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SPECIFICATIONS

DOCUMENT

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SALI SPECIFICATION

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Should you require specifications for compaction, paving, concrete work, masonry or timber construction please use Associations that are compliant with each section of construction i.e. B.I.F.S.A. (Building Industries Federation of South Africa)

SECTION 1

General

1.1 Contractors temporary structures

If required the Contractor shall provide adequate offices, toilet and sheds for the protection of equipment, implements and materials. The positioning of these facilities shall be on the approval of the Client and shall be done in cooperation with him. Cost of these facilities shall be for the account of the Contractor, unless agreed otherwise.

The Contractor shall make provision for the removal, if necessary, of toilets, and the eventual clearing of the site to the satisfaction of the health inspector. The Contractor shall ensure that the toilets are, indeed used. After the contract is fulfilled, the Contractor shall remove all structures and leave the site in a tidy condition to the satisfaction of the Client.

1.2. Water and Electricity

Water and electricity are to be supplied on site if required for construction purposes by the Client unless agreed otherwise.

1.3. Storage for material on site

The Contractor shall ensure that no material is delivered, dumped or off loaded on the site unless the area for it has been approved by the Client.

1.4 Site board

The erection of the site board on the site shall be at the commencement of the contract, and shall be removed when the contract is completed.

1.5 Existing works

Special precautions shall be taken by the Contractor to avoid damage to existing buildings, structures, sewerage pipes, storm water drains, and pipes, storm water grids, and inlets, manholes, valve casings, water pipes and taps, fire hydrants, irrigation pipes and equipment, cables, completed landscaping works, telephone and light poles, vegetation and other services.

It is the duty of the Client to point out the exact positions and existence or nonexistence of all these services, and at what depth, whether or not they shall be affected, and if so, to establish the exact position of these services before any of the services are initiated. Any claims that might arise from damage shall be carried by the Contractor, if the service etc. was pointed out prior to commencement of the contract. All damage shall be reported to the Client immediately, as well as to the affected party.

Where manholes, valve castings and other services have to be adjusted to fit in with the construction work or for any other reason, the Client shall be notified in good time, so that the necessary arrangements can be made.

Manholes, valve casings, meter casings, fire hydrants etc., shall always be easy to reach and visible. The Contractor's attention is drawn to Section 51 (3) of the Electricity Act (Act no. 40 of 1958, as amended).

1.6 Protection of property

The Contractor shall take all necessary precautions against damage that might occur to any person, animal, building, structure, services, vegetation, vehicles etc. Enough warning signs, railings, lighting etc. shall be placed around excavations, obstacles, and heaps, and foot bridges, shall be placed over trenches, where necessary for the convenience of the public.

1.7 Safety of the workers

The safe completion of the works is a primary aim of the contract. All works shall be executed in compliance with all applicable statutory regulation and requirements.

1.8 Supervisor

The Contractor shall at all times have a capable supervisor of the work in his employ, said supervisor shall receive instruction from the Client and see that such instructions are executed.

1.9 Conservation of rocky outcrops and ridges

The Contractor shall in the course of his work preserve all rocky outcrops and boulders occurring on the site. Only on explicit orders from the Client may such rocks be removed.

1.10 Conservation of existing trees, shrubs and plants

All existing trees, shrubs and plants on site is the property of the client and may under no circumstances be damaged or removed from the site without the explicit instruction of the Client and within known conservation restrictions. The Contractor shall, if instance bid accordingly, be prepared to remove plants inside the construction area with roads and benches intact and to store them in the meantime until such plants can be replanted when the area is ready.

1.11 Conservation of waterways

The Contractor shall ensure that rain and irrigation water flow normally in waterways during the work on site.

1.12 Conservation of fauna

Any living animals natural to the area is the property of the client and shall be protected by the Contractor. Contravention of this paragraph shall make the Contractor liable to disciplinary measures.

Under Review

SECTION 2

MATERIALS

2.1 General

The Contractor shall deliver on site all material not available on site but required for the proper execution of the work.

The Contractor shall ensure that all materials necessary to the contract be delivered on site in time in good condition and shall then protect such materials. The Contractor shall continuously check the material to be used in the contract and the Client may at any time inspect and test the material even if it is only proposed for use on site.

Unless otherwise agreed in the contract the prices supplied by the Contractor on the Bill of Quantity shall include the following:

The purchase of materials; transport thereof to the site; receipt and storage thereof until used; moving material for use or to make the area available for work; to remove excess material from site if not used in the contract; also all labour, supervision and equipment for proper execution of the work.

Whether the quality of material is specified or not the Contractor shall at all times use only the best quality material and shall base his price on such quality material.

2.2 Delay in delivery of material

The Contractor shall ensure that no delay to the work is caused by late delivery on site of materials or because of shortage of material or delay in placing of orders by the Contractor. If so requested the Contractor shall supply written proof of orders that were placed in time at capable transports to the satisfaction of the Client.

2.3 Tests

The Contractor shall periodically take soil samples on site at places pointed out by the Client for analysis to establish fertility and suitability of the soil and shall be paid for costs necessary to cover this item.

2.4 Fertilizer

All fertilizer to be used under the contract shall be stored on site in plastic bags. Care shall be taken that bags are not damaged and not left out where they can get wet.

2.5 Compost

All compost shall be made up from well-decayed organic material free from any harmful salts and other impurities with pH not higher than 7,0. A sample shall be submitted for analysis and approval by the Client. Where compost is delivered on site in loose quantity the Contractor shall ensure that it does not become excessively desiccated and is not blown away and that it is protected from rain.

2.6 Top soil

Acceptable topsoil shall be sandy loam to sand clay loam with the ideal a ratio being 15 – 25% clay, 10% silt and 75 – 66% sand. The minimum organic material shall be 2% of volume. The soil shall be free from harmful salts, weed seeds and waste of any kind.

2.7 Plant material

All plant material shall be healthy, vigorous and free from damage or disease, parasites or insects. No pot bound plants shall be accepted. Plant containers shall be weed free. Soil in plant shall be supplemented regularly as necessary, to avoid exposure of roots. Only approved soil or compost shall be used for the purpose. Where plants are kept on site for an exceptionally long period and roots begin to grow out of the containers, the plants shall be planted into larger containers or root pruned regularly.

No broken, bruised or misshaped plant shall be stored or planted on the site.

Dead plants shall immediately be removed from the site.

Plants in containers shall be well rooted with a well balanced root system. Roots shall be evenly spread through the root medium. Plants shall be in containers for a minimum of 8 weeks.

2.8 Plants from open ground

Plants from open ground shall be ground covers, trees and shrubs, grass runners, perennials that have been carefully lifted and transported to the site under ideal conditions i.e. kept moist protected against sun and wind. Plants shall be replanted on the same day as being lifted, or laid in to prevent their roots drying out. Plants must be sourced by a legal vendor and comply with conservation regulations.

2.9 Seed

Seed shall be free from foreign seed and other material and shall be purchased from a registered seed merchant or other approved source.

2.10 Turf/sod

Turf/sod shall be obtained from an approved source, mown short and weed free. Runners shall be well matted with a soil layer of at least 5mm. Sods shall be transported to the site rolled up, or stacked flat on pallets, and shall be planted on the same day. Grass shall be pure according to species, unless specified as 'veld sods,' which may contain more than one species, and shall have a healthy green colour with no dead areas.

2.11 Storage of plants

Plants that cannot be planted immediately (i.e. plants in containers), shall be stored in nursery conditions in an area as specified by the Client and shall be tended up to and including such time as the plants are replanted.

2.12 Anchors for trees

2.12.1 Trees with a height of less than 3000mm

These shall be tied with binding wire passed through piping to treated wooden stakes and driven about 300mm into the ground. The stakes shall be the same height as that of the trees being anchored and with a diameter of 40-70mm.

Alternatively, an approved patent tree tie can be used.

2.12.2 Trees with a height of more than 3000mm

These shall be anchored by wire anchors in four directions tied to the trunk with plastic piping and anchored in the ground to iron stakes. Iron stakes shall be Y or I type poles and shall be 1,800mm in length.

Alternatively, an approved patent tree anchoring system shall be used.

2.13 River sand

River sand shall be clean and shall be free from any organic matter.

2.14 Pebbles

Pebbles shall be more or less round as agreed upon with the client and shall be clean and free from flakes and chips. Conservation regulations for harvesting of natural pebbles will apply.

2.15 Wood

2.15.1 Planed wood

All wood shall be of type and grade as indicated on drawings elsewhere, and shall be stored in a dry weatherproof hut and in such a way as to prevent warping. All wood construction shall be done under dry conditions and shall be treated as specified before it is allowed to get wet. Any wood that is warped or cracked should be rejected by the Client.

2.15.2 Treated wooden poles

All wooden poles shall be of type and size and treated as specified on the drawings or elsewhere. All poles shall be selected, straight and without cracks or knots or splinters. The cut end of all poles that have to be cut for any purpose, shall receive the same treatment as the rest of the pole. Refer to specifications S.A.L.M.A.

SECTION 3

EARTHWORKS

3.1 Scope

This section covers all phases of the earthworks in respect of the shaping of land by means of machinery and manual equipment to conform to the profile as defined on the earth works plans.

3.2 Clearing of the work area

All rubble, cement stakes, foundations and blocks, grass clippings, steel etc, shall be piled up for measurement by the Client before being removed from site.

Suitable areas for rubbish piles shall be indicated to the Contractor by the Client and the Contractor shall maintain the piles in conditions acceptable to the Client.

3.3 Definitions

3.3.1 Rock

Rock shall be boulders more than 0.5m³ in size and rock in solid banks or layers or beds of conglomerate of other materials appearing as solid as rock. The excavation of rock shall necessitate the use of explosives or mechanical rock breakers.

3.3.2 Earth

Earth shall consist of all materials except rock be it soil, gravel, soft rock, shale or any other material that can be removed, without the use of explosives, or mechanical plant.

3.3.3 Undesirable material

Undesirable material shall consist of material that naturally occur where paving shall be done or roads made and where services shall be laid in trenches and which under normal circumstances cannot be satisfactorily completed. The Contractor shall notify the Client as soon as possible after finding undesirable material so that it can be surveyed.

3.4 Excavations

The Contractor shall at all times be responsible for the safety and maintenance of excavations. Any damage that might occur as a result of the excavations shall be repaired by the Contractor at his own expense to the satisfaction of the Client.

Unless otherwise specified by the Client all excavations in any material except rock and gravel shall be taken down to the exact depth as specified on the earth moving plan. The surface shall never vary more than 50mm from the specified heights and no humps or dips of more than 50mm shall be visible when tested with a 3000mm straightedge. Any excavated material shall be stored in piles, the Client shall indicate and approve situation of these piles.

3.5 Back filling (land fill)

Soil shall be built up in layers not greater than 300mm. Where the composition of the soil differs from layer to layer, each successive layer shall be mixed into the preceding layer.

Where soil is filled over existing vegetation the vegetation shall first be removed.

Areas to be filled shall be broken up to a depth of 300mm and 500mm apart before being filled.

Pieces of concrete shall not be shallower than 1000mm under the surface of the soil and solid cement blocks shall be broken up to pieces smaller than diameter 500mm. No filler containing cement or other substances harmful to vegetation may be used and shall be removed from the premises. Where loose stone, shale, ash or gravel is part of the filler it shall not be deposited in layers but shall be mixed with soil to ensure optimum root penetration and drainage. Contractor shall ensure that storm water shall drain away.

3.6 Topsoil and cut areas

When there is topsoil on cut areas it shall first be put aside in storage piles for later usage on site.

3.7 Topsoil

Unless otherwise specified by the Client the area shall be covered with a layer of topsoil according to the drawing, after the basic ground shaping has been done. The surface of the topsoil shall conform as clearly as possible to the contours indicated in the earthworks plan.

The surface shall never vary more than 50mm from the specified heights and no humps or dips of more than 50mm shall be visible when tested with a 3000mm straightedge.

3.8 Erosion

The contractor shall repair washed out areas by filling such areas with material washed away and heaped up in watercourses and dams and compact such material as required. Should there be insufficient reclaimable filling, the Contractor shall fill the areas with approved filling and compact such filling as required. Existing waterways shall be kept free from rubble and filler and may not be diverted unless with the Client's permission. No waterways may be diverted onto adjoining areas.

3.9 Excavation in situ

Where excavations are surveyed by the Client for purposes of payment it shall be measured and calculated up to the exact depths and measurements on the earthworks plan and measured according to the total volume of excavation measured in situ. No allowance shall be made for the expansion of the soil after excavation.

3.10 Cut and fill, extra import of material

Excavations of cut and fill, extra imported material shall be calculated as excavation in situ material. No payment shall be made per load of material, either brought in, or removed.

3.11 Other excavations

All excavations apart from the above mentioned shall be measured and paid on in situ volumes regardless of the depth thereof. The Contractor shall ensure that surveys are done by the Client before excavation commences.

SECTION 4

SOIL IMPROVEMENT AND FERTILIZING

4.1 Scope

This section describes the application and incorporation of soil improvement agents, organic or inorganic fertilizers.

4.2 Method of application

4.2.1 Poorly soluble (slow release) fertilizer

Slow release fertilizer shall be applied in either powder or granular form as available. The Contractor shall ensure that quantities are evenly distributed over the area according to the dimensions.

4.2.2 Application of slow release fertilizer during filling

Where fill is brought in, quantities of fertilizer as determined by soil test, shall be broadcast during the dumping process to ensure thorough mixing. Manual applications of pre-measured quantities per volume of soil dumped shall be applied.

4.2.3 Time of application

Application of fertilizers shall unless otherwise specified, be spread after waste material has been removed and soil broken up by means of a ripper but before further preparation takes place.

4.2.4 Loss through wind and weather

Fertilizers shall be worked into the soil within 12 hours of application to prevent loss through wind or flooding.

4.2.5 Maximum quantities of Agricultural lime

Agricultural or dolomitic lime shall, where large quantities are required, be applied at intervals of four weeks, with maximum application of 1000 kg/ha.

4.2.6 Incorporation of Agricultural lime

Agricultural lime, dolomitic lime or flower of sulphur shall, after application, be mixed thoroughly with the soil.

4.2.7 Incorporation of phosphate fertilizer

Phosphate fertilizer shall be applied after the soil has been loosened, ploughed or ripped and shall be well mixed with the top 200mm of soil.

4.2.8 Application of phosphate after agricultural lime

Where agricultural lime has been applied, super phosphate may only be applied six weeks later.

4.2.9 Time of application – soluble fertilizers

Soluble fertilizers such as nitrates and also artificial mixtures shall be applied no more than 8 days before planting. Fertilizer shall be broadcast evenly and worked into the top 100mm of the topsoil.

Soluble fertilizer may only be used on growing plants if the leaves are dry.

Fertilizer shall immediately after application be washed off the leaves.

There shall be no traffic over areas after application of fertilizer and before watering. Soluble fertilizer shall be applied after irrigation and shall then be washed into soil with light watering.

- 4.2.10** Organic material shall be applied on areas to be planed according to prescribed quantities. Organic material shall be worked in immediately after application to a minimum depth of 100mm. Precautions shall be taken against having too much organic material retained on the surface. Organic material must be obtained from a recommended supplier.

SECTION 5

SOIL PREPARATION

5.1 Scope

This section covers the preparation of the soil before and after ground shaping according to plans and when specification has been completed.

5.2 Breaking of soil

5.2.1 Ground with slope of 0 – 15%

All soil to be planted shall, unless otherwise stipulated by the Client be broken up to a depth of 300mm by means of a ripper or by means of some other approved implement.

5.2.2 Ground with steep slopes

Ground with a slope steeper than 15% shall be broken up along the contour to a depth of 300mm

5.3 Preparation, including incorporation of fertilizers and soil improvement agents

5.3.1 Cultivation with rotavator

After the ground set aside for planting has been loosened (item 6.1) and fertilized with prescribed quantity's soil shall be cultivated to a depth of 200mm. Soil shall be in an optional state of dampness for cultivation.

5.3.2 Areas unsuitable for mechanical cultivation

Areas not cultivable with mechanical cultivation shall be loosened with garden forks or pick axe to a depth of 200mm. Soil shall be moist.

5.3.3 Final shaping of ground profile and preparation of seed beds

After soil has had final cultivation the ground profile shall be finished to the specifications shown on the drawings and in the Bill of Quantities. Final shaping shall be done with a light box blade and where applicable followed by garden rakes.

5.4 Mechanical fertilizing

On areas where the slope shall allow for grass cutting by means of mechanical cutters as specified in the drawings, the preparations shall consist of breaking of the soil and then ploughing with a disc plough. Incorporation of fertilizers included in this item.

5.4.1 Leveling of veldgrass areas

Where the level of the ground is not within the required tolerance, the area to be sowed shall be leveled by means of a box blade, worked crisscross throughout the area twice.

5.4.2 Harrowing of veldgrass areas

After the ground had been plough harrowed, fertilized and sowed the area shall be crisscross harrowed with a harrow.

5.4.3 Rolling of veldgrass areas

Sowed areas shall be rolled with Cambridge or suitable roller.

5.4.4 Veldgrass on ground not suitable for machine fertilizing

In areas where mechanical implements cannot be used the seed bed shall be prepared according to item 5.3.2.

5.4.5 Stones

Stones longer than 50mm diameter loosened in preparation shall be placed in measurable piles or heaps so that they can be surveyed by the Client. If not immediately removed from the site the stones shall be piled where indicated by the Client. Stone piles shall be kept neat.

SECTION 6

PLANTING

6.1 Scope

This section describes the preparation of holes for planting, planting and maintenance until the project is complete.

6.2 Plant material according to the planting plans

Plant material shall strictly conform to the planting plans, alternatives shall be submitted for approval by the Client.

6.3 Digging of holes for trees and shrubs from containers

After a fine sandbase has been prepared and fertilizer mixed in, according to Section 6, holes shall be dug for the planting of trees, shrubs and ground cover.

6.3.1 Size of holes in soft well drained soil

Holes shall be dug to be two times wider and 1.5 times deeper than the container from which the plant is to be transported. Place the dug out soil next to the hole.

6.3.2 Digging holes in soil which does not drain well

Where topsoil lies on a layer of rock, shale or clay or where there is a shallow water liable for the planting holes shall not penetrate the lower layer. If rock or clay layers should occur shallower than the depth of the container, or a high water-table is present within the area of planting, the matter shall be referred to the Client.

6.4 Incorporation of fertilizers and compost

Empty a one third by volume of compost on the pile of dug out soil and mix well with super phosphates as determined by the soil test.

6.5 Backfilling of planting hole

Refill the hole to a level that would bring the plant container level with the surface of the ground, where it is to be put in the hole.

6.6 Planting of plants from a container

Remove the plant from the container without loosening soil round the roots. Remove all stones or ash from the roots that were in the bottom of the container. Loosen the bottom 50mm of root and place in the hole. Replace the soil so that the plant is 10mm deeper in the soil than it had been in the container. All roots shall be well covered. Grafted (or budded) plants shall be planted with the graft above the ground. Press the soil down firmly around the plant roots and water by filling the well to the brim. Now place a 100mm thick layer of veldgrass hay, or any other approved mulch material around the plant in the well.

6.7 Plants from the open ground

Where transplanting on site is from open ground the plants shall be layered in soil immediately they are brought on site and shall be kept moist until planted. Care shall be taken to ensure that roots are spread and not broken or bent in planting. Root tips shall be cut back at an angle.

6.8 Watering of plants

It is recommended that all plants be planted in moist soil and are well watered within the hour.

6.9 Treatment after planting

6.9.1 Expel air from planting hole

During irrigation all air shall be expelled from the planting hole by carefully working through the loose soil.

6.9.2 Tramp soil down

Soil around the plant shall be well tamped down.

6.9.3 Roots in a natural position

Roots shall be well spread and damaged roots shall be cut off. Roots shall not be folded or nipped.

6.9.4 Remove excess soil and stone

Excess stones and soil from the holes shall be removed from the site.

6.9.5 Securing trees

All trees with stems less than 30mm in diameter and plants that the Client considers to be in danger of being damaged by wind shall be tied to a wood or iron stay. The method of binding shall be by means of binding wire that has been fed through a 20mm diameter plastic pipe and looped lightly round the stem of the tree and bound to the stay at 500mm intervals or an approved tree tie. Stays shall be put in next to the tree. Stays shall not be driven through the root zone and shall be deep enough into the ground to support the plant strongly.

6.9.6 Mulch/where applicable

After trees and shrubs have been planted, soil tramped down, watered and stayed a 100mm thick layer of seedfree hay or other approved mulch shall be placed around the stems, watered well and covered with a thin layer of soil to prevent it being blown away.

6.10 Lifting of big trees

6.10.1 General

Pruning of trees to be transported shall be decided on site.

6.10.2 Trees

The Contractor shall remove the various trees pointed out to him on site, soil and all the transplant to the plant area. The trees shall be removed with a neat ball of undisturbed soil around the roots.

The Contractor shall allow for enough work area around and under the root ball to allow for removal without damage.

Where mechanical tree removing equipment is used the specifications shall be approved by the Client.

In crumbling soil or soil without cohesion the root ball shall be suitably wrapped to prevent damage to the root ball.

The size of the root ball shall be determined by the contractor for individual trees shall be such that the main root system is not damaged.

6.11 Transplanting of big trees

a) Digging of holes for trees

Dig a hole twice as wide and 1.5 times as deep as the root ball.

b) Soil mix for tree holes

Prepare a mixture consisting of 30% by volume of approved topsoil, 30% well rotted compost and balance of excavated soil, with super phosphates 1kg/m³ and 2:3:2 1kg/m³.

c) Planting

The ground shall be formed into a well 300mm deep and at least 1000mm across, around the stem. Water by filling the well to the brim and cover it with a 100mm thick lay of veldgrass hay or other mulch, as soon as the water has seeped away.

d) Stays for trees

Trees less than 3000mm tall shall be tied with plastic coated wire to treated wooden stays 50mm thick and drain 300mm into the ground, or by other approved staking system. The stays shall be as tall as the trees being stayed. Trees shall be staked on at least 2 sides.

Trees taller than 3000mm shall be anchored on at least four sides with wire anchors attached to the stem with wire enclosed in plastic tubing and attached to steel pegs in the ground.

6.12 Planting of extra large trees

a) Dig a hole 1.6 x 1 metre.

b) Mix the dug out soil ($\pm 1.5\text{m}^3$) with 4kg of 2:3:2 fertilizer.

c) Position the tree next to the hole.

d) Cut off the plastic horizontally between the wires as near as possible to the bottom.

e) Remove the plastic from the top. If it sticks, make a few vertical cuts and remove the plastic piece by piece.

f) Tilt the container.

g) Cut approximately ten holes in the bottom of the container.

h) Fill the hole with soil so that the top of the container will be just lower than the surrounding soil, after the tree has been planted.

i) Place the tree in the hole with the wire basket after the plastic has been removed.

- j) To place the basket in the hole without mechanical aids, use two poles \pm 100mm thick and 2-3m long and place them on opposite sides of the tree trunk on top of the container.
- k) Run two thick wires beneath the bottom of the container and fasten it to the poles. Eight men can then lift the tree and carefully place it in the hole.
- l) Keep the tree upright and fill the cavity under the container with soil so that the tree will stand by itself.
- m) Remove the poles and wire (not the wire basket).
- n) Fill the hole with water.
- o) Gradually fill the hole with soil and trample or pound the soil firmly while watering.
- p) Make a two metre wide dam around the tree and fill with water. Fill any holes which form with soil.
- q) If the tree should tilt, anchor it with suitable anchors while the ground is still soaking wet.
- r) Thread anchor cables through a piece of plastic pipe or watering hose, where the cable touches the trunk.
- s) Water the tree thoroughly twice a week using at least 80 litres of water until the tree can sustain itself.
- t) Repeat the fertilization, 1kg of 2:3:2 (22), monthly, well spread out in the dam around the tree.
- u) For good results, “love your tree regularly!”

6.13 Planting of grass

6.13.1 Grass roots

On level ground the grass roots shall be planted in rows 150mm apart and 50mm deep with roots lay in continuous rows. Plant material of the species “*Pennisetum clandestinum*” and “*Cynodon dactylon*” may be completely covered with a layer of soil not more than 10mm deep. Plant material shall preferably be visible here and there. Grass roots of the species “*Stenotaphrum secundatum*” and *Digitaria swazilandensis*” where specified, shall be planted so that leaves are visible above the ground.

6.13.2 Grass Plugs

Grass planted by means of plugs shall be planted in rows at a density of 15 to 25 per m² or as specified.

6.13.3 Planting of grass sods (turf)

Sods of species as specified on the drawings shall be used. Sods shall be laid adjacently to form a continuous grass mat. Immediately after laying sods they shall be well watered and kept damp until the area is handed over. After planting the surface shall be level and any irregularities shall be filled in with a soil and compost mixture. Maximum height difference between sods: 5mm. A mixture of soil and compost shall be worked in between the sods. After laying, the grass sods shall be rolled with a garden roller to ensure a level surface. Sods which are not going to be planted immediately after delivery shall be kept damp. The contractor shall always indicate the source of grass sods and guarantee that it is weed free.

6.13.4 Fixing sods on slopes

Where planting is on a slope and if necessary sods shall be fixed by means of wooden pegs and shall if necessary be removed later.

6.14 Sowing of seed

6.14.1 Sowing of stabilization seed

- a) Method of sowing
Seed shall be sowed in moist soil in well-prepared seed bed. Seed shall be sown with accepted and approved type of back pack or other type of sower.
Where seed is sowed by hand because of the incline of the terrain it shall be mixed with enough lime or fine sand. Seed shall be halved and sowed over the area twice to get an even distribution.
- b) Covering and rolling of seed
After being sowed the seed shall be covered by pulling an inverted harrow or hessian drag over the area. After covering the sowed seed the area shall be rolled with a Cambridge roller.
- c) Watering
The seed bed shall after sowing be kept damp up to completion of the project.

6.14.2 Sowing of lawn seed

- a) Method of sowing
Seed shall be sowed in moist ground by means of an approved sowing apparatus in quantity and by methods decided from time to time. Seed shall be sowed when there is no wind to prevent loss and spread of seed to areas where not wanted.
- b) Covering and rolling of seed
Seed shall be covered after being sowed with garden rakes. Immediately after being covered the seed bed shall be rolled.
- c) Watering
Seed shall, after being sowed and rolled, be constantly kept moist up to completion of the project. This shall be done by means of light overhead spraying until the runners are 10mm long after that normal watering is acceptable.
- d) Spreading through erosion
Spreading of seed through erosion to areas where not wanted shall be prevented. The contractor shall be responsible for control and for correction should such spreading occur.

6.15 Planting of ground covers, perennials, herbaceous plants and annuals from containers

Unless otherwise decided the above mentioned plants shall be planted as follows:

6.15.1 Determination of plant positions

The contractor shall determine the positioning of ground creepers according to the triangle system. Plants after planting are in rows pointing in four directions that makes weed control and the control of the plants easier.

6.15.2 Preparation of the soil

A fine plant bed shall be prepared according to Section 5.

After plant positions have been pegged, work one third by volume of approved compost into each plant position to a depth of 100mm.

6.15.3 Planting

After the ground has been prepared holes shall be made only big enough to receive the whole root ball. Plant the plants after the container has been removed, firm the ground well and water immediately. After watering prepare a basin around the plant 500mm across and 100mm deep.

6.16 Planting of ground covers by means of surface plant parts, runners, roots etc

6.16.1 Soil preparation

Prepare seed bed as specified in Section 5. Where appropriate a layer of topsoil, as specified shall be spread. Spread a layer of approved compost to a thickness of 40mm and work well into the top 100mm of soil.

6.16.2 Distances between and methods of planting

Plants shall be planted in neat rows and at distances as specified in rills or individual holes which in both cases shall be deep enough to accommodate the whole root ball. Where runners or roots are planted it shall be in a continuous row. All roots shall be carefully covered. All leaves, if present shall be above ground and free from soil.

6.16.3 Watering

After planting the area shall be watered and kept moist up to completion of the project.

SECTION 7

MAINTENANCE

7.1 Scope

Maintenance shall mean the supply of all labour and maintenance apparatus necessary, replacing of plants that have died, weed control, additional planting of grass roots, spreading of fertilizers and working in of compost, irrigation, etc and to produce vigorous growth in all plants and to keep the terrain in a neat and acceptable state up to final handing over to the client. Normal retention work i.e. any shortcomings in construction, of whatever nature that might occur shall be restored or replaced before final handing over of the terrain.

7.2 Commencement of maintenance period

Maintenance period shall commence when all work, including all additional work has been completed and accepted at terrain inspection by the client.

Where the terrain has been divided into areas or phases, such phases of the work as has been agreed to by the client may on approval be considered complete.

The acceptance of completed work shall not relieve the contractor of any of his obligations and responsibilities in connection with this contract.

7.3 Duration of maintenance period

When the completed work has been accepted, the terrain or portions thereof, as agreed, shall be maintained as specified.

7.4 Handover

The terrain or part thereof shall after complying with all maintenance requirements be taken over by the client. This only after a final inspection of the work is done and it is found that the work or the repair work has been done satisfactorily.

7.5 Irrigation

The contractor shall ensure that all planted areas are kept damp enough to stop wilting of areas planted with trees, shrubs, creepers and groundcover and shall be kept moist to a depth of 300mm.

7.6 Cutting of grass

7.6.1 Areas of lawn

Grass shall be mowed regularly with an acceptable and modern petrol, electric or diesel driven lawn mower. Mower blades shall be sharp at all times. The blades may not be set higher than 30mm and all grass cuttings shall be removed from the area unless otherwise specified.

All stones and foreign objects shall be picked up and removed before mowing starts. Grass shall only be cut when the grass blades are dry unless continuous wet weather necessitates the cutting of wet grass.

Grass shall be cut for the first time when runners are 100mm long, unless otherwise decided on site or specified.

7.6.2 Cutting of edges

All edges of lawns where it borders paving foot paths, structures, kerbing, poles and fencing, planted areas etc shall be trimmed neatly with shears or edge cutters.

7.7 Aeration

The contractor shall make provision for the aeration of planted areas as necessary. Aerating shall be by means of garden forks or other approved apparatus. Established services shall not be damaged.

7.8 Top dressing

Material for top dressing shall be equal quantities of well-rotted organic matter and topsoil. Grass shall first be mowed and all cuttings removed before top dressing is applied. Top dressing shall be applied in layers not more than 20mm thick and shall be tidied up with a drag mat and rakes and finally tested for levelness with a straightedge. No hump or hollows shall be apparent when testing. If necessary fertilizers shall be added to the top dressing and mixed in before application.

7.9 Weeding

Unless otherwise decided by the Client, all weeds in lawns that are not removed by the mowing process shall be taken out by hand and removed from the area. Weeds of any description in beds and other areas shall regularly be hoed or pulled out by hand and removed from the area. Approved herbicides may only be used and may only be applied under supervision of capable and qualified staff. The contractor shall take precautions against weeds or foreign grasses being brought on site with organic material.

7.10 Replacing dead plants

The contractor shall replace all plants that die during the period of the work and shall, during the maintenance period systematically replace with the same species according to specifications or after consultation with the Client, with any other plant decided on.

The contractor shall ensure that all plants are regularly examined for disease or insects. Control measures as approved by the Client shall be applied.

7.11 Cleaning up of the terrain

All works and equipment related to this contract shall be handed over to the client in a clean and neat state and in working order.

SECTION 8

COMPACTION

- 8.1 Extent
This section covers all facets of preparation and compaction of ground for paving.
- 8.2 Excavations and fillings for compaction
The earthworks cover the excavation of material and the placing and compacting of suitable approved excavated material, the tidying up of excavations and fillings in order to achieve a level surface. The earthworks margin of error must be acceptable according to the slope and profile as shown on detail drawings.
- 8.3 Removal of unwanted material
 - 8.3.1 Surface of site
All grass and other unwanted and foreign material must be removed from the site.
 - 8.3.2 Excavations
In excavations all tree stumps with a diameter of more than 75mm, all grass roots and foreign material must be removed to a depth of 300mm lower than the final height required, plus any material unsuitable for filling or backfilling
 - 8.3.3 Existing loose fill
All unsuitable loose fill on site such as e.g. ash, tins, rubbish etc, must be removed from site.
- 8.4 Earth moving
Where filling areas are to be compacted for paving filling must be done with selected and suitable material from the general earth moving work.
- 8.5 Bringing in of suitable material
If there is not enough suitable material available from excavators the contractor will be required to bring in suitable material.
- 8.6 Removal of excess material
All excess material from the excavations must be taken to a dumping site by the contractor or else removed from site, unless agreed otherwise.
- 8.7 Formation height
Formation height is defined as the final height of excavations and fillings.
- 8.8 Compacting of ground
 - 8.8.1 Standard
Adequate compaction of the layer works, i.e. subgrade, subbase etc, must be carried out with suitable equipment. It is the contractor's responsibility to ascertain what the necessary compaction is for the specific application and site.

SECTION 9

PAVING

9.1 Extent

This section covers all phases of paving be it brick, key stone, tile or stone.

9.2 Sand substratum

On completion of the base a layer of fine sand, approved by the landscape architect, which may consist of river sand, mine sand or gravel sand must be put down to a thickness 12mm – 25mm. The sand must be leveled with a straight edge to the required heights. The layer of sand must be rolled in order to form a stable base.

9.3 Brick paving with mortar joints

Bed the specified bricks in mortar or sand according to the pattern, slope and finishing and with joints done according to drawings or other specification. Where the pattern is free flowing the joints must follow the paving line and where necessary bricks must be cut to shape to keep uniformity of pattern. Bricks with cracks, hollows or broken corners may not be used. Fill the joints with 1/3 cement mortar mix and paint and be careful that finished paving does not have cement splashes or any other marks on.

9.4 Brick paving without mortar joints

Bed the specified bricks in sand or mortar, according to the pattern and the slope and without joints as indicated on drawings or elsewhere. Where the pattern is free flowing the joints must follow the paving line and the pattern must be maintained. Where necessary bricks must be cut in order to keep joints even. No bricks with cracks, hollows or broken corners may be used. Spread a clean and approved fine sand/cement mixture with no rough particles over the paving and sweep into the joints. Remove excess sand and compact the bricks laid on the sand bed with a vibrator plate. Then joints must again be filled with the fine sand/cement mixture.

9.5 Key stone paving

Bed the specified keystones on sand or mortar according to the pattern, slope and measurements as indicated on the detail drawings or elsewhere. Keystones must if necessary be cut so that they will interlock. Keystones with cracks, hollows or broken may not be used. Spread a clean approved layer of fine sand with no round particles over the paving and sweep well into the joints. Remove excess sand and compact keystones laid on sand with a vibrator plate. Then the joints must again be filled with fine sand.

Paving must conform to finishing requirements. Keystones must be selected to be of even thickness.

9.6 Tile paving

Bed specified tiles on sand or mortar according to the pattern, slope and measurements with or without joints as indicated on the detail drawings or elsewhere. Where necessary to keep the pattern, tiles must be cut with an electric tile cutter. Where necessary joints must be filled with 1-3 cement mortar filling and painted.

Paving must be free from cement splashes or any other foreign material. No tiles with cracks, hollows or broken covers may be used. Paving must conform to finishing standards.

9.7 Pebble paving/Riverstone paving

Bed pebbles on sand or concrete according to the pattern, slope and measurements as indicated on the detailed drawings or elsewhere. Where appropriate spaces must be filled to the sand or concrete bed with 1:3 cement mortar mixture and finished with a brush. Care must be taken to leave stones without cement splashes or marks from any other material.

9.8 Finishing requirements

After completing the paving the surface must be examined for accuracy of height, evenness of slope and cross section.

9.8.1 Height

Final height must at no point be more than 25mm higher or lower than specified.

9.8.2 Slope

Deviations from the specified slope will only be accepted if the variations do not exceed the following.

Measured length of slope or under specified	Maximum variation over slope
2 meter	0.30%
4 meter	0.27%
8 meter	0.24%
15 meter	0.20%
30 meter	0.16%

Where no slope is specified it must be assumed that the minimum slope on paved areas in the direction of the general slope must not be less than 2%. The contractor must ensure that all storm water can drain away without forming peals.

9.8.3 Evenness

The surface of the paving must be free from irregularities, humps or dips of more than 6mm when tested with a 3m straight edge parallel to the center line.

SECTION 10

CONCRETE WORK

10.1 General

The quality of the completed concrete will be the main concern. Despite what may be specified about material, mixing methods and pouring the contractor above will be responsible for delivery of concrete work of the required quality. Structures designed to hold water must be fully impermeable without addition of extra finishing or waterproofing of the concrete surface. The contractor shall be responsible to ascertain the strength of concrete for the particular application and it shall not be porous, contain patches of grit or voids.

10.2 Mixing of concrete

Sand and stone mix must be measured according to mass. If cement is measured per bag, the bag must not be divided the whole contents of the bag must be put into the mixer at the same time. Nominal proportions of cement, sand and stone mix must conform to quantities given in Table A. The proportions after examination of sand and stone mix must be adjusted according to further specifications, if necessary. Any such alterations will be made without the quoted unit price as long as the proportion of cement to total sand and stone mix remains unchanged. It will be in the interest of the contractor to, before starting work, submit samples of proposed aggregate to an approved laboratory where sample mixtures can be developed and tested. The components must be thoroughly mixed in the correct proportions for the application. The following table gives guidelines for mixes and strengths.

Type	Max. size of course Mix mm	Max. total water content litre per bag of cement and kg		Weight of mix per bag of 50kg cement stone kg	Min. final strength after 28 days MPA
M19	19	55	175	230	-
M36	38	55	160	290	-
15/19	19	55	175	230	15
20/19	19	33	110	155	20
25/19	19	29	95	135	25
30/19	19	26	80	125	30
35/19	19	23	75	115	35
40/19	19	21	60	100	40

10.5 Steel reinforcing

It is the contractor's responsibility to ensure that steel reinforcing should be adequate to perform the task intended.

SECTION 11

MASONRY

11.1 General

This section covers all phases of brick work, plastering and tiling.

11.2 Foundations for walls

All excavations for concrete foundations and screening walls, retaining walls, plant boxes etc, will be into the natural ground and concrete must be poured to fill the whole excavation. The width of foundations and the mix will be suitable for the application.

11.3 Brickwork

All brickwork and masonry shall comply with the detail plans or alternatively perform the function for which it is intended, and should comply with SABS recommendations and local building regulations.

11.4 Stone walls

All stone walls shall be adequately supported with a concrete foundation and should be fitted together so that not more than one third of the surface area is cement fill.

11.5 Plastering

All plaster will consist of one third cement and clean sifted river sand free organic material and foreign objects and will after finishing be as least 10mm thick. The plaster will, after being applied and before becoming too dry to work with, be finished with a straight edge in order to obtain a level surface throughout. The final finishing will be according to detail drawings or other specification and will when tested with a 3m straight edge show no humps or hollows of more than 2mm. Irregular hollows or humps will not be acceptable. Finished plaster must constantly be kept damp for 3 days so that it does not crack because of to rapid drying. Joints will, unless impossible, be expanding joints or building joints.

11.6 Tiling

Tiling means work done with ceramic mosaic or approved tiles attached with a suitable fixative.

SECTION 12

TIMBER CONSTRUCTION

Timber type and sizing shall be suitable for the application, erected by a skilled artisan and protected with a suitable weather resistant finish if it is not pretreated timber.

Ends.