SABLE HILLS
waterfront estate
Sable Hills Pty (Ltd)

HOMEOWNERS ASSOCIATION : IRRIGATION GUIDELINES .

Annexure – " C-2 "

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RECOMMENDED STANDARDS

FIRST EDITION
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1. GENERAL .

1.1 The following Recommended Standards have been drawn up from a pooling of experience gained from many years in the industry and reliable technical sources . They are formulated as a safeguard to ensure efficient and trouble free systems . The inclusion of each item has been carefully assessed and only used where it has been proved that it's exclusion in the past has resulted in a drop in quality.

1.2 It is appreciated that with the advancement in technology and the appearance of new innovative equipment, additions and amendments will be needed, and when indicated, revised editions of these "Recommended Standards" will be issued.

1.3 An important aspect in the industry is that all participants use a universal terminology - both written and verbal and to this end a complete set of terms in common practice in the irrigation field together with their accepted abbreviations has been included.

2. IMPLEMENTATION OF STANDARDS.

Members of the LIA are required to ensure that all installations and services are carried out in accordance with these standards, subject to the following proviso's:

2.1 NEW INSTALATIONS

These standards shall be deemed to apply as the minimum requirements, unless approved variations have been agreed to in advance, in writing, by all parties concerned.

2.2 EXISTING INSTALLATIONS

Installations prior to June 1991 may remain as installed if not under dispute. Should any repairs or extensions take place, this work shall be deemed to be done in accordance with these standards, unless approved variations have been agreed to in advance, in writing, by all parties concerned.

2.3 APPROVED VARIATIONS

Where compliance of these standards are impractical any variations shall be agreed to, in writing, by all parties concerned,

2.4 DISPUTES

In the event of a dispute where agreement is not possible between parties concerned, it is agreed to accept the findings of an arbitration committee appointed by the LIA who will assess the problem on a facts found basis, with no redress whatsoever, financial or otherwise to the LIA.

3. TERMINOLOGY.

3.1 HYDRAULIC DATA

3.1.1 Volume

Amount of water in a container or that required by plants, expressed as :

ℓ = Litres
m^3 = Cubic Metre or 1000 litres

3.1.2 Mass
Weight of the volume of water in a container, expressed as:

Kg = Kilogram

3.1.3 Flow
Amount of water passing through a pipeline, sprinkler or emitter, as expressed as:

ℓ/s = Litre per second
ℓ/m = Litre per minute
ℓ/h = Litre per hour
m^3/h = Cubic Metre per hour or 1000 litres per hour

3.1.4 Velocity
Rate of water passing through a pipeline, expressed as:

m/sec = Metre per second.

3.1.5 Pressure
Amount of energy exerted by water in a container, pipeline or sprinkler, expressed as:

Bar = Bar
M h = Metre Head

3.1.6 Static Pressure
Pressure under no flow condition. (Being that for maximum pressure rating of equipment).

3.1.7 Working Pressure
Pressure under a flow condition. (Being that available to operate irrigation equipment).

3.1.8 Surge Pressure
Pressure generated by flow shut down. (Being that to be avoided by optimum pipe velocity and shut down procedure).

3.1.9 Friction
Resistance caused by flow in pipeline, fittings, valves, sprinklers etc., expressed as:

m h = Metre Head

3.2 SYSTEM DATA

3.2.1 Water Application
Volume of water applied to an area, expressed as:

mm/ha = Millimetres per hectare

3.2.2 Gross Precipitation Rate

The rate at which water is applied by an irrigation system without evaporation losses, expressed as:

mm/hr = Millimetres per hour

3.2.3 Coefficient of Uniformity

The uniformity of a sprinklers water distribution, expressed as:

% CU = Percentage Coefficient of Uniformity

3.2.4 Efficiency

A measure of effectiveness, expressed as:

% Eff = Percent Efficiency

3.2.5 Power

The energy required by an electric motor or engine to drive a pump, as expressed as:

KW = Kilowatt

3.2.6 Electricity

A source of energy associated with power, expressed as:

V = Volts
W = Watts
A = Amps
VDC = Volts direct current
VAC = Volts alternating current
50 HZ = 50 Cycle
1 PH = Single Phase
3 PH = Three Phase

3.3 DIMENSIONAL DATA

3.3.1 Measurement

Distance, size of plans, pipes, valves, spacing of sprinklers and emitters, expressed as:

m = Metre
mm = Millimetre

3.3.2 Area

The size of land, expressed as:

m^2 = Square Metre
ha = Hectare

3.3.3 Sprinkler Spacing

The distance between sprinklers and rows, expressed as:

S x L = Sprinkler Spacing x Row Spacing.

4. TECHNICAL DATA.

4.1 FORMULA

4.1.1 Gross Application Rate

(S = Sprinkler Spacing, L = Row Spacing)

$$\text{mm/hr} = \frac{\ell/s \times 3600}{S \times L \text{ (m Spacing)}}$$

$$\text{mm/hr} = \frac{m^3/h \times 1000}{S \times L \text{ (m Spacing)}}$$

4.1.2 Power

$$KW = \frac{\ell/s \times m\ h}{\%\ Eff \times 1.02}$$

$$KW = \frac{m^3/h \times m\ h}{\%\ Eff \times 3.7}$$

4.1.3 Electricity

1 PHASE	3 PHASE
$V = \frac{W}{A}$	$V = \frac{W}{A \times 1.73 \times 0.8}$
$A = \frac{W}{V}$	$A = \frac{W}{V \times 1.73 \times 0.8}$
$W = V \times A$	$W = V \times A \times 1.73 \times 0.8$

5. GENERAL DESIGN PARAMETERS

5.1 A system shall be capable of a gross application per week to suit the needs of the planted material and ground condition, and this gross application shall be clearly stated in millimetres per week of equivalent rainfall as also the total time in hours per week required for it's achievement.

5.2 The duration of a watering cycle shall be clearly stated for each station giving the time in minutes per station it shall run, the precipitation which shall result in millimetres per hour, and the number of times the cycle should operate per day and be repeated in a week.

5.3 Sprinklers having dissimilar rates of precipitation shall not be included on the same station.

5.4 The size and location of a spray line shall where ever possible ensure watering compatibility with the area concerned, so as to avoid heavy rates of precipitation on steep slopes which could cause wash away, or very light watering in hot and sandy soil situations , where little water reaches the plants.

5.5 When the water supply is from a municipal feed, the piping connecting from this feed to the sprinkler valves shall be of a class specified by the municipal authority or HOA , or if not specified , of a class in excess of the highest closed valve pressure.

5.6 Rules and regulations as laid down by local authorities or HOA must be applied.

6. PIPEWORK AND TRENCHES.

6.1 TRENCHES

6.1.1 All piping under 75mm dia shall be installed such that they have a minimum soil cover of 500mm below the finished grade. For pipe diameters above 75mm and cabling it is desirable that this depth be increased to a minimum of 750mm cover.

6.1.2 If rock or other adverse conditions preclude the installation at the prescribed depth the clients permission must be obtained for burial at a shallower depth and adequate protection shall be given to piping and cabling.

6.1.3 Trenches shall be properly back filled and compacted to prevent subsidence, and backfill surrounding the pipe and/or cable shall be free of rock or sharp objects .

6.2 PIPING

6.2.1 Only piping from approved manufacturers with a guaranteed pressure rating and the SABS mark , shall be used.

6.2.2 All piping shall be installed according to manufacturers specifications.

6.2.3 Piping shall not at any time under working conditions be subjected to pressures in excess of the pressure rating.

6.2.4 Adequate thrust blocks shall be cast at all bends, tees and end caps on PVC and Fibre Cement pipelines.

6.2.5 Expansion joints shall be installed at intervals as recommended by pipe manufacturer.

6.2.6 Only approved fittings shall be used.

6.2.7 Only piping and fittings made from a material suitable to the site soil conditions shall be used. (P.H. etc.)

7. SPRINKLERS AND SPRINKLER SPACING.

7.1 SPRINKLERS

7.1.1 The sprinklers shall be selected to operate only within the manufacturers pressure range.

7.1.2 Only sprinklers having a compatible rate of precipitation shall be used on the same spray line.

7.1.3 Pop-up sprinklers shall be installed on swing joint risers or flexible risers – so a to allow for adjustment to cope with turf build up.

7.1.4 Shrub sprinklers shall be mounted on rigid risers of galvanized steel or ultra violet resistant plastic.

7.1.5 Shrub risers shall be positioned such, as not to create a hazard or be prone to damage. In particular risers shall not be used on kerb edges where they are liable to be damaged by parked car overhangs.

7.1.6 Sprinklers that are not provided with low head drainage valves shall be surrounded with adequate drainage material to allow the sprinklers to drain freely and to circumvent the effects of low head drainage.

7.2 SPACING

7.2.1 In the case of square, rectangular and inline spacing of sprinklers the distance between sprinklers shall not exceed 50% of the diameter of coverage. In triangular pattern the spacing shall not exceed 55%. These figures are given as a general norm and may be superceded by the manufacturers recommended spacing.

7.2.2 Spacing should be de-rated according to persistent wind conditions.

7.2.3 In the case of triangular spacing the aim is to achieve an equilateral triangle and not a triangle with apex height equal to base length. The apex height would be 0,866 times the base length.

7.3 SPRAY LINES

7.3.1 Spray line pipe sizing shall not exceed 20% pressure variance between the first and last sprinklers on the line.

8. VALVES

8.1 No solenoid valve or valve in head sprinkler shall be used for a pressure or capacity in excess of the manufacturers recommendation. In the interest of energy efficiency the pressure loss across a solenoid valve shall not exceed 15% of the sprinkler operating pressure unless it is specifically designed as a pressure reducing valve and in such case it shall be so stated.

8.2 Pressure reducing valves shall be installed where excessive line pressure occur.

8.3 All systems connected to a potable water system shall be fitted with an easily accessible isolation valve.

8.4 Sufficient isolating valves and scour valves , where necessary , shall be fitted so as to permit maintenance of the control valve without having to drain the whole system.

8.5 Air release valves shall be fitted to all systems where air accumulation could occur.

8.6 Valves installed underground shall be housed in valve boxes.

9. PUMPS AND MOTORS

9.1 GENERAL

9.1.1 Pumps shall be selected to provide a capacity of 10% in excess of the design flow and be able to cope with the additional friction and pressure involved in this increase. Selections must be within the manufacturers recommended operating limits.

9.1.2 Motors shall be protected with an approved starter with over loads, set to trip at full load.

9.1.3 Unions or break joints shall be fitted on both suction and delivery pipes , so as to be able to remove the pumping unit for servicing without having to cut piping.

9.1.4 An isolating valve shall be fitted on a pump suction and/or delivery piping where flooding can occur.

9.1.5 All pumps set above a water source shall have a foot valve installed on the suction line and be fitted with a priming device.

9.1.6 All positive displacement pumps shall be fitted with a pressure relief valve, of adequate size, between the pump and the delivery isolating valve.

9.1.7 All bore hole pump installations are to conform with the specifications as laid down by the Bore hole Water Association.

9.1.8 All pumps must be fitted with adequate protection devices to prevent running dry.

9.2 WATER SUPPLY

9.2.1 It is the responsibility of the designer and / or contractor to establish if the required water capacity and quality is suitable for the system.

9.2.2 If water is to be stored, to make up required capacity, the storage shall be adequate for the flow period.

9.3 WATER STRAINING

9.3.1 A strainer shall be fitted to all suction intakes, and sized to prevent blocking of pump components.

9.3.2 Where fine nozzles are being used and water conditions warrants, a cleanable filter of adequate size shall be installed on the mainline inlet of a system. The recommended grade of the filter may be selected from the following:

a) Sprinklers 30% of the smallest nozzle area.
b) Micro-Sprayers 20% of the smallest nozzle area.
c) Drippers 10% of the dripper path area.

10. ELECTRICAL.

10.1 All electrical work is to comply with local municipal codes.

10.2 All cable joints shall be waterproof.

10.3 Cable selections shall ensure that the voltage available at a solenoid shall not be less than 90% of the solenoid rating.

10.4 All low voltage control cables shall be installed to a depth of not less than 500mm to minimize damage and preferably where possible in the same trenches as the pipe work , so as to present no extra hazard.

10.5 Sprinkler controllers shall be installed according to manufacturers recommendations. If in themselves they are not waterproof they shall either be sited indoors or affixed in a waterproof casing. If not already equipped they shall have surge protection fitted.

11. WARRANTY.

11.1 The terms and conditions of the warranty or guarantee shall be clearly stated and shall not be for less than 12 months from the date of hand over of the completed plant – or in the case of large systems, for each section, from the date of hand over of the section.

11.2 Warranties and / or guarantees on materials of irrigation equipment from suppliers shall be passed on to the client and shall be clearly stated.

11.3 It is recommended that, for the clients safety, adequate safeguards in the form of insurance in respect of public liability, product liability and all forms of indemnity be taken out, these all being commensurate with the magnitude of the involved contract.

12. AS BUILT DRAWING.

12.1 An as-built drawing to scale 1:50 shall be provided upon handing over of the system.

12.2 The drawings must clearly indicate:

a) The position of sprinklers, their model and make.
b) The groups of sprinklers which operated simultaneously.
c) The position, sizes and classes of piping and wiring.
d) The position and class of the main line clearly distinguishable from the spray line piping.
e) The position and size and make of all isolation valves.
f) The position, size and make of all control valves.
g) The position, model make and size of pump if any.

Signed at …….. on the …… day of …….…… 200….

…….. ……
Owner / Client : Contractor :