSTRUCTIONS

The track will have an internal and external peripheral zone that is free of all obstructions such as floodlighting columns, fences, etc. This zone will be at least 1.00m wide, both inside and outside when measured from the infield edge of the inside lane line and the outside edge of the outside lane line.

4 FIELD ITEM SPECIFICATIONS

4.1 LONG JUMP / TRIPLE JUMP

The long and triple jump is located as indicated on the drawings. The runway is 1.22m wide. It will be marked with white lines 50mm wide. The overall inclination is will not exceed 0.1 % (1:1000).

4.1.1 TAKE-OFF BOARDS

Take-off boards are incorporated into the runway; flush with the finished surface, at distances indicated on the drawings.

- Long jump – 1.00m and 2 m
- Triple jump – 13.00m, 11.00m and 9.00m and 7.00m.

The take-off boards will consist of proprietary designs that allow for interchangeable use of the take-off board with blanking boards surfaced in the same material as the runway. Each board will be numbered and the orientation marked. The take-off and blanking boards will be adjustable in height to avoid trip edges and will have a maximum gap of 5mm around the board when installed in the runway.

4.2 HIGH JUMP

The take-off area will have a slope of 0.4 % (1:250) upward towards the centre of the landing mats.

4.3 POLE VAULT

The runway for the pole vault is 1.22m wide and minimum 45.00m long measured from the '0' line. The runway will be marked with white lines 50mm. The overall inclination of the runway will not exceed 0.1 %.

New concrete bases to match the size of the adjustable rails for the uprights will be constructed, flush with the surface, at the both ends of the runway as per the manufacturer's details. The pole vault box will be stainless steel, mounted flush with the surface as per the manufacturer's details and the drawings. The box will be 1 metre in length, measured along the inside of the bottom of the box, 600mm in width, at the front end, tapering to 150mm in width at the bottom of the stop-

board, where it will be 200mm in depth. The box will be constructed such that the sides slope outwards and end next to the stop-board at an angle of approximately 120 degrees to the base.

The inside edge of the end board of the box is the 'O' line which will be marked with a white line 10mm wide extending beyond the width of the uprights. The pole vault boxes will have a stainless steel cover covered in the same material as the runway surface. Drainage will be provided as detailed on the drawings. The landing area is 6.00m x 6.00m. The last 8.00m of the runway will have a reinforced synthetic surface of 20mm in thickness.

4.4 JAVELIN

The runway is 4.00m wide between line markings. The runway will be marked with white lines 50mm wide. The overall inclination of the runway will not exceed 0.1 %.

A throwing arc will be painted on the surface at the end of the runway with a line width of 70mm. The arc will have a radius of 8.00m and the centre point will be permanently marked with a metal tube with a synthetic plug. The last 8.50m of the runway will have a reinforced synthetic surface of 20mm in thickness.

4.5 HAMMER AND DISCUS

The circles will be installed in a concrete slab as detailed on the drawings and be surrounded by a protective throwing cage as supplied by the specialist synthetic Contractor. The diameter of the circles is 2.135m for hammer and 2.50m for discus. The circles will be constructed using structural concrete with a mesh reinforcing, extending beyond the circles as detailed on the drawings, on a crushed stone base layer. The steel rings for both hammer and discus are manufactured with radial bracings to ensure that the ring does not deform during installation. The top of the steel ring will be set to correspond with the surrounding concrete level outside the ring, and 20mm above the level of the finished concrete inside the ring. This concrete will have a lightly stippled, rough but not ribbed, granolithic concrete finish and not be slippery. A centre mark will be installed using a 4mm-diameter tube with plug. Drainage will be provided by inserting 25mm diameter PVC pipes through the concrete slab into the stone base layer, which, in turn, must be connected to the track drainage system.

4.6 SHOT PUT

The shot put is located in the internal sector at the northern bend. The diameter of the circle is 2.135m. The construction of the shot put circle is the same as the hammer and discus with the addition of a stop board. This stop board is made of wood or other suitable material and is curved to suit the radius of the circle. The stop board will be 1.20m long, 112mm thick and 100mm high (+ or – 2mm.), painted white. The stop board must be firmly fixed to the concrete surround of the steel ring, positioned centrally on the landing sector and flush with the inside of the steel ring.

4.7 THROWING CAGES

The minimum height of the netting for the hammer and discus throwing cage is 7.0m. The cage should be u-shaped in plan. The width of the mouth should be 6m, positioned 7m in front of the centre of the throwing circle. the end points of the 6m wide mouth shall be the inner edge of the pivoted netting. the height of the netting panels or draped netting at their lowest point shall be at least 7m for the panels/netting at the rear of the cage and at least 10m for the last 2.80m panels

to the gate pivot points. The gate panels must be able to open and close to suit left, or right, handed throwers.

5 DRAINAGE

The run-off from the track surface will be collected by a new slotted drainage channel as provided by the specialist synthetic Contractor and installed by the Specialist Civil Subcontractor. The slotted drainage channel will be located on the inside of the internal kerb as detailed on the drawings. The channel will be connected to the existing storm water system. The gradient of the sump outlet to the collector pipe will be a minimum of 1 % (1:100).

All field events drainage will be connected to the existing storm water system; sandpits, water jump, pole vault, hammer, discus, shot put and take-off boards.

6 SURVEYS

Surveys by a Land Surveyor of the as built constructed levels and geometry will be provided to the design consultant upon completion of the following stages of construction:

- Installation of new concrete kerbs
- Installation of the slotted drainage channels
- Upon completion of the base where applicable
- Upon completion of the asphalt layers where applicable

The surveyed result will be provided in an acceptable electronic format for approval by the design consultant.

In addition, the asphalt surfaces will be flooded with water upon completion for visual inspection and approval by the specialist synthetic track Contractor.

BASE

New base areas to the track, including the field-event areas, is designed to will meet the following criteria:

It will be capable of supporting and transmitting the loads of all vehicles, plant, machines and materials to be used in the construction, without causing deformation of the site. After completion of the track, it will be capable of supporting and transmitting all loads on the finished surface from athletes, officials, spectators and maintenance equipment without deformation of the synthetic surface.

The base will be constructed using hard, clean crushed frost-resistant aggregates. The grading of the sub-base material will be as specified such as to provide stability. The material will be laid in layers as specified, each layer being compacted before the next is laid. The nominal compacted thickness of base stone will be not less than 150mm. The surface level tolerance will be within - 10mm of the design level, and when checked with a 3m straight edge there should be no deviation greater than 10mm.

7 PERIMETER EDGING

The perimeter edgings and drainage channels are installed to contain the synthetic surface. Pre-cast concrete kerbs will be installed along the outer perimeter of new synthetic and paved areas. These kerbs and drainage channels will be firmly bedded in concrete, continuously haunched and be laid to a line and level tolerance as prescribed. The internal demountable kerb defines the measured length of the track.

8 ASPHALT BINDER & SURFACING COURSE CONSTRUCTION

The asphalt courses of the track are conventionally constructed using bituminous asphalt in a two-layer system to the particular specification and SABS 1200 MH 1996. In this case, the synthetic surfacing being a porous (sandwich) system, the asphalt will be of an open-textured grading and specification. To meet the stringent requirements of compaction and surface tolerances, the asphalt layers will be installed using conventional road surfacing plant and equipment.

Asphalt specifications for the porous construction:

An open-textured lower levelling binder course consisting of a minimum of 35mm, nominal compacted thickness, of 14mm or 20mm nominal-sized aggregate, plus an open textured upper finishing surface course consisting of a minimum of 25mm, nominal compacted thickness, of 10mm nominal-sized aggregate, both to the particular specification SABS 1200 MH 1996.

The surface tolerance required on the levelling course material is 6mm under a 3m straight edge. Care will be taken at adjacent paving bay joints to ensure that no lips or edges are left.

8.1 BINDER COURSE

The use of an asphalt binder course is fundamental to enhancing the performance and extending the serviceable life of a track. The purpose of an asphalt binder course is to provide a stable, well-shaped platform to receive the surface course. Open-graded binder course mixtures with low fines content offer good workability during laying, with the additional benefit after compaction of providing a high voids content free-draining layer. A bituminous binder course enhances the contractor's ability to meet the dimensional tolerances required of the surface course, and minimises textural variations. The stable binder course platform provides the best opportunity to enable compaction of the surface course to be achieved, thus providing a uniformly porous and durable surface.

For the binder course, an open-graded asphalt mix having a target grading within the parameters given in SABS 1200 MH 1996 for a 14mm or 20mm size open-graded surface course, is recommended. A minimum binder content of 3.5% (with a production tolerance of $\pm 0.5\%$ applied to the value) is likely to be satisfactory.

Where hand screeding is used to lay the material, a 0/10mm size open-graded surface course can be used laid to the same recommended thickness as the 14mm or 20mm size material. In applications where the construction demands an increase in the asphalt binder course layer thickness, a 20mm size open-graded binder course can be used.

Recommendations for the layer thicknesses, laying and compaction are contained within Table 7.5. For both these mixes, the supplier will select the target grading from within the parameters given in SABS 1200 MH 1996.

Whichever mix is chosen; the supplier will select appropriate binder content for the type of aggregate used. A bitumen grade of 190/220 penetration is generally recommended, and the grade used should be no softer than 250/300 penetration.

To reduce the risk of the surface course material softening, through the entrapment of volatile oils, the use of cutback or deferred set binders should be avoided.

8.2 SURFACE COURSE

The asphalt finishing surface course is an open textured upper finishing surface course consisting of a minimum of 25mm, nominal compacted thickness, of 10mm nominal-sized aggregate to the particular specification SABS 1200 MH 1996.

8.3 POROSITY

For the asphalt mix to be porous it needs to contain an adequate proportion of interconnecting voids after compaction. This is ensured by employing an aggregate grading with a low fine aggregate content when compared to that of the standard medium-graded surface course asphalt.

9 SYNTHETIC SURFACES

Synthetic surface will be Sandwich system (new areas) and re-topping as per specifications over an open-graded base. The product will be IAAF certified.

9.1 THICKNESS

Upon completion of the track, the synthetic surface must be an average of at least 13mm thick, with no areas less than 12mm. Where the thickness of the track system is disputed, measurements will be taken in accordance with the method laid down by the IAAF.

New areas of high impact, such as the end of the javelin runway, the water jump landing area, the high jump take-off and the area between the triple jump take-off board and landing area, the depth of the synthetic material will be 20mm and 25mm as indicated on the drawings by adjusting the level of the asphalt.

9.2 TESTING

The test criteria for the track surfaces fall into two categories:

9.2.1 TESTS CARRIED OUT BY INSPECTING THE FINAL INSTALLATION:

1. Imperfections
2. Colour uniformity
3. Drainage of the surface after rain

4. Flatness

5. Thickness

TESTS CARRIED OUT ON THE SURFACE MATERIAL EITHER ON SITE OR IN THE LAB:

1. Force reduction

2. Modified Vertical Deformation

3. Friction

4. Tensile properties

The IAAF limits for these performance tests are included in Table 1 below. For National or International competition, the IAAF limits will be applicable. Refer to section IAAF requirements for synthetic surfaces.

9.2.2 TABLE 1 IAAF LIMITS FOR PERFORMANCE TESTS

TESTS	IAAF LIMITS
A.	
1. Imperfections	No serious imperfections
2. Colour	One point on Methuen Handbook
3. Drainage	No surface water after 20 min
4. Flatness	6mm below 4m straightedge 3mm below 1m straightedge
5. Thickness	Average 12mm Min 10mm
B.	
1. Force reduction	35% to 50% between 10°C and 40°C
2. Modified deformation	0.6 to 2.2mm between 10°C and 40°C
3. Friction	Not less than 0.5 when wet
4. Tensile properties	Tensile strength of 0.4 MPa for porous systems
	Elongation at break not less than 40%

Note: Within the prescribed range of acceptable values for Force Reduction, it is preferred to have the track conform to the lower end of the range.

10 TRACK MARKINGS

10.1 GENERAL:

Lane Lines Finish Line
Photo finish grid
Break line
Lane numerals (start and finish sprint straight)

10.2 START LINES FOR:

50M (schools) * 60M
(schools) * 70M
(schools) * 75M
80M
100M
110M

10.3 STAGGERED START LINES FOR:

150m *
200M
300M
400M
800M

10.4 CURVED STARTS LINES FOR:

800M
1,000M
1,500M
1 Mile (include 440y, 880y, 1320y marks on inside of kerb) 1,500M
Steeplechase
2,000M Steeplechase
3,000M Steeplechase
3,000M
5,000M
10,000M

10.5 HURDLE POSITION MARKER LINES FOR:

60M *
70M *
75M
80M
100M
110M
150M **SA requirements**
200M **SA requirements**
400M

10.6 STEEPLECHASE

10.6.1 RELAY ZONES AND ACCELERATION MARKS FOR:

4x100M Relay

4x400M Relay

These markings represent the total recommendation but the individual user groups should be consulted with regard to the need for the events marked *. The marking for the barriers are the same for all steeplechase events but their precise location will depend on the water jump location. The detail of all markings will be as per IAAF requirements.

10.7 PCA-4.5 MARKING OF TRACK AND TRACK GEOMETRY

- The track shall be set out and painted by the Contractor in accordance with the latest rules and requirements of the IAAF and ASA.
- The Contractor will be provided with the necessary details showing the relevant symbols for the track, lines and symbols.
- The Contractor shall employ an IAAF registered Land Surveyor to execute the setting out for the marking of the track. The Land Surveyor shall satisfy himself as to the accuracy of the data supplied and, upon completion of the Contract, submit to the Engineer a Certificate of approval for the painted lines, symbols, horizontal and vertical geometry and dimensions of the track, in accordance with the IAAF normal requirements and standards.
- The type of paint to be used by the Contractor and the colours thereof shall be approved by the supplier of the synthetic material and the Engineer. Only polyurethane products will be considered unless specified by the supplier/manufacturer of the synthetic surface.
- All painted lines and symbols shall be neat and have clean edges. Lines shall be uniform in width. No lines shall be more than 5 mm out of its designated position and, if measured over a length of 4 m, shall have a maximum variation from the designated form of 3 mm. If measured over 1 m, this variation shall not be greater than 1 mm.
- There shall be no splash marks on the final product.
- The symbols shall be painted with internationally accepted coloured coatings. These markings shall adhere well to the surface. The application shall be to the Engineer's satisfaction and shall not alter the resilience and skid-resistance properties of the surface. The coatings shall be resistant to ageing.
- The application rate of the coatings shall be of such a nature that the surface water runoff is not impeded.

10.8 PCA-5 GUARANTEES

- A comprehensive guarantee covering the synthetic track as well as the paint markings shall be provided by the Contractor. The guarantee period shall not be less than ten years for new synthetic layers and not less than three years for the paint markings. The guarantee shall commence upon issue of the Certificate of Completion.
- Full particulars regarding the contents and interpretation of the clauses of the above- mentioned guarantees shall be handed in with the Tender.

10.9 MEASUREMENT AND PAYMENT

10.9.1 SYNTHETIC SURFACE

Existing Shock-pad:

Level Corrections: Grinding over total area of existing athletics track to a total average depth of 5mm
Unit: m2

Shock-pad Surface Rejuvenation: Unit: m2

Sealing of existing shock-pad Unit: m2

Re-topping First Layer: 5mm level correction Unit: m2 Retopping Final

Layer 5mm Full Polyurethane Construction Surfacing. Colour blue Unit: m2 New synthetic surfacing:

13mm Sandwich system Construction Surfacing, (RAL 5010 Colour Dark Blue) Unit: m2

20mm Sandwich system Construction Surfacing. Colour blue Unit: m2

Provision of a synthetic keys of 20 mm x 25 mm Unit: m.

Provision of a synthetic keys of 10 mm x 25 mm Unit: m UV

PROTECTION Polyurethane sealer, 10-year product insurance guarantee (RAL 5010 Colour Dark Blue) Unit: m2

Painting of lines (50mm wide) & Event Symbols including IAAF accredited Land Surveyor's fee for setting-out Sum

IAAF accredited Land Surveyor's fee for IAAF certification surveys and report Sum

IAAF Certification Fee Class 2 Sum

Masking of kerbing and channels Unit: m

The tendered rate for the synthetic surfacing shall cover the complete cost for supply and importation of materials, installation, testing and equipment.

10.9.2 SUPPLY AND INSTALLATION OF FIELD ITEMS:

Shot circle complete with stop boards as detailed on the drawings	Number
Aluminum demountable kerb with locating devices	m
Discuss circle complete as detailed on the drawings	Number
Hammer circle complete as detailed on the drawings	Number
Pole Vault boxes complete as detailed on the drawings	Number
Pole Vault stand foundations as detailed on the drawings	Number
Water jump	Number
upgrade with adjustable hurdle as detailed on the drawings	Number
Hammer and Discuss cage	Number
complete with ground sockets	Number
Discuss cage complete with ground sockets	Number
Supply and install take-off boards complete with inserts as detailed on the drawings	Number

The tendered rate shall include the supply, setting-out, preparation requirements and installation of all field items.

11 GRANULAR BASE CONSTRUCTION– NEW AREAS ATHLETICS TRACK AND FIELD EVENTS

11.1 G1 BASE MATERIAL

G1 Crushed un-weathered rock, quality material produced from sound rock, clean, sound mine dump rock, or clean, sound boulders. Only fines from the same sound parent material may be added to achieve the required grading.

Sieve Size (mm)	Nominal max size 37.5 mm
53	100
37.5	100
25	84 – 94
19	71 – 84
13.2	59 – 75
4.75	36 – 53
2	23 – 40
0.425	11 – 24
0.075	4 – 12
ATTERBERG LIMITS	
Liquid Limit	25%
Plasticity Index Max	4
Flakiness Index	Max 35% on weighted average of -28 (26.5) and -20 (19) mm fractions All faces fractured
Crushing Strength	10% FACT (min) 110 kN or ACV (max) 29%

11.2 COMPACTION

Base Class	Minimum % Apparent Density (AD)	Minimum % Bulk Density (BD) % MDD
G1	86 to 88	89

12 ASPHALT PAVEMENT – NEW AREAS ATHLETICS TRACK AND FIELD EVENTS

12.1 PART I – GENERAL

12.1.1 DESCRIPTION

- A. The Contractor shall provide all labour, materials, equipment, and services necessary for the construction of the asphalt pavement as shown on the contract drawings and/or as specified herein. In the event that the drawings contain insufficient detail, the rules, requirements and regulations set out in SANS 1200 MH 1996 shall prevail.
- B. Asphalt pavement shall be placed in strict conformance with the lines, grades, thicknesses, paving patterns and cross-sections as shown on the drawings.

12.2 DESIGN RESPONSIBILITY

The manufacturer shall be responsible for development of a mix design to comply with the requirements below.

12.3 QUALITY ASSURANCE

12.3.1 STANDARDS

- a. Unless otherwise specified, the most current edition of the standard specifications as published in SANS1200MH: 1996 and TRH8 design and use of hot-mix asphalt in pavements 1987 shall prevail.
- b. A secondary reference shall be the "Hot-Mix Asphalt Paving Handbook, 2nd Edition as published by the American Association of State Highway and Transportation Officials (AASHTO). This handbook sets forth proper methods of manufacturing and construction of hot plant mix asphalt.

12.4 TESTING

All sampling and laboratory testing required demonstrating that materials used, and that the resulting mix complies with this specification shall be performed by an accredited laboratory.

12.4.1 GEOMETRY AND SLOPE ACCURACY

- The main Contractor shall retain and pay for the services of an independent, registered land surveyor. The Contractor may use the same surveyor for the layout work for the project. Defects in the underlying construction will be reflected in the finished surface, resulting in athletic facility surfaces that have undulations, inconsistent surface plane, and varying cross-slope.
- The finished surface product requires strict planar qualities to meet athletic performance requirements. To ensure high quality finished surfacing, determining acceptability of the asphalt construction is a crucial step in the construction of synthetic athletic track.
- The field quality control measurements for acceptance of the base construction are strict within a specified tolerance range and must be field measured to verify Contractor compliance.
- The specific and narrow range of the tolerance requirements requires more reliant measures than using a straight edge or string line, relying on human judgment and visual interpretation and areas of non-compliance can be easily missed based upon the number of locations selected for visual observation and field survey of the base course.
- As-built surveying will provide accurate elevation data that can be evaluated in consideration of field planarity requirements, slope, as well as relation to design grade and is considered superior to visual observation alone.

12.5 SUBMITTALS: MATERIALS

The Contractor shall submit the mix design and sieve analysis for each component for review and approval by the engineer (or owner's representative).

12.6 PROJECT COORDINATION AND SCHEDULING

A. Coordination

The asphalt paving described in this section is a critical component of the construction of this athletic facility. The facility is not to be used as a road during or after construction. All components of the track construction process are part of an athletic flooring system that happens to be outside. Using the asphalt paving section as a path or platform for other construction activities is inappropriate. If, during phasing, traffic is unavoidable over the areas covered by this section, covering paving fabric with half of the stone base may be deemed necessary. Unless otherwise impossible, all work on the interior of the track (field construction/goal posts/utility construction and hook-ups) should be completed prior to the construction of the asphalt paving.

B. Scheduling and Curing Time

Whenever possible, the asphalt paving should be the last construction completed prior to the installation of the athletic running surface. The asphalt will cure from 14 days to 28 days per the manufacturer's written instructions. This curing time is essential and imperative to the long-term success of the construction.

12.7 PART 2 – PRODUCTS

12.7.1 DOUBLE LAYER

This system comprises of a lower levelling binder course of mix with a maximum particle size of 19mm to a thickness of 35 mm. On top of this layer, a 25mm thick upper finishing layer of a mix with a maximum particle size of 9.5mm is constructed.

12.7.2 LEVELLING COURSE ASPHALT:

The levelling course asphalt shall meet the requirements as indicated. The mix design shall have a maximum aggregate size of 19mm. A minimum of 35mm of levelling course asphalt shall be placed over the crushed stone aggregate.

12.7.3 FINISH COURSE ASPHALT:

The finish course asphalt shall meet the requirements as indicated. The mix design shall have a maximum aggregate size of 6mm. A minimum of 25mm of finishing course asphalt shall be placed over the levelling course asphalt.

12.7.4 MIX DURABILITY

As long as adequate binder content is used in the asphalt mix and the aggregate is of adequate strength, the mix should be durable and perform to expectations. A minimum binder content of 4.5% is likely to be satisfactory, and the supplier should take account of his production tolerance before setting a target binder content to meet this requirement. The target binder content selected will also be dependent on the particular aggregate type and on the target grading employed. Suppliers will consider all these factors in order to ensure a durable mix.

12.7.5 RESISTANCE TO SOFTENING

The degree of softening will depend on the stiffness of the mix, which is principally governed by the stiffness of the binder used in it. Asphalt mixes stiffen-up due to bitumen hardening: the older the surfacing, the less likely it is to be affected by softening.

To resist softening, relatively hard bitumen need to be used in the asphalt mix. It is recommended that a bitumen binder grade no softer than 160/220 penetration is used. To reduce the degree of softening in susceptible areas, a modified binder or additive such as latex or wax may be used. Mixes incorporating latex require higher laying temperatures and laying in cold, wet or windy weather conditions should be avoided and any "double handling" (e.g. wheel barrowing) of the asphalt must be kept to a minimum.

12.7.6 MINERAL FILLER

Mineral filler for base and continuously graded surfacing shall consist of one of the following:

- a) Portland cement that complies with the applicable requirements of SANS ENV 197;
- b) lime that complies with the applicable requirements of SANS 824;
- c) approved milled granulated blast-furnace slag;
- d) approved rock flour
- e) approved fly ash.

12.7.7 QUANTITY OF ACTIVE MINERAL FILLER

The quantity of active mineral filler, i.e. lime or cement, in base and surfacing shall not exceed 2 % (by mass) of the total aggregate blend.

12.7.8 BITUMINOUS BINDER

Bitumen should conform to the latest revision of SANS Method 307: Penetration Grade Bitumen's. In general, 60-70 pen are used for open-graded mixes. The appropriate grade of binder is selected to meet the required mix design criteria.

12.7.9 PRIME

Cutback bitumen of type and grade designation MC-30 that complies with the applicable requirements of SANS 308 applied at a rate of 0.7 l/m².

12.7.10 TACK COAT

The tack coat shall consist of a bitumen emulsion that complies with the applicable requirements of SANS 309 or SANS 1260 and that is of sufficient stability to allow for dilution. The tack coat consists of 30 % bitumen anionic stable grade emulsion, applied at a rate of 0.2 l/m².

12.7.11 CURING COAT

A curing coat shall not be applicable. The construction program shall allow for the 14 – 28-day curing period.

12.8 PROPOSED OPEN GRADED ASPHALT MIX ENVELOPES

Sieve Size mm	LEVELLING COURSE	FINISHING COURSE
26.5	-	-
19	100	-
13.2	85-100	-
9.5	10-25	100
6.7		85-100
4.75	7-20	10-30
2.36	5-15	5-15
1.18	-	1-5

0.075	1-5	-
Effective Binder Content % by mass min	4	4.5
Aggregate Content % by mass	93	93
Active Mineral Filler Content % by mass	1	1
Minimum Thickness of Asphalt (mm)	30	20

12.9 PROTECTION OF KERBS AND CHANNELS

Kerbs and channels shall be protected from the spray application. Any kerbs or channels on which binder is sprayed or which are damaged shall be thoroughly cleaned or replaced (as appropriate) by the Contractor at own expense and to the satisfaction of the Engineer. Mask kerbing and channelling with 150 micron PVC sheeting during application of primer and tack coats.

12.10 THICKNESS AND SURFACE REQUIREMENTS

The final surface shall be of a uniform texture conforming to the lines, grades and cross-sections shown on the plans. The roughness of the completed surface shall comply with the specific contract requirements.

Thickness shall be carefully controlled during construction and shall be in full compliance with plans and specifications. During compaction, preliminary tests as an aid for controlling the thickness shall be made by inserting a flat blade or spike, correctly graduated, through the material to the top of the previously placed base, or by other means acceptable to the Engineer. No part of the finished surface shall deviate more than 6 mm from a 4 m straight edge lying under its own weight on the surface.

Any irregularities that vary more than 6 mm from this straight edge longitudinally or transversely shall be corrected. Irregularities that develop before the completion of rolling shall be remedied by loosening the surface mix and removing or adding material as may be required. Should any irregularities, defects, surface projections or mismatched joints remain after final compaction, the material shall be removed promptly and sufficient new material laid to form a true and even surface.

To achieve a satisfactory finished surface, it is essential that the pavement be checked regularly before and during the final compaction operation with the aid of a 4 m straight edge. The Contractor will be required to have such a straight edge on the site of the works and to use it in the control of the final rolling operation.

12.11 EXECUTION

12.11.1 GENERAL

- (1) The asphalt system is constructed solely for as an outdoor athletic facility. The track base layer and asphalt platform should not be used as a haul road or for storage of materials for use on other parts of the project site. Adjacent construction should be completed prior to the final compaction, compaction testing and surveying of the sub-base.
- (2) All methods of construction, types of equipment, and test methods shall conform to SANS 1200 MH: 1996, as described in the AASHTO handbook.

12.11.2 PREPARATION

- (1) Just prior to the commencement of the construction of the stone base and asphalt course, the sub-base shall be proof-rolled and compaction tests done to the satisfaction of the engineer from an independent testing firm defined under section Testing. The Contractor shall notify

the testing firm and/or engineer when the project is ready to advance to the construction of the stone base and asphalt course. Forty-eight hours' notice is required. The testing firm/engineer shall determine the method of testing. The Contractor shall make available both a 10-ton roller and a fully-loaded dump truck for proof-rolling. It will be necessary to remove, replace and re-compact and re-stabilise all areas deemed by the engineer to be unsuitable.

- (2) The land surveyor shall check the elevations of the sub-base to confirm compliance with the project geometry. The frequency of grade shots is described below under the section sections entitled Surveying and Visual Inspection and Setting-out.

12.11.3 INSTALLATION

12.11.3.1 STONE BASE PLACEMENT AND LASER GRADING

The base course of stone shall be placed and compacted.

Any areas that are disturbed by other construction activity will be re-compacted.

Compaction Test – the testing firm/engineer shall inspect the stone base and perform sufficient testing to assure compliance with the specifications Tolerances are as follows:

Maximum Variation from a Uniform Plane: 6mm measured with a 3m straight-edge. Maximum

Variation from the Specified Thickness: 6mm

Maximum Variation from Elevations Shown on the Drawings: 6mm

12.11.3.2 LEVELLING (FIRST) COURSE OF ASPHALT

Compaction Test – the testing firm/engineer shall inspect the levelling course of asphalt and perform sufficient testing to assure compliance with the specifications.

Tolerances are as follows:

Maximum Variation from a Uniform Plane: 6mm measured with a 3m straight-edge. Maximum

Variation from the Specified Thickness: 6mm

Maximum Variation from Elevations Shown on the Drawings: 6mm

12.11.3.3 FINISH (SECOND) COURSE OF ASPHALT

A suitable tack coat should be used if the first course of asphalt has been in place for more than 72 hours, or if it has been contaminated with dirt. Loose dirt shall be swept away and embedded dirt shall be pressure washed.

Compaction Test – the testing firm/engineer shall inspect the intermediate course of asphalt and perform sufficient testing to assure compliance with the specifications.

Tolerances are as follows:

Maximum Variation from a Uniform Plane: 3mm when measured with a 4m straight-edge. Maximum

Variation from the Specified Thickness: 6mm

Maximum Variation from Elevations Shown on the Drawings: 3mm

12.11.4 FIELD QUALITY CONTROLS

- (1) The asphalt paving Contractor shall check the flatness of the main screed at the beginning of each paving session. No crown should be present in the main screed. Paving extensions shall be heated and in excellent working condition and shall be parallel to the main screed. This planarity shall be checked at the beginning of a paving session and the asphalt mat shall be

checked after the paving machine has laid the first 15m section of mix. This is to be done with a 3m straight-edge, which the Contractor shall keep on site during all paving operations. Additional checks shall be done at intervals that produce the planarity set forth in this section.

(2) Geometry and Planarity

(3) The land surveyor shall check the geometry and planarity at the locations specified in the sections entitled Surveying and Visual Inspection and Setting-out.

(4) Compaction Test – the testing firm/engineer shall inspect and test the Stone Base, Levelling Course of Asphalt and Finishing Course of Asphalt. The engineer shall perform sufficient testing to assure compliance with the specifications set forth in this section.

12.11.5 SURVEYING AND VISUAL INSPECTION

Defects in the underlying construction will be reflected in the finished surface, resulting in athletic facility surfaces that have undulations, inconsistent surface plane, and varying cross-slope.

The finished surface product requires strict planar qualities to meet athletic performance requirements. To ensure high quality finished surfacing, determining acceptability of the asphalt construction is a crucial step in the construction of synthetic athletic track.

The field quality control measurements for acceptance of the base construction are strict within a specified tolerance range and must be field measured to verify Contractor compliance.

The specific and narrow range of the tolerance requirements requires more reliant measures than using a straight edge or string line, relying on human judgment and visual interpretation and areas of non-compliance can be easily missed based upon the number of locations selected for visual observation and field survey of the base course.

As-built surveying will provide accurate elevation data that can be evaluated in consideration of field planarity requirements, slope, as well as relation to design grade and is considered superior to visual observation alone. Therefore, the following surveys will be submitted in an acceptable electronic format:

Surveys will be carried out on the new asphalt for approval by the Sport Consultant and the Specialist Synthetic Contractor prior to commencement of synthetic surfacing, the minimum being as follows:

- (1) at 5m centres along the outer kerb circumference
- (2) at 5m centres along the centre line of the track
- (3) at 5m centres along the inner drainage channel perimeter
- (4) at 5m centres along the centre of Field event areas
- (5) at 5m centres along the outer kerbs of Field event areas

In addition, the asphalt surface will be flooded with water in the presence of the Synthetic Athletics Contractor to identify any irregularities such as undulation, depressions, or other planar deficiencies prior to acceptance of the surface. Any irregularities will be rectified to the satisfaction of the Sport Consultant and the Synthetic Athletics Contractor, in accordance with IAAF regulations.

12.11.6 WORK IN RESTRICTED AREAS

The Contractor shall take cognisance of the fact that no extra over will be paid for areas where material cannot be processed satisfactorily in place with normal construction equipment, and has to be processed as a consequence by hand.

12.11.7 BASIS OF PAYMENT

All miscellaneous items, lodgings, supervision, contingencies, sampling and testing, conveyance of plant and incidental work, plus general overhead and administration are incorporated in the unit rates listed in the schedule.