

C2.1 Pricing Instructions

(Yellow forms) Provides criteria and assumptions which the Tenderer has used in developing his Financial Offer

C2.1.1 For the purposes of this Pricing Schedule, the following words shall have the meanings hereby assigned to them.

Unit:	The unit of measurement for each item of work as defined in the Scope of Works.
Quantity:	The number of units of work for each item as provided by the Employer or as tendered by the Service Provider.
Rate:	The payment per unit of work for which a rate has been provided by the Employer or for which the Service Provider tenders to do the work.
Amount:	The product of the quantity and the rate tendered for an item.
Sum:	An amount tendered for an item, the extent of which is described in the Pricing Schedule, the Scope of Work or elsewhere, but of which the quantity of work is not measured in units.
Provisional Sum:	An amount allowed for in the Pricing Schedule, for which the quantity of work is not known.
Prime Cost:	Is a specific type of Provisional Sum where payment is made on the production of invoices showing the cost price of the implementation or installation of the service required. Services rendered in this manner carry a cost for which a rate or a lump sum is offered at tender stage to cover all the tenderer's handling, supervision and liability costs in providing the item or services.

C2.1.2 The quantities provided by the Employer in the Pricing Schedule are only approximate quantities. The quantities of work finally accepted and certified for payment, and not the quantities given in the Pricing Schedule, will be used to determine payments to the Service Provider.

The validity of the Contract shall in no way be affected by differences between the quantities in the Pricing Schedule and the quantities finally certified for payment. Work is valued at the rates or lump sums tendered.

C2.1.3 Rates and lump sums shall include full compensation for overheads, profits, incidentals, tax (other than VAT), etc., and for the completed items of work as specified in the Scope of Works and Contract Data and for all the risks, obligations and responsibilities specified in the General Conditions of Contract, Particular or Special Conditions of Contract, except in so far as the quantities given in the Pricing Schedule are only approximate.

C2.1.4 The tenderer shall fill in a quantity or a rate or a lump sum for each item where provision is made. Items against which no rate or lump sum has been entered in the tender will not be paid for when the work is executed, as payment for such work will be regarded as being covered by other rates or lump sums in the pricing schedule.

The tenderer shall fill in a rate against all items where the words "rate only" appears in the amount column. Although no work is foreseen under such item and no quantities are consequently given in the quantity column, the tendered rate shall apply should work under this item actually be required. Tenders should note the provisions of clause C2.1.10 of this preamble.

The tendered lump sums and rates shall be valid irrespective of any change in the quantities during the execution of the contract.

C2.1.5 The short descriptions of the payment items in the Pricing Schedule are only given to identify the items and to provide specific details. Reference shall, *inter alia*, be made to the Contract Data, General Conditions of Contract and Particular/Special Conditions of Contract and Scope of Works for more detailed information regarding the extent of work entailed under each item.

C2.1.7 Interim payments for lump sum payment items may be permitted. Such interim payments shall however be limited to proven progress achieved for that particular service deliverable. The sum of any progress payments made under a particular lump sum payment item shall be deducted prior to calculating any adjustments for escalation as described in clause C2.1.6 above.

C2.1.8 Provisional and Prime Cost Sums: Each Sum shall only be used, in whole or in part, in accordance with the Employer's instructions and the Contract Price shall be adjusted accordingly. The total sum paid to the Service Provider shall include only such amounts, for the work, supplies or services to which the Sum relates, as the Employer shall have instructed.

For each Sum, the Employer may instruct plant, materials or services to be procured by the Service Provider in accordance with the Employer's policies, and for which there shall be included in the Contract Price:

- The actual amounts paid (or due to be paid) by the Service Provider under the Sum, and
- An item for compilation and printing of procurement documentation, quotation/tender process and evaluation, and all overhead charges and profit, tendered in the Pricing Schedule. Provided that for Prime Cost Sums only, where a percentage mark-up or lump sum mark-up is tendered, which shall exclude profit.

The Service Provider shall produce all quotations, invoices, vouchers and accounts or receipts in substantiation of any claim under a Sum.

Any percentage adjustment or lump sum mark-up against the Sum for handling fee, profits, etc. shall not be negative.

C2.1.9. Subject to the conditions stated in Clause C2.1.10 below, the rates and lump sums filled in by the tenderer in the pricing schedule shall be final and binding with regard to submitting the tender and may not be adjusted should there be any mistakes in the extensions thereof and in the total sums appearing in the tender. Should there be any discrepancies between the tender sum and the correctly extended and totalled pricing schedule, the rates and the lump sums will be regarded as being correct, and the Employer shall have the right to make adjustments to the tender sum to reconcile the tender sum with the total of the pricing schedule. In such an event the tenderer will be consulted but, failing agreement between the parties, the decision of the Employer shall be final and binding. Adjustment of the tender sum will take place prior to the signing of the contract. In their own interest tenderers must make doubly sure of the correctness of their tendered rates and lump sums, the extensions and the tender sum.

C2.1.10 A tender shall be deemed non-responsive if the unit rates or lump sums for some of the items in the Pricing Schedule are, in the opinion of the Employer, unreasonable or out of proportion, and if the tenderer fails, within a period of seven (7) days of having been notified in writing by the Employer to adjust the unit rates or lump sums for such items, to make such adjustments.

C2.1.11 All rates and sums of money quoted in the Pricing Schedule shall be in South African Rand and whole cents

C2.1.12 The item numbers appearing in the Pricing Schedule refer to the corresponding item numbers in the Scope of Work.

C2.2 Activity/Work Schedule

(Yellow forms) Records the Financial Offers to provide the services as described elsewhere – in the Scope section.

Note to tenderer:

The tenderer will be declared non-responsive if:

- A signed Form of Offer is submitted with an incomplete Pricing Schedule.
- A signed Form of Offer is submitted without a Pricing Schedule, but only the Summary of Pricing Schedule submitted.

Free State Department of Agriculture, Rural Development and Environmental Affairs

UPGRADE OF THE OLD NURSERY/HATCHERY BUILDING FOR MULTI-SPECIES BREEDING
INCLUSIVE OF TILAPIA AND FRIES. CIDB GRADING: 4 ME AND HIGHER PERIOD: ONCE-OFF**SUMMARY OF BILL OF QUANTITIES**

SECTION	DESCRIPTION	AMOUNT
i)	GENERAL ITEMS	R -
1	SECTION A: Room 1 and 1.1	R -
2	SECTION B: Room 2	R -
3	SECTION C: Room 3	R -
4	SECTION D: Room 4	R -
5	SECTION E: Room 5	R -
6	SECTION F: Room 6	R -
7	SECTION G: Room 7	R -
TOTAL OF PRICED ITEMS		R -
PLUS : 20% CONTINGENCIES (calculated on TOTAL OF PRICED ITEMS) *1		R -
SUB TOTAL		R -
PLUS : 15% VAT (calculated on SUB TOTAL)		R -
TOTAL (CARRIED OVER TO FORM OF OFFER & FRONT PAGE)		R -

Note *1 : This contract can be awarded excluding Contingencies whereby this amount may only be utilized on written instruction by the Project Manager with approval by the client.

.....
TENDERER'S SIGNATURE.....
DATE.....
ON BEHALF OF COMPANY

Note: Failure to price any of the items will invalidate the bid. The Departmental representatives from the Department of Agriculture and Rural Development will negotiate with the successful bidder to ensure a balanced Bill of Quantities and approve the Bill of Quantities if necessary.

C2.2.1 BILL OF QUANTITIES

UPGRADE OF THE OLD NURSERY/HATCHERY BUILDING FOR TILAPIA BREEDING AND FRIES PRODUCTION AT AQUACULTURE TECHNOLOGY
DEMONSTRATION CENTER (ATDC), GARIEP DAM

TABLE: Costing and function of old hatchery upgrade into multispecies hatchery (see Figure 1 - 10 for detail references)

Note:

The quantities for Room 8 are measured under items 6 and 7 in Room 3 and Item 1 of Room 5 in the BoQ.

i) GENERAL ITEMS:

Nr	Description	Unit	Quantity	Rate	Amount
OHS	OCCUPATIONAL HEALTH AND SAFETY				
	Adherence to the OHS Act and Construction Regulations and the Client Specific: Client Health And Safety Specifications as per Construction Regulation 5(1)(B), 2014 Occupational Health and Safety Act, No. 85 of 1993, as also in Annexure C.	L/Sum	1	R	R
ENV	ENVIRONMENTAL				
	Adherence to the NEMA Act and all Environment Regulations, also to the EMP and other Environmental documentation as attached in Annexure B.	L/Sum	1	R	R
	Summary of General items carried to Summary of Schedules				R

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
Room 1 and 1.1 (Fig 1 and 2)						
1	Primary hatchery Hapas	Hapas (1.0 mm polyester mesh) and 50cm (L) x 30cm (w) 20cm (d)		24		Hapas also equipped with corner bottom bags with marbles as weight to configure bag shape when sinking. Hapa also stitch seam attached to a ss roundbar (6mm) frame suspending the Hapa in trough.
2	Primary hatchery and third bench multispecies primary hatchery flow through preheating option	STC 1000 Temp controller with wiring and housing box + 2 kW inline heater unit (set)		2		This option for juveniles of species sensitive to RAS build-up of phosphates
		Temp adjustable aquarium heaters SS (200 W)		12		In winter, the heatpump is non-efficient. The heater elements to be used in supporting the 2 kW heater indicated in previous item.
3	Primary hatchery + third bench multispecies primary hatchery systems main heating (flow through capacity heating)	Heatpump/chiller (1 kW input and 5.4 kW output)		2		Heatpump required to heat all troughs with valve controlled recirculation through filter components below bench (Fig 2b). Heating support in winter with mentioned SS heaters.
4	Filtration of primary hatchery + third bench primary hatchery multispecies systems	BLACK BIO SPONGE 60 cm (L) x 45 cm (w) x 4 cm (thick)		16		Mechanical filtration function

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		Zeolite chips in 20kg bags		10		Ammonia remover during early hatchery stage, transforming into biofilter in late hatchery stage
		15mm float valve		2		Top up water influent
		15mm flush valve + socket lock connection		2		System fill or flush
		Oyster net bottom grid stand (rust proof)(150mm high)- snug fit in current sump below bench		2		Water permeable surface serving as free board for system pump and aquarium heaters below to function
		55W UV Sterilizer (50mm unions fitted) with wall mount brackets		2		Sterilization of recirculated water (antibacterial and antiviral)
		50mm PVC T pieces (x16), elbows (x35), 50mm PVC pipe (18m), 15mm PVC pipe (18m), PVC weld (500ml),		1		Plumbing and valve control points
5	Third bench primary hatchery components (multi-species)	Aztec square conical glass upwelling egg tumblers (x 3) with 25mm overflow PVC socket and union connection to 25mm PVC pipes flowing into primary nursery tank. Each incubator Lock into platform fully galvanised (FG) of water resistant stand frame		3		Incubator type can be different but with similar function and spatial placement dimension than indicated

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		Incubator wedge locking stand platform (FG) with water resistant frame and legs (FG coated 12mm roundbar frame)		3		The incubator is vertically stabilized by wedging into platform square shape frame within platform.
		Primary nursery tank (1,2m (L) x 0,6m (W) x 45cm (D) (FG)		1		Primary nursery tank with smooth inner surface (gelcoat) and equipped with open end lip line to re-enforce the firmness of the tank against water pressure. Tank wall re-enforced with horizontal fibreglass embedded steel ribs (steel rods fibreglassed into exterior tank wall and floor)
		Primary nursery stand with water resistant frame and legs (FG coated)		1		Stand removable and made of fibreglass coated steel skeleton. Platform rests on steel skeleton. Platform made of 10mm plywood coated with fibreglass layer.
		Piping and fittings as per Figure 2B the 50mm supply pipe from system pump is fitting reduced to 20mm delivery lines to the three incubators. The flow control gate valves are PVC type as well as unions - that disconnects pipeline to incubator during cleaning. The outflow of incubators in 50mm piping and unions. The pipe		1		Flow from system pump control by PVC gate valves for fine tuning. Water overflow form Aztec incubators to primary hatchery tanks gravitational via removable pipes (union connected). The 50mm bottom insert pipe equipped with banjo screen and overflow screen pipe (50mm T piece connected to slotted pipe and removable endcap)

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		removable water exit plumbing in incubator tank in 50 mm. Banjo filter (+2 spares) made of 160mm pipe. Screening mesh of banjo filter is 0.8mm Nytal and overflow screen pipe mesh is 1mm soft mosquito net.				
6	Third bench packing facility for fish sold to clients.	12kg technical Oxygen bottle with male adapter connection having 10mm nozzle for 10mm aperture silicon-rubber pipe connection. Silicon rubber pipe = 2m. Mounting strap for bottle against wall in horizontal position (as per Fig 2B) or vertical (next to bench).		1		Portapak oxygen bottles an option since no monthly rental required. In this case spare Portapak bottles must be available due to low volume of oxygen available per bottle.
		Stand with platform. Plastic bags in closed pockets: 70cm x 90cm x 75 micron plastic bags (10 x 100) and No 64 elastic bands (6kg). 60cm x 40cm x 80micron bags (x1000). 50cm x 100cm x 80micron bags (x 500)		1		Surplus pockets of bags can be stored in the storage space in filter room of Room 1 (Room 1.1 -Fig 2)

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
7	Recovery/Functional broodstock system (4 tanks)	Repair tiling and outlet of tanks. Bottom drain points connected to filter room swirl separator (Room 1.1 Fig 2 and Figure 10). Current pressure supply piping lines used for external connection to supply pump from Room 1.1. Current biofilter in Room 1 to be removed.		1		
		Wall mount anchor plates for hooking swimming pool net cover over tanks - preventing the jump escape of breeder fish. Net covers must have hooks for plate connection. Hook plates and hooks stainless steel.		4		Mesh of swimming pool net not more than 50mm. Anchor plates spaced 30cm apart on the upper vertical part of tank outside walls (linear - in one line).
		Flat walkway pallet like planking on floor between broodstock tanks - require repair and partial replacement		1		Non- water proof walkway pallets must be treated with water proofing varnish

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
	Aeration lines for all three systems	50mm overhead closed loop (along all four walls of room above tank and trough levels. LP 100 airpump x 2 mounted in loop line and on wall bracket with platform, connection between LP100 and loop and system components (all Hapas, broodstock tanks, sumps and open troughs. Leaky pipe (20mm) diffusers for each system application, all microjet tubing and nipples required (Fig 9).		1		
	Overhead LED lighting with timer	Overhead lighting (LED T8 Tubes) at 3 per each of the trough banks of primary nursery and multispecies hatchery, as well as each tank bank of broodstock tanks (30 lights). Each bank on its own timer. All timers in wall mount box next to door entrance. Lights double barrel in moisture proof casing suspended by ceiling mount brackets. Lights accessible by operator using a three step ladder		1		

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
8	Room 1.1 filter system outlay for recovery/functional broodstock system recirculation water filtration and treatment (Fig 2)	Current water return lines redirected to swirl separator in Room 1.1. Swirl separator (0,8m diameter and about 1,2m high or level with brood tank in Room 1) that is made of fibreglass and equipped with overflow gutter or decantation chamber (Figure 10) and 63mm sludge removal double union ball valve in bottom cone exit.		1		All sludge or waste water lines (including the one from primary hatchery systems) directed to current drain box externally to Room 1, which will form part of Room 1,1 after construction.
9	Mechanical Filter tank	FG filter tank (1,2m (h) x 0,9m (w) x 1m (L) with rib reinforcement or steel frame (water resistant). Tank equipped with oyster net grid floor spaced 150mm from tank floor with cut and fixed 110mm pipes. Oyster net grid packed with BLACK BIO SPONGE 60 cm (l) X45 cm (w) X 4 cm thick (x16) bedded in two layers. Three pipes perforate the filter and the oyster net platform. One pipe (110mm) is slotted in area below oyster net and transfers water to the area below grid when sponge filter gets blocked with organic waste. The two		1		

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		remaining pipes (75mm) transfer filtered water via upper tank wall to the sump fluidized biofilter bed (Fig 2)				
10	Sump	FG sump tank (1,2m (h) x 0,9m (w) x 1m (L) with rib reinforcement or steel frame (water resistant). It is adjacent to filter tank and receives water via 2 x 75mm pipes flowing into the fluidized biofilter tank with grid floor.		1		Sump is water delivery and extraction point, and accommodates secondary mechanical filter, fluidized biofilter and trickle tower degasser + system and filter pumps.
	Sump biofilter	The inner sump FG biofilter tank (0.9m x 0,6m) is in a shape of a tank but it has an elevated floor made of oyster net fixed to the tank walls at about 150 mm above sump tank floor level. About 100 litres of the fluidized Kaldnes biomedia is in this compartment. The media is fluidized by the incoming water but also by a 20mm leaky pipe aeration loop fixed to the borderline attachment of the oyster net grid. The leaky pipe receives two opposite T - piece connections that is connected		1		The biofilter receives water from the sponge filter tank and water exits into the sump via the elevated oyster net grid floor of the biofilter tank.

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		to the overhead airpump (LP100) mounted on an angle plate platform attached to the side wall of the sump.				
11	Sump accessories:	Trickle degasser tower: The fibreglass sheet made rectangular shaped tower is standing on the sump floor and with elevated oyster net grid about 90cm from floor of tank. Four bioblocks (TERBO 1200X = 900mm x 300mm) are packed vertically in the box and suspended by the oyster net grid platform. The blocks are separated from the water level in sump (approximately 700m depth) and receives overhead sprayed water from the system pump (valve controlled). The tower is closed with a lid so that sprayed water must pass		1		

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		through the bioblock tower column to the sump.				
		ACP 20 pumps x 2. Pumps are in manifold connected to the common water supply pipe that serve the degasser tower (valve controlled) and the final treatment units (UV sterilizer and Heatpump) before supplying water to the 4 broodstock keeping tanks. Flow switch in main system pump line installed. Flow switch activate the second pump when required (switchgear)		2		Main system pump failure activate the second system pump by flow switch control. A GSM sms warning must be signalled by cellphone to the system manager.
		Thermo adjustable stainless steel aquarium heaters (200W)		6		The heaters required in winter when heat pump function is impaired by cold weather.

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		20mm HP cistern valve (municipal water). Line to cistern valve equipped with an inline activated carbon filter cartridge which is replace-able. The cistern valve also supported by forked municipal line input (20mm valve control). This input required when system flushing or fast top-up required.		1		Municipal line connections must be considered in the final costing analysis.
		Sump overflow exits (63mm) at 900 or 700mm from floor. The lower exit equipped with a valve. Exit water is directed to the effluent sump and out of the way (Fig 2)		1		
	UV treatment	55W UV Sterilizer (50mm unions fitted) with wall mount brackets (+ 4 spare UV lamps)		2		See Figure 3 for UV bank and inverter heatpump construction outlay (mounting brackets and site specific geometrics will add to extra materials required, catered for under contingencies)
	Heat treatment	12 kW output inverter heat pump (~2kW input)		1		
	UV + Heat treatment plumbing	UV bank and Heatpump station plumbing - 50mm Ball valves (x10), 50mm fittings (7 elbows (90 degrees); 6 T-pieces, pipe x		1		

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		3m). Geometric required extra fittings to be included in contingency cost.				
	Filtermat cleaning station (Fig 2 & 4)	Pressure cleaner (Same or higher specification as Karcher K2.360)		1		
	Mat cleaning basin	Stainless steel basin with wash area angle of about 45 degrees (Fig 4) with support legs and wall mount anchor points	-	1		
		Valves, fittings and outlet piping to effluent sump		1		
12	Switchgear (Room 1+1,1)	Switchgear for all overhead lighting, pumps, airpumps, UV sterilizers, heatpumps, heating elements grouped and marked as per system in DB next to the wall that separates the building from the external pump room. Airpumps on UPS system (ELLIES/MECER 1600W) with two deep cycle batteries harnessed for theft control. Airpumps will run uninterrupted during loadshedding or power failures. GSM warning system (SMS) for		1		

ITEM NO	Allocation	Component	Rate	Quantity (incl spares)	Amount	Comments
		each system main pump function failure.				
13	Room 1.1 & 7 construction cost	Double bricks & mortar cost per square meter. There is already a foundation, roof and floors, thus needing only break & build plus additional wall construction, joints opening for doors and windows.		50,05		
14	Insulation paint on walls and ceiling plus ceiling repair (Room 1 +1,1)	Eco Insulate at 1 Litre per m ²		100		
15	Slide door	Slide door of synthetic type (plastic or FG) and railings stainless steel		1		
16	25000 BTU Airconditioner	Airconditioner installed below window level and opposite as per Fig 1		2		
A	SUBTOTAL carried to summary					

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
Room 2 (Fig 5)						
1	Room 2 & 3 construction cost	Double bricks & mortar cost per square meter. There is already a foundation, roof and floors, thus needing only break & build plus additional wall construction, joints opening for doors and windows.		25,025		
2	Racks from rooms 3 or 4 to cover one side of room)	Labour and materials		1		
3	Treatment of rack skeleton with rust proof coating (epoxy/FG)	Epoxy/FG coating of square tubing skeleton and sheeting		1		
4	Three tier rack system (17 square meters storage space)	25mm square tubing skeleton frame (approximately 56 meters)		48		
5	Extractor fan	Extractor fan installed with control box		1		
6	Refrigerator, scale and spares	- Refrigerator (324L) - Mettler scale or similar (5kg with 0.1g resolution) - Spare pumps 2 x ACP12 Submersible pumps - Spare Hapa bags 10 x as per Room 1		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		3 x as per Room 3 3 x as per Room 5 6 x as per Room 6				
7	Lighting and wall plugs	T8 LED tubes double barrel in moisture proof casing and mounted on ceiling in row of three units. Switch on wall next to slide door entrance. Light switch serves timer which controls photoperiod. Wall plugs mounted against wall above benchtop. Wall plugs weatherproof type. 4 wall plugs or 1 for every meter of bench top surface. Electricity supply controlled from breaker in main DB (Room 3)		1		
8	Slide door	Slide door of synthetic type (plastic or FG) and railings stainless steel		1		
B	SUBTOTAL carried to summary					

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
Room 3 (Figs 1 and 6)						
1	Room 3 New wall	Double bricks & mortar cost per square meter. There is already a foundation, roof and floors, thus needing only break & build plus additional wall		0		Construction cost of new wall in Room 3 included in the cost of new wall Room 2 (See above)
2	6kl Suspended fibreglass trough with 6 Hapas for Tilapia broodstock (1male + 4 females per Hapa)+filter system (Figure 6)	4m (L) x 0,6m (w) x 0,7m (d) suspended fibreglass trough with tapering floor towards filter system. Water level at 0.5m depth and drain exit flows into swirl separator sump. Hapa made of polyester/nylon mosquito net (60cm (L), 60cm(w) x 60cm deep)		1		
3	Filter system of tilapia reserve broodstock tank	FG filter tank (0.9m (h) x 0,6m (w) x 0.9m (L) with rib reinforcement or steel frame (water resistant). Tank equipped with oyster net grid floor spaced 150mm from tank floor with cut and fixed 110mm pipes. Oyster net grid packed with BLACK BIO SPONGE 60 cm (l) X 45 cm (w) X 4 cm thick (x16) bedded in two layers. Three pipes perforate the filter		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		and the oyster net platform. One pipe (110mm) is slotted in area below oyster net and transfers water to the area below grid when sponge filter is blocked with organic waste. The two remaining pipes (75mm) transfer filtered water via upper tank wall to the sump fluidized biofilter bed (similar to quarantine tank filter system in Fig 2)				
4	Sump	FG sump tank (1,0m (h) x 0,9m (w) x 1,2m (L) with rib reinforcement or steel frame (water resistant). It is adjacent to filter tank and receives water via 2 x 75mm pipes flowing into the fluidized biofilter tank with grid floor (similar configuration but smaller than Room 7 sump with accessories).		1		Sump is water delivery and extraction point, and accommodates secondary mechanical filter, fluidized biofilter and trickle tower degasser + system and filter pumps.
		The inner sump FG biofilter tank (0.4m x 0.6m) is in a shape of a tank but it has an elevated floor made of oyster net fixed to the tank walls at about 150 mm above sump tank floor		1		The biofilter receives water from the sponge filter tank and water exits into the sump via the elevated oyster net grid floor of the biofilter tank.

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		level. About 60 litres of the fluidized Kaldnes biomedial is in this compartment. The media is fluidized by the incoming water but also by a 20mm leaky pipe aeration looping on the zeolite chip packed veggie bags (one layer) below it. The leaky pipe receives two opposite T - piece connections that is connected to the overhead airpump (LP100) mounted on an angle plate platform attached to the side wall of the sump.				
5	Sump accessories:	Trickle degasser tower: The fibreglass sheet made rectangular shaped tower is standing on the sump floor and with elevated oyster net grid about 90cm from floor of tank. Four bioblocks (TERBO 1200X = 600mm x 300mm) are packed vertically in the box and suspended by the oyster net grid platform. The blocks are separated from the water level in sump (approximately 700m depth) and receives overhead sprayed water from the system		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		pump (valve controlled). The tower is closed with a lid so that sprayed water must pass through the bioblock tower column to the sump.				
		ACP 12 pumps x 2. Pumps are in manifold connected to the common water supply pipe that serve the degasser tower (valve controlled) and the final treatment units (UV sterilizer and Heatpump) before supplying water to the 3 Quarantine tanks. Flow switch in main system pump line installed. Flow switch activated the second pump when required (switchgear)		2		Main system pump failure activate the second system pump by flow switch control. A GSM sms warning must be signalled by cellphone to the system manager.
		Thermo adjustable stainless steel aquarium heaters (200W)		6		The heaters required in winter when heat pump function is impaired by cold weather.
		20mm HP cistern valve (municipal water). Line to cistern valve equipped with an inline activated carbon filter cartridge which is replace-able. The cistern valve also supported		1		Municipal line connections must be considered in the final costing analysis.

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		by forked municipal line input (20mm valve control). This input required when system flushing, or fast top-up required.				
		Sump overflow exits (63mm) at 900 or 700mm from floor. The lower exit equipped with a valve. Exit water is directed to the external of room and finally connected to common sump (Fig 1)		1		
		55W UV Sterilizer (50mm unions fitted) with wall mount brackets (+ 4 spare UV lamps)		2		See Figure 3 for UV bank and inverter heatpump construction outlay (mounting brackets and site specific geometrics will add to extra materials required, catered for under contingencies)
		6 kW output inverter heat pump (~1kW input)		1		
		UV bank and Heatpump station plumbing - 50mm Ball valves (x10), 50mm fittings (7 elbows (90 degrees); 6 T-pieces, pipe x 3m). Geometric required extra fittings to be included in contingency cost.		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
6	Filtermat cleaning station (similar cost and layout than for Room 1.1 but positioned in Room 8 (Fig 1))	Room 8		1		
7	Room 8 will have common filter mat cleaning stations for filters of Rooms 3,4,5 and 6	Stainless steel basin with wash area angle of about 45 degrees (Fig 4) with support legs and wall mount anchor points		1		
		Valves, fittings and outlet piping to effluent sump		1		
8	Switchgear (Room 3) and main DB	Switchgear for all overhead lighting, pumps, airpumps, UV sterilizers, heatpumps, heating elements grouped and marked as per system (Rooms 3, 4, 5 and 6) in main DB (Fig 1). Airpumps on UPS system (ELLIES/MECER 1600W) with two deep cycle batteries harnessed for theft control. Airpumps will run uninterrupted during loadshedding or power failures. GSM warning system (SMS) for each system main pump function failure. Main DB provides electricity to all sub		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		DB's and lighting switches for all rooms - as per respective circuit breakers, earth leakage trip breakers, and wiring with core diameter sufficient for electricity demand per room. The main DB also provides switch controlled electricity to LED flood lights where required outside building (doors, filter rooms and quarantine room). An alarm is mounted on DB to signal specific breaker fail. Breakers marked for different sub DB's. Main breaker switch from ESKOM = 100A per phase. DB must have 3 phase supply. Phases must be balance in power distribution between different sub DB's.				
9	Stand alone work benches x 2	Waterproof work benches with waterproof tops and ss legs (or ss or plastic coated mild steel) required. Bench for rinsing female mouths to obtain eggs/larvae with following dimensions (2m (l) x 1m (w) x 0.8m (h)). Second smaller bench for jugs and bowls when		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		required and measures 1m (w) x 1.5m (L) x 0.8m (h). Municipal water (prefiltered) supplied by tap installed above both benches (40cm above bench top)				
10	Lighting and wall plugs	T8 LED tubes double barrel in moisture proof casing and mounted on ceiling in center (longitudinal axis of ceiling) row of 6 evenly spaced units. Switch on wall next to both slide door entrances. Wall plugs mounted against wall above each benchtop. Wall plugs weatherproof type. 4 wall plugs or 1 for every meter of bench top surface. Electricity supply controlled from breaker in main DB (of Room 3)		1		
11	Slide door	Slide door (double door size) of synthetic type (plastic or FG) and railings stainless steel. Slide door in closed position allows little air to come through from external environment.		2		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
12	25000 BTU Airconditioner	Airconditioner installed below ceiling level and positioned as per Fig 1.		2		
13	LP 100 blower supply (Rooms 3-6)	LP100 x 2 is mounted in overhead aeration loop (50mm) that supplies air to systems in Room 3 -6. The airline runs as a closed loop through all the mentioned rooms above water works and branches of microjet tubing (4mm) with leaky pipe aerators to all units with fish (Figure 9). Each leaky pipe equipped with a microjet choke valve to control airflow. The two LP 100 blowers similarly connected and wired as for those in room 1 (UPS inverter and deep cycle batteries)- so that aeration is still running in times of loadshedding or power failures.		1		
14	Insulation paint on walls and ceiling plus ceiling repair	Eco Insulate at 1 Liter per m²		100		
C	SUBTOTAL carried to summary					

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
Room 4 (Fig 1)						
1	Brick, brickforce and plaster tank as support structure for fibreglass lining (2 layers chopmat) and top coat for 7kl fish breeder tank	Bricks, brickforce and plaster screed required for 7kl endemic fish broodstock tank (3,9m (L) x 1,6m (w) x 1,3m (d)). Fibreglass resin, chopmat, catalyst, acetone, latex gloves, rollers brushes and 10L top coat (bright blue pigment)		1		
2	Filtration, sump and heating system	Filtration and heating system similar to Room 3.		1		
3	Primary hatchery system (similar to multispecies primary hatchery in Room1)	1.5m x 1.2m re-enforced bench (0.8m high) with space below for sump and filtration system (chemical = zeolite and biofiltration = media filter, 15UV filter and 1kW element. 55w Royal pump (x2 = 1 spare) in sump - supplying water to egg tumblers x 3 (see room 1 details of similar system. Wall mount egg tumblers deliver water respectively to each of three glass aquaria (80cm (l) x 30cm (w) x 40cm (d). The		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		aquaria filter serviced overflows reach filtermat filter one top compartment of sump. Also bench top over filter system to create space to work with breeders. Municipal tap installed above 7kl tank, hatchery and benchtop for fish handling.				
4	15000 BTU Airconditioner	Airconditioner installed below window level and positioned as per Fig 1.		1		
5	Swingdoor treated with fibreglass resin after prepared with sanding.	Sanding and fibreglass coating of swingdoor		1		
6	Lighting and wall plugs	T8 LED tubes double barrel in moisture proof casing and mounted on ceiling in center (longitudinal axis of ceiling) row of 2 parallel spaced units above broodstock tank, and one each above hatchery and working station (second bench top) Light switch on wall next to swing door entrances. Light switch serves timer which controls photoperiod. Wall plugs mounted against wall above		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		each benchtop. Wall plugs weatherproof type. Two weatherproof wall plugs against wall in proximity to filtration and pump system. Electricity supply controlled from breaker in main DB (of Room 3)				
7	Insulation paint on walls and ceiling plus ceiling repair	Eco Insulate at 1 Litre per m ²		57		
D	SUBTOTAL carried to summary					

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
Room 5 (Fig. 1)						
1	Ornamental fish broodstock conditioning/spawning induction tank + filter system	Fibreglass (or re-enforced brickwall tank) (2,7m (l) x 1,5m (w) x 1m deep). Tank capacity = 3000 litres at 0.8m water depth). Floor taper diagonally to exit pipe that enters the filter system swirl separator sump. Filter components and heating similar to room three system but reductively adapted to biometrics for ornamental fish density allowed. The exit opening (75mm) equipped with an inserted cylindrical constructed oysternet screen. Tank directly used for big fish such as Koi broodstock. Otherwise 5 Hapas (0.5m (w) x 1,5m (l) x 70cm deep) can be used to house goldfish of different strains (x5) separately. Filtermats will be cleaned in Room 8.		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
2	Ornamental fish hatchery tank + filter system	Tank dimensions and filter similar to the ornamental fish broodstock conditioning/spawning tank. This tank also can function as a secondary broodstock conditioning/spawning induction tank. However, it is easily converted into a hatchery tank by translocating the breeders (ex Room 1 breeder tanks), and the incubators activated by the system recirculating pump.(plumbing adapted). The hatchery is equipped with netbags (floating perlon nets with cluster weights (x16) each net = 30cm (w) x 70cm (l) x20cm deep) which will receive eggs that have been stripped, fertilized and then cast evenly over these nets. The nets are attached to 25mm conduit frames. Hatched larvae are transferred to externally prepared plankton rich ponds.		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
3	15000 BTU Airconditioner	Airconditioner installed below window level and positioned as per Fig 1.		1		
4	Sliding door treated with fibreglass resin after prepared with sanding.	Sanding and fibreglass coating of slide door or using synthetic slide door		1		
5	Lighting and wall plugs	T8 LED tubes double barrel in moisture proof casing and mounted on ceiling in center (longitudinal axis of ceiling) row of each tank (broodstock or hatchery). Light switch on wall next to slide door entrances. Light switch serves timer which controls photoperiod. Wall plugs mounted against wall above each tank and wall mount in proximity of each of respective filtration systems. Wall plugs weatherproof type. Electricity supply controlled from breaker in main DB (of Room 3)		1		
6	Insulation paint on walls and ceiling plus ceiling repair	Eco Insulate at 1 Litre per m ²		57		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
E	SUBTOTAL carried to summary					

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
Room 6 (Figs 1 and 6)						
1	4kl Suspended fibreglass trough with 5 Hapas for Tilapia broodstock (1male + 4 females per Hapa)+filter system (similar to Room 3 system) (Figure 6)	4m x 1m meter x 0,7m suspended fibreglass trough with tapering floor towards filter system. Water level in Hapa at 0.5m depth and drain exit flows into filter system and sump similar in design as for the reserve broodstock systems in Room 3. Hapas equipped with weights and suspension structures as per Fig 7		1		
2	2 x 1.8kl Suspended fibreglass troughs with 7 Hapas each for tilapia upswimming fry rearing to 0.5g (30days) +filtration system	3.5m x 1m meter x 0,6m suspended fibreglass trough with tapering floor towards filter system. Water level at 0.6m depth and drain exit flows into filter system and sump similar in design as for the reserve broodstock systems in Room 3. Hapas equipped with weights and suspension structures as per Fig 7		1		
3	Down welling egg tumblers with fibreglass platforms and water reticulation	Aztec downwelling egg tumblers x 14. Each supply flow controlled water to each of the 14 Hapa bags in hatchery.		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
	supply to hatchery Hapas. (See Figure 8)	Overhead water supply (20mm) creates down welling with height adjustable pipe (40mm). Water supply manifold mounted against the wall above hatchery and with reachable gate valves (screw type) for finer flow adjustments = compared to ball valves). Overhead water supply removable (unions) if egg incubation tumblers must be removed for cleaning.				
4	25000 BTU Airconditioner	Airconditioner installed below ceiling level and positioned as per Fig 1.		2		
5	Work bench (waterproof and synthetic) at hip height (3m x 0.5m)	Work bench (3m (l) x 50cm (w)) positioned between broodstock and hatchery systems (Fig 1). Bench for breeder mouth washing and other management activities.		1		
6	Lighting and wall plugs	T8 LED tubes double barrel in moisture proof casing and mounted on ceiling above the work bench. 5 units evenly spaced in straight line. Light		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		switch on wall next to slide door entrances. Light switch serves timer which controls photoperiod. Wall plugs mounted against wall above each tank and wall mount in proximity of each of respective filtration systems. Wall plugs weatherproof type. Electricity supply controlled from breaker in main DB (of Room 3)				
7	Insulation paint on walls and ceiling plus ceiling repair	Eco Insulate at 1 Litre per m ²		69		
8	Sliding door treated with fibreglass resin after prepared with sanding.	Sanding and fibreglass coating of slide door or using synthetic slide door. Two slide doors to be used due to space available (Fig 1)		1		
F	SUBTOTAL carried to summary					

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
Room 7 (Fig. 1)						
1	Room 7 New wall	Double bricks & mortar cost per square meter. There is already a foundation, roof and floors, thus needing only break & build plus additional wall		0		Construction cost of new wall in Room 7 included in the cost of new wall Room 1.1 (See above)
2	Quarantine tanks	Square conical FG tanks similar to Seapoint hatchery tanks (1,3m x 1,3m x 1,2m (d)) + 63mm outlet port.		3		
		Plumbing for quarantine tanks: 63mm T-piece slotted screen pipe with removable end caps for floor mount, 63mm valve, pipe manifold to next tank		3		
3	Filter system	FG filter tank (0.9m (h) x 0,6m (w) x 0.9m (l) with rib reinforcement or steel frame (water resistant). Tank equipped with oyster net grid floor spaced 150mm from tank floor with cut and fixed 110mm pipes. Oyster net grid packed with BLACK BIO SPONGE 60 cm (l) X 45 cm (w) X 4 cm thick (x16) bedded in two layers.		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		Three pipes perforate the filter and the oyster net platform. One pipe (110mm) is slotted in area below oyster net and transfers water to the area below grid when sponge filter gets blocked with organic waste. The two remaining pipes (75mm) transfer filtered water via upper tank wall to the sump fluidized biofilter bed (Fig 2)				
4	Sump	FG sump tank (1,0m (h) x 0,9m (w) x 2m (l) with rib reinforcement or steel frame (water resistant). It is adjacent to filter tank and receives water via 2 x 75mm pipes flowing into the fluidized biofilter tank with grid floor.		1		Sump is water delivery and extraction point, and accommodates secondary mechanical filter, fluidized biofilter and trickle tower degasser + system and filter pumps.
5		The inner sump FG biofilter tank (0.4m x 0.6m) is in a shape of a tank but it has an elevated floor made of oyster net fixed to the tank walls at about 150 mm above sump tank floor level. About 60 litres of the fluidized Kaldnes biomedia is in		1		The biofilter receives water from the sponge filter tank and water exits into the sump via the elevated oyster net grid floor of the biofilter tank.

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		this compartment. The media is fluidized by the incoming water but also by a 20mm leaky pipe aeration looping on the zeolite chip packed veggie bags (one layer) below it. The leaky pipe receives two opposite T - piece connections that is connected to the overhead airpump (LP100) mounted on an angle plate platform attached to the side wall of the sump.				
6	Sump accessories:	Trickle degasser tower: The fibreglass sheet made rectangular shaped tower is standing on the sump floor and with elevated oyster net grid about 90cm from floor of tank. Four bioblocks (TERBO 1200X = 900mm x 300mm) are packed vertically in the box and suspended by the oyster net grid platform. The blocks are separated from the water level in sump (approximately 700mm depth) and receives overhead sprayed water from the system pump (valve controlled). The tower is closed with a lid so that		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		sprayed water must pass through the bioblock tower column to the sump.				
7		ACP 12 pumps x 2. Pumps are in manifold connected to the common water supply pipe that serve the degasser tower (valve controlled) and the final treatment units (UV sterilizer and Heatpump) before supplying water to the 3 Quarantine tanks. Flow switch in main system pump line installed. Flow switch activated the second pump when required (switchgear)		2		Main system pump failure activates the second system pump by flow switch control. A GSM sms warning must be signalled by cellphone to the system manager.
8		Thermo adjustable stainless steel aquarium heaters (200W)		6		The heaters required in winter when heat pump function is impaired by cold weather.
9		20mm HP cistern valve (municipal water). Line to cistern valve equipped with an inline activated carbon filter cartridge which is replace-able. The cistern valve also supported by forked municipal line input (20mm valve control). This		1		Municipal line connections must be considered in the final costing analysis.

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		input required when system flushing or fast top-up required.				
		Sump overflow exits (63mm) at 900 or 700mm from floor. The lower exit equipped with a valve. Exit water is directed to the effluent sump and out of the way (Fig 2)		1		
		55W UV Sterilizer (50mm unions fitted) with wall mount brackets (+ 4 spare UV lamps)		2		See Figure 3 for UV bank and inverter heatpump construction outlay (mounting brackets and site specific geometrics will add to extra materials required, catered for under contingencies)
		12 kW output inverter heat pump (~2kW input)		1		
		UV bank and Heatpump station plumbing - 50mm Ball valves (x10), 50mm fittings (7 elbows (90 degrees); 6 T-pieces, pipe x 3m). Geometric required extra fittings to be included in contingency cost.		1		
	Filtermat cleaning station (Fig 2)	Pressure cleaner (Same or higher specification as Karcher K2.360)		1		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
		Stainless steel basin with wash area angle of about 45 degrees (Fig 4) with support legs and wall mount anchor points		1		
		Valves, fittings and outlet piping to effluent sump		1		
	Switchgear (Room 1+1,1)	Switchgear for all overhead lighting, pumps, airpumps, UV sterilizers, heatpumps, heating elements grouped and marked as per system in DB next to the wall that separates the building from the external pump room. Airpumps on UPS system (ELLIES/MECER 1600W) with two deep cycle batteries harnessed for theft control. Airpumps will run uninterrupted during loadshedding or power failures. GSM warning system (SMS) for each system main pump function failure.		1		
	Insulation paint on walls and ceiling plus ceiling repair	Eco Insulate at 1 Liter per m ²		40		

ITEM NO	Allocation	Component	Cost per ea	Quantity (incl spares)	Collective total	Comments
	Slide door	Slide door of synthetic type (plastic or FG) and railings stainless steel		1		
G	SUBTOTAL carried to summary					

C3. Scope of Services and Scope of Work

1. BACKGROUND

The following provides a background on Gariep Aquaculture Technology Demonstration Centre (ATDC) with special reference to Tilapia mini hatchery unit.



LOCATION DISCRIPTION

The project is located in Free State province, Xhariep District, kopanong local municipality, Gariep dam along the Orange River System which supplies water to the Centre. Area of 47 ha

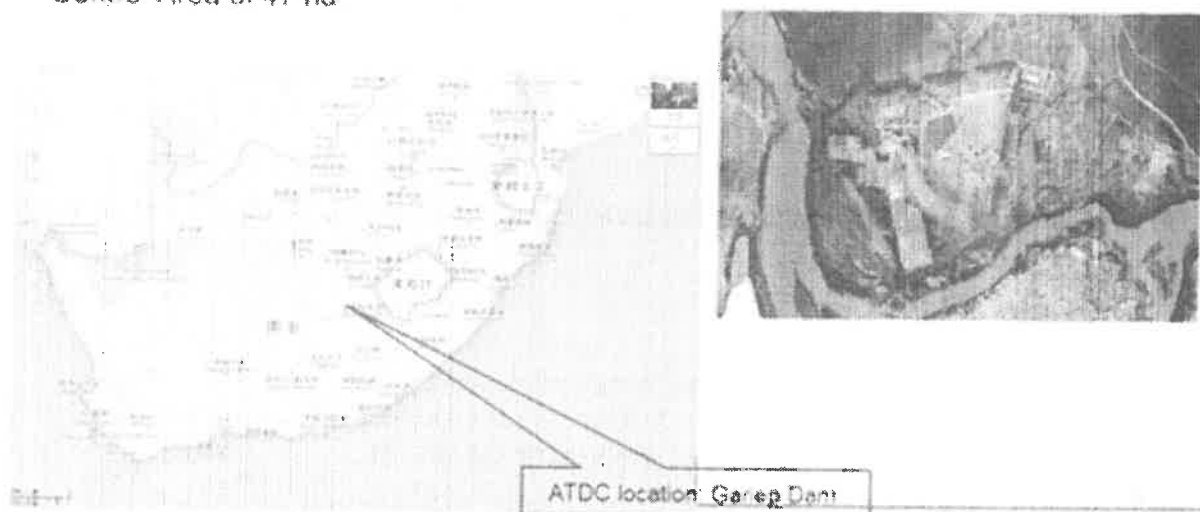


Figure1: Maps depicting the area in RSA, Free State Province showing where Gariep ATDC is situated and exact spot Gariep ATDC at Gariep dam.

The Gariep ATDC is situated along the Upper Orange River Water Basin in the Xhariep District bordering the Northern Cape Province. The total farm is amounting 47 ha in size, though the portion area parcel where the Centre is situated is less than 20 Ha.

The key functions of the Gariep Aquaculture Technology Demonstration Centre (ATDC) is for research and development, technology demonstration, fish breeding techniques, training and promotions to support aquacultural development in the South African Development Community regional countries, with special reference to South Africa as the country of first priority.

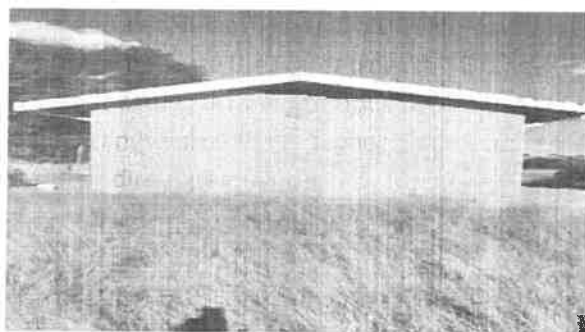
The Gariep ATDC systems was initially planned and developed as Flow Through Aquaculture System (FTAS) for both breeding and grower production systems, which was and is still inefficient. This FTAS is not user friendly since it is not energy efficient (meaning it wastes lot of electricity because the water from the Orange River is only heated once and then flow back directly into the river without reuse, thus continuous heating), FTAS is further risky because there is higher chances for both fries and fingerlings fish to have higher chances of escaping into the Orange River due to poor metal screen, thus it can result in dire repercussions.

The whole Hatchery FTAS is in the process of been reconstructed into Recirculating Aquaculture System (RAS), of which both the hatchery for brooder stock and nursery grower for growing both fries and fingerlings units are anticipated to operate more energy efficient and cost effectively;

After the handover of the Gariep ATDC by the Chinese Government to RSA Government, with special reference to the National Department of Agriculture, a new premise was set wherein, the systems were re-planned to suit the South African conditions. This therefore, let to the redesigning and refocusing to ensure efficient upgrade in order to support sustainable development from Flow-Through Aquaculture Systems (FTAS) to Recirculating Aquaculture Systems (RAS).



Picture 1: Front longitudinal side



Picture 2: Side view backside

It is against this background therefore that, a Tilapia Mini Hatchery RAS Unit is in the process of been developed through reconstruction (see picture 1 & 2) from the existing old hatchery and store building into a Tilapia Mini Hatchery RAS facility. The current old hatchery and store building needs to be reconstructed into a more plausible user friendly system to ensure effective and efficient Research & Development, hatchery for breeding, Training and promotion, and Technology demonstrations infrastructure through upgrade. The attached sketch depicts a full component design plans for the envisaged new Tilapia Mini Hatchery;

Currently the FTAS is been converted into RAS, of which for further development of Tilapia species within the fish industry, a Tilapia Mini Hatchery is a necessity;

Since the whole old hatchery is been upgraded to RAS. The store-room joined with old hatchery building is hereby to be reconstructed and upgraded to a more economical plausible RAS unit for Tilapia breeding purposes;

The ultimate intent and processes of the Gariep ATDC includes amongst others, center's revitalization, upgrade,

further development and growth to serve and fulfill the requirements of a developmental state for successful R&D, Breeding techniques, Training promotions and technology demonstration.

Table 1: Table indicating various physical structural buildings function and magnitudes.

Main Facilities	Size	Functions
Administrative Building	1073 m ²	Space for training, meetings, offices and labs
Expert Apartment	299.9 m ²	Accommodation for fishery visiting experts
Hatchery	1007.6 m ²	Cat-fish breeding and overwintering growing system (84 Fish tanks been upgraded to RAS)
Tilapia Mini-Hatchery	127,96 m ²	Tilapia breeding stock and fries to fingerlings rearing facility
Boiler Room	99 m ²	Heating supplying systems
Storage Room	102 m ²	Fish feed and farming tools
Ponds	36	Demonstration of the pond farming technology (outgrow & adaptabilities & floating cage culture ponds systems)

2. SCOPE OF WORK

The works include the following:

- 2.1 Supply, deliver, install and commissioning of Recirculation Aquaculture System (RAS) with its electrical and plumbing installation and associated building works. The system includes heating (heat pumps), ancillary equipment, filtration, Water Treatment and Aeration system.
- 2.2 Supply, deliver, install and commissioning Hatching Systems and Packaging (fingerlings) with its electrical and plumbing installation and associated building works.
- 2.3 Supply, deliver, install and commissioning of Broodstock and Quarantine facilities with its electrical and plumbing installation and associated building works.

- 2.4 Supply, deliver, install and commissioning of Air Conditioning Systems with its electrical and plumbing installation and associated building works.
- 2.5 Supply, deliver, install and commissioning of Water quality Testing Equipment.

3. APPLICABLE STANDARDIZED AND PARTICULAR SPECIFICATIONS

3.1 The following Acts and Codes of practice are applicable to the Specifications included in this Bid Document:

- Standardized Specifications for Civil Engineering Construction – SANS 1200.
- National Building Regulations S.A.N.S. 0400.
- Building Regulations of Act 1977 (Act 103 of 1977).
- Wiring Code – SANS 0142
- Occupational Health and Safety Act (83 of 1993)
- SANS 0142 1987 Electrical installations
- SANS 1200 AA General (Small works)
- SANS 1200 C Site clearance
- SANS 1200 DA Earthworks (Small)
- SANS 1200 DB Earthworks (Pipe trenches)
- SANS 1200 GA Concrete (Small works)
- SANS 1083 Aggregates from natural source
- Act for Health and Occupational Safety
- Specific regulations and requirements of the local authority must be adhered to.
- National Environmental Management Act (NEMA)

The Standardized and Particular Specifications are deemed to form part of the Bid document. The Bidder must make his own arrangements for obtaining the Specifications and keep copies of all listed Specifications on site during the construction period. Health and Safety records and registers must be kept on the site during construction.

3.2 General Specifications

- All materials used must be new.
- All rubble / building materials must be removed from the building site after completion of the building.
- All construction work to be carried out in compliance with the S.A.N.S. codes of practice and strictly to plans and specifications.
- The Bidder must inform the Representative of the Department at least 48Hrs beforehand, in writing, about construction inspections to be done.

3.3 Detail Specifications

- Detail specifications of the works to be conducted are included in the Bill of Quantities read with the structural change layout drawing as well as Figure 1: Old Hatchery Layout change.
- Bidders must confirm dimensions during clarification meeting and obtain additional measurements required.
- During implementation, the Contractor will be requested to submit proposals for some of the items specified, which will have to be approved by the department before procurement.

C4 Site Information

The old nursery/hatchery building at Gariep Fish Hatchery (ATDC) near Gariep Dam must be upgraded to improve efficiency and allow for Tilapia breeding and Fries production. Coordinates: S 30.62628°; E 25.47266°

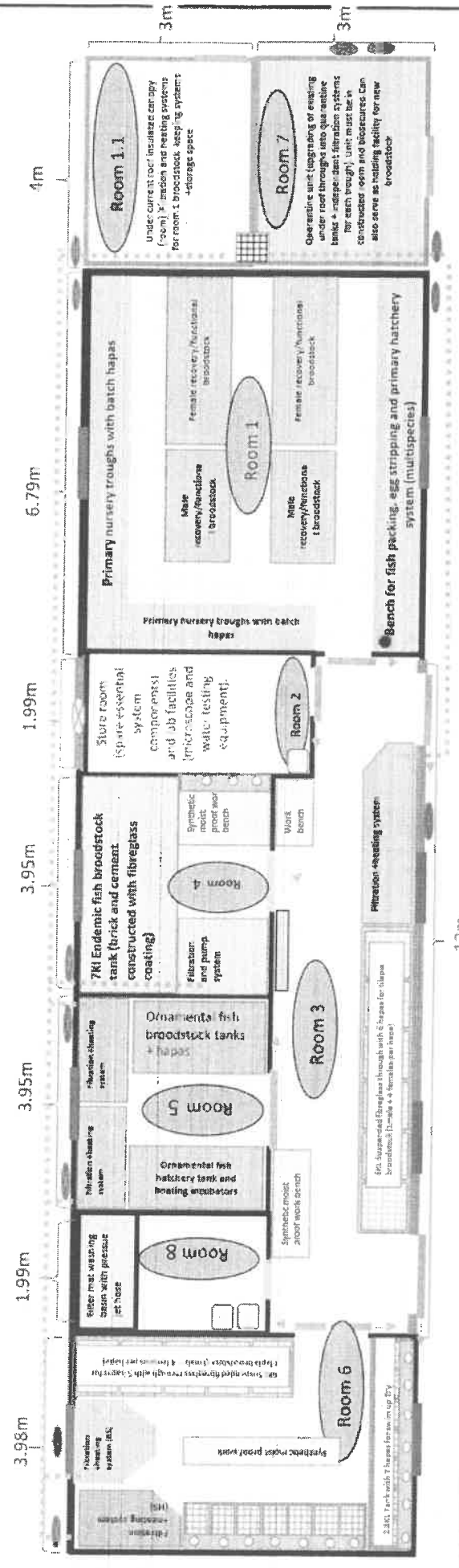
LIST OF DRAWINGS

Drawing No.	Description	Annexure
Figure 1	Old Hatchery layout change	Annexure 1
Figure 2	Room 1, 1.1 and 7 schematic outlay	Annexure 2
Figure 2B	Bench for fish packing, egg stripping and primary hatchery system	Annexure 3
Figure 3	UV Bank outlay	Annexure 4
Figure 4	Filtermat cleaner station	Annexure 5
Figure 5	Store room	Annexure 6
Figure 6	Broodstock conditioning system	Annexure 7
Figure 7	Hapa net bag with frame configuration	Annexure 8
Figure 8	Tilapia hatchery tank and platform outlay	Annexure 9
Figure 9	Leaky pipe diffuser construction	Annexure 10
Figure 10	Swirl separator outlay	Annexure 11

ANNEXURE B: ENVIRONMENTAL

ANNEXURE C: HEALTH AND SAFETY SPECIFICATION

Figure 1: Old hatchery layout change for multispecies broodstock and hatchery/primary nursery systems installation



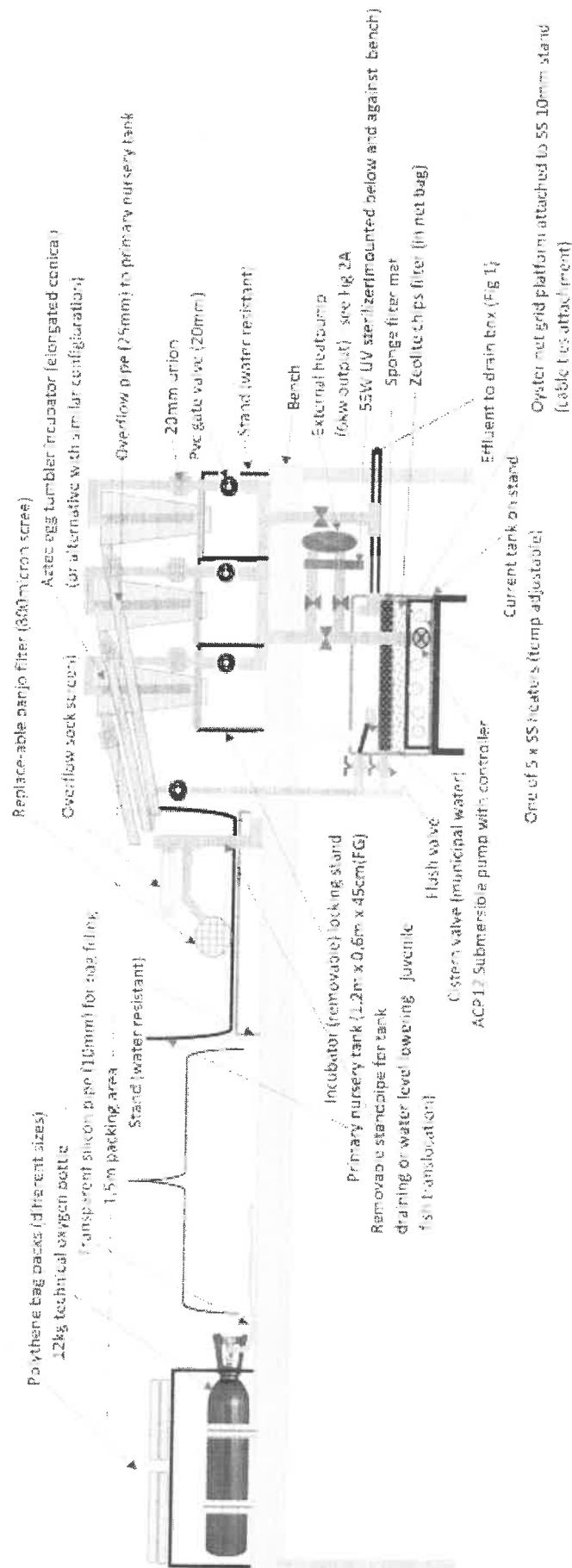
LEGEND

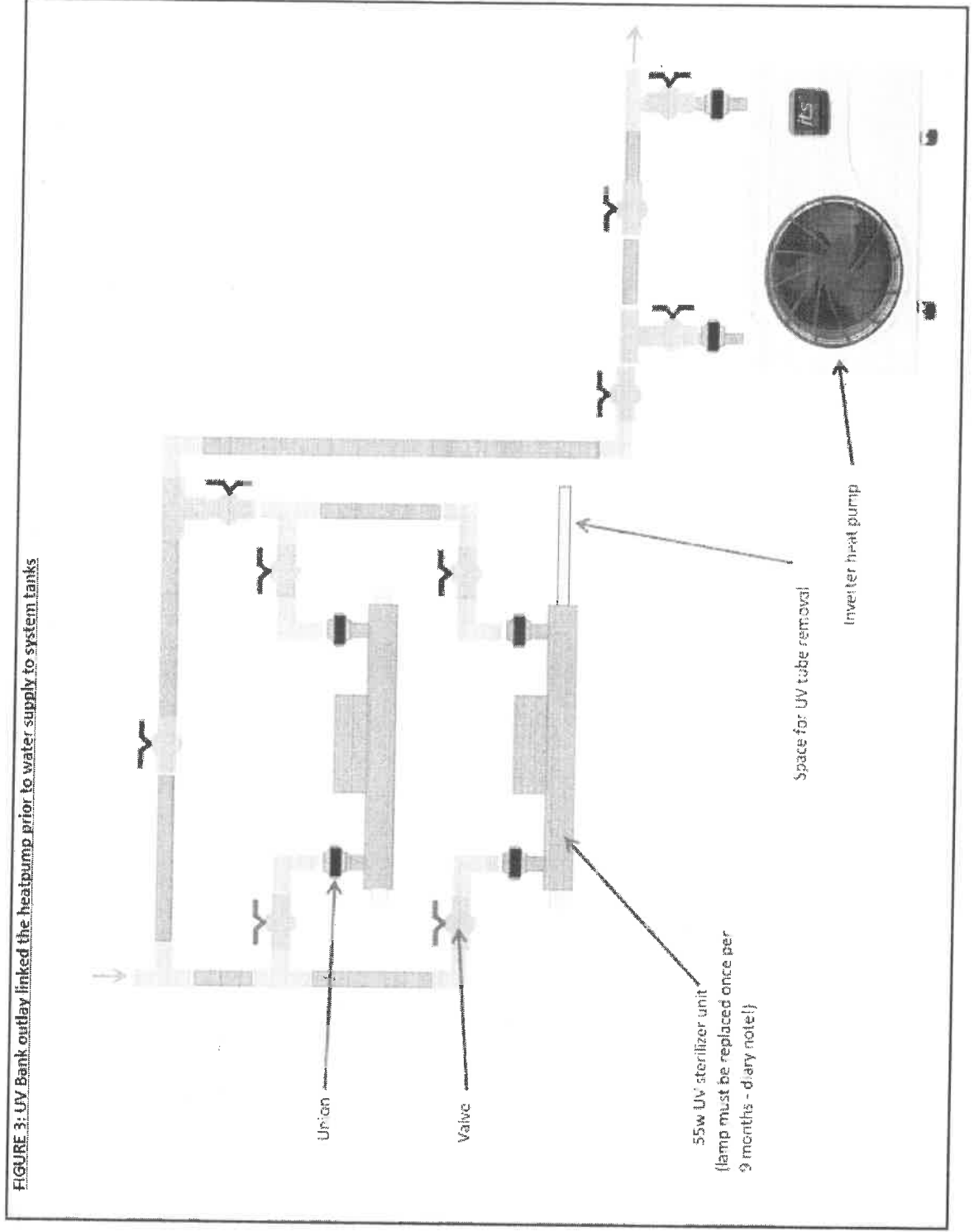
- New wall
- Sanded wooden slide doors (or synthetic) with fibreglass coating
- Heatpump/chiller
- 25K BTU air conditioner
- Pure oxygen bottle (technical oxygen - portapak = 4 in store)
- Effluent water drain grid
- Extractor fan
- Wash basin
- Slide door moving direction
- Wall rack with downwelling egg tumbler
- Main DB
- Swing door
- Waste lines

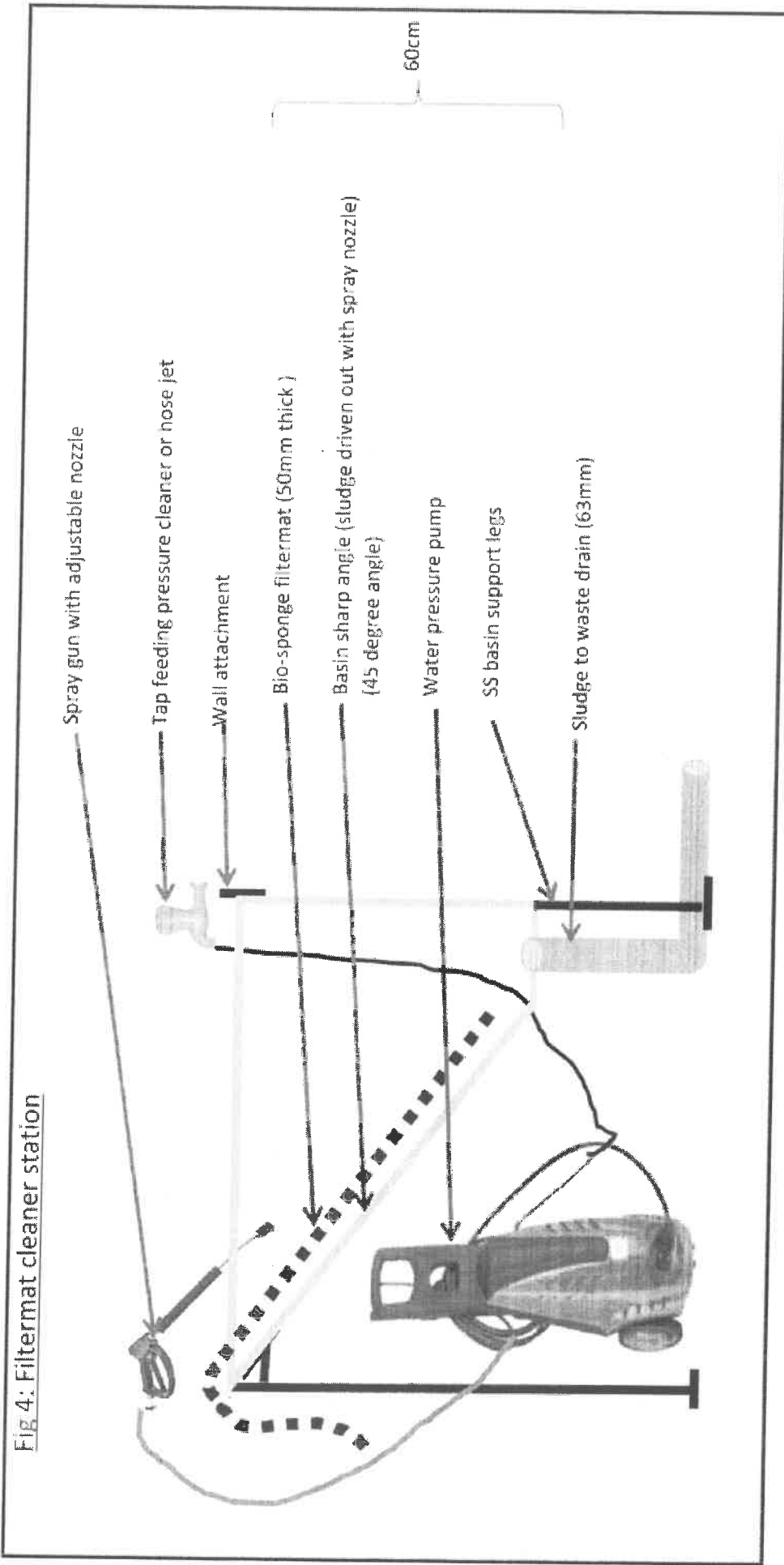
NOTES:

- Building roof to be painted with ECO-INSULATE® (Thermal insulation)
- Building inner walls and ceilings must be painted with ECO-INSULATE® (thermal insulation)
- Airconditioners will provide 80%+ of energy temp control and will prevent unhygienic wet walls and ceilings (mould formation etc). Some systems will additionally be controlled by heat pumps and heating elements (winter time support items))
- All rooms will have 18w LED moistproof tubes as overhead lighting as per detailed specifications to follow. Lighting will be on timers as required for specific species
- System tank dimensions, plumbing and electrical requirements also to follow in detailed costing doc

FIG 2B: Bench for fish packing, egg stripping and primary hatchery system (multispecies)
(Primary nursery troughs with batch hapas - filtration and heating system a copy of FIG 2b system)

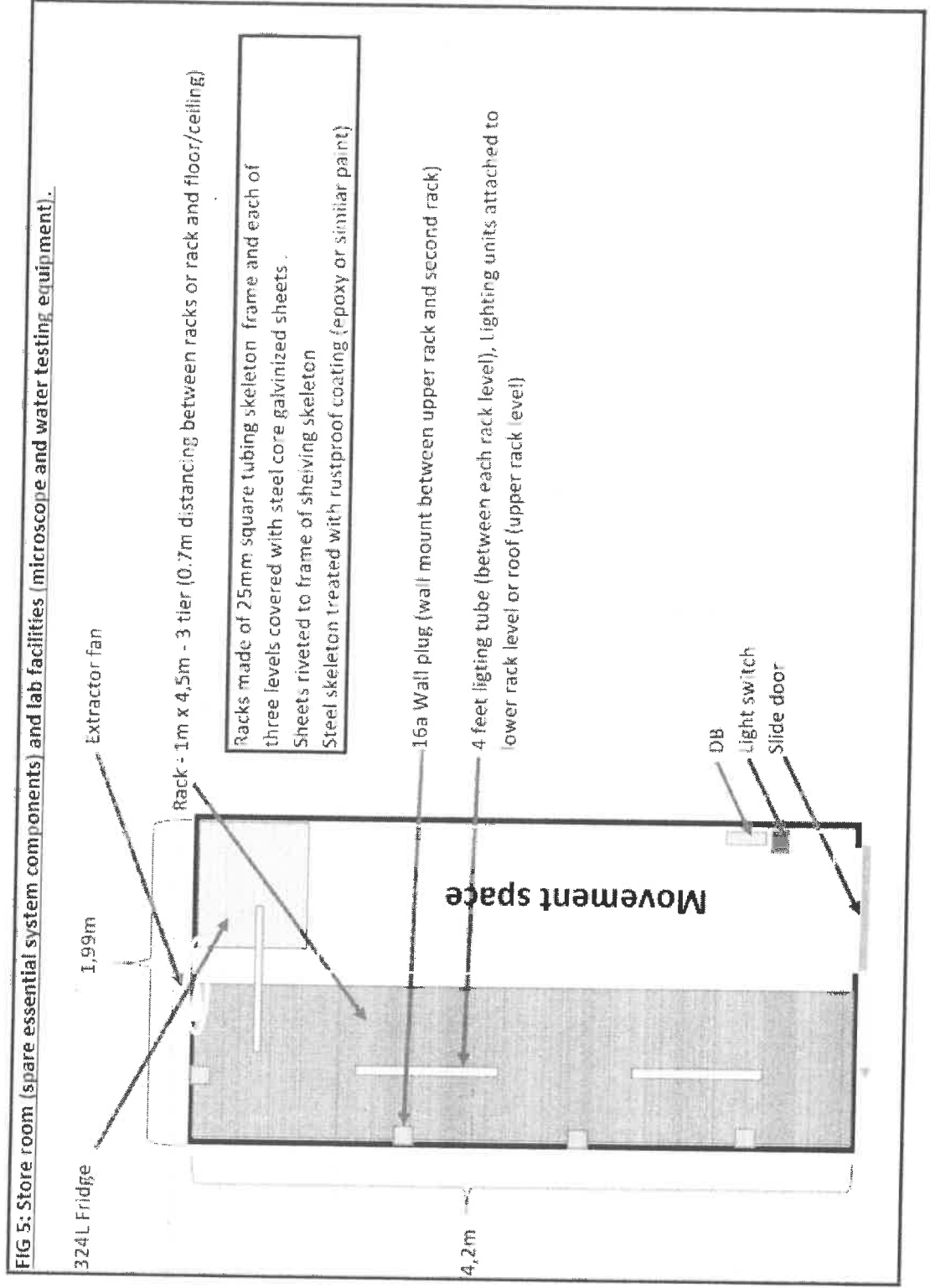


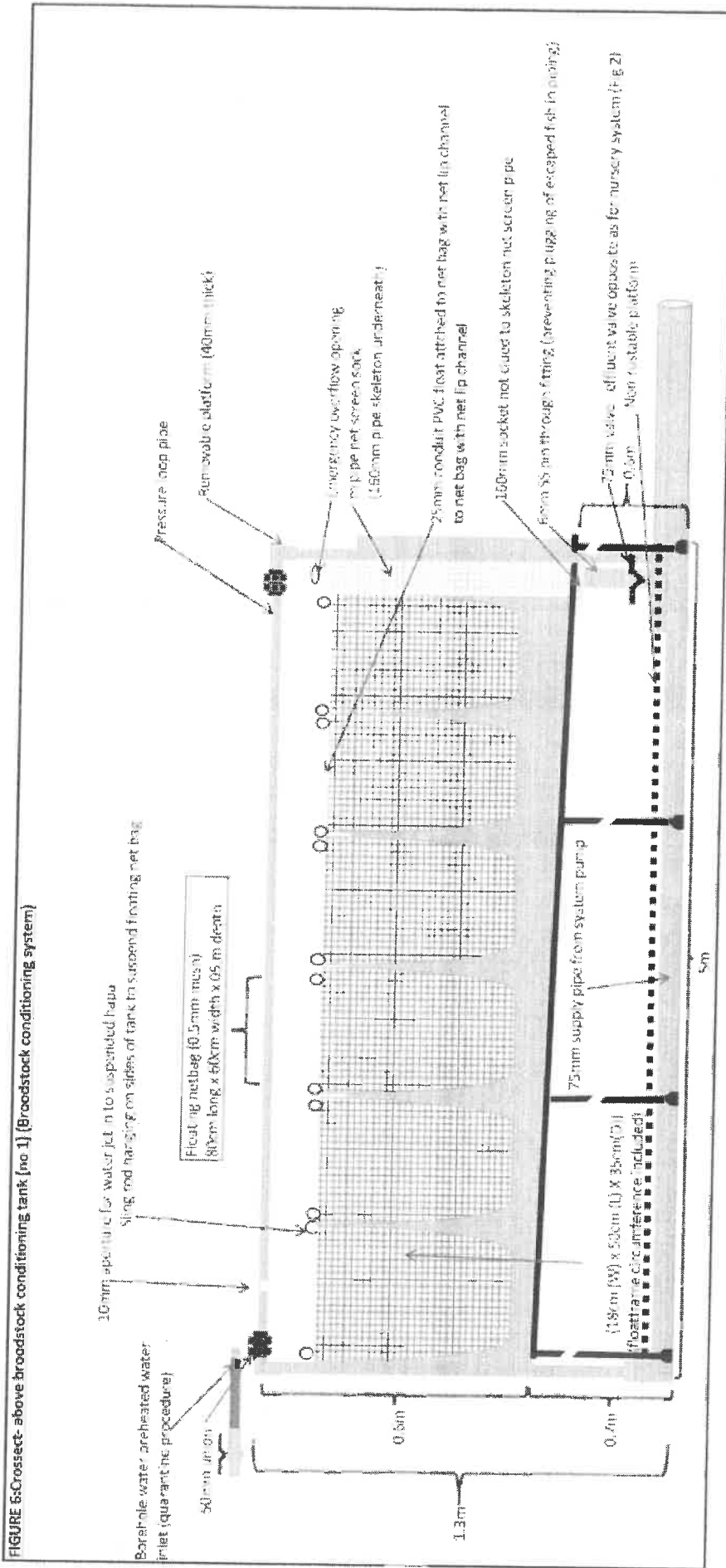




CONTRACT NO: DARDEA/RFT 01/2024/2025

Annexure 6





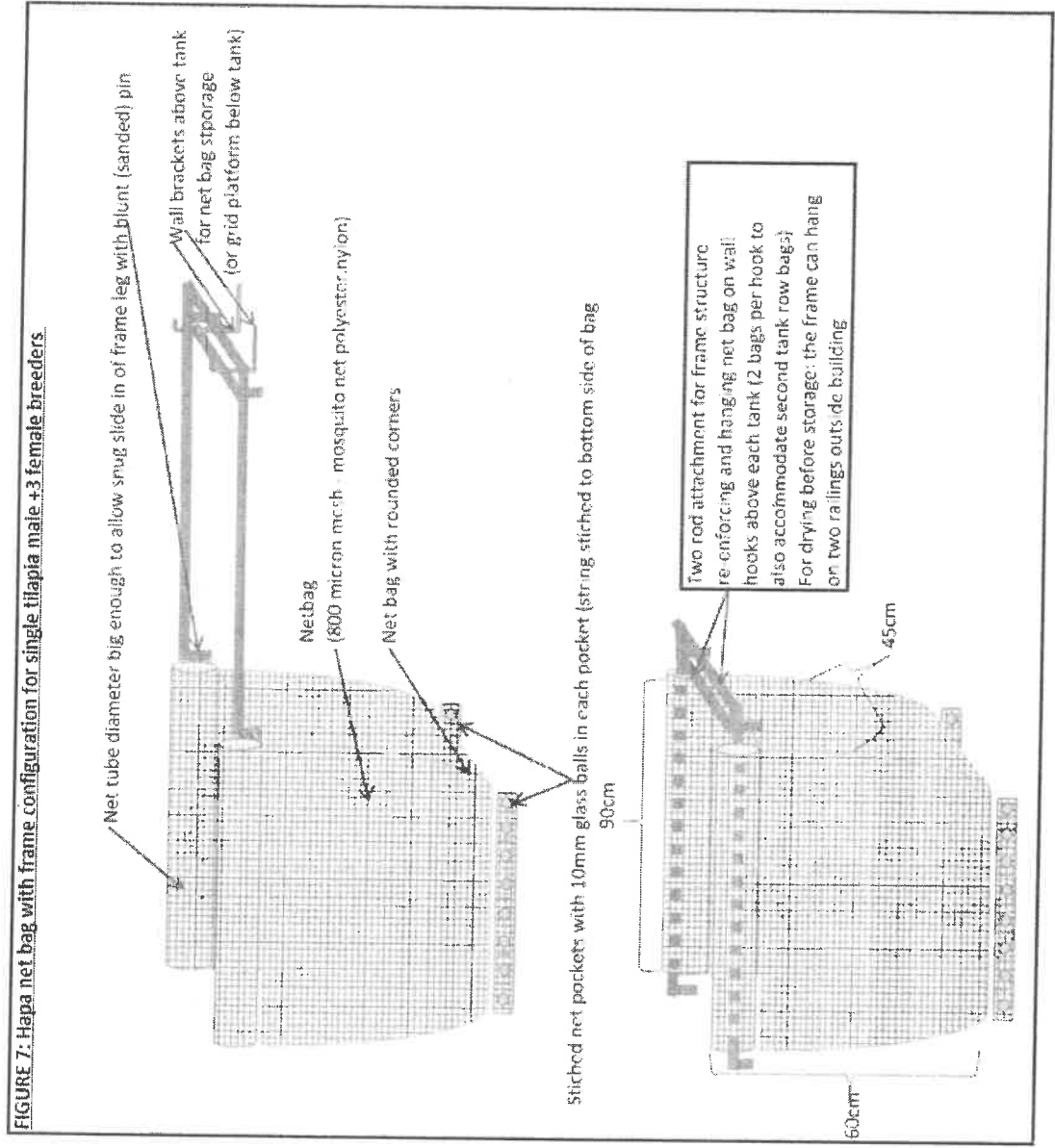


FIGURE 3: Cross-section overhead removable tilapia hatchery tank and platform outlay (Room 6)

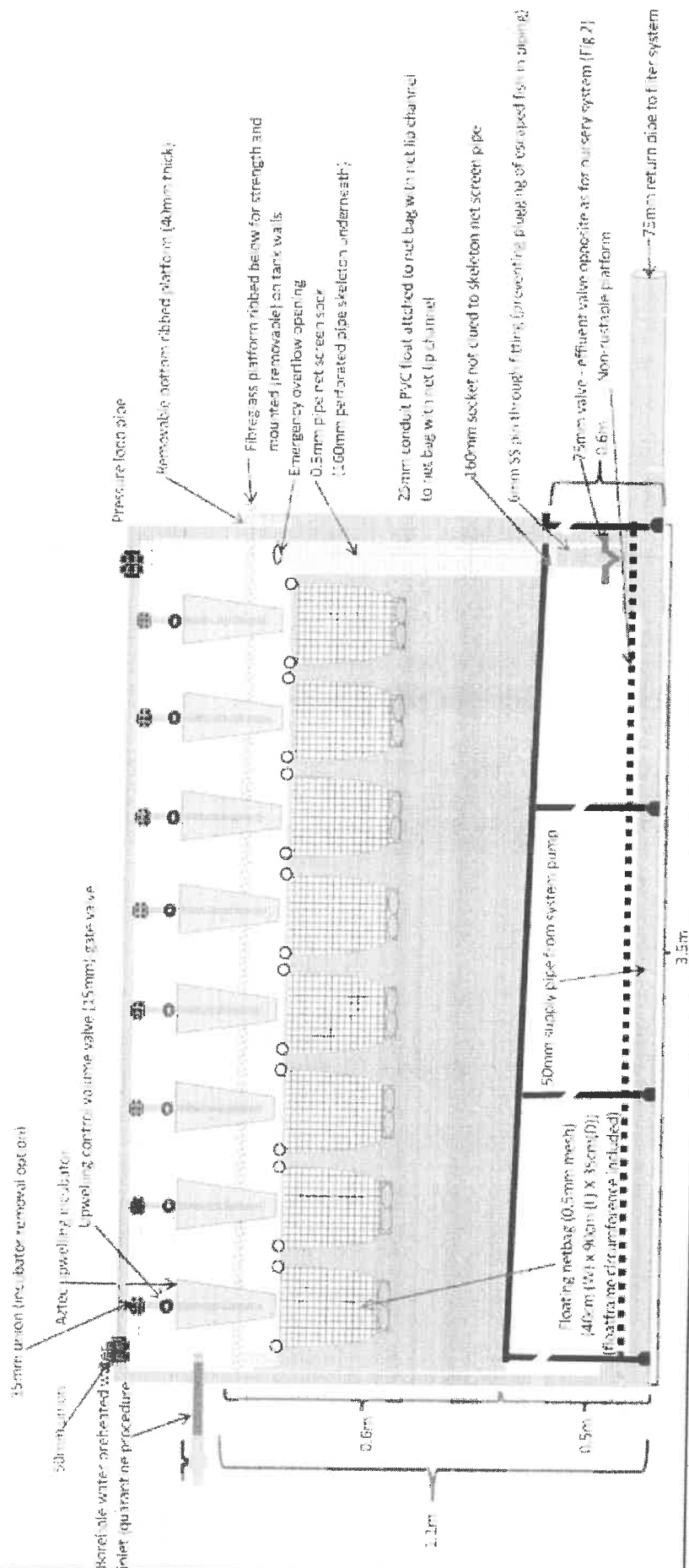


FIGURE 9: Leaky pipe diffuser construction

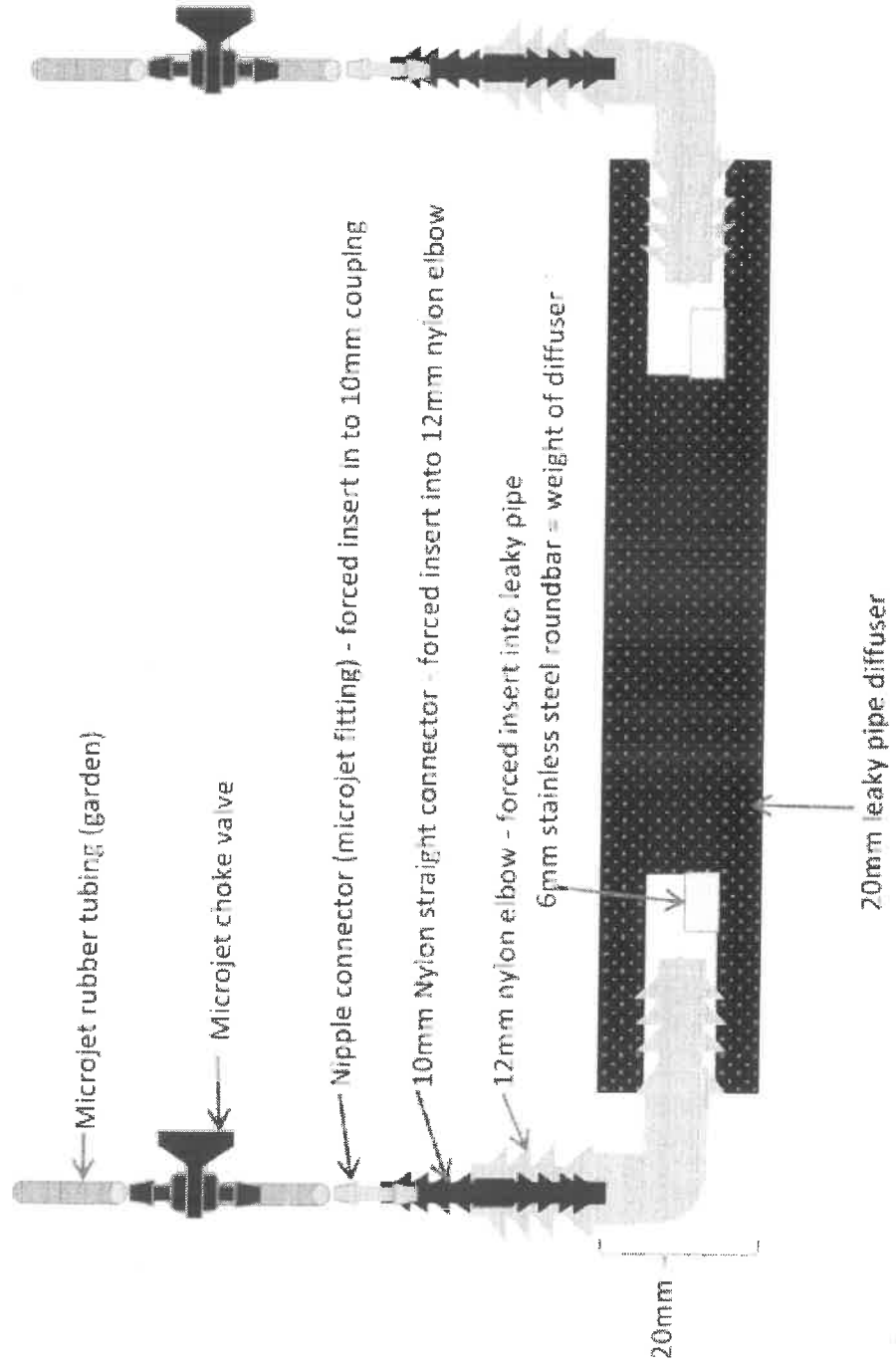
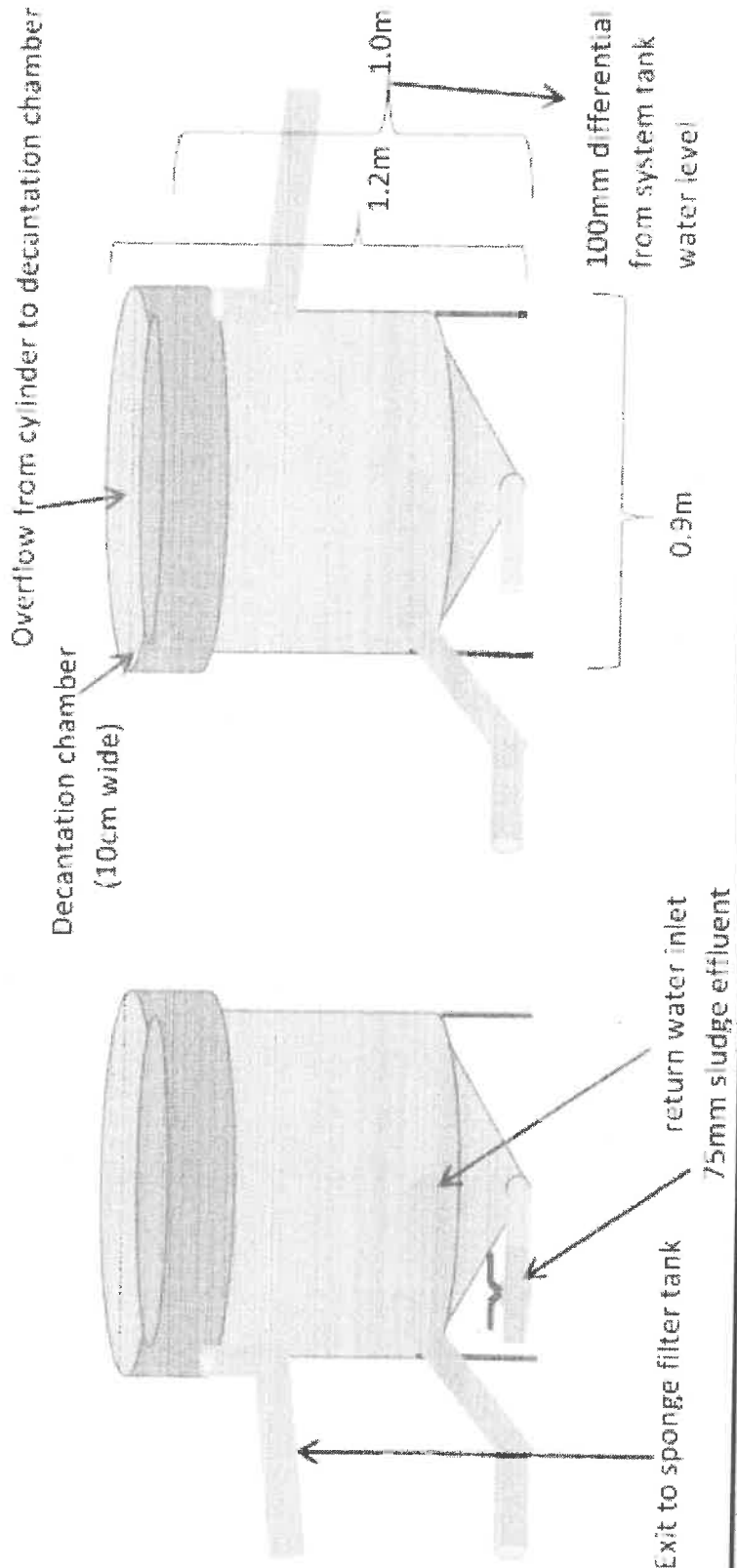


FIGURE 10: Swirl separator outlay



ANNEXURE B: ENVIRONMENTAL

EMP and RODs here.