

**TECHNICAL SPECIFICATION  
FOR  
LANDSCAPE WORKS  
&  
IRRIGATION WORKS**

## **1. SCOPE OF WORK**

The scope of the work is to provide soft landscaping works at Gardens in Sector- 7A, 2 & 9, GMC, Gandhinagar, Gujarat, India. The scope of this contract is the soft landscaping only, the works of which are listed below.

The landscape contractor shall from the date of commencement of contract, furnish all materials, labour, and related items necessary to complete the work indicated and specified herein. Along with site management, the responsibilities will include soft landscaping works (horticulture works related to landscape) and being responsible of these newly created works i.e from the day of complete execution of the entire works as certified by the LANDSCAPE CONSULTANT i.e. during the defects liability period.

The scope of work shall be as per enclosed herewith,

### **1.1 STAGE - I: EXECUTION**

All Landscape Horticulture Works as shown in Drawings for:

- a) Boundary tree plantation
- b) Shrubs and ground cover plantation –Court yard and road side avenue
- c) Area demarcation drawing.

### **1.2 MAINTENANCE OF HORTICULTURE WORK**

Maintenance for horticultural works includes watering, manuring, weeding (weeding up to 1000 mm around planted areas), fertilizing, using of pesticides or fungicides as required, and other works for the healthy growth of the plants.

After planting, all planted areas that have exposed soil will have to be mulched with straw or hay. Mulching will be evenly spread to cover any exposed soil.

In addition, the contractor will also be responsible for filling gaps, thinning and transplanting, or replanting where plants may need to be replaced. Along with other planting, the contractor will also be responsible for improving soil conditions for planting. This may include import /export of sand/soil to/from site. The contractor will also clear vacant area from existing grasses, keep the site clean and maintain the already planted areas free of weeds, pests or insects that cause diseases. All weeds, unwanted grasses and plant material will be cleared up to 1000mm from the edge of planting of newly created and already existing horticultural works (such as boundary trees). The contractor will also be responsible for protection of the plants from salt spray that may occur during the monsoons.

All the works envisaged in the contract shall be executed generally as per the indicated concepts in the accompanying drawings, strictly confirming to the Indian standard specification and code of practices, as applicable

### **1.3 DEFECTS LIABILITY PERIOD:**

All work shall be carried out strictly in accordance with the specification and shall be free from faulty planning, workmanship, execution, testing and interpretations. If any trouble or defect originating with the results and reports submitted arise at any time prior to three months from the date of completion of the above work under the contract, the Landscape Contractor, at his own expense and within the time limit set by the Employer, shall make such alterations, reworking at field and at laboratory as may be necessary and submit the revised reports. Employer's decision in this respect shall be final and binding on the Landscape Contractor.

### **2.1 SUPERVISION**

The contractor is required to have " On site " during all work hours, a competent, full time supervisor (acceptable to the Employer/ Landscape Architect) who will be responsible to the Employer/Landscape Architect for the conduct of the work and who has the authority to receive and act on such instructions as the employer / landscape architect may give. The work of the contractor is subject to inspection by the Employer / consultant at all times, but such inspection does not relieve the contractor of any of the responsibility.

The Contractor's on site supervisor will be responsible for providing any information regarding the site conditions such as the presence of existing trees, boulders, rocks, shrubbery, difference in levels, etc. To the Landscape architect as requested by the Landscape architect or if the information given in the drawings do not coincide with the site conditions and should take the permission of the Landscape architect to proceed with on the works.

## **2.2 FACILITIES TO OTHER CONTRACTORS:**

The Employer reserves the right to use the premises and any portion of the site for the execution of any work not included in this contract which he may desire to have carried out by other agencies / parties, and the contractor is to allow all reasonable facilities for the execution of such work but is not required to provide any plant or materials for execution of such work except by special requirement with the Employer.

Such work shall be carried out in such a manner without impeding the progress of the works included in the contract and the contractor is not to be responsible for any damage or delay which may happen to be occasioned by such works. Consultants will co-ordinate the activities of all the agencies / persons.

## **2.3 ALTERATION IN QUANTITY OR WORK, SPECIFICATION & DESIGN / ADDITION OF WORK / DELETION OF WORK**

The Landscape Architect consultant / Employer shall have power to make any alterations / additions to or substitutions for the original specifications, drawings, design and instructions that may appear to him to be necessary during the progress of work. For that purpose or if for any other reason it shall in his opinion be desirable, he shall have power to order the contractor to do and the contractor shall do any or all of the follows:

- a) Increase or decrease the quantity of any work included in the contract.
- b) Delete any such work.
- c) Change the character or quantity or kind of any such work.
- d) Change the levels, liners, positions and dimensions of any part of the work.
- e) Execute additional work of any kind necessary for the completion of the works
- f) Change in any specified sequence, method of timing of the work.

The contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Landscape Architect Consultant / Employer or other competent authority and shall not in any way vitiate or invalidate the contract. Deviation in the work may be ordered by the Accepting officer /Consultant up to a maximum of Ten percent of Contract value.

## **2.4 PENALTY FOR BAD WORK, REMOVAL OF IMPROPER WORK:**

If at any time before expiry of defect liability period, it shall appear to the employer that any work has been executed with unsound, imperfect or unskilled workmanship or with materials of inferior quality or that any materials or articles provided by him for the execution of the work are unsound or of a quality not in accordance with the contract, it shall be lawful for the employer to intimate this fact in writing to the contractor and then notwithstanding the fact that the work, materials or articles complained or may have been paid for, the contractor shall be bound forthwith to rectify or remove and reconstruct the work so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the contractor failing to do so within a period to be specified by the employer in the written intimation aforesaid, the Employer may rectify, or remove and re-execute the work or remove and replace the materials or articles complained of, as the case may be at the risk and expense in all respects of the contractor.

## **2.5 WEEKLY REPORT:**

The contractor shall also maintain a work report for work completed each week. The same report in English, will be sent to the landscape architect every week. The landscape architect shall verify completed work as per the report. Contractor will be responsible for meeting deadlines for the completion of the job.

## **2.6 MATERIALS & LABOUR:**

All materials for soft landscape works will be as specified in the Bill of Quantities, unless otherwise noted.

## **2.7 RESPONSIBILITY:**

- a) The contractor's work shall not hinder other work, either underground or over ground, such as electrical, phone lines, water or sewage lines, etc. In areas of overlap, the contractor shall work in coordination with other related contractors. Any damage by the landscape contractor's team to such utilities will be penalized and contractor shall be responsible for cost for such damages.
- b) The contractor shall abide by the Security rules / procedures of the Employer, and shall obtain gate pass, issue I.D. badges to all their employees on site, etc. as prescribed by the Employer.

## **3. TECHNICAL SPECIFICATIONS**

### **3.1 CLEARING OF SITE:**

The client will have to provide the land for execution of horticulture works by clearing the site of unusable materials and other construction materials of the surrounding buildings under construction and transporting the same to a site as indicated by the engineer-in-charge. Before finally leaving the site upon completion of the work, the previous concern contractor shall remove all his infrastructure facilities like huts, tools, equipment, scaffoldings, centering materials, rubbish etc., and the site shall be left clean and tidy.

### **3.2 APPROVAL OF SAMPLES:**

The contractor is required to provide a sample of work before commencing with the works. Sample of saplings, soil, Farm Yard Manure etc. of acceptable quantities and sizes that is sufficient to gauge quality of work / product and get it approved by the consultant before executing the work on site. If the contractor fails to comply with this clause and the work executed is not to the satisfaction of the consultant / employer the contractor shall at his cost redo the entire work as per the instruction of the consultant / employer.

### **3.4 ESTABLISHMENT OF NURSERY:**

Due to the expanse of the project, various plants will have to be procured and maintained at the site. For this purpose, a shade net area will be made available by the contractor at site. The nursery area will have a shade net area with potting shed. Approximately 2000 sq. mt. of Shade net area using Agro net, green color will be required to be maintained and replaced whenever necessary, for which no extra payment will be made by the employer. The contractor will have to have a satisfactory stock of plants specified in this tender in the nursery and share details of the same with the employer and its landscape consultant. The Contractor will be responsible for maintaining adequate number of all varieties of plants that have been proposed by the Landscape Consultant at any given point of time. The Contractor shall take approval from the Landscape Consultant regarding the plants stocked / propagated before he proceeds with planting in the designated areas. He shall also maintain an additional of 20% of the numbers specified of all the varieties of plants for gap filling and replacement due to mortality. The Contractor will establish the nursery within 1.5 months from the date of Letter of Acceptance and maintain the same for the entire period of the contract and the defects liability period at his own cost. At end of the defects liability period he shall hand over the nursery to the concerned authority of the employer with adequate number of plants of all species required for filling of gaps, replacement etc. that would have been planted at site as proposed by the Landscape Consultant.

### **3.3 WATERING/IRRIGATION OF LANDSCAPE:**

Water will be made available in landscape area by irrigation network like pop- pop, drip irrigation, rain gun etc by the client. If the water on site is insufficient then the client shall be responsible for importing water, in water tankers for the general upkeep of the plants. No plants shall be allowed to wither or die due to lack of proper watering.

### **3.4 REPLACEMENT OF PLANTS:**

Those plants that are not up to the standards, and do not meet specifications shall be replaced by the contractor at no extra cost to the Employer.

When the plants are to be replaced either for filling gaps or poor quality, then the contractor shall replace within 15 days of the plants in that area. For this purpose, extra numbers of plants of those used in the project will have to be maintained in the Nursery.

### **3.5 PLANT REQUIREMENTS:**

Plants and shrubs shall be sourced by the contractor from available nurseries, unless otherwise specified. Seeds shall be acquired from reputed organizations and hybrid seeds will be used where possible - particularly for flower varieties. No plant material shall be changed without the consent of the landscape architect.

### **3.6 PLANT MATERIALS:**

All plant materials shall be healthy, found vigorous, free from plant diseases, insect pests or their eggs and shall have healthy well developed root systems. All plants have to be of specified height and should be bushy with plenty of leaves. Plants that are not full grown, or are weak and without adequate leaves shall be rejected and not counted towards any payment - partial or full.

Plant supplied shall confirm to the names listed on both the plan and the plant list. Numbers of plants will vary depending on area at site. Any discrepancy with numbers from those specified in the Tender should be brought to the attention of the Landscape Architect before proceeding with the work.

### **3.7 SUPPLY & SUBSTITUTION:**

Upon submission of evidence that certain materials including plant materials are not available at the time of execution, the contractor shall be permitted to substitute other materials and plants, with an equitable adjustment of price. All substitutions shall be of the nearest species and variety to the original specified and shall be subject to the approval of the Landscape Architect.

### **3.8 EQUIPMENT:**

All labour should be provided with tools required for regular maintenance and upkeep of a garden. Lawn mowers, hoses, garden scissors, pruning shears, trowels, spading forks for loosening soil will be available on the laborers at all times.

Safe custody of these tools / equipment shall be the responsibility of the contractor.

### **3.9 Filling of Garden Soil Mixture:**

Supplying and filling of tree pits, shrub bed & lawn beds with Fertile Soil Mix with Farm Yard Manure on datum level in the following percentage - 15% Farm yard Manure, 85% locally available "Kaap" soil by volume graded towards the drains & chambers located at site with a minimum slope of 1%.

**Recommended fill of the beds are as follows:**

1. Tree Pits - 900 x 900 x 900mm;
2. Shrub beds - To a depth of 230mm;
3. Lawn beds - To a depth of 150mm.

### **3.10 Development of Hillock:**

Supplying and filling of black cotton soil/ Goradu soil to develop hillock of average 1.2 mt height, 8.5 mt. width and length as per site condition, as per design. It includes grading, compacting up to 85% and shaping hillock as per design (attached typical plan & Section).

The item shall be measured and paid in a unit of 1 cum.

#### **4.00 TREE PLANTING:**

Whenever planting, the following specifications will be followed by the contractor. Wherever sand is to be removed, the following specifications shall be followed after refilling the area with good soil.

#### **4.01 DIGGING OF PITS:**

Tree pits of 900mm x 900 mm x 900 mm shall be dug. For shrubs bed and ground cover bed, the land will be prepared by digging up to 450 mm in depth.

If the soil quality is poor, it shall be replaced with soil mixture acceptable to the landscape architect. The soil condition will have to be approved by the landscape architect. Tree pit shall be filled with dry husk @ 100mm from bottom. Pest/termite prevention chemicals or any other approved chemical to be applied into the soil before planting as per supplier's specification.

When shrubs or ground covers planting are in more than one row, then pits will be dug in a zigzag fashion ensuring a diagonal planting in each row.

#### **4.02 PLANTING MIXTURE:**

The topsoil will be prepared with 15% Farm yard Manure, 85% locally available "Kaap" Soil by volume. This mixture will be filled in pits before and after planting.

#### **4.03 BACK FILLING:**

The soil is back filled in tree pit on 100 mm layer of dry husk, watered thoroughly and gently pressed down a day previous to planting, to make sure that it may not further settle down after planting.

#### **4.04 PLANTING:**

No tree pits shall be dug until a final tree position has been pegged out for approval. Care shall be taken that the plant sapling when planted is not buried beyond the level of the pot containing it. Planting should not be carried out in waterlogged soil.

#### **4.05 STAKING:**

If necessary, a single vertical stake 1 to 1.5 meter longer than the clear stem of the plant, driven 300 mm to 450 mm (approx. 1ft to 1'6") into the soil shall be used. Each plant should be secured to the stake so as to prevent excess movement.

#### **4.06 FERTILIZING:**

The trees shall be fed Farm yard manure @ 5 kg /Tree/Year.( In two dose per year)

#### **4.07 WATERING:**

The landscape contractor shall allow for the adequate watering of all newly planted trees, shrubs and groundcover immediately after planting and during the following growing season, shall keep the plant material well watered. Water supply and irrigation network will be provided by the client free of cost.

#### **4.08 MULCHING:**

All planted areas, including around trees which have open soil that is exposed will have to be mulched with straw or hay. Rates indicated in the Bill of Quantities shall include such mulching costs. No separate compensation will be paid for mulching.

#### **4.09 PLANTING ALONG THE EDGE OF THE BUILDING:**

All plants proposed to be planted by edge of building in front façade of building should be planted with special care so as to ensure the following:

- a) The painting/cladding of walls is not soiled and kept clean at all times

b) Watering is done with care so as to ensure water is not entering windows or muddy water is not splashed on walls.

c) All plants growing over the height of windows should be trimmed below window height.

#### **4.10 PROTECTION:**

The client will be responsible and should take measures to protect the planted saplings from cattle, salt spray and high wind pressure. Rates indicated in the Bill of Quantities shall exclude such costs of protecting the plants including any physical construction such as walls, tree guards, etc. that may be required for the same.

#### **4.11 MODE OF MEASUREMENT:**

The item shall be measured and paid for a unit of one Nos.

### **5.00 SHRUB PLANTING & GROUND COVER:**

Same specification as for trees, except where specified otherwise.

#### **5.01 SOIL MIXTURE:**

The top soil mixture layer of 230mm shall be 15% Farm yard Manure, 85% locally available "KaaP" Soil. Pest/termite prevention chemicals to be mixed if required. The soil mixture levelled to maintain positive drainage or specified slopes.

#### **5.02 MODE OF MEASUREMENT:**

The item shall be measured and paid for a unit of one Sq. mts.

### **6.00 LAWNS:**

#### **6.01 PREPARATION:**

During period prior to planting the lawn, the area shall be maintained free from weeds, Grading and final leveling of the lawn shall be completed at least 2 weeks prior to the actual sowing.

#### **6.02 SOIL MIXTURE:**

The top soil mixture layer of 150mm shall be 15% Farm yard Manure, 85% locally available "KaaP" Soil. Pest/termite prevention chemicals to be mixed if required. The soil mixture leveled to maintain positive drainage or specified slopes.

#### **6.03 EXECUTION:**

Nodes of specified grass shall be dibbled not more than 50mm apart on above mentioned soil conditions. Positive slopes will be maintained to ensure that there will be no low lying areas in center where water logging or pools are created.

#### **6.04 MAINTAINANCE:**

In the absence of rain, lawn shall be watered daily - heavily, soaking the soil thoroughly to a depth of at least 150 mm.

#### **6.05 CUTTING/LAWN MOWING:**

The scythe must continue to be used for several months until the grass is sufficiently secure in the ground to bear the mowing machine. Electricity and plug points in garden area as per requirement will be provided by the client.

#### **6.06 EDGINGS:**

These shall be kept neat and must be cut regularly with the edging shears.

#### **6.07 FERTILIZING:**

The lawn shall be fed warm culture manure or castor cack @ 3 kg /Sq. Mt./Year.( In three dose per year).

#### **6.08 WEEDING:**

Prior to regular mowing, the contractor shall carefully remove unsightly weeds.

#### **6.09 DEFECTS LIABILITY PERIOD:**

The Landscape Contractor shall be responsible for all the newly created soft-scaped areas within the landscape contract boundaries. The defects liability period shall include arboriculture works which shall mean replacements of dead plants, watering, weeding, cultivating, control for insects, fungus and other diseases by means of spraying with an approved insecticide or fungicide, pruning and other horticultural operations necessary for the proper growth of the plants and for keeping the landscape subcontract area neat in appearance.

#### **6.10 MODE OF MEASUREMENT:**

The item shall be measured and paid for a unit of one Sq. mts.

#### **7.0 MAKING OF HILLOCKS:**

- a. The basic grading of the soil and final the final grading is landscape contractor's work as per drawing with supply of black cotton soil/ goradu soil.
- b. The contractor has to do Supplying and spreading garden soil mixture of 150 mm layer on the finished hillocks.
- c. Final grading of the hillocks shall be done in such a way to allow free movement of lawn-mower all over the hillock.

#### **7.01 MODE OF MEASUREMENT:**

The item shall be measured and paid for a unit of one Cum. mts.

#### **8.00 All Landscape Horticulture Works of Stage - I mentioned below will be a part thereof:**

- A. The effective date for commencement of maintenance is from the date of virtual completion as certified by the Landscape Consultant after successful completion of all the works as per the Tender.
- B. The Contractor shall not sub contract any of the work specified in this contract.
- C. The rates quoted shall be firm for the entire duration of the contract. The concerned authority / Landscape consultant has the option to terminate the contract if he so desires any time during the tenure of the contract, after giving an advance notice of 15 days.



- D. At the end of the defects liability period the site shall be handed over to the concerned authority / Consultant complete in all respects in good condition along with all records, log books.
- E. If the concerned authority desires to associate his operating personnel along with the contractor's personnel during the maintenance period, the contractor shall arrange for the same. However, this shall not relieve the contractor of his obligations under this contract.
- F. The contractor shall deploy his own experienced, competent, qualified personnel who are working permanently in his organization and have at least 2 years of experience in maintenance of Landscape & arboriculture works.
- G. The Contractor shall furnish the organizational chart indicating various categories of technical and administrative staff envisaged for satisfactory maintenance of the Landscape works. This information shall be submitted along with the tender.
- H. The Contractor shall bring his own tools and equipments required for maintenance of Landscape works.
- I. The contractor shall make his own transport arrangements for reaching the work site and for movement within the plant premises and accommodation for his staff at no extra cost to employer.
- J. The Contractor shall furnish to the concerned authority of the employer / Landscape Consultant MAINTENANCE SCHEDULE one month in advance to the commencement of the maintenance period with details of lawn mowing, manuring, pruning, staking, mulching, spraying of pesticides, watering etc.
- K. The Contractor shall be responsible for the safety of plants executed by him under this tender and provide adequate security staff at no extra cost to the employer.
- L. The Contractor's Site supervisor will be responsible for forwarding weekly reports to the Landscape Consultant and employer regarding the progress of works.
- M. The Contractor shall adhere to all Statutory Regulations and Accepted Safety norms.
- N. The Contractor shall maintain the nursery for the entire period of the maintenance and at the end of the defects liability period the Contractor shall hand over the nursery with adequate number of plants - particularly the species of plants that are regularly used for filling of gaps, replacements, etc. to the Accepting Officer at no extra cost.
- P. STAKING - The Contractor if necessary, provide a single vertical stake 1 meter (approx. 3 ft) longer than the clear stem of the plant, driven 300 mm to 450 mm (approx. 1ft to 1'6") into the soil shall be used. Each plant should be secured to the stake so as to prevent excess movement.
- Q. WATERING - The landscape contractor shall allow for the adequate watering of all planted trees, shrubs and groundcover during the following growing season, shall keep the plant material well watered. In the absence of rain, lawn shall be watered daily - heavily, soaking the soil thoroughly to a depth of at least 150 mm.

Water supply and irrigation network will be provided by the client free of cost.

- R. LOOSENING THE SOIL & MULCHING - Soil around the planted areas - i.e around trees, shrubs, ground cover has to be loosened periodically and the area around trees and shrubs have to be maintained in the form of shallow pits for watering. All planted areas including around trees which have open soil that is exposed will have to be mulched with straw or hay.
- S. All plants - trees, shrubs, ground cover planted by edge of building or in front façade of building should be maintained with special care so as to ensure the following:
  - 1. The painting/cladding of walls is not soiled and kept clean at all times
  - 2. Watering is done with care so as to ensure water is not entering windows or muddy water is not splashed on walls.
  - 3. All plants growing over the height of windows should be trimmed below window sill height.

- T. PROTECTION** -The client will be responsible and should take measures to protect the planted saplings from cattle, salt spray and high wind pressure by constructing physical construction such as walls, tree guards, etc. that may be deemed necessary at his own cost.
- U. CUTTING** - For the lawns the scythe must continue to be used for several months until the grass is sufficiently secure in the ground to bear the mowing machine. The edges shall be kept neat and must be cut regularly with the edging shears.
- V. MANURING & FERTILIZING** - Adequate manure and fertilizers shall be supplied and sprayed at periodic intervals as per the instructions of the Landscape Consultant.
- The lawn shall be fed warm culture manure or castor cack @ 3 kg /Sq. Mt./Year.( In three dose per year).
- Neem based Bio- fertilizers and Bio - pesticides which are environment friendly should be used. Use of Chemical based fertilizers is to be avoided.
- Manure to be used should be organic compost as it is bio - degradable and environment friendly and hence would not pollute the ground water.
- W. REPLACEMENTS** - When the plants are to be replaced either for filling gaps or poor quality, the contractor shall replace within 15 days. For this purpose, extra numbers of plants of those used in the project will have to be maintained in the Nursery.
- X. WEEDING** - The Contractor shall be responsible for maintaining the planted areas free of weeds. He shall employ adequate labour to manually remove the weeds in the planted areas and in the lawn. Weeding has to done for up to 1000mm around the planted areas. In the lawns, weeding has to be done before mowing is done.
- Y. MOWING** - The lawn has to be mowed with the lawn mower to maintain an uniform level of the grass periodically depending on the growth. The Contractor has maintain adequate number of lawn mowers and employ sufficient labour for the same. Electricity and plug points in garden area as per requirement will be provided by the client.

## **9.00 LIST OF DRAWINGS:**

- a) Boundary tree plantation
- b) Shrubs and ground cover plantation –Court yard and road side avenue
- c) Area demarcation drawing.

**TECHNICAL  
SPECIFICATION  
FOR  
IRRIGATION WORKS**

## **1.01 PIPING WORKS**

### **PVC PIPE:-**

- All underground irrigation pipes shall be PVC, conforming to IS 4985:1988 standards for both mainlines and laterals. Makes of pipes shall be as specified in the List of Approved Manufacturers / Makes.
- Pipes shall be made using virgin material and shall be continuously and permanently marked with following information.

Pipes shall be of uniform wall thickness, smooth finish inside and outside shall show no evidence of interior scratches, extrusion marks, blisters, groves or any manufacturing or transit damage.

### **HDPE PIPE:-**

- All underground irrigation pipes shall be HDPE, conforming to IS 4984 standards for both mainlines and laterals. Makes of pipes shall be as specified in the List of Approved Manufacturers / Makes.

Pipes shall be of uniform wall thickness, smooth finish inside and outside shall show no evidence of interior scratches, extrusion marks, blisters, groves or any manufacturing or transit damage.

## **1.02 FITTINGS**

### **[i] PVC FITTINGS**

All PVC fittings shall have a minimum pressure rating of 6Kg/sq.cm working pressure (for the respective PN rating of pipes), confirming to the standards and shall be of the same material as that of the pipes.

All fittings including the threaded ones shall be of injection moulded type.

### **[ii] HDPE FITTINGS**

All HDPE EF fittings shall have a minimum pressure rating of 6Kg/10Kg working pressure (for the respective PN rating of pipes), confirming to the standards and shall be of the same material as that of the pipes.

## **1.03 JOINT CEMENT AND PRIMER**

Solvent cement and primer for PVC pipes shall be as per pipe manufacturer's recommendations.

## **1.04 LANDSCAPE DRIP LINE**

Providing and Fixing Pressure compensating (P.C) Inbuilt Drip line 16mm/12inch/0.9 gph

- Black in colour with two parallel yellow strips, excellent characteristics of LLDPE pipe use in advance technology.
- UV stabilizes
- No environment effect.

### **INLINE / BUTTON DRIPPER**

- 4 / 8 Ltr/hr discharge
- UV stabilizes
- No environment effect.
- Anti – bug cap

### **DRIPLINE FITTINGS**

- 16 mm size Valve, Tee, Bend and all
- UV stabilizes
- No environment effect

## **1.05 POP UP IMPACT DRIVEN ROTORS**

The Sprinkler shall be gear drive Pop up sprinkler (full/part) capable of covering 7 - 15m at 1.7 – 4.5 Bars with a discharge rate of 0.09- 0.53lps. The overall pop-up height shall be 4inch. The sprinkler shall have a pressure-activated wiper seal, screen attached to the drive housing to filter inlet water, 3/4" bottom inlet, tapered riser, standard rubber cover which designates the full-circle sprinkler from the top, as well as designates each adjustment opening from the top, stainless steel retract spring, stainless steel adjusting screw capable of reducing the radius up to 25%. The body of sprinkler shall have a double-wall construction and made of heavy-duty, UV-resistant plastic. The sprinkler shall have 8 interchangeable nozzles having three ports for optimal close-in, mid-range and long range water distribution. The sprinkler shall have 12 interchangeable nozzles: 6 Rain Curtain nozzles for superior close in watering, 3 Low Angle nozzles for reduced radius of throw and superior wind resistance, and 3 radius + nozzles for extra distance.

## **1.06 SWING PIPES**

The Gear Driven Pop Up Sprinklers shall be connected to the service saddle, sitting on the pipe, through 3/4" Pop up Connecting Assembly. The tubing shall be made of polyethylene having wall thickness of 2.3mm, a working pressure of 5.5 kg/cm<sup>2</sup> at 43°C and a surge pressure of 16.6 kg/cm<sup>2</sup>. The fittings shall be made of UV resistant thermo plastic.

## **1.07 QUICK COUPLING VALVES (QCV)**

The quick coupling valves shall be self-closing, spring loaded quick coupling of 1" inlet size made of brass & having self-closing thermoplastic hinged lid. A 1" key for quick coupling hydrant made up of brass must be provided for operating the QCV. Brass Swivel Hose Elbow 1" X 1" should be provided along with MS saddles with GI risers of adequate sizes to allow the QCV arrangement on the pipes.

## **1.08 PVC BALL VALVES**

The ball valves shall be of PVC with Teflon seats having flow indicator when lever is removed. The security pivot should maintain lever in space. The valve shall have a double water tight joint, direct injection stem non mechanical, with a base which permits maximum penetration into the valve.

## **1.09 AIR RELEASE VALVE**

Air release valve shall be double acting type, made of high strength fiber glass reinforced plastic. The Air release valve shall be capable of both releasing and admitting air from and into the line. The working pressure shall be 10 Bars and testing pressure shall be 16 Bars.

## **1.10 VALVE BOXES**

All valve boxes shall be PVC of suitable size with poly vinyl chloride reinforcement and shall have green top cover.

Valve boxes shall be available in both round and rectangular models. Where larger size is required a combination of round and rectangular valve boxes may be used.

## **1.11 FILTRATION SYSTEM**

Providing & Fixing of Automatic self cleaning Disc filter with controller unit of approved make Azud (Spain)/ Yardney (USA)/ VAF (USA), filter has fabricated from polyamide reinforced with fiber glass as per manufacture's specifications with inlet & outlet manifold piping connection, disc element size not more than 100 micron. complete system with inlet & outlet pressure gauge. Element- PP (disc), Temp-60 degree C, Clamp-SS size 63mm inlet 63mm outlet 63mm drainage, PH-4 to 10, connection threaded, power 110V/220V, Flow rate 24 m<sup>3</sup>/hr, feed pressure 2.5-3.0 kg/cm<sup>2</sup> max. pressure 10kg/cm<sup>2</sup>

## **1.12 PUMP STATION**

- A) Pumping system shall have Openwell pump set from Kirloskar or equivalent complete with anti-vibration pad, all necessary G.I./M.S. inlet and delivery manifolds, Brass/GM NRV,

isolation valves, water meter, hydraulic pressure release valve, Pressure switch and pressure tank, Control panel with L & T or Siemens starter and weather proof connectors and box.

- B) Pumps: A 5.0 HP pump with designed discharge and head of 20800 LPH @ 30 m head, fitted with appropriate size accessories such as ARV, PRV, gate valves etc shall be provided at the water source.

#### Non-return valve

1	Nominal sizes	100 / 80mm (4" / 3")
2	Working Pressure	Class 1 - 1.0 Mpa Class 2 - 1.6 Mpa
3	Material	
	Body	a) Brass
	Bonnet or cover	a) Brass
	Stuffing box, disc hinge, Stem, hinge pin and plug	As per BIS specification As per BIS specification

#### SYSTEM AUTOMATION COMPRISES:

##### 1.13 REMOTE CONTROL VALVES (SOLENOID VALVES)

The solenoid valves must be electric remote control valve which shall be normally closed 24VAC 50 cycle solenoid actuated globe pattern design. The valve pressure rating shall not be less than 10.35 bar. The valve body and bonnet shall be constructed of high-impact, weather-resistant PVC with stainless steel screws. The valve shall have manual open/close control (internal bleed) for manual opening and closing of valve without electrically energizing the solenoid, fully-encapsulated one-piece solenoid, a captured plunger with a removable retainer for easy servicing. The valve shall operate with minimum 19.6 VAC at 10.35 bar. The valve must open or close in less than 1 minute at 10.35 bar, and less than 30 seconds at 1.38 bar. The valve construction shall provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

##### 1.14 IRRIGATION CONTROLLER

Providing & Fixing of 50 station Controller expandable to 200 stations. Station timing: 0 min to 12 hrs Seasonal Adjust: 0% to 300% (16 hrs maximum station run time) 4 independent programs; programs can overlap 8 start times per program, Power back-up: Lithium coin-cell battery maintains time and date while nonvolatile memory maintains programs, Multi-valve station capacity: up to 2 solenoid valves per station; simultaneous operation of up to eight solenoids and/or master

##### 1.15 COMMUNICATION WIRES AND SPLICES

The communication cables should be UF cables for direct burial at 1.5' below the ground level. The cables shall be as per the following specs.

#### Technical specs:

Description	:	Single Core, 1.5 sq. mm, direct burial
Voltage Grade	:	650/1100 V
Conductor	:	1 / 1.63 mm Class 1 soft annealed solid bare electrolytic copper conductor confirming to IS : 8130
Insulation	:	Nominal Insulation Thickness: 1.70 mm Insulation Material: PVC Type D as per IS: 5831, suitable for temp. upto 70 degrees C.
Core Identification	:	Cores shall be colour coded generally in Red & Black colours or as per customer's requirement.

#### Electrical Data

**Spark Test : 6000 V AC**

**Conductor**

**Resistance (max.): 8.81 Ohms / Km at 20 degrees C**

**Physical Data:**

**Overall Dia. : 5.05 mm ( $\pm$  0.50 mm.)**

**The cable connections must be done with silica based grease filled insulation splices, for water proofconnections.**