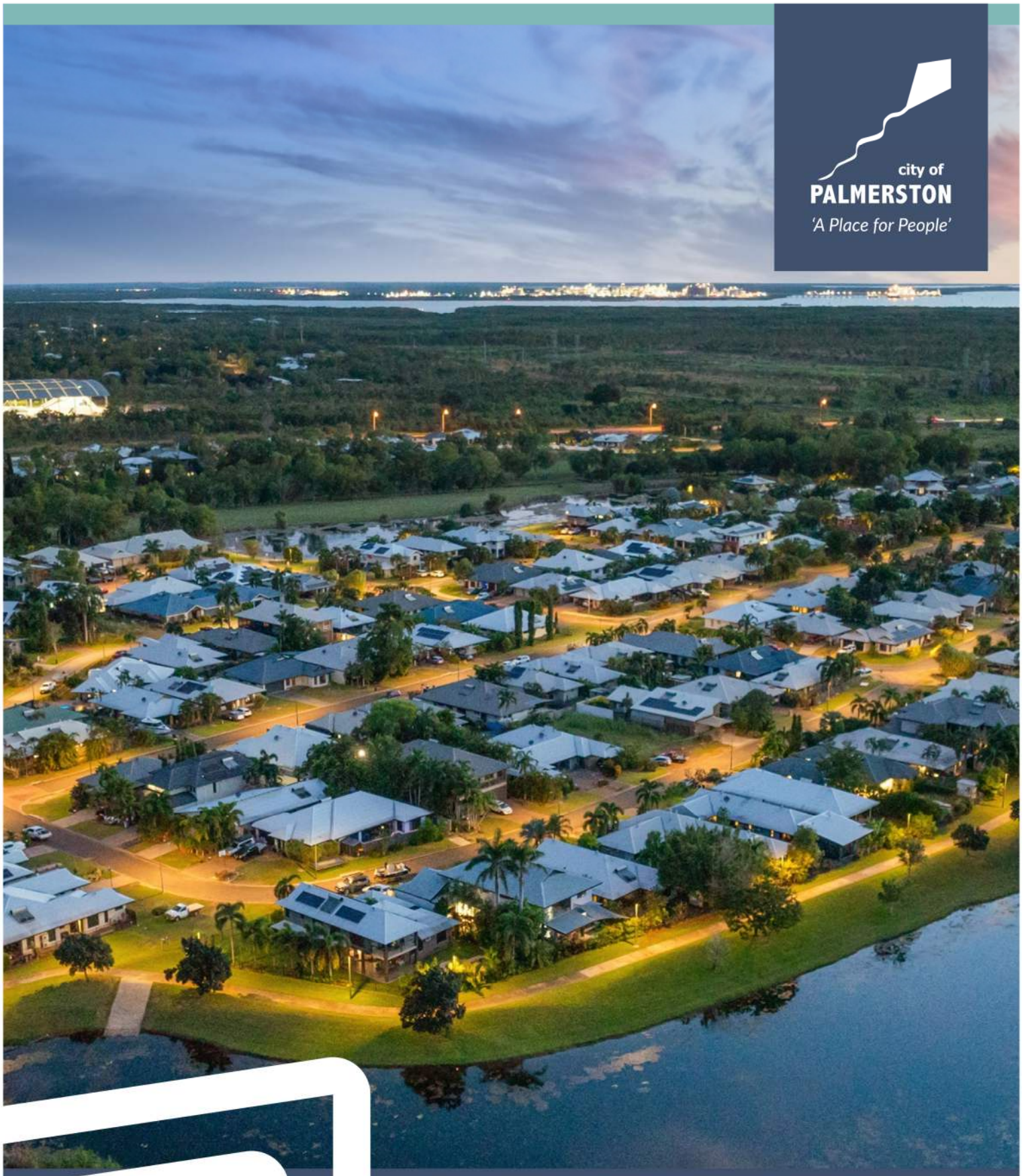

city of
PALMERSTON
'A Place for People'

IRRIGATION DESIGN & INSTALLATION SPECIFICATIONS

CONTENTS

DOCUMENT PROPERTIES

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, please contact:

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Version History

Version	Revision date	Revised by	Checked by
1	05/12/2025	Jasper Hodgson	Jasper Hodgson
2	11/03/2026	Daniel Baker	Jelise Camilleri

Approved by	Name	Endorsement ID	Date
GMI	Nadine Nilon	687556	15/05/2026

1. GENERAL

This Part specifies the requirements for the supply and installation of an irrigation system. Unless specified otherwise, the Contractor shall be responsible for:

(a) connection to water supply points.

(b) supply and installation of all components of the irrigation system – new and salvaged.

(c) programming, flushing, commissioning and testing of the system.

(d) ensuring that the system is fully functioning.

(e) provide 'as constructed' drawings.

The drawings may specify additions, deletions or modifications to the requirements specified in this part.

2. REFERENCED DOCUMENTS

The works, materials and installations in this specification and project drawings shall conform to the current edition of the appropriate Australian Standards and Plumbing Code of Australia.

The work under the Contract shall comply with the following:

AS/NZS1477	PVC pipes and fittings for pressure applications
AS3879	Solvent cements and Priming fluids for use with un-plasticised PVC pipes and fittings
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS2129	Flanges for pipes, valves, and fittings
AS/NZS 2638.1	Gate valves for waterworks purposes – metal seated
AS/NZS 2638.2	Gate valves for waterworks purposes – resilient seated
AS 3500.1	National Plumbing and Drainage Code Part 1: Water Services
AS 2129	Flanges for pipes, valves and fittings
AS 2698.2	Plastics pipes and fittings for irrigation and rural applications – Polyethylene rural pipe
AS 2698.3	Plastics pipes and fittings for irrigation and rural applications – Mechanical joint fittings for use with polyethylene micro-irrigation pipes
AS 1572	Copper and copper alloys – Seamless tubes for engineering purposes
AS 4809	Copper pipe and fittings – installation & commissioning
AS 1074	Steel tubes and tubulars for ordinary service
AS 4129	Fittings for polyethylene (PE) pipes for pressure applications
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications

AS/ NZS 4131	Polyethylene (PE) compounds for pressure pipes and fittings
AS 1830	Grey cast iron
AS 2566.2	Buried flexible pipelines – installation
AS/NZS 4765	Modified PVC (PVC-M) pipes for pressure applications
AS/NZS 2280	Ductile iron pipes and fittings
AS 3688	Water supply – metallic fittings and end connectors
AS 4181	Stainless steel clamps for waterworks purposes
AS 1646	Elastomeric seals for waterworks purposes
AS/NZS 4087	Metallic flanges for waterworks purposes
AS 1628	Water supply – copper alloy gate, globe and non-return valves
AS/ NZS3000	Electrical Installation of Building, Structures & Premises - Wiring Rules Amendments 1, 2, and 3.

Power and Water corporation- Service and Installation Rules.

The Plumbing Code of Australia.

Office of the Technical Regulator (OTR) Requirements.

3. ABBREVIATIONS AND IRRIGATIONS TERMS

Control Valve	Valves that connect mainlines to laterals or sub-mains. On/off & pressure control.
Mainline	Pipes that are constantly pressurised when irrigation feed water to control valves.
Lateral	Intermittently pressurised pipe work with outlets attached, downstream from control valves.
Submain	Manifold of controlled pressure to feed laterals.
PVC	Poly Vinyl Chloride
HDPE	High Density Polyethylene (AS4130 & AS2033)
LDPE	Low Density Polyethylene (Type 30 to AS2698)
BSP	British Standard Pipe
RBY	Rainbird product -Pressure-regulating filter
ICV	Hunter product - Irrigation Control Valve
ICD	Hunter product – Irrigation Control Decoder

DBRY	Direct Bury (Red/Yellow) Wire Joiner
FLOW	Flow sensor
QCV	Quick Coupling Valve
VQA	Valve Quick Action or Flushing Valve
PC	Pressure Compensating
AS	Anti-Siphoning
XR	Extra Root Resistant
DCV	Backflow Prevention Device
RPZ	Reduced Pressure Zone
PRV	Pressure-reducing valve
PE	Polyethylene
PN	Pressure Rating
EFW	Electro-Fusion welding
SWJ	Solvent weld joint
RRJ	Rubber ring joint
SDR	Standard Dimension Ratio
DN	Outside Diameter

*from AS3000

4. EXISTING SERVICES

4.1 Existing Services Locations

The Contractor shall by investigation and using the 'Dial before You Dig' services, accurately locate and expose all existing services at least 25 metres ahead of any excavation. The Contractor shall seek advice from the Council representative and other relevant Service Authorities regarding the location of any existing services. Information provided to the Contractor shall not diminish the Contractor's responsibility to locate all existing services.

4.2 Protection of or Damage to Existing Services

The Contractor must take precautions necessary to protect private & public services during the works. If any existing service is damaged, the Contractor shall immediately:

- Notify the council of any damage to an existing service.
- Contact the relevant Services Authority concerned to advise of the damage and arrange for required isolation of the service.
- Make arrangements for any repairs required to the service by qualified and licensed trade workers.

- Damage to any existing services, previously identified, shall be made good at the Contractor's expense.

4.3 Salvaged Materials

- Any existing irrigation components required to be removed and/or re-used for the installation of the new or amended system (excluding PVC/HDPE & LDPE pipe work) shall be exhumed, cleaned, and returned to the Council representative.
- The Irrigation Technical Officer shall determine the suitability of each item for re-use.
- Any existing irrigation components deemed not suitable for re-use by the Irrigation Technical Officer, will be decommissioned and disposed of by the Contractor at their cost.

5. PRODUCTS AND APPROVALS

All installed materials & products shall be new and unused.

5.1 Brands and Trade References

Where a brand and/or supplier catalogue or reference numbers is nominated, it is intended to establish the required standard of quality, compatibility, performance and fit for purpose. Equivalent products may be proposed but must not be installed without Council's prior written approval. Any proposed alternative must demonstrate equivalent or better performance, durability, compatibility, maintainability and whole-of-life value.

5.2 Products certified for use

Where service authorities require that equipment be approved for connection to their utilities, the Contractor shall validate that certification/ approval is current for all equipment proposed for use. Evidence of such certification/approval shall be provided to the council on request and form part of the 'as constructed' documentation package.

6. ANOMALIES

The Contractor shall become familiar with the project drawings, Standard Details, Irrigation Specification, and instructions prior to any works being undertaken. Any errors, omissions or contradicting detailing / clauses discovered in any of the above-mentioned documents shall be referred to the Irrigation Technical Officer immediately.

The Contractor will not wilfully install the irrigation system as diagrammatically shown when it is obvious that obstructions, grade differences or site dimensions exist that may not have been foreseen or considered in the irrigation system design.

If this notification is not performed, the contractor shall assume full responsibility and costs for any revision or repair work where necessary.

7. WATER SUPPLY

7.1 Water Source

- Northern Territory Power and Water Corporation.
- Existing City of Palmerston bores.

Any new water meter required, as part of the overall irrigation design to be supplied & paid by the Council.

The location of the water service take-off points shall be in accordance with the drawings.

When 'not for drinking' water is to be used, the Contractor shall install visual identification in accordance with local regulations, which includes the following:

- Lilac-coloured pipe (full colour jacket) for use on non-potable water.
- Lilac-coloured sprinkler covers, solenoid valve covers and valve boxes.
- Adequate signage indicating the use of 'not for drinking' water.
- Pease note that by definition, any water regardless of its origin, that enters an irrigation system takes the classification of "not for drinking" and shall be treated accordingly, however lilac is only required on bore and recycled water supplies.

7.2 Backflow Prevention

Where 'drinking' mains water is used for the irrigation system, approved testable backflow device must be installed and connected downstream of the water meter as indicated on the drawings.

All backflow devices must be installed and tested by a licensed plumbing contractor who is qualified to install backflow devices and must comply with AS3500, the Plumbing Code of Australia. The contractor is to provide license qualifications and details to the Irrigation Technical Officer prior to undertaking any works.

All backflow device installations must be tested and issued with a Certificate of Compliance and these certificates/ compliance statements must be included in the 'as-constructed' documentation package. This shall be issued to the Irrigation Technical Officer for their information and records.

For any Drinking water meter requiring backflow prevention, the contractor shall supply & install:

- A testable backflow prevention device approved by the Power and Water Corp. for any irrigation system that is supplied by the same water meter.
- Backflow devices shall also have the following components.
- A bronze Y-strainer immediately upstream of the backflow prevention device.
- Two (2) approved ball valves on the inlet and outlet sides of the device.
- A screwed bronze barrel union or flanges on the inlet and outlet side of the check valve.
- All pipework from the water meter to the 'inlet-isolating valve of the backflow device shall be hard drawn copper (council preferred) or HDPE if specified on the project drawings. The pipe from the isolating valve on the discharge side of the backflow device to the master control valve shall be hard drawn copper according to the project drawings.
- All copper pipe work shall comply with AS4809.
- Refer to IRR-PC-CS-07 for further details.

For any installation requiring a high level of hazard protection, Reduced Pressure Zone devices shall be used, these will be installed following the same principles of the double check device except these must be installed above ground, the contractor shall supply & install:

- the backflow prevention device 300mm above ground level, adjacent the water meter. "No RPZ
- valves to be located below ground. "
- all above ground pipework as hard drawn copper with copper fittings and male & female threads made of de-zincification resistant brass.
- all copper pipe work shall comply with AS4809.
- the device within a pad-lockable fully welded galvanised EA steel-framed and vandal resistant cage or a pad-lockable painted metal cabinet on a concrete plinth base. (As determined by the council (CoP).
- Refer to IRR-PC-CS-08 for further detailing information.

For all plinth-based installations, the contractor shall supply & install:

- the base of the valve assembly on a minimum 100mm thick Class N20 concrete with centrally located SL72 reinforcement mesh and 100mm thick PM2/20QG pavement compacted to 98%MMDD.
- 2-off appropriately sized Class 9 PVC sleeves within the concrete base to allow for the safe installation of copper pipework; or
- Denso-tape or similar can wrap around the section of copper pipe installed within the slab.

8. SETTING OUT AND CHECKING OF WORK

8.1 Setting Out Pipe

If the Contractor becomes aware of any discrepancy or ambiguity in or between the drawings, Specification, and actual conditions on the site, it must notify the Irrigation Technical Officer as soon as practicable and before commencing work on the affected part of the Work. The Council is not obliged to make payment for additional work undertaken by the Contractor as a result of the Contractor's failure to comply with this Clause.

The Contractor shall clearly identify the location of mainline and lateral pipe runs, using paint or pegs for approval by the CoP Irrigation Technical Officer prior to trenching.

In general, sprinkler and drip tube locations are critical for uniform coverage however variations in pipework may be approved by the CoP Irrigation Technical Officer to avoid obstacles.

8.2 Inspection

The Contractor shall give 24 hours' notice for the Council /Irrigation Technical officer to make inspections at each of the following stages:

(a) Irrigation system pegs out and set-up including sprinkler head layout.

(b) first control valve (ICV) and valve box installation.

(c) First section of mainline/ submain, to observe depth, width and location.

(d) mainline/submain & lateral pipe installation prior to backfill.

(e) excavation around trees within a tree protection zone.

(f) mainline/sub main & lateral flushing.

(g) mainline pressure test.

(h) Practical Completion, and

(i) Final Inspection.

9. TRENCHING

9.1 General

The Contractor shall excavate all trenches to the dimensions and depths indicated on the drawings and described in this specification. The Contractor to allow for all bedding, fittings, cables and valve box assemblies.

Trench bases shall be flat, smooth and free from rocks or other debris that could be injurious to pipes and control cables.

No trenches are to be left open overnight or while the site is unoccupied unless suitably isolated (temp fencing) from pedestrian access.

The Contractor shall provide all necessary equipment for the backfilling of trenches, compacting, levelling and shall be responsible for top dressing trenches. This shall include trenches that have subsided after completion of works.

No variations shall be approved and paid for excavations except where material cannot be removed by reasonable methods – rock.

The definition of rock for the purpose of this specification is any material that in the irrigation technical officer/ project superintendent's opinion cannot be removed by hand tools or a backhoe/ excavator with
300mm wide bucket. the contractor shall advise the irrigation technical officer /project superintendent before attempting to remove the rock by other means. the contractor and irrigation technical officer/Project superintendent shall agree upon a method and price for removal. The price will reflect the type of rock and the methodology required for its removal.

9.2 Layout

Trenches shall be pegged out using a Total Survey System (or approved GPS system) by the Contractor and checked by the Irrigation Technical Officer, on behalf of the council, before trenching is undertaken. Trench layout shall only be altered where necessary and with the written approval of the IRRIGATION TECHNICAL OFFICER /PROJECT SUPERINTENDENT.

9.3 Trench Alignment

The Contractor shall ensure all mainline and lateral paths are straight and true as shown in the supplied drawings, unless noted otherwise.

Trenches shall align with fixed items such as buildings, kerbs, paths, sprinklers or valve locations.

Trenches shall be straight and less than a trench width deviation from true, unless sweeping arcs are required to avoid obstacles.

When there is a requirement to divert around an obstacle, the trench shall be offset parallel to the first trench and 45-degree angles used to join the pipe work.

Pipe deflections will only be allowed where the deflected radius is within pipe manufacturer's tolerances or is greater than 130 times the nominal pipe diameter.

Where existing trees are to be retained, any works adjacent to trees shall be performed without causing damage to root zone or limbs. Council shall be notified prior to any trenching or excavation suspected to involve cutting of roots >50mm in diameter. The roots must be clean cut with no tearing behind the cut.

The CoP Arborist will visit the site and inspect the tree roots and determine the best approach, which may require a combination of:

- Hydrovac excavation around roots.
- Hand digging where appropriate.
- Tree roots being cut back.

Contractor shall provide a schedule of rates in Clause 24 for the above-mentioned tasks/activities.

9.4 Trench Width

Trenches for all irrigation pipes work up to and including 50mm in diameter shall be installed in a minimum 140mm wide trench, unless noted otherwise.

63 ~100mm diameter pipe work shall be installed within a minimum 300mm wide trench.

When containing two (2) pipes (up to and including 50mm diameter) in the same trench, a minimum 300mm wide trench shall be provided.

When two (2) or more pipes greater than 50mm are laid in the same trench, the trench shall be 450mm wide.

Where multiple pipes are laid in common trench, pipes must be apart by at least 1off diameter of the largest pipe and trench width adjusted to suit.

9.5 Trench Depth

The Contractor shall allow for trench depths, including allowances for fittings, valve assemblies, valve boxes to ensure the resultant cover is achieved as described in Clause 11.8 – Depth of Cover to Top of Pipes.

Refer to IRR-PC-CS-21 for further detailed information.

9.6 Trench Adjustments

Trench adjustment changes, where required, shall be increased or decreased by gradual changes to the satisfaction of the Irrigation Technical Officer.

9.7 Excavated Material

Excavated material shall be stored on site during the installation process in such a manner as to not obstruct any drain, roadway, footpath, right of way or building access and shall not be deposited against a wall of any building or fence.

Any excavated topsoil shall be kept separate from other material to allow for the respreading at the completion of the trench if deemed suitable.

The Contractor shall remove surplus excavated materials from the site when appropriate. and any dumping fees shall be absorbed by the Contractor. Excavated rock shall not be used for back fill.

9.8 Backfilling

The Contractor shall generally apply bedding, backfill, and top finishes to trenches and excavations. Refer to IRR-PC-CS 21 further detailing information.

The base of trenches shall be laid & prepared with 60mm deep bedding sand complying with AS3500.1. Contractor to allow for imported bedding sand as part of the tender and include as a separate price (supply & delivery only).

At the time of excavation, if it is agreed with the Project superintendent and CoP Irrigation Technical Officer that the excavated spoil is suitable for bedding sand, it shall be used in lieu of the tendered bedding sand.

Unless noted otherwise, the first backfill to 200mm over any pipe shall be selected bedding material from excavated spoil or bedding sand complying with AS3500.1. The remaining trench depth can be filled with selected site spoil excavated from site.

Backfilling of trenches shall occur in layers of not more than 150mm thereafter. Each layer shall be compacted prior to the application of the next layer.

Trench compaction shall be using manual tamping for up to the first 200mm above the top of pipe and mechanical tamping thereafter.

9.9 Top Finish Treatments

All trenches, holes and other areas affected by the Contractor's works shall be reinstated to the same condition that existed prior to the excavation. The reinstated pavement shall not be of a lesser standard and thickness than the existing pavement.

Contractor to replace excavated sod-cut turf greater than or equal to 300mm with new and matching instant turf that is top-dressed (sandy loam: 80/20) and watered in. For trench widths less than 300mm, replace with 'seed mix' in lieu of new roll out turf.

Seed Mix	Instant Turf
80:20 Paspalum notatum 'Pensacola': Cynodon dactylon (couch) 4kg per $100m^2$	Couch or Zoyzia

Subsidence of trenches during construction and after completion of works shall remain the responsibility of the Contractor for the duration of the agreed maintenance /defects period.

10. LAYING & JOINTING OF PIPES

10.1 General

Pipes shall be laid complete with all valves and fittings in accordance with project drawings.

No irrigation pipework or wiring shall be laid beneath a concrete, paved or bituminous driveway, footpath or roadway unless contained within a sleeve pipe / conduit. No joins in either wiring or pipes shall occur within, or in close proximity to the sleeved section. Refer to Clause 11.7 for further information.

10.2 Witness Marks

Where witness marks are shown by pipe manufacturers, they shall be marked on the pipe spigot and must remain visible after completing the join.

10.3 Making Joints and Tolerances

Pipes shall be laid by inserting spigots into sockets. Manual jointing only will be permitted. Tolerances and deflections shall not exceed those defined by manufacturers and the appropriate Australian Standard. PVC and poly pipe shall be cut square, with a fine tooth saw or tube cutter, chamfered so all sharp edges and burrs are removed prior to making joints.

10.4 Preventing Dirt from Entering Pipes

The Contractor shall ensure before laying pipes of fittings that they are free from dirt or foreign matter. All pipe ends left open overnight shall be sealed to prevent material ingress.

10.5 Flushing

All pipes (mainline, submain & laterals) must be flushed of all debris before installing downstream devices including but not limited to solenoid valves, sprinklers or dripper lines. Pipes shall be flushed at the highest velocity possible, using whatever pumped or mains pressure is available.

11. PIPES AND FITTINGS

11.1 General

All pipework shall be installed according to the size and class shown on the drawings.

All pipe work and fittings shall be installed according to manufacturer's recommendations. All pipe work shall be flushed and completely cleaned of debris.

All irrigation pipes shall be lilac and solid in colour on bore and recycled water supplies, standard colours on potable mains (white for PVC, black with blueline for HDPE). All mainline and sub-main trenches shall have Marker Detection Tape installed at a minimum of 200mm above the top of irrigation pipework or conduit. Detection tape to exhibit metallic properties for easy detection on site.

Refer to AS2648.1 - 1995 for minimum requirements for detection marker tapes for all buried underground services.

11.2 Polyvinylchloride (PVC) Irrigation Pipes and Fittings

All PVC pipes that are connected to a bore, recycled or alternate 'not for drinking' shall be lilac and solid in colour.

All PVC mainline and sub-main pipe work upstream of local solenoid valve fitting shall be Class 12 minimum, unless noted otherwise on the drawings. All PVC lateral pipes located downstream of a local solenoid valve fitting may be Class 9 minimum, regardless of nominal diameter, unless noted otherwise on the project drawings.

PVC pipes less than 80mm nominal diameter shall use PVC Class 12 solvent welded connection fittings minimum after the master solenoid valve fitting, unless noted on the project drawings.

Solvent weld joints shall be made using priming fluid and cement to AS3879. No PVC pipe work shall be used above ground.

11.3 Polyethylene Irrigation Pipes and Fittings

All HDPE polyethylene pressure pipes must conform to AS4130 polyethylene (PE) pipes for pressure applications and be installed to AS2033.

All HDPE pipes that are connected to a recycled or alternate 'not for-drinking' shall be lilac and solid in colour.

All 'pressurised' HDPE pipes with nominal diameter less than or equal to 63mm shall be minimum PE100 PN12.5 SDR13.6, installed in accordance with manufacturers' specifications and apply electrofusion welded joins only.

All 'non-pressurised' HDPE pipes with nominal diameter of 63mm or lower shall be minimum PE100

PN12.5, installed in accordance with manufacturers' specifications and may apply either electrofusion welded joins or compression fittings.

Note, compression fittings may be applied to 'non-pressurised' pipes within Reserves and sports fields.

Any HDPE pipe work system located beneath a concrete hardstand area or pavers laid over a rigid concrete substrate to apply electrofusion welded joins only.

All LDPE pipe work diameter sizing follow inside diameter measurements only. All LDPE pipework to be used for dripper and drip grid headers only.

When recycled or mains water supply is utilised, all LDPE pipes shall be lilac and solid in colour. Refer to layout project drawings for specified pipework types and diameters.

11.4 Copper Pipes and Fittings

All copper piping shall be seamless hard drawn copper tube in accordance with AS1572. All copper piping & fittings to be installed & commissioned in accordance with AS4809.

Connections to copper pipe work shall be made by copper weld on fittings up to and including 50mm.

Connections of 80mm diameter and above shall be joined by welding type stipulated in Table E of AS2129 and/or Table PN16 of AS4807, with bronze flanges fitted with suitable rubber gaskets and galvanised M16 steel bolts. Contractor to liaise with Irrigation Technical Officer regarding final welding type to be applied on site prior to undertaking the work.11.5 Irrigation Cable Conduits.

All irrigation cable shall be run in grey PVC conduit from controller cabinet to each valve box.

Any unprotected PVC conduit above ground shall be shrouded via galvanized sheets.

Flexible conduit may only be used to connect the bottom of the irrigation cabinet to the start of the PVC conduit (maximum 200mm length permitted).

11.5 Connection to Existing Pipework

For any connection off an existing HDPE mainline irrigation pipe, the contractor shall supply & install an EFW Tapping Saddle Adaptor for all sizes up to and including 63mm.

For any connection off an existing PCV mainline irrigation pipe, the contractor shall supply & install a brass Tapping Saddle Adaptor for all sizes up to and including 65mm. (Under no circumstance is a slip fix repair coupling to be installed in a pressurised mainline).

Tapping saddles with U-bolt fastenings are not to be used for PVC pipe.

Contractor to confirm Tapping Saddle Adaptor for HDPE or PVC with Irrigation Technical Officer prior to undertaking the works.

For any connections to the end of an existing copper water supply pipe, the Contractor shall install and appropriately sized HDPE or PVC male threaded adaptor for all pipe sizes up to and including 50mm.

All sizes at of above 63mm to use Table E ‘PVC Flanges’ from AS2129 and/or Table PN16 of AS4807 with galvanised steel backing plates.

11.6 Pipes under Roadways and Concrete Footpaths

No pipe work or wiring shall be laid beneath a concrete footpath or bitumen/concrete roadway unless contained within a suitable conduit pipe.

Conduits shall be a minimum of 80mm in diameter. Pipe shall be Class 12 PVC pressure pipe or an approved alternative.

Conduits shall be installed at the same depth as the pipework it is to house, ensuring that no deviation in pipe level occurs, where possible.

No joins in either wiring or pipes shall occur within 150mm of the sleeved section.

12. JOINTS AND JOINTING MATERIALS

12.1 General

Joints and jointing materials shall be as per the table below, unless noted otherwise:

Pipe Material	Pipe Size	Joint Type	Jointing Method	Standard
PVC	All pipe sizes	Spigot & Socket	Solvent Material	AS2033
PVC	All pipe sizes	Screwed Fittings	Mechanical (PTFE tape)	AS1195
HD Polyethylene	All pipe sizes	Spigot & Socket	Electro-fusion Welding	AS4129
HD Polyethylene	All pipe sizes	Spigot & Socket	Mechanical (Reserves)	AS4129

13. VALVES

13.1 General

All valves and their installation shall and comply with the relevant Australian Standards for their intended use.

No valve shall be used to terminate pipe work. A minimum length of 2.0m shall be left between the valve and the end of the line. The end of the pipe shall be capped and anchored with appropriate thrust blocks.

No valve shall be installed at the same depth as the pipework. All valves should be installed close to the surface to allow for easy access and maintenance. Top of handle to be 100mm below finished grade level unless noted otherwise.

13.2 Pressure-Regulating Filters

The valve shall be a type that will adjust the flow requirements within a set limit and maintain a fixed pressure for dripline irrigation systems only.

A pressure regulator and filter (200 mesh) assembly (RBY) shall be located immediately downstream of a Local Automatic Solenoid Valve Assembly. An RBY valve cannot be installed where they are under constant water pressure.

Refer to IRR-PC-CS-02 / 04 for further detailing information.

13.3 Pressure-Reducing Valves

If water pressure reduction is required immediately after the master valve control due to excessive water pressure on site a suitable pressure reducing valve shall be installed. Contractor to liaise with the Irrigation Technical Officer prior to undertaking any works.

13.4 Ball Valves

Ball Valves 50mm nominal diameter or less:

All ‘pressurised’ ball valves shall be bronze with screwed connections to AS1628, be dezincification resistant, include a stainless-steel handle and sized to suit the nominal pipe diameter.

All ball valves assemblies connected to 32, 40, 50 and 63mm diameter pipework shall be housed within a 1419-12 valve box and supported with masonry pavers and concrete paver.

Refer to IRR-PC-CS-25 further detailing information.

All ball valves 25mm or less, shall be housed within a Rainbird 250mm spotter box. Refer to IRR-PC-CS-15 for further detailing information.

For ‘non-pressurised’ valves 25mm or less and located immediately upstream of a garden bed or tree system, the contractor can supply & install a plastic/PVC isolation valve within a 150mm spotter box.

Refer to IRR-PC-CS-16 for further detailing information.

Sluice or Butterfly Valves greater than 50mm nominal diameter:

- Shall conform to AS2638.2 (watermarked).
- Shall include a resilient sluice gate valve similar to AVK model 57/40.
- Shall include flanged connections with 316 stainless steel backing rings, nuts and bolts, for all valves of nominal diameter of 80mm and above.
- Install the valve assembly within a Rainbird 10” round valve box.

Provide 1off ‘T-bar’ handle per project for sluice valve operation to the CoP Irrigation Technical Officer.

Refer to IRR-PC-CS-24 for further detailing information.

13.5 Flushing Valves

Flushing Valves 50mm nominal diameter or less:

All flushing valves shall be de zinc tested ball valve and sized to suit the nominal pipe diameter. All flushing valves assemblies shall be housed within a 150mm spotter box.

Refer to C Refer to IRR-PC-CS-16 for further detailing information.

13.6 Vacuum/Air Relief Valves

Vacuum/air relief valve(s) shall be provided as required or as indicated on the project drawings by the Contractor to ensure all air pockets within pipeline are released into the atmosphere when it is full and under operating pressure at the time of testing and inspection.

<u>For drip-garden irrigation systems:</u>

A Bermad ½ inch air relief valve shall be installed at the highest point of each watering zone within a Rainbird 150mm spotter box.

Refer to IRR-PC-CS-14 for further detailed information.

<u>For mainline & submain pipe work:</u>

A combination ARI vacuum breaker/air relief valve (D-040) shall be installed at the highest point of a

50mm diameter mainline or submain pipe in a Rainbird 1419-12 box as required on site. Refer to IRR-PC-CS-28 for further detailed information.

13.7 Solenoid Valves

All solenoid valves shall be Hunter ICV Series - Sentry Filter & Flow Control properties with valve diameters to suit designed flow rates on the project drawings.

Master solenoid valves shall be installed at the point of connection for each system and shall be the same diameter as the largest zone valve in that system.

Pressure-regulating modules must be included on master solenoid valves where the dynamic supply pressure is greater than or equal to 700kPa (100Psi). Refer to Clause 13.2. Contractor to liaise with CoP Irrigation Technical Officer regarding the requirement of a pressure regulating device prior to undertaking the works.

All solenoid valves shall: - be installed according to:

(a) IRR-PC-CS-01,02,03,04.
(b) have a minimum pressure rating of 1000kPa.
(c) have an operating voltage of 24 volts – AC when connected to a remote controller.
(d) have an operating voltage of 24 volts - DC coils when connected to a “non-AC powered controller”.
(e) be installed within 100mm of the finished grade level.
(f) exhibit a 25mm minimum clearance between the blue metal gravel base and underside of solenoid valve assembly.
(g) be centrally within the box to allow easy access for manual operation and maintenance.
(h) include DBR/R-6 connectors and a service loop that allows cables to be extended 1.0m outside of the valve box. The valve box and pipework must not rest on the cables.
(i) incorporate a ‘pressurised ball valve’ on the inlet side.
(j) be installed in a horizontal position.
(k) be housed within a Rainbird 1491-12 valve box for 25mm to 50mm diameter Hunter ICV valves.
(l) flow controls on each solenoid must be tuned so that the valve closure occurs within 10 seconds of control signal, without affecting sprinkler performance.

All subsequent solenoid valves and valve boxes shall be inspected periodically thereafter.

13.8 Flow Sensors

The Flow Sensor shall be installed upstream of the Master Control Valve (10 x inside diameter of prevailing pipework upstream of sensor, 5x downstream) and the sensor decoder, connection cables and connectors must be connected back to the Irrigation Controllers nominated in Clause 19.2 of this specification document.

A Flomec QS200 or Arad MS Multijet flow sensor shall be installed according to the manufacturer’s recommendations (application dependent on site and controller requirements and must be approved by Irrigation Technical Officer). Contractor to supply & install the flow sensor to suit prevailing pipe work diameter. If the Contractor wishes to seek an alternative, approval must be obtained from the CoP Irrigation Technical Officer.

Refer to IRR-PC-CS-27 for further detailed information.

14. VALVE BOXES

14.1 General

All valve boxes shall be (Heavy Duty/ commercial) and comply with the following:

(a) rectangular and constructed from high density polypropylene lockable lid.

(b) lockable with a 316-grade stainless steel nut & bolt kit.

(c) set lid flush with final grade.

(d) capable of withstanding being run over by a vehicle of three (3) tonne gross weight.

All valve boxes, excluding Polycrete or concrete boxes, shall be mounted on a minimum of 4off

50mm thick masonry pavers with a concrete slab. Prior to backfilling, line the surrounds of the valve box with a continuous plastic sheeting or Geotextile fabric. Allow for taping around inlet & discharge pipe work from the valve box. Backfill material shall be approved clean sand or existing spoil. If the latter option is applied, the contractor shall obtain approval in writing from the CoP Irrigation Technical Officer prior to backfilling.

No part of the valve box shall rest on any pipe work or fittings. Pavers & valve box shall be installed so that the level inside the chamber remains 50mm lower than the bottom of the valve.

Unless otherwise specified, all solenoid valve assemblies shall be installed in a Rainbird 1419-12 valve box to allow for easy access and maintenance.

Refer to IRR-PC-CS-01 for further detailed information.15. SPRINKLERS.

14.2 Type and Size

Install new sprinklers as per the irrigation design drawings, unless instructed otherwise.

The number of new sprinkler heads per zone not to exceed the maximum allowed given the on-site dynamic water pressure reading.

All sprinklers shall be Hunter Rotary models with standard plastic turret and specified nozzle spray type as indicated on the drawings, unless noted otherwise.

All sprinklers shall be the plastic version of specified model above, unless noted otherwise. All sprinklers shall be installed to finished grade and perpendicular to the surface.

Where a part circle sprinkler is positioned adjacent to a hard edge, it shall be no less than 50mm and no greater than 100mm from the hard edge. Adjust sprinkler radii and arcs to suit individual site conditions as shown on the drawings. Part circle sprinklers to be fully adjustable.

The body of the sprinkler must not sit within any tree protection zones or root systems.

Smaller turf areas (less than 5m in width) shall generally be irrigated using small rotary sprinklers (MP Rotator) as directed by the CoP Irrigation Technical Officer.

14.3 Connection

All sprinklers shall be installed to manufacturer's instructions. Sprinklers shall be installed within 100mm of the designated location.

Nominal diameter and thread type of articulated riser assemblies shall match that of the sprinkler inlet
– 25mm BSP for Hunter I-25 adjustable rotors etc.

Each sprinkler shall be installed to the lateral pipe with a matching 300mm long polyethylene articulated riser assembly. Articulated risers shall be at approximately 45 degrees to vertical when the top of the sprinkler is set to finished grade.

Refer to IRR-PC-CS-03,04 for further detailing.

14.4 Re-use and Relocation of Existing Sprinklers

Where indicated on the project drawings, the contractor shall relocate existing sprinklers as part of the new or amend irrigation system, unless instructed otherwise.

Where applicable, the Contractor is to note materials used in existing sprinkler system. Any amendment or new works to apply same material to match overall system unless instructed otherwise.

Any existing irrigation components required to be removed and/or re-used for the installation of the new or amended system (excluding PVC/HDPE & LDPE pipe work) shall be exhumed, cleaned and returned to the Council.

The CoP Irrigation Technical Officer shall determine the suitability of each item for re-use.

Any existing irrigation components deemed not suitable by the CoP Irrigation Technical Officer, for the new or amended system shall be decommissioned and disposed of by the Contractor at their cost.

15. DRIP IRRIGATION

15.1 General

All dripper tube shall be the brand, type and emitter spacing as described in the following clauses and project drawings.

Low Density Polyethylene Pipe: Standard: To AS2698.1

Sizes to be used shall be 13mm, 19mm, 25mm and 32mm only.

All connections between LDPE header/ flushing tubes and drip tube must be made using barbed tees or elbows secured with stainless steel grade 304 clamps using a compatible crimping tool. No push-in type off-take fittings are allowed.

Header and flushing pipes shall be designed for each zone.

A flushing valve (VQA series) shall be installed at the low point of a dripper grid (garden bed or sub-surface irrigation system), either along the flush pipe or no more than 500mm from last 13mm drip line lateral. Flush valve shall match the diameter of the header & flush pipes. The flush valve shall be housed within a 150mm spotter box that is to match final surface grade level.

An air relief valve (Bermad series) shall be installed at the high point of a dripper grid (garden bed or sub-surface irrigation system), either along the flush pipe or no more than 500mm from the last 13mm drip line lateral. Air Relief Valve shall match the diameter of the header & flush pipes. The Air Relief Valve shall be housed within a Rainbird 150mm spotter box that is to match final surface grade level.

LDPE may only be used for header's, footers and drip line, all other pipe on lateral must be HDPE or PVC.

15.2 Garden bed drip systems

Supply and install inline 13mm Netafim AS PC drip tube (pressure compensating) at 0.4m spacing with flow rate of 1.6 litres per hour and 0.4m dripper emitter spacing along tube, unless noted otherwise Dripper tube shall be laid above finished soil grade and underneath the mulch layer. Drip tube shall be pinned every 3m with a plastic 150mm long U-pin.

Refer to manufacturer's recommendations regarding tailored emitter and drip tube spacing for different soil types. Contractor to liaise with CoP Irrigation Technical Officer to confirm specific site soil conditions prior to undertaking the laying of drip tubing.

Any tree planting situated within dedicated garden bed areas may be part of the same irrigation zone only when indicated on the drawings

Refer to IRR-PC-CS-17 for further detailing information.

15.3 Turf sub-surface drip systems

Supply and install inline 13mm Netafim AS XR drip tube (anti-siphoning) at 0.4m spacing with flow rate of 1.6 litres per hour and 0.4m dripper outlet spacing along tube, unless noted otherwise. Dripper tube shall be laid at a depth of 150mm below finished grade level.

Refer to IRR-PC-CS-16 for further detailing information.

Refer to manufacturer's recommendations regarding tailored emitter and drip tube spacing for different soil types. Contractor to liaise with CoP Irrigation Technical Officer to confirm specific site requirements prior to undertaking any sub-surface drip irrigation.

15.4 Tree watering systems

All trees that require supplemental watering will utilise a shrubbier type of irrigation system that consists of two (2) bubbler emitters on each tree and placed approximately 300mm from the trunk of the tree.

Refer to IRR-PC-CS-18 for further detailing information.

Any arrangement of new trees assigned a tree watering system' and that form part of the overall irrigation design, must all be connected to a separate and dedicated control valve assembly, unless noted otherwise.

16. THRUST BLOCKS

The construction of anchor and thrust blocks shall be in accordance with Appendix G and AS2566.2 at all changes in direction, where branches occur at blank ends and generally whenever an out of balance force is generated by the pressure and velocity of water in the main run pipe.

The design of the thrust blocks shall allow for loads to be encountered during testing. The allowable bearing pressure for the design of the thrust blocks shall be in accordance with manufacturer's specifications and soil types.

The thrust blocks shall have a minimum volume of 0.025m3 and 0.2mm thick polyethylene membrane (AS2870) placed between the pipe and concrete. The class N20 concrete shall not encase more than half of the diameter of the pipe and shall be cured for a minimum of 48 hours prior to testing. All concrete thrust blocks shall be bed against undisturbed soil wall.

Type 1 Thrust Blocks shall be applied in the field to all pressurised mainline and submain pipework below 63mm in diameter.
Type 2 Thrust Blocks shall be applied in the field when pressurised pipe diameters of 80mm or greater are encountered.

Refer to IRR-PC-CS-22 for further detailed information.

17. ELECTRICAL

17.1 General

All electrical installations shall be in accordance with AS3000 requirements.

All installations shall comply with current Power and Water Corp. requirements, including approvals, registrations, inspections and certificate of compliance.

All new installations of LV (240V) or MV (415V) shall be installed by an electrician who is qualified and licensed for such work.

The Contractor shall:

(a) engage a qualified & registered electrician to provide and install a new low voltage.

(b) 240V AC electrical service to the irrigation control cabinet in accordance with AS3000 and Service Rules and Conditions.

(c) ensure electrician provides a safety switch and a dedicated circuit breaker for the power outlet (double GPO) for the irrigation controller. Note, afore-mentioned fittings shall not to be located within irrigation controller cabinet.

(d) provide a Certificate of Compliance to the IRRIGATION TECHNICAL OFFICER/PROJECT SUPERINTENDENT.

17.2 Earthing and Lightning Protection (Multicore Cable System)

The irrigation cabinet and controller to be separately grounded/ earthed to AS3000, power and water

Corp and controller manufacturers' requirements.

Very low voltage systems (less than 32v) shall include grounding methods and devices to achieve less than eight (8) ohms resistance to the ground.

The grounding method shall be tested by a licensed electrician at the first grounding site to verify that the resistance to ground is achievable for the prevailing soil type.

Grounding methods must be checked for compliance by the Contractor prior to the Practical Completion inspection. The Contractor will be required to replace any non-compliant grounding systems.

No additional grounding or lightning surge protection required beyond irrigation cabinet for a multicore-wired system.

17.3 Earthing and Lightning Protection (2-Wire Decoder System)

The irrigation cabinet and controller to be separately grounded/ earthed to AS3000, Power and Water.

Corp and controller manufacturers' requirements.

All irrigation controllers, decoder devices and field cables shall be grounded strictly according to the selected Hunter Controller Technical Installation Drawings.

Resistance must be less than 10 ohms to ground. Grounding methods must be checked for compliance by the Contractor prior to the Practical Completion inspection. The Contractor will be required to replace any non-compliant grounding systems.
All grounding sites shall be located no greater than 300m apart and not exceeding 12 decoders, whichever is the lesser length.

Lightening protection inside the decoders can wear out, decoders shall be replaced at regular intervals that will be determined by the electrical activity of the area.

Refer to IRR-PC-CS-29 for further detailing information.

17.4 Solenoid Wiring

17.4.1 General

All wiring joins shall be made using 3M Direct Bury Splice DBR/Y-6 connectors or 3M Scotchlok 314 may be used on conventional wiring and decoder to solenoid connections.

Allow 1m of loose wire above the valve box lid at each solenoid valve coil or sensor device to allow for the removal of the coil for maintenance without cutting cables.

Cables shall be installed at the base of the irrigation trench, in appropriately sized conduit and run parallel to pipes. Minimum separation to be diameter of largest pipe in trench.

Any above ground low voltage wiring shall also be installed in a grey electrical conduit.

In a multicore cable application:

(a) All 24-volt low voltage cable shall be polyethylene insulated and multi-strand- multi-core.

(b) All control cables are to be installed in Grey electrical conduit. The size of which will be determined by the cable installation.
  (i) 32mm for 1 x 13 core or equivalent
  (ii) 40mm for 2 x 13 core cables or equivalent
  (iii) No flexible electrical conduit is to be installed.

(c) The minimum active wire size to be 1.0mm2. Contractor allowed up to 2.0mm2 in size depending on distance.

(d) The minimum wire size for a common cable shall be 2.5mm2, multi-strand and single core. Contractor allows up to 4mm2 in size depending on distance.

(e) All station cables shall be minimum 1.0mm2 multi-strand, multi-core cable with colour coding, which must not change between the controller and solenoid valve.

(f) All station cables shall be colour coded in any colours excluding the common colour. All common cables shall be black.

(g) Provide expansion loops at intersections, bends and pipe crossovers.

(h) Cable runs shall be continuous between the controller and its destination valve.

(i) Intermediate cable joins are unacceptable.

In a decoder application:

(a) Minimum active wire size and type shall be ID1 Wire Solid Core, twisted 1.6mm diameter copper wires direct bury cable.

(b) All control cables are to be installed in grey electrical conduit. The size of which will be determined by the cable installation. 40mm for two (2) core solid strand decoder cable (maximum of two [2] cables per conduit).

(c) Hunter ICD series Decoders (ICD-1,2,4 and 6) and associated components to be located as per the project drawings and shall be installed by the Contractor according to manufacturer's recommendations.

(d) No more than 12 decoders/ modules between two (2) surge protection assemblies of which are no more than 300 metres apart.

18. CONTROL SYSTEMS

18.1 General

The location of controller(s) shall be confirmed on site between the Contractor and CoP Irrigation Technical Officer prior to any work being undertaken.

The Contractor shall install the controller(s) according to the manufacturers written recommendations, unless noted otherwise.

Controllers and cabinets must be grounded to Hunter and AS3000 requirements. The Contractor shall install the multicore wiring from the valves to the controller.

The Contractor shall install the decoder wiring from the valves/decoders to the controller.

Unless noted otherwise, the contractor shall program, test and commission the controller to the satisfaction of the CoP Irrigation Technical Officer.

18.2 Irrigation Controllers

AC Controller(s)

All new irrigation controllers (non-battery type) shall be fully automatic and connected to an approved 240V AC electrical source. Contractor shall supply and install one (1) of the following controllers with CoP Irrigation Technical Officer approval:

- Galcon GSI AC – up to 24 stations and only one (1) flow meter.
- Hunter ACC2 – more than 24 stations and or more than one (1) flow meter.

All controllers mentioned above shall be provided with the appropriate hardware to perform as a centrally controlled system if required.

DC Controller(s)

Where AC power is not available, Galcon GSI DC controllers can be used. Where these controllers are installed, there must only be a maximum of 24 station in use. The controller also requires:

- 20W solar panel – minimum.
- 10amp MPPT solar charger – minimum.
- 20ah battery – minimum.

18.3 Controller Cabinet

The Hunter irrigation controllers shall generally be housed in an above ground cabinet – Rittal Stainless steel enclosure or similar approved by CoP Irrigation Technical Officer, unless noted otherwise.

Rittal AX Stainless Cabinet

Material: Stainless steel

Water Protection: IP66 (door closed) Impact Protection: IK08.

Cabinet Bus Rating (electrical):32A.

Contractor to allow for the supply and installation of a painted metal cabinet and associated structural supports, fixings and/or concrete plinths for reserves and urban locations as indicated on the project drawings.

The Contractor shall engage a licensed electrician to provide the 240V AC power feed to the cabinet to AS3000 requirements.

The electrician to apply the following methods when installing power to the cabinets:

- Wall-mounted cabinet: via a painted 40mm diameter HDPE conduit.
- Above ground cabinet: via a 40mm HDPE orange conduit, panted to match the enclosure and appropriately shrouded. No electrical cabling allowed within 75SHS support posts.
- Plinth based cabinet: via a 40mm HDPE orange conduit riser to upper portion of the cabinet.

The power source feed in for all cabinet types listed above shall terminate at a double RCD protected GPO secured to the mounting plate/board within the cabinet to AS3000.

All irrigation field cables shall include a 1.5m service loop behind the enclosure's internal mounting plate/board to allow for the easy swing action for the mounting plate.

All cables shall be clearly and permanently marked wit hits station number or sensor.

The cabinet enclosure shall have vandal proof staple and hasps mounted at the top and bottom corners of the door.

Contractor to provide a steel swing handle or pad bolt with CoP 'padlock' to cabinet openings. Contractor to liaise with CoP Irrigation Technical Officer regarding padlock type & keying. All gaps and conduit openings within the irrigation cabinet (ICB2) or when placed 'back-to-back' with a guard against water, vermin, ants and dust, etc.

The Contractor shall provide shop drawings of the cabinet(s) for approval by the project superintendent.

Refer to IRR-PC-CS-30,31 for further detailing information.

19. PRACTICAL COMPLETION

19.1 General

Practical completion includes commissioning, testing and site clean-up. Following a successful inspection and compliance with the drawings and specification, a Certificate of Practical Completion shall be issued by the IRRIGATION TECHNICAL OFFICER / PROJECT SUPERINTENDENT.

Prior to calling for the inspection, the Contractor shall:

(a) complete several automatic cycles without fault.

(b) test all components to ensure proper function.

(c) pressure test the mainline and drip system.

(d) check that the system complies with the Specification.

(e) ensure that all 'as-constructed' documentation specified under Clause 20.4, have been submitted.

(f) ensure that all manuals and documentation specified under Clause 20.5, are available and submitted.

(g) completely clean up the site.

(h) reinstate all surfaces affected during construction.

(i) remove machinery and surplus equipment/ materials from site; and

(j) be satisfied that the system is ready for inspection.

Following the completion of the above, the Contractor shall provide a least 24 hours' notice to the Project superintendent and CoP Irrigation Technical Officer that the system is ready for inspection.

19.2 Testing and Inspection

The Contractor is responsible for undertaking all testing necessary to verify that the system will perform to the intended level of service.

The Practical Completion inspection by the Contractor and the Project Superintendent /CoP Irrigation Technical Officer shall include checks for compliance with the specification and in particular, but not limited to the following:

- nozzle size and arc setting.
- sprinkler positioning (new & relocated).
- vertical alignment.
- height relative to finished grade.
- pop-up and retract function.
- drip tube configuration and installation.
- valve pressure/ flow control settings.
- valve diameters.
- cable installation and labels.
- tag and testing of controller.
- valve box type and installation method.
- controller and sensor installation.
- backflow prevention device installations and registrations with OTR.
- trenches being compacted and filled to match the surrounding finished soil levels.
- the contractor must provide Council with a schedule, indicating dates when site inspections will occur to review trench finished levels and the undertaking of remedial works. This must extend for the duration of the defect liability period.

The Contractor shall generate the Irrigation and Electrical Inspection & Test Plans (ITP's) for the irrigation project. The IRRIGATION TECHNICAL OFFICER /PROJECT SUPERINTENDENT to approve the template and its contents prior to undertaking any testing and commissioning on site.

The ITPs shall form as an official record of events during the testing and commissioning phase up and until the end of the Defects Liability Period and Final Inspection.

If the system fails Practical Completion inspection more than once, the Council may deduct inspection costs from the final payment.

19.3 Mainline Pressure Test

The Contractor shall run a successful pressure test in the presence of the CoP Irrigation Technical Officer. The pressure test is deemed to be successful if after applying a pressure of 800 kPa to all mainline pipework, the pressure has not dropped over fifteen minutes, or leakage has not exceeded 0.2 l/hr. Pressure tests must not be performed earlier than 48 hours after pouring thrust blocks. Pressure testing may be done for separate sections of pipework. (If site pressure is not adequate a jockey or booster pump may be required at the determination of the Irrigation Technical Officer.)

19.4 'As Constructed' Drawings

Upon completion of the installation the Contractor shall provide the Project Superintendent with a set of "As Constructed" drawings accurately indicating all trench and wiring routes and solenoid valve locations and any other relevant information. The 'as-constructed' drawings shall be included as part of the Irrigation Contractor's Scope of Works.

The 'As Constructed' drawings must be presented to council at the same drawing standard as applied for the construction issued drawings.

Sprinklers, valves, pipes and cables, etc. shall be represented on separate layers. The drawings shall be provided in PDF and AutoCAD. format.

All documentation shall be submitted no later than two (2) weeks prior Practical Completion.

19.5 Manuals and Operations

For the whole system and for each item incorporated within it, the Contractor shall provide the following:

The Contractor shall provide the Project Superintendent a 1off soft copy (electronic- PDF files) two (2) weeks prior to the Practical Completion inspection of the following items:

- Operations manual.
- Details of electrical wiring.
- All certificates of compliance, including but not limited to those for electrical and plumbing work.
- Warranties for every product, material, or service used in the project.
- Registration information for backflow devices (if applicable).
- Cross-connection audit certificate (if relevant).
- Water meter numbers and sizes (where applicable).

The PDF files must be clearly named and placed in a logical order within a dedicated folder.

The Contractor is to provide 1off hard copy of the controller instructions including any wiring diagrams in a suitable holder in the irrigation cabinet.

20. MAINTENANCE (DEFECTS LIABILITY PERIOD)

All work required during the defect liability period including work of obtaining clearances and repair of damage to property becoming evident during the defect liability period shall be carried out before final certification, and the defects liability period shall be extended accordingly.

During the maintenance period the Contractor shall attend to all emergency calls as quickly as possible. If during the maintenance period the Contractor does not promptly attend to the emergency, the Council reserves the right to engage others to rectify the problem and recover costs from the Contractor.

During the maintenance period, if it is found that theft or vandalism has occurred, the cost of the works required to repair the damage shall be borne by the Council. All such cases shall be immediately reported to the IRRIGATION TECHNICAL OFFICER / PROJECT SUPERINTENDENT.

In the event of any defective work not being rectified within two (2) working days (or shorter time if conditions are created that are hazardous to persons or the irrigated area) of the need arising, the Council may have the same work carried out by others and the cost will be deducted from any moneys due to the Contractor under this Contract.

21. FINAL INSPECTION

Final inspection and testing shall be carried out at the end of the maintenance (defects liability) period. If the system fails final inspection test, the additional costs reasonably incurred by the Council as a consequence of the additional inspections may be deducted from the payment due to the Contractor.

Final Inspection shall include checks for compliance with specification and in particular but not limited to the following:

- General system operation.
- Controller scheduling.
- Nozzle size and arc setting.
- Vertical alignment.
- Height relative to finished grade.
- Pop-up and retract function.
- Drip tube installation.
- Valve pressure settings.
- Valve box installation method.
- Control cabinet cleanliness.
- Trenches must be compacted and filled to match the surrounding finished soil levels. Following a successful inspection and compliance with the specification, a Certificate of Final.

Completion shall be issued by the IRRIGATION TECHNICAL OFFICER /PROJECT SUPERINTENDENT.

If the system fails final inspection test more than once, the Council may deduct inspection costs from the final payment.

22. SCHEDULE OF RATES

Contractor to provide a full schedule of rates for the items listed below excluding GST:

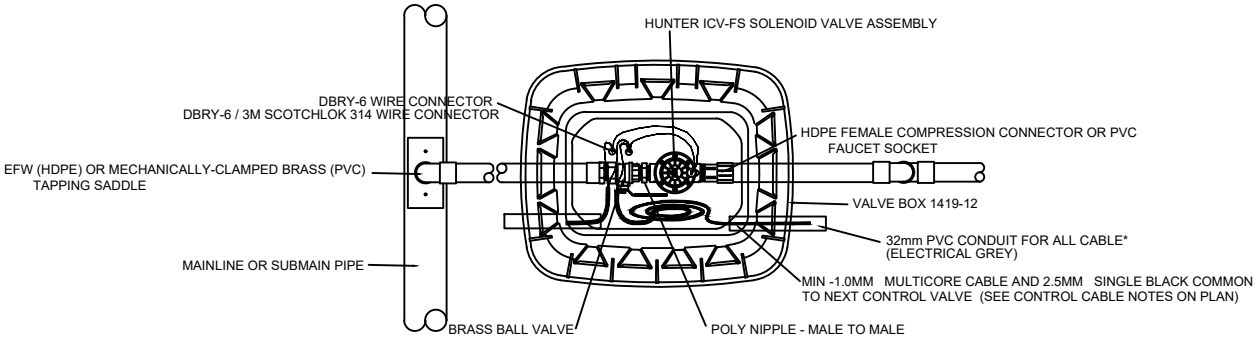
Description (Supply & Installation)	**RATE/PER**
PE100 DN63 PN12.5 EFW HDPE pipe	/m
PE100 DN50 PN12.5 EFW HDPE pipe	/m
PE100 DN40 PN12.5 EFW HDPE pipe	/m
PE100 DN32 PN12.5 EFW HDPE pipe	/m
PE100 DN25 PN12.5 EFW HDPE pipe	/m

PE100 DN20 PN12.5 EFW HDPE pipe	/m
PE100 DN63 PN12.5 CF HDPE pipe	/m
PE100 DN50 PN12.5 CF HDPE pipe	/m
PE100 DN40 PN12.5 CF HDPE pipe	/m
PE100 DN32 PN12.5 CF HDPE pipe	/m
PE100 DN25 PN12.5 CF HDPE pipe	/m
PE100 DN20 PN12.5 CF HDPE pipe	/m
65mm SWJ PVC pipe	/m
50mm SWJ PVC pipe	/m
40mm SWJ PVC pipe	/m
32mm SWJ PVC pipe	/m
25mm SWJ PVC pipe	/m
20mm SWJ PVC pipe	/m
32mm LDPE tube	/m
25mm LDPE tube	/m
19mm LDPE tube	/m
13mm LDPE tube	/m
13mm Netafim AS PC drip tube (pressure compensating) with flow rate of 1.6 litres per hour and 0.4m dripper emitter spacing – garden beds.	/m
13mm Netafim AS XR drip tube (anti-siphoning) with flow rate of 1.6 litres per hour and 0.4m dripper emitter spacing – sub surface irrigation	/m
13mm Netafim AS PC drip tube (pressure compensating) with flow rate of 1.6 litres per hour and 0.3m dripper outlet spacing	/m
25mm Hunter ICV Valve Assembly	/ea
40mm Hunter ICV Valve Assembly	/ea
50mm Hunter ICV Valve Assembly	/ea
2.0mm2 Irrigation Cable (multi-strand/single core) - Common	/m
4.0mm2 Irrigation Cable (multi-strand/single core) – Common for extended distances	/m
1.0mm2 Irrigation Cable (multi-strand/ multi-core) – Valve to Controller	/m
1.5mm2 Irrigation Cable (multi-strand/multi-core) – Valve to Controller for extended distances	/m

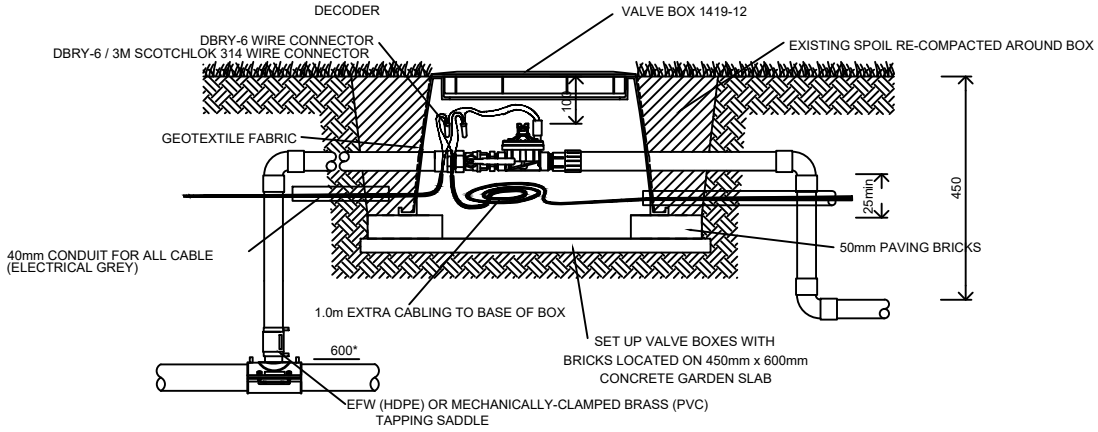
2-wire 2.5mm2 Maxi Cable (Decoder system)	/m
Hunter I-25 pop up sprinklers	/ea
Hunter I-20 pop up sprinklers	/ea
Hunter PGP Ultra pop-up sprinklers	/ea
Hunter Pro Spray pop up sprinkler – 100mm	/ea
Hunter Pro Spray pop up sprinkler – 150mm	/ea
Hunter Pro Spray pop up sprinkler – 300mm	/ea
Hunter PRS40 Pro Spray pop up sprinkler – 100mm	/ea
Hunter PRS40 Pro Spray pop up sprinkler – 150mm	/ea
Hunter PRS40 Pro Spray pop up sprinkler – 300mm	/ea
Hunter MP Rotator nozzle	/ea
Hunter MSBN nozzle	/ea
Hunter ICD decoder	/ea
20mm 'Dura' DZR Brass Ball Valve	/ea
25mm 'Dura' DZR Brass Ball Valve	/ea
32mm 'Dura' DZR Brass Ball Valve	/ea
40mm 'Dura' DZR Brass Ball Valve	/ea
50mm 'Dura' DZR Brass Ball Valve	/ea
20mm Philmac VQA34 Valve (red ring)	/ea
25mm Philmac VQA10 Valve (green ring)	/ea
Bermad ½ inch Air Release Valve/Vacuum Breaker	/ea
Rainbird VB 1419-12 Valve Box	/ea
Rainbird 150mm Spotter Valve Box	/ea
Rainbird 250mm Spotter Valve Box	/ea
Rainbird Super Jumbo Valve Box	/ea
Supply of Type D Bedding Sand (DIT) – Backfilling of trenches	/Ton
Flomec QS200 Ultrasonic Irrigation Flow Sensor	/ea
Arad MS-Multi-Jet Magnetic Water Meter	/ea
Other Items:	

Project Foreman	/Hr
Irrigation Tradesperson	/Hr
Electrician	/Hr
Labourer	/Hr
Trench digger – 150mm wide x 450mm deep	/Lm
Hand Digging around tree roots within a Tree Protection Zone	/Hr
Excavation of rock as specified	/Lm
Fees for preparation of as constructed drawings and documentation.	/ea

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

CONSTRUCTION STANDARDS

CONTROL VALVE INSTALLATION DETAIL- 40MM/50MM - MULTICORE SYSTEM

GENERAL NOTES:

· ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.

· ALL HDPE PIPEWORK TO BE PE100/PN12.5 ON 'PRESSURISED' SIDE OF CONTROL VALVE. HDPE PE100/PN12.5 OR PVC PIPEWORK THEREAFTER

· ALL PVC PIPEWORK TO BE CLASS 12 ON 'PRESSURISED' SIDE OF CONTROL VALVE. CLASS 9 PVC OR HDPE THEREAFTER - MINIMUM.

· GEOTEXTILE FABRIC TO BE INSTALLED AROUND WHOLE VALVE BOX INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AND ON TOP OF THE BRICKS

· ALL IRRIGATION CABLE CONDUIT TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS.
USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON
USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON
AND/ OR TWO WIRE DECODER CABLE

APPLICATION:

· SPRINKLERS SYSTEMS WITH FLOWS EXCEEDING 60-80 L/MIN

NOTES.

1. DO NOT SCALE OFF OF DRAWINGS. WRITTEN DIMENSIONS GOVERN.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN AUSTRALIAN HEIGHT DATUM UNLESS NOTED OTHERWISE.
4. VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR SHOP DRAWINGS.
5. IF DISCREPANCIES ARE FOUND IN DIMENSIONS, PHAUS MUST BE NOTIFIED.
6. REFER TO OTHER CONSULTANTS DRAWINGS BEFORE COMMENCING WORK.
7. SERVICES ARE SHOWN SELECTIVELY AND INDICATIVELY.
8. CONTRACTOR TO LOCATE AND DEPTH ALL SERVICES BEFORE COMMENCING WORK.
9. TREE PROTECTION ZONES IN ACCORDANCE WITH AS4970 TO BE MAINTAINED AROUND ALL EXISTING TREES FOR THE DURATION OF CONSTRUCTION PERIOD.

IRRIGATION CONSTRUCTION STANDARDS ARE TO BE USED IN CONJUNCTION WITH THE IRRIGATION DESIGN AND IRRIGATION TECHNICAL SPECIFICATION

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REV	ISSUE	DATE
A	PRELIMINARY	16.10.2025

CLIENT

CITY OF PALMERSTON
1 CHUNG WAH TERRACE.
PALMERSTON, NT, 0830

palmerston@palmerston.nt.gov.au

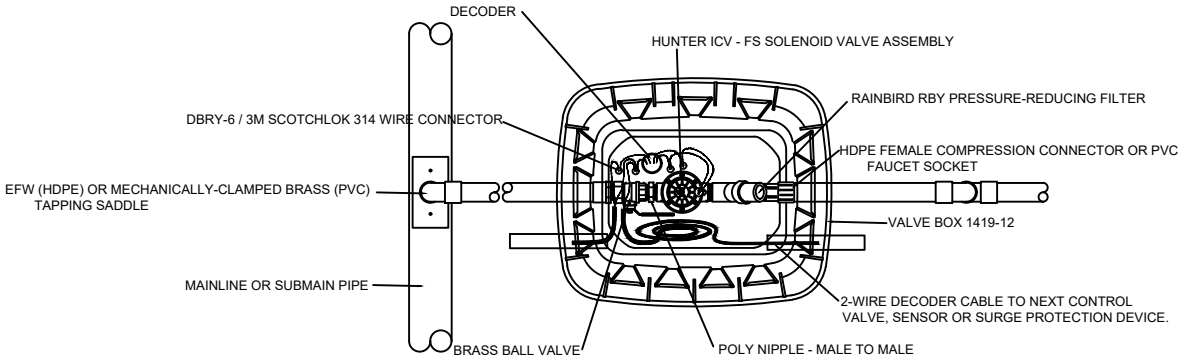
city of PALMERSTON 'A Place for People'

PALMERSTON COUNCIL

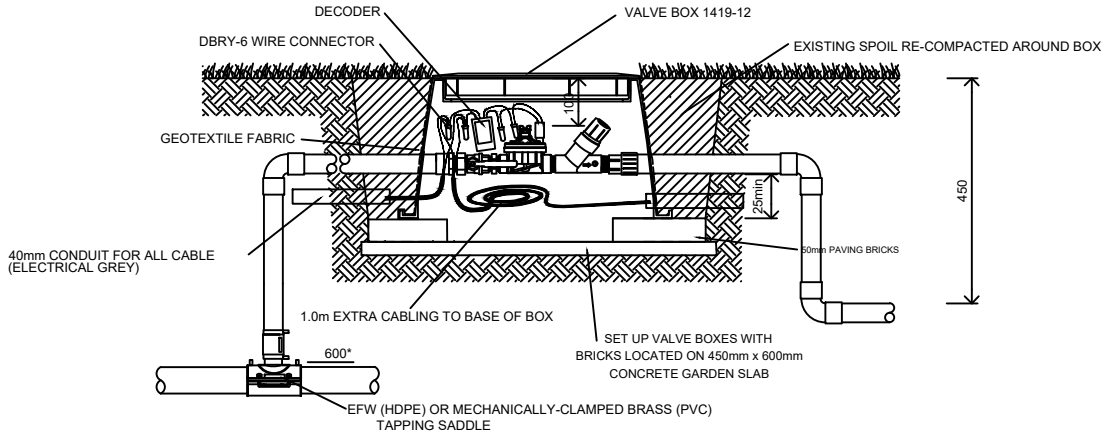
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS -01	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

CONSTRUCTION STANDARDS

CONTROL VALVE INSTALLATION DETAIL - DRIP IRRIGATION - DECODER SYSTEM

GENERAL NOTES:

· ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.

· ALL HDPE PIPEWORK TO BE PE100/PN12.5 ON 'PRESSURISED' SIDE OF CONTROL VALVE. HDPE PE100/PN12.5 OR PVC PIPEWORK THEREAFTER

· ALL PVC PIPEWORK TO BE CLASS 12 ON 'PRESSURISED' SIDE OF CONTROL VALVE. CLASS 9 PVC OR HDPE THEREAFTER

· GEOTEXTILE FABRIC TO BE INSTALLED AROUND WHOLE VALVE BOX INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AND ON TOP OF THE BRICKS

· ALL IRRIGATION CABLE CONDUIT TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS.
USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON
USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON
AND/ OR TWO WIRE DECODER CABLE

APPLICATION:

· DRIP IRRIGATION SYSTEMS WITH FLOWS LESS THAN 60L/MIN

NOTES.

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2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN AUSTRALIAN HEIGHT DATUM UNLESS NOTED OTHERWISE.
4. VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR SHOP DRAWINGS.
5. IF DISCREPANCIES ARE FOUND IN DIMENSIONS, PHAUS MUST BE NOTIFIED.
6. REFER TO OTHER CONSULTANTS DRAWINGS BEFORE COMMENCING WORK.
7. SERVICES ARE SHOWN SELECTIVELY AND INDICATIVELY.
8. CONTRACTOR TO LOCATE AND DEPTH ALL SERVICES BEFORE COMMENCING WORK.
9. TREE PROTECTION ZONES IN ACCORDANCE WITH AS4970 TO BE MAINTAINED AROUND ALL EXISTING TREES FOR THE DURATION OF CONSTRUCTION PERIOD.

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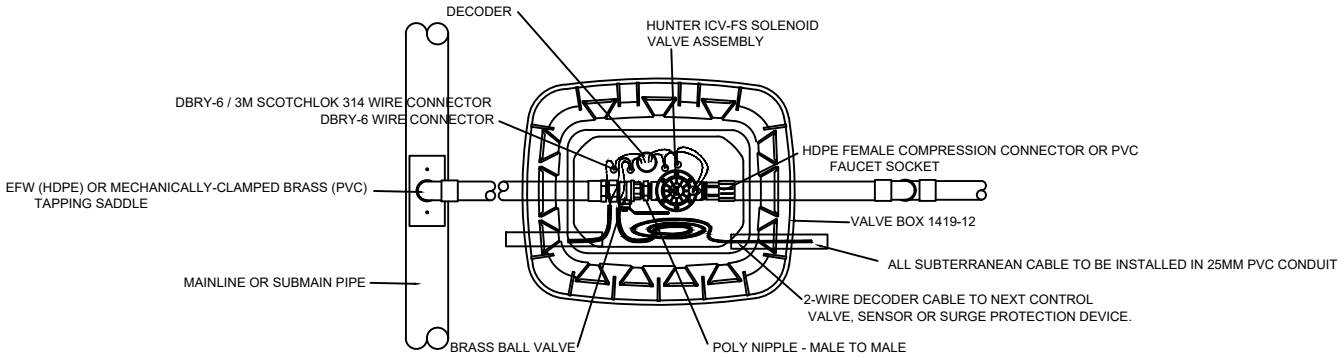
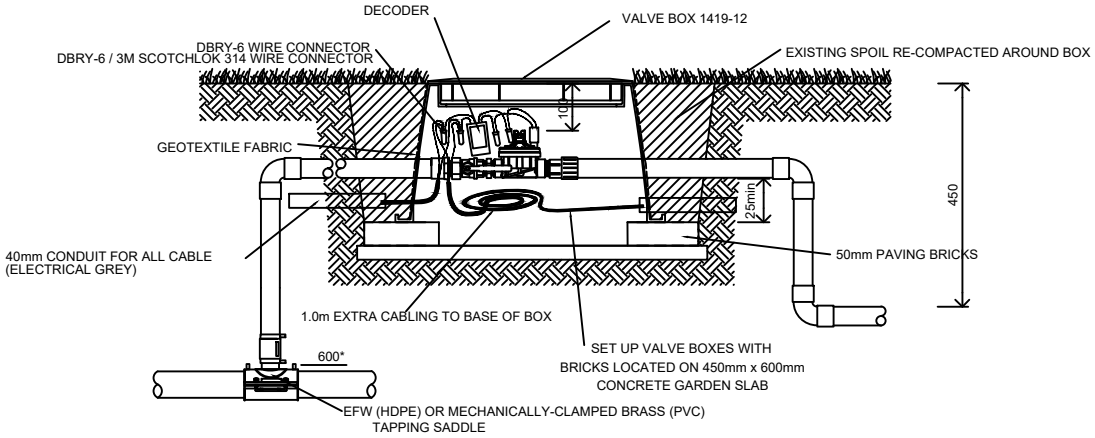
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS -02	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

GENERAL NOTES:

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· ALL IRRIGATION CABLE CONDUIT TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS.
USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON
USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON
AND/ OR TWO WIRE DECODER CABLE

APPLICATION:

· SPRINKLERS SYSTEMS WITH FLOWS EXCEEDING 60-80 L/MIN

CONSTRUCTION STANDARDS

CONTROL VALVE INSTALLATION DETAIL- 40MM/50MM - DECODER SYSTEM

NOTES.
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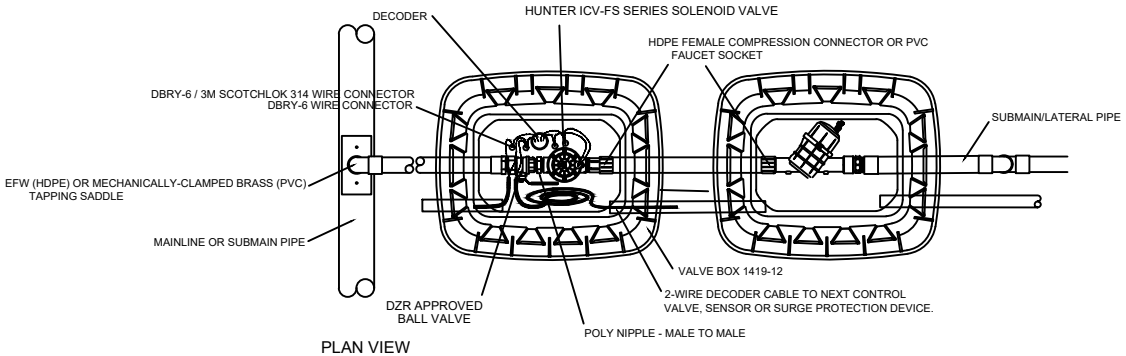
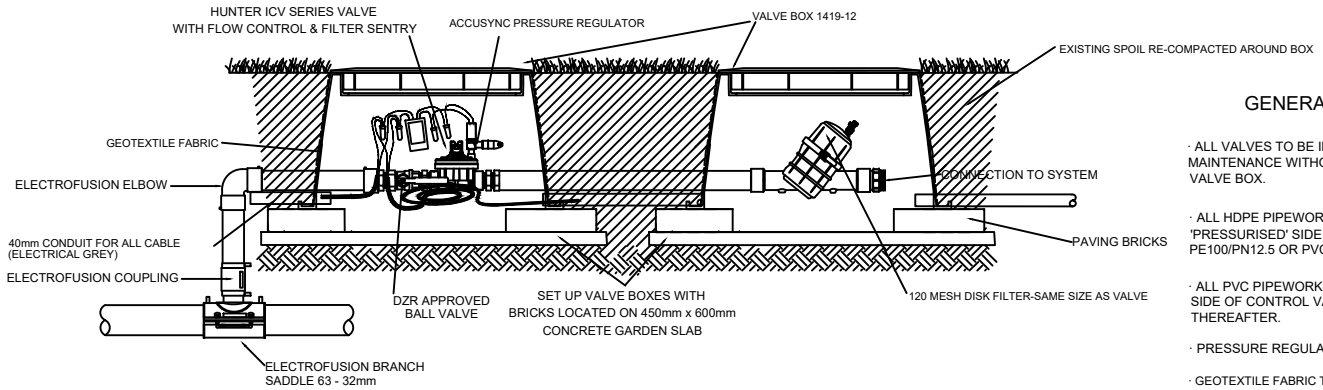
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS -03	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

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· PRESSURE REGULATION WITH HUNTER ACCU SYNC

· GEOTEXTILE FABRIC TO BE INSTALLED AROUND WHOLE VALVE BOX INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AND ON TOP OF THE BRICKS

· ALL IRRIGATION CABLE CONDUIT TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS. USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON AND /OR TWO WIRE DECODER CABLE

APPLICATION:

· DRIP GARDEN BED IRRIGATION SYSTEMS WITH FLOWS LESS THAN 80L/MIN

CONSTRUCTION STANDARDS

CONTROL VALVE INSTALLATION DETAIL - DRIP SYSTEM WITH SPIN FILTER - DECODER SYSTEM

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IRRIGATION CONSTRUCTION STANDARDS

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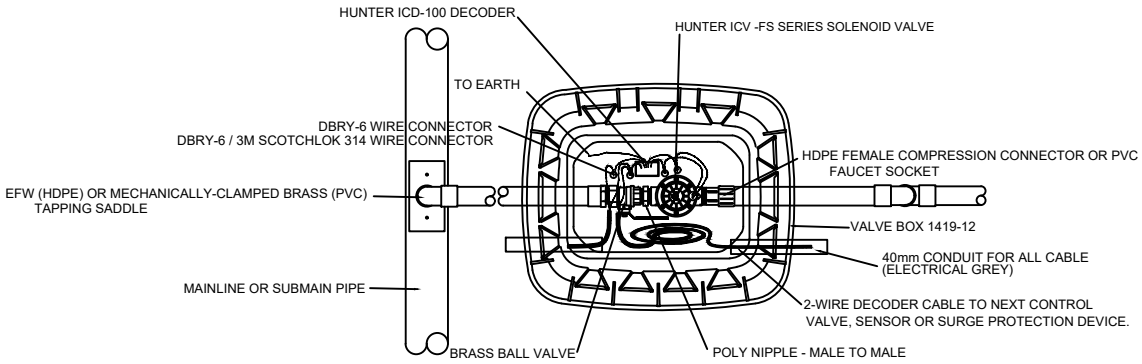
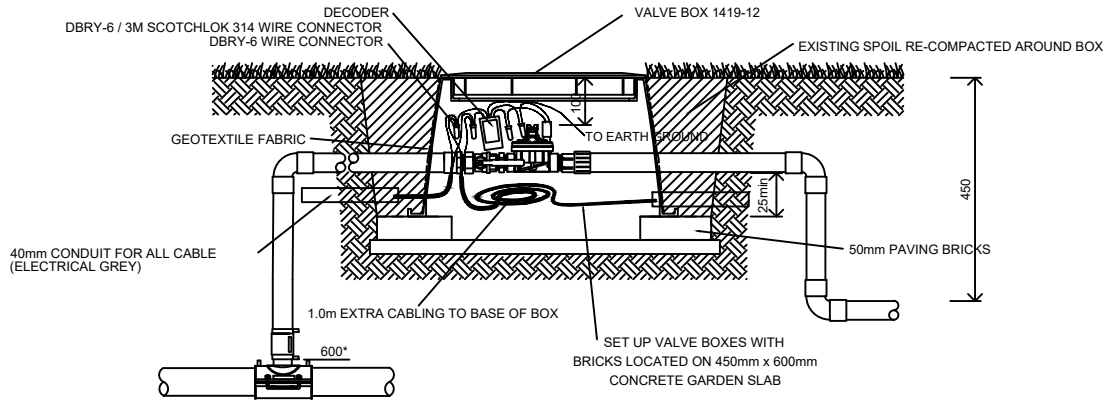
NTS	IRR-PC-CS-04	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

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AND /OR TWO WIRE DECODER CABLE

APPLICATION:

· SPRINKLERS SYSTEMS WITH FLOWS EXCEEDING 60-80 L/MIN

CONSTRUCTION STANDARDS

CONTROL VALVE INSTALLATION DETAIL - DRIP IRRIGATION - HUNTER ICD-100 DECODER

NOTES.

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REV	ISSUE	DATE
A	PRELIMINARY	16.10.2025

CLIENT

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1 CHUNG WAH TERRACE.
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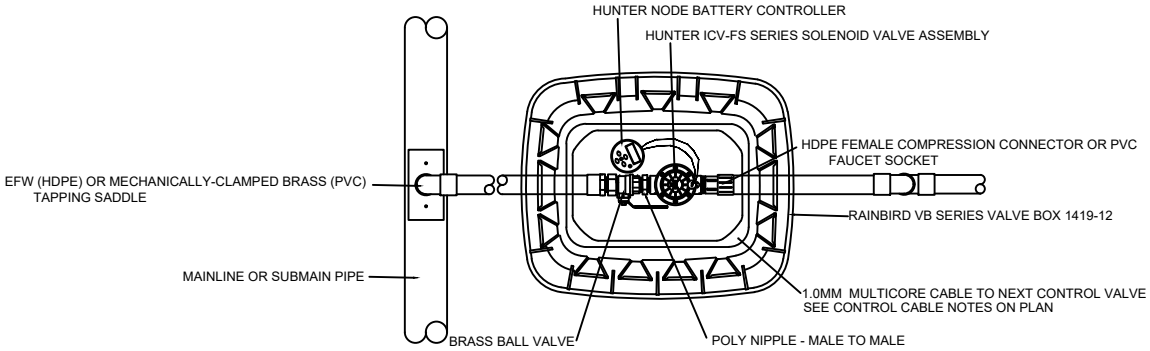
PALMERSTON COUNCIL

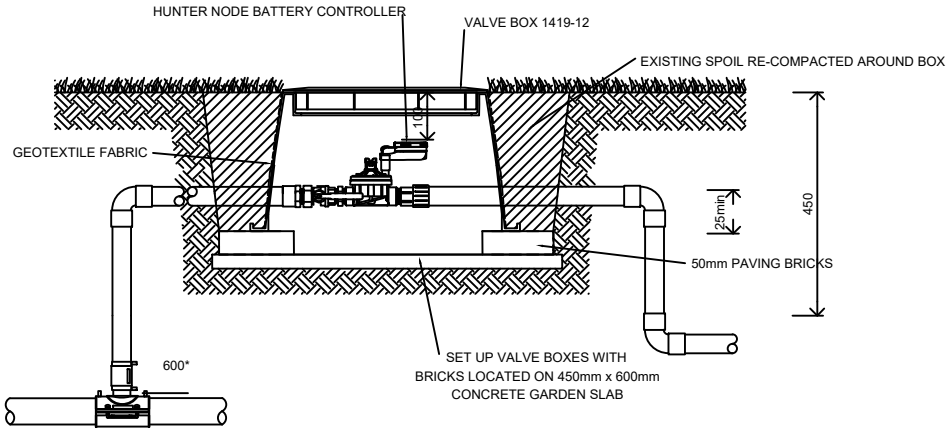
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS-05	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

GENERAL NOTES:

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· ALL PVC PIPEWORK TO BE CLASS 12 ON 'PRESSURISED' SIDE OF CONTROL VALVE. CLASS 9 PVC OR LDPE THEREAFTER - MINIMUM.

· GEOTEXTILE FABRIC TO BE INSTALLED AROUND WHOLE VALVE BOX INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AND ON TOP OF THE BRICKS

APPLICATION:

· SPRINKLERS SYSTEMS WITH NO ACCESSIBLE POWER SUPPLY

· NOT TO BE USED WITHOUT WRITTEN CONSENT FROM IRRIGATION TECHNICAL OFFICER.

CONSTRUCTION STANDARDS

CONTROL VALVE INSTALLATION DETAIL - DRIP IRRIGATION - HUNTER "NODE" BATTERY CONTROLLER

NOTES.

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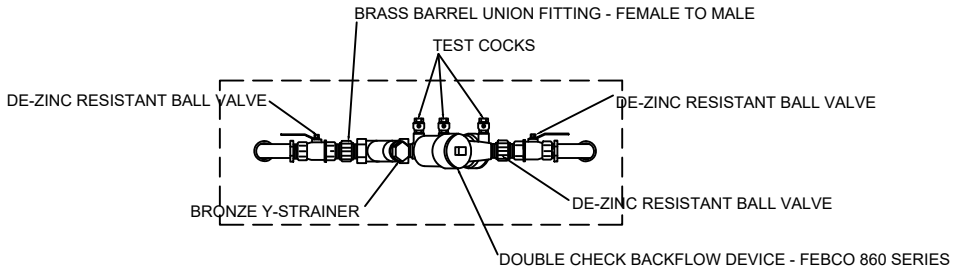
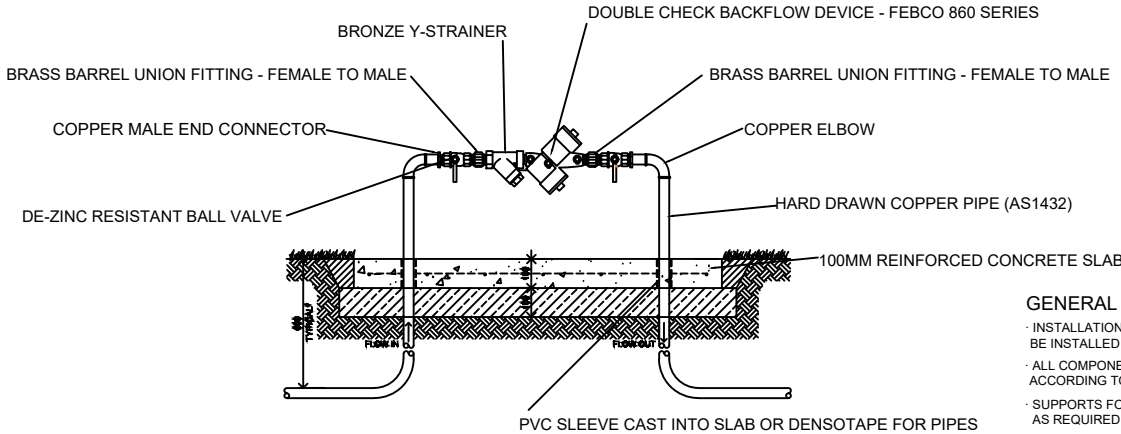
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS-06	A

INSTALLATION DETAIL





CONSTRUCTION STANDARDS

BACK FLOW PREVENTION DEVICE - DOUBLE CHECK BACKFLOW DEVICE (DCV)

GENERAL NOTES:

- INSTALLATION OF BACKFLOW DEVICE TO ONLY BE INSTALLED BY DULY QUALIFIED PLUMBER
- ALL COMPONENTS AND INSTALLATION SHALL BE ACCORDING TO MUNICIPAL WATER REQUIREMENTS.
- SUPPORTS FOR BACKFLOW ASSEMBLY TO BE PROVIDED AS REQUIRED BY SUPERINTENDENT. (80MM AND ABOVE).
- ENTIRE ASSEMBLY TO CONFORM TO AS3500.
- ALLOW FOR A MINIMUM 300MM CLEARANCE UNDER BACK FLOW DEVICE AND 150MM EITHER SIDE.
- BACKFLOW DEVICE TO BE PROTECTED BY BESPOKE WIRE CAGE WITH HINGES AND LOCKING MECHANISM AS DIRECTED BY PROJECT LEAD.

APPLICATION:

- DOUBLE CHECK BACKFLOW DEVICE : MEDIUM HAZARD RATING
- WHERE 'DRINKING' WATER IS BEING USED FOR IRRIGATION

NOTES.

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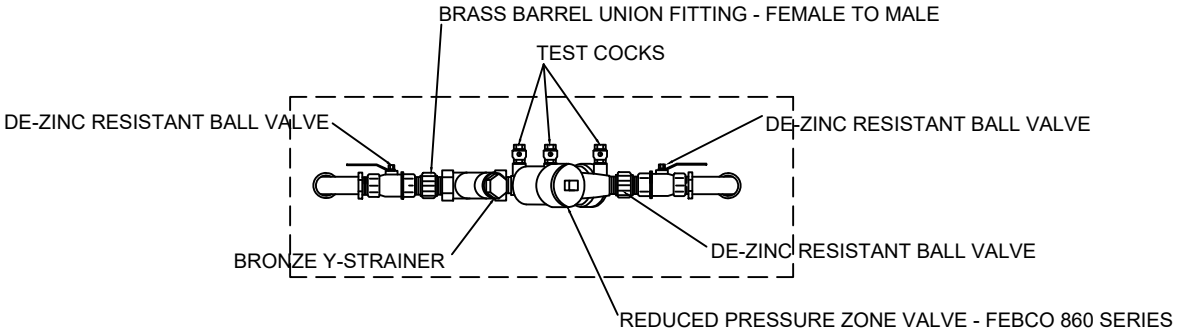
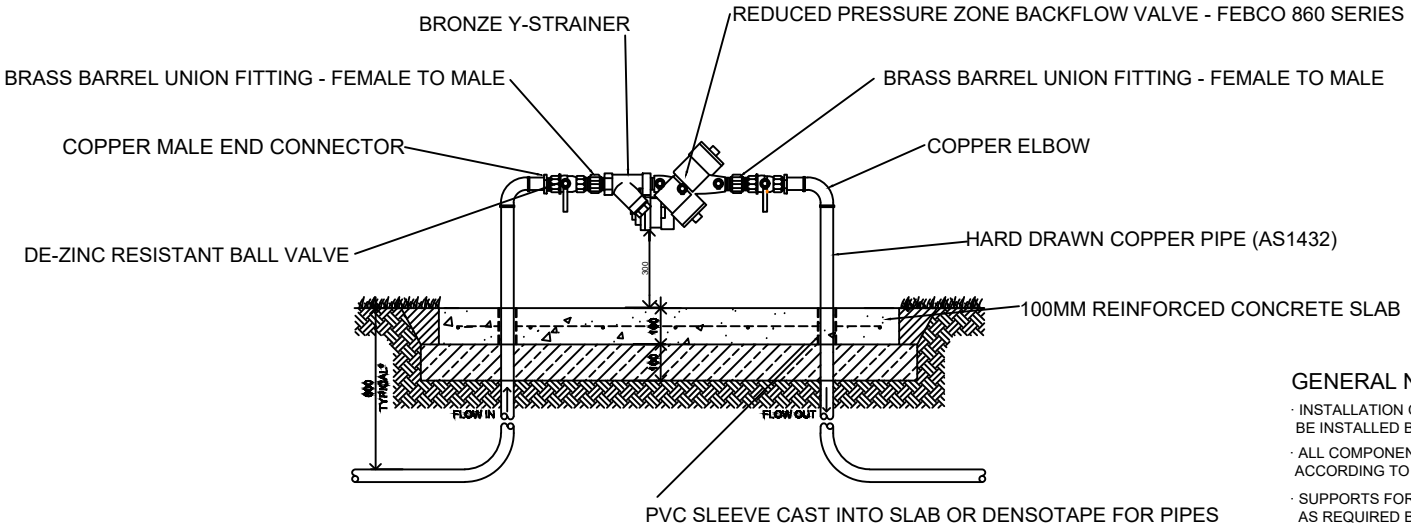
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS-07	A

INSTALLATION DETAIL





CONSTRUCTION STANDARDS

BACK FLOW PREVENTION DEVICE - REDUCED PRESSURE ZONE DEVICE (RPZ)

GENERAL NOTES:

- INSTALLATION OF BACKFLOW DEVICE TO ONLY BE INSTALLED BY DULY QUALIFIED PLUMBER
- ALL COMPONENTS AND INSTALLATION SHALL BE ACCORDING TO MUNICIPAL WATER REQUIREMENTS.
- SUPPORTS FOR BACKFLOW ASSEMBLY TO BE PROVIDED AS REQUIRED BY SUPERINTENDENT. 80MM AND ABOVE).
- ENTIRE ASSEMBLY TO CONFORM TO AS3500.
- ALLOW FOR A MINIMUM 300MM CLEARANCE UNDER BACK FLOW DEVICE AND 150MM EITHER SIDE.
- BACKFLOW DEVICE TO BE PROTECTED BY BESPOKE WIRE CAGE WITH HINGES AND LOCKING MECHANISM AS DIRECTED BY PROJECT LEAD.

APPLICATION:

- REDUCED PRESSURE ZONE DEVICE : HIGH HAZARD RATING
- WHERE 'DRINKING' WATER IS BEING USED FOR IRRIGATION OR WATER FEATURE OR FERTILIZED WATER INJECTION SYSTEM.

NOTES.

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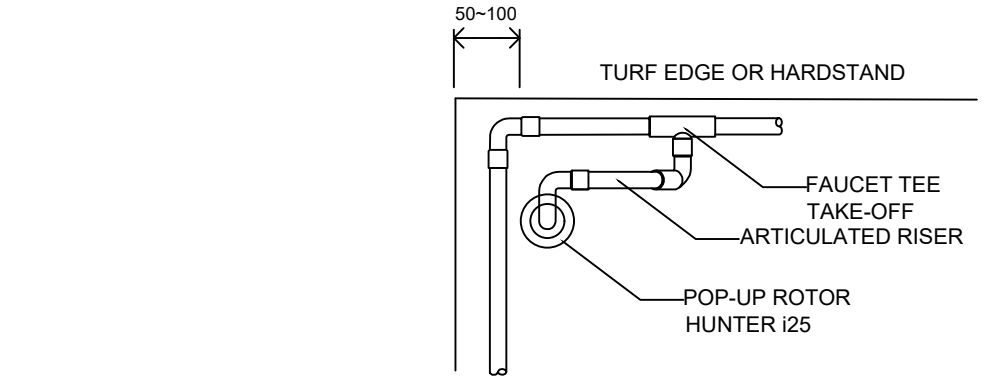
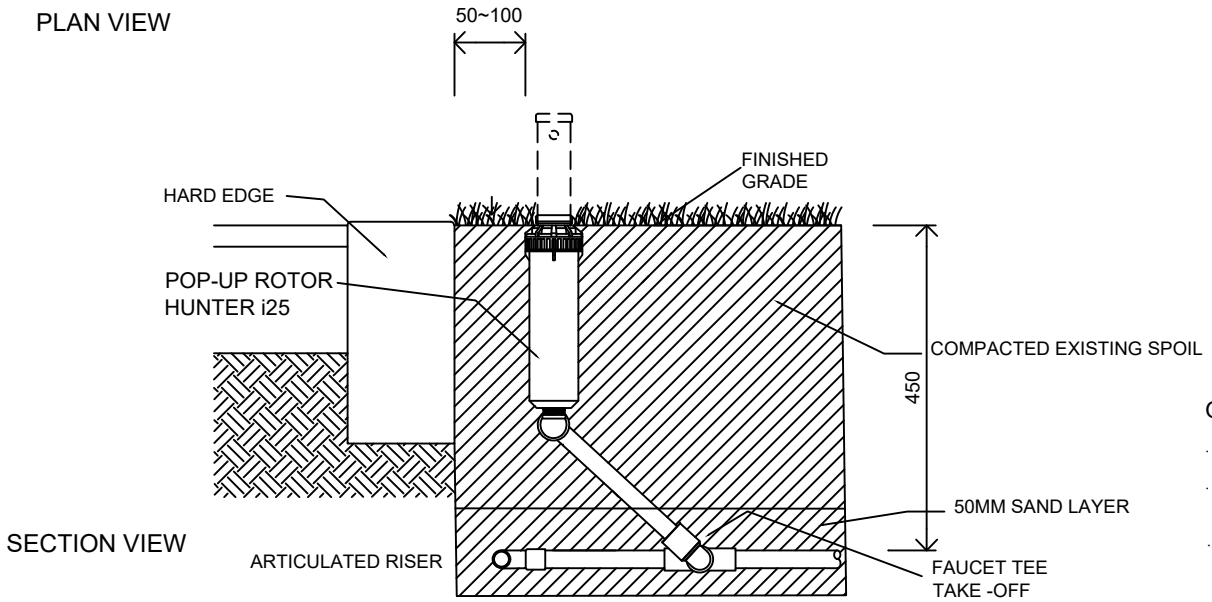
INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

GENERAL NOTES:

- ALL SPRINKLERS SHALL BE INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS
- EACH SPRINKLER TO BE CONNECTED TO LATERAL PIPE USING 25MM POLY ARTICULATED RISER. THREAD SIZE TO BE 25mm BSP, AS PER INLET THREAD SIZE OF SPRINKLER
- SADDLE CONNECTIONS CAN BE COMPRESSION TYPE SADDLE FITTINGS IF USING HDPE LATERALS

APPLICATION:

- RESERVE AND PARKLAND IRRIGATION

CONSTRUCTION STANDARDS

IRRIGATION ROTOR ON PVC LATERAL - INSTALLATION DETAIL

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9. TREE PROTECTION ZONES IN ACCORDANCE WITH AS4970 TO BE MAINTAINED AROUND ALL EXISTING TREES FOR THE DURATION OF CONSTRUCTION PERIOD.

IRRIGATION CONSTRUCTION STANDARDS ARE TO BE USED IN CONJUNCTION WITH THE IRRIGATION DESIGN AND IRRIGATION TECHNICAL SPECIFICATION

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A	PRELIMINARY	16.10.2025

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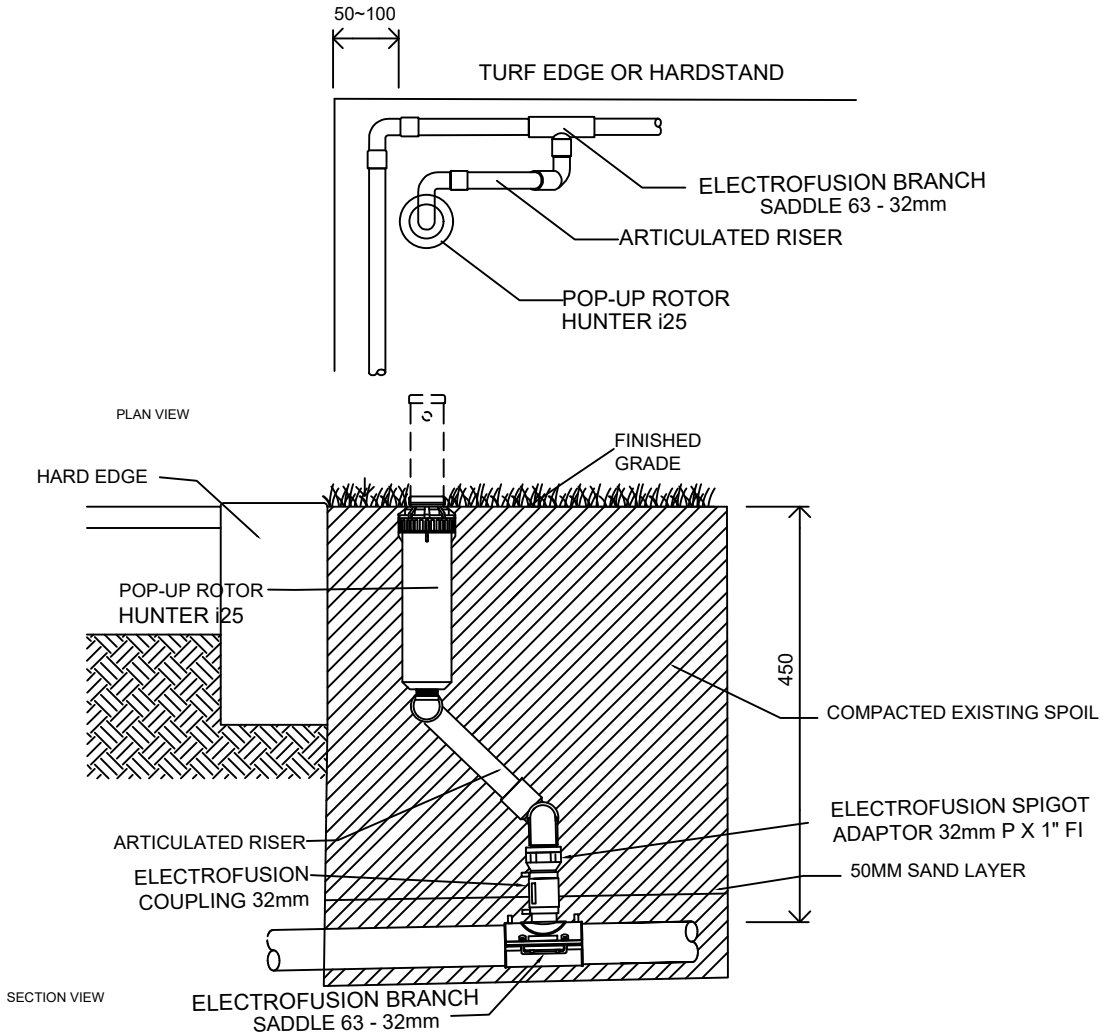
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS-11	A

INSTALLATION DETAIL



GENERAL NOTES:

- ALL SPRINKLERS SHALL BE INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS
- EACH SPRINKLER TO BE CONNECTED TO LATERAL PIPE USING 25MM POLY ARTICULATED RISER. THREAD SIZE TO BE 25mm BSP, AS PER INLET THREAD SIZE OF SPRINKLER
- SADDLE CONNECTIONS CAN BE COMPRESSION TYPE SADDLE FITTINGS IF USING HDPE LATERALS

APPLICATION:

- RESERVE AND PARKLAND IRRIGATION

CONSTRUCTION STANDARDS

IRRIGATION ROTOR ON HDPE LATERAL - INSTALLATION DETAIL

NOTES.

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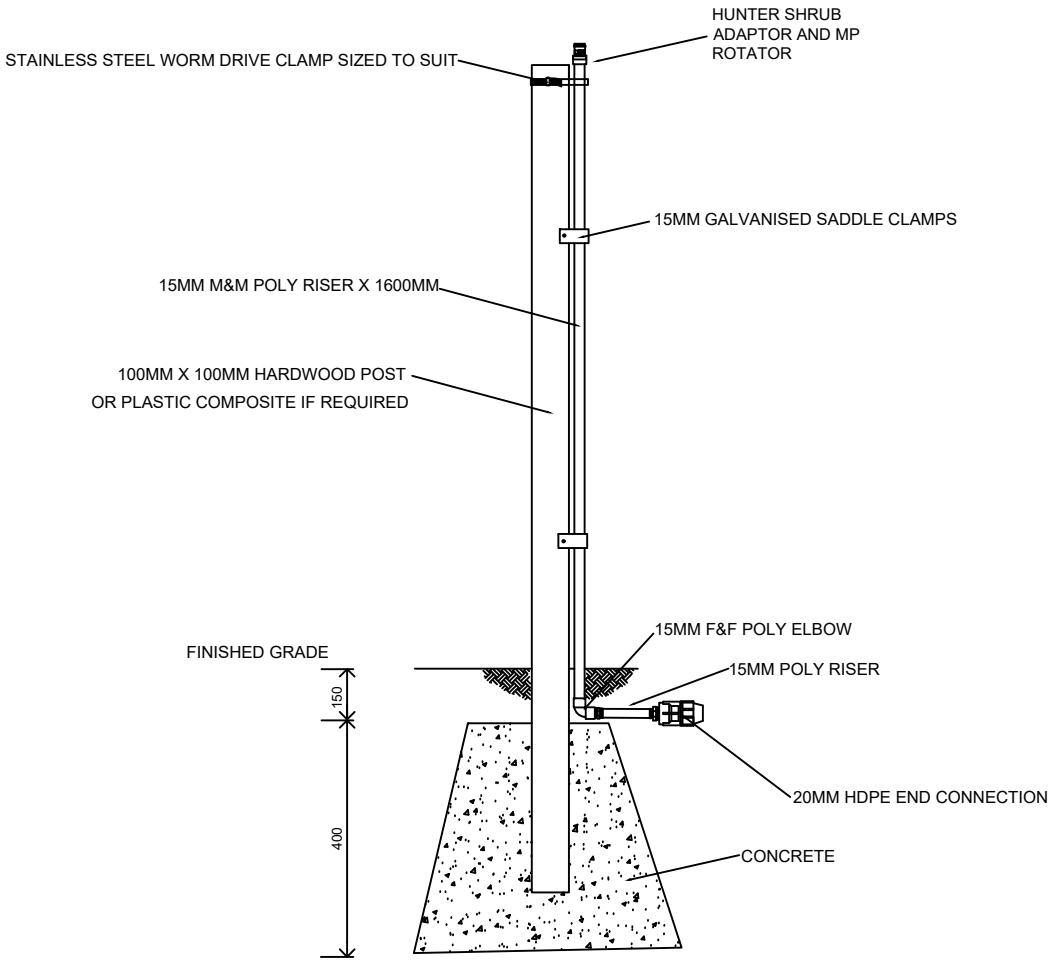
INSTALLATION DETAIL



CONSTRUCTION STANDARDS

IRRIGATION ROTATOR ON POST - INSTALLATION DETAIL

GENERAL NOTES:

- ENSURE THAT THE RISER IS FIXED TO THE POST
- ALL POSTS TO BE CONCRETED IN PLACE TO A MINIMUM DEPTH OF 400MM
- EACH SPRINKLER TO BE CONNECTED TO LATERAL PIPE USING 15MM POLY RISER. THREAD SIZE TO BE 15mm BSP.
- SADDLE CONNECTIONS CAN BE COMPRESSION TYPE SADDLE FITTINGS IF USING HDPE LATERALS

APPLICATION:

- GARDENS AND LANDSCAPE APPLICATIONS WHERE RODENT ACTIVITY IS ABUNDANT

NOTES.

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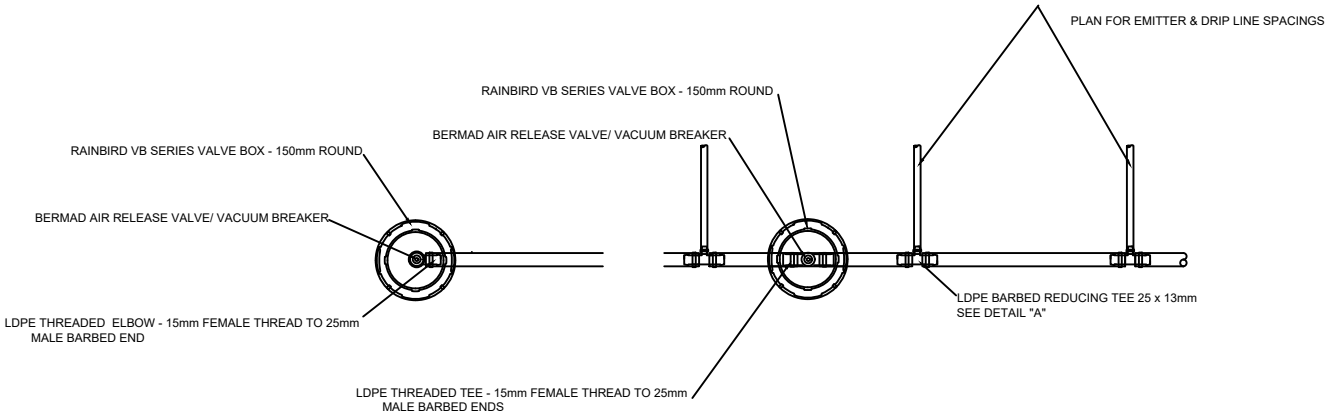
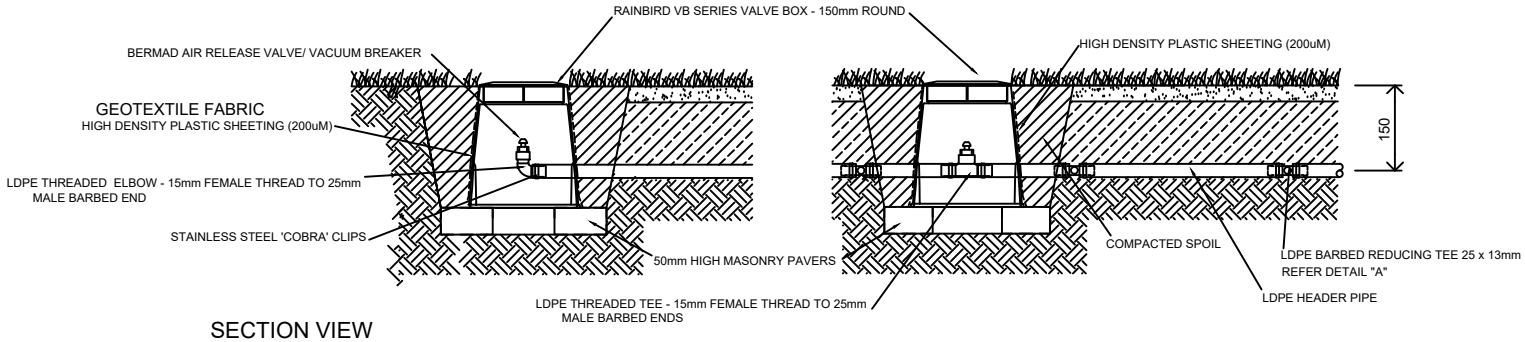
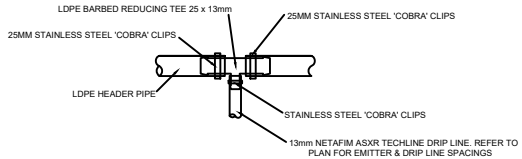


PLAN VIEW



SECTION VIEW



DETAIL" A"

GENERAL NOTES:

- ALL BREAKERS ARE TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.
- AIR RELIEF VALVE MAY BE LOCATED ALONG FLUSH PIPE OR WITHIN 500mm OF THE LAST 13mm DRIPLINE LATERAL - ENSURE AT HIGHEST POINT.

APPLICATION:

- ALL DRIP (GARDEN BED) AND SUB-SURFACE (TURF) IRRIGATION SYSTEMS AT HIGH POINT WHEN NOT USING ANTI SYPHON DRIP SYSTEMS.

CONSTRUCTION STANDARDS

AIR RELIEF VALVE ASSEMBLY - SUBSURFACE AND LANDSCAPE IRRIGATION AREAS

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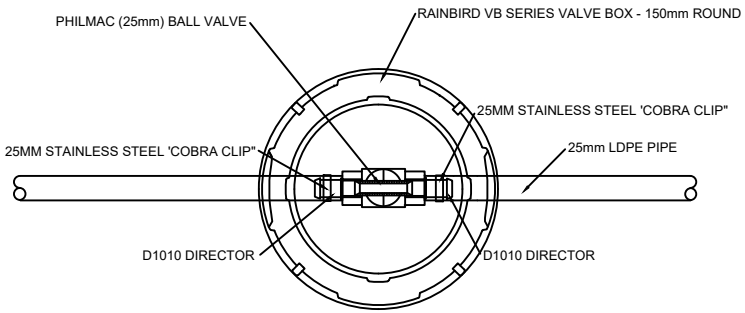
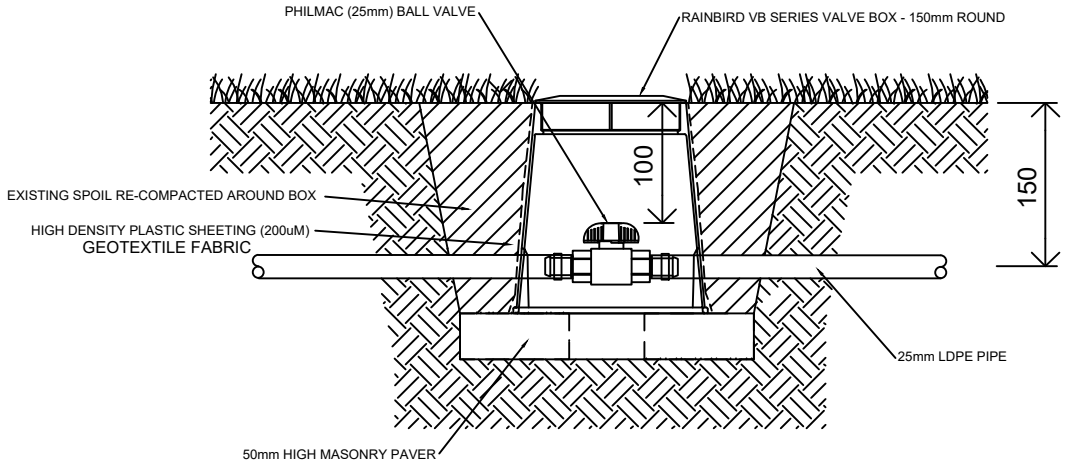


PLAN VIEW



SECTION VIEW

GENERAL NOTES:

- ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.
- WHEN CONNECTED TO RECYCLED WATER OR NOT FOR DRINKING' WATER SYSTEM, THE CONTRACTOR TO PROVIDE LILAC COLOURED FITTINGS AS REQUIRED.
- THE PHILMAC BALL VALVE CAN BE REPLACED WITH A VQA POLY VALVE IF DIRECTED ON THE PLAN

APPLICATION:

- BEFORE A ZONE OF SUB-MULCH DRIP OR SUB-SURFACE DRIP IRRIGATION THAT FORMS PART OF AN OVERALL SYSTEM IN PARK LANDS AND LANDSCAPING PROJECTS
- NON-PRESSURISED PIPEWORK.
- POLY BALL VALVE (25mm) VALVES CAN BE USED AS AN ISOLATION FITTING WHEN DOWN STREAM OF ANY LOCAL SOLENOID VALVE ASSEMBLY.

CONSTRUCTION STANDARDS

BALL VALVE ASSEMBLY TYPE 2 (ISOLATION) - 25mm OR LESS

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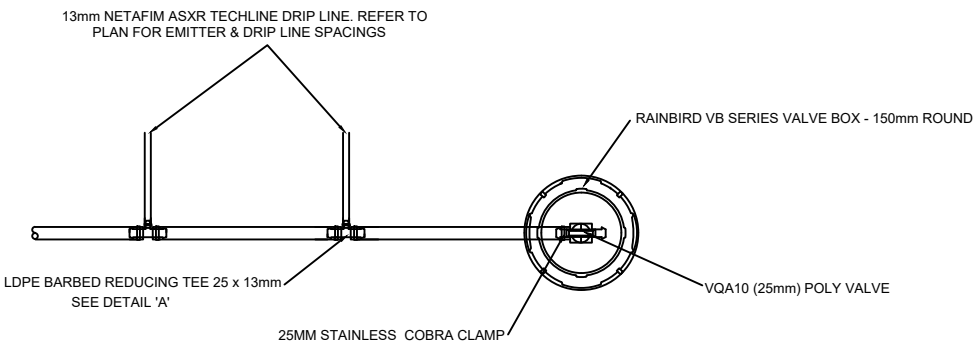
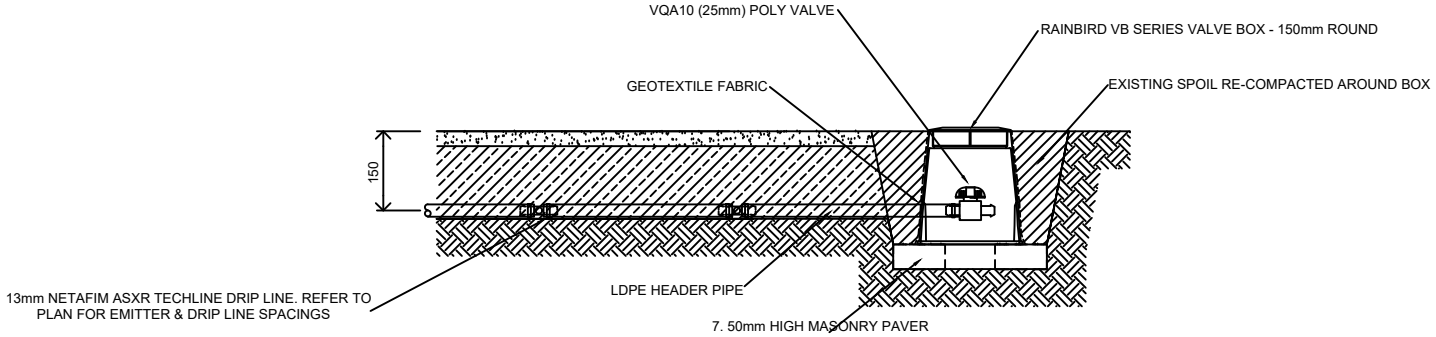
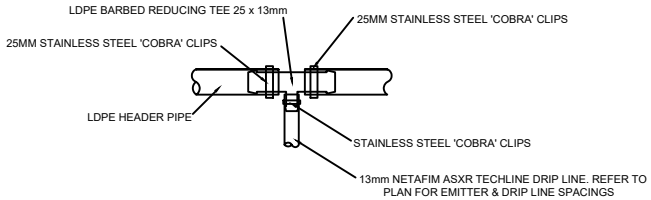


PLAN VIEW



SECTION VIEW



'DETAIL A'

GENERAL NOTES:

- ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.
- WHEN CONNECTED TO RECYCLED WATER OR 'NOT FOR DRINKING' WATER SYSTEM, CONTRACTOR TO PROVIDE LILAC COLOURED FITTINGS AS REQUIRED.
- FLUSHING VALVE CAN BE LOCATED ALONG FLUSH PIPE OR WITHIN 500mm OF THE LAST 13mm DRIPLINE - ENSURE AT LOWEST POINT.

APPLICATION:

- LOW POINT OF AN IN-LINE DRIP IRRIGATION SYSTEM FOR TURF AREAS
- FOR USE IN SUB-SURFACE AND SUB-MULCH DRIP SYSTEMS
- NON-PRESSURISED PIPEWORK

CONSTRUCTION STANDARDS

FLUSH VALVE ASSEMBLY

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IRRIGATION CONSTRUCTION STANDARDS

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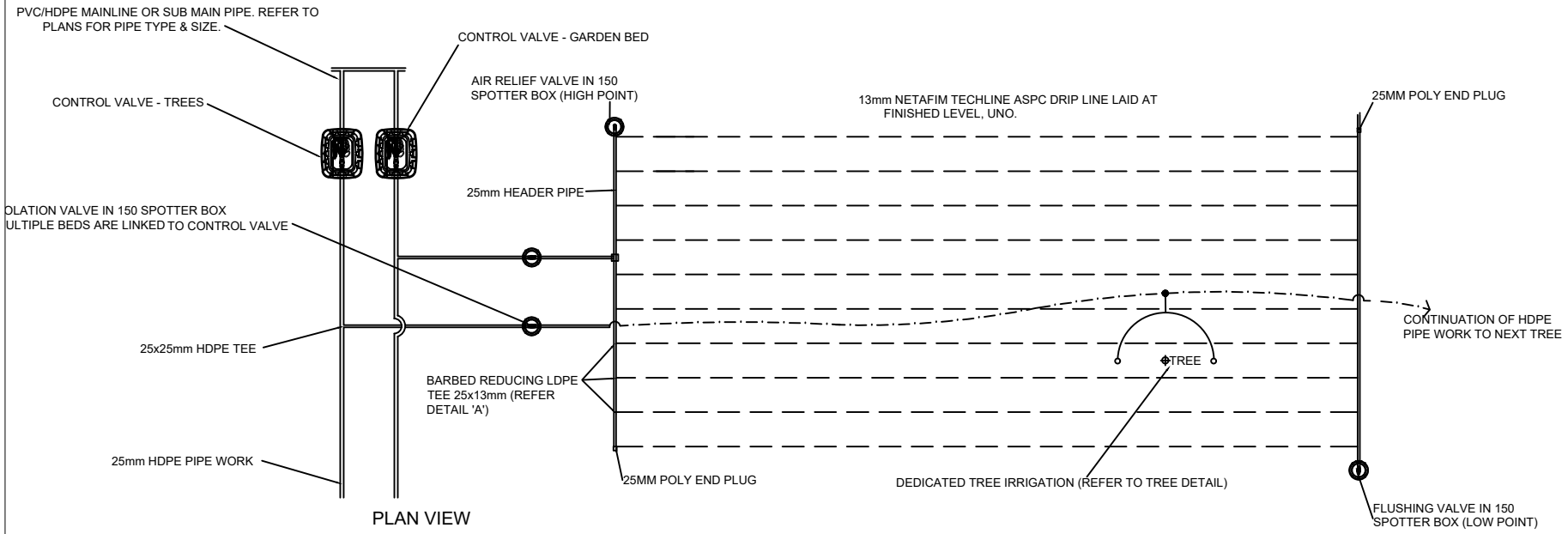
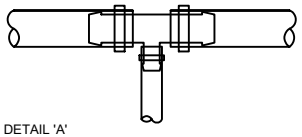


PLAN VIEW



DETAIL 'A'

GENERAL NOTES:

- ALL TECH LINES SHALL BE INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS
- DRIP LINES GENERALLY LAID PARALELL WITH CONTOUR OF LAND.
- ALL DRIP IRRIGATION SYSTEMS TO EXHIBIT A FLUSHING VALVE AT LOW POINT AND AIR RELIEF VALVE AT HIGH POINT UNLESS INDICATED OTHERWISE ON THE PROJECT DRAWINGS.
- IF A TREE IS PLACED WITHIN A GARDEN BED, THE IRRIGATION TO BE ALLOCATED TO A SEPARATE VALVE ASSEMBLY. GARDEN BED VALVES ARE NOT TO IRRIGATE TREES UNLESS ADVISED OTHERWISE BY IRRIGATION TECHNICAL OFFICER.
- ALL JOINS TO BE CLIPPED WITH STAINLESS STEEL 'COBRA' TYPE FITTINGS TO BARBED END FITTINGS.
- LDPE SHALL CONFORM TO AS2698
- 13, 19, 25 AND 32mm PIPE SIZES ONLY TO BE USED.
- ALL GARDEN BED TECH LINES TO BE LAID ALONG FINISH SURFACE LEVEL WITH 75mm THICK MULCH OVER AND PINNED AT 3m SPACINGS WITH 150mm GALVANISED U-PINS

APPLICATION:

- PARK LAND AND RESERVE GARDENS

CONSTRUCTION STANDARDS

DRIP IRRIGATION INSTALLATION DETAILS - GARDEN BED WITH A TREE

NOTES.

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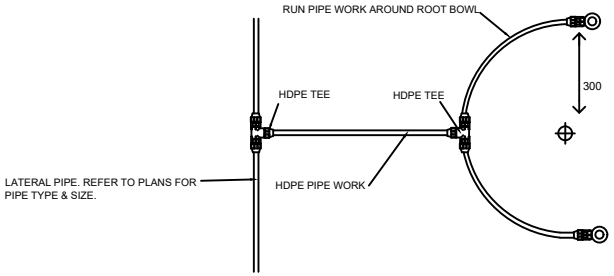

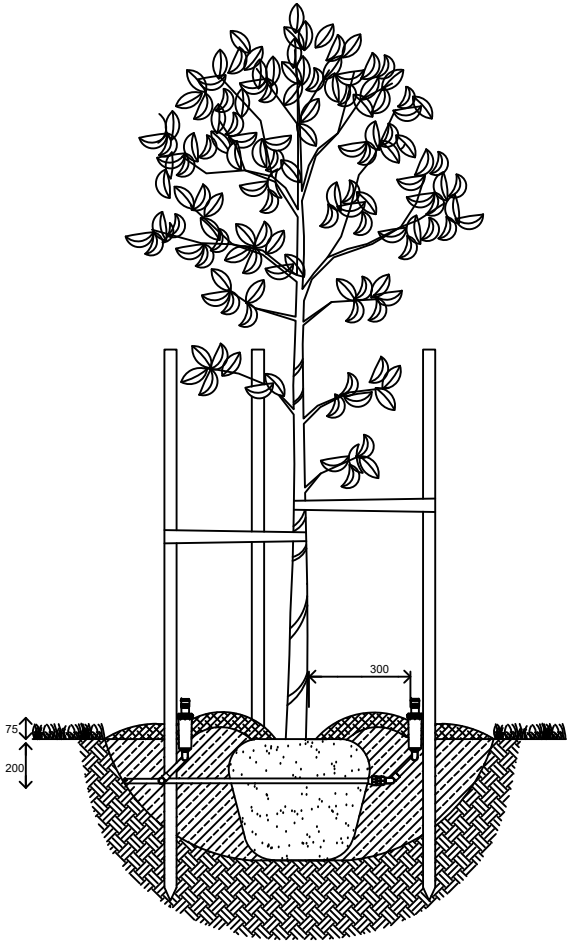

GENERAL NOTES:

- IF A TREE IS PLACED WITHIN A TURF AREA, THE IRRIGATION TO BE ALLOCATED TO A SEPARATE VALVE ASSEMBLY. TURF VALVES ARE NOT TO IRRIGATE TREES UNLESS ADVISED OTHERWISE
- ALL TREE IRRIGATION TO BE LAID WITH A MINIMUM OF 200MM COVER WITH ALLOWANCE FOR AN EXTRA 75mm MULCH COVER.

APPLICATION:

- ALL NEW TREE PLANTINGS WHERE REQUIRED

CONSTRUCTION STANDARDS

TREE SHRUBBLER IRRIGATION INSTALLATION DETAIL
(MSBN-20F WITH HUNTER PROS 4)

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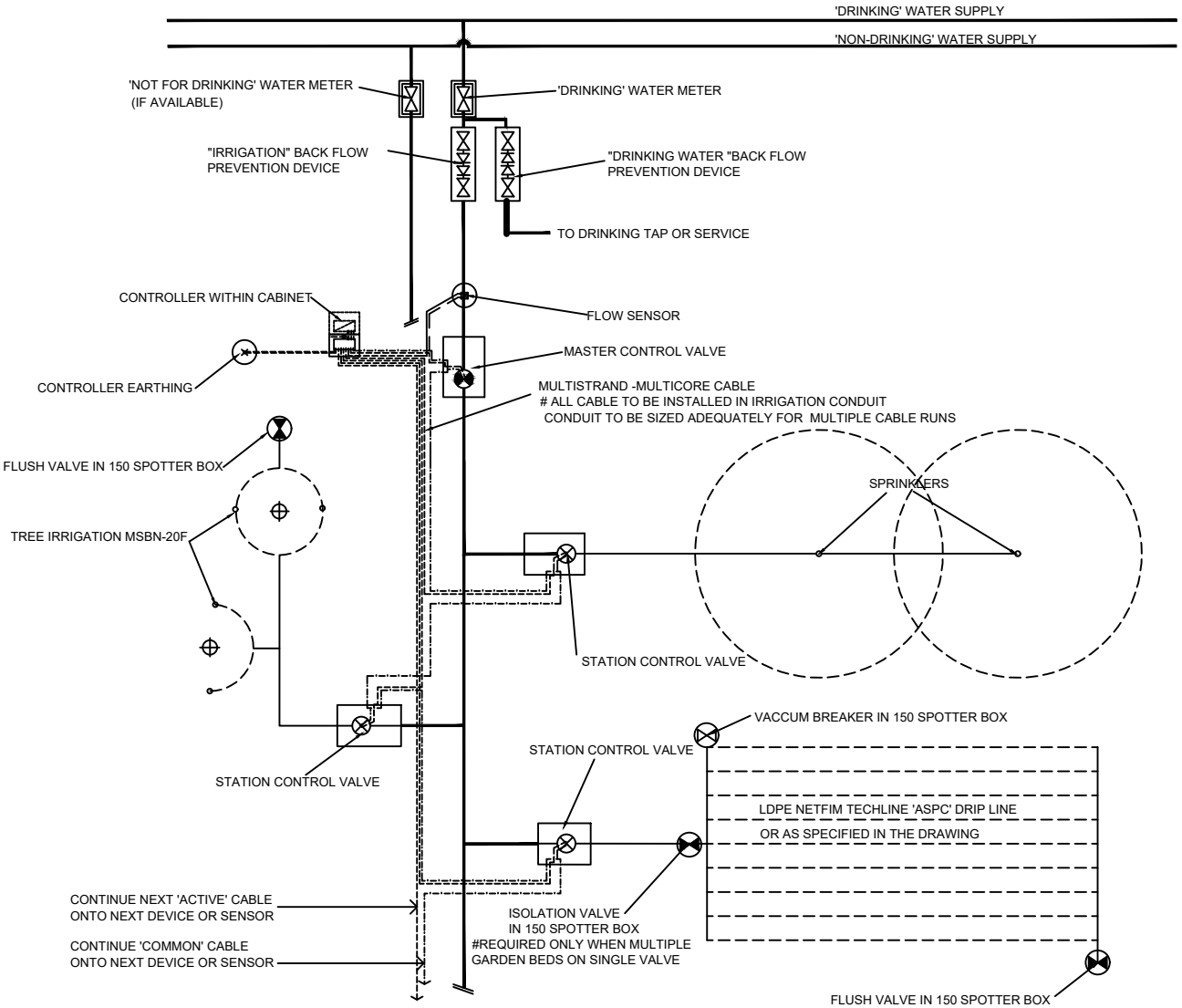

GENERAL NOTES:

- ALL EQUIPMENT & MATERIALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
- BACKFLOW REQUIRED WHEN CONNECTING INTO A 'DRINKING' WATER SUPPLY LINE :TYPE OF BACKFLOW TO BE DETERMINED DUE TO HAZARD LEVEL AUDIT TO BE UNDERTAKEN BY IRRIGATION TECHNICAL OFFICER TO CONFIRM HAZARD LEVEL AND TYPE OF BACKFLOW DEVICE FOR PROJECT PRIOR TO DOCUMENTATION PHASE.
- REFER TO INDIVIDUAL COMPONENT DRAWINGS FOR DETAIL

APPLICATION:

- PARK LANDS AND RESERVES -UP TO 24 STATIONS (AC OR DC)
- GARDEN BED OR GRASSED VERGES AND MEDIAN STRIPS
- STRATA TREE CELL ARRANGEMENTS

CONSTRUCTION STANDARDS

COMMERCIAL CONTROLLER WITH MULTICORE WIRE CABLING - TYPICAL SET -UP

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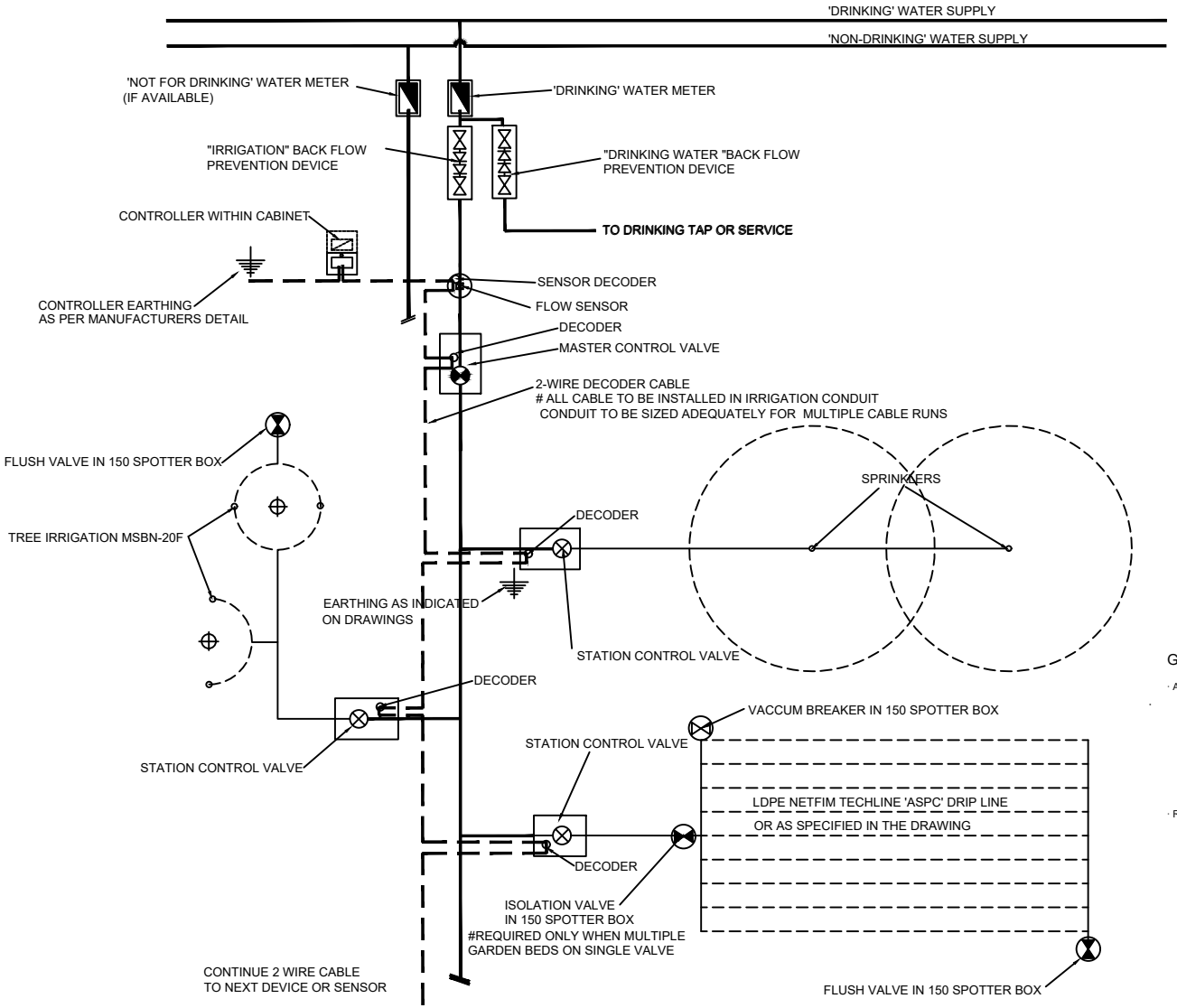

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- REFER TO INDIVIDUAL COMPONENT DRAWINGS FOR DETAIL

APPLICATION:

- PARKS AND RESERVES -MORE THAN ONE FLOW METER/ WATER SOURCE, DECODERS ALREADY IN USE OR MORE THAN 24 STATIONS (AT THE DISCRETION OF CoP IRRIGATION TECHNICAL OFFICER
- GARDEN BED OR GRASSED VERGES AND MEDIAN STRIPS
- STRATA TREE CELL ARRANGEMENTS

NOTES.

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palmerston@palmerston.nt.gov.au

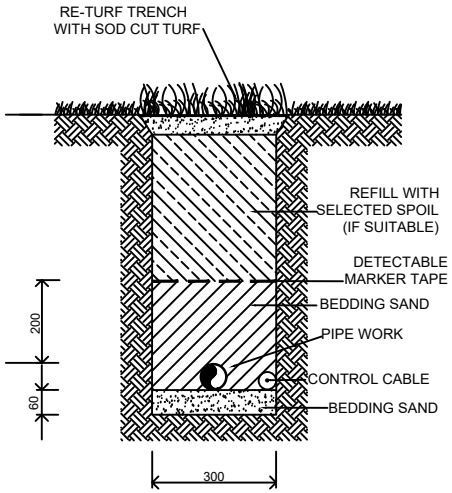
city of PALMERSTON 'A Place for People'

PALMERSTON COUNCIL

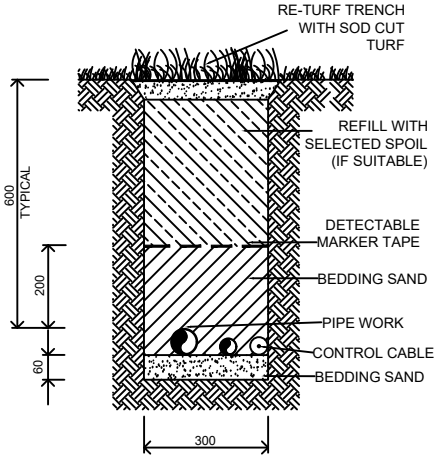
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS -20	A

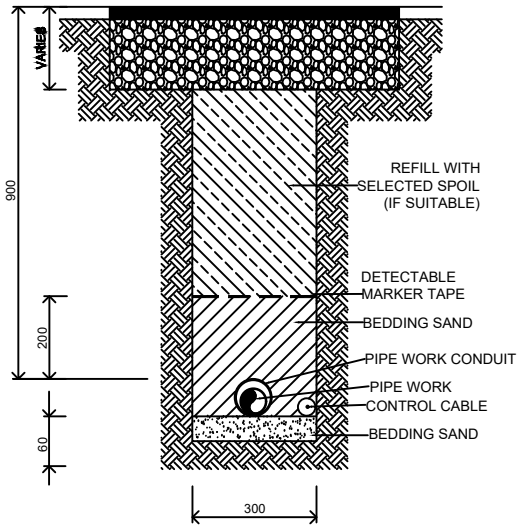
INSTALLATION DETAIL



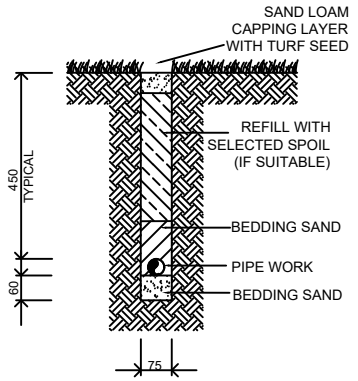
DETAIL 1 TYPICAL MAINLINE OR SUBMAIN TRENCH



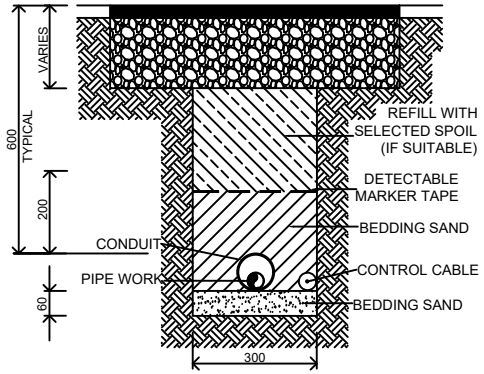
DETAIL 2 TYPICAL SHARED MAINLINE/ LATERAL TRENCH



DETAIL 5 TYPICAL IRRIGATION PIPEWORK UNDER SEALED ROADWAY SURFACES ONLY



DETAIL 3 TYPICAL LATERAL TRENCH



DETAIL 4 TYPICAL IRRIGATION PIPEWORK UNDER CONCRETE/ HARDSTAND

GENERAL NOTES

- WHERE MULTIPLE PIPES ARE LAID IN A COMMON TRENCH - ALLOW A MINIMUM OF TWO PIPE WIDTHS SEPARATION BETWEEN EACH PIPE
- ENSURE ALL TRENCH BASES ARE LEVEL AND FREE FROM ROCKS
- ALL TRENCHES ARE TO BE MECHANICALLY TAMPERED AS TO MINIMISE SUBSIDANCE OF TRENCHES
- ALL CONTROL CABLE CONDUITS ARE TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS.
  USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON
  USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON AND/ OR TWO WIRE DECODER CABLE

CONSTRUCTION STANDARDS

TRENCHING DETAIL

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IRRIGATION CONSTRUCTION STANDARDS

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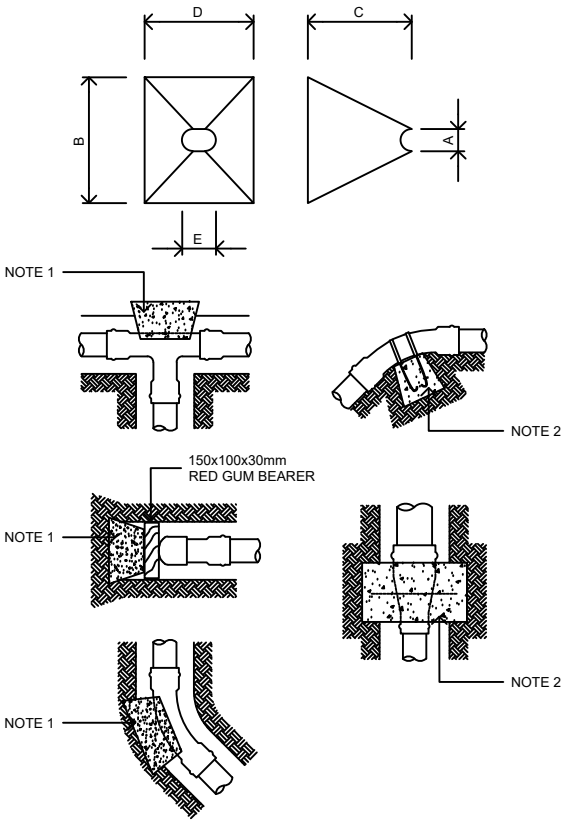
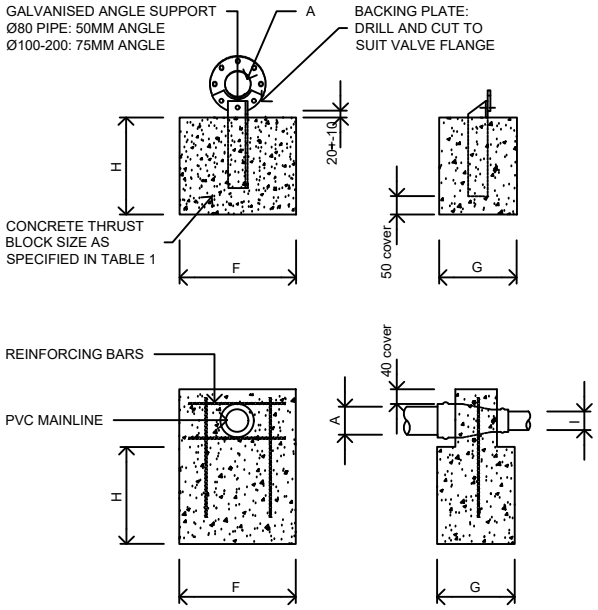


THRUST BLOCK - TYPE 1

NOT TO SCALE



THRUST BLOCK - TYPE 2

NOT TO SCALE

THRUST BLOCK NOTES:

1. DIMENSIONS BASED ON CLASS 12 PIPE & 75kPa SOIL BEARING CAPACITY
2. THRUST BLOCKS SHALL BE OF AT LEAST 20 MPa CONCRETE AT 28 DAY STRENGTH AND HAVE A BEARING SURFACE NOT LESS THAN THAT LISTED IN TABLE 1.
3. THRUST BLOCKS SHALL BE INSTALLED ON ALL RRJ MAINLINE FITTINGS WHEN PRESENT ON THE PROJECT DRAWINGS INCLUDING ELBOWS, BENDS, TEES, REDUCERS, STOP ENDS AND ISOLATION VALVES BUT EXCLUDING 'SELF STRAINING' TAKE-OFFS SUCH AS TAPPING BANDS FOR AIR VALVES AND TEES TO SOLVENT WELD BRANCHES FOR SUBMAINS. ISOLATION VALVES SHALL HAVE A STEEL BRACKET RESTRAINT (SEE DRAWING).
4. THRUST BLOCKS SHALL BE SO PLACED THAT THE PIPE JOINTS AND ANY BOLT-UP JOINTS WILL BE ACCESSIBLE FOR INSPECTION AND REPAIR.
5. CONCRETE FOR THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED SOIL FACE. ALL SIDES OF THE BLOCK NOT IN CONTACT WITH UNDISTURBED SOIL SHALL BE FORMED.
6. INSPECTION OF EXCAVATIONS SHALL BE REQUIRED FOR ALL THRUST BLOCKS PRIOR TO PLACEMENT OF CEMENT AND BACKFILLING.
7. ALL CABLES LAID NEAR THRUST BLOCKS SHALL BE CLEAR OF THE FITTING AND BLOCK, AND SHALL BE WRAPPED IN 10MM THERMAL INSULATOR.
8. TYPE 1 THRUST BLOCK DETAILS APPLIED IN THE FIELD TO ALL PRESSURIZED MAINLINE AND SUB MAIN PIPE WORK BELOW 63mm IN DIAMETER.
9. TYPE 2 THRUST BLOCK DETAILS APPLIED IN THE FIELD WHEN PRESSURIZED PIPE DIAMETERS OF 80mm OR GREATER ARE APPLIED.

TABLE 1: THRUST BLOCK DIMENSIONS (mm)

	A	B	C	D	E	F	G	H	I
90° BEND	200 150 100 80 50	750 450 300 300 250	TO UNDISTURBED SOIL FACE - MINIMUM 500mm	1000 700 500 400 300	LEAVE ACCESS TO PIPE JOINT AND FLANGE BOLTS				IF 'I' IS LESS THAN THIS, USE STOP END DIMENSIONS
STOP END	200 150 100 80 50	750 450 300 300 250		750 600 400 300 300					
TEE	200 150 100 80	750 450 300 300		1000 700 500 400					
CROSS	200 150 100 80								
BEND	200 150 100 80	750 450 300 300		750 450 400 300					
MAINLINE ISOLATION VALVE	200 150 100 80					800 700 550 550	400 400 300 300	600 500 450 300	
REDUCERS	200 150 100 80					350 300 200 200	400 400 300 300	450 150 150 150	100 80 50 40

APPLICATION:

· TO ALL PRESSURISED MAINLINE AND SUB MAIN PIPE WORK

CONSTRUCTION STANDARDS

THRUST BLOCK INSTALLATION DETAILS

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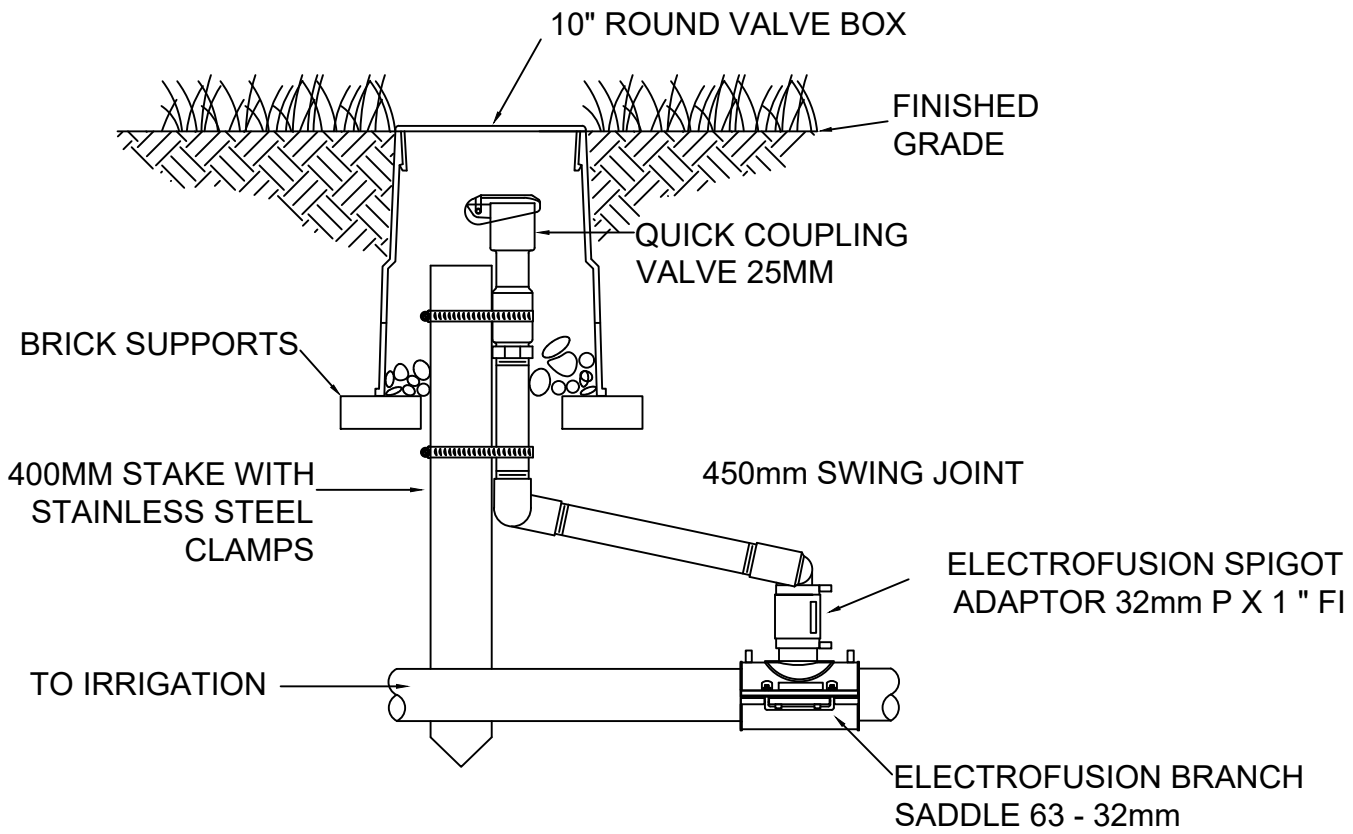
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1: NTS

DRG. NO: IRR-PC-CS -22

REV: A

INSTALLATION DETAIL



CONSTRUCTION STANDARDS

QUICK COUPLING INSTALLATION DETAIL

GENERAL NOTES:

- ALL HDPE PIPEWORK TO BE PE100/PN12.5 FOR 'PRESSURISED' PIPEWORK.
- ALL PVC PIPEWORK TO BE CLASS 12 FOR 'PRESSURISED' PIPEWORK.

APPLICATION

- INSTALLED TO APPLY EXTRA WATERING TO HIGH USE AREAS

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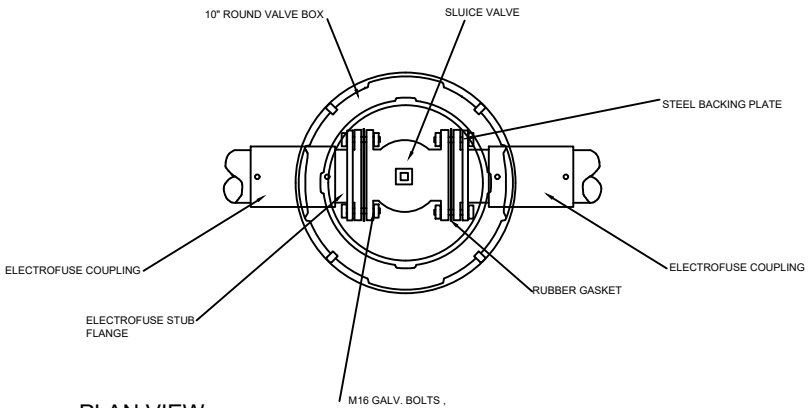
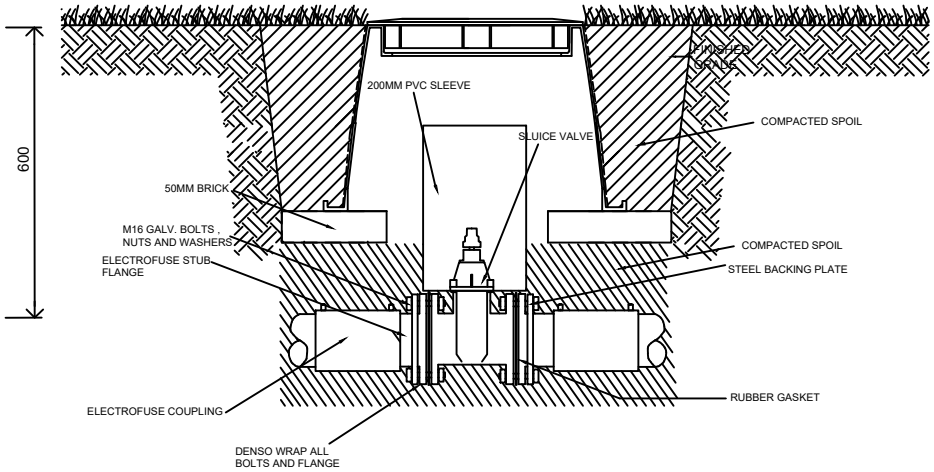
SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS-23	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

CONSTRUCTION STANDARDS

SLUICE VALVE INSTALLATION DETAILS

GENERAL NOTES:

- ALL HDPE PIPEWORK TO BE PE100/PN12.5 FOR 'PRESSURISED' PIPEWORK.
- ALL PVC PIPEWORK TO BE CLASS 12 FOR 'PRESSURISED' PIPEWORK.

APPLICATION

- INFIELD ISOLATION OF TRANSMISSION MAINLINES -90MM AND ABOVE

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IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
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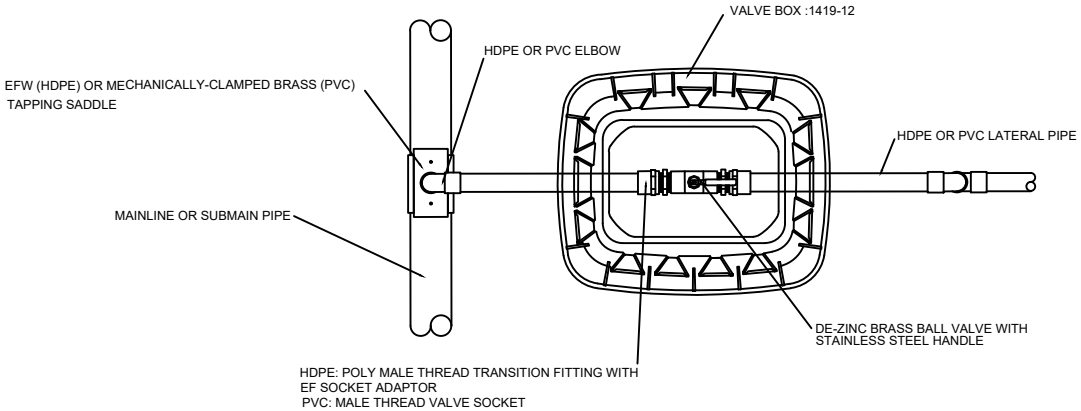
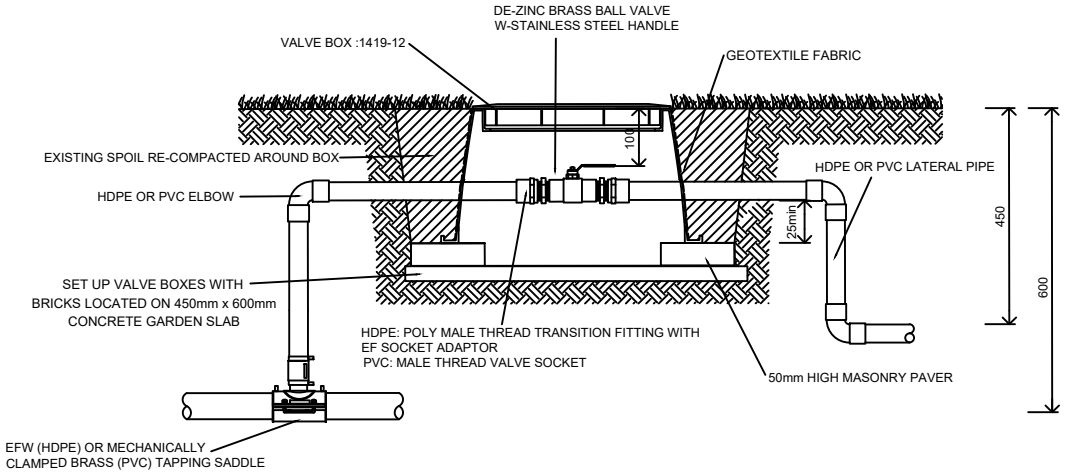
INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

GENERAL NOTES:

- ENSURE THAT THE VALVE ASSEMBLY POSITION ALLOWS FOR FULL OPERATION OF THE HANDLE
- ALL HDPE PIPEWORK TO BE PE100/PN12.5 FOR 'PRESSURISED' PIPEWORK.
- ALL PVC PIPEWORK TO BE CLASS 12 FOR 'PRESSURISED' PIPEWORK.
- GEOTEXTILE FABRICK TO BE INSTALLED AROUND WHOLE VALVE BOX INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AND ON TOP OF THE BRICKS

APPLICATION

- INFIELD ISOLATION OF SMALL/MEDIUM MAINLINES AND SUBMAINS -63MM AND BELOW

CONSTRUCTION STANDARDS

ISOLATION VALVE INSTALLATION DETAIL 50MM AND BELOW

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IRRIGATION CONSTRUCTION STANDARDS

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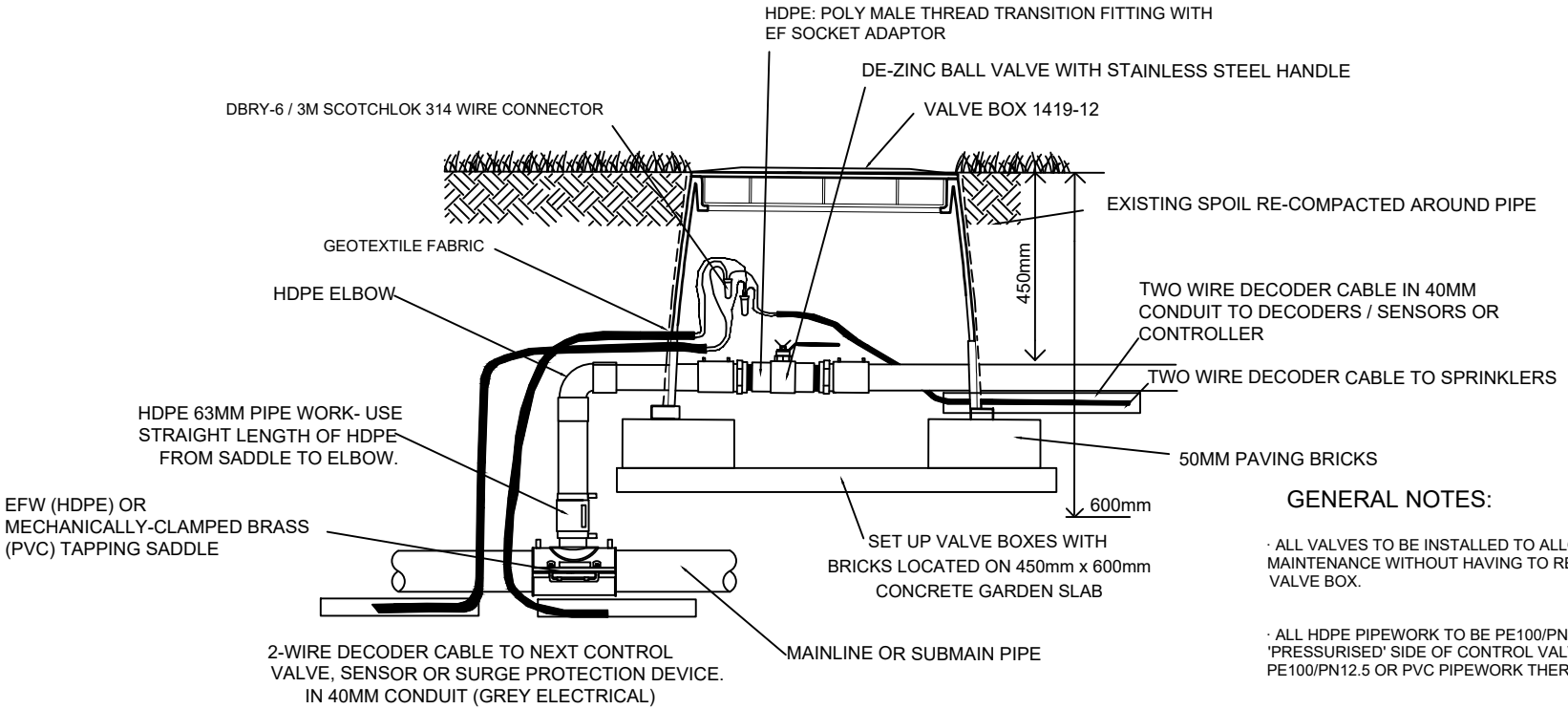
INSTALLATION DETAIL



GENERAL NOTES:

· ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.

· ALL HDPE PIPEWORK TO BE PE100/PN12.5 ON 'PRESSURISED' SIDE OF CONTROL VALVE. HDPE PE100/PN12.5 OR PVC PIPEWORK THEREAFTER

· ALL PVC PIPEWORK TO BE CLASS 12 ON 'PRESSURISED' SIDE OF CONTROL VALVE. CLASS 9 PVC OR HDPE THEREAFTER

· GEOTEXTILE FABRIC TO BE INSTALLED AROUND WHOLE VALV INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AN OF THE BRICKS

· ALL IRRIGATION CABLE CONDUIT TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS. USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON AND/ OR TWO WIRE DECODER CABLE

APPLICATION

· INFIELD ISOLATION OF SMALL/MEDIUM MAINLINES AND SUBMAINS -63MM AND BELOW

CONSTRUCTION STANDARDS

SUBMAIN TAKE OFF CONNECTION INSTALLATION DETAIL

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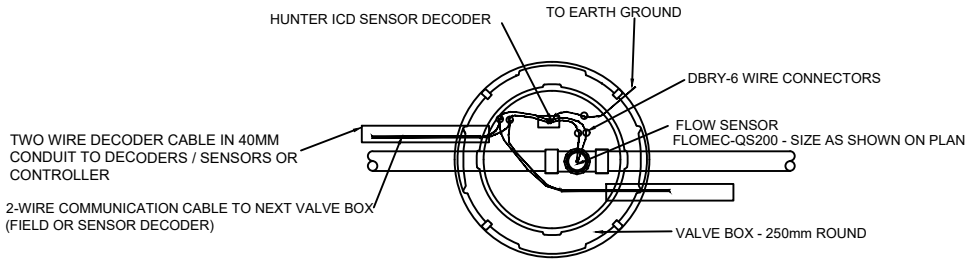
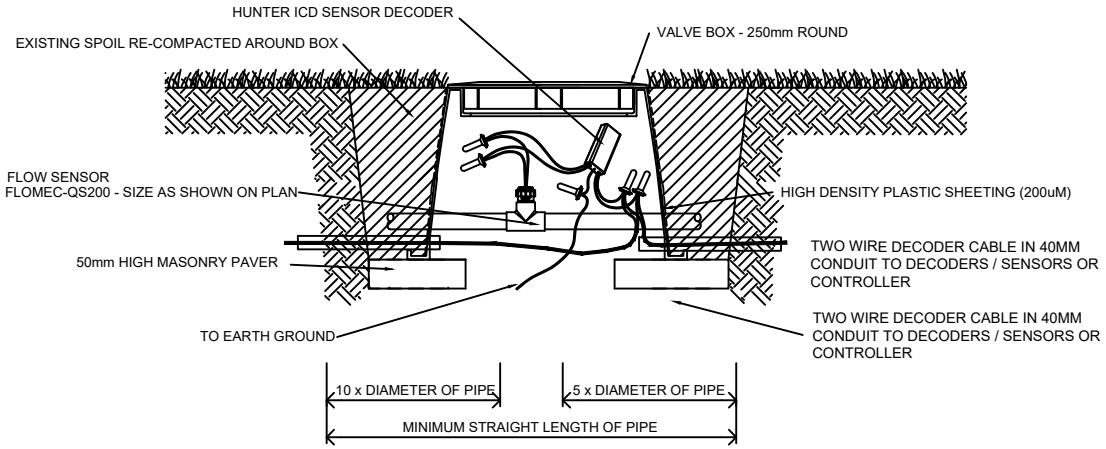
INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

CONSTRUCTION STANDARDS

FLOW SENSOR INSTALLATION DETAIL - DECODER SYSTEM

GENERAL NOTES:

· ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.

· ALL PIPEWORK TO BE EITHER HDPE PE100/PN12.5 OR CLASS 12 PVC.

· EARTH GROUND TO BE A MINIMUM OF 200MM AWAY FROM ICD SENSOR DECODER AND AT A RIGHT ANGLE TO THE TWO WIRE PATH

· GEOTEXTILE FABRIC TO BE INSTALLED AROUND WHOLE VALVE BOX INCLUDING OPENINGS AND FOLDED UNDER VALVE BOX LIP AND ON TOP OF THE BRICKS

· ALL IRRIGATION CABLE CONDUIT TO BE ELECTRICAL GRADE GREY RIGID CONDUIT WITH SWEEPING BENDS. USE 32MM FOR 1 X 7-13 CORE AND SINGLE COMMON USE 40MM FOR 2 X 7-13 CORE AND SINGLE COMMON

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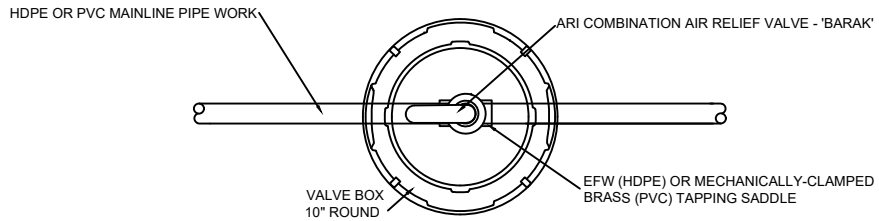
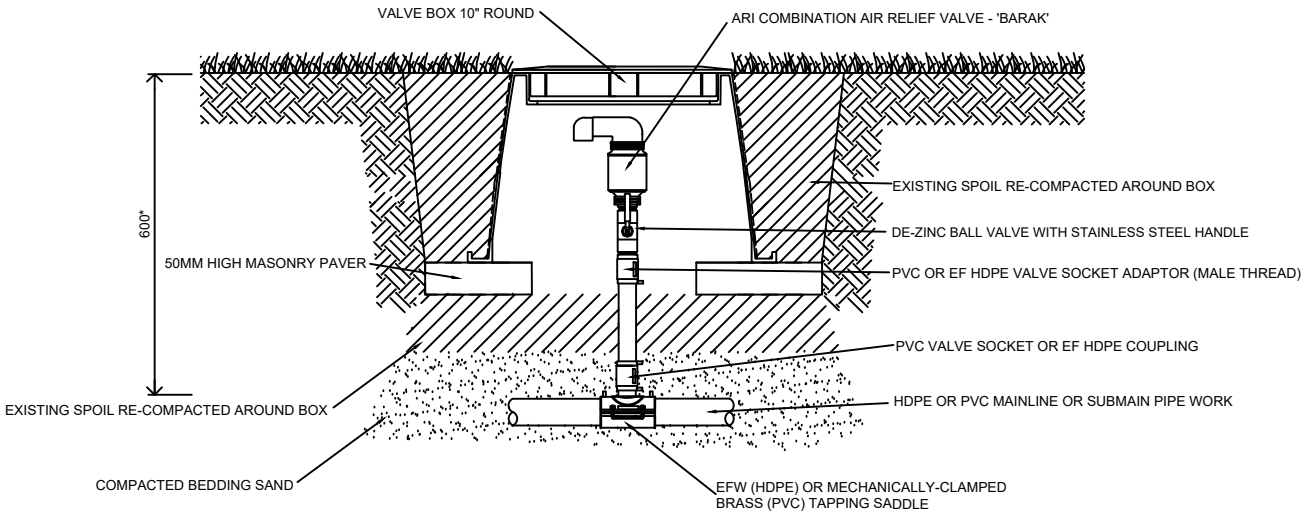


PLAN VIEW



SECTION VIEW

CONSTRUCTION STANDARDS

AIR RELIEF VALVE INSTALLATION DETAIL

GENERAL NOTES:

- ALL VALVES TO BE INSTALLED TO ALLOW EASE OF MAINTENANCE WITHOUT HAVING TO REMOVE THE VALVE BOX.
- ALL PIPEWORK TO BE EITHER HDPE PE100/PN12.5 OR CLASS 12 PVC.

APPLICATION:

- ALL HIGH POINTS TO MAINLINE PIPE WORK AS REQUIRED
- APPLY CORRECTLY SIZED AIR RELIEF FITTING TO SUIT PREVAILING PIPE WORK DIAMETER & PRESSURE RATING

NOTES.

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IRRIGATION CONSTRUCTION STANDARDS ARE TO BE USED IN CONJUNCTION WITH THE IRRIGATION DESIGN AND IRRIGATION TECHNICAL SPECIFICATION

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REV	ISSUE	DATE
A	PRELIMINARY	16-10.2025

CLIENT

CITY OF PALMERSTON
1 CHUNG WAH TERRACE.
PALMERSTON, NT, 0830

palmerston@palmerston.nt.gov.au

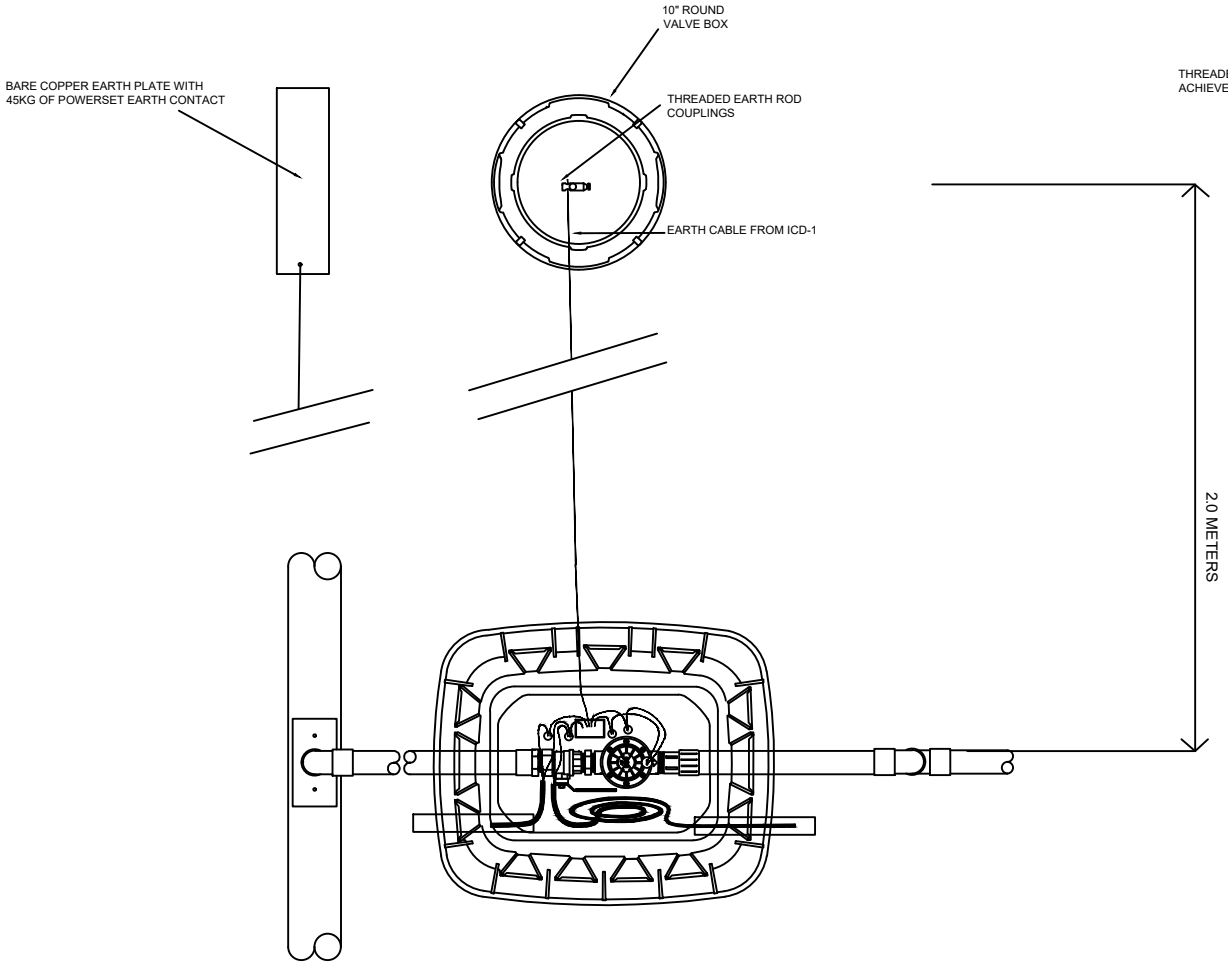
city of PALMERSTON 'A Place for People'

PALMERSTON COUNCIL

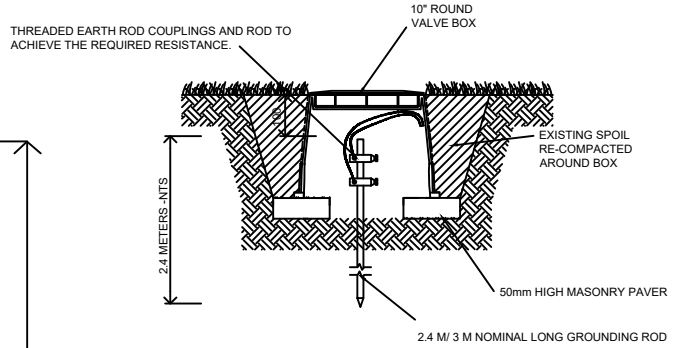
IRRIGATION CONSTRUCTION STANDARDS

SCALE @ A1	DRG. NO.	REV
NTS	IRR-PC-CS-28	A

INSTALLATION DETAIL



PLAN VIEW



SECTION VIEW

GENERAL NOTES:

· HUNTER ICD-100 HAVE INTEGRATED SURGE PROTECTION AND GROUNDING WIRE, CONNECT GROUNDING WIRE TO EARTH STAKE AS INDICATED IN SEPERATE VALVE BOX

· GROUNDING OF METAL IRRIGATION CABINET NOT TO BE CONNECTED TO DECODER GROUNDING ASSEMBLY

· GROUNDING TO BE A MINIMUM OF 2 METERS AWAY FROM ICD-100 AND AT RIGHT ANGLES TO THE WIRE PATH

· GROUNDING TO ACHIEVE A READING OF 10 OHMS RESISTANCE TO GROUND; CAN BE ACHIEVED VIA AN EARTH ROD ASSEMBLY OR EARTH PLATE AND POWER SET COMPOUND
· IF SUITABLE READINGS CANT BE ACHIEVED ADD AN EXTRA GROUNDING DEVICE.

APPLICATION:

· PART OF AN OVERALL DECODER-BASED IRRIGATION SYSTEM.
· CONNECTED TO IRRIGATION CONTROLLER AND GROUNDED ACCORDING TO CONTROLLER MANUFACTURER'S REQUIREMENTS.

CONSTRUCTION STANDARDS

LIGHTNING SURGE PROTECTION ASSEMBLY EARTH ROD - DECODER SYSTEM

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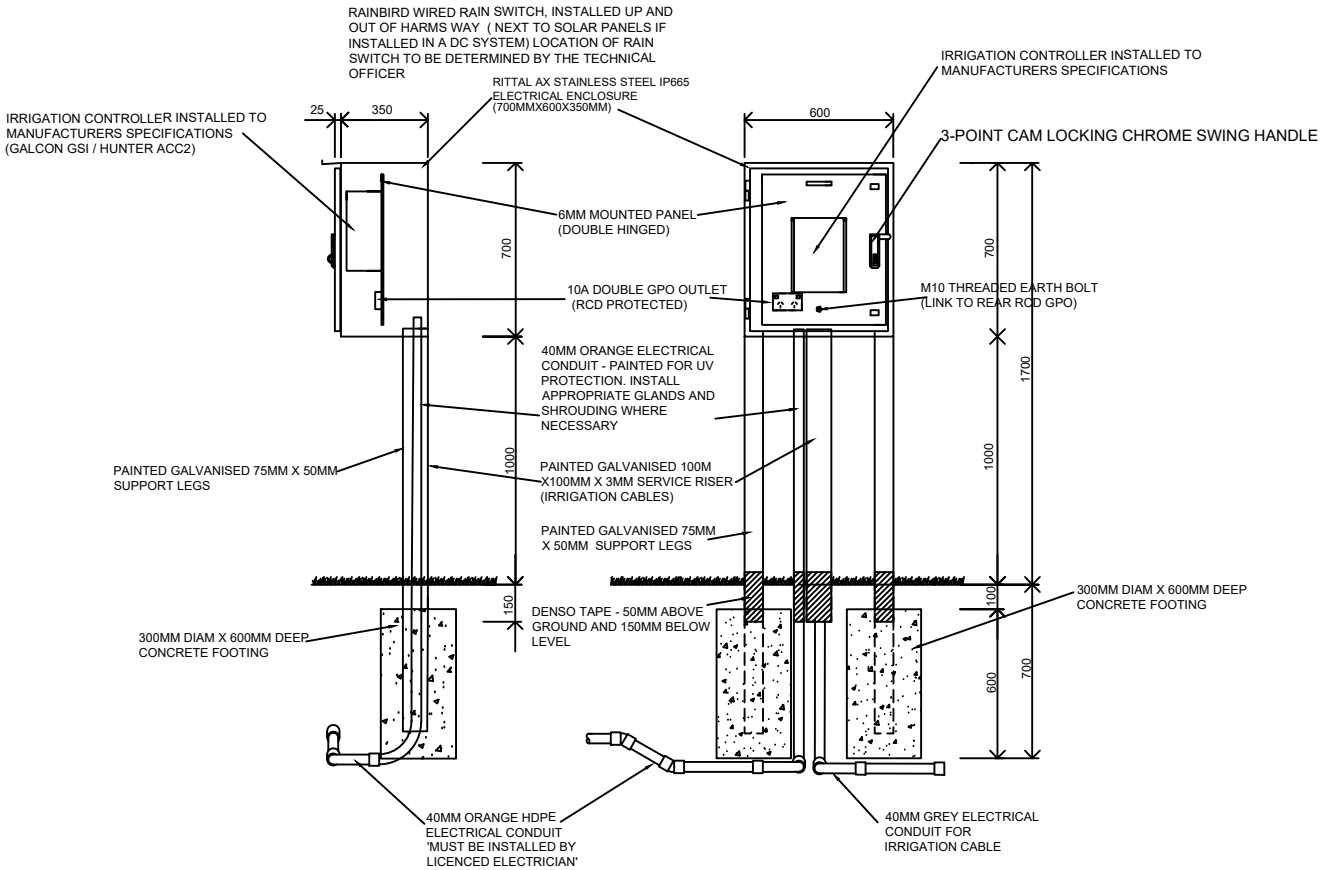

SIDE VIEW

FRONT VIEW

GENERAL NOTES:

- ALL (NEW AND EXISTING) SERVICES SHALL BE LOCATED BY THE CONTRACTOR PRIOR TO UNDERTAKING WORKS
- ALL ELECTRICAL WORKS, INCLUDING CONDUITS ARE TO BE INSTALLED AS PER AS3000 ELECTRICAL STANDARDS
- ALL ELECTRICAL WORKS ARE TO BE CARRIED OUT BY SUITABLEY QUALIFIED / LICENCED CONTRACTORS
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATION
- ALL ELECTRICAL SERVICES ARE TO BE SHROUDED BY USING APPROPRIATE GLANDS AND PROTECTION
- ENSURE RCD PROTECTION IS INSTALLED FOR THE IRRIGATION CONTROLLER
- ENSURE METAL CABINET IS EARTHED TO AS3000
- NO ELECTRICAL OR IRRIGATION CABLE IS TO BE INSTALLED WITH-IN THE STRUCTURAL SUPPORT LEGS
- DULUX ACRATHANE IF PAINT -N65 GRAPHITE GREY
- GALCON GSI (LESS THAN 24 STATIONS)
- HUNTER ACC2 (MORE THAN 24 STATIONS)

APPLICATION:

- POSITIONED IN RESERVES ADJACENT POWER SUPPLY WHERE NO BUILDING OR STRUCTURE IS PRESENT

CONSTRUCTION STANDARDS

CONTROLLER ENCLOSURE INSTALLATION DETAIL - FREE STANDING CABINET

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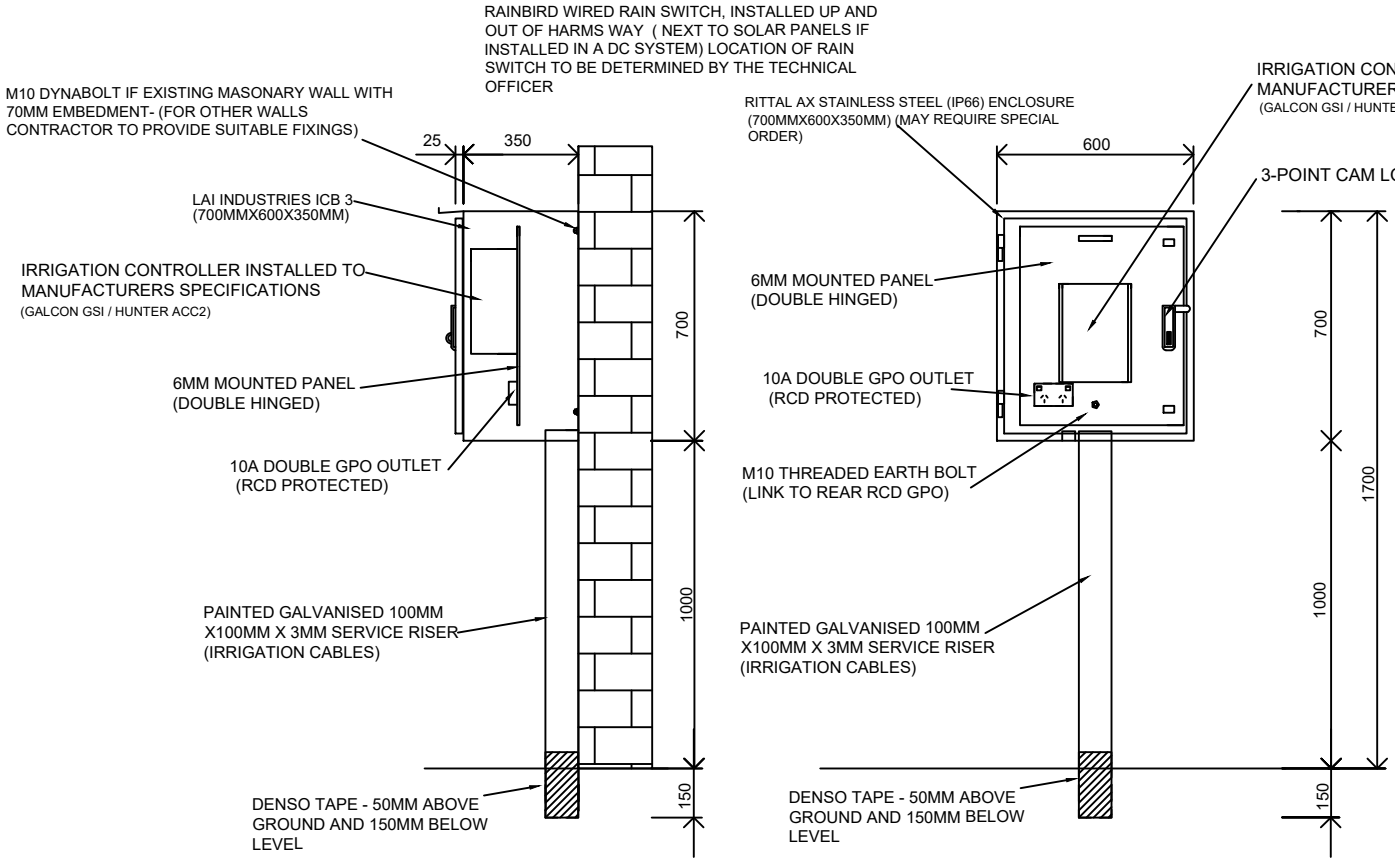

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- ALL ELECTRICAL WORKS, INCLUDING CONDUITS ARE TO BE INSTALLED AS PER AS3000 ELECTRICAL STANDARDS
- ALL ELECTRICAL WORKS ARE TO BE CARRIED OUT BY SUITABLEY QUALIFIED / LICENCED CONTRACTORS
- POWER CAN BE SOURCED FROM THE BUILDING IF AVAILABLE
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATION
- ALL ELECTRICAL SERVICES ARE TO BE SHROUDED BY USING APPROPRIATE GLANDS AND PROTECTION
- ENSURE RCD PROTECTION IS INSTALLED FOR THE IRRIGATION CONTROLLER
- ENSURE METAL CABINET IS EARTHED TO AS3000
- NO ELECTRICAL OR IRRIGATION CABLE IS TO BE INSTALLED WITH-IN THE STRUCTURAL SUPPORT LEGS
- DULUX ACRATHANE IF PAINTED -N65 GRAPHITE GREY
- GALCON GSI (LESS THAN 24 STATIONS)
- HUNTER ACC2 (MORE THAN 24 STATIONS)

APPLICATION:

- FIXED TO PALMERSTON COUNCIL BUILDINGS OR ASSETS SUPPLY ONLY

CONSTRUCTION STANDARDS

CONTROLLER ENCLOSURE INSTALLATION DETAIL - EXISTING STRUCTURE CABINET

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