TREATMENT PLANT APPROVAL 15/2021

Plumbing and Drainage Act 2018

Approval

1. The **Nature Flow MK II STP** ("the system") described in the Specifications and Drawings in the attached Schedule and manufactured by **Nature Flow Systems Pty Ltd** (ABN 51 867 535 979) ("the manufacturer") has been assessed in accordance with the Queensland Plumbing and Wastewater Code (QPW Code) dated 26 October 2017.

2. Approval is granted for the secondary quality wastewater treatment system, subject to compliance by the manufacturer with the requirements of the *Plumbing and Drainage Regulation 2018*, and the conditions of approval detailed below.

3. This approval, the conditions of approval and the Schedule comprise the entire Treatment Plant Approval document.

4. Any modification by the manufacturer to the design, drawings or specifications scheduled to this approval must be approved by the Chief Executive.

Conditions of approval

5. The manufacture, installation, operation, service and maintenance of the systems must be in conformity with the conditions of this Treatment Plant Approval.

6. The secondary quality wastewater treatment system, which is an example of the approved systems, may only be used on premises that generate per day:

   (a) a maximum hydraulic loading of 5,000 litres; and

   (b) a maximum organic loading of 1500g BOD^5

7. The system must continue to meet the requirements of secondary quality wastewater treatment system, producing the following effluent quality:

   (a) 90% of the samples taken must have a BOD^5 less than or equal to 20 g/m^3 with no sample greater than 30g/m^3.

   (b) 90% of the samples taken must have total suspended solids less than or equal to 30g/m^3 with no sample greater than 45g/m^3.

   (c) 90% of the samples taken must have a thermotolerant coliform count not exceeding 200 organisms per 100 mL with no sample exceeding 1000 organisms per 100 mL.

   (d) Total chlorine concentration must be between 0.5g/m^3 and 2.0 g/m^3 in four out of five samples taken.

8. Each system must be serviced in accordance with the details supplied in the owner's operation and maintenance manual.

9. This approval does not extend, apply to, or include the land application system used in conjunction with an approved system installed on premises.

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Delegated Authority
Department of Energy & Public Works

10. Each system must be supplied with —

    (a) a copy of this Treatment Plant Approval document;
    (b) details of the system;
    (c) instructions for authorised persons for its installation;
    (d) a copy of the owner's manual to be given to the owner at the time of installation; and
    (e) detailed instructions for authorised service personal for its operation and maintenance.

11. At each anniversary of the Treatment Plant Approval date, the supplier must submit to the Chief Executive a list of all systems installed in Queensland during the previous 12 months. Where the Chief Executive is notified of any system failures the Chief Executive may randomly select a number of installed systems for audit. The Chief Executive will notify the supplier's nominated NATA accredited laboratory which systems are to be audited for BOD^5 and TSS. The sampling and testing of the selected systems, if required, is to be done at the supplier's expense. The following results must be reported to the Chief Executive;

    a) Address of premises;

    b) Date inspected and sampled;

    c) Sample identification number;

    d) BOD^5 for influent and effluent; and

    e) TSS for influent and effluent.

12. The Chief Executive may, by written notice, cancel this approval if the manufacturer/supplier fails —

    a) to comply with one or more of the conditions of approval; or

    b) within 30 days, to remedy a breach, for which a written notice been given by the Chief Executive.

13. This approval may only be assigned with the prior written consent of the Chief Executive.

14. This approval expires on 01 January 2024 unless cancelled earlier in accordance with paragraph 12 above.

Stacey McInnes

A/Director
Plumbing, Drainage and Special Projects
Building Legislation and Policy
Date approved: 30 March 2021

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TREATMENT PLANT APPROVAL No. 15/2021
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SCHEDULE

Attachment 1

Drawings and Specifications for the

Nature Flow MK II STP

Treatment Plant Approval
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Department of Energy & Public Works

Queensland Government

NATURE FLOW® MK II STP
PRODUCT SPECIFICATION

BRIEF DESCRIPTION

The name of this system shall be *NATURE FLOW® MK II Sewerage Treatment Plant* (abbreviated form to be "Nature Flow® Mk II STP").

The Nature Flow® Mk II STP utilises treatment chambers (may be a single tank with multiple compartments or multiple tanks) and an independently constructed media bed to produce treated effluent of secondary quality. Where effluent disposal is above ground, final disinfection is achieved via a chlorine contactor and/or ultra violet unit.

BASIC DESIGN PARAMETERS

The *Nature Flow Mk II STP* has a design loading of 10 to 20 equivalent persons based on the following loading rates.

Hydraulic Loading

The daily loading rate of 250 litres per day per person has been used for calculations which give a daily flow of 5000 litres per day on a 20 EP calculation and 1500 litres per day for the average domestic installation of 6 EP.

The media filter shall have a peak hydraulic loading rate of 210 L/m2/day. Shape and size of the media filter may be modified (in compliance with the above filter loading rate) to suit system loading.

Minimum daily flow of 150 litres per day per person.

Organic Loading

Calculation for the organic waste loading rate has been based on 60 grams per person per day.

Nutrient Loading

Average daily suspended solids – 70 grams per person
Average daily total nitrogen – 15 grams per person.
Average daily total phosphorus – 2.5 grams per person

NORMAL OPERATING CAPACITY

Normal operating capacity has been calculated at 2000 litres per day based on a 10EP plant with a daily loading rate of 200 litres per person per day.

However due to recent social and/or legislative changes regarding water use in the home and specifically the use of water saving devices the daily loading rate (10EP) is expected to reduce to an estimated average of 1500L - 1700L per day.

PEAK DESIGN CAPACITY

The system retains its peak design capacity at the prior approved daily loading rate of 250 litres per person per day and therefore a peak design capacity of 2500L per day on a 10EP loading and 5000L per day on a 20EP loading. A maximum organic loading of 1500 grams BOD5 per day on a 20EP loading.

PLEASE NOTE: TYPICAL ARRANGEMENTS

Throughout these specifications the TYPICAL arrangement (products & plant design) has been identified for the 10EP (@200L/p/d) plant.

These specifications identify that site and/or plant requirements may require deviation from the TYPICAL and flexibility within the specifications remains for this purpose.

However ANY deviation from the TYPICAL identified within these specifications shall require prior written approval by the manufacturer.

COMPONENTS LIST & DETAILS

1. Treatment Tank
    a. Primary 1
    b. Primary 2/Secondary
    c. Pump Well 1
    d. Pump Well 2
2. TFR Filter
3. Venturi
4. Packed Bed Media Filter
    a. Media
    b. Liner
    c. Drainback
    d. Disposal Raft
    e. Geotextile
5. Disinfection
    a. Chlorine
    b. Ultra Violet
    c. Nil (subject to compliance with AS/NZS1547 & Qld Plumbing & Wastewater Code)
6. Submersible Pumps
    a. Pump Well 1 - Media
    b. Pump Well 2 - Disposal/Irrigation
7. Control Box, Electrical Control Panel & Cover
8. Alarms

Standard operation is for effluent to flow through from primary chambers to pump well one where it is pressure fed through the media bed, gravity drained to pump well two and pressure fed through to irrigation/disposal. Where irrigation/disposal is via surface method, disinfection in the form of a chlorine contactor and/or ultra violet unit must be added prior to disposal.

PLEASE NOTE: Details of typical products are outlined in these specifications. Due to the geographical coverage of the Nature Flow® Mk II STP it is a requirement that we use various manufacturers throughout Queensland. Installers may use equivalent products as an alternative to the typical product detailed herein subject to written approval from Nature Flow Systems Pty Ltd. Alternative products are to maintain equivalency in quality and/or fitness-for-purpose as the typical products.

The attached drawings are to be read in conjunction with these specifications:

DRAWING NUMBER	TITLE
NFS-TA-001A	TYPICAL SYSTEM LAYOUT SINGLE TANK SYSTEM
NFS-TA-001B	TYPICAL SYSTEM LAYOUT MUTIPLE TANK SYSTEM
NFS-TA-002	TYPICAL SYSTEM LAYOUT DETAILED ARRANGEMENT
NFS-TA-003A	MEDIA FILTER DETAILED ARRANGEMENT TYPICAL 10EP SYSTEM
NFS-TA-004A	NATURE FLOW TANK ARRANGMENT – CHLORINE DISINFECTION
NFS-TA-004B	NATURE FLOW TANK ARRANGMENT – UV DISINFECTION
NFS-TA-005A	NATURE FLOW DISINFECTION OPTIONS – CHLORINE
NFS-TA-005B	NATURE FLOW DISINFECTION OPTIONS – ULTRA VIOLET
NFS-TA-007A	TYPICAL UV STP CONTROLLER – ELECTRICAL SCHEMATIC
NFS-TA-007B	TYPICAL HIGH WATER CONTROLLER – ELECTRICAL SCHEMATIC
WP 98002	TYPICAL GRAVITY FEED LAYOUT

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TREATMENT TANK
The treatment tank(s) shall have a minimum total capacity of 8000 litres (10EP).

Minimum capacity shall be increased for hydraulic loadings above the standard 10EP domestic at the manufacturer's direction.

Example (indicative only): 20EP based on 250l/p/d, total capacity
Primary: 8000L
Secondary: 8000L (baffled – minimum 4000L for primary, remainder for primary/pump well 1).
Clear Water Pump Chamber: 3000L

Due to the geographical coverage of the Nature Flow Mk II STP it is a requirement that we use various tank manufacturers throughout Queensland. All tanks are to be constructed to AS/NZS 1546.1. Individual tank companies utilized throughout Queensland are required to supply written confirmation of compliance.

Tankage may vary according to installations and includes both concrete and poly tank equivalent. Additionally, where the standard single tank has internal chambers, these may be replicated using multiple tanks, where the additional tankage maintains the minimum capacity of the standard single tank chamber.

Typical Tankage (10EP)
Materials: Precast reinforced concrete, or plastic, in accordance with AS/NZS 1546.1:2008
Examples of existing tank suppliers:

Taylex Maxi Tank Type D/All Purpose Tank Epsom – **TYPICAL 10 EP Single Concrete Tank with Multiple Chambers.** Refer to Drawing No NFS-TA-001A.

Total Height: 2 300mm
Invert from base: 1830mm
Diameter: 2 440mm
Max Dry Weight: 6.1 T

Total Volume: 9 320 litres
Primary: 3050L
Secondary: 2500L
Pump Well 1 (to media filter): 800L
Pump Well 2 (to disposal): 750L
Working Volume: 7100 litres

Inlet Connection: 100mm dia standard sewer grade fitting to AS/NZ 3500.
Outlet Connection: 32mm dia class C pressure socket.

SUSPENDED SOLIDS FILTER
The outlet from primary 2 to pump well one shall be equipped with an Xtra Treat/Zabel or equivalent sediment/solids filter.

TYPICAL is the Taylex TFR filter:
Material: ABS Plastic
Length: 60cm
Diameter: 10cm
Weight: 300g

VENTURI

Proprietary manufactured component of Nature Flow® Systems Pty Ltd. Refer to Drawing No NFS-TA-003A.

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PACKED BED MEDIA FILTER
The Peak Filter Hydraulic Loading rate shall be 210 L/m2/day where total depth of bed is 1.5m with packed section of bed at 1.35m. Accordingly the Peak Filter Hydraulic Loading rate shall be adjusted to 155 L/m2/day where total depth of bed is reduced to 1.25m with a packed section of 1.0m to allow for typical tank invert range.

(Note that 250mm cover is maximum required and may be reduced to 150mm subject to site conditions. This would reduce the total depths above accordingly.)

Thus the following may be inferred:

Daily Hydraulic Loading of 200L/p/d
10EP – 13m2 – Typical 6.5m long x 2m wide x 1m depth (to ground level). **TYPICAL**
15EP – 20m2 – Typical 7m long x 3m wide x 1m depth (to ground level).
20EP – 26m2 – Typical 2 x 6m long x 2m wide x 1m depth (to ground level).

Daily Hydraulic Loading of 250L/p/d
10EP – 16m2 – Typical 8m long x 2m wide x 1m depth (to ground level).
15EP – 24m2 – Typical 2 x 6m long x 2m wide x 1m depth (to ground level).
20EP – 32m2 – Typical 2 x 8m long x 2m wide x 1m depth (to ground level).

NOTES
1. Media filter shape may be modified to suit site subject to compliance with peak filter hydraulic loading rate. Modification to shape may lead to subsequent modification of internal components of media filter eg pipe raft, venting, drainback etc to adjust to altered shape.
2. Media filter depth above does not include the 150-250mm mounded cover to the bed. Media filter depth shall remain at minimum one (1) metre however depth may be increased to 1.35 metres (media proportions to be maintained through out modified depth). Use of this depth may improve treatment and may be used in systems over 10EP/domestic. Note that this depth is not considered the typical depth due to incompatability with standard invert levels of a number of tank options. Where increased depth is utilised, risers may be required on tanks.

Refer Drawing No NFS-TA-003A.

The packed bed media filter shall consist primarily of two media types of the following general characteristics:-

Media One: Due to the geographical coverage of the Nature Flow Mark 2 WWTP media may vary between durable washed granular silica sand (or manufactured equivalent) or aggregate. Operating contact depth shall be a minimum of 500mm.

Sand (or manufactured equivalent):
Media range shall be 1mm to 5mm rundown. Typical mean average shall be 2.5mm. Uniformity coefficient of 2.5.

Aggregate (**TYPICAL**):
Clean/washed, media range shall be 4mm to 14mm with a typical mean average of between 5 to 10mm.

Use of media other than the TYPICAL detailed above shall require prior written approval by the manufacturer.

Media Two: Aggregate, clean/washed, typical mean average shall be 20mm.

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Filter Liner
The filter liner material (standard) is "Canvacon 5000E" liners (Green). Standard roll widths are 2.05m and 2.5m. All seams are to be welded.

The filter bed shape/size may be modified subject to compliance with filter loading rate – any variation to the TYPICAL detailed below requires written approval from Nature Flow Systems Pty Ltd. Accordingly the liner size may be adjusted to suit any such modification.

Standard liner sizes are as follows (note that finished widths will be slightly smaller than dimensions listed below due to losses at welded seams):

Daily Hydraulic Loading of 200L/p/d
Standard minimum liner size (10EP) is 9.5m long x 5m wide. **TYPICAL**
Standard minimum liner size (15EP) is 10m long x 6m wide.
Standard minimum liner size (20EP) is 2 x 9m long x 5m wide.

Daily Hydraulic Loading of 250L/p/d
Standard minimum liner size (10EP) is 11m long x 5m wide.
Standard minimum liner size (15EP) is 9m long x 5m wide.
Standard minimum liner size (20EP) is 2 x 11m long x 5m wide.

Due to the geographical coverage of the Nature Flow Mark II it is a requirement that we use various manufacturers throughout Queensland. Thus the standard liner above may be replaced with an equivalent alternative.

Product profile of standard filter liner material (Canvacon 5000E) can be found in additional data included herewith.

Drainback in Media Filter
Refer Drawing No NFS-TA-002.

The under drain collection system (drainback) shall be 100mm diameter pipe. Orifices shall be manually placed in the drainback as follows:

1. Bottom of the pipe. The orifice size diameter shall be 16mm. The lateral spacing shall be 1000mm.
2. Sides of the pipe. The orifice size diameter shall be 16mm. The lateral spacing shall be 300mm.
3. Top of the pipe. No orifices required.

The drainback in the media filter shall be glued to the proprietory outlet mould which shall then connect to the tank (pump well 2) via standard 100mm Dwv pipe (no orifices in this section).
The drainback shall have two (2) vertical vents to surface. Vents shall be 100mm diameter pipe, brought to surface vertically from the drainback, secured via a concrete surround and capped with a mosquito proof vent cowl. One vent at the start of the drainback and one at the end. Fall on this drainback shall comply with AS/NZS 3500.

Filter Dispersal Raft
Dispersal through pipe raft may be gravity fed or pressure fed.

Drawing WP 98002 details the standard layout of the gravity raft system. A distribution box shall deliver effluent from the treatment tank to the gravity raft. The gravity raft shall be constructed from 100mm PVC sewer pipe and fittings. The orifice size diameter shall be 4.5mm. The lateral spacing shall be 300mm.

Drawing Number NFS-TA-003A details the standard layout of the pressure raft dispersal system. The pressure raft shall be constructed from 32mm OD PVC or PE pipe and fittings. The dispersal orifice size shall be 4mm diameter. The dispersal lateral spacing shall be 300mm centres. A flush valve for the raft shall be installed within the disposal raft using a 32mm tee, a 25mm junction, a riser and a 1" turf valve. The flush valve shall be housed in a suitable valve box (lilac lid).

Pressure fed dispersal is the **TYPICAL** arrangement.

Geotextile Cover
Geotextile Fabric shall be used to cover the media filter prior to "top dress" finishing of filter with friable soil and establishment of grass cover.

The geotextile fabric is a product of Geotextile Supplies & Engineering (standard). Trade name for this material is "Geotex 401" non woven geotextile.

Due to the geographical coverage of the Nature Flow Mark II it is a requirement that we use various manufacturers throughout Queensland. Thus the standard geotextile fabric above may be replaced with an equivalent alternative.

Product profile of standard geotextile fabric (Geotex 401 Non Woven Geotextile) can be found in additional data included herewith.

PUMPS & ASSOCIATED CONTROLS
Media Filter Pump
The type and capacity of the pump will be in accordance with size and arrangement of media bed.

TYPICAL pump (10EP) is Davey D25A submersible pump or equivalent.
Height: 370mm
Diameter: 225mm
Weight: 9kg
Capacity: 240lpm
Head: 9m
Pump output: 250 watts
Power Source: 230v/50Hz AC

Disposal/Irrigation Pump
The type and capacity of the pump will be in accordance with land application requirements.

TYPICAL pump for surface disposal/trenches/ETA beds (subject to site) is Davey D25A submersible pump or equivalent.
Height: 370mm
Diameter: 225mm
Weight: 9kg
Capacity: 240lpm
Head: 9m
Pump output: 250 watts
Power Source: 230v/50Hz AC

TYPICAL pump for subsurface disposal – pressure compensating dripline (subject to site) is Davey D42A submersible pump or equivalent.
Height: 475mm
Diameter: 2335
Weight: 20kg
Capacity: 110lpm
Head: 26m
Pump output: 600 watts
Power Source: 230v/50Hz AC

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DISINFECTION

Where treated effluent is dispersed via above ground disposal methods eg sprinkler/spray irrigation, disinfection must be utilised. Disinfection may be via chlorination and/or ultra violet sterilisation.

Disinfection via chlorination Refer to Drawing No NFS-TA-005A and NFS-TA-004A.
Subject to site and tankage, disinfection via chlorination of effluent prior to disposal may be achieved through online, in-line or in-tank chlorine contactors. Chlorine contactors may vary between installations.

Trychloroisocyanuric acid (or equivalent) containing 90% available chlorine in tablet form is used to disinfect the effluent.

Minimum disposal pump is a Davey 25 AV or equivalent (surface irrigation). Pumpage may vary according to installation and land application design.

Householder's are informed of their responsibilities with regard to chlorine tablet replenishment (if required) in between annual service intervals (refer Owner's Manual).

Where appropriate (eg online models) chlorinator is to be located inside a suitable housing (typical = poly cabinet). This cabinet (subject to site variations) may be mounted to the top of the treatment tank.

Control Box for this unit includes a high water alarm (visual and audible). Control box may be mounted inside, or external to, the cabinet (if available) or mounted to a standpost adjacent to the treatment tank.

TYPICAL arrangement shall be via an online chlorinator. Refer to Drawing No NFS-TA-004A.
The standard model is the Hayward Chlorine Feeder Model # CL200 or equivalent. After the chlorinator a 15mm drawoff line to take chlorinated effluent back to pump well 2 via a control valve is to be installed. The dial-up chlorine residual and control system bypass valve back to the pump chamber is set at installation. Chlorine tablets to be used are 150 gram Trichloroisocyanuric Acid (each tablet) or equivalent.

Disinfection via ultra violet sterilisation
Minimum requirements: The UV lamp(s) shall:

1. Emit UV light in the range of 250nm to 270nm to effectively inactivate micro-organisms.
2. Be replaced in accordance with the manufacturer's recommendations.
3. Not overheat the disinfection apparatus.
4. Have easy access for cleaning and maintenance.

Lamp wattages and unit sizing may vary where required. Optional - ozone producing UV lamps.

Housing type and mounting location may vary subject to site conditions.

Flow may be controlled through the use of valves where required.

TYPICAL Arrangement shall be via a proprietary Nature Flow® UV Disinfection Unit.
Typical - Nature Flow® 40 watt UV unit with patented self-cleaning UV technology with maximum flow rate of 24 L/min. Refer to Drawing Nos NFS-TA-004B and NFS-TA-005B.

Advanced control system using light sensor. Unit has audible and visual alarm system. Typical installation – UV unit including control box to be mounted inside poly cabinet. UV cylinder must be mounted vertically. Maximum operating pressure 500 kPa. Cabinet to be secured to top of treatment tank.

Alternative mounting arrangements for cabinet include adjacent to treatment tank (stable bi[illegible] required) or in-tank orientation (cabinet may be replaced with PVC pipe housing/chamber).

CONTROL BOX & ELECTRICAL CONTROL PANEL
TYPICAL as per below. Note that controllers and covers may change according to site requirements. Below is indicative only of typical arrangements.

Control Box – Basic High Level Alarm. Refer Drawing No NFS-TA-007B.
Material: ABS
Height: 100mm
Length: 270mm
Depth: 70mm
IP Rating: 68

Control Box – UV Disinfection. Refer Drawing No NFS-TA-007A.
Material: ABS
Height: 190mm
Length: 290mm
Depth: 100mm
IP Rating: 68

Refer to drawings above for wiring schematic for controllers.

Cabinet – Chlorinator/ High Level Alarm TYPICAL
Material: Poly moulded
Height: 640mm
Length: 440mm
Depth: 400mm

Cabinet – UV Disinfection Unit TYPICAL
Material: Poly moulded
Height: 1100mm
Length: 440mm
Depth: 180mm

ALARM SYSTEM
The system has audible and visual alarms.

Trigger: Pressure switch/light sensor
Activators: High water/pump failure and UV lamp failure (UV disinfection only).
Visual: 12 volt strobe light.
Audible: Buzzer approx 70dB SPL at 1m.
Follow troubleshooting guide to identify nature of fault.

SERVICING INTERVALS
Routine maintenance servicing of the Nature Flow® Mk II STP is to be scheduled a minimum of once per year or as determined necessary by an approved Nature Flow Sales technician or due to mechanical failure.

Audible and visual alarms have been included in control systems to identify high water levels and UV lamp degradation. Householders have been advised (refer Owner's Manual) of their maintenance responsibilities including the replenishment of chlorine tablets (quarterly check and refill as required).

SLUDGE REMOVAL INTERVAL
Sludge build-up by volume has been calculated on the basis of 80 litres per person per year.

Thus it is anticipated that desludging of the plant would be:
- on a 3 to 4 year cycle on a full 20EP loading
- on a 6 to 8 year cycle on a full 10 EP loading.

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ATTACHMENTS

1. OWNERS MANUAL
2. INSTALLATION MANUAL
3. OPERATION & MAINTENANCE MANUAL
4. DATA SHEETS/OWNERS MANUALS
    a. Atlantic Ultraviolet UV Lamps/Sleeves
    b. Davey D42A Submersible Pump – Specs.
    c. Davey D25A Submersible Pump – Specs.
    d. Davey Submersible Pumps – Owners Manual.
    e. Canvacon 5000E – Specs.
    f. Geotex 401 – Specs.
    g. Hayward CL200 Online Chlorinator – Owners Manual.
    h. Nature Flow® UV Disinfection Unit – Specs.
    i. Taylex Epson Concrete Tank – Specs.
    j. Taylex Maxi Tank
    k. MSDS – Chlorine Tablets
    l. MSDS – UV Lamps

DRAWINGS

DRAWING NUMBER	TITLE
NFS-TA-001A	TYPICAL SYSTEM LAYOUT SINGLE TANK SYSTEM
NFS-TA-001B	TYPICAL SYSTEM LAYOUT MUTIPLE TANK SYSTEM
NFS-TA-002	TYPICAL SYSTEM LAYOUT DETAILED ARRANGEMENT
NFS-TA-003A	MEDIA FILTER DETAILED ARRANGEMENT TYPICAL 10EP SYSTEM
NFS-TA-004A	NATURE FLOW TANK ARRANGMENT – CHLORINE DISINFECTION
NFS-TA-004B	NATURE FLOW TANK ARRANGMENT – UV DISINFECTION
NFS-TA-005A	NATURE FLOW DISINFECTION OPTIONS – CHLORINE
NFS-TA-005B	NATURE FLOW DISINFECTION OPTIONS – ULTRA VIOLET
NFS-TA-007A	TYPICAL UV STP CONTROLLER – ELECTRICAL SCHEMATIC
NFS-TA-007B	TYPICAL HIGH WATER CONTROLLER – ELECTRICAL SCHEMATIC
WP 98002	TYPICAL GRAVIEY FEED LAYOUT

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STATEMENT OF SERVICEABLE LIFE & WARRANTY PERIODS

Primary, secondary and tertiary in ground vessels have been chosen by material type for their durability and anticipated life of 15 years minimum. The concrete structures forming part of the plant shall comply with the requirements of AS/NZS 1546.1:2008.

Mechanical and electrical components, such as pumps, control box, chlorinator and UV unit, with annual service, would be expected to have a 3-5 year life cycle.

All metallic components associated with the plant shall be suitably protected against corrosion.

Warranty is provided by the manufacturer for the following components:

Component	Warranty (yrs)	Expected Service Life (yrs)
Chlorinator	1	5
Concrete Tank(s)	15	15
Electrical Control Box	1	5
Filter Liner	3	15
Pumps	1	3-5
Ultra Violet Unit (excl UV glassware)	1	5

Warranty terms and conditions vary subject to the manufacturer and the component.

Expected service life is based on an effective maintenance program at 12 month intervals and the end user taking a responsible interest in plant operation.

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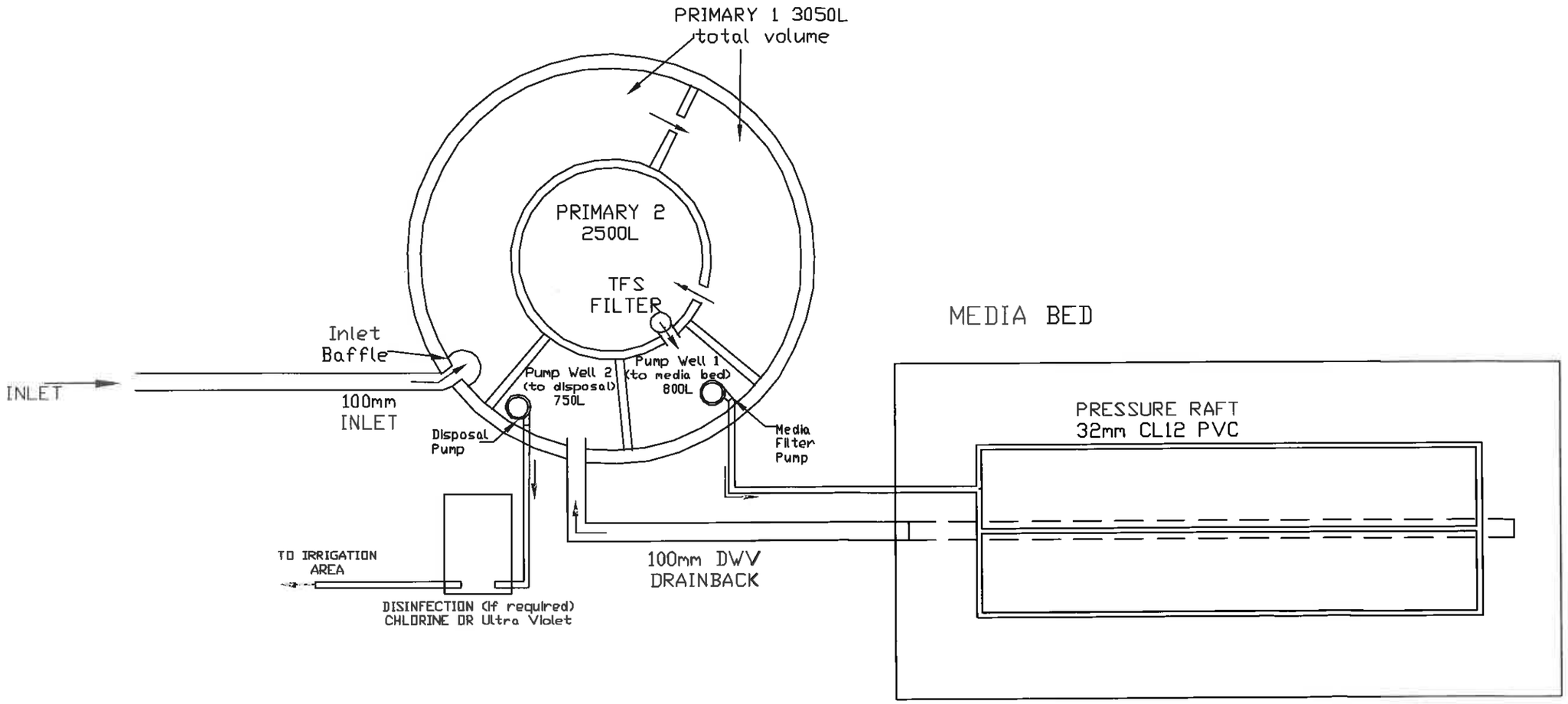
RevNo	Revision note	Date	Signature	Checked

SYSTEM LAYOUT
"TYPICAL 10EP System 2000L/day"



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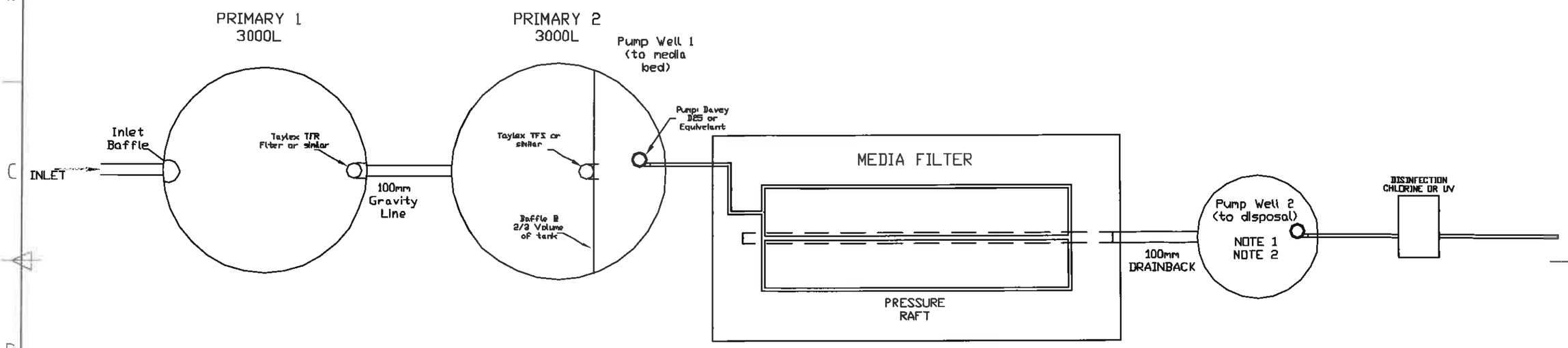
Itemref	Quantity	Title/Name, designation, material, dimension etc				
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS	
Typical System Layout Single Tank System			NATURE FLOW SYSTEMS			
			NFS-TA-001A	Revision 1	Sheet A3	

RevNo	Revision note	Date	Signature	Checked

SYSTEM LAYOUT
TYPICAL
MULTIPLE TANK SYSTEM



NOTE 1: Pump Well 2 to suit invert level of media filter drainback line.

NOTE 2: 24 hr storage capacity to be obtained in Pump Well 2.

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Typical System Layout Multiple Tank System				NATURE FLOW SYSTEMS		
				NFS-TA-001B	Revision 1	Sheet A3

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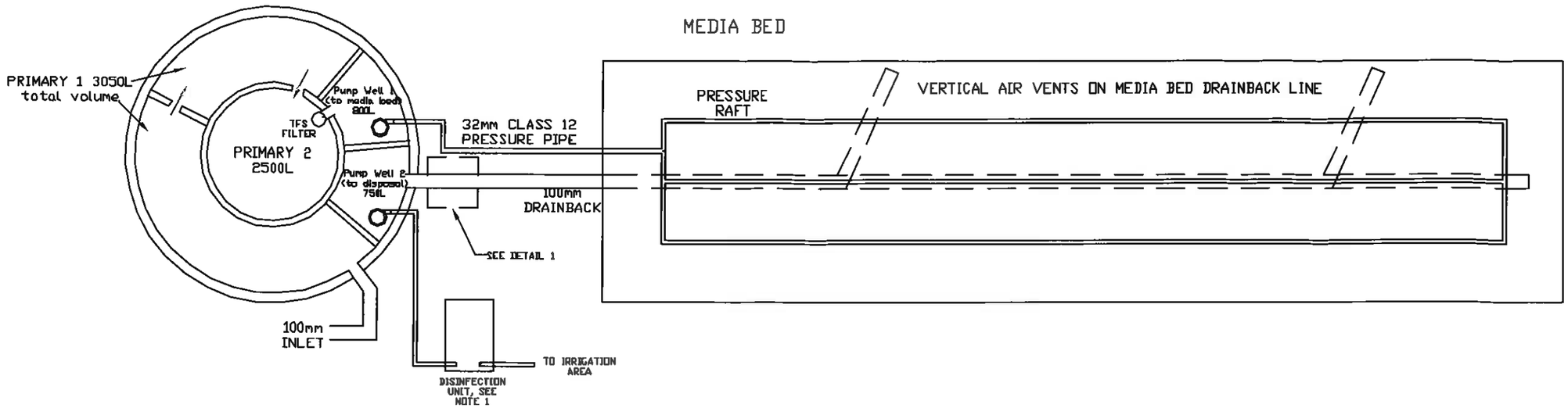
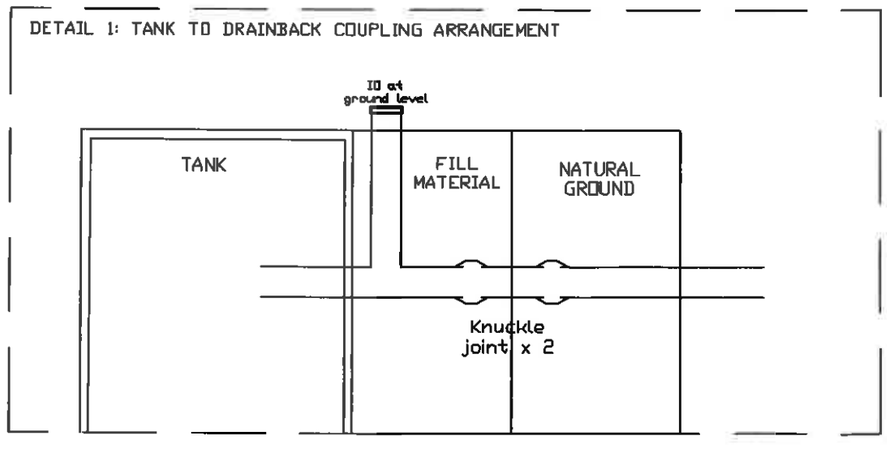
RevNo	Revision note	Date	Signature	Checked

TYPICAL SYSTEM LAYOUT
10EP SYSTEM 2000L/DAY
DETAILED ARRANGEMENT





NOTE1 : DISINFECTION OPTIONS

FOR CHLORINE OPTIONS REFER TO DRAWINGS NFS-TA-005A

FOR ULTRA VIOLET OPTION REFER TO DRAWING NFS-TA-005B

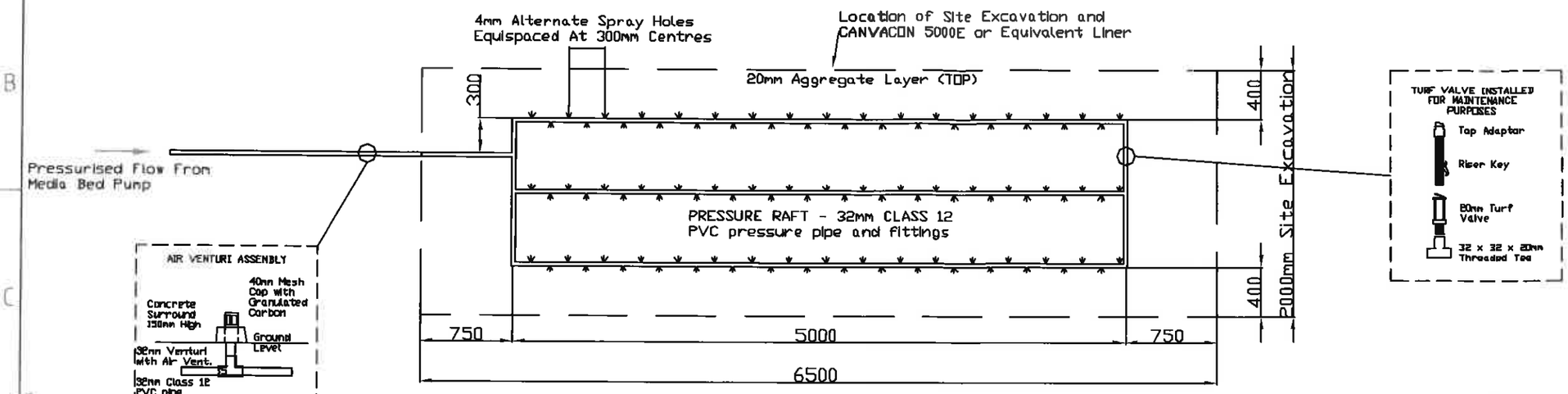
Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works

Queensland Government

Itemref	Quantity	Title/Name, designation, material, dimension etc				
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS	
Typical System Layout Detailed Arrangement				NATURE FLOW SYSTEMS		
				NFS-TA-002	Revision 1	Sheet A3

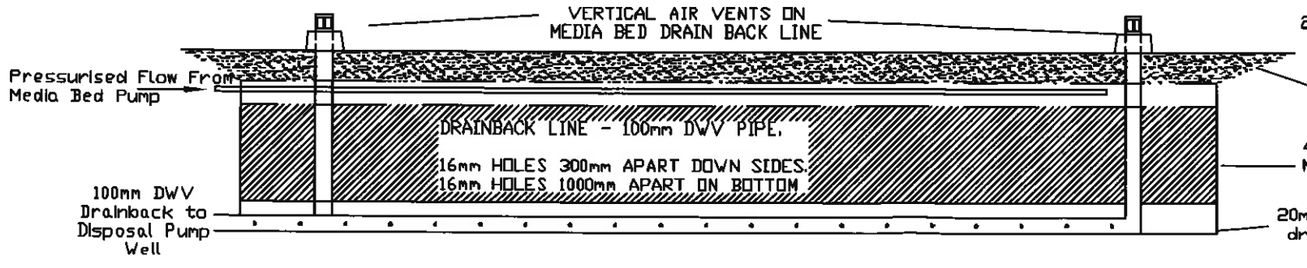
RevNo	Revision note	Date	Signature	Checked

TYPICAL 10EP SYSTEM
2000L/DAY

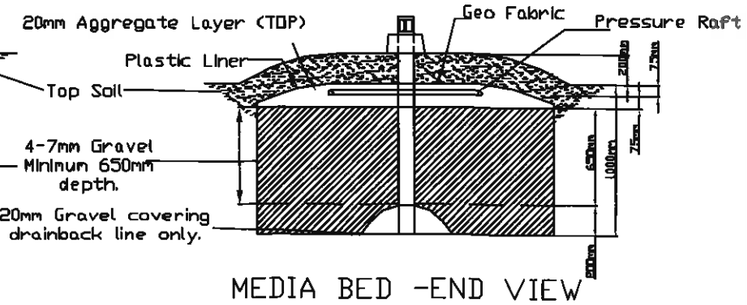


MEDIA BED -PLAN VIEW
PRESSURE RAFT DETAIL
TYPICAL LAYOUT FOR 10EP SYSTEM

*PLACE 200 MM OF 20MM WASHED GRAVEL IN MEDIA FILTER BED AND DISTRIBUTE EVENLY ENSURING COVER OVER THE DRAINBACK.
*NOTE THAT A FULL LAYER OF 20MM GRAVEL ACROSS THE FLOOR OF THE ENTIRE BED IS NOT MANDATORY SUBJECT TO ADEQUATE COVER OVER THE DRAINBACK.
*THEN COVER WITH 650MM OF 4-7MM WASHED AGGREGATE AND SPREAD EVENLY.
*PLACE 75MM OF 20MM WASHED GRAVEL OVER 4-7MM AGGREGATE AND SPREAD EVENLY.
*INSTALL PRESSURE RAFT.
*COVER PRESSURE RAFT WITH 75MM OF 20 MM WASHED GRAVEL AND SPREAD EVENLY.
*COVER BED WITH GEOTEXTILE.
*COVER EVENLY WITH 150 - 250MM OF SANDY SOIL/FILL. GRASS SEED OR TURF AREA.



MEDIA BED -SIDE VIEW



MEDIA BED -END VIEW

Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works
Queensland Government

Itemref	Quantity	Title/Name, designation, material, dimension etc				
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale 1:400	
Media Filter Detailed Arrangement Typical 10EP System			NATURE FLOW SYSTEMS NFS-TA-003A	Revision 1	Sheet A3	

RevNo	Revision note	Date	Signature	Checked

AIR VENTURI ASSEMBLY

32mm Venturi with Air Vent

TURF VALVE INSTALLED FOR MAINTENANCE PURPOSES

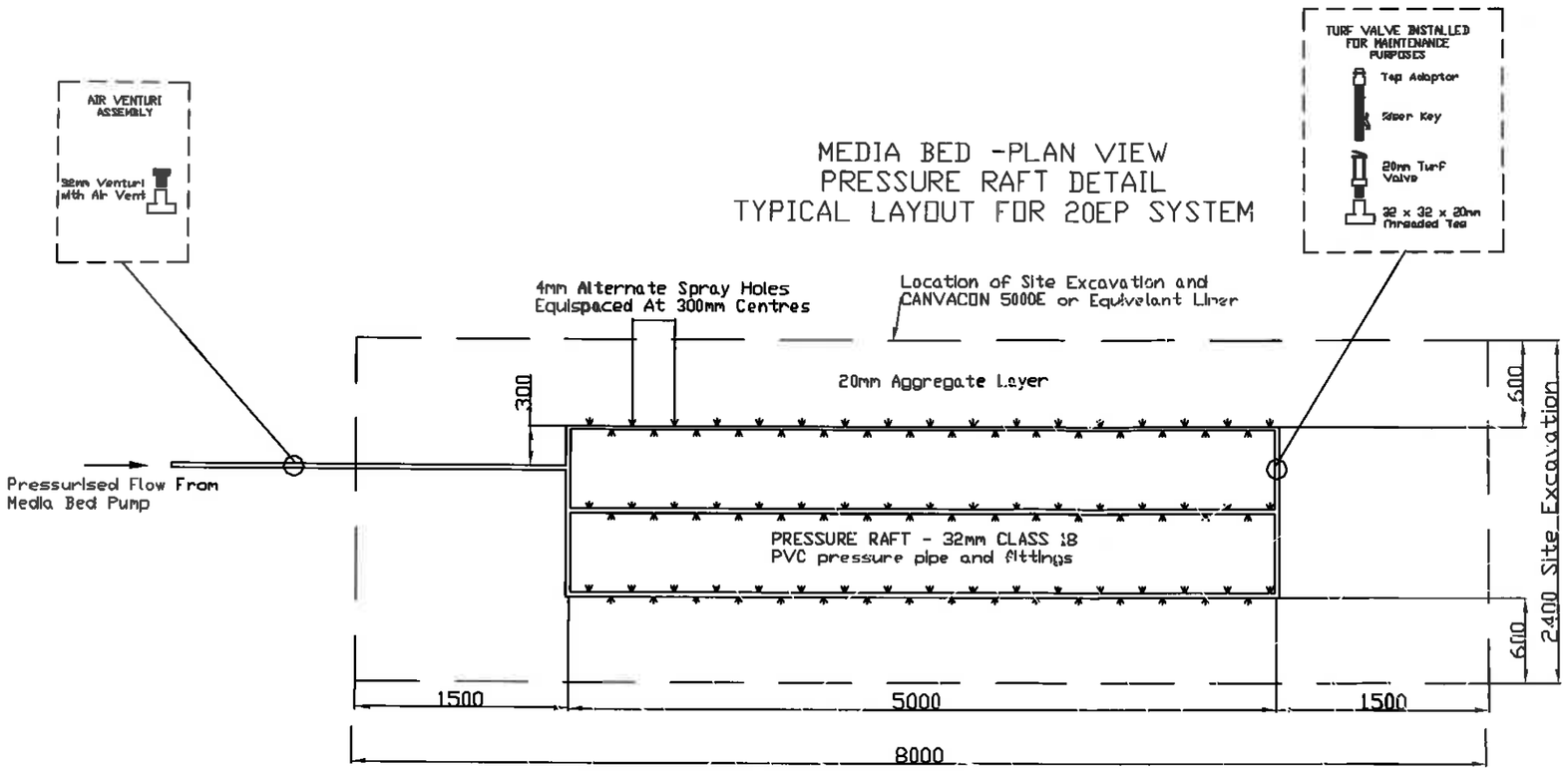
Tap Adaptor

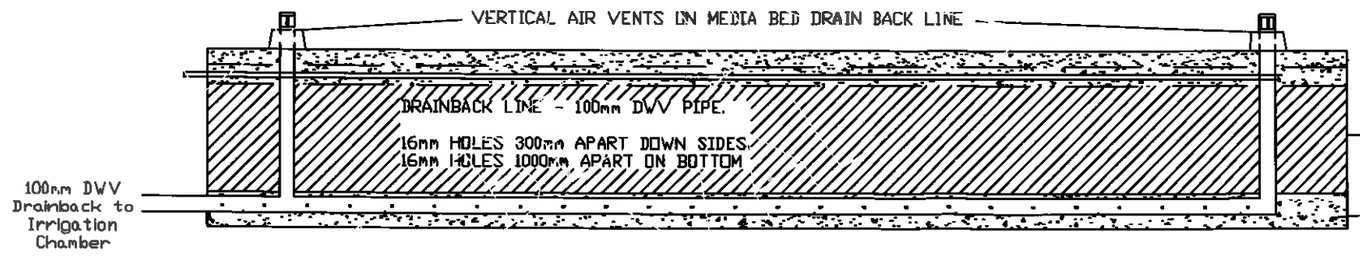
Spear Key

20mm Turf Valve

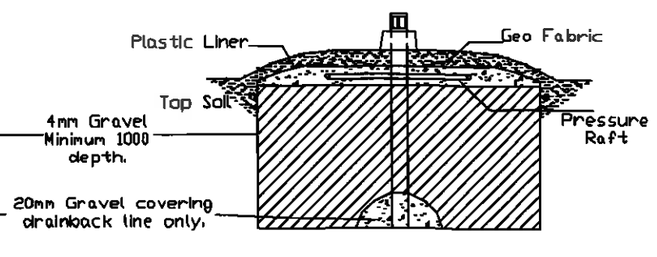
32 x 32 x 20mm Threaded Tee

MEDIA BED -PLAN VIEW
PRESSURE RAFT DETAIL
TYPICAL LAYOUT FOR 20EP SYSTEM





MEDIA BED -SIDE VIEW



MEDIA BED -END VIEW

Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works

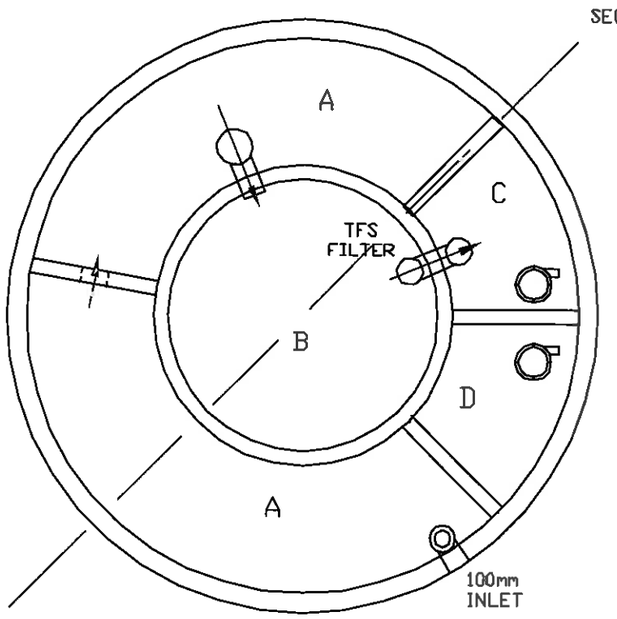
Queensland Government

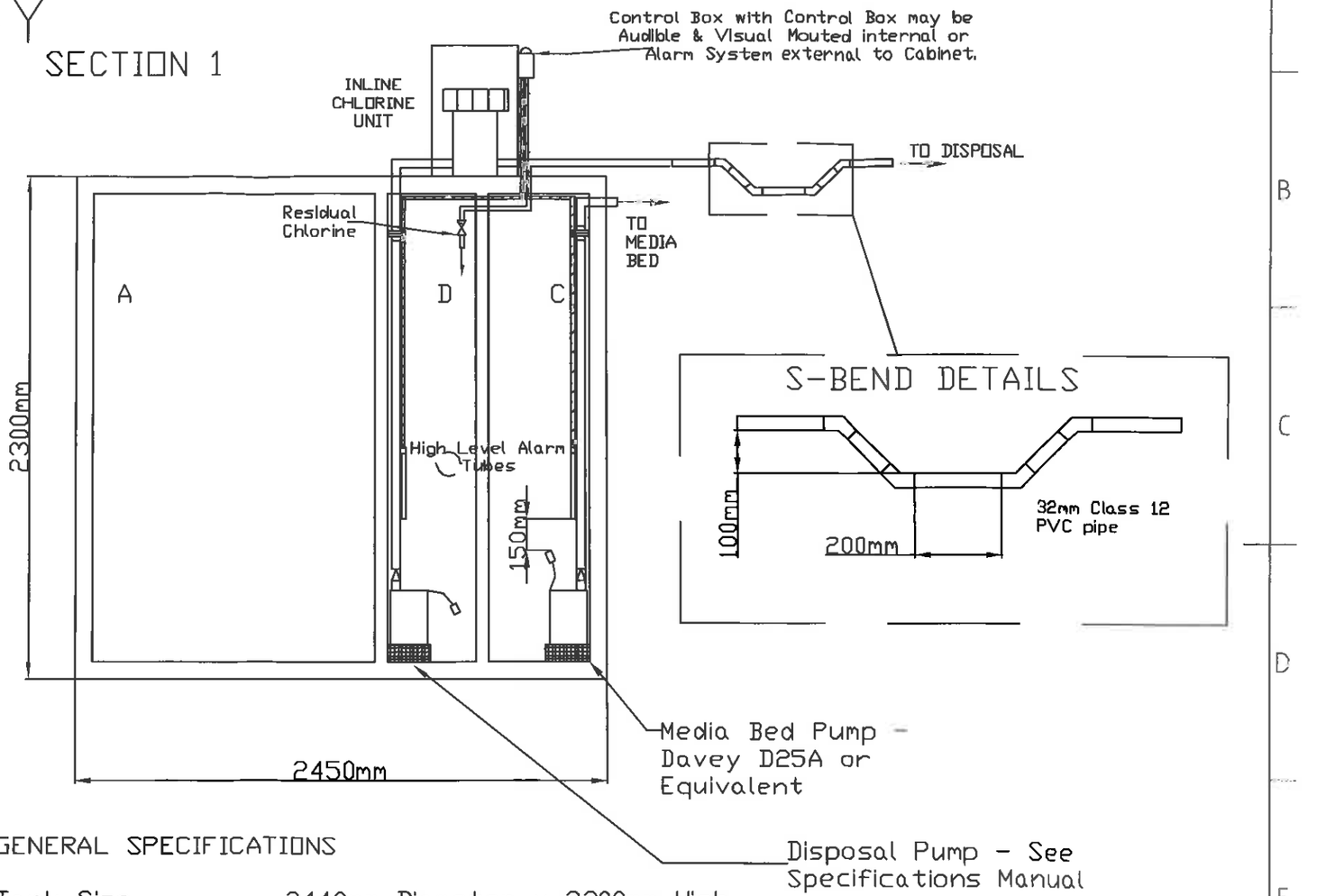
Itemref	Quantity	Title/Name, designation, material, dimension etc				
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 13/10/2010	Scale 1:400	
Media Filter Detailed Arrangement			NATURE FLOW SYSTEMS NFS-TA-003C		Revision 1	Sheet A3

RevNo	Revision note	Date	Signature	Checked

TYPICAL 10EP SYSTEM 2000L/DAY

SECTION 1





A. PRIMARY 1 TOTAL VOLUME 3050 L
B. PRIMARY 2 2500L
C. PUMP WEL 1 800L (to media bed)
D. PUMP WELL 750L (to disposal)

GENERAL SPECIFICATIONS

Tank Size	2440mm Diameter x 2300mm High
Depth	Invert to Inlet 370mm
Inlet Connection	100mm Dia. Std. Sewer Grade Fitting to AS/NSZ 3500
Outlet Connection	32mm Dia. Class 12 Pressure Socket

Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works
Queensland Government

Itemref	Quantity	Title/Name, designation, material, dimension etc			
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS
Nature Flow Tank Arrangment - Chlorine Disinfection		NATURE FLOW SYSTEMS			
		NFS-TA-004A		Revision 1	Sheet A3

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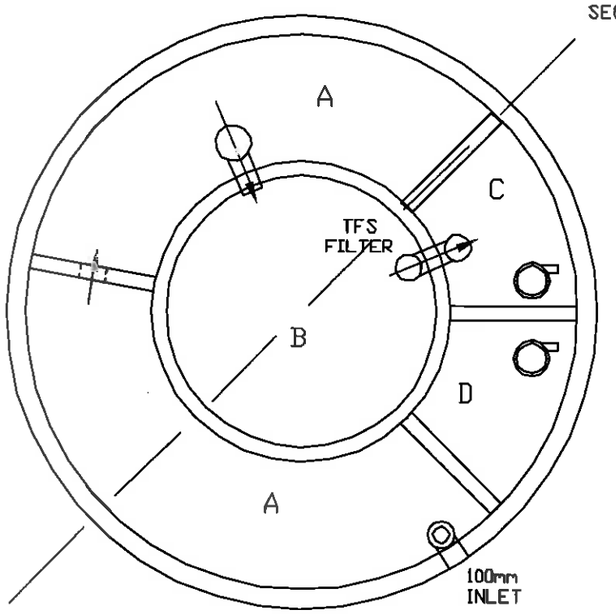
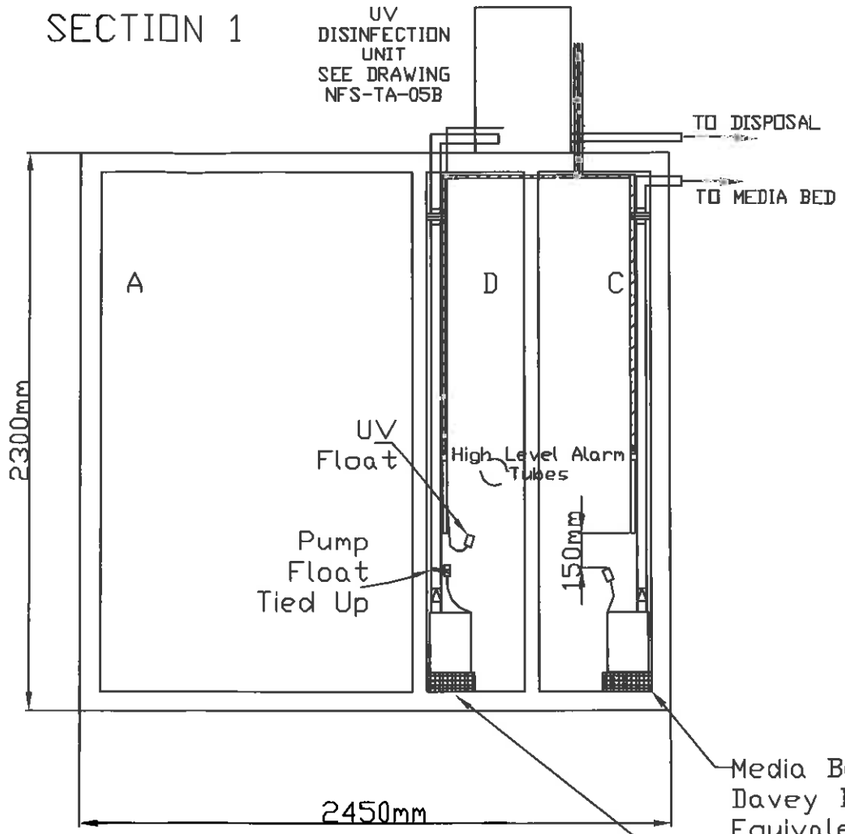
RevNo	Revision note	Date	Signature	Checked

TYPICAL 10EP SYSTEM
2000L/DAY



SECTION 1



A. PRIMARY 1 TOTAL VOLUME 3050 L
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C. PUMP WEL 1 800L (to media bed)
D. PUMP WELL 750L (to disposal)

GENERAL SPECIFICATIONS

Tank Size	2440mm Diameter x 2300mm High
Depth	Invert to Inlet 370mm
Inlet Connection	100mm Dia. Std. Sewer Grade Fitting to AS/NSZ 3500
Outlet Connection	32mm Dia. Class 12 Pressure Socket

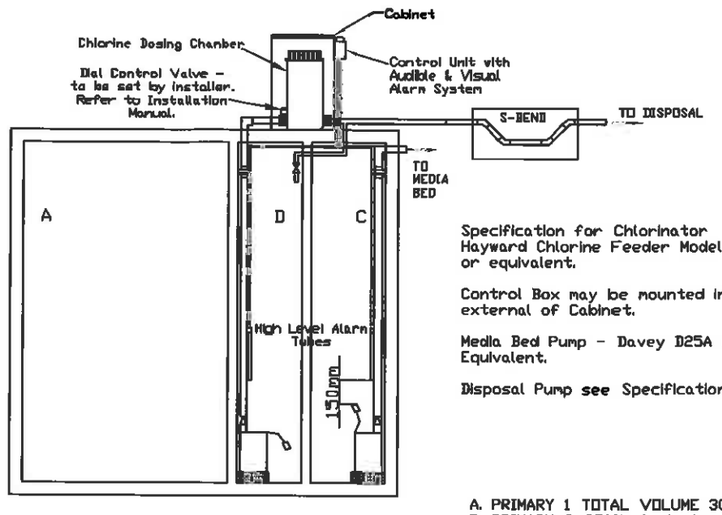
Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works

Queensland Government

Itemref	Quantity	Title/Name, designation, material, dimension etc			
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS
Nature Flow Tank Arrangment - UV Disinfection			NATURE FLOW SYSTEMS		
			NFS-TA-004B	Revision 1	Sheet A3

RevNo	Revision note	Date	Signature	Checked

INLINE CHLORINATION DISINFECTION ARRANGEMENT



Specification for Chlorinator
Hayward Chlorine Feeder Model No.CL200 or equivalent.

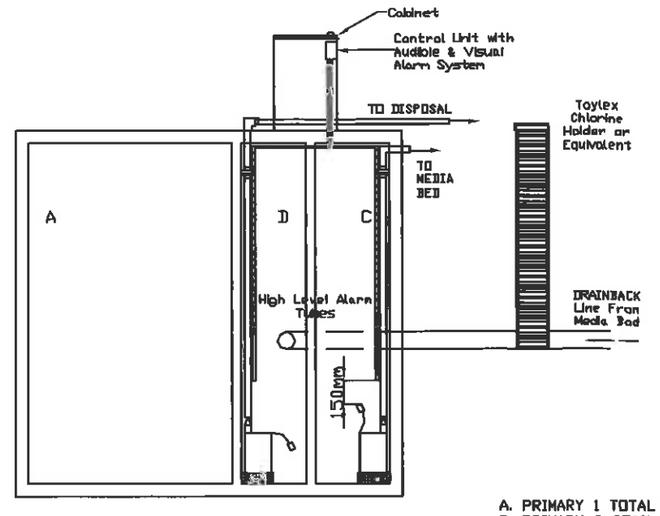
Control Box may be mounted internal or external of Cabinet.

Media Bed Pump - Davey D25A or Equivalent.

Disposal Pump **see** Specifications Manual.

A. PRIMARY 1 TOTAL VOLUME 3050 L
B. PRIMARY 2 2500L (not shown)
C. PUMP WEL 1 800L (to media bed)
D. PUMP WELL 750L (to disposal)

ALTERNATIVE CHLORINATION DISINFECTION ARRANGEMENT



Specification for Chlorinator
Taylex Chlorine Holder or equivalent.

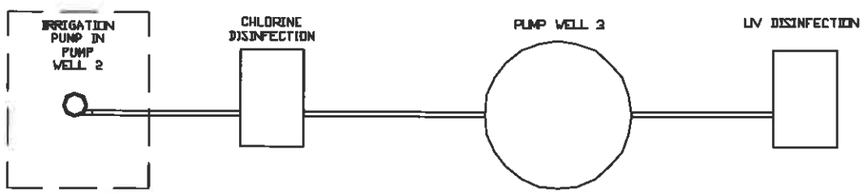
Control Box may be mounted internal or external of PE Enclosure

Media Bed Pump - Davey D25A or Equivalent

Disposal Pump see Specifications Manual

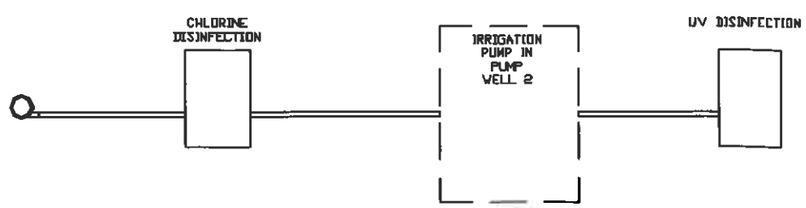
A. PRIMARY 1 TOTAL VOLUME 3050 L
B. PRIMARY 2 2500L (not shown)
C. PUMP WEL 1 800L (to media bed)
D. PUMP WELL 750L (to disposal)

ALTERNATIVE DISINFECTION ARRANGEMENT



Where Pump Well 2 is part of a multichamber tank Pump Well 3 may be required to prevent Chlorine flowing back into media bed.

ALTERNATIVE DISINFECTION ARRANGEMENT



Where Pump Well 2 is an independent vessel, Pump Well 3 may not be required.

Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works

Queensland Government

Itemref	Quantity	Title/Name, designation, material, dimension etc			
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS

Nature Flow Disinfection Options - CHLORINE

NATURE FLOW SYSTEMS

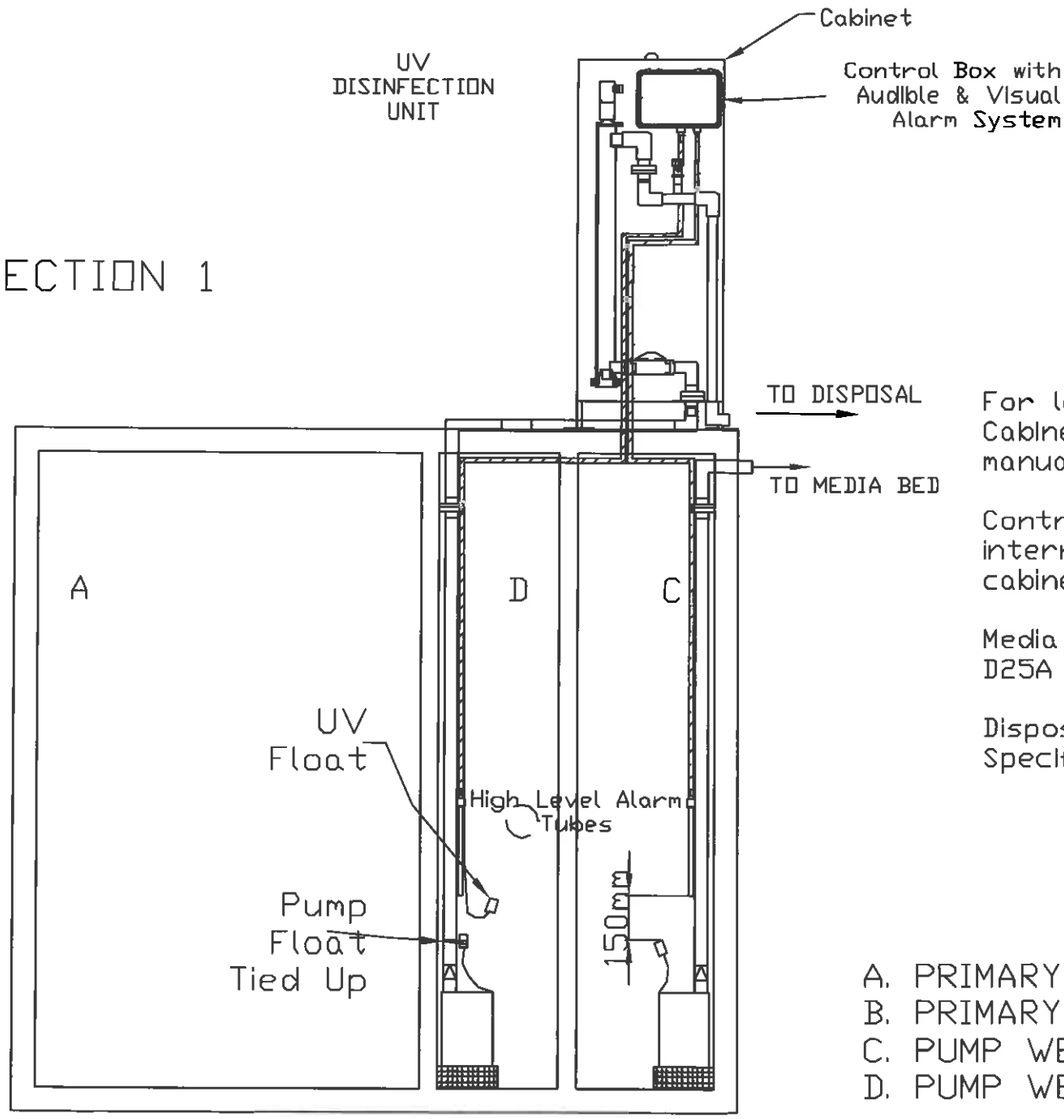
NFS--TA-005A | Revision 1 | Sheet A3

MADDOX

RevNo	Revision note	Date	Signature	Checked

INLINE ULTRA VIOLET DISINFECTION ARRANGEMENT

SECTION 1



For location of Ultra violet Cabinet see Installation manual.

Control Box may be mounted internal or external to cabinet.

Media Bed Pump - Davey D25A or Equivalent

Disposal Pump see Specifications Manual

A. PRIMARY 1 TOTAL VOLUME 3050 L
B. PRIMARY 2 2500L (not shown)
C. PUMP WEL 1 800L (to media bed)
D. PUMP WELL 750L (to disposal)

Treatment Plant Approval
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Delegated Authority
Department of Energy & Public Works
Queensland Government

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Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale 1:400	
Nature Flow Disinfection Options - Ultra Violet				NATURE FLOW SYSTEMS		
				NFS-TA-005B	Revision 1	Sheet A3

RevNo	Revision note	Date	Signature	Checked

ACTIVE

NEUTRAL

Test Switch

ELECTRONIC BALLAST

UV LAMP

T1 (Pump Timer)

T1-1

R1-1

C1-1

C1 (Pump Contactor)

Dispersal Pump

Alarm Switcher

24.0V N
24.1V A
24.1V N
24.1V A

12V+
GND
LDR +
LDR –
STROBE +
STROBE –
N/O
COM
N/C

Note: Link 2-3 Only

T1-2

Lamp Sensor

Alarm Relay

HLS1

HLS2

Audible Alarm Buzzer

Visual Alarm Strobe

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Delegated Authority
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Itemref	Quantity	Title/Name, designation, material, dimension etc				
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS	
TYPICAL UV STP CONTROLLER - ELECTRICAL SCHEMATIC		NATURE FLOW SYSTEMS				
		NFS-TA-007A		Revision 1	Sheet A3	

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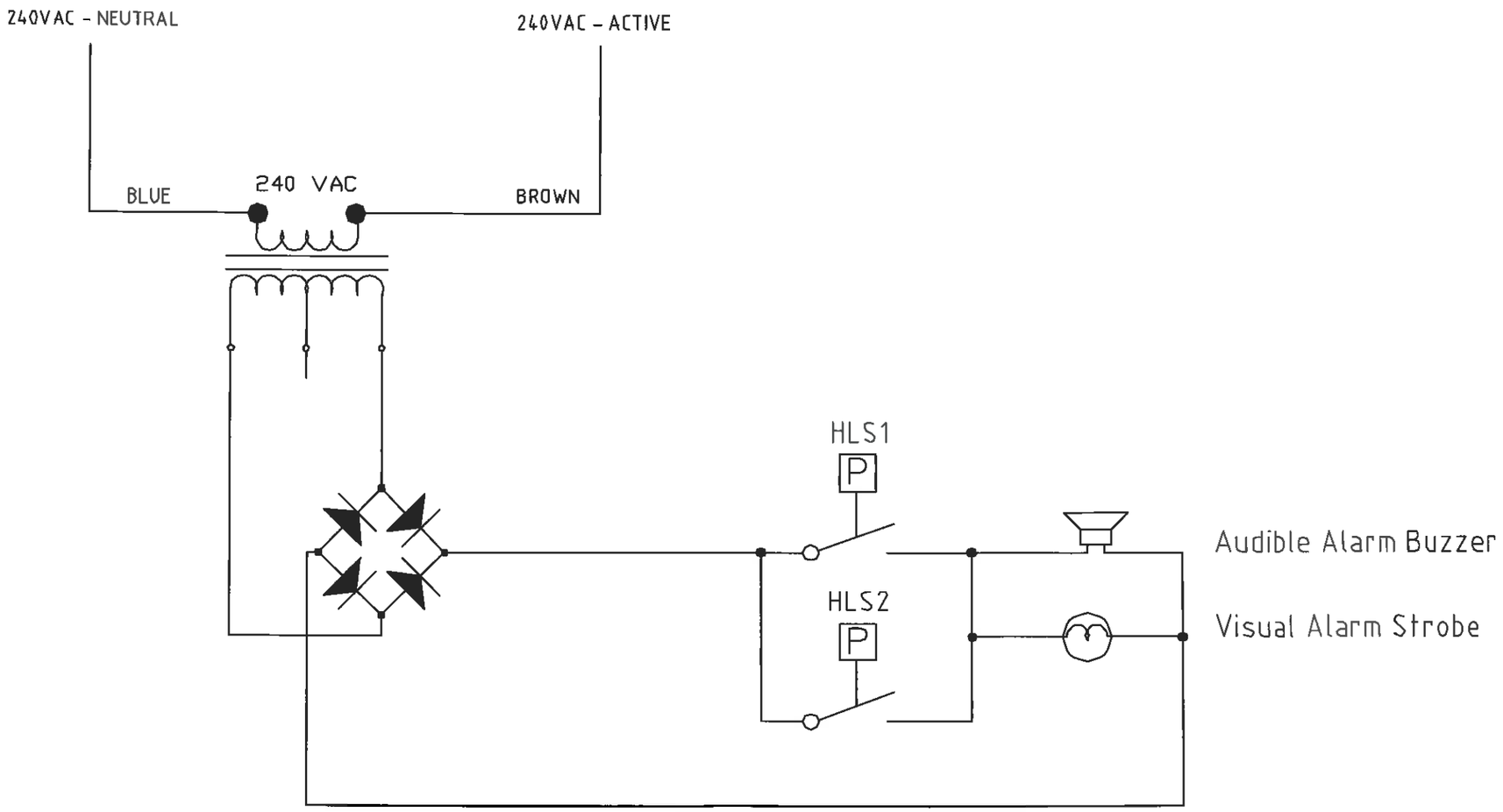
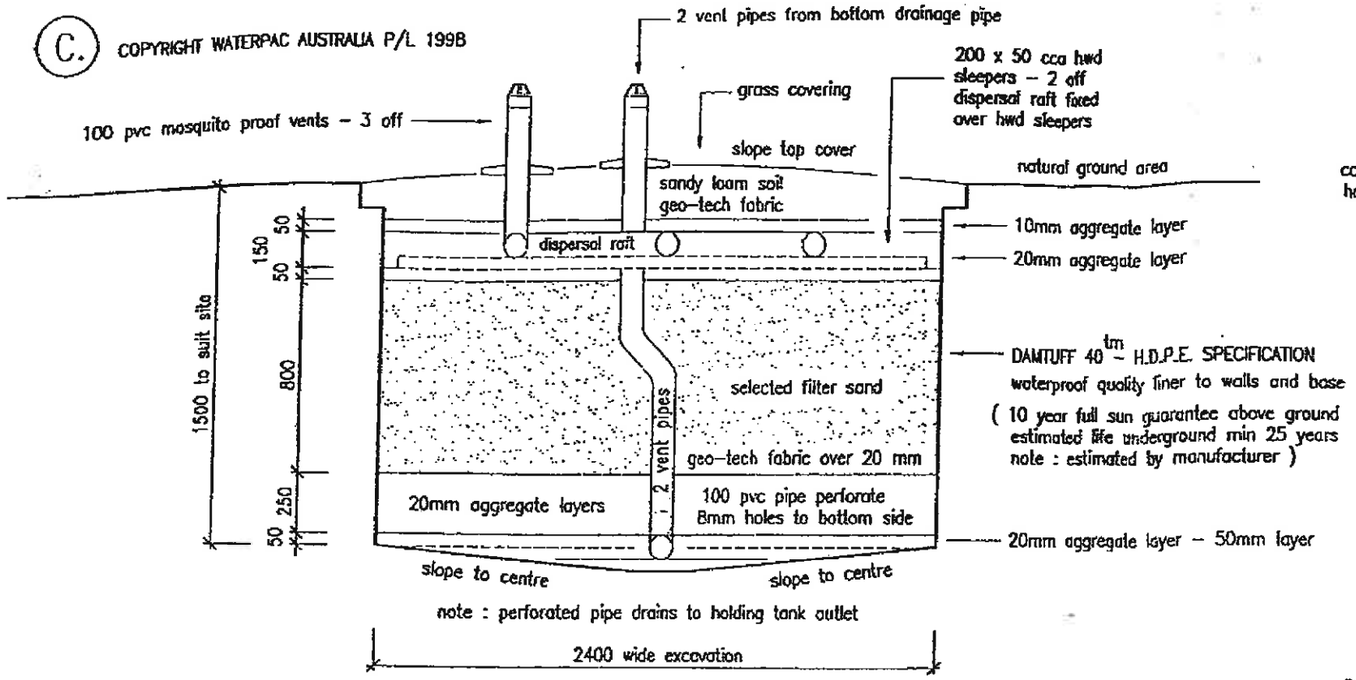
RevNo	Revision note	Date	Signature	Checked



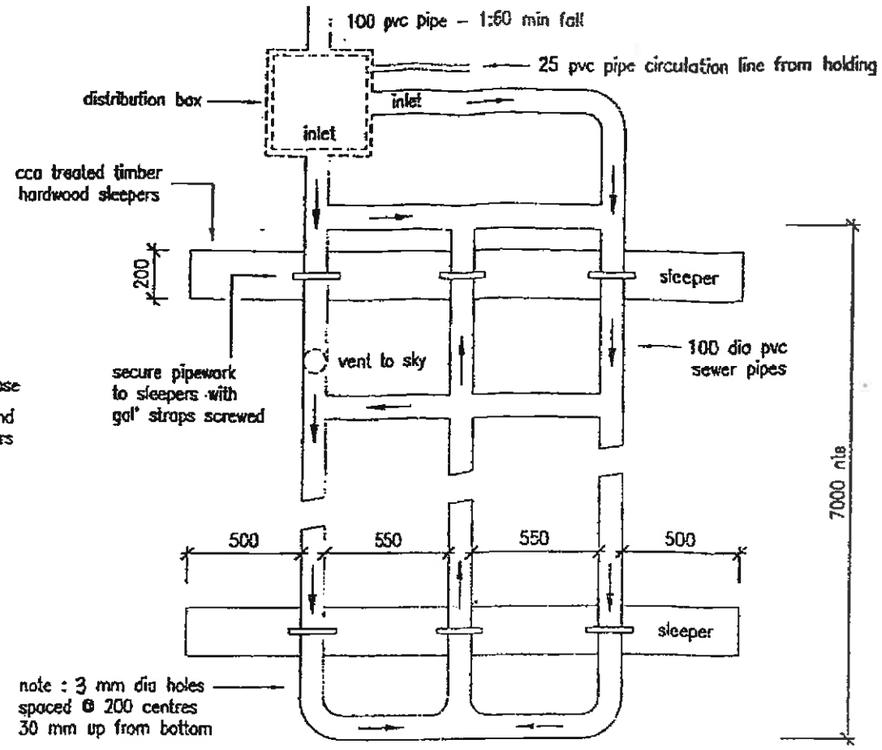
Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works

Queensland Government

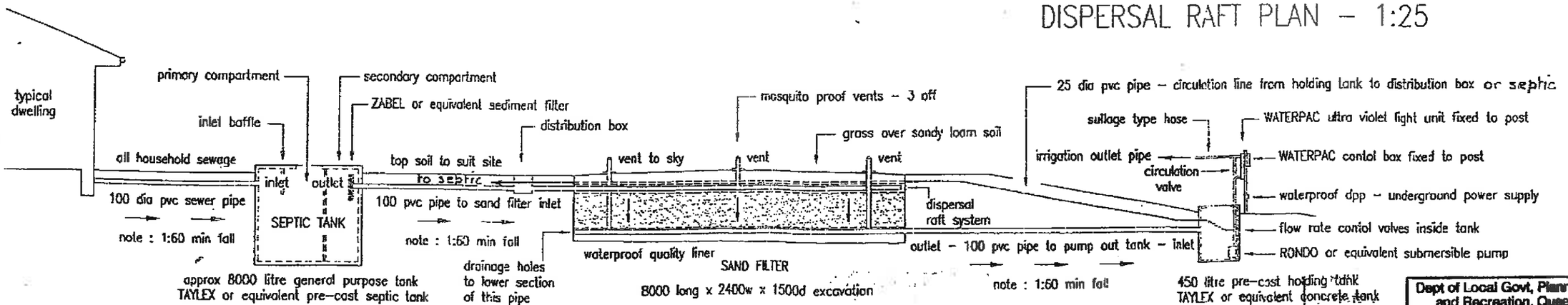
Itemref	Quantity	Title/Name, designation, material, dimension etc				
Drawn by T. PRINCE	Checked by	Approved by - date	Filename	Date 01/11/2010	Scale NTS	
TYPICAL HIGH WATER CONTROLLER - ELECTRICAL SCHEMATIC			NATURE FLOW SYSTEMS			
			NFS-TA-007B	Revision 1	Sheet A3	



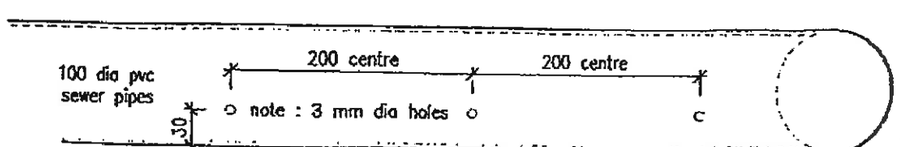
TYPICAL SECTION THRU SAND FILTER – 1:25



DISPERSAL RAFT PLAN – 1:25



TYPICAL SECTION THRU HOUSEHOLD SEWERAGE TREATMENT PLANT – 1:100



TYPICAL DISPERSAL PIPE DETAIL – 1:5

Dept of Local Govt, Planning, Sport and Recreation, Queensland
TYPE SPECIFICATION APPROVAL
Approval No.: SA
Date of Issue: 24 Nov 2005
General Manager: ...
Building Codes Qld

Treatment Plant Approval
Approved by: Stacey McInnes
Delegated Authority
Department of Energy & Public Works
Queensland Government

HOUSEHOLD SEWERAGE TREATMENT PLANT	BEAUDESERT SHIRE COUNCIL
WATERPAC AUSTRALIA PTY LTD Po Box 189 Jimboomba Q 4280 QUEENSLAND AUSTRALIA PHONE 07 55469833	SCALE AS SHOWN DATE 7–10–98 DRAWN NEIL WILSON DRAWING No WP98002