**Project**

Specification for the supply and installation

of a new irrigation pump station at

Gundagai Golf Course

**Client**

Cootamundra Gundagai Regional Council

**Contract No:**

GGC\_PU\_2312

Date

10 July 2024

Revision A

Logo

Description automatically generatedLogo

Description automatically generated



**COPYRIGHT**

Water Wise Consulting has given, Cootamundra Gundagai Regional Council “The Principal” and invited parties the rights to copy either whole or part of the document set for the express purpose of preparing or obtaining quotes for the work. The use the document either, whole or in part for any other purpose will be in breach of copyright.

Table of Contents

[1 PRELIMINARIES 1](#_Toc155794622)

[1.1 WORKS 1](#_Toc155794623)

[1.2 PROJECT OVERVIEW 1](#_Toc155794624)

[1.3 WORKS BY THE PRINCIPAL 1](#_Toc155794625)

[1.4 TECHNICAL ENQUIRIES 1](#_Toc155794626)

[1.5 SET-OUT 1](#_Toc155794627)

[1.6 DEFECTIVE WORKS 1](#_Toc155794628)

[1.6.1 NON-CONFORMING WORKS 2](#_Toc155794629)

[1.7 SECURITY 2](#_Toc155794630)

[1.8 STORAGE COMPOUND 2](#_Toc155794631)

[1.9 SITE AMENITIES 2](#_Toc155794632)

[1.10 SITE CLEANING 2](#_Toc155794633)

[1.10.1 NOTICE TO CLEAN UP 2](#_Toc155794634)

[1.11 ACCESS TO SITE 3](#_Toc155794635)

[1.11.1 PIPE DELIVERIES 3](#_Toc155794636)

[1.11.2 DELIVERIES VEHICLES 3](#_Toc155794637)

[1.11.3 DELIVERIES, HANDLING AND STORAGE 3](#_Toc155794638)

[1.12 EXISTING NON-IRRIGATION SERVICES 3](#_Toc155794639)

[1.13 EXISTING IRRIGATION SERVICES 3](#_Toc155794640)

[1.13.1 TEMPORARY CAPPING, CONNECTIONS AND ALTERATIONS 3](#_Toc155794641)

[1.13.2 SYSTEM SHUTDOWNS 4](#_Toc155794642)

[1.14 RECORDING OF EXISTING SERVICES 4](#_Toc155794643)

[1.15 NOMINATED BRANDS, MODELS 4](#_Toc155794644)

[1.15.1 CONTINUITY OF COMPONENTS 4](#_Toc155794645)

[1.15.2 STOCKS OF PRODUCTS 4](#_Toc155794646)

[1.16 FINAL INSPECTION AND HAND OVER 4](#_Toc155794647)

[1.17 DEFECTS AND LIABILITY PERIOD 5](#_Toc155794648)

[1.18 GUARANTEES AND WARRANTIES 5](#_Toc155794649)

[1.18.1 DEVIATIONS FOR GUARANTEES AND WARRANTIES 5](#_Toc155794650)

[1.19 PRACTICAL COMPLETION 5](#_Toc155794651)

[1.20 ACCURACY OF BILL OF MATERIALS 5](#_Toc155794652)

[1.21 WORKS RISK ASSESSMENT 6](#_Toc155794653)

[1.22 DILAPIDATION REPORT 6](#_Toc155794654)

[1.23 WORK AS EXECUTED DRAWINGS AND DOCUMENTATION 6](#_Toc155794655)

[1.24 RATES 6](#_Toc155794656)

[2 INSTALLATION 7](#_Toc155794657)

[2.1 TRENCHING AND MINOR EXCAVATION 7](#_Toc155794658)

[2.1.1 MACHINERY 7](#_Toc155794659)

[2.2 TRENCHING AND EXCAVATION IN ROCK AND IMPORTED MATERIALS 7](#_Toc155794660)

[2.2.1 ROCK 7](#_Toc155794661)

[2.3 WASTE / UNSUITABLE MATERIAL 7](#_Toc155794662)

[2.3.1 CONTAMINATED SOILS 8](#_Toc155794663)

[2.4 MEASUREMENT OF ROCK AND IMPORTED FILL 8](#_Toc155794664)

[2.5 HARD GROUND 8](#_Toc155794665)

[2.6 HAND DIGGING 8](#_Toc155794666)

[2.7 EXCESS SPOIL 8](#_Toc155794667)

[2.7.1 TEMPORARY STOCKPILES 8](#_Toc155794668)

[2.8 TRUCKS 8](#_Toc155794669)

[2.9 TRENCH CONSTRUCTION 9](#_Toc155794670)

[2.9.1 EXTENT OF TRENCHING 9](#_Toc155794671)

[2.9.2 TRENCHING ALIGNMENT 9](#_Toc155794672)

[2.10 TRENCH DEPTH 9](#_Toc155794673)

[2.10.1 IRRIGATION SYSTEM 9](#_Toc155794674)

[2.10.2 TRENCH WIDTH 9](#_Toc155794675)

[2.10.3 TRENCH WIDTH IN ROCK OR GROUND REQUIRING FILL 9](#_Toc155794676)

[2.10.4 TRENCH SET-OUT 9](#_Toc155794677)

[2.10.5 TRENCH SPOIL AS BACKFILL 10](#_Toc155794678)

[2.11 TRENCH FINISH 10](#_Toc155794679)

[2.12 COMPACTION 10](#_Toc155794680)

[2.13 MACHINERY 10](#_Toc155794681)

[2.13.1 SUBSIDENCE 10](#_Toc155794682)

[2.13.2 HAND RAKING 10](#_Toc155794683)

[2.13.3 TOP-DRESS FINISH 10](#_Toc155794684)

[2.13.4 WORK BY THE PRINCIPAL 11](#_Toc155794685)

[2.14 BEDDING MATERIAL 11](#_Toc155794686)

[2.14.1 PIPE TRENCHES 11](#_Toc155794687)

[2.15 EXISTING HARDSTAND SURFACES 11](#_Toc155794688)

[2.16 CONFLICT WITH EXISTING OR OTHER SERVICES 11](#_Toc155794689)

[3 SYSTEM 11](#_Toc155794690)

[3.1 DEFINITION (AS 3000) 11](#_Toc155794691)

[3.2 IP RATING 11](#_Toc155794692)

[3.3 CONDUITS 12](#_Toc155794693)

[3.3.1 MEDIUM DUTY 12](#_Toc155794694)

[3.3.2 HEAVY DUTY 12](#_Toc155794695)

[3.3.3 FLEXIBLE CONDUIT 12](#_Toc155794696)

[3.3.4 IRRIGATION CABLE CONDUITS (< 32 VAC) 12](#_Toc155794697)

[3.4 ELECTRICAL PITS CONDUIT FITTINGS 12](#_Toc155794698)

[3.4.1 BELOW GROUND: 12](#_Toc155794699)

[3.4.2 ABOVE GROUND: 12](#_Toc155794700)

[3.5 CONDUIT SADDLE 12](#_Toc155794701)

[3.6 ULTRAVIOLET PROTECTION 13](#_Toc155794702)

[3.7 ELECTRICAL PITS 13](#_Toc155794703)

[3.7.1 LOW VOLTAGE PITS 13](#_Toc155794704)

[3.7.2 EXTRA LOW VOLTAGE AND COMMUNICATION CABLE PITS 13](#_Toc155794705)

[3.8 CABLES 13](#_Toc155794706)

[3.8.1 IRRIGATION DECODER CABLE 13](#_Toc155794707)

[3.9 CABLE JOINERS 13](#_Toc155794708)

[3.10 MDPE PIPEWORK 14](#_Toc155794709)

[3.10.1 ABOVE GROUND PIPE WORK 14](#_Toc155794710)

[3.10.2 HANDLING 14](#_Toc155794711)

[3.10.3 BENDING 14](#_Toc155794712)

[3.10.4 MAINLINE PIPE 14](#_Toc155794713)

[3.10.5 DAM AND TANK FILL PIPES 14](#_Toc155794714)

[3.10.6 SHORT PIPE LENGTHS 14](#_Toc155794715)

[3.11 FITTINGS 14](#_Toc155794716)

[3.11.1 MAINLINE 14](#_Toc155794717)

[3.11.2 TAPPING SADDLES 15](#_Toc155794718)

[3.11.3 QUALIFIED WELDERS 15](#_Toc155794719)

[3.12 THREAD SEALING 15](#_Toc155794720)

[3.12.1 SPOIL 15](#_Toc155794721)

[3.12.2 BACKFILL 15](#_Toc155794722)

[3.12.3 COMPACTION 15](#_Toc155794723)

[3.13 HARDSTAND SURFACES 15](#_Toc155794724)

[3.13.1 OPENING 15](#_Toc155794725)

[3.13.2 MAKING GOOD 15](#_Toc155794726)

[3.14 HEAD-WORKS 16](#_Toc155794727)

[3.15 PIPE SUPPORTS 16](#_Toc155794728)

[3.15.1 FIXING 16](#_Toc155794729)

[3.16 PUMPS 16](#_Toc155794730)

[3.16.1 PLAYING FIELD PUMP 16](#_Toc155794731)

[3.16.2 JOCKEY PUMP 16](#_Toc155794732)

[3.16.3 DUTY PUMPS 16](#_Toc155794733)

[3.16.4 TRANSFER PUMPS 17](#_Toc155794734)

[4 PUMP SET 18](#_Toc155794735)

[4.1.1 CONFIGURATION 18](#_Toc155794736)

[4.1.2 CONSTRUCTION 18](#_Toc155794737)

[4.1.3 FEATURES 18](#_Toc155794738)

[4.2 CONTROL CABINET CABLE ENTRY 21](#_Toc155794739)

[4.3 CABINET FINISH 21](#_Toc155794740)

[1.1 DAM LEVEL SENSOR 21](#_Toc155794741)

[4.4 LEVEL SENSOR STILLING TUBE 21](#_Toc155794742)

[4.5 PROTECTION 21](#_Toc155794743)

[4.6 DAM DISCHARGE PIPE 21](#_Toc155794744)

[4.6.1 FLOATS 22](#_Toc155794745)

[4.6.2 WIRE ROPES 22](#_Toc155794746)

[4.7 AUTOMATIC FILTERS 22](#_Toc155794747)

[4.8 FASTENERS 22](#_Toc155794748)

[4.8.1 NUTS, BOLTS AND WASHERS 22](#_Toc155794749)

[4.9 FLANGES 22](#_Toc155794750)

[4.10 GALVANIC PROTECTION 22](#_Toc155794751)

[4.11 CORROSION PROTECTION 22](#_Toc155794752)

[4.12 FLOOR AND WALL ANCHORS 23](#_Toc155794753)

[4.13 SELF TAPPING SCREWS 23](#_Toc155794754)

[4.14 THREAD TREATMENT 23](#_Toc155794755)

[4.15 PUMP SHED 23](#_Toc155794756)

[4.16 ELECTRICAL SERVICE 23](#_Toc155794757)

[4.17 ELECTRICAL ENCLOSURES 23](#_Toc155794758)

[4.17.1 PUMP ISOLATION ENCLOSERS 23](#_Toc155794759)

[4.17.2 MOUNTING 24](#_Toc155794760)

[4.18 VALVES 24](#_Toc155794761)

[4.18.1 BUTTERFLY VALVES 24](#_Toc155794762)

[4.18.2 MOTORISED ACTUATORS 24](#_Toc155794763)

[4.18.3 NON-RETURN VALVES 24](#_Toc155794764)

[4.19 IRRIGATION SYSTEM 24](#_Toc155794765)

[4.20 IRRIGATION STORAGE TANK 24](#_Toc155794766)

[5 SUPERVISION 26](#_Toc155794767)

[5.1 HOLD POINT AND WITNESS POINTS 26](#_Toc155794768)

[5.2 WARRANTY CERTIFICATE 27](#_Toc155794769)

[5.3 QUALITY ASSURANCE CERTIFICATE 27](#_Toc155794770)

[5.4 SYSTEM TESTING 27](#_Toc155794771)

[5.4.1 TESTING MAINLINE 27](#_Toc155794772)

[5.4.2 VALVE AND BOXES 28](#_Toc155794773)

[5.4.3 LATERAL AND SPRINKLER TESTING 28](#_Toc155794774)

[5.4.4 CONTROL SYSTEM 28](#_Toc155794775)

[5.5 ELECTRONIC EQUIPMENT 28](#_Toc155794776)

[5.6 PUMPS 28](#_Toc155794777)

[5.7 QUALITY ASSURANCE CERTIFICATE 30](#_Toc155794778)

[2 CONTRACT TERMS AS4000:1997 30](#_Toc155794779)

# PRELIMINARIES

## WORKS

The works will include but not be limited to:

* Supply and installation of all equipment required to complete the design intent,
* Testing and commissioning of the system,
* Supply and control suitably qualified labour to complete the works,
* Undertake repairs and rectification as required during the defects and liability period,
* Coordinate works with other trades.

## PROJECT OVERVIEW

The Principal has complete works on their waste water treatment plant, with the treated water to be used both on the adjacent golf course and playing fields. This works package is to construct the necessary pumping system to allow:

* Irrigation of the playing fields directly from the treated water storage tank
* Supply water to the irrigation storage tank and dam for irrigation of the golf course
* Allow smaller watering needs to be supplied directly from the treated water tank (via jockey pump)
* Transfer water from the dam (on course) to the irrigation holding tank

## WORKS BY THE PRINCIPAL

The Principal and or their Representative will undertake the following works:

* Supervision of work.

## TECHNICAL ENQUIRIES

All technical enquires relating to the project are to be made to:

Peter Brueck

Water Wise Consulting

Email peter@wwconsulting.com.au

Phone 0411 425 831

Email [daniel@theentertainmentgrounds.com.au](mailto:daniel@theentertainmentgrounds.com.au)

## SET-OUT

The set-out of the works will be done by the Principal’s Representative.

**No installation is to occur without approval of the set-out being given.**

It remains the Contractor’s responsibility to maintain the set-out markings during the construction period.

## DEFECTIVE WORKS

Where it is discovered that work has been undertaken by the Contractor or their Sub-Contractors is not in accordance with the drawings or specification, the Principal or their Representative has the right to halt all works and direct the Contractor to undertake or arrange its rectification immediately. The Contractor remains liable for all costs associated with the rectification works, including all cost incurred by the Principal or other parties affect by the defect.

Where the Contractor does not undertake the rectification in the allotted time or completes the rectification work in a sub-standard manner the Principal or their Representative has the right to arrange for the rectification to be undertaken by another company.

All costs incurred by the Principal will be deducted from monies owed to the Contractor. Should moneys withheld by the Principal be insufficient to cover the cost, the Principal has the right to seek re-imbursement from the Contractor. In the case of defective works by a Sub-Contractor the Principal will hold the Head Contractor responsible for all costs.

### NON-CONFORMING WORKS

The Principal is not bound to accept any 'non-conforming works'. If the Principal chooses to accept the work as 'Non-Conforming', a credit shall be applied to the contract sum and be calculated by establishing the total cost of rectifying the non-conforming works less the value of the non-conforming works as accepted by the Principal.

## SECURITY

Contractors remain wholly responsible for the security of any plant, equipment amenities and materials.

## STORAGE COMPOUND

The Contractor is to arrange for the storage of all plant and equipment.

All pipe and machinery must be stored in the location agreed to by the Principal.

## SITE AMENITIES

The Contractor and its staff may use the site amenities including toilets, power, and water. The Principal reserves the right to deny site amenities to the Contractor if they consider the amenities are being abused or misused.

In the case of abuse or misuse, the Contractor will be required to arrange amenities.

## SITE CLEANING

The site is to remain clean and tidy always. The Contractor is to ensure that all rubbish including pipe off cuts, packaging etc., **is collected daily and either stored in commercial rubbish bins or disposed of offsite**.

**The Contractor is not to use the site rubbish bins for disposal of any waste.**

### NOTICE TO CLEAN UP

If the Principal or Principal’s Representative determine that the Contractor is not meeting its obligation to keeping the site clean, they may issue a notice to clean up, the Contractor will be required to immediately undertake the actions as set-out in the notice.

If the Contractor fails to act on the notice, the Principal has the right to arrange for the works to be done either “in house” or by others and deduct the cost from the Contractors payments.

## ACCESS TO SITE

The Principal will indicate site access paths. These paths are to be used for all vehicle and machinery movements.

### PIPE DELIVERIES

For quoting purposes, Contractors are to allow for all associated cost with the use of **12-metre lengths of pipe.**

### DELIVERIES VEHICLES

The Contractor must escort all delivery vehicles which are required to drive onto the course.

No vehicles shall drive on the Course Proper at any time unless specifically approved by the Principal.

### DELIVERIES, HANDLING AND STORAGE

The Contractor shall provide and pay for all transportation required to deliver and remove materials and equipment. Contractors must have available sufficient labour and equipment to take delivery while ensuring ‘safe manual handling practices’ are adhered to.

Materials shall be delivered to the site and handled in accordance with manufacturer’s recommendations.

## EXISTING NON-IRRIGATION SERVICES

Existing services (such as drains, watercourses, public utility, and other services) obstructing the works or if damaged while performing the work, shall be dealt with as follows:

* Water or gas if the services are to be continued- repair, divert, and relocate as required.
* Obsolete services- cut and seal or disconnect and make safe as required.
* Electrical and communication- damaged cables are to be replaced between the nearest connection points **repairing only is not acceptable unless approved by the Principal**.
* For services that are to be diverted, instruction to proceed must be sought from the Principal’s Representative before proceeding.
* Prior to commencement of work, the Contractor must establish the location of all existing services utilising the services/database of Dial Before You Dig (“DBYD”) <https://www.1100.com.au/> and a DBYD-Certified services locator, as necessary.

## EXISTING IRRIGATION SERVICES

### TEMPORARY CAPPING, CONNECTIONS AND ALTERATIONS

The Contractor is to allow to install temporary connections including isolation valves and caps to allow continuing operation of all parts of the existing irrigation system that are to remain operational during the construction of works.

A minimum of 2-working days’ notice is to be given to the Course Superintendent before any works is undertaken that may impact on the existing irrigation system.

The Contractor is to allow to use fittings which will allow the existing system to be operational within 3 hours of the works being completed.

A provisional sum has been allowed for this work, prior to any claim being accepted for these works, an itemised cost is to be submitted for approval.

### SYSTEM SHUTDOWNS

Unless approved by the Course Superintendent the Contractor is to ensure the existing irrigation system does not remain shut down for more than 12 hours.

## RECORDING OF EXISTING SERVICES

The contractor is responsible for locating all services and (underground and overhead). Where an existing service is damaged by the Contractor for any reason whatsoever, the Contractor shall bear the costs associated with repairing, or replacing or disconnection of the service.

The location of any service or repair is to be recorded and recorded on the WAE drawings.

## NOMINATED BRANDS, MODELS

Where an item is nominated by either brand or model, **only** that item is to be installed.

Where a choice of brand or model is given, the Contractor is to indicate their choice.

If it is specified that an alternative is acceptable the Contractor must submit with their bid, technical data to prove the product is equal to the nominated item and must on request offer a sample for assessment.

Failure to nominate an alternative product may result in the Principal rejecting the alternative and the Contractor will be required to install the specified product.

No variation will be accepted because of the Principal rejecting the alternative.

### CONTINUITY OF COMPONENTS

The same brand and model must be maintained for all components.

No item is to be substituted without the written permission of the Principal.

No extension of time will be given due to the lack of supply.

### STOCKS OF PRODUCTS

So as not to delay the project the Contractors must ensure enough stock of all components are held on site, in store or at the supplier.

No item is to be substituted without the written permission of the Principal.

**No extension of time will be given due to the lack of supply.**

## FINAL INSPECTION AND HAND OVER

**Prior to a practical completion certificate being issued,** the Contractor must arrange for the Principal and their Representative to be present for a final inspection.

A minimum of **5 working days**’ notice for the inspection is to be given to Principal’s Representative.

A final inspection may be requested once the following have been completed.

* The system has been fully tested to ensure correct operation.
* Written proof is supplied to confirm all fees, inspections, approvals, and forms required by the Water and Power Utility have been completed and submitted.
* Trenches have been backfilled and compacted in accordance with this specification.
* All excess trench spoil has been dealt with in accordance with this specification.
* Any rectification works to the site or utilities has been completed.
* Any outstanding ‘Non-conformance’ issues have been rectified or resolved.
* Training has been provided to the Principal’s staff on proper operation and maintenance of the system.
* Supplied the spare parts and service tools.

## DEFECTS AND LIABILITY PERIOD

**For a 12-month period from the date of practical completion**, the Contractor will at their cost remain liable for the repair or replacement of any part of the works that is discovered to be faulty. The Contractor will also be liable for the cost of repair relating to any damage or claims that may arise due to the fault or failure.

## GUARANTEES AND WARRANTIES

Obtain and ensure that the Principal will have the benefit of warranties or guarantees as specified in the contract or offered by suppliers, including warranties or guarantees that are obtained by, or offered to the Sub-Contractors of the Contractor.

|  |  |
| --- | --- |
| **Item** | **Years** |
| Labour | 3 |
| Pipe | 5 |
| Valves | 5 |
| Pump Control | 2 |
| Filter | 5 |
| All other | 3 |
| Pumps | 2 |

### DEVIATIONS FOR GUARANTEES AND WARRANTIES

Where the Contractor and or Suppliers offers guarantees or warranties that do not meet the stated terms or have conditions associated, these must be submitted with the tender. Failure to disclose will be taken as unconditional acceptance and for the periods stated.

## PRACTICAL COMPLETION

A 'Practical Completion Certificate' will be issued once the requirements of [FINAL INSPECTION AND HAND OVER](#_FINAL_INSPECTION_AND) have been met.

The certificate will be dated the next calendar day after the date that the works have been deemed to be ‘practically complete’.

## ACCURACY OF BILL OF MATERIALS

Quantities shown in the Bill of Materials (BoM) have been determined from the design drawings, every attempt has been made to ensure their accuracy, however it remains the Contractors responsibility to determine their own quantities needed to complete the intended works.

**No allowances have been made for wastage**. The Contractor remains responsible for all costs associated with returning or retaining any excess materials purchased for the project. The Principal will not be required to purchase any excess materials.

## WORKS RISK ASSESSMENT

The Contractor is required to undertake their own risk assessment of the site and works, the assessment is to include but not be limited determining the possible loss to the Contractor due to:

* Theft.
* Vandalism.
* Act of nature including flood or bushfire.
* Other users of the racecourse property.

## DILAPIDATION REPORT

The Contractor is to prepare a dilapidation report prior to commencing work, the report is to identify:

* Any existing damage to roads, paths, fencing, structures etc,
* The state of health and cover of any grass surfaces that will be excavated and specified to be reinstated.

If the Contractor neglects to undertake the dilapidation report, it will be considered they accept the existing irrigation system is fully operational and without fault. The Contractor will be held responsible for all costs associated with the repair to the system if after any new works are undertaken a fault is discovered.

## WORK AS EXECUTED DRAWINGS AND DOCUMENTATION

Works as executed drawings will be prepared by Water Wise Consulting.

## RATES

Include all labour, plant, parts, wastage and associated costs for the proper completion of all works, together with all general risks, liabilities and obligations set forth or implied in accordance with the document set including the Contract terms, specifications and drawings.

# INSTALLATION

## TRENCHING AND MINOR EXCAVATION

### MACHINERY

The Contractor is to ensure that proposed machinery chosen to excavate trenches will effectively excavate the ground on site.

As a guide to the minimum size of machine to be used

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Task | Type | Minimum size | Depth m | Width mm | Notes |
| Large excavation | Excavator | 7.5 ton | 3 |  | with unworn teeth |
| Mainlines | Excavator | 5 ton | 2.5 | 300 | with unworn teeth |
| Backhoe | 70 hp | 1.5 | 600 | with unworn teeth |
| Chain trencher | 65 hp | 1.5 | 450 | Alligator chain |
| Minor excavation | Hand tools |  |  |  | Unworn tips |
| Electrical | 1400 w |  |  | Unworn tips |
| Pneumatic | 50 CFM |  |  | with 130 CFM compressor |
| Wheel trencher | 65 hp | 0.8 | 0.75 | with self-loader and rock points |
| Compaction | Petrol Rammer | 2.8 hp |  | 100 | Equal to Mikasa MTR40HF |
| Smooth drum roller | 5-8 ton |  |  | when vibratory plough is used |

## TRENCHING AND EXCAVATION IN ROCK AND IMPORTED MATERIALS

### ROCK

Rock is defined as limestone, sandstone, granite or similar naturally forming composite in solid beds or masses in original, stratified position or imported to site which cannot be excavated by the nominated machinery.

As a guide only, the nominated machinery types are.

* Manually operated tools Sharp pointed crowbar
* Chain trencher 65 HP with unworn teeth and points equal to a Ditchwitch RT55 with Alligator combo chain.
* Backhoe 70 HP with unworn bucket teeth equal to tiger teeth
* Excavator 5 ton with unworn bucket teeth equal to tiger teeth

## WASTE / UNSUITABLE MATERIAL

Waste/unsuitable material is defined as material not natural to the site which cannot be used as back fill material without bedding material being used to protect the pipe (Examples may include concrete, building waste, tree stumps etc), and cannot be excavated by the nominated machinery.

As a guide.

* Manually operated tools Sharp pointed crowbar
* Chain trencher 65 HP with unworn teeth and points equal to a Ditchwitch RT55 with Alligator combo chain.
* Backhoe 70 HP with unworn bucket teeth equal to tiger teeth
* Excavator 5 ton with unworn bucket teeth equal to tiger teeth

### CONTAMINATED SOILS

Contaminated soils are to be considered to include any material considered a health risk *(e.g., Asbestos) or may affect the longevity of the system.*

Where the Contractor identifies contaminated soils, they are to.

* Stop all excavations immediately and notify the Principal’s Representative.

The Principal’s Representative is to give direction to the Contractor as to the treatment of the material. Any extra cost associated with the treatment will be calculated using the rate submitted.

## MEASUREMENT OF ROCK AND IMPORTED FILL

Measurement of rock will be taken as the:

* Cubic metre of the void excavated and not of the loose measurement of material removed.

The rate stated in the bill of material is to include the supply and placement of bedding material and removal of the rock to a nominated stockpile located on site.

## HARD GROUND

Hard ground is determined as clean compacted material consisting of soils, sands, or individual rocks of a size smaller than 100 mm in diameter.

**No variation will be given for excavation in 'hard ground**'.

## HAND DIGGING

The Contractor is to allow for any hand digging that may be needed to ensure the sprinklers and valves are located as per the design and set out.

**No variation for hand digging will be accepted.**

## EXCESS SPOIL

All excess trench spoil is to be stockpiled on site in a location to be determined by the Principal.

Stockpiles are to be established for re-useable and waste material.

### TEMPORARY STOCKPILES

Temporary stockpiles may be placed in the areas they are working on and then allow to transport to a site nominated by the Principal. No stockpiles shall be established within the alignment of a racing or training track under any circumstances.

## TRUCKS

The maximum size of any truck used to transport the spoil around site is to be 5 ton.

The Contractor is to allow for machinery capable of excavating the various ground conditions found on site.

No variations for costs or delays will be given for “hard going”.

Any damage caused by the Contractors machinery must be repaired to the original or better condition by the Contractor at their cost.

## TRENCH CONSTRUCTION

### EXTENT OF TRENCHING

The Contractor is to limit the excavated trenches to what can be installed and backfilled in a day.

Generally, no trenches or holes are to be left open overnight.

Where it is agreed that an excavation may remain open, the Contractor is to:

* Remove all excess trench spoil.
* Cover excavation with 17 mm thick marine grade plywood.
* Cover plywood with a 25 mm thick layer of clean dirt.

The Contractor remains wholly responsible for the security of all trenching or holes.

### TRENCHING ALIGNMENT

Where the trench deviates more than 100 mm from the centre of set out line marked line the Contractor will be made to backfill, compact and re-trench in a straight line. All trenches that have not been correctly aligned will require for the turf to be re-instated.

## TRENCH DEPTH

### IRRIGATION SYSTEM

Contractors are to ensure that all trenches achieve the following soil cover over pipe and or conduits.

Minimum Maximum

* Mainline 600 mm 800 mm.
* Low Voltage Conduit

when not in a common trench 600 mm 800 mm

### TRENCH WIDTH

Excavate trenches to a width, which will allow for a minimum gap of 50 mm between pipes and/or conduits.

### TRENCH WIDTH IN ROCK OR GROUND REQUIRING FILL

Where the trench is in rock or ground requiring bedding with imported fill, the trench width must ensure that a 50 mm gap is maintained between the trench wall and the pipes or conduits.

### TRENCH SET-OUT

All trench lines are to be marked out prior to trenching; the Contractor is to use the following method:

* Mark out using string lines from point to point.
* Mark lines using spray marker paint or fixed string lines.
* **Under no circumstance shall trenching be done by “line of sight” or “eye”)**
* Carryout installation.
* Compacted trenches as per this specification.
* If specified re-instate turf.

### TRENCH SPOIL AS BACKFILL

Generally, the trench spoil is to be used as backfill. Material placed around the pipe must be clean of any sharps that could potentially damage the pipe. Where the trench spoil has a percentage of small rock it is acceptable as backfill only if:

* The rock does not have any sharp edges.
* The size is to be less than 15 mm in diameter and no larger than the diameter of the pipe or conduit in the trench.
* The ration of rock to soils is not greater than 1:25

## TRENCH FINISH

The Contractor is to undertake the following works regarding the backfill of the nominated trenches.

## COMPACTION

Allow for compacting of all trenches and excavations. Trenches are to be filled in layers of no thicker than 150 mm.

## MACHINERY

Regardless of the method of compaction used, the foot or roller must be narrower than the trench and not less than 75% of the trench width.

**The first layer must be compacted using a petrol driven rammer.**

Subsequence layers may be compacted by the use of a petrol driven rammer of trench wheel.

The Contractor is to ensure that, prior to compacting; no voids exist under the pipe, conduits, or fittings.

Care is to be taken when compacting around sprinklers, valves etc. so as not to cause damage, movement, or distortion to the valve boxes.

Where the specification does not require the Contractor to remove and replace turf the trench is to be crowned to 25 mm higher than the surrounding ground.

### SUBSIDENCE

Any trench that has subsided more than 15 mm (taken from the surround ground level) is to be rectified by the Contractor.

The Contractor remains responsible for the rectification of all trench subsidence.

### HAND RAKING

Areas where the road broom cannot be used are to be hand raked to remove all spoil.

### TOP-DRESS FINISH

Trenches not requiring to be re-turfed are to be top-dressed by placing dressing material (see bedding material for required soil specification) over the trench and levelled using a hand drawn “level lawn” device.

**Top-dressing is to occur prior to Practical Completion inspection.**

### WORK BY THE PRINCIPAL

The Principal may choose to undertake the cutting and re-instate some of the turf surfaces. Where this is to occur, the Contractor is to compact the trenches and level the trench at -25mm from the ground level.

## BEDDING MATERIAL

### PIPE TRENCHES

The expectation is the type of trenching machine used on the site will be able to sufficiently macerate the ground into suitable backfill material.

If the Contractor determines that their method of excavation will require not produce a suitable bedding material, they are to allow for all costs associated with the:

* Reuse of any clean excess trench spoil generated by the works.
* Importation of a suitable bedding material.

## EXISTING HARDSTAND SURFACES

The Contractor is to allow for repair any hard surfaces damaged as the result of their works including that done by Sub-contractor’s or delivery vehicles. The repair is to be done to achieve a finish that is equal or high than the original finish.

## CONFLICT WITH EXISTING OR OTHER SERVICES

Where the nominated trench depth conflicts with an existing service the

Contractor will.

1 alter the depth of the installation to pass under the existing service.

Depth of excavation is not to exceed 1 metre,

2 Where the above cannot resolve the conflict the Contractor is to seek instruction from the Principal before proceeding.

No works are to proceed, or the level of cover be changed without approval by the Principal or their Representative.

# SYSTEM

## DEFINITION (AS 3000)

Extra low voltage not exceeding 32 V ac or 45 V dc.

Low voltage exceeding extra-low voltage, but not exceeding 1000 V ac or 1500 V dc.

High Voltage exceeding low voltage.

## IP RATING

The Contractor is to ensure that all conduits and fittings chosen meet the requirements of AS/NZS 1939 and AS/NZS 3000:2007 in relation to their International Protection Rating (IP rating).

As a minimum, the Contractor is to ensure the following levels of protection are achieved.

Electrical works mounted externally IP64.

Electrical works mounted internally IP54.

## CONDUITS

All conduit and fittings are to comply with AS/NZS 2053.

### MEDIUM DUTY

(Grey in colour) may be used when installation is:

* Extra low voltage (less than 32 VAC) both above and below ground.
* Low voltage (less than 1000 VAC) above ground.

### HEAVY DUTY

(Orange in colour) to be used when installation is:

* Low voltage below ground

### FLEXIBLE CONDUIT

**Internal**

Standard flexible conduit and fittings may be used so long as it is not exposed to direct sunlight.

**External**

Only UV stable (solar system type) “black” sheathed flexible conduits is be used.

Equal to Cobalt Soal heavy duty conduit.

### IRRIGATION CABLE CONDUITS (< 32 VAC)

For the irrigation system control and monitoring cables only, MDPE type B polyethylene pipe with green strip or black in coloured is to be used as conduit.

**Under no circumstance is pipe with blue or purple markings to be used as a conduit.**

**Standard pipe fittings are not to be used**.

## ELECTRICAL PITS CONDUIT FITTINGS

All conduit fittings are to comply with AS/NZS 2053.

### BELOW GROUND:

* Only sweep bends with solvent welded joints are to be used. The use of tee junctions is not allowed.
* No corrugated conduit or fittings are to be used below ground.

### ABOVE GROUND:

* Fittings with solvent welded joints are to be used for all rigid conduits.

## CONDUIT SADDLE

All above ground conduits are to be supported by zinc plated or hot dipped galvanised steel saddles. Saddles must be of the same size as the conduit they are supporting.

Saddles are to be fixed to the wall using either stainless-steel cup head screws and wall plugs or stainless-steel anchor sets.

Maximum spacing between saddles is not to exceed:

* horizontal installation 1.0 m
* vertical installation 1.5 m

The use of cable ties to bundle conduits together is not acceptable. Each conduit is to be fixed using individual saddles.

## ULTRAVIOLET PROTECTION

Where conduits and fittings are exposed to direct sunlight, they are to be painted using two coats of plastic-based paint. The paint is to be a 'mat white' colour.

## ELECTRICAL PITS

All pits are to be set level with the surrounding undisturbed ground, and the turf re-instated as per.

A minimum of 0.5 m length of cable is to remain in each pit.

See [TREATMENT OF TURF AROUND VALVE BOXES AND SPRINKLERS](#_TREATMENT_OF_TURF)

### LOW VOLTAGE PITS

Aco type 3 pits with drop in concrete lid (stamped electrical) are to be used at each tee or 90° junctions and at every 150 m of a cable run.

Where single insulated cables are used, and extra low voltage cables pass through the same pit. A removable barrier such as Perspex sheet is to be installed between the cables.

All conduit entries are to be made by hole-sawing the side of the pit with a bit of the same size as the conduits OD. The ends of the conduits are to extend 75 mm into the pit and then the hole sealed using a high-quality construction sealer equal to Sikaflex.

### EXTRA LOW VOLTAGE AND COMMUNICATION CABLE PITS

A 1419B style valve box with green lid is to be used as a junction pit at all tee or 90° junctions.

All conduit ends are to extend 75 mm into the junction valve box.

See VALVE BOX INSTALLATION for installation requirements.

Cables conducting voltages of 32 volts or higher are **NOT** to be joined below ground.

Power and communication cables are to be joined within standard electrical turrets.

## CABLES

Unless specifically stated, all cables must be installed within conduit or ducting.

### IRRIGATION DECODER CABLE

Only Toro decoder 2.1 mm² cable is to be used.

## CABLE JOINERS

All joints are to be made at either valve location done using a 3M Resin kit.

## MDPE PIPEWORK

### ABOVE GROUND PIPE WORK

**Where the pipe is installed above ground only factory supplied straight lengths are to be used.**

All pipe and fittings are to be installed in accordance with the manufacturer’s specification.

The Contractor is to allow for expansion or contraction of the pipe resulting from changes in temperature.

In shared trenches a minimum of 50 mm clearance is to remain between all pipes and conduits.

Refer to detail for installation.

### HANDLING

Pipes are to be supplied in the longest practical lengths. The Contractor is to ensure that the pipe is handled, stored, and installed in accordance with the pipe manufacturer’s requirements.

### BENDING

Where the pipe is to be bent, the Contractor must ensure that the radius, of which the pipe is bending, does not exceed the manufacturer’s specification. The minimum radius must not be tighter than 20 times the pipe diameter.

### MAINLINE PIPE

Is to PE100 MDPE pipe rated PN 12.5.

Pipe is to be with non-potable markings.

### DAM AND TANK FILL PIPES

Is to be PE100 MDPE pipe rated to PN 10.

Pipe is to be with non-potable markings.

### SHORT PIPE LENGTHS

Short lengths of pipes may be joined using electrofusion coupling or butt welding only. Generally, pipe lengths of 10 metres or longer should be joined.

## FITTINGS

### MAINLINE

Butt welded, or electrofusion fittings are to be used for all couplings, bends and junctions.

The Contractor is to ensure that where electrofusion fittings are used that the welding equipment is correct for the fitting.

If during welding a fault is registered with the weld or an error occurs the fittings is to be replaced.

Under no circumstance shall the fittings be reheated or reused.

Where fittings are flanged and installed below ground, backing rings are to either fabricated from

* 304 stainless-steel drilled to ‘Table D’

All fittings must be rated to a minimum of PN 16.

All fittings other than tapping saddles are to be electrofusion or butt weld type equal to Plasson or Durafuse.

### TAPPING SADDLES

Tapping saddles are to be HDPE rated to a minimum PN 16 with tight fitting stainless-steel retaining rings fitted to the branch. All saddles are to have 304 stainless-steel set bolts and nuts.

Anti-seize is to be used on all threads prior to tightening.

Saddles are to be equal to.

Plasson type 16077 series,

Philmac type 97 75 series.

### QUALIFIED WELDERS

Only staff holding a current electrofusion welding accreditation to PMBWELD302B shall undertake pipe welding.

## THREAD SEALING

All threads are to be cleaned prior to wrapping with single density commercial grade PTFE Teflon thread tape.

The use of sealing compound is acceptable unless specified otherwise. Sealing compound is to be equal to Christy’s ultra-seal. The Contractor must ensure that the use of liquid sealers does not affect the operation of any other compound of the system or is in breach of any warranty terms associated with the products installed. Contractors are to ensure threads remain clean while installing.

### SPOIL

All trench spoil is to be disposed of on site at a location nominated by the Principal.

### BACKFILL

All trenches are to be backfilled with a 150 mm layer of trench backfill sand and then compacted with road base material.

### COMPACTION

The road base material is to be compacted to achieve 95% Density Ration ( Modified).

## HARDSTAND SURFACES

### OPENING

The contractor is to allow for saw cutting of any hardstand area

### MAKING GOOD

All surfaces are to be reinstated to the same or high finish than the existing.

Specifically to concrete slabs the contractor is to allow for dowling starter rods.

## HEAD-WORKS

All pipework associated with the pumps and filter is to be fabricated using 304 (minimum) seamless stainless-steel pipe rated to PN 12.5

The assembled pipework is to be such that there are no stresses are placed on any connections of joints.

**The use of flexile coupling for alignment is not permitted.**

## PIPE SUPPORTS

All pipes. Conduits and equipment needing support is to be done using either

304 stainless-steel heavy duty bracketing systems equal to Unistrut or

Custom fabricated supports minimum 5mm thick.

### FIXING

All fixings are to be stainless-steel of the same grade as the steel.

## PUMPS

Multistage centrical pumps

### PLAYING FIELD PUMP

System pressure 80 m/head

Minimum flow 4 l/second

Duty point 12 l/second

### JOCKEY PUMP

System pressure 85 m/head

Minimum flow 1.0 l/second

Duty point 6 l/second

Acceptable pump makes and models

Make Model

Grundfos CR

Lowara SV

### DUTY PUMPS

All pumps are to be submersible borehole type constructed of stainless steel and suitable for horizontal installation.

System pressure 85 m/head

Minimum flow 5 l/second

Duty point 20 l/second

Acceptable pump makes and models

Make Model

Grundfos SP

Lowara Z875

### TRANSFER PUMPS

All pumps are to be submersible borehole type constructed of stainless steel and suitable for horizontal installation.

System pressure 20 m/head

Duty point 15 l/second

Acceptable pump makes and models

Make Model

Grundfos SP

Lowara Z660

# PUMP SET

### CONFIGURATION

1 x Playing field pump 15 kW

1 x Jockey pump 7.5 kW

2 x Main pumps 22 kW (submersible motor)

2 x Transfer pump 4.0 kW (submersible motor)

### CONSTRUCTION

* Floor mounted type on a 100 mm high stainless steel or galvanised steel plinth.
* Feature cable gland plates at base.
* Powder coated stainless steel construction.

### FEATURES

**COMMON FEATURES**

* **Independent operation of:**
  + Playing field pump
  + Golf course pumps
  + Transfer pumps
* Main isolating switch mounted on door.
* Inner door
* Touch screen interface to for setting and display.
* Circuit breakers per pump and control circuit.
* Forced cooling of cabinet.
* Manual/off/auto selector switches.
* Phase failure and symmetry protection.
* Automatic rotation of lead pump.
* Surge protection equal to Critec TDS250TT277 on incoming supply.
* Surge protection equal to Critec TDF10A on control circuit.
* Surge protection of all 4-20 milliamp input/ outputs.
* **Sine wave dv/dt filter for irrigation duty pumps.**
* Remote access via mobile phone network to allow support by manufacture.
* Remote access to allow monitoring and changes of the system.
* SMS alarms/ warnings.
* Remote override circuit 24-dc (giving Principal ability to prevent operation) for each;
  + Playing field pump
  + Irrigation system
  + Transfer system

**The system is to allow the operator to adjust using the touch screen the following parameters.**

* Set point pressure
* System cut in pressure.
* Low pressure alarm/ shutdown.
* High pressure alarm/ shutdown.
* Fault rest.
* Pump run hour reset.

**The display is to indicate:**

* Pump running.
* Pump operating speed in Htz.
* Any fault.
* Pump run hours.
* Irrigation tank level
* Treated water tank low level
* Irrigation tank low or high alarm level
* Dam low level
* Thermistor trip.
* Water temperature trip.
* Suction fault- extra low or high pressure.
* Transducer fault.
* Last 30 fault event logger.

**Outputs:**

Voltage free outputs are to close when.

* Any pump fault.

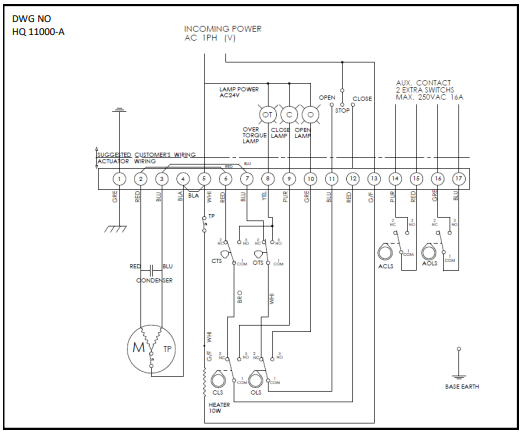
**PUMPS**

* Variable frequency inverters for each irrigation mounted within control panel.
  + Playing field pump
  + Jocke Pump
  + 2 x Irrigation pumps
* Direct online start
  + 2 x Transfer pump
* Motor thermistor inputs for
  + Playing field pump.
  + Jockey pump
* High water temperature protection (PT-100 or equivalent).
  + Playing field pump
  + Jocke Pump
  + 2 x Irrigation pumps

**MOTORISED VALVES**

* DN100 240 vac with quarter turn actuator
* DN300 240 vac with quarter turn actuator

Proposed actuator Challenger HQ 015-120

****

**SETUP**

Playing field pump

* Independent operation as pressure systems
* Low level protection via treatment tank level switch

Irrigation pumps

* Independent operation as pressure systems
* Jockey pump low level protection via treatment tank level switch
* Irrigation pumps low level protection via irrigation tank level sensor and switch

Dam transfer pumps

* Control via irrigation tank level transducer
* Low level protection via dam level switch

Irrigation tank fill

* Control via irrigation tank level sensors and switch

*Operation*

* Start level 1 reached
  + Open DN100 treated water tank motorised valve
* Start level 2 reached
  + Start transfer lead pump
* Start level 3 reached
  + Strat transfer pump 2
* Shut down sequence

Reverse of start

Dam fill

* Low level protection via treatment tank level switch
* Start level reached via dam float switch
  + Open DN300 treated water tank motorised valve
* Shut down sequence

Reverse of start

Acceptable manufacturer / suppliers of the pump control include.

* Lowara -Inca.
* Grundfos.

## CONTROL CABINET CABLE ENTRY

All cables must enter through the cable plate. The cable plate must not be removed.

All cables are to be fitted with cable glands.

## CABINET FINISH

Once all works have been completed cabinets are to be cleared using either vacuum or compressed air.

* 1. **DAM LEVEL SENSOR**

A submersible level transducer is to be installed with a stilling pipe within the dam. The transducer is to be equal to be compatible with the control system installed.

The transducer is to be order with enough cable, so it can be connected to the control cabinet without joining.

Equivalent products may be used subject to approval.

## LEVEL SENSOR STILLING TUBE

The sensor is to be installed within a 50 mm uPVC sleeve,

## PROTECTION

The following protection devises are to be fitted to each pump.

* Temperature sensor equal to PT-100.
* Motor thermistors.
* 8 mm brass air relief valve.

## DAM DISCHARGE PIPE

The pipe is to be fabricated from DN160 PE100 PN 10. With electrofusion or butt-welded fittings. Flanges are to be fabricated from minimum 304 stainless steel and drilled to be Table D.

All nut, bolts and washers are to be minimum 304 stainless steel, with washers used under both the nut and bolt.

### FLOATS

The suction line is to be supported by Jagpoly pipe floats, so as not to allow air entrapment.

### WIRE ROPES

4mm stainless steel rope is to be used to hold the foot valve and floats in place. The ropes are to be anchored on the bank using concrete piers.

## AUTOMATIC FILTERS

A Filtaworx model FW200 automatic filter is to be installed.

The filter is to be supplied with a 200-micron screen.

## FASTENERS

### NUTS, BOLTS AND WASHERS

All nuts, bolts and washers are to have metric threads and made from 304 stainless steel.

Bolts are to have a length to ensure all threads protrude a minimum of three (3) full threads and no more than ten (10) full threads once tightened. Washers must be used under both nut and bolt head.

The same length bolts are to be used when installing the same item.

The use of washers or other items as packing is not allowed.

Care must be taken to ensure that when fully tightened the bolt or nut does not damage any protective coating on the fitting.

Contractors are to ensure that when making connections with dissimilar materials that galvanic corrosion does not occur. Generally, the bolt sets are to be of the same material as that of the flange material.

**Nut, bolts, and washers are to be a minimum of:**

|  |  |
| --- | --- |
| Flange Nominal Bore Size | Bolt Dimension |
| 15 mm – 40 mm | M12 |
| 50 mm – 200 mm | M16 |

## FLANGES

Where flanges are supplied with oversized bolt hols or different drillings the bolt sets must match the flange drilling.

## GALVANIC PROTECTION

Where practical all screws, nuts, bolts, washers, or anchors are to be made of the same material as the material they are in contact with. Care is to be taken to prevent any galvanic reaction.

## CORROSION PROTECTION

All fittings with a galvanised finish that are installed below ground including, backing rings, nuts, bolts, and washers are to be protect by wrapping in 50 mm wide Denso Tape. When wrapping fittings, a 50 % overlap of tape is to be applied. The use of small pieces to cover the heads of nuts, bolts and washers is not acceptable.

## FLOOR AND WALL ANCHORS

Unless shown or stipulated otherwise, for all equipment of a gross weight greater than 10-kg’s stainless-steel anchors equal to Ramset type, Dyna bolts are to be used. The diameter is to match the anchor point. The diameter of the anchor is to be no less than 10% of the whole of the fitting or fixture.

Washers are to be used under the head of the nut and bolts.

Anchors are to be sized as per Ramset Dyna Bolt Technical Manual minimum length of:

* 40 mm for all horizontal fixings
* 65 mm for all vertical fixings

The Contractor is to ensure that the chosen anchor is correctly sized for its application.

## SELF TAPPING SCREWS

Unless shown or stipulated otherwise, for loads less than 10-kg’s and less un, 304 stainless steel self-tapping ‘pan head’ screws with ‘Phillip head’ pattern is to be used. The screws are to be a minimum length of 40 mm. The diameter of the anchor is to be no less than 10% of the whole of the fitting or fixture.

The Contractor is to ensure that the chosen anchor is correctly sized for its application.

Where the fixing is into concrete or brick nylon wall plugs are to be used. If the fixing is into plasterboard plastic or metal Ramset type Wallmate anchors are to be used.

Care must be taken to ensure that the correct size hole is drilled to suit the anchor.

## THREAD TREATMENT

Prior to assembly of any stainless-steel bolt sets, the bolt threat must be lubricated with a suitable anti-seize component equal to EAL NICKEL ANTI SEIZE.

## PUMP SHED

As part of the works the Contractor is to build a new pump shed. The shed is to be;

* A double pedestrian lockable door
* Air vent “Whilly birds”
* 4 x double power outlets spaced equally around the shed
* 1 x double LED strip lights

## ELECTRICAL SERVICE

The principal will arrange for power to be connected to the new pump control unit.

## ELECTRICAL ENCLOSURES

All enclosures are to be made from 304 stainless steel and fitted with padlock lockable handles.

### PUMP ISOLATION ENCLOSERS

Where indicated on the drawings circuit breakers and din rail terminal strips are to be fitted to allow connecting and isolation of components.

### MOUNTING

At the irrigation tank it is proposed the enclosures are to be mounted on the existing wall.

At the Dam the cabinet is to be mounted on twin 50x50 stainless steel posts, which are to be concreted into the ground.

## VALVES

### BUTTERFLY VALVES

All butterfly valves are to be wafer style with cast iron body and stainless-steel shaft and disc.

Were nominated valves are to be fitted with gear driven handles.

Valves are to be equal to HYFLOW MKV Valves supplied by Tradelink.

### MOTORISED ACTUATORS

Where nominated on the drawing install 240 vac quarter turn actuators.

Actuators are to be equal to Challenger type HQ 015-120.

**Where a different actuator is proposed it must be compatible with the pump controller and its programming.**

### NON-RETURN VALVES

Cast Iron swing wafer style non-return valves are to be installed.

Valves are to be equal to Jonhnson valves JV81002.

## IRRIGATION SYSTEM

A Filtaworx model FW200-EX automatic filter is to be installed.

The filter is to be supplied with a 150-micron screen.

DN25 High Pressure vacuum breaker valves are to be installed on each filter flush pipe

The Contractor is to supply all tools needed to service the filter.

## IRRIGATION STORAGE TANK (BY OTHERS

The contractor is to connect to the newly installed panel tank.

The tank will be supplied wit

* 1 x Ladder
* 2 x Roof vent
* 1 x DN250 flanged outlet
* 1 x DN100 inlet
* 1 x DN200 inlet
* 1 x DN100 overflow

Tank is to be equal to a Pioneer Tank GTi501.

# SUPERVISION

All works will be over seen by the Principal’s Representative. The Representative will have the authority to stop works at any time if it is discovered the works are not to specification. They will also be empowered to direct the Contractor to carryout rectification works if it is discovered the works do not comply with the specification. If the Contractor does not undertake and rectify works within a reasonable time (maximum allowable time to rectify is 5 working days from notification) the Principal has the right to engage another Contractor to carry out rectification works and deduct any cost from money owed to the Contractor in accordance with the General Conditions of Contract. These works will not affect any warranty obligation of the Contractor.

## HOLD POINT AND WITNESS POINTS

For clarification,

* A ‘Hold Point’ is an identified point in the construction process that the Contractor shall not proceed beyond without a direction from the Principal’s Representative.
* A ‘Witness point’ is a point which provides the Principal’s Representative with an opportunity to inspect/test the work at its discretion; however no contractual obligation is implied. The activity can proceed without approval of the Principal.”

If the Contractor chooses to proceed without having a hold point inspected the Principal may instruct the Contractor to excavate the completed works to allow for inspection. All costs associated with the excavating and making good will be borne by the Contractor.

|  |  |  |  |
| --- | --- | --- | --- |
| **Works** | **Witness by**  **See bottom of table for clarification of abbreviations** | **Hold Point** | **Witness Point** |
| **Preliminary** |  |  |  |
| Project management plan | P, W | # |  |
| Site specific plan | P, W | # |  |
| Installation program |  |  |  |
| Review of maintenance manuals | W | # |  |
| **Construction** |  |  |  |
| Establishment of site | P or W |  | # |
| Establishment of stockpile security and containment | P or W | # |  |
| Setout | W, C | # |  |
| Damage to any service or utility | P | # |  |
| Repair of any service or utility | P, W | # |  |
| Measurement of rock excavation | P or W | # |  |
| Backfill of the connection to the existing systems | P | # |  |
| Pressure testing and commissioning | W, C | # |  |
| Final inspection | P, W, C | # |  |
| **Pump Shed** |  |  |  |
| Placement of pumps | W | # |  |
| Damage to any service or utility | P or W | # |  |
| Repair of any service or utility | P or W | # |  |
| Measurement of rock excavation | P or W | # |  |
| Main trench and installation | P or W |  | # |
| Backfill of the connection to the existing systems | P | # |  |
| Trench and installation | P or W |  | # |
| Backfill of the connection to the existing systems | P | # |  |
| Electrical connections | P or W |  | # |
| **Tanks** |  |  |  |
| Site preparation | P, W | # |  |
| Erecting | P, W | # |  |
| Pipework | P, W | # |  |
| **Testing** |  |  |  |
| Pressure testing and commissioning | P, W, C, SC | # |  |
| Final inspection | P, W, C | # |  |
|  |  |  |  |
| **Witness Abbreviations** |  |  |  |
| P= Club Representative |  |  |  |
| C=Contractor |  |  |  |
| W= Water Wise Consulting |  |  |  |
| SC= Sub Contractor |  |  |  |

## WARRANTY CERTIFICATE

A warranty certificate is to be issued to the Principal indicating the period of warranty, including terms and conditions that relate to warranty.

The certificate is to be dated one day after Practical Certificate is issued.

## QUALITY ASSURANCE CERTIFICATE

The Contractor is to supply as part of the operations manual a signed Quality Assurance Certificate.

The certificate is to be dated one day after Practical Certificate is issued and is to be presented in original form no later than 2-days after Practical Completion has been issued. Any reduction in retention monies held will not be released until the certificate is issued to the Principal.

## SYSTEM TESTING

The Contractor is to bear all costs associated with testing of the installation. If the installation does not past test the Contractor must arrange for re-testing and bear any costs associated including costs that the Principal may incur.

### TESTING MAINLINE

The mainline pressure test is to be witnessed by the Principal’s Representative.

All mainlines are to be tested as follows:

* Flush and purge all debris and air from the pipework.
* Isolate all laterals.
* Pressurise pipe to 1000 kPa, add water as needed for a period of 30 minutes or until pressure equalises.
* Isolate water supply and record pressure drop over a 60-minute period.
* If the pressure drop does not exceed more than 100 kPa the pipe is considered sound.

### VALVE AND BOXES

Valve and valve boxes will be considered acceptable if.

* No leaks are observed.
* Operate correctly.
* Pressure regulator correctly set.
* Conduits sealed.
* Cable joints correct.
* Valve box is clean of debris or soil.
* Valve box is set to the level specified.
* Turfing has occurred.

### LATERAL AND SPRINKLER TESTING

Installation will be considered acceptable if.

* Correct nozzles have been installed.
* Arcs are set correctly.
* Sprinklers operate correctly.
* No leaks are observed.
* Sprinklers are set level with the surrounding ground and are no lower than 20 mm below the surrounding ground height.

### CONTROL SYSTEM

* Control System will be considered acceptable if.
* Wiring is proven to be correct.
* Sprinklers operate automatically.
* Resistance test reading undertaken and recorded.
* Wiring sequence chart completed.

## ELECTRONIC EQUIPMENT

This involves but is not limited to the following:

All tests and checks required for provision of an electrical compliance by a licensed electrical Contractor. Tests to the manufacturer's installation requirements, as a minimum:

* Checking signals to and from the control system.
* Checking signals to and from any remote sensors.
* Setting to work in the normal automatic operational mode.

## PUMPS

This involves but is not limited to the following:

* All tests and checks required for provision of certificate of electrical compliance to AS/NZS:3000 2007 by a licensed electrical Contractor.
* Ensuring the pump shed is clear of all debris and tools.
* Testing of equipment duty and performance.
* Operate each pump singly and in their possible combinations to confirm system and component performance.
* Checking current draw to ensure safe operation and pumps are operating to manufacturer’s specification.
* Test protection devices
* Vibration checks
* Ensuring that all overload systems are functioning.
* Setting to work in the normal automatic operational mode after the tests have been completed.
* Lights are operational.

## QUALITY ASSURANCE CERTIFICATE

**(Not required to be completed as part of submission)**

Project Automatic Irrigation System at:

Contract Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Stage of Works \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Related Documents Specification \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Drawings \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

As the duly authorised officer for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(company name) ,

ABN\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(full name) holding the position of

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ herby certify that the works completed by our company including works undertaken by our Company or Sub Contractors has been carried out in accordance with the above stated documentation.

Should it be discovered that any works completed by our Company or our Sub Contractors are faulty regardless if it falls within the warranty period, our company will rectify the fault at no cost to the Principal. This includes the repair of any associated works, structures, or grounds, affected by failure or rectification works.

This agreement is limited to the works which related to that which was undertaken by our company or our Sub Contractors and does not include any alterations that may be needed in the future due to changes in site conditions, or changes to any authority’s rules or codes which may occur after the date of practical completion.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature Witness Signature

Date \_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Witness Name (print)

1. **CONTRACT TERMS AS4000:1997**

**ANNEXURES TO THE GENERAL CONDITIONS OF CONTRACT**

**PART A**

Annexure to the Australian Standard General Conditions of Contract AS 4000-1997

This Annexure must be completed and, subject to any Special Conditions of Contract will be attached to the General Conditions of Contract and will form part of the Contract.

|  |  |
| --- | --- |
| * + - 1. **Item** |  |
| 1. Principal (clause 1) | ABN |
| 2. Principal’s address |  |
| 3. Contractor (clause 1) | ABN |
| 4. Contractor’s address |  |
| 5. Superintendent (clause 1) | Water Wise Consulting |
| 6. Superintendent’s address | 39 Coachwood Crescent  Alfords Point, NSW, 2334 |
| 7. (a) Date for practical completion (clause 1)  OR  (b) Period of time for practical completion (clause 1) | As per agreed program |
| 8. Governing law (clause 1(h)) | New South Wales |
| 9. (a) Currency (clause 1(g)) | Australian dollars |
| (b) Place for payments (clause 1(g)) | Unless otherwise agreed, at the Principal’s address |
| (c) Place of business of bank (clause 1(d)) | Not applicable |
| 10. Bills of quantities (subclause 2.2) | . |
| (a) Alternative applying (subclause 2.2) | Alternative 1 |
| (b) If Alternative 2 applies, is the bill of quantities to be priced? (subclause 2.2) | Not used |
| (c) Lodgement time (subclause 2.3(b)) | Tender submission |
| 11. Quantities in schedule of rates, limits of accuracy (subclause 2.5(b)) | 10% |
| 12. Provisional sum, percentage for profit and attendance (clause 3) | Not used |
| 13. Contractor’s security  (a) Form (clause 5) | (b) [An approved unconditional undertaking given by a financial institution approved by the Principal]  (c) OR  (d) [Retention moneys] |
| (b) Amount or maximum percentage of contract sum (clause 5) | 5% of the Contract Sum |
| (c) If retention moneys, percentage of each progress certificate (clause 5 and subclause 37.2) | 10%, until the limit in Item 13(b) |
| (d) Time for provision (except for retention moneys) (clause 5) | Within 28 days of date of Principal's notice of acceptance |
| (e) Additional security for unfixed plant and materials (subclauses 5.4 and 37.3) | Nil |
| (f) Contractor’s security upon certificate of practical completion is reduced by (subclause 5.4) | 50% of amount held |
| 14. Principal’s security |  |
| (a) Form (clause 5) | Not applicable. |
| (b) Amount or maximum percentage of contract sum (clause 5) | Nil. |
| (c) Time for provision (clause 5) | Not applicable. |
| (d) Principal’s security upon certificate of practical completion is reduced by (subclause 5.4) | Not applicable. |
| 15. Principal-supplied documents (subclause 8.2) | 1 copy of the drawings and specification. |
| 16. Time for Superintendent’s direction about documents (subclause 8.3) | 14 days |
| 17. Subcontract work requiring approval (subclause 9.2) | All subcontract work of a value greater than $5,000.00 |
| 18. Novation (subclause 9.4) | Nil. |
| 19. Legislative requirements  (a) Those excepted (subclause 11.1) | Nil. |
| (b) Identified WUC (subclause 11.2(a)(ii)) | Nil. |
| 20. Insurance of *the Works (*clause 16)  (a) Alternative applying | Alternative 1. Contractor shall insure. |
| (b) Provision for demolition and removal of debris | Not applicable. |
| (c) Provision for consultants’ fees | Not applicable. |
| (d) Value of materials or things to be supplied by the *Principal* | Nil |
| e) Additional amount or percentage | NIL |
|  |  |
| 21. Public liability insurance (clause 17)  (a) Alternative applying | Alternative 1 applies. Contractor shall insure. |
| (b) Amount per occurrence shall be not less than | $20 million |
| 22. Time for giving possession (subclause 24.1) | 14 days from order |
| 23. *Qualifying causes of delay* Causes of delay for which EOTs will not be granted (page 3, paragraph (b)(iii) of clause 1 and subclause 34.3) | Lack of supply of product  Lack of labour and machinery |
| 24. Liquidated damages, rate (subclause 34.7) | $440.00 per day |
| 25. Bonus for early *practical completion* (subclause 34.8) | Nil. |
| 26. Delay damages, other *compensable causes* (page 1, clause 1 and subclause 34.9) |  |
| 27. *Defect’s liability period* (clause 35) | 12 months |
| 28. Progress Claims (subclause 37.1)  (a) Times for progress claims  OR  (b) Stages of *WUC* for progress claims | Last Tuesday of the month |
| 29. Unfixed plant and materials for which payment claims may be made (subclause 37.3) | Not applicable. |
| 30. Interest rate on overdue payments (subclause 37.5) | Nil. |
| 31. Time for *Principal* to rectify inadequate possession (subclause 39.7) | 14 days |
| 32. Arbitration (subclause 42.3)  (a) Person to nominate an arbitrator | The President of the Institute of Arbitrators, Australia |
| (b) Rules for arbitration | Rules 5-18 of the Rules of The Institute of Arbitrators, Australia for the Conduct of Commercial Arbitration |
| (c) Appointing Authority under UNCITRAL Arbitration Rules | Not applicable. |