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SECTION 14 – IRRIGATION (DESIGN AND CONSTRUCTION)

14.1 GENERAL

The Tenderer shall enclose as part of the tender submission full details of the design in AutoCAD format.

The details shall include the following-

- (a) A schematic drawing of the system to scale
- (b) A description of all pop-up sprays heads, pipework, valves, the control panel selected for use, conduit locations under paved areas, control wiring and power connection, the location of at least 2 No taps for hand watering in the event of the system not operating.

The irrigation design should at all times follow and satisfy the performance standards in this section of the specifications.

Tenders are advised and expected to arrange an appointment to visit the site before tendering and ascertain for themselves the actual extent of the work required, the nature thereof and any difficulties. An appointment shall be made through the Head Contractor. The Principal will not accept any claim whatsoever on account of failure to do so.

The Contractor shall determine the actual (not advised) available water supply pressure and flow, and design a fully automatic underground sprinkler system to service all turf areas and garden beds designated on the project drawings. The Contractor shall determine the location and the extent of works required to connect the proposed irrigation system into the existing Water Main.

Refer to Landscape Drawing for the location of Irrigation Conduits. It should be noted that all garden beds and grass areas shall be irrigated. The Contractor shall allow for all conduits between these areas to allow irrigation to reach these areas.

All materials incorporated in this system shall be new and without defects in quality. All excess materials upon completion of the contract area are the property of the Contractor and shall be removed from the site.

The Contractor shall accept responsibility of the proper performance of the system. If, after installation, the system fails to deliver the quantity or coverage of water necessary, the Contractor shall adjust or alter the system to achieve it. No payment shall be made for alterations or adjustments unless the causes are due to unforeseen circumstances, beyond the Contractor's control.

The Contractor shall allow for two manually operated water points on this site in accordance with this Specification.

14.2 EXTENT OF WORKS

The extent of this Contract includes construction of all work necessary for the proper completion and testing of works shown or implied in the Approved Drawings and this Performance Specification.

Where irrigation works are continuous with existing works, the Contractor is responsible for making the proper junction between the two sections and for making good any damages caused to adjoining works.

14.3 INTERPRETATION OF THE DOCUMENTS

The Contractor shall check the documents and verify all areas, dimensions and specified materials, before commencing work or ordering materials. Any discrepancies in the documents shall be identified immediately for clarification by the Superintendent. No claim for extras arising from failure to obtain measurements or other required information on site will be allowed.

14.4 DESIGN DRAWINGS

The general design of pipework, wiring and equipment shall be in accordance with the Australian Standards and all valve boxes shall be located as shown.

14.5 CODES, STANDARDS, PERMITS AND REGULATIONS

All work shall comply with relevant codes, Australian Standards, Permit requirements and Regulations currently in operation.

14.6 COORDINATION

It is the sole responsibility of the Contractor to be fully informed of the location of services and to make the necessary provisions, and coordinate with other trades.

Allow for ample time to investigate and coordinate the work to ensure the full scope of the work is understood, and that services do not clash.

The Contractor shall be held responsible for the cost of making good any damage to existing services and mains, whether or not they are shown on the Drawings.

The Contractor shall be responsible for damage to all property occasioned by activities resulting from the works associated with this Contract.

Alteration of works due to inadequate coordination shall not be deemed a variation.

14.7 AUTOMATIC SPRINKLER SYSTEM

i) General

The system shall be designed to deliver the volume of water required to completely irrigate the areas designated at a rate of 5mm per day for garden beds and 10mm per day for lawn areas on the basis that this quantity is delivered within a 6-hour overnight period.

Due allowance shall be made for fluctuating pressure, particularly during periods of hot weather.

Sprinkler Spacing Patterns- Sprinkler Overlap. Subject to the sprinkler pattern chosen, the maximum spacing shall be that recommended by the manufacturer for a wind velocity of 0-6kph, provided that the wetted diameter is 100%.

Sprinkler Type. The design shall be based on the use of pop up sprays. 300mm pop-ups shall be used in garden beds.

Controller. The sprinklers shall be activated by electrically controlled solenoid valves, wired to an approved automatic controller located as specified.

Stop Valve. A manual stop valve or isolating gate valve shall be placed at the upstream end of the proposed supply line. It shall be set below ground and housed in a lockable plastic moulded casing.

Solenoid Valves. Solenoid valves shall have adjustable flow control and be rated to 1400 kPa. Valves shall be fitted below ground in approved valve boxes.

Backflow Preventer. Install RPZD double check valves in the locations shown on the drawings (tapping points) to relevant Standards and Regulations. Provide a wire strainer prior to the valve and positive seating check valves on both the up and down stream sides.

Overspray. Overspray onto buildings and pavements shall be kept to an absolute minimum. Sprinklers, particularly in gardens, shall spray away from any buildings.

Conduits. Conduits shall be laid by others under hard paved areas for irrigation pipework and electrical conduits to be passed through.

ii) Materials

a) Sprinklers and Valves

All sprinklers, spray heads and valves shall be constructed of either cast bronze, brass, stainless steel or durable plastic or a combination of these materials.

Where indicated on the Drawings, covers of sprinkler heads shall be no greater than 80mm in diameter and constructed of a rubberised or other suitable material to prevent injury to persons.

Pop-Up Sprinkler heads shall only rise out of their housings under mains pressure or by use of a special tool for inspection, maintenance or adjustment purposes, and shall be of pressure regulating type, PSAM PRS (pressure regulating stem). All sprinklers shall be fitted with anti -drain valves.

All sprinkler heads shall be as vandal resistant as practicable. Sprinkler heads shall be as specified.

b) Pipework

PVC class 12 pressure pipe and fittings shall be used throughout the contract. All joints shall be solvent welded, unless otherwise specified. All pipes, fittings, solvent and cements shall conform to the appropriate codes.

c) Risers

All risers shall be constructed using articulated joints, to minimise the risk of accidental breakage or leakage.

d) Electrical Wiring

The electrical wiring from the control panel to the solenoid valves shall be sized according to the manufacturer's specifications.

Wire connections to valves, and buried joints, shall be made by means of an approved wire connector - sealing cement system, e.g. "Gel-tite".

All wiring shall be taped to the underside of the PVC pipe or housed in a separate conduit laid beside the PVC pipe. All above ground wiring shall be run in electrical conduit with appropriate tees and elbows as required.

The location of the GPO for the controller should be confirmed by the Contractor.

e) Valve Boxes

All valves shall be located in durable, lockable, valve boxes with free draining material below the pipework, i.e. gravel. All valve box locations shall conform to the designated valve schedule, shown on the drawings.

Valve boxes shall be of lockable non-metal construction.

f) Electrical Conduit

Above ground wiring shall be installed in electrical conduit and suitably supported with brackets as specified to conform to the appropriate codes.

g) Copper Tube

Exposed copper tube and installations below paving shall be of Type 'A' and sized accordingly to the design requirements. Copper tube installed elsewhere shall be of Type 'B' and sized according to the design requirements.

h) Control Panel (to be confirmed by Frankston City Council)

The control panel shall be as specified housed in a metal lockable cabinet where specified. The location of the control panel should be confirmed by the Contractor and approved by the Superintendent. The GPO shall be located inside the lockable cabinet.

The control panel shall have the following features: -

- A 24-hour clock (with provision for starts at any hour).
- A 7 day calendar (with provision for starts on any day)
- Independent timing for each station.
- Adjustable station timing.
- Manual over-ride control (to allow operation of any station at any time).
- Multiple program capacity
- Capabilities to include remote site controlling and moisture sensing.

14.8 INSTALLATION

(i) General

Supply, install, test and commission the irrigation system to the requirements of the relevant provisions of AS3500 and those of the manufacturer's requirements.

(ii) Excavation and Backfilling

All pipeline trenches shall be excavated in straight lines to a depth of 450mm. Pipelines traversing existing paved areas shall be thrust bored, if directed by the Superintendent at no additional cost to the Principal. Pipework under slabs shall be constructed as one annealed length where possible.

All perishable material, foreign matter, and stone greater than 50mm in size shall be removed from the excavated material and dumped off site. Under no circumstances shall such material be used for backfilling of trenches.

Following pipe and cable laying, trenches shall be backfilled in 150mm layers and compacted to a density exceeding 95% of Australian Standard Compaction. Trenches shall be topped off with a 25mm high crown, to allow for consolidation.

Where excavation is required through established lawn areas the Contractor shall carefully remove the turf for a width of 500mm to a depth of 50mm over the length of trenching and store in a shaded area (regularly watered) for reuse during reinstatement of trenches. Alternatively the Contractor may elect to supply and lay pre-grown turf when reinstating trenches.

(iii) Approval of Works

The Contractor shall give sufficient notice so that inspection may be made at the following stages:

- Set-out of works.
- Trenching and excavation, ready for pipe laying.
- Works ready for testing.
- Practical Completion - covered works.
- Final completion.

(iv) Existing Services

Carry out necessary alterations to existing services. Obtain approval before interruption of an existing service. Keep number and time of interruption to a minimum and submit a program before starting the works.

(v) Pipework, Fittings, Sprinkler Heads and Inspection

The Superintendent shall inspect all work prior to backfilling. The Contractor shall ensure that the risers are maintained in position during backfilling.

The sprinkler heads shall be 10mm above the surrounding finished surface level, until grass is established. When advised by the Superintendent that the grass has been established, the sprinkler heads shall be reset flush with the surrounding finished surface level.

A 300mm x 300mm turf sod of relevant species shall be placed around each sprinkler head at sowing time to prevent erosion and washing of sown areas.

14.9 CLEAN UP

All disturbed or damaged areas are to be satisfactorily reinstated prior to the issue of a Certificate of Practical Completion.

14.10 TESTING

Following completion of installation the Contractor shall arrange for a full test of the system in the presence of the Superintendent or his nominated representative. In addition a nominated council officer shall be fully briefed on the operating procedures of the system and two sets of written instructions for the operation and maintenance of the entire system are to be provided to the Superintendent.

Satisfactory completion of the works shall include the satisfactory operation of all equipment and the satisfactory coverage of all areas shown on the plan to be watered.

14.11 MAINTENANCE & ESTABLISHMENT PERIOD

The Contractor shall establish the irrigation works for a period of twelve (12) months, following the date of issue of the Certificate of Practical Completion by the Superintendent.

The irrigation establishment shall include a quarterly review of the system's performance in the presence of a nominated grounds person.

Establishment shall include rectifying any defects that become apparent in the works or system operation under normal use, correction of any faults and adjustments as required to the control panel and programming. Any soil subsidence or erosion which may occur after backfilling of trenches and preparation operations shall be made good at the Contractors expense on a monthly basis or as directed by the Superintendent.

All maintenance shall be provided as required to ensure that manufacturers' requirements are not breached. Contracts with specialist maintenance companies for specialist installations are to be set-up as required.

The Contractor must allow for supply of materials from any available source to enable completion within the specified time. No cost adjustment will be made for the use of imported materials if the Contractor finds it necessary to augment or replace local supplies with imported material.

During the establishment period, the Contractor shall maintain the system in a clean and proper working order, to the satisfaction of the Superintendent. The Contractor shall undertake regular inspections of the system during operating periods, at least weekly (November to April) and monthly (May to October), to ensure proper operation. All minor faults or adjustments shall be rectified within 24 hours of notification. All major faults (e.g. a valve which fails to cut-out, causing flooding of property) shall be rectified immediately upon notification.

The Contractor shall show evidence of local contacts to carry out high priority or emergency works for the duration of the contract period.

14.12 WARRANTIES

The Contractor shall furnish to the Principal written warranties which guarantee against defects in materials, workmanship and performance for periods stated below commencing at the date of Practical Completion.

The Warranties shall obligate the Contractor, after each and every notification of the appearance of defects, to take all necessary action promptly to rectify the defects and to restore to a condition equivalent to the standard required under the Contract.

Warranties for a twelve month period are required for the control panel, solenoid valves and sprinklers and any other associated equipment (eg check valves).