waterscapes Ltd

WATER FEATURE & IRRIGATION SPECIALISTS

# Belgrove House

PROPOSED

LANDSCAPE IRRIGATION SYSTEM

# SPECIFICATION

Document No. WSL3209-SP1 P01

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## Revision History

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| Revision P01 – 24th November 2022 | First Issue |
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## Contents

# TENDER DOCUMENTATION

## 1.0 Requirements & Outline of Works

### 1.1 Scope of Works

The irrigation system shall be installed wherever possible in accordance with the guidelines previously set out by the British Turf & Landscape Irrigation Association (BTLIA).

The selected Irrigation Contractor is to:-

i. To supply, install, test and commission a new irrigation system as generally detailed to the site known as Belgrove House, based upon this specification, and the drawings listed within.

ii. The Irrigation Contractor is to ensure that they can fulfil the requirements as stated in this document; submission of tender deems this to be the case. No allowance will be made for claims due to failure to examine the enclosed specification.

iii. Where necessary the Irrigation Contractor shall design specific elements and acknowledge responsibility for these items e.g. solenoid valve assemblies and pump station.

iv. The Irrigation Contractor will be required to enter into a formal written contractual agreement with the Landscaping trade contractor based upon this specification and drawings.

v. Ensure that the irrigation system satisfies the requirements of the BREEAM Wat 04 credit and LEED requirements.

The Irrigation Contractor shall state the priced equipment manufacturers within their submission.

The Irrigation Contractor shall satisfy themselves as to the completeness of the specification / design. It shall be the Irrigation Contractors responsibility to check material volumes /

lengths prior to submission of the tender. Submission of the tender document shall be confirmation of this.

## 1.2 Design Brief

Areas to be irrigated have been identified on the drawings listed within the specification.

The system has been designed to supply the following application rates:

Shrubs: at a peak application rate of approx. 4mm/mtr² per day

Trees: at a peak application rate of approx 25 – 60 ltrs/tree per day

Final run times / application rates shall be commensurate with seasonal weather.

No changes to the plan or material selection may be made unless the Irrigation Contractor has the written approval of the Designer.

## 1.3 General Conditions

### 1.3.1 Changes

No changes in either plans or specification shall be made by the Irrigation Contractor without the written approval of the Designer.

### 1.3.2 Additional Work

Should additional work involve additional plant / manpower not previously included, these shall be provided at an agreed rate, made in writing and accepted by the Main Contractor, prior to the commencement of the additional works.

### 1.3.3 Storage

The Irrigation Contractor shall be responsible for the safe storage of all materials and for the safe handling of these materials until the completion of the project.

The Irrigation Contractor shall also be responsible for the removal / disposal of all packaging / boxing / pipe cuttings, etc. at the end of each day to the site skips unless otherwise agreed.

### 1.3.4 Warranty

Warranty terms shall be indicated by the Irrigation Contractor. A standard minimum of 12 months from handover will be required.

This warranty will be applicable to component failure through improper installation, faulty workmanship or general component failure due to a manufacturing defect.

The Irrigation Contractor is not liable to effect the repair if it is found that the fault is due to negligence or improper use by the Main Contractor or indeed acts of vandalism / misuse by a third party.

### 1.3.5 Damage

Should irrigation works be damaged by persons other than the Irrigation Contractor, then the repair shall be made by the Irrigation Contractor after agreeing a cost and obtaining an instruction in writing from the Main Contractor.

### 1.3.6 Other Services

The Main Contractor is responsible for the identification of all underground / above ground services.

### 1.3.7 Site Supervisor

Throughout the duration of the contract, the Irrigation Contractor will supply a competent supervisor as required to ensure that all aspects of the contract are handled in a professional manner.

### 1.3.8 Contracts Manager

Throughout the duration of the contract, the Irrigation Contractor will supply a competent contracts manager as required to oversee and liaise with the main contractor on all contract issues. The contracts manager will be required to attend regular progress meetings as necessary. The contracts manager will be expected to provide all relevant health and safety paperwork, program of works and interim payment applications.

### 1.3.9 Other Legislation

Local /national byelaws / codes of practice will override any section of the enclosed specification with regard to abiding by legislation and law.

### 1.3.10 Insurances

The Irrigation Contractor and his employees shall be covered by suitable policies including public, employers and product liability (£10 million each), contract works (min £500,000) and professional indemnity insurance (£5 million any one occurrence).

The Main Contractor or the Designer hold no responsibility for losses or damage that occur to property or persons as a result of the Irrigation Contractor's operations in carrying out the contract.

The Irrigation Contractor shall provide the Main Contractor with written evidence of all requested insurances and liability insurances. Insurance of equipment on site remains the responsibility of the Irrigation Contractor until handover.

It is the Irrigation Contractor's responsibility to indemnify against all damages received or sustained by persons as a result of undertaking the works through negligence, consequence, improper management, ground conditions, weather, neglect or defective materials.

The Irrigation Contractor shall be liable for all costs arising out of claims or actions which may be brought against the Designer or Main Contractor by the above.

### 1.3.11 Validity

The tender shall be valid for a period of 60 days from the date of submission.

### 1.3.12 Operations & Maintenance Manuals

The Irrigation Contractor shall supply the Main Contractor with draft O & M Manuals at the time of final inspection / handover.

Final O&M manual documents shall be issued in an electronic format within 3 weeks of the date of the handover certificate.

This is in addition to all the training required by the Main Contractor to ensure a safe and understanding knowledge of the as installed irrigation system. Training shall be undertaken both prior to and after handover, until the Main Contractor is satisfied.

### 1.3.13 Handover / Final Inspection

Handover date shall be the date when the project is deemed to be completed to the satisfaction of the Main Contractor and Designer and all instructions for the operation and maintenance of the system have been provided.

Final system inspection will involve the proof and witness of station operation, pump operation and control system operation.

Subject to the correct operation of the system and, if necessary, subsequent repair of failures, the system shall be approved as satisfactory by the Main Contractor. The irrigation contractor shall produce a formal handover certificate for signing by the main contractor and irrigation contractor. This may be conditional upon the completion of a snag list.

Corrections / repairs to the system will be done by the Irrigation Contractor within an agreed time scale.

The supply of record drawings shall be within 3 weeks of the date on the handover certificate.

### 1.3.14 Marking Out / Pipe Routes

The Irrigation Contractor shall be responsible for the marking out of the system (emitter equipment and pipe positioning), unless otherwise indicated by the Main Contractor.

Pipe routing shall be generally as per irrigation plans. The Main Contractor reserves the right to change the route if required. Any changes may affect the price, if prices are affected these shall be agreed in writing prior to the work being undertaken.

It is the responsibility of the irrigation contractor to check with the designer any changes in pipe routing to ensure the hydraulic integrity of the design is not compromised.

### 1.3.15 Payments

The successful contractor shall agree terms with the main contractor / client.

These shall be submitted at periods to be agreed.

### 1.3.16 Tenders

The Main Contractor is not bound to accept the lowest price offered and reserves the right to negotiate after receipt of the offers.

### 1.3.17 Site Cleanliness

At all times it is the Irrigation Contractor's responsibility to ensure that the site remains clear of his debris and rubbish. He shall remove his offices, machinery, surplus materials, etc. within an agreed period following handover.

### 1.3.18 Programme of Works

The irrigation contractor shall liaise with the main contractor to fit in with the main program of works. It is anticipated that multiple visits will be required to carry out the installation.

# 2.0 Services / Requirements

## 2.1 Electrical Supply

The electricity supply is not the responsibility of the Irrigation Contractor. A suitable supply shall generally be provided at the proposed electrical equipment positions for connection into by the Irrigation Contractor unless otherwise agreed.

The Irrigation Contractor shall carry out all necessary electrical installations to current IEE regulations and shall be NIC EIC registered for pump installations and issue certificates certifying all works completed.

- Irrigation Booster Set – Variable speed
  - Voltage - 400V 3Ph 50Hz/N/E
  - Motor Size – 1.5 kW

- UV Treatment Unit –
  - Voltage - 240V 1Ph 50Hz
  - 5 Amp Fused Spur

- Electronic Water Conditioner –
  - Voltage - 240V 1Ph 50Hz – 3 Amp

- Irrigation Control System –
  - Voltage - 240V 1Ph 50Hz – 5 Amp

## 2.2 Water Supply

The water supply is not the responsibility of the Irrigation Contractor. A suitable supply shall generally be provided within the plant room for connection into by the Irrigation Contractor (unless otherwise agreed).

The Mains Water Supply shall have Min flow 0.8l/s @ min pressure 1 bar, max pressure 4 bar regulated terminating within a BSP threaded isolation valve, this shall be the responsibility of others.

## 2.3 Drainage

A Trapped bunded floor gully in plant room for tank drain down and filtration backwash shall be provided and sized by main contractor to suit.

## 2.4 Plant Room

The irrigation system will require a suitable plantroom located within the basement of the development. The irrigation plantroom shall be sufficient to house the irrigation water storage tank, irrigation pumpset and associated equipment.

The plant room shall be no less than 3.5m x 3m with a height of no less than 2.5m.

Lighting, ventilation, fire alarms systems etc. are by others.

All builders' works within the plant room shall be by the main contractor.

All fire stopping within the plant room shall be by the main contractor.

## 2.5 LAN Connection

The LAN connection is not the responsibility of the Irrigation Contractor. A suitable connection shall be provided at the proposed irrigation controller position for connection into by the Irrigation Contractor unless otherwise agreed.

The irrigation system requires a RJ-45 port with a LAN network connection and a static IP address.

## 2.6 Testing / Commissioning

It shall be the Irrigation Contractor's responsibility to test and commission the system as work progresses. The provision of equipment necessary to test the system is the responsibility of the Irrigation Contractor.

Pressure testing shall be carried out after backfilling / installation; sections of the mains / lateral pipework; pipe will be tested for leaks and static pressure loss.

Drip emitters and valves shall be operated for at least 10 minutes during the testing period to ensure correct positioning, pressure continuity and operating pressure. The Main Contractor reserves the right to randomly check the pressures prior to acceptance.

Any repairs or leaks shall be made good by the Irrigation Contractor at his expense prior to handover.

## 2.7 Internal Pipework and Signal Cable

Pipework and signal cable within the building – from the irrigation plant room to the connection points location to each planted area is the responsibility of others.

Two separate supplies leave the irrigation plant room –

- Supply 1 – Feeds to levels 6-9 façade planting (Fertiliser dosed supply)
- Supply 2 – Feeds to levels 1,2,3,4,5 and 10

Internal pipework sizes shall be confirmed by the irrigation consultant based on their final flow rates. This pipework is not expected to be greater than 35mm.

The signal cable shall generally follow the path of the pipework and shall consist of a 2 core 2.5mm screened cable.

## 3.0 Material Specification

The Irrigation Contractor shall supply and install all materials necessary, as well as all necessary sundry materials required for the full installation of the system.

All materials used by the Irrigation Contractor shall be new, unused and in line with the below specification. The landscape trade contractor shall have the right to inspect the materials used at any time.

Substitution of any parts specified within the material specification is not permitted, unless in written agreement with the landscape trade contractor or Designer. It is the Irrigation Contractor's responsibility to include all necessary sundry fittings and to check all material quantities.

Should the Irrigation Contractor at any time have failed to meet the requirements set out by the Designer, he shall either re-install the equipment or replace and re-install the equipment at his own cost. This includes improper drip line staking and sprinkler spacing.

The Irrigation Contractor shall make available his work for regular inspection. The passing of the work by the principle Contractor, or the Designer shall not be acceptance of the standards.

The Designer does not accept liability for faulty installation / poor workmanship on behalf of the Irrigation Contractor.

Any work that fails to meet an acceptable standard within the installation warranty period will be re-done.

## 3.1 Water Storage Tank

Water for the proposed irrigation system shall be stored within a 3,000 litre externally flanged water storage tank approx. 2m x 1m x 1.5m located within the irrigation plant room.

The Irrigation Contractor shall include all necessary sundry fittings to allow infill of tank from mains water supply and for suction from the tank via the pump station (the Irrigation Contractor shall include all necessary drawings).

The Irrigation Contractor shall ensure the tank complies with water regulations and includes an AB air gap arrangement and spill over weir.

Water storage tank steels, base works and tank erection shall be by the Irrigation Contractor and be exactly as per manufacturer's instructions including if / where necessary bylaws and codes of practice.

## 3.2 Water Level Sensing Equipment

Selected level indication / measurement equipment shall be suitable for the type of tank and water quality. The Irrigation Contractor should ensure that the equipment does not interfere or inhibit any associated or localised other system.

Main water supply shall be controlled via level probes installed within the tank by the irrigation contractor.

In all cases the Irrigation Contractor shall ensure that all equipment and installation techniques are in compliance with all relevant local & national standards / codes of practice and within the manufacturers recommended tolerances / specifications for usage / material.

## 3.3 Pumping Station

The pump station shall feature a vertical multistage centrifugal pump controlled by variable frequency drive.

The station shall be built by a specialist pump station manufacturer. All necessary items to effect a complete and operational pumping station shall be included -

- A vertical inline WRAS approved hydraulic accumulator
- Pressure transducer connection
- Drain valve.
- A Control Panel fully wired and tested in full compliance with the latest edition of the wiring regulations
- Storage tank high and low level monitoring facility
- Outputs to connect to the building management control system (BMS).
- All of the pump equipment will be mounted on a pre-fabricated folded steel base plate complete with anti-vibration mountings.

This element of the works is Contractor design specific; the pumping station shall have an operating flow of 1.5³/hr at 85 metres pressure (To be checked by contractor). The pumping unit shall be manufactured by Grundfos or equal.

The design of the pumping station and its associated pipework to meet the specification is the responsibility of the Irrigation Contractor.

The pumping unit shall be designed to provide a constant pressure, whilst dealing with variable flow demands down to approximately 0.12m³/hr.

It is the Irrigation Contractor's responsibility to ensure that all necessary ancillary equipment required in order to ensure the correct operation of the pumping station is provided (communication cable, motor cables, operations manuals, service schedules, etc).

The Irrigation Contractor shall also supply full technical data of the proposed pumping station within his tender submission including -

- Pump duty performance curves.
- Manufacturer
- Pump Type & Motor Size and Number of Pumps
- Station Duty (Flow /mtrs Pressure)
- NPSH Calculations
- Motor Full Load Current
- Combined Start Up Loading

## 3.4 Suction and Delivery Manifolds

Suction and delivery manifolds shall be manufactured from UPVC or other approved material. Suction manifold velocity shall not exceed 1.5 mtrs/second; suction discharge manifold velocity shall not exceed 1.5 mtrs/second.

The suction and delivery manifolds should include as standard the following items:

- The suction manifold shall include –
    - Tank Isolation Valve

- The delivery manifold shall include –
    - Pump Isolation Valve
    - Debris Filter – See Specification item 3.5
    - Electronic Water Conditioner – See Specification item 3.5
    - Ultra-violet Treatment unit – See Specification item 3.5

- Pressure Relief Valve Set At Approximately ½ Bar (5mtrs) Above The Working Pressure Complete With Pipework Back To Water Storage Tank
- Hydraulic accumulator.
- Pulse Water Meter.
- Two Legs of supply pipework leave the plant room –
  - Supply 1 – Feeds to levels 6-9 façade planting (Fertiliser dosed supply)
  - Supply 2 – Feeds to levels 1,2,3,4,5 and 10
- Fertiliser Dosing System on Supply 1 only.

The Irrigation Contractor shall provide a layout of his proposed pumping arrangement with his tender submission.

## 3.5 Water Treatment / Filtration

The irrigation contractor shall provide suitable water filtration for the system as follows –

- 1 no. Inline Debris interception filters on the discharge manifold, installed in a step down method, the first filtering to 200 microns, the second filtering to 100 microns.
- Electronic water conditioner system sized to suit the service flow of the system. The unit uses pre-programmed micro-chips to transmit pulses of electrical charge into the water at varying frequencies and amplitudes. These “signals” cause some of the salts in the water to form sub-microscopic clusters. The clusters act as nucleation seeds upon which the calcium carbonate (limescale) precipitates. Instead of the hard encrustation on pipes and heating elements that normally occurs the precipitation takes the form of tiny calcium carbonate crystals that float suspended in the water. These invisible fine crystals are carried away with the flowing water.
- Ultra Violet treatment system sized to suit the service flow of the system complete with a bypass facility. The unit will include a Unit controller either mounted on the unit or on the wall nearby. The UV Reactor will be made from stainless steel 316 L and can be mounted horizontally or vertically. The unit will include a low pressure high intensity Spektrotherm UV Lamp with amalgam indium-dotation, high UV–C output. The UV lamp and quartz sleeve assembly will be easily removable from one end of the reactor.
- Suitable fertiliser dosing system comprising of a Dosatron unit or equal sized to suit the outgoing flows and pressure. A dosing tank and suitably sized bund should also be installed. Final dosing/application arrangement and N, P, K values etc. should not be part of the irrigation designers or irrigation contractors package. We suggest that all elements associated with fertigation are overseen by an agronomist; the application of fertiliser through an irrigation system must be carefully balanced with the plant growth stages and maturity. Fertilisers must also be correctly selected to avoid emitter blockage and steel structure corrosion.

## 3.6 Mainline and Lateral Distribution Pipelines

### 3.6.1 UPVC Pipework

All pipework within the plant room and basement areas of the development shall be supplied as uPVC pipework. The uPVC pipework and fittings shall be rated as class E, while uPVC fitting shall have a maximum pressure rating of 16 Bar. The UPVC pipe dimensions and working pressures are to BS EN 1452.

The mainline UPVC pipework shall be supported by a Hilti pipe support system with all necessary fittings where appropriate.

Pipelines shall be jointed by either glued or screwed fittings.

In all cases, the pipe jointing / installation method must be carried out strictly in accordance with relevant code of practice and manufacturers recommendations for that particular piping product.

All joints shall be made utilising the correct jointing products and techniques; adequate ventilation shall be provided at all times by the Irrigation Contractor.

Other acceptable pipe products shall be copper / stainless steel used in discharge manifolds and at penetration points; all pipe joints shall be either screwed or flanged in these instances.

The UPVC characteristics of excellent chemical resistance, durability, smooth bore, good abrasion resistance, good thermal and electric insulation, lightness, non-toxic and ease of jointing have secured Unplasticised Polyvinyl Chloride as the most widely used of all plastics for pipe installations. UPVC is suitable for use at temperatures from 0°C to 60°C.

**NOTE:** All pipework and signal cable from the plant room to the landscaped areas requiring irrigation are the responsibility of others. There are two feeds out of the plant room to the landscaped areas as detailed in section 3.4 above.

### 3.6.2 PE Pipework

All pipework within the landscaped area of the development shall be supplied as black Polyethylene pipe work to BSEN12201 complete with 4 green stripes and labelled appropriately.

All standards regarding polyethylene pipe shall be in accordance with the latest WRAS code of practice.

Pipelines shall be jointed by either compression or electrofusion fittings. Saddle clamps or grommet type connectors **shall not** be used for mainline or lateral pipes.
Standards applicable to pipe are:-

- BSEN12201 for PE pipes

Where couplers other than compression or electrofusion are utilised, i.e. flanges, they will be manufactured to the relevant national standard.

In all cases, the pipe jointing / installation method must be carried out strictly in accordance with relevant code of practice and manufacturers recommendations for that particular piping product. Under no circumstances shall the pipe exceed manufacturer's recommendations for curvature or be bent / re-heated by the Irrigation Contractor during installation.

Other acceptable pipe products shall be copper / stainless steel used in discharge manifolds and at planter entry points; all pipe joints shall be either screwed or flanged in these instances.

Where trenches are required these shall be provided by the main / landscape contractor.

Pipelines installed into trench lines will be placed only onto level bases and free of sharp, irregularly shaped objects.

After installation of the pipeline and associated pipe joints, backfilling shall take place. Backfilling shall initially be undertaken by hand and then mechanically if by approved methods. Backfill shall be compacted to achieve a firm finish that minimises settlement. Backfilling around pipe joints / valves and other reasonably delicate products shall be done with care to avoid undue material stress.

The irrigation contractor is to oversee the backfilling of trenches, backfilling will be with a suitable friable material, free of large stones, sharp objects and frozen lumps.

Any excavation works shall be undertaken with prevalent Health & Safety standards in operation. All trench lines shall be marked and taped to, as far as is practicable, minimise any risk to Health & Safety.

Mainline trenchlines will generally be 100mm wider than the outside diameter of the pipe (50mm clearance either side). Trenchlines shall be deep enough to ensure 600mm cover from the top of the pipe radius to finished ground level (subject to soil levels).

Lateral pipelines shall be installed to a depth of approximately 400mm from finished ground level to the top of the pipe radius and shall be undertaken to the same installation specification as mainline pipeline installation.

Any existing services shall be crossed with due care and diligence according to any / all local bylaws and the principle Contractor clearance prior to work.

Due to the nature of the project and restrictions to depth of available soil, installation depths shall vary across the site, main line and lateral pipelines shall be installed to a depth to allow suitable installation of irrigation equipment.

The Irrigation Contractor shall flush the installed irrigation pipe system at regular available opportunities. It is the Irrigation Contractor's responsibility to ensure that all pipelines, valves and drip embittering equipment is free from debris.

Any equipment that fails due to blockage shall be replaced by the Irrigation Contractor at his cost.

## 3.7 Planter Entry Points / Slab Penetrations

Required pipe and signal cable entry points into planters or through slab / structures shall be provided by the irrigation Contractor unless otherwise noted. These penetration fittings shall be manufactured in stainless steel and shall be manufactured to suit the slab thickness specifically for this project. It is the Irrigation Contractors responsibility to liaise with the landscape trade contractor / principle contractor regarding final entry point positions.

All planter / entry slab core holes shall be undertaken by the principle Contractor. The Irrigation Contractor shall install the pipeline within these access points using approved products and construction techniques. Subsequent water proofing is to be provided by the landscape trade contractor.

## 3.8 Hard Paved Areas / Road Crossings / Draw Pits

Areas such as paving between planters shall be ducted; ducts and draw pits will be provided for irrigation services by the landscape trade contractor. The Irrigation Contractor is responsible for liaising with the landscape trade contractor with regard to final positions and sizes.

## 3.9 Isolating Valves

Isolation valves used for the pipelines shall have a minimum pressure rating of 16 bar and be suitable for direct burial, offering a watertight seal at 16 bar pressure.

Valves of 2" or smaller shall be ball valves, either threaded or flanged in connection.

Access to all system isolation valves shall be by a valve chamber. The chamber will be large enough to provide unhindered access to the valve. All chambers will be supported to prevent damage to the irrigation pipe / cable.

All chambers will have a textile membrane installed within the base, complete with a 50mm layer of pea gravel (or equal) above the membrane. All valve chambers will be installed at approximately 20mm below finished ground level and located on stable level ground.

The irrigation Contractor is, unless otherwise directed, responsible for the final valve box positions.

## 3.10 Drain Valves

Drain valves shall be generally ¾" in size and as per general valve description enclosed. Valves shall be manually operated and shall drain to an agreed point; point of drainage to be agreed with structural engineer.

Access to all system drain valves shall be by a valve chamber. The chamber will be large enough to provide unhindered access to the valve. All chambers will be supported to prevent damage to the irrigation pipe / cable.

All chambers will have a textile membrane installed within the base, complete with a 50mm layer of pea gravel (or equal) above the membrane. All valve chambers will be installed at approximately 20mm below finished ground level and located on stable level ground.

The irrigation Contractor is, unless otherwise directed, responsible for the final valve box positions.

## 3.11 Solenoid Valve Assemblies

Where required and indicated, the system will utilise ¾" or 1" automatic solenoid operated 24 volt, normally closed electric valves, these shall be plastic in manufacture with a BSP thread featuring manual bypass and manual operation. Solenoid Valves shall be manufactured by Rain Bird.

Solenoid valves shall be incorporated into an irrigation valve chamber. The Irrigation Contractor may choose to place a maximum of 3 No. valves in one large chamber.

All chambers will have a textile membrane installed within the base, complete with a 50mm layer of pea gravel (or equal) above the membrane. All valve chambers will be installed at approximately 20mm below finished ground level and located on stable level ground.

The assembly shall include a valve isolation valve (same bore as solenoid valve), inline filter and pressure regulation, if applicable.

The assembly shall be constructed of PE or PVC pipework or an approved equal that is not affected by water treatment regimes, connections into and out of the assembly will be jointed onto pipelines by either electrofusion or compression fittings.

The irrigation Contractor is, unless otherwise directed, responsible for the final valve box positions.

## 3.12 Irrigation Products

### 3.12.1 Shrub Irrigation

Pressure compensating drip line shall be provided for areas of ground cover shrubs / shrub planting and hedges. The drip line emitters shall be pressure compensating, and self-flushing in operation, spaced at approximately 33cm intervals at a flow each of approximately 2.3 litres per hour. The drip pipework shall be manufactured by Rain Bird.

Row spacing shall be even and not exceed emitter spacing.

The dripline shall be of low density polyethylene and the emitters pre-inserted. Outside diameter shall be approximately 17mm, internal diameter approximately 13.6mm, manufactured by Rain Bird or an approved equal.

Drip lines shall be jointed by compression, barbed or screwed fittings as approved by the manufacturer.

Drip lines shall be installed as per manufacturer's recommendations with regular flushing during installation to remove debris. Run lengths shall not exceed the maximum stated by the manufacturer.

Drip lines shall be laid into place on the soil and staked prior to mulching. Drip line shall be held in place at approximately 1.0 metre to 2.0 metre intervals, generally as per

manufacturer's instructions. Stakes shall be designed to be robust in use and longevity, preferably purpose built plastic stakes such as Rain Bird C-12 or approved equal.

Drip lines shall be installed in a grid fashion to ensure even pressure is delivered to emitters throughout.

Drip lines will be fed from a lateral feed pipe generally installed feeding into the centre of the drip grid.

Drip lines shall be tested visibly prior to mulching to ensure satisfactory operation.
Kinked or damaged pipe shall not be installed or re-used by the Irrigation Contractor.

The principle Contractor reserves the right to check spacings of driplines and if applicable instruct the Irrigation Contractor to re-install these correctly.

### 3.12.2 Tree Irrigation

Tree irrigation shall be installed after tree installation and before final mulching.

Lateral pipework shall terminate at the base of each tree and be connected to a 16mm LDPE necklace of pipe surrounding the tree trunk. Emitters shall be installed within the tree necklace at even spacing.

Trees shall be irrigated by pressure compensating 'push' in emitters with an output of approximately 7.6 litres per hour. These shall be of a self-piercing type, inserted in 16mm polyethylene distribution tubing (minimum pressure rating of tubing shall be 6.0 bar).

Each tree shall have 8 No. emitters spaced equally around the rootball (depending upon tree size).

Only compression, barbed or screwed fittings approved by the manufacturer shall be used.

Emitters and tubing shall be manufactured by Rain Bird or approved equal.

Tree drip emitters are specified as Rain Bird XB20PC pressure compensating units with a flow of 7.6 ltrs/hr each or approved equal.

The Irrigation Contractor shall ensure that the final spacing shall water the soil area effectively, reaching the root zone of each tree.

The necklace shall be flushed prior to final connection.

The principle Contractor reserves the right to check the spacing and number of emitters fitted and if applicable, to instruct the Irrigation Contractor to re-install the necklace and emitters.

## 3.13 Control System

The selected control system shall be an ESPLX-IVM decoder-based system manufactured by Rain Bird or approved equal.

This will control the solenoid valve operation via a twin core 2.5mm² low voltage signal cable. All joints will be made using DBR-Y water resistant/ waterproof connectors.

Features:

- The ESPLX-IVM can manage up to 60 stations & up to 4 weather sensors.
- The ESPLX-IVM can run up to 8 stations simultaneously.
- Flow management has been built into every ESPLX-IVM.
- Supports Rain Bird IVM Solenoid Coil Module & Rain Bird IVM Surge Protector.
- Four sensor inputs with override switch.
- Station timing: 0 min to 96 hrs.
- Program level and global monthly seasonal adjust, 0% to 300% (96hrs max. station run time)
- 8 start times per program.
- Program day cycles include custom days of the week, odd, odd no 31st, even and cyclical dates.
- Remote water management using the IQ4 platform.

The contractor shall include within the control system a rain switch, which will be located in a suitable position, cabled as per manufacturer's instructions.

The rain switch shall be mounted on a stainless steel mounting poles concealing all cables, these shall be provided by the irrigation contractor.

Programming and testing of the control system / rain sensor shall be the responsibility of the Irrigation Contractor. The Irrigation Contractor shall be responsible for calculating run times, hydraulic optimisation and flow branch allocation.

The Irrigation Contractor shall also supply the necessary number of decoders – as per specification. Decoders shall be fully compatible with the central controllers and installed with the central control systems exactly as per manufacturer's recommendations.

The Irrigation Contractor must include earthing and surge protection as per manufacturer's minimum recommendations ensuring that the systems are adequately earthed.

## 3.14 Rain Bird Communication Module

The irrigation contractor shall supply and install a communication module linked to the irrigation controller.

The module shall provide the following features –

- Remote control / management of the irrigation system.
- Automated Email Alarm/Warning and Satellite Station Run Time Reports
- Detailed logs and reports
- Manual Program, Test Program, Station starts
- Automated or user initiated satellite Synchronize & Retrieve Logs and Weather Source Retrieve Weather Data communication
- Monitor system performance and identify problems
- IQ Global Weather Internet Service which provides local weather data including rain fall.

To fully enable the above features the irrigation contractor shall also install a flow sensor and master valve.

All control system equipment shall be installed exactly as per manufacturer's requirements and as per any relevant national codes of practice and byelaws, particularly electrical.

## 3.15 Decoders

The selected decoders shall be ESPLX-IVM Solenoid Modules supplied by Rain Bird or approved equal.

Decoders shall be fully compatible with the central controller and installed with the central control system exactly as per manufacturer's recommendations.

## 3.16 Signal Cable

All signal cable shall be suitable for direct underground burial where used in landscaped area and manufactured by Rain Bird.

The solid bare 2.5mm copper cable shall be insulated with a 0.7mm polyethylene sleeve (black and blue cores) and protected with an outer polyethylene sheath to protect the cable from damage during installation and to prolong life.

Cables between decoders and solenoids will only be 2-core in configuration; all signal cable under hard landscaped areas shall be ducted.

The Irrigation Contractor shall also ensure that the control system in operation does not conflict with any other electrical services.

The signal cable will be a minimum of 2.5mm² and conform to CEI 60502-1 (this includes both mainline and cable from decoder to the solenoid valve). The cable shall be approved for use by the control system manufacturer.

All cables will be UV resistant and have a temperature operating range suitable for the climate. Signal cables will be jointed using grease filled joints such as DBR-Y connectors.

Signal cable shall be installed or clipped in such a manner that ensures that it is not stretched / scraped / damaged / laid down under tension. The cable will be laid and supported throughout its length. All cable joints will be made ensuring that at least one metre of cable is slack.

Cables shall not be installed in the formation of a continuous circuit at any point.
Signal cables shall be installed by the Irrigation Contractor in a cable tray / duct from the pump room to the rising main connection point.

From this point cable shall be installed as required to solenoid valve positions.

## 4.0 Health & Safety Requirements

The Irrigation Contractor will be responsible to fulfill his required duties with regards to health & safety.

The Irrigation Contractor shall not commence any site works until his method statements, risk assessments and COSHH assessments have been issued and approved by the main contractor.

## 4.1 Health & Safety Overview

The Irrigation Contractor must ensure that his obligations under all relevant national Health & Safety laws have been met prior to commencement of works. This includes all risk assessments, method statements, COSHH assessments, and operator training.

The main contractor may issue additional requirements not detailed within this specification which will have to be adhered to.

The Irrigation Contractor will be responsible to fulfill his required duties.

## 4.2 Method Statement and Risk Assessments

The Irrigation Contractor shall be expected to provide all method statements and risk assessments for the proposed works.

The Irrigation Contractor shall not commence any site works until his method statements, risk assessments and COSHH assessments have been issued and approved by the main contractor.

## 4.3 Fire

The Irrigation Contractor shall aim to minimise all risk of fire and shall take the necessary action if fire is discovered.

If hot works is required the irrigation contractor must apply for the relevant permits to work from the main contractor prior to commencing work. The contractor shall have suitable insurance to cover the hot works.

## 4.4 Traffic & Machinery Movement

The Irrigation Contractor is responsible for all traffic associated with the irrigation contract and must ensure that appropriate Health & Safety measures are in place to control the traffic safely and without danger to the public.

## 4.5 Health & Safety Information

The Irrigation Contractor must under his obligations with the CDM Regulations; provide Health & Safety information prior to the commencement of the project.

The above elements are subject to contract working standards issued by the Main Contractor.

## 4.6 Designers Risk Assessment

Provided within appendix A is the design risk assessment undertaken by the Designer in accordance with the CDM regulations.

All suppliers, contractors and designers appointed by the Main Contractor shall undertake their own CDM regulation obligations which include liaising with designers, Main Contractors, and planning supervisor with relevance to all Health & Safety matters, and with this in mind the Main Contractor shall ensure that all his suppliers and sub-contractors comply with this requirement.

# Appendix A – Risk Overview

## DESIGN RISK OVERVIEW

The irrigation design at Belgrove House is based upon the current standards within the landscape irrigation industry and the minimum standards laid down by the British Turf and Landscape Irrigation Association.

Risk overview has been undertaken by the designer. Significant residual hazards which cannot be reasonably designed out are noted and included within this document.

However, the enclosed does not claim to cover every site risk. Contractors must point out in their tender submission other hazards that they believe cannot be controlled during installation and therefore require design review.

| Hazard Type | Risk | Personnel At Risk | Action To Control Risk |
|---|---|---|---|
| Machinery movement on site | Medium | Irrigation Contractor Other Contractors | Irrigation Contractor to undertake risk assessment and issue method statement, machinery movement routing and program of works. Warning signage for footpaths. Erection of barriers within vicinity of footpaths. |
| Installation of irrigation materials; pipelines, control cables, valves | Medium | Irrigation Contractor Other Contractors | Irrigation Contractor to undertake risk assessment and issue method statement, and adherence to method statement. Use of marking tape and signage where applicable. Issue detailed program of works and undertake search of services within area of work. |
| High water pressure in pumping station, underground pipeline | Medium | Irrigation Contractor Other Contractors Maintenance Staff | Ensure high pressure main is isolated and residual pressure removed before attempting service work. Ensure all operatives have received relevant training regarding product operation. Specification of products that are designed for use within the stated system operating pressure. |

| Hazard Type | Risk | Personnel At Risk | Action To Control Risk |
|---|---|---|---|
| Electricity within pump room | Medium | Irrigation Contractor<br>Other Contractors<br>Maintenance Staff | Isolation of electrical supply at pump to prevent electrocution risk if working within pump area. Only authorised and qualified operatives to use and maintain equipment. Lockable pump house doors. |
| Installation of pipework through slab into planters and clipping of pipework / signal cable | Medium | Irrigation Contractor<br>Other Contractors | Irrigation Contractor to undertake risk assessment. Use of proper access equipment – scaffolding tower. Issue of method statement and proof of scaffolding license if required. |
| Ground conditions - Slippery Surfaces | Medium | Irrigation Contractors<br>Machinery Operatives | Irrigation Contractor to undertake risk assessment and issue method statement for work in associated risk areas. |
| Excavations - Spoil heaps, trench line collapse, trespassers | Medium | Irrigation Contractors<br>Machinery Operatives<br>M & E Engineers | Irrigation Contractor to undertake risk assessment and issue method statement for associated works. |
| Small electrical equipment and compressed air tools | Medium | Irrigation Contractors<br>M & E Engineers | Irrigation Contractor to undertake risk assessment and issue method statement; to include daily maintenance regime if applicable. Wearing of PPE. |
| Legionnaires disease, associated risk of disease in stored water | Medium | Main Contractor<br>M & E Engineers<br>End User | Water to be regularly tested by Client after handover as part of operating risk assessment and further treatment may be required. |

# Appendix B – Valve Schedule

**Project: Belgrove House**
**Ref: Q3209 R1**
**Date: 24/11/22**
**Dwg Ref: WSL3209-01-10**

| Station Type | Quantity | Total Run Time (mins) | Estimated Water Usage (ltr) |
|---|---|---|---|
| Drip Pipework | 2273 Metres | 509 | 3443.94 |
| Trees | 4 No. | 89 | 180.00 |
| | | | |
| **Total** | | **598**<br>**Hrs** 9 **Mins** 58 | **3623.94** |

**Project: Belgrove House**
**Ref: Q3209 R1**
**Date: 24/11/22**
**Dwg Ref: WSL3209-01-10**

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

## Drip Station Flows, Runtimes and Water Usage

**33 cm Spaced Emitters 2.3 l/h**

| Valve Station No. | Length of Dripline (m) | No. of Emitters (33cm Spacing) | Flow $m^3/h$ | Daily App. Rate mm | Run Time (mins) | Water Usage (Ltr) | Level |
|---|---|---|---|---|---|---|---|
| D1 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | Level 1 |
| D2 | 44 | 133 | 0.31 | 4 | 13.0 | 67 | Level 1 |
| D3 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | Level 1 |
| D4 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | Level 2 |
| D5 | 44 | 133 | 0.31 | 4 | 13.0 | 67 | Level 2 |
| D6 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | Level 2 |
| D7 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | Level 3 |
| D8 | 44 | 133 | 0.31 | 4 | 13.0 | 67 | Level 3 |
| D9 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | Level 3 |
| D10 | 176 | 533 | 1.23 | 4 | 13.0 | 267 | Level 4 |
| D11 | 88 | 267 | 0.61 | 4 | 13.0 | 133 | Level 4 |
| D12 | 176 | 533 | 1.23 | 4 | 13.0 | 267 | Level 4 |
| D13 | 182 | 552 | 1.27 | 4 | 13.0 | 276 | Level 4 |
| D14 | 155 | 470 | 1.08 | 4 | 13.0 | 235 | Level 4 |
| D15 | 182 | 552 | 1.27 | 4 | 13.0 | 276 | Level 4 |
| D16 | 152 | 461 | 1.06 | 4 | 13.0 | 230 | Level 5 |
| D17 | 152 | 461 | 1.06 | 4 | 13.0 | 230 | Level 5 |
| D18 | 152 | 461 | 1.06 | 4 | 13.0 | 230 | Level 5 |
| D19 | 152 | 461 | 1.06 | 4 | 13.0 | 230 | Level 5 |

| Valve Station No. | Length of Dripline (m) | No. of Emitters (33cm Spacing) | Flow $m^3/h$ | Daily App. Rate mm | Run Time (mins) | Water Usage (Ltr) | Level |
|---|---|---|---|---|---|---|---|
| D22 | 10 | 30 | 0.07 | 4 | 13.0 | 15 | **Level 6** |
| D23 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 6** |
| D24 | 12 | 36 | 0.08 | 4 | 13.0 | 18 | **Level 6** |
| D25 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 6** |
| D26 | 10 | 30 | 0.07 | 4 | 13.0 | 15 | **Level 7** |
| D27 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 7** |
| D28 | 12 | 36 | 0.08 | 4 | 13.0 | 18 | **Level 7** |
| D29 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 7** |
| D30 | 10 | 30 | 0.07 | 4 | 13.0 | 15 | **Level 8** |
| D31 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 8** |
| D32 | 12 | 36 | 0.08 | 4 | 13.0 | 18 | **Level 8** |
| D33 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 8** |
| D34 | 10 | 30 | 0.07 | 4 | 13.0 | 15 | **Level 9** |
| D35 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 9** |
| D36 | 12 | 36 | 0.08 | 4 | 13.0 | 18 | **Level 9** |
| D37 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 9** |
| D38 | 18 | 55 | 0.13 | 4 | 13.0 | 27 | **Level 10** |
| D39 | 54 | 164 | 0.38 | 4 | 13.0 | 82 | **Level 10** |
| D40 | 28 | 85 | 0.20 | 4 | 13.0 | 42 | **Level 10** |
| D41 | 54 | 164 | 0.38 | 4 | 13.0 | 82 | **Level 10** |
| **TOTALS** | **2273** | | | | **508.7** | **3444** | |

**Project: Belgrove House**
**Ref: Q3209 R1**
**Date: 24/11/22**
**Dwg Ref: WSL3209-01-10**

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

## Tree Drip Flows, Runtimes and Water Usage
## 8 Spaced Emitters

| Valve Station No. | No. Trees | No. Emitters per Tree | Total No. Emitters | Emitter Flow LPH Ltr/hr | Total Valve Flow ($m^3$/hr) | Total Flow to Each Tree Ltr/min | Daily App. Rate Ltr | Run Time (mins) | Water Usage (Ltr) | Level |
|---|---|---|---|---|---|---|---|---|---|---|
| TD20 | 2 | 8.00 | 16.00 | 7.60 | 0.12 | 1.01 | 45.00 | 44 | 90 | Level 5 |
| TD21 | 2 | 8.00 | 16.00 | 7.60 | 0.12 | 1.01 | 45.00 | 44 | 90 | Level 5 |
| | **4** | | **32** | | | | | **89** | **180.00** | |

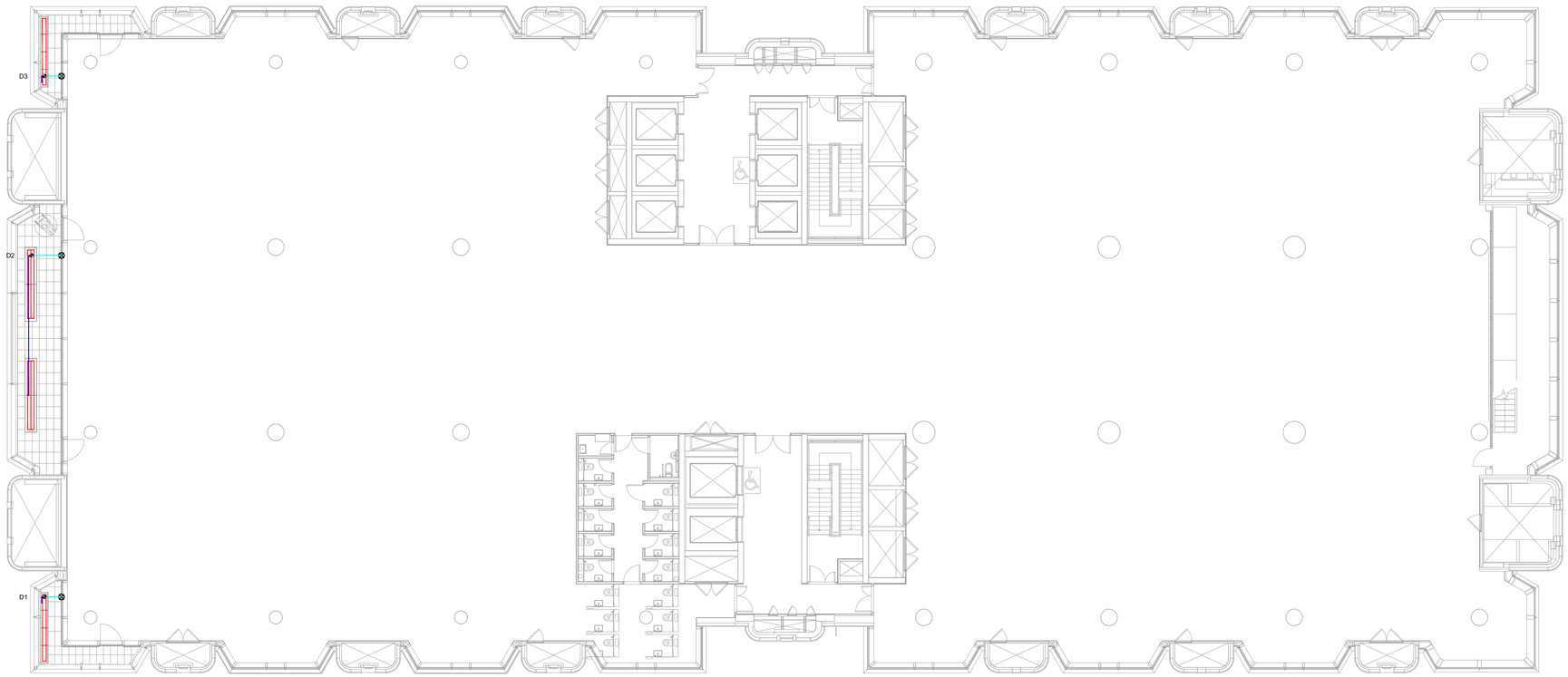
# Appendix C – Drawings

**Reference Drawings -**

| | |
|---|---|
| Irrigation Layout Level 2 | WSL3209-02 |
| Irrigation Layout Level 3 | WSL3209-03 |
| Irrigation Layout Level 4 | WSL3209-04 |
| Irrigation Layout Level 5 | WSL3209-05 |
| Irrigation Layout Level 6 | WSL3209-06 |
| Irrigation Layout Level 7 | WSL3209-07 |
| Irrigation Layout Level 8 | WSL3209-08 |
| Irrigation Layout Level 9 | WSL3209-09 |
| Irrigation Layout Level 10 | WSL3209-10 |
| Irrigation Plant Room Layout | WSL3209-11 |

**Example Drawings -**

| | |
|---|---|
| Example Drip Pipework Installation | WSL3209-EX1 |
| Example Solenoid Valve Assembly | WSL3209-EX2 |
| Example Rain Bird Drip Pipework | WSL3209-EX3 |
| Example Movable Planter Irrigation Connection | WSL3209-EX4 |




REFERENCE DRAWING(S): -

- BEL-BHS-ZZ-01-DR-LA-0102-LEVELS 1-2.dwg

NOTES: -

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LEGEND:

25mm PE Pipework

2.3 l/h, 33cm Spaced Pressure Compensating Dripline

Solenoid Valve

Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |
| P02 | 24.11.22 | Issued for Stage 4a | PDB | MC | - |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 1

| Scale at A1: | Status: | CAD File Name: |
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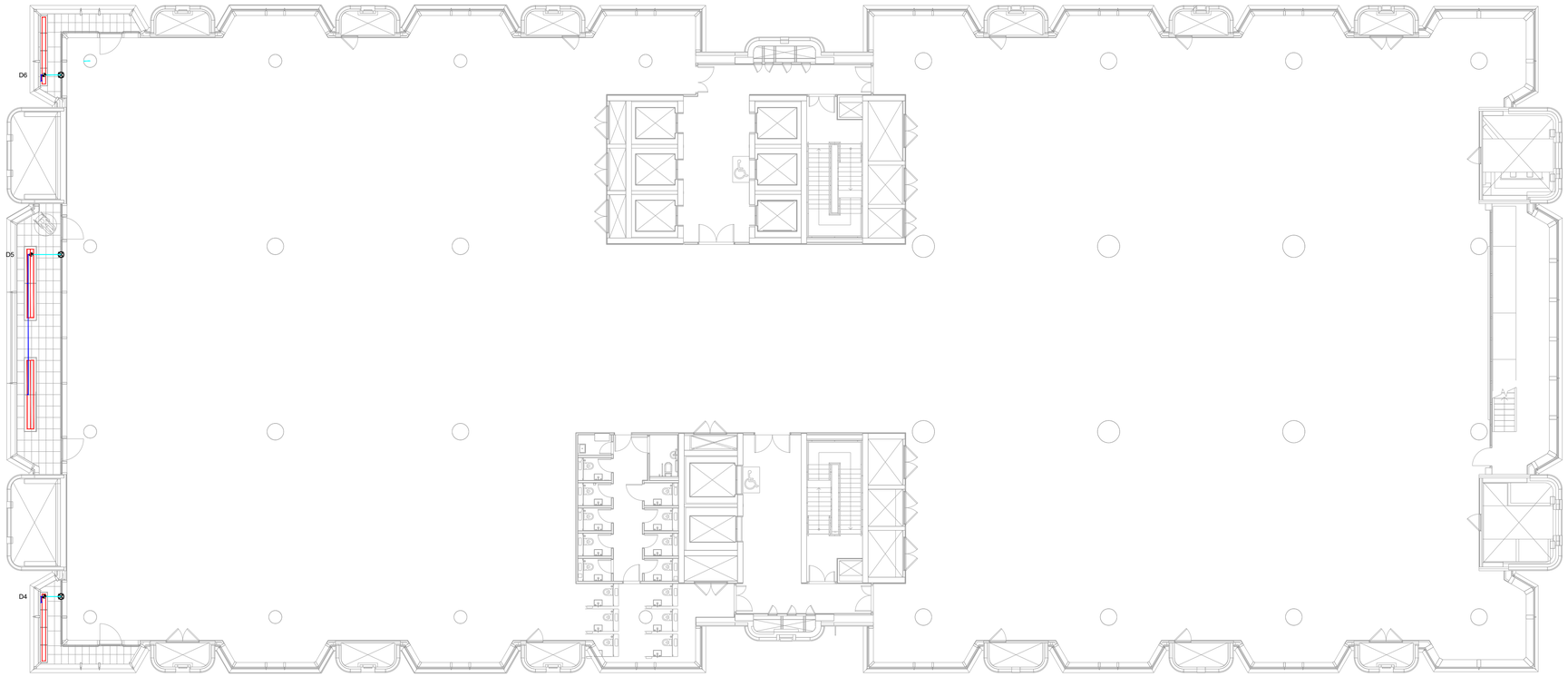
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

Drawing No: WSL3209-01

Revision: P02






REFERENCE DRAWING(S): -

- BEL-BHS-ZZ-01-DR-LA-0102-LEVELS 1-2.dwg

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LEGEND:

25mm PE Pipework

2.3 l/h, 33cm Spaced Pressure Compensating Dripline

Solenoid Valve

Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

| Rev. | Date | Description | Drn. | Chd. | App. |
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| P02 | 24.11.22 | Issued for Stage 4a | PDB | MC | - |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 2

| Scale at A1: | Status: | CAD File Name: |
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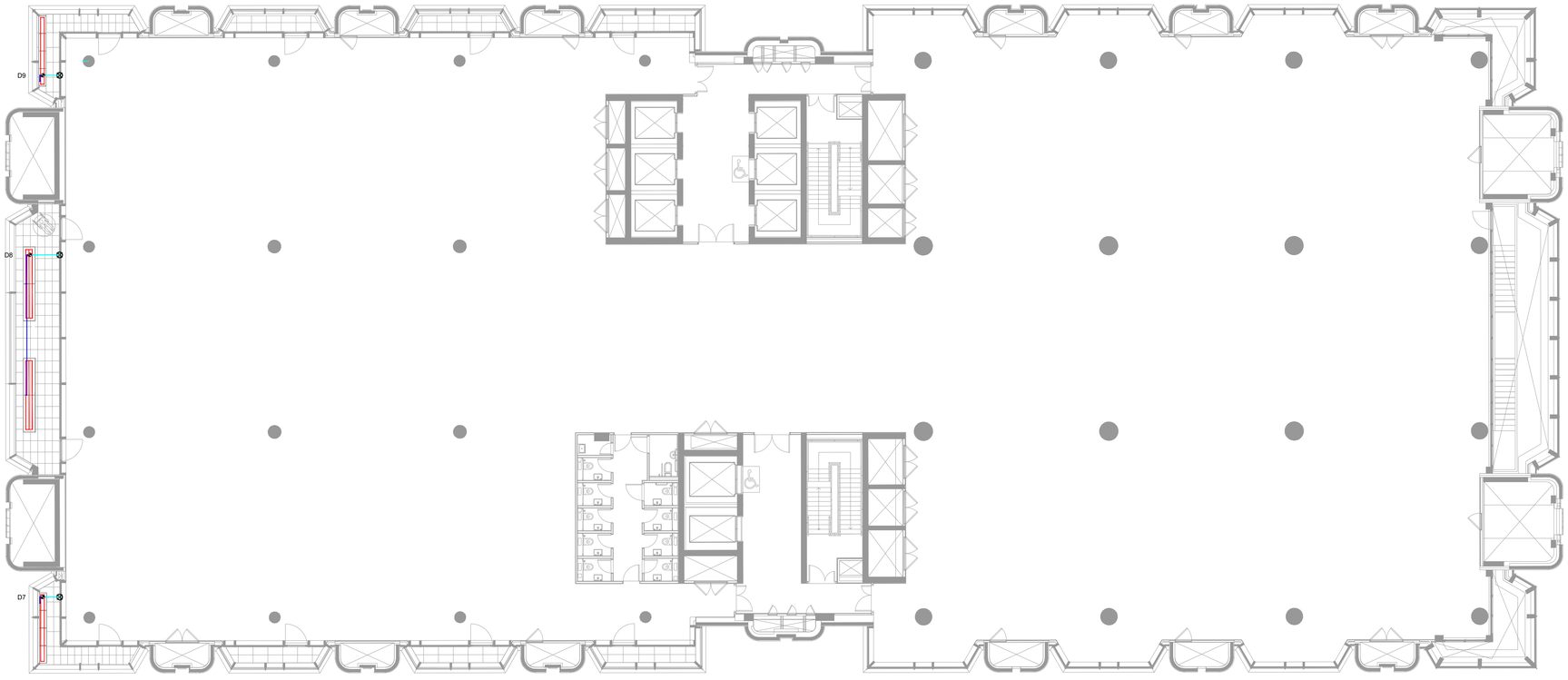
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

Drawing No: WSL3209-02

Revision: P02




REFERENCE DRAWING(S): -

- BEL-BHS-ZZ-01-DR-LA-010xx-LEVEL 3.dwg

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4. ANY OMISSIONS OR DISCREPANCIES TO BE REPORTED TO WATERSCAPES IMMEDIATELY

LEGEND:

25mm PE Pipework

2.3 l/h, 33cm Spaced Pressure Compensating Dripline

Solenoid Valve

Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

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| Rev. | Date | Description | Drn. | Chd. | App. |

Landscape Architect:

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Irrigation Consultant:

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 3

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| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

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4. ANY OMISSIONS OR DISCREPANCIES TO BE REPORTED TO WATERSCAPES IMMEDIATELY

LEGEND:

- 25mm PE Pipework
- 2.3 l/h, 33cm Spaced Pressure Compensating Dripline
- Solenoid Valve
- Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.5 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |
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Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 4

| Scale at A1: | Status: | CAD File Name: |
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| **Drawn:** | **Checked:** | **Approved:** |
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| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

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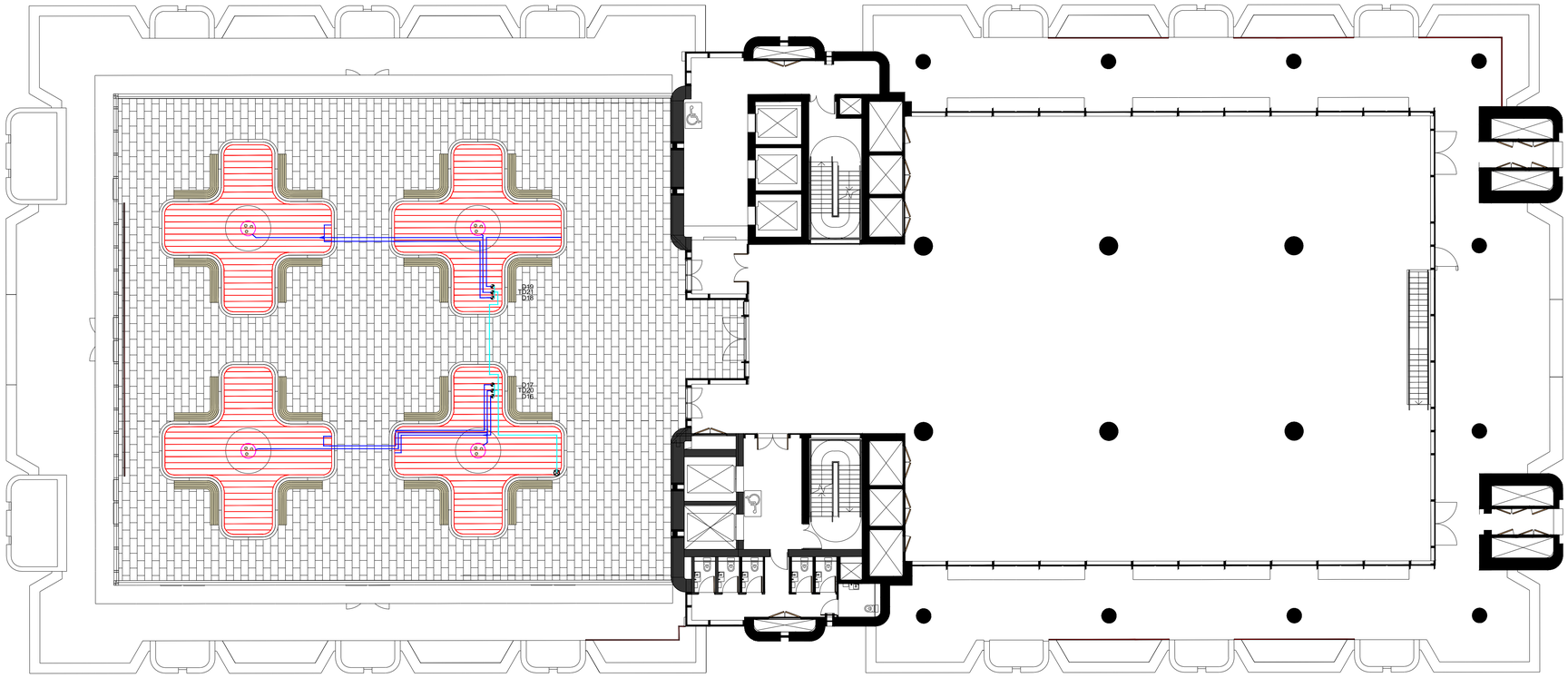
| WSL3209-04 | P02 |



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LEGEND:

25mm PE Pipework

2.3 l/h, 33cm Spaced Pressure Compensating Dripline

Solenoid Valve

Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.5 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |
| P02 | 24.11.22 | Issued for stage 4a | PDB | MC | - |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 5

| Scale at A1: | Status: | CAD File Name: |
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| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

| Drawing No: | Revision: |
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| WSL3209-05 | P02 |

REFERENCE DRAWING(S): -

- BEL-BHS-ZZ-06-DR-LA-0105-LEVELS 6-9 .dwg

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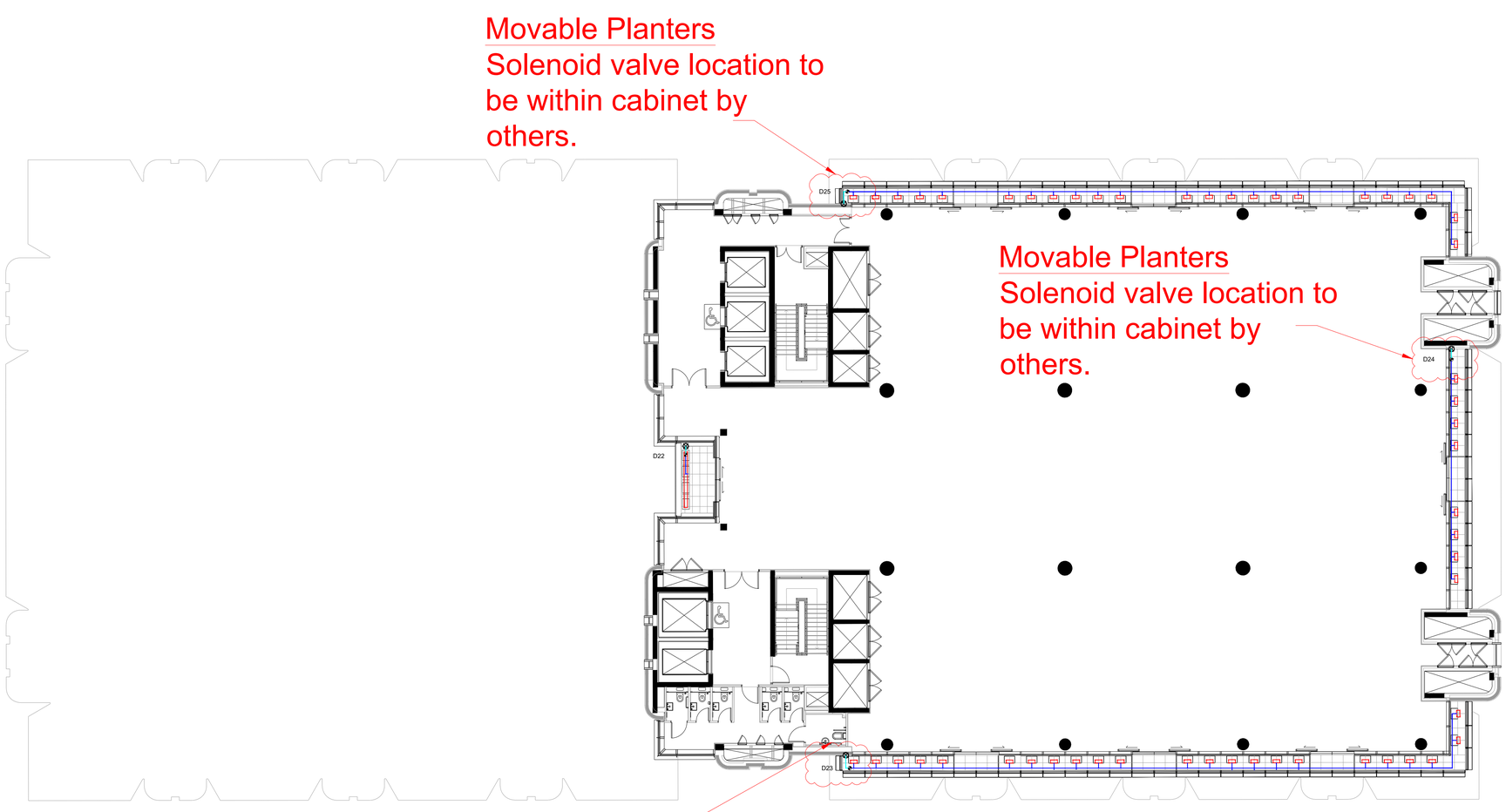
LEGEND:

- 25mm PE Pipework
- 2.3 l/h, 33cm Spaced Pressure Compensating Dripline
- Solenoid Valve
- Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors




| Rev. | Date | Description | Drn. | Chd. | App. |
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| | | | | | |
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| P02 | 24.11.22 | Issued for stage 4a | PDB | MC- | - |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

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*Wincanton Business Park*
*Wincanton*
*Somerset, BA9 9RX*
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*Email: info@waterscapeslimited.com*

Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 6

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:150 | Stage 4a | WSL3209-06 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

| Drawing No: | Revision: |
|---|---|
| WSL3209-06 | P02 |

REFERENCE DRAWING(S): -

- BEL-BHS-ZZ-06-DR-LA-0105-LEVELS 6-9 .dwg

NOTES: -

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3. DO NOT SCALE FROM THIS DRAWING - ALL DIMENSIONS TO BE CHECKED ON SITE

4. ANY OMISSIONS OR DISCREPANCIES TO BE REPORTED TO WATERSCAPES IMMEDIATELY

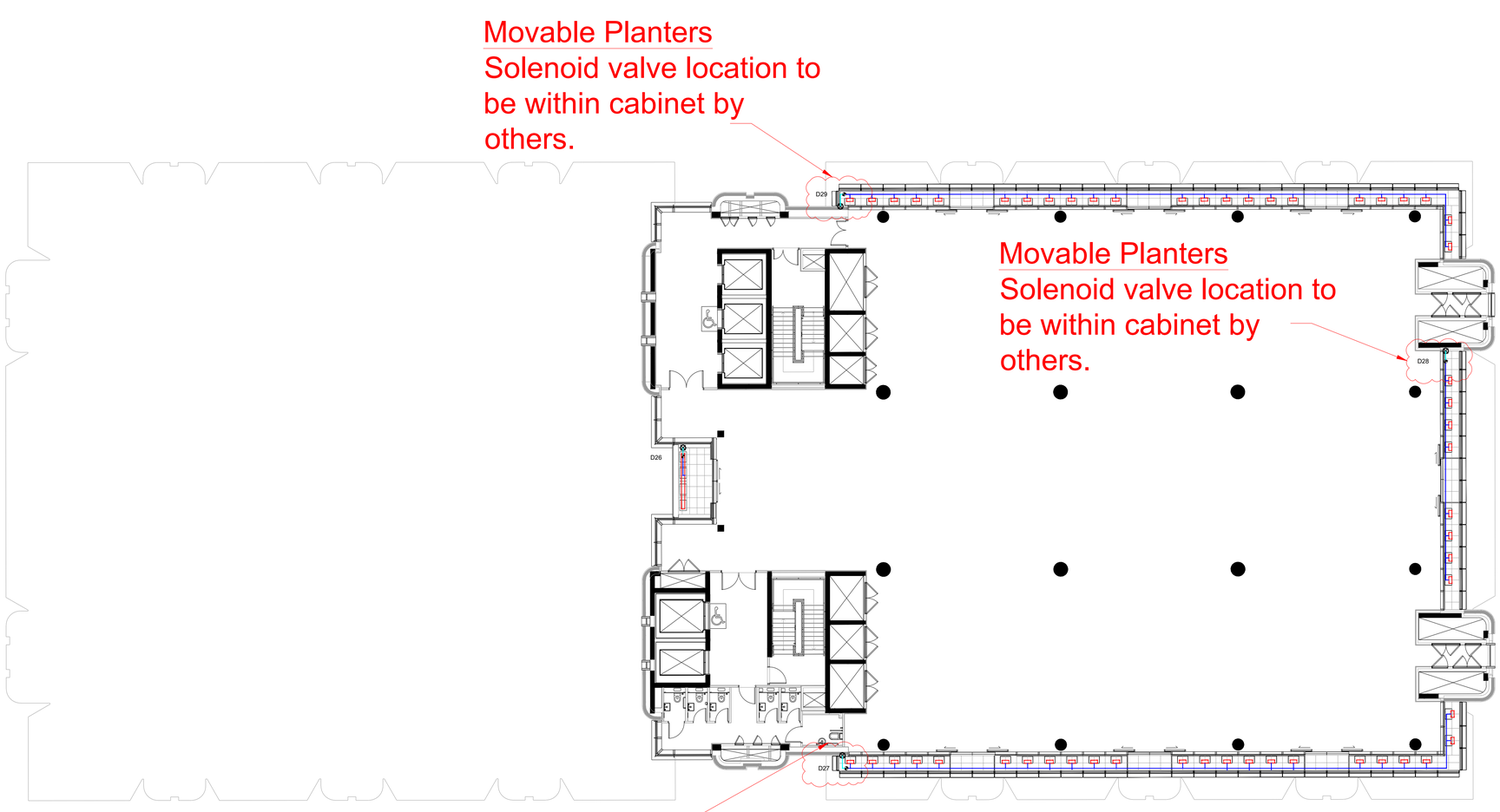
LEGEND:

- 25mm PE Pipework
- 2.3 l/h, 33cm Spaced Pressure Compensating Dripline
- Solenoid Valve
- Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors




| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |
| P02 | 24.11.22 | Issued for stage 4a | PDB | MC- | - |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

*1 Murray Court*
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*Wincanton*
*Somerset, BA9 9RX*
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*Email: info@waterscapeslimited.com*

Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 7

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:150 | Stage 4a | WSL3209-07 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

| Drawing No: | Revision: |
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| WSL3209-07 | P02 |

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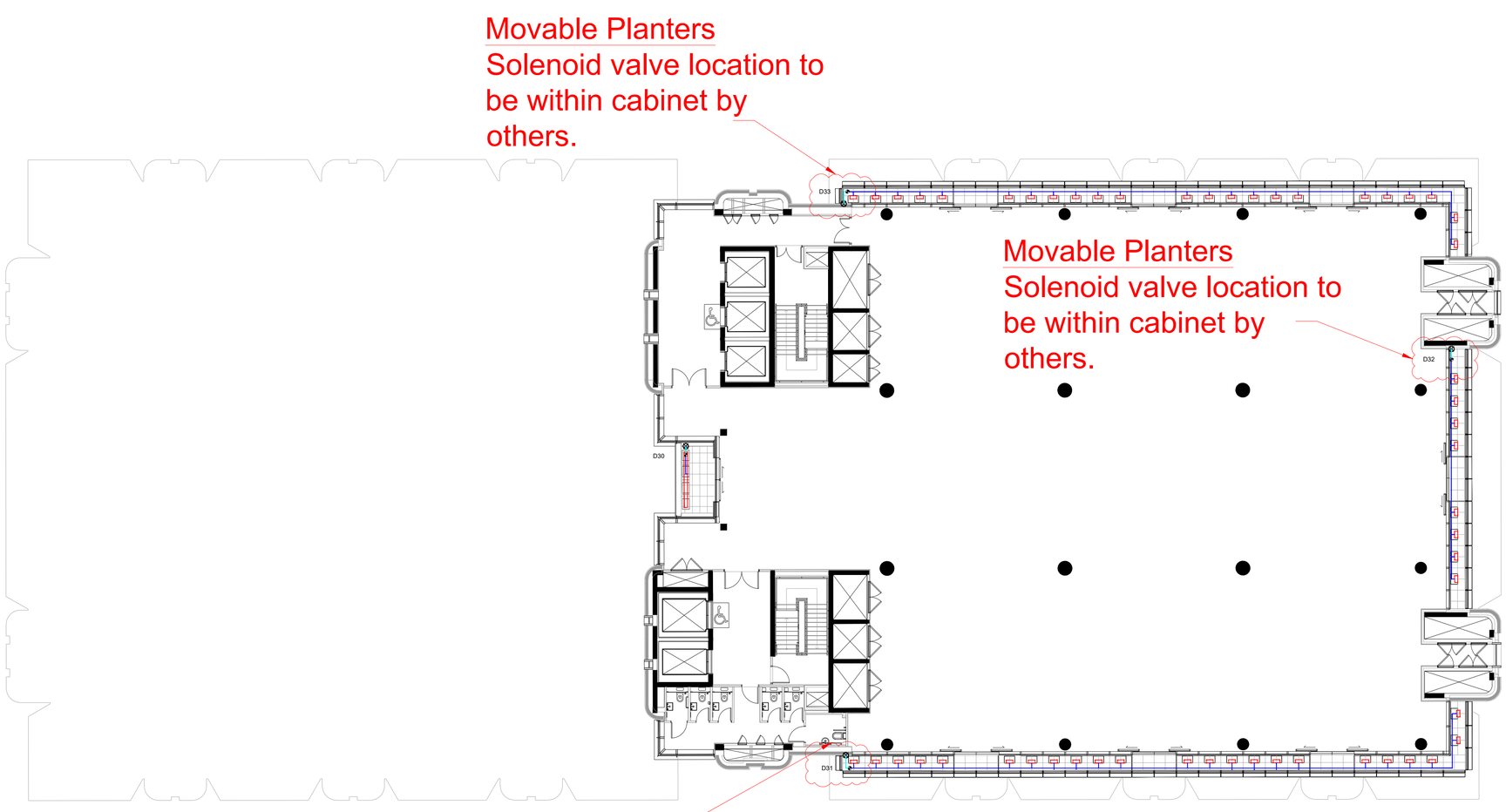
LEGEND:

- 25mm PE Pipework
- 2.3 l/h, 33cm Spaced Pressure Compensating Dripline
- Solenoid Valve
- Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

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| Rev. | Date | Description | Drn. | Chd. | App. |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 8

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:150 | Stage 4a | WSL3209-08 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

| Drawing No: | Revision: |
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| WSL3209-08 | P02 |

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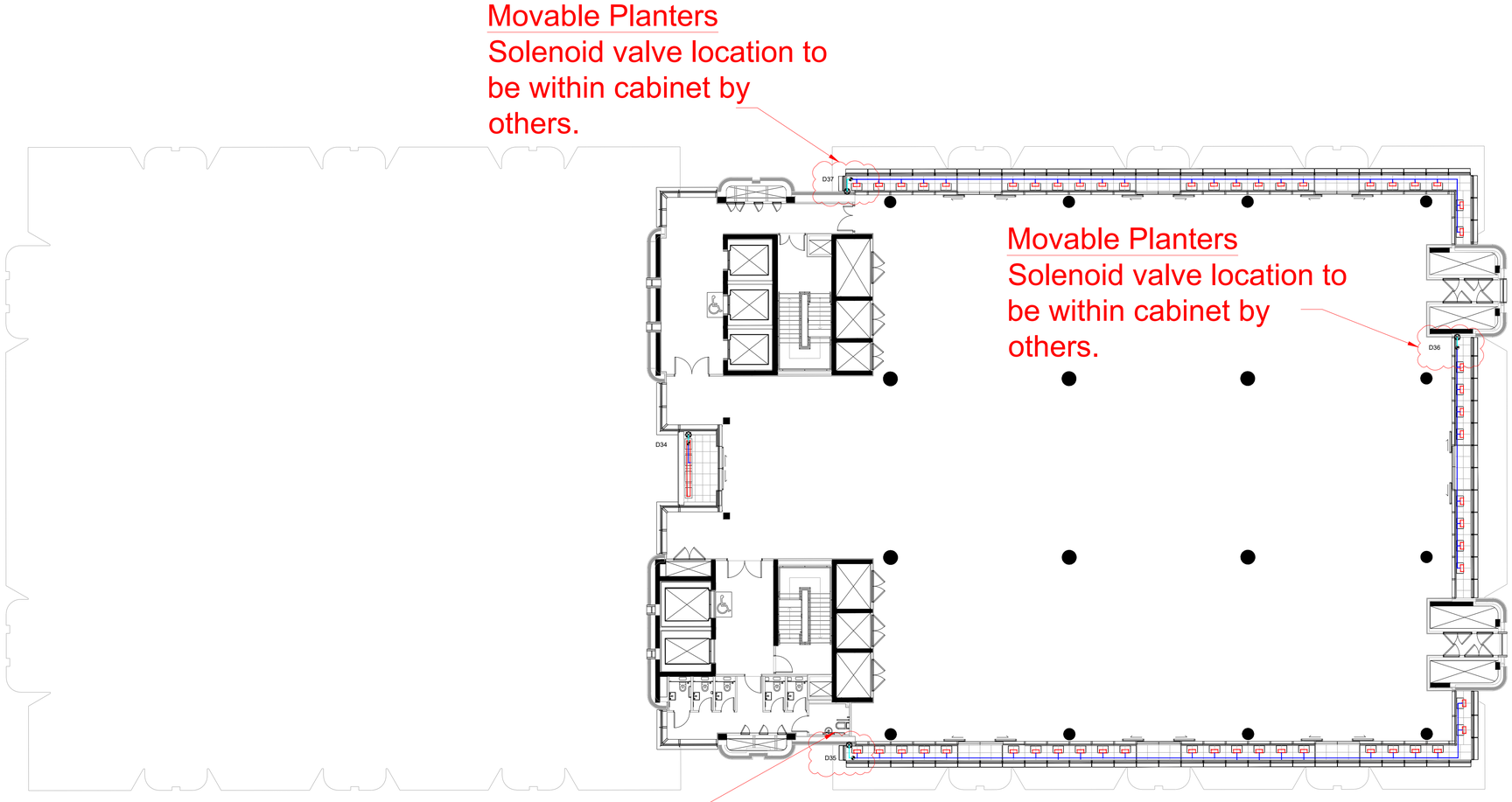
LEGEND:

- 25mm PE Pipework
- 2.3 l/h, 33cm Spaced Pressure Compensating Dripline
- Solenoid Valve
- Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

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| P02 | 24.11.22 | Issued for stage 4a | PDB | MC- | - |
| Rev. | Date | Description | Drn. | Chd. | App. |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

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Project Title:

Belgrove House

Drawing Title:

Irrigation Layout
Level 9

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:150 | Stage 4a | WSL3209-09 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

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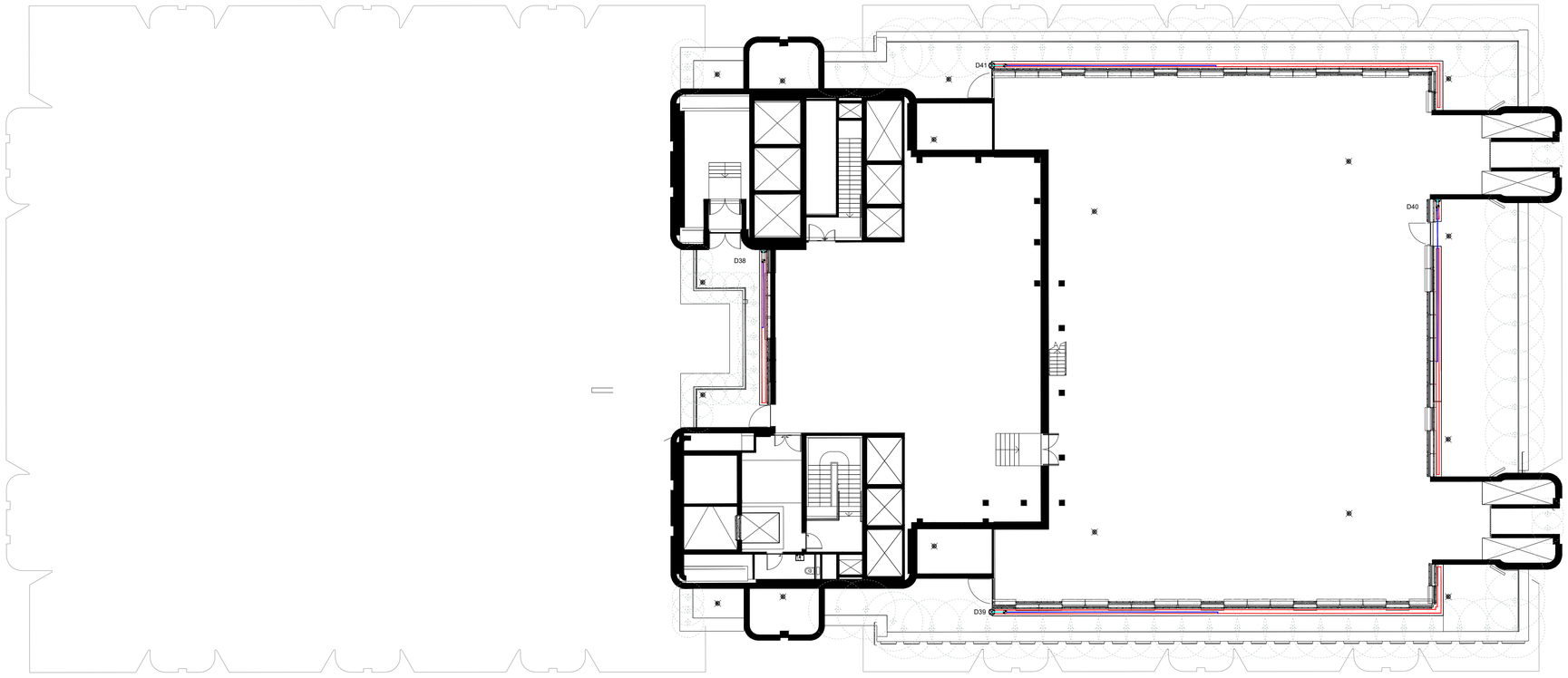
| WSL3209-09 | P02 |






REFERENCE DRAWING(S): -

- BEL-BHS-ZZ-TP-DR-LA-0106-LEVEL 10.dwg

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LEGEND:

25mm PE Pipework

2.3 l/h, 33cm Spaced Pressure Compensating Dripline

Solenoid Valve

Water/Signal Cable Connection Point - Supply pipework and signal cable from irrigation plant room to connection points shown by M&E Contactors.

Services Required

Water Supply - Suitable CAT 5 water supply at the penetration points shown minimum flow required 0.3 litres per second at min. pressure 3.0 bar, regulated to a max. pressure 5.0 bar

Signal Cable : Screened 2 Core 2.5mm LV signal cable from controller location to each connection point by M&E contractors

| Rev. | Date | Description | Drn. | Chd. | App. |
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| P02 | 24.11.22 | Issued for stage 4a | PDB | MC- | - |

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Irrigation Consultant:

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Project Title:

Belgrove House

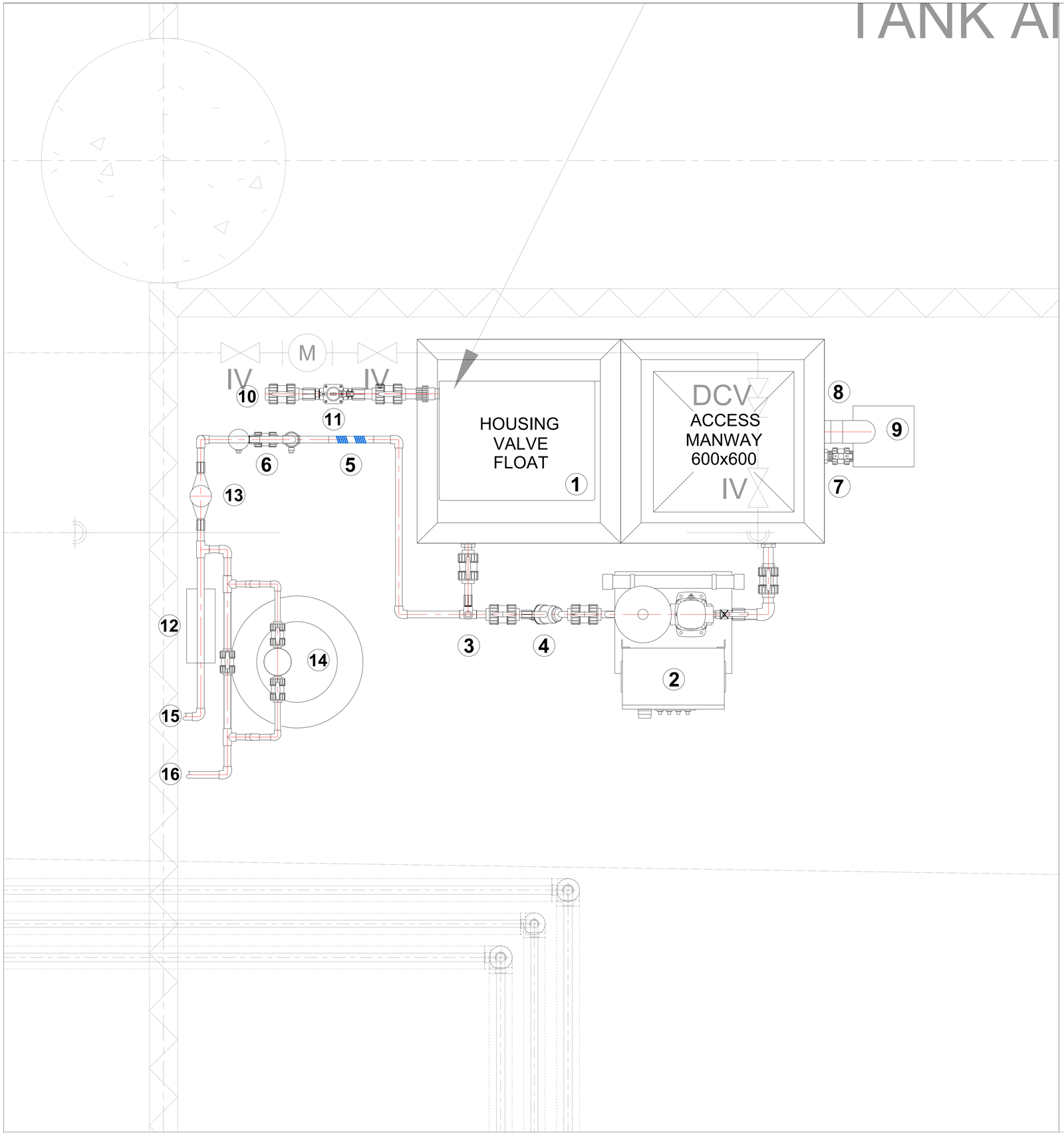
Drawing Title:

Irrigation Layout
Level 10

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:150 | Stage 4a | WSL3209-10 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

Drawing No: WSL3209-10

Revision: P02




## Legend

1. Irrigation System Water Storage Tank - Internally Flanged - 2m L x 1m W 1.5m H
2. Irrigation Booster Pumpset
3. Pressure Relief Valve c/w Pipework routed back to tank
4. Amiad Inline debris Filter
5. Electronic Water Conditioner
6. Ultra Violet Treatment System
7. Tank Drain Down Facility
8. Tank Overflow Outlet
9. Floor Gully to be Sized by M&E Consultants
10. Mains Water Supply To This Location By Others
11. Mains Water Top-up Solenoid Valve
12. Irrigation Controller
13. Water Meter
14. Fertiliser Dosing System c\w Bund
15. Water Exits Plant Room to Landscaped Areas (Level 1,2,3,4,5 and 10)
16. Water Exits Plant Room to Landscaped Areas (Level 6,7,8 and 9)

NOTE: All Pipework and signal cable routing within the building from the plant room to the landscaped areas to be designed and coordinated by others.



REFERENCE DRAWING(S): -

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NOTES: -

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Notes

Water Supply - WSL requires 0.8 litres per second at minimum pressure of 1 bar. maximum pressure 4 bar regulated in a BSP type threaded fitting at point 10 shown on drawing.

Drainage - WSL shall require a suitable drainage connection.

Power - WSL shall require a suitable power supply to the irrigation equipment -

- 25A / 415V / 3 Ph / 50Hz / N / E - Pump System
- 10A / 240V / 1 Ph for Irrigation Control System
- 10A / 240V / 1 Ph for Electronic Water Conditioner
- 10A / 240V / 1 Ph for UV Treatment Unit

Network Connection - WSL requires a RJ-45 port with a LAN Connection and a static IP address for remote access to the irrigation control system.

Other Items - The plant room shall require other standard items such as lighting, fire detection / warning systems etc - if required this will need to be specified by the main architects

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| P02 | 24.11.22 | Issued for stage 4a | PDB | MC- | - |

Irrigation Consultant :

waterscapes Ltd
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*Wincanton*
*Somerset, BA9 9RX*
*Tel: 01963 824166 Fax: 01963 824443*
*Email: info@waterscapeslimited.com*

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Project Title:

Belgrove House

Drawing Title:

Irrigation
Plant Room Layout

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:10 | Stage 4a | WSL3209-11 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 01.11.22 | 01.11.22 | - |

| Drawing No: | Revision: |
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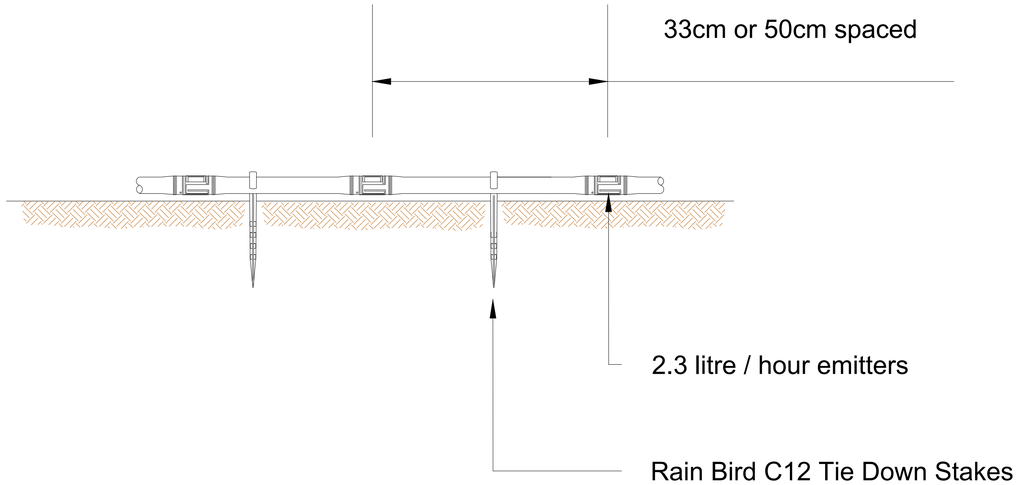
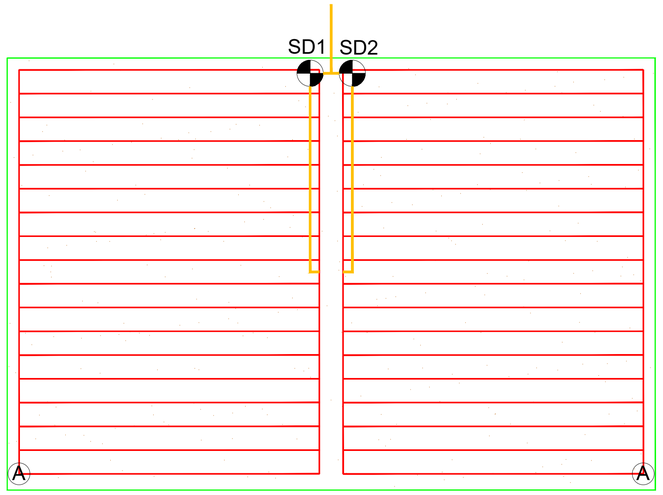
| WSL3209-11 | P02 |




Section View - Installed on Soil Surface before mulching




Typical Grid Style Installation

Legend

- Drip Pipework
- Pipework
- Solenoid Valve
- Air Relief Valve



REFERENCE DRAWING(S): -

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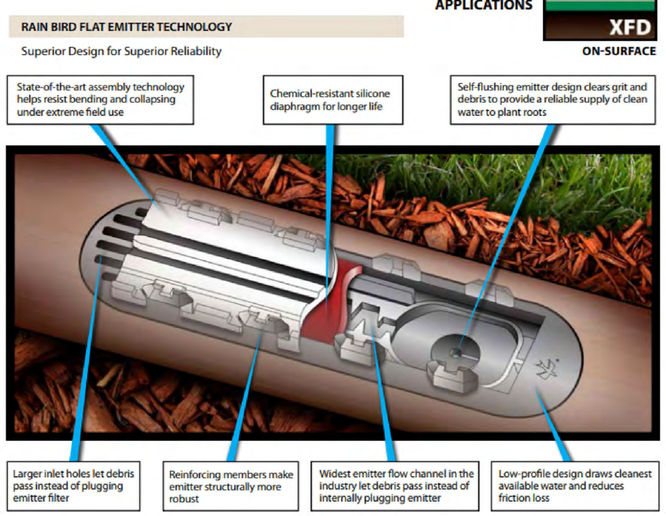
XFD DRIPLINE FOR ON-SURFACE APPLICATIONS

ON-SURFACE




## XF™ Series Dripline

### The most flexible, kink resistant tubing

**Applications**

Rain Bird XF™ Series Dripline is the latest innovation in the Rain Bird Xerigation® family. Because it is the most flexible, kink-resistant tubing available, it's ideal for irrigating areas where traditional drip tubing is difficult to install.
XF™ dripline is perfect for small, narrow and tight planting areas, as well as areas with tight curves or many switchbacks.

Because it accepts 17mm insert fittings, and Lock type fittings makes it easier than ever to design with, and install Rain Bird dripline.

XF™ Series Dripline is **simple, reliable** and **durable.**

**Features**

**Simple**
- Unique material offers significantly greater flexibility and kink-resistance for fast, easy installation.
- The bend radius for XF™ dripline is 7,6 cm no matter which way you bend the tube. Other driplines will bend 10,2 cm if bending with the natural curve of the coil and only 17,8 cm if bending against the natural curve of the coil.
- Greater flexibility assures design capability of tight curves and spaces.
- Accepts Rain Bird 17mm insert fittings and Lock type fittings.
- Variety of spacing and coil lengths provides design flexibility for a number of nonturfgrass applications.

**Reliable**
- The pressure-compensating emitter design provides a consistent flow over the entire lateral length ensuring higher uniformity for increased reliability in the pressure range of 0,59 to 4,14 bar.

**Durable**
- Dual-layered tubing (brown over black) provides unmatched resistance to chemicals, algae growth and UV damage.

**Operating Range**
- Pressure: 0,59 to 4,14 bar
- Flow rates: 2,3 l/hr
- Temperature:
  Water: Up to 38° C
  Ambient: Up to 52° C
- Required Filtration: 120 mesh

**Specifications**
- OD: 16,10 mm
- ID: 13,61 mm
- Thickness: 1,24 mm
- 33 cm, 40 cm and 50 cm spacing
- Available in 25 m, 50 m, 100 m and 200 m coil

**Models**
- XFD-23-33-25
- XFD-23-33-50
- XFD-23-33-100
- XFD-23-33-200
- XFD-23-40-50
- XFD-23-40-100
- XFD-23-50-100
- XFD-23-50-200

XF™ Dripline Coil

XF™ Dripline offers increased flexibility for easy installation.

***How to Specify/Order:***

***XFD-23-33-100***

- ***Model*** *XF™ Dripline*
- ***Flow Rate*** *23= 2,3 l/h*
- ***Coil Length*** *25= 25m, 50=50m, 100=100m, 200=200m*
- ***Emitter Spacing*** *33= 33 cm, 40= 40 cm, 50= 50 cm*

| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
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Landscape Architect:

Bradley-Hole Schoenaich Landscape

Irrigation Consultant:

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

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*Email: info@waterscapeslimited.com*

Project Title:

Belgrove House

Drawing Title:

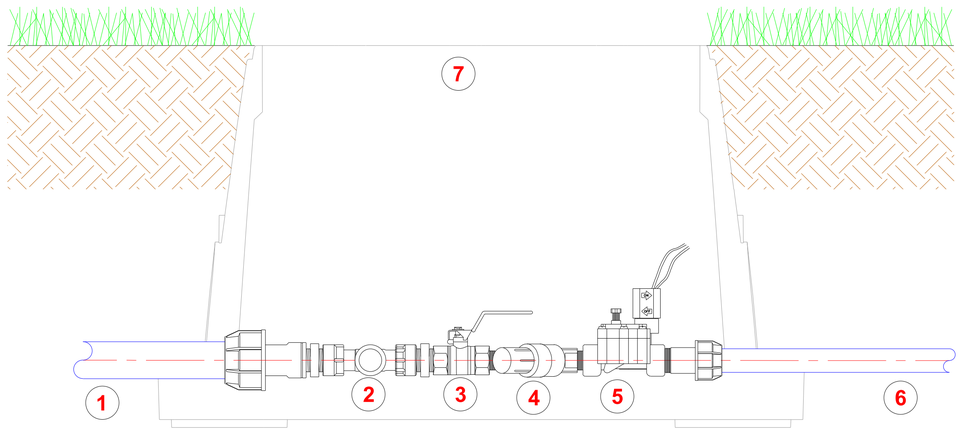
Example Drip Pipework Installation

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| NTS | For information | WSL3209-EX1 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 24.11.22 | 24.11.22 | - |

Drawing No: WSL3209-EX1

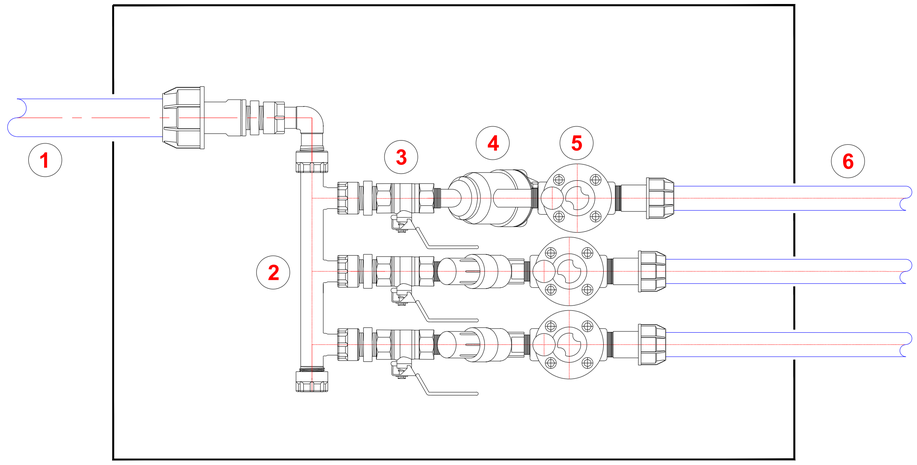
Revision: P01

## Section View




1. Irrigation Main Line Pipework
2. Dura Manifold
3. Full Flow Valve
4. In-line Filter
5. Rain Bird Solenoid Valve
6. Outgoing water to irrigated landscape
7. Buried Rain Bird valve box

## Plan View



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Landscape Architect:

Bradley-Hole Schoenaich Landscape

Irrigation Consultant:

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS
*1 Murray Court*
*Wincanton Business Park*
*Wincanton*
*Somerset, BA9 9RX*
*Tel: 01963 824166 Fax: 01963 824443*
*Email: info@waterscapeslimited.com*

Project Title:

Belgrove House

Drawing Title:

Example Solenoid Valve Assembly

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| NTS | For information | WSL3209-EX2 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 17.11.2022 | 17.11.2022 | - |

Drawing No: WSL3209-EX2

Revision: P01

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RAIN BIRD. Tech Spec

## DV Series Valves

### The Industry Leader for Over 20 Years.




### Features

**DV SERIES**
- Double-filtered pilot-flow design for maximum reliability
- Balanced-pressure diaphragm for long life
- External bleed to manually flush system of dirt and debris during installation and system start up
- Internal bleed for spray-free manual operation
- Energy efficient, low-power encapsulated solenoid with captured plunger and 163 micron solenoid filter
- Buna-N diaphragm with self-cleaning 163 micron pilot water filter and captive spring
- Operates in low-flow and Xerigation® applications when a minimum 75 micron filter is installed upstream
- 3,2 cm stainless steel phillips head screws
- Accepts latching solenoid for use with Rain Bird battery-operated controllers
- Available as:
  - ¾" (20/27) and 1" (26/34) standard in-line configuration
  - 1"(26/34) Male-by-Male (MM) configuration

**DVF SERIES**
- Incorporates all features of DV Series valves
- Unique, easy-to-turn pressure-assisted flow control mechanism

### Operating Range

- Pressure: 1,0 to 10,4 bar
- 075-DV Flow: 0,05 to 5,0 m³/h; 0,01 to 1,39 l/s; for flows below 0,75 m³/h; 0,21 l/s or any Xerigation application, when a minimum 75 micron filter is installed upstream
- 100-DV/DVF Flow: 0,05 to 9,08 m³/h; 0,01 to 2,52 l/s; for flows below 0,75 m³/h; 0,21 l/s or any Xerigation application, when a minimum 75 micron filter is installed upstream
- Temperature: Up to 43° C
- Ambient air temperature up to 52° C

### Electrical Specifications

- 24 VAC 50/60 Hz (cycles/sec) solenoid
- Inrush current: 0,30 A (7,2 VA) at 60 Hz
- Holding current: 0,19 A (4,6 VA) at 60 Hz
- Coil resistance: 42-55 Ohms
- Not compatible with ESP-LXD decoders. Use Rain Bird commercial valves (PGA, PEB, GB, EFB-CP and BPE series)

### Dimensions

**DV SERIES**
- Height: 11,4 cm
- Length: 11,1 cm; (MM) 14,6 cm
- Width: 8,4 cm

**DVF SERIES**
- Height: 14,2 cm
- Length: 11,1 cm
- Width: 8,4 cm

### Models

- 075-DV: ¾" (20/27)
- 100-DV-9V: 1"(26/34)
- 100-DV: 1"(26/34)
- 100-DV-MM: 1"(26/34)
- 100-DV-MM-9V: 1"(26/34)
- 100-DVF: 1"(26/34)

### 100-DV Male x Male

**Valve Pressure Loss (bar)**

| Flow | | 075-DV ¾" | 100-DV/100-DVF 1" |
|---|---|---|---|
| (m³/h) | (l/s) | (bar) | (bar) |
| 0,25 | 0,06 | 0,18 | 0,15 |
| 0,75 | 0,21 | 0,18 | 0,15 |
| 1,0 | 0,28 | 0,20 | 0,17 |
| 2,0 | 0,56 | 0,24 | 0,19 |
| 5,0 | 1,39 | 0,37 | 0,31 |
| 7,5 | 2,08 | - | 0,48 |
| 9,1 | 2,52 | - | 0,60 |

### 100-DV Male x Male

**Valve Pressure Loss (bar)**

| Flow | | Male x Male 1" |
|---|---|---|
| (m³/h) | l/s | (bar) |
| 0,25 | 0,06 | 0,15 |
| 0,75 | 0,21 | 0,15 |
| 1,0 | 0,28 | 0,17 |
| 2,0 | 0,56 | 0,19 |
| 5,0 | 1,39 | 0,36 |
| 7,5 | 2,08 | 0,72 |
| 9,1 | 2,52 | 1,27 |

**Notes:**
1) Rain Bird® recommends flow rates in supply line not to exceed 2,5 m/sec (8,2 ft/sec) to reduce the effects of water hammer.
2) DV Series valves cannot be used with WR-Jr® pressure regulating modules.
3) DV/DVF Male x Male not recommended for flows exceeding 6,8 m³/h; 1,9 l/s.
4) DV/DVF Valves cannot be used with two-wire/decoder systems.

### How To Specify

100 - DV - MM

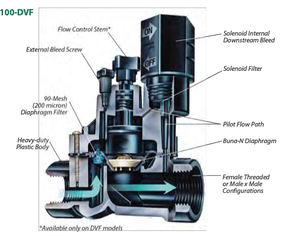
- 100 — Size: 075: ¾" (20/27) 100: 1"(26/34)
- DV — Model: DV: Remote Control Valve
- MM — Optional Configuration: MM: Male x Male

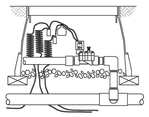
*Note: This specifies a 100-DV valve; 1" (26/34) male x male.*

---

RAIN BIRD.

## 100-DVF



DV Series

### Specifications

**075-DV, 100-DV, 100-DV-MM Electric Remote Control Valves**

The valve shall be normally closed 24 VAC 50/60 Hz (cycles per second) solenoid actuated, balanced pressure type capable of a flow rate of _____ l/s; m³/h with a pressure loss not to exceed _____ bar. The valve pressure rating shall not be less than 10,4 bar. The valve body and bonnet shall be constructed of high impact weather resistant plastic, stainless steel and other chemical/UV resistant materials. The valve shall have a one unit diaphragm constructed of durable Buna-N rubber material with a clog resistant metering orifice. The valve shall have one 90-mesh (200 micron) pilot filter attached to the diaphragm. The valve shall have one fully encapsulated solenoid with captured plunger.

The valve shall have one 90-mesh (200 micron) filter attached to the solenoid base.

The valve body shall have one of the following: a 3/4" globe configuration (20/27) or 1" (26/34) (FBSP) inlet and outlet; a 1" (26/34) (MBSP) inlet and outlet configuration.

The valve shall be actuated by a low power 0,30 A (7,2 VA) in-rush current and 0,23 A (5,5VA) holding current. The valve shall be capable of on/off control by turning the solenoid 1/4 turn. The valve shall provide a flush mode that is manually activated by 1/2 turn of the bleed screw where external porting is permissible.

The valve shall be as such to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

The remote control valve shall be manufactured by Rain Bird Corporation, Azusa, California.

**100-DVF Electric Remote Control Valves with Flow Control**

*Optional Feature Specifications*

When so indicated on the design, the DVF valve shall have all the specifications of the DV Series remote control valve plus a unique, easy-to-turn pressure-assisted flow control mechanism.

The remote control valve with flow control shall be as manufactured by Rain Bird Corporation, Azusa, California.

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RAIN BIRD. Tech Spec

## PGA Series Valves

### Versatility at an affordable price.

Whether the job calls for a globe or angle valve, PGA Series valves are the right choice. Loaded with features, these heavy-duty PVC valves are economical, easy to install and built to withstand constant 150 psi (10,35 bar) pressure and 2 to 150 gpm (0,45 to 34,05 m³/h; 7,8 to 568 l/m) flows.

The PGA Series from Rain Bird – built to last… and last!

### Features

- Globe and angle configuration for flexibility in design and installation
- PVC and glass reinforced nylon construction
- Filtered pilot flow to resist debris and clogging of solenoid ports
- Slow closing to prevent water hammer and subsequent system damage
- Manual internal bleed operates the valve without allowing water into the valve box
- One-piece solenoid design with captured plunger and spring for easy servicing Prevents loss of parts during field service
- Non-rising flow control handle adjusts water flows as needed
- Normally closed, forward flow design

### Options (order separately)

- Accommodates optional, field installed PRS-D pressure regulating module
- Optional purple flow control handle for easy identification of non-potable water system
  - PGA-NP-HAN (1" and 1½")
  - PGA-NP-HAN2 (2")
- Accepts latching solenoid for use with Rain Bird battery-operated controllers up to 150 psi (10.35 bar)
- Compatible with ESP-LXD decoders

### Operating Range

- Pressure: 15 to 150 psi (1.04 to 10.35 bar)
- Flow: 2 –150 gpm (0.45 to 34.05 m³/h; 7.8 to 568 l/m)
- Flow with PRS-D: 5 –150 gpm (1.14 to 34.05 m³/h; 19.2 to 568 l/m)
- Water Temperature: up to 110° F (43° C)
- Ambient Temperature: up to 125° F (52° C)

### Electrical Specifications

- Power: 24 VAC 50/60 Hz (cycles/sec) solenoid
- Inrush current: 0.41 A (9.84 VA) at 60 Hz
- Holding current: 0.28 A (6.72 VA) at 60 Hz
- Coil resistance: 30-39 Ohms

### Models

| | | |
|---|---|---|
| • 100PGA | 1" | (26/34) |
| • 150PGA | 1½" | (40/49) |
| • 200PGA | 2" | (50/60) |

*• BSP threads available; specify when ordering.*

### Dimensions

| Size | Height | Length | Width |
|---|---|---|---|
| 100PGA | 7¼" (18.4 cm) | 10" (14.0 cm) | 3¼" (8.3 cm) |
| 150PGA | 8" (20.3 cm) | 6¼" (17.2 cm) | 3¼" (8.9 cm) |
| 200PGA | 10" (25.4 cm) | 7¼" (19.7 cm) | 5" (12.7 cm) |

*Note: The PRS-D option adds 2" (5.1 cm) to valve height.*

### PGA Series Valve Pressure Loss (psi)

| Flow gpm | 100-PGA Globe | 100-PGA Angle | 150-PGA Globe | 150-PGA Angle | 200-PGA Globe | 200-PGA Angle |
|---|---|---|---|---|---|---|
| | 1" | | 1½" | | 2" | |
| 3 | 5.5 | 4.0 | - | - | - | - |
| 5 | 5.9 | 5.0 | - | - | - | - |
| 10 | 6.0 | 5.6 | - | - | - | - |
| 30 | 6.4 | 5.5 | 1.9 | 1.3 | - | - |
| 40 | 7.0 | 7.5 | 3.2 | 2.0 | 1.2 | 1.0 |
| 50 | - | - | 4.8 | 3.0 | 1.5 | 0.9 |
| 75 | - | - | 11.1 | 6.9 | 3.0 | 1.7 |
| 100 | - | - | 19.2 | 11.7 | 5.5 | 3.0 |
| 125 | - | - | - | - | 8.6 | 4.8 |
| 150 | - | - | - | - | 12.0 | 6.5 |

### PGA Series Valve Pressure Loss (bar)

| Flow m³/h | Flow l/m | 100-PGA 2.5cm Globe | 100-PGA 2.5cm Angle | 150-PGA Globe 3.8cm | 150-PGA Angle 3.8cm | 200-PGA Globe 5.1cm | 200-PGA Angle 5.1cm |
|---|---|---|---|---|---|---|---|
| 0,23 | 3,8 | 0,38 | 0,28 | - | - | - | - |
| 0,4 | 5,0 | 0,38 | 0,32 | - | - | - | - |
| 1,2 | 20 | 0,38 | 0,35 | - | - | - | - |
| 3 | 50 | 0,41 | 0,38 | - | - | - | - |
| 6 | 100 | 0,43 | 0,38 | 0,10 | 0,07 | - | - |
| 9 | 150 | 0,48 | 0,52 | 0,14 | 0,09 | 0,08 | 0,07 |
| 13 | 220 | - | - | 0,28 | 0,23 | 0,13 | 0,07 |
| 15 | 250 | - | - | 0,61 | 0,36 | 0,17 | 0,10 |
| 18 | 300 | - | - | 0,86 | 0,51 | 0,24 | 0,13 |
| 21 | 350 | - | - | 1,16 | 0,70 | 0,33 | 0,18 |
| 24 | 400 | - | - | - | - | 0,41 | 0,23 |
| 27 | 450 | - | - | - | - | 0,54 | 0,30 |
| 30 | 500 | - | - | - | - | 0,67 | 0,36 |
| 34 | 568 | - | - | - | - | 0,85 | 0,45 |

**Notes**
1) Loss values are with flow control fully open.
2) PRS-D module recommended for all flow ranges.
*Recommendations*
1) Rain Bird recommends flow rate in the supply line not to exceed 2,5 ft./sec. (0,29 m/s) in order to reduce the effects of water hammer.
2) For flows below 5 gpm (1.14 m³/h; 19,21 l/m), Rain Bird recommends use of upstream filtration to prevent debris from collecting below the diaphragm.
3) For flows below 10 gpm (2,22 m³/h; 37,8 l/m) Rain Bird recommends the flow control stem be turned down two full turns from the fully open position.



### PGA Series Temperature Rating

| Water Temp. | Continuous Pressure |
|---|---|
| 73° F (23° C) | 150 psi (10,40 bar) |
| 80° F (27° C) | 132 psi (9,10 bar) |
| 90° F (32° C) | 112 psi (7,70 bar) |
| 100° F (38° C) | 93 psi (6,40 bar) |
| 110° F (43° C) | 75 psi (5,20 bar) |

### How To Specify

100 - PGA - PRS-D

- 100 — Size: 100: 1" (26/34) 150: 1½" (40/49) 200: 2" (50/60)
- PGA — Model: PGA
- PRS-D — Optional Feature: PRS-D: pressure regulating module. (must be ordered separately)

*Note: Valve and PRS-Dial modules must be ordered separately. For non-U.S. applications, it is necessary to specify NPT or BSP thread type.*

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RAIN BIRD.

### Specifications

The electric remote control valve shall be a normally closed 24 VAC 50/60 Hz (cycles/sec) solenoid actuated globe/angle pattern design. The valve pressure rating shall not be less than 150 psi (10,35 bar). The valve shall have the following characteristics (circle one):

Flow rate: _____ gpm m³/h l/m

Pressure loss not to exceed: _____ psi bar

The valve body and bonnet shall be constructed of high-impact, water-resistant PVC for the body and glass-filled nylon for the bonnet 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. The valve's internal bleed shall prevent flooding of the valve box.

The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing, and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 VAC, minimum at 150 psi (10,35 bar). At 24 VAC, average inrush current shall not exceed 0,41 amps. Average holding current shall not exceed 0,28 amps.

The valve shall have a flow control stem for accurate manual regulation and/or shut off of outlet flow. The valve must open or close in less than 1 minute at 150 psi (10,35 bar), and less than 30 seconds at 20 psi (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. The body shall have a removable O-ringed plug for installation in either globe or angle configuration.

### Optional Feature Specification

**PRS-D Pressure Regulating Module**
**100PGA-PRS-D, 150PGA-PRS-D, 200PGA-PRS-D**

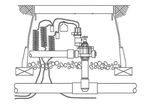
When so indicated on the design, the electric remote control valve shall have a pressure regulating module (PRS-D) capable of regulating outlet pressure between 15 and 100 psi (±3 psi) (1.04 and 6.90 bar (±0,21 bar)).

The PRS-D module shall have an adjusting knob for setting pressure and Schrader valve connection for monitoring pressure. The pressure shall be adjustable from the PRS-D when the valve is internally manually bled or electrically activated.

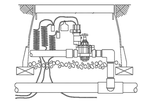
**Non-Potable Flow Control Handle**
**PGA-NP-HAN1 - Fits 1" and 1½"**
**PGA-NP-HAN2 - Fits 2"**

When so indicated on the design, the valve shall have a purple flow control handle to indicate to the user that non-potable water is being used. There shall be no difference between the black and purple handles except for the color.

Plastic Electric Remote Control
PGA Valve (with PRS-D) using bottom inlet



Plastic Electric Remote Control
PGA Valve (with PRS-D) using side inlet



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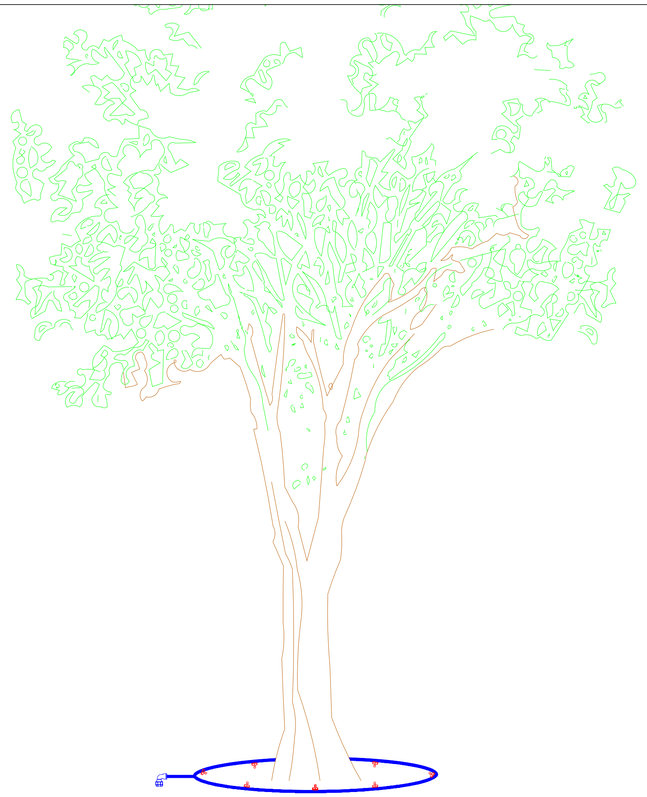
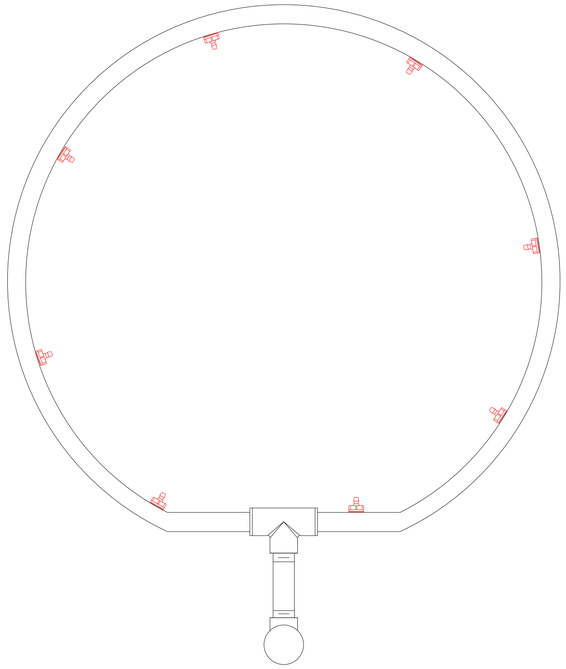


Typical Tree Ring Installation



Tree Ring Example with 8 Equally Spaced Rain Bird Emitters

Example Tree Ring installed - before and after being covered with mulch

Example of Tree Emitter in operation



REFERENCE DRAWING(S): -

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NOTES: -

1. THIS DRAWING IS TO READ IN CONJUNCTION WITH ALL OTHER DRAWINGS & SPECIFICATIONS ON THIS CONTRACT WORKS PACKAGE

2. ALL DIMENSIONS IN mm (UNLESS OTHERWISE NOTED)

3. DO NOT SCALE FROM THIS DRAWING - ALL DIMENSIONS TO BE CHECKED ON SITE

4. ANY OMISSIONS OR DISCREPANCIES TO BE REPORTED TO WATERSCAPES IMMEDIATELY

| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |

Irrigation Consultant:

waterscapes Ltd
WATER FEATURE & IRRIGATION SPECIALISTS

*1 Murray Court*
*Wincanton Business Park*
*Wincanton*
*Somerset, BA9 9RX*
*Tel: 01963 824166 Fax: 01963 824443*
*Email: info@waterscapeslimited.com*

Landscape Architect:

Bradley-Hole
Schoenaich Landscape

Project Title:

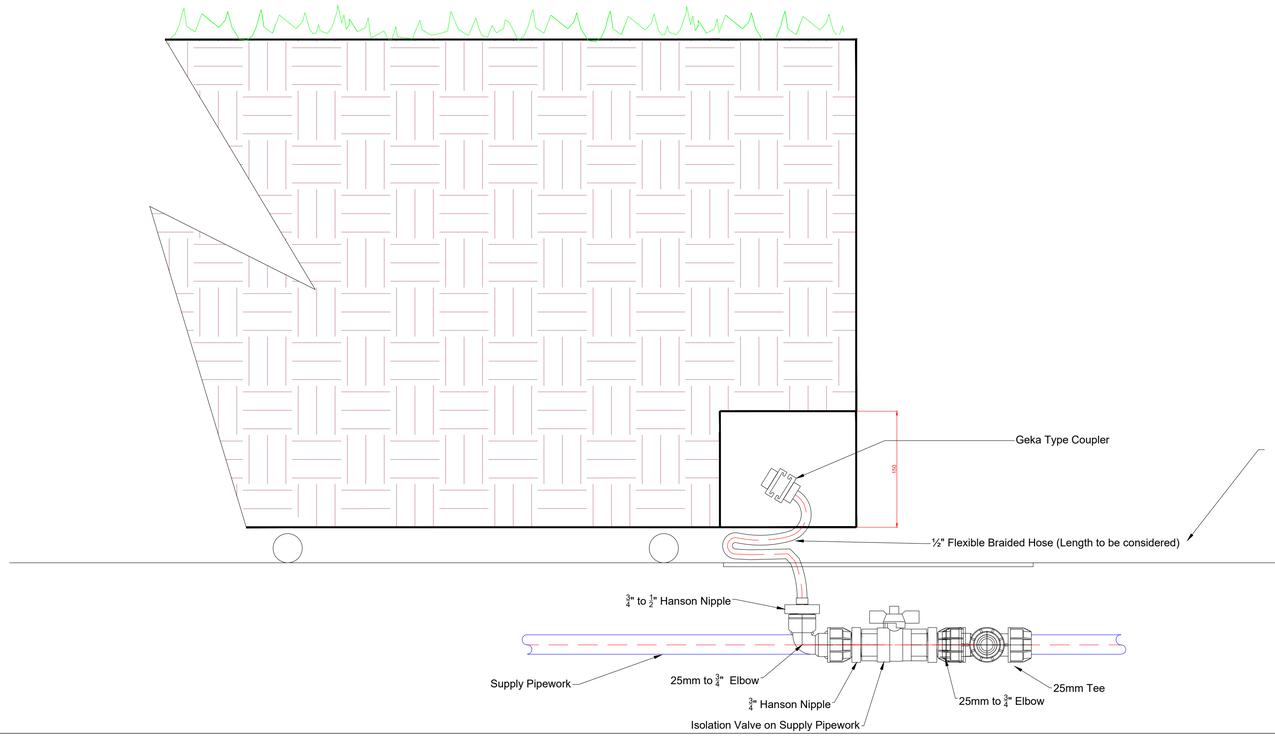
Belgrove House

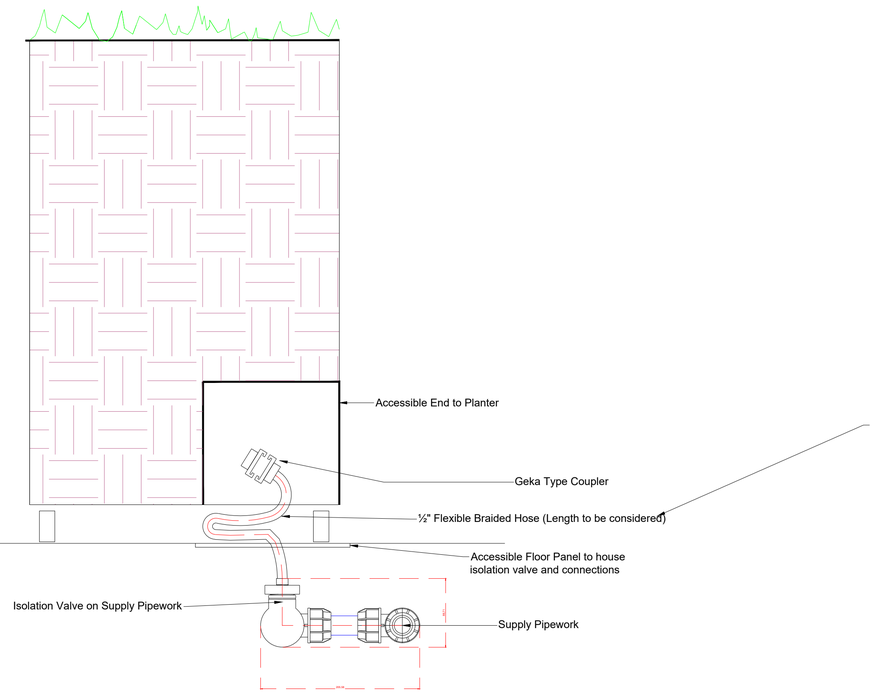
Drawing Title:

Example Tree
Drip Installation

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| NTS | For information | WSL3209-EX3 |
| **Drawn:** | **Checked:** | **Approved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 24.11.22 | 24.11.22 | - |

| Drawing No: | Revision: |
|---|---|
| WSL3209-EX3 | P01 |

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LEGEND:

Note: Pipe and fitting sizes will depend upon requirement

| Rev. | Date | Description | Drn. | Chd. | App. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |

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Project Title:

## Belgrove House

Drawing Title:

## Example Moveable Planter Irrigation Connection

| Scale at A1: | Status: | CAD File Name: |
|---|---|---|
| 1:4 | For information | WSL3209-EX1 |
| **Drawn:** | **Checked:** | **Aprroved:** |
| PDB | MC | - |
| **Date:** | **Date:** | **Date:** |
| 24.11.22 | 24.11.22 | - |

Drawing No: WSL3209-EX4

Revision: P01