



5 Maafu Street
Suva
Fiji
8th March 2017

Dear Sir

Request for Quotation - Naboro Prison Biogas Plant

The International Union for the Conservation of Nature (IUCN) is assisting the Fiji Correctional Services to install a biogas plant at the Naboro Prison's piggery in order to clean up the waste water coming out from the piggery and polluting nearby waterways. The biogas plant consist of a holding steel tank (the digester) about 5.5 meters in diametre and 5m high and a steel gas holder 4.3 m in diameter and 1.8 m width that inverts into the biogas digester and thus traps the gas generated from pig wastes. The specific details are attached.

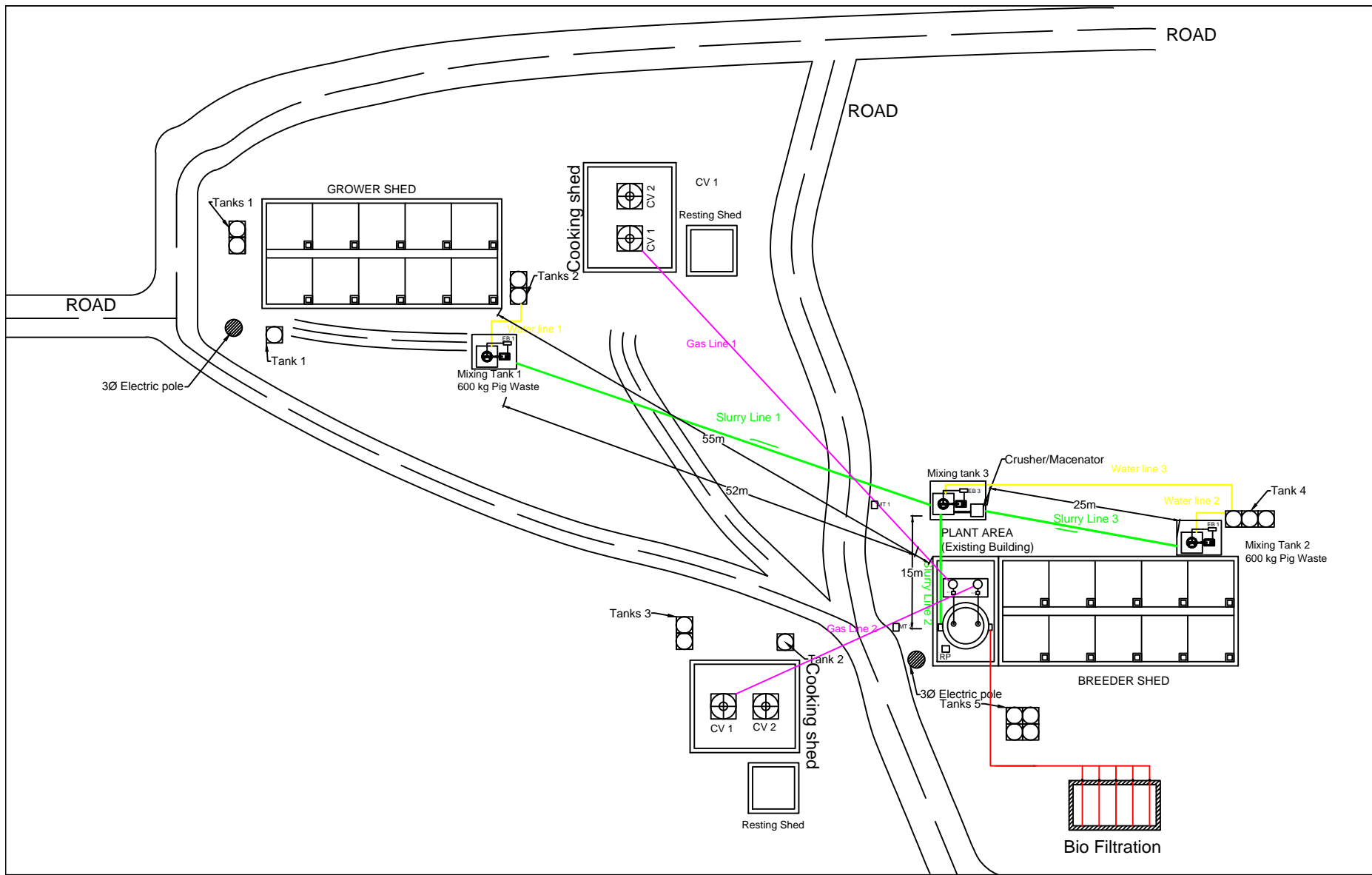
When completed the unit would look like this:



Quotes should be e-mailed to varea.romanu@iucn.org or to ifereimi.dau@iucn.org or sent via mail to **Energy Programme, IUCN ORO, 5 Maafu Street, Suva**. Contact number is 7733715.

Yours sincerely,

Varea Romanu
Energy Programme Assistant
IUCN ORO



NOTE

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- The Drawing is site specific and cannot be generalised and replicated for projects of similar kind
- The fabricator shall carryout fabrications in compliance with Industrial Standards
- The fabrication shall ensure good quality of materials and good workmanship
- The details have been given for all the components, in case of unforeseen items, the fabricator shall contact NIE-CREST for clarification
- The changes may be suggested during fabrication of the plant, but the fabricator shall not claim such change/modifications as "additional works"
- Detailed guideline for painting will be provided in due course
- Name board shall be painted on the biogas plant as per the text which will be provided by NIE-CREST in the due course

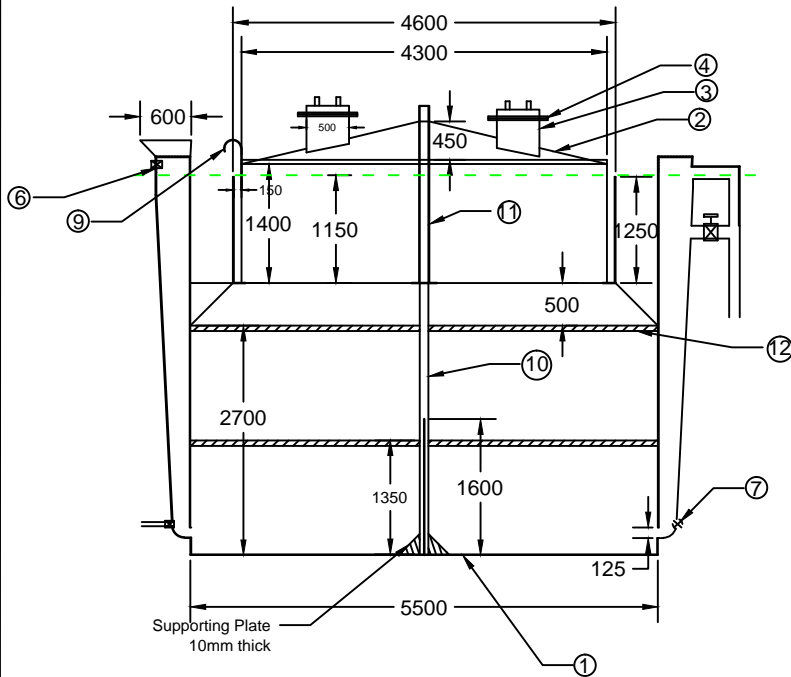
DETAILS

Drawing No.	Draft Drawing 1
Title	Fiji Biogas Plant Layout
Scale	Not to scale
Dimensions	All Dimensions are in Metre
Designed by	NIE-CREST, Mysore
Drawn by	Manjunath V B, NIE-CREST
Approved by	Prof. S Shamsundar, Chief Coordinator and Head, NIE-CREST

NIE-CENTRE FOR RENEWABLE ENERGY AND SUSTAINABLE TECHNOLOGIES [NIE-CREST]

The National Institute of Engineering (NIE), Manandavadi Road, Mysore -570008, Ph: 0821-4004914, Email: niecrest@gmail.com, Web: www.niecrest.in

ASSEMBLY



Details of the Parts

Sl.No.	Parts	Dimention	Material	Quantity
1	Digester	Ø5500 & Ø4600 and 2700, 500 & 1250 Length	Sheet Steel 10mm Thickness	1
2	Gas Holder	Ø4300X1400 length	Sheet Steel 6mm Thickness	1
3	Inspection Chamber with gas outlet	Ø500	Sheet Steel 6mm Thickness	2
4	Flange	Ø600, 6X15mmX10mm	10mm MS Plate	2
5	Nut, Bolt and Plate Washers	Ø15mm	Stainless Steel	6 nut & Bolt, 12 Plate Washers
6	Collers and End Plug	Ø100mm	Mild Steel	5
7	Ball Valve	Ø160mm	Stainless Steel / MS	4
8	Gusset Plate	Given in Drawing	10mm Thick MS Plate	8
9	Handles for Digester Lifting huck for gas holder	Given in Drawing	10mm Thick MS Plate	4 Handles and 2 Hucks
10	Digester Traversing Pipe	Ø100 & 5200 length	5mm Thick MS Pipe	1
11	Gas holder Supporting Pipe	Ø125 & 1800 length	5mm Thick MS Pipe	1
12	L- angle	65X65X10mm	Mild steel	As per Drawing requirment
13	Coating	Inside and outside the Digester and Gas holder	FRP 2mm	-
14	Painting	Inside and Outside the Digester and Gas holder	One Coat anti-corrossive paint Duco and enamel Paint	-

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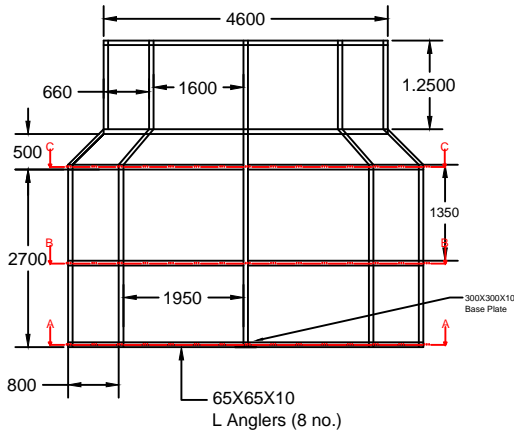
DETAILS

Drawing No.	Biogas Plant/Detailed Drawing/1
Title	Detailed drawings of 1000kg per day kitchen waste biogas plant
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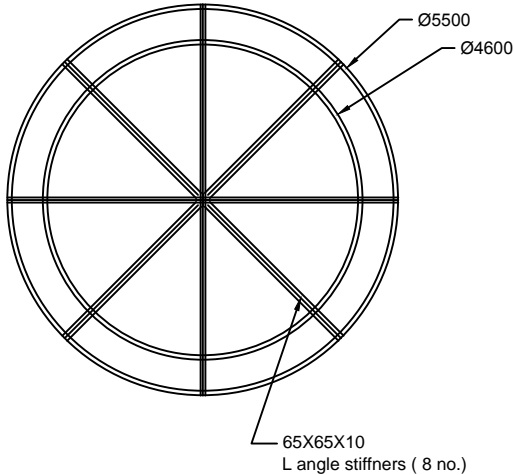
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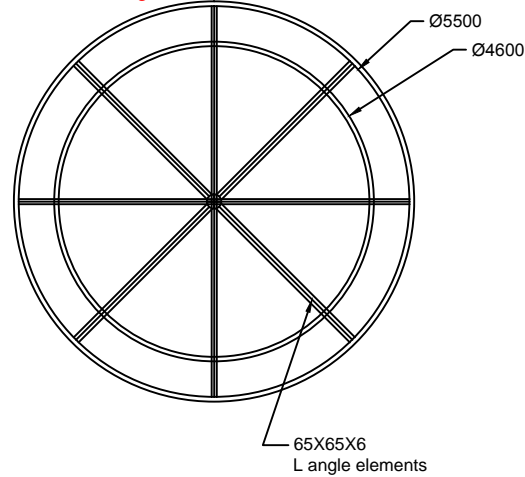
Digester Steel Structure



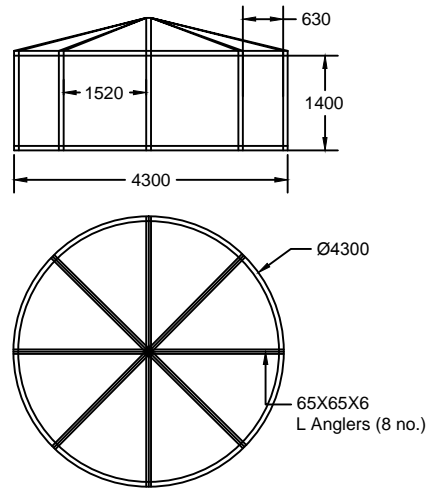
Radial Elements along A - A and B - B



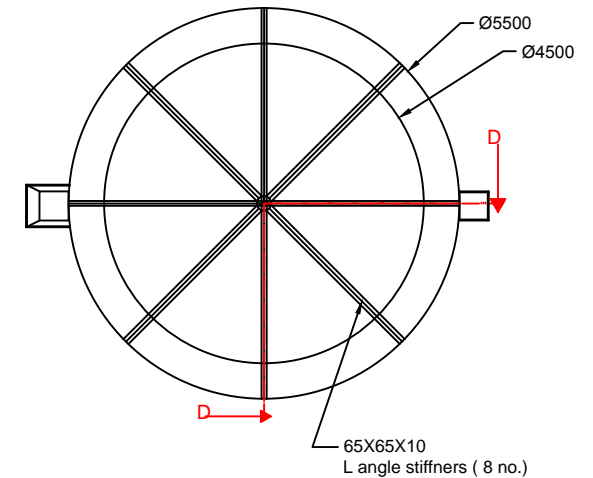
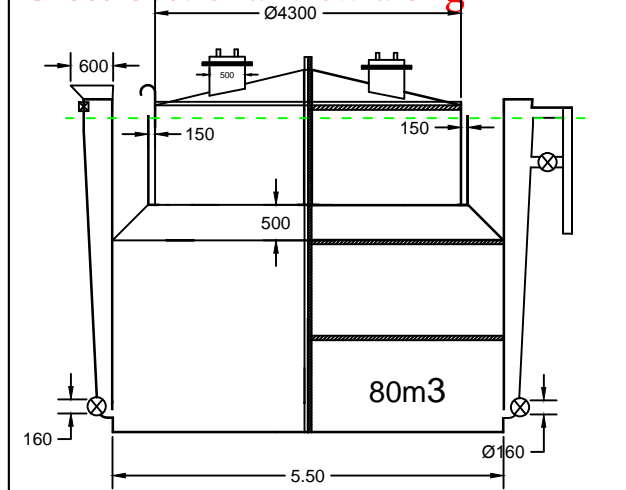
Radial Elements along C - C



Gas Holder Steel Structure



Cross Sectional view along D - D

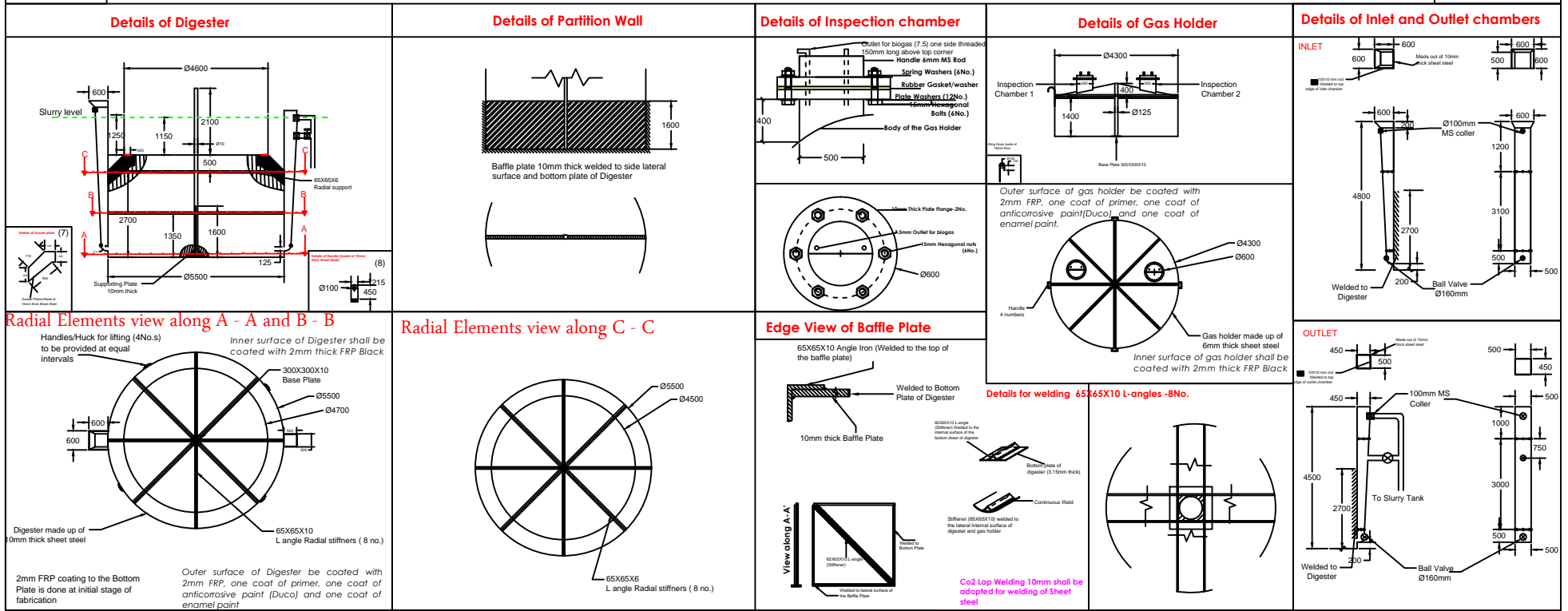


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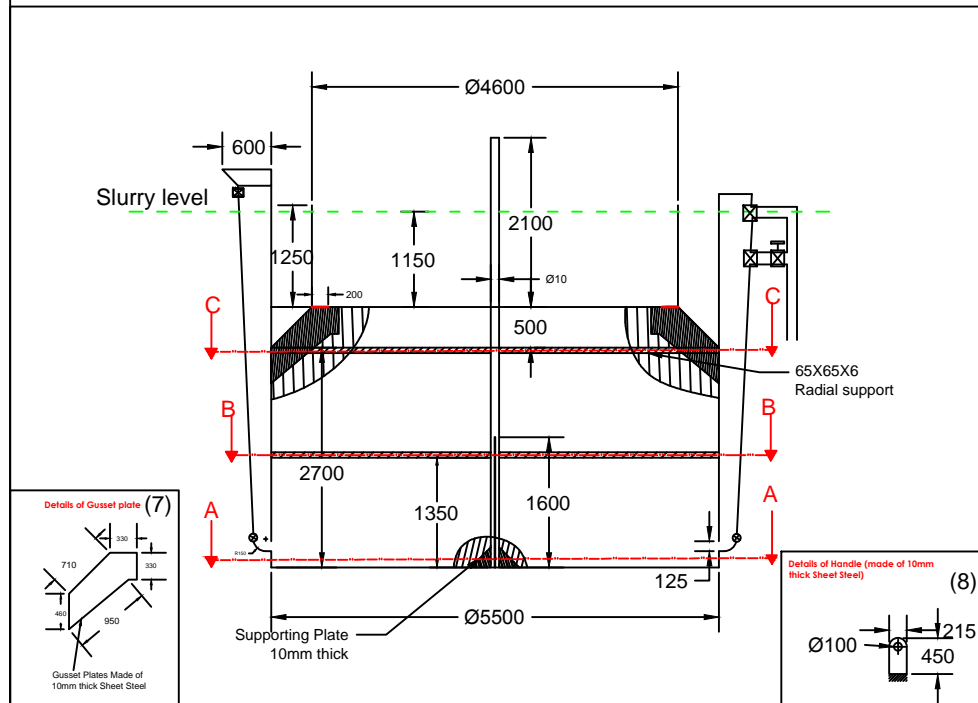
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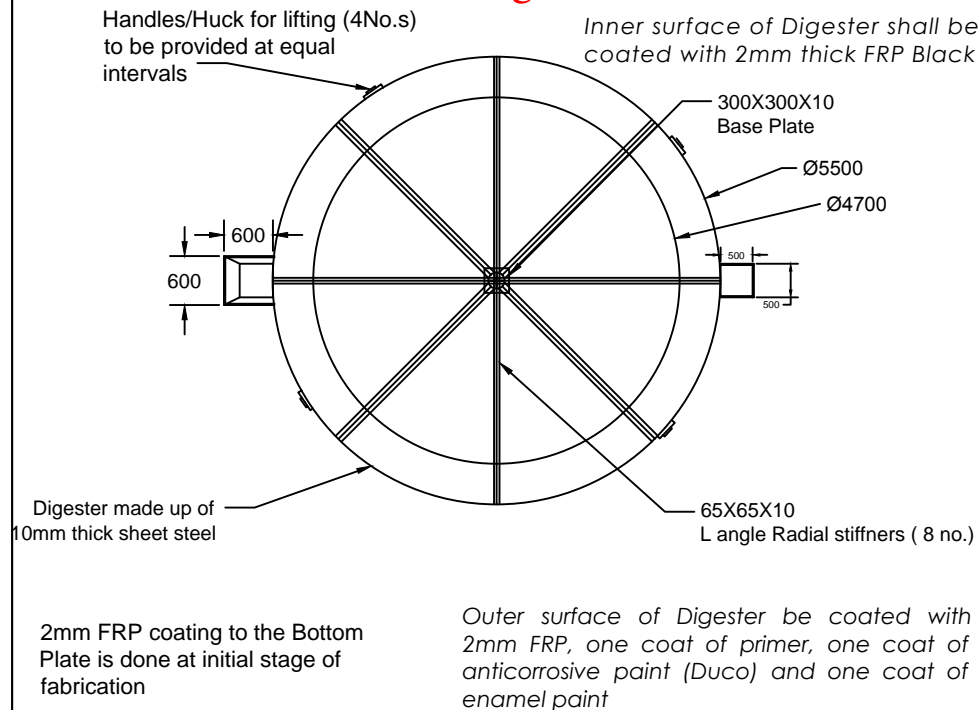
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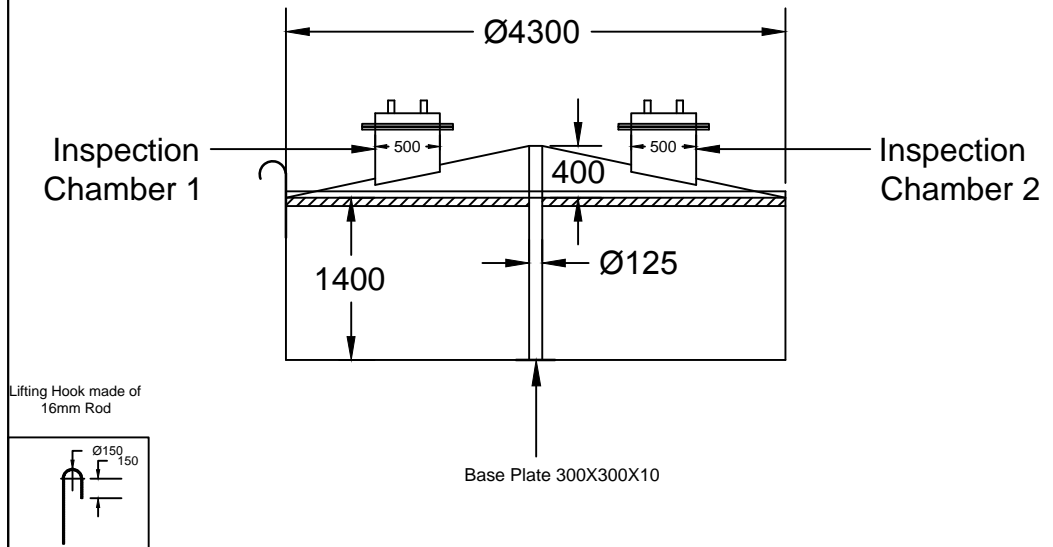
Details of Digester



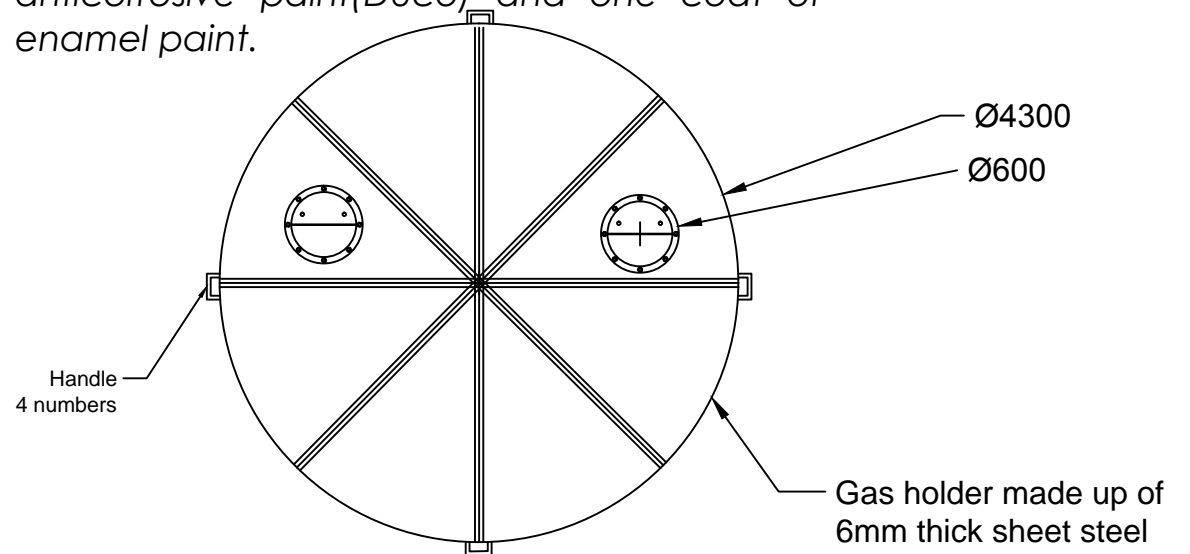
Radial Elements view along A - A and B - B



Details of Gas Holder



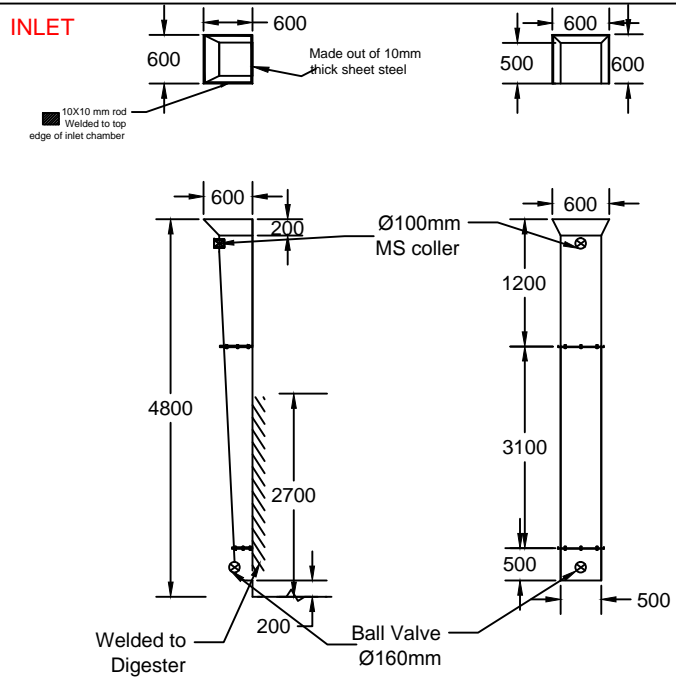
Outer surface of gas holder be coated with 2mm FRP, one coat of primer, one coat of anticorrosive paint(Duco) and one coat of enamel paint.



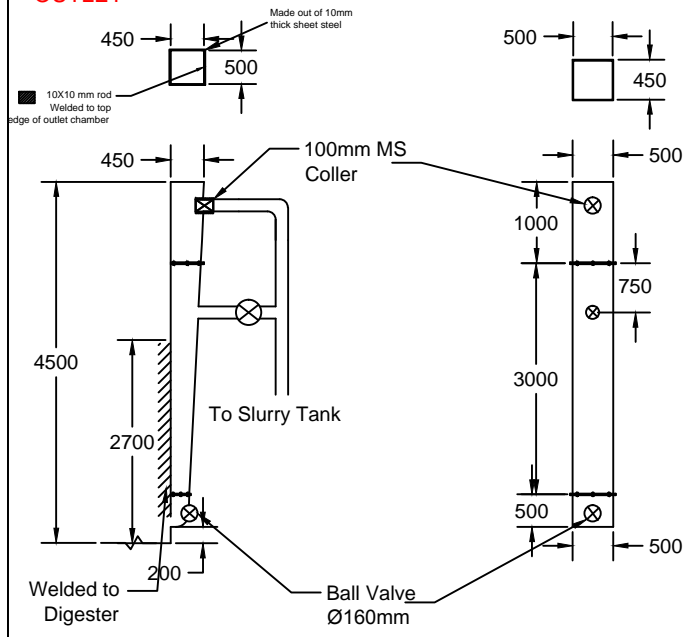
Inner surface of gas holder shall be coated with 2mm thick FRP Black

Details of Inlet and Outlet chambers

INLET



OUTLET



TOR FOR THE NABORO BIOGAS WORK

1. In consultations with the Fiji Correctional Services and Consultants for the Project (Subbarao Consultants) the Contractor will
 - a. Fabricate a biogas plant at the Naboro Piggery. The fabricated plant will be coated with anti-corrosion paint as per the specifications given in the table below and in the detailed designs.
 - b. Source specific items as outlined below for the biogas plant including meters, pumps, blowers, etc.
2. Entry on to the Naboro piggery will be facilitated by the Fiji Correctional Services. Please contact Mr. Junior Bali at the FCS HQ or officers at Naboro
3. All quotations should be received by April 30th 2017. Quoted amount should be in Fiji dollars
4. This expression of interest is managed by a team comprising representatives from the Fiji Department of Energy, the Fiji Correctional Services and the International Union for Conservation of Nature. Extension of time to get a proper quotation worked out may be entertained on discussion
5. For any clarification please consult ifereimi.dau@iucn.org and copy vareafesaitu.romanu@iucn.org

Specifications for the biogas plant

	Particulars	Qty
1	Main digester: Mild steel (BIS 2062) main digester of capacity 80m ³ without water jacket, fabricated out of 10mm thick with necessary circumferential, tangential, radial, lateral support frames made of MS Angle iron (L-angle) 65mmx65mmx10mm MS flats, flanges, bolts, nuts, guide pipe etc., complete inclusive of one primer coat, Including fabrication of inlet pipe, outlet pipe, supporting stands, ladder) as per approved drawing NIE-CREST	1
2	Construction of a concrete base to Fiji Construction standards or similar for sitting the Mild steel (BIS 2062) main digester of capacity 80m ³	
3	Materials for FRP coat (1mm thick) and Anticorrosive Paint with FRP Coating and painting to be done on site	
4	Gas Holder: Mild steel (BIS 2062) Gas holder of capacity 20m ³ fabricated out of 8mm thick with necessary circumferential, tangential, radial, lateral support frames made of MS Angle iron (L angle) 65mmx65mmx10mm MS flats, flanges, bolts, nuts and guide pipe inclusive of one primer coat, as per approved drawing NIE-CREST. Materials for FRP coat (1mm thick) and Anticorrosive Paint to be sourced and FRP Coating and painting done on site	1 Set
5	Supply of Feeder Pumps: 3HP, 3phase submersible pump, Make: M/s Sharp Pumps Pvt. Ltd. , Coimbatore, Tamilnadu Model: 80PDS-12-17-3.0 Submersible Drainage Pump – 415 Volt, 50Hz Liquids: water, sludge, slurry Motor: electric motor Rated Flow: 12 m ³ /h Rating/rpm: 2.2 kW/2880 rpm Rated Head: 17 m Nominal current: 6 A Motor start: Star / Delta General Specifications Protection: IP68 Discharge connection: 80 mm Insulation class: F Weight (pump): 50 kgs Volt/Phase: 415v-3p Solids handling: 72 mm Cable length: 6mtrs(standard) Dimensions L x B x H: 269x118x570 mm Material Specifications Details Pump Castings: FG200 Max.sub. depth: 10 m Impeller: FG200 Max. Liquid Temp: 40° C Seal: Sic – Sic / car- cer Shaft Material: S S 4 3 1 for Pumping Swine manure/Vegetable Waste/Digested Slurry.	
	Feeder Pump 1 @ Grower Shed to pump swine manure + Water Mixture to Plant area	1
	Feeder Pump 2 @ Plant area to pump swine manure + Cassava Waste+Vegetable Waste +Water Mixture to Biogas Plant	1

	Feeder Pump 3 @ Grower Shed to pump swine manure + Water Mixture to Plant area	1
	Feeder Pump 4 @ Slurry tank to pump slurry to utility	1
	Total	4
6	Crusher/Maccerator: to crush 150kg of cassava waste, 150kg of vegetable waste, inclusive of 3HP, 3Phase electric motor, belt drive, belt and sink (Model: CD 3050 Make: M/s Point Industries)	1
7	Supply of Blower 1: Make: M/s Kulkarni Power Tools Ltd. Pune, Maharashtra Model: SR010 Biogas blower with 2HP, 3phase electric motor, belt drive, belt, pulleys, shaft, pressure release valve, silencer for blowing biogas for recirculation of biogas with a pressure of 400millibar, maximum discharge of 18cu.m/hr	1
8	Supply of Blower 2: Make: M/s Kulkarni Power Tools Ltd. Pune, Maharashtra Model: SR015 Biogas blower with 3HP, 3phase electric motor, belt drive, belt, pulleys, shaft, pressure release valve, silencer for blowing biogas for recirculation of biogas with a pressure of 1bar	1
9	Supply of Solar water heater comprising of solar fat plate collector of required size and stainless steel hot water storage tank with stainless steel heat exchanger absorber made of copper sheet and copper tube of 500L capacity aluminium box collector with appropriate capacity electrical back up arrangement including inlet and outlet pipes, SS Model with 100mm thick of 48kg/cu.m density rock wool insulation with 22SWG aluminium cladding with necessary stand/supporting frame complete	1
10	Supply of stand/terrace, Three layered PVC Tank of capacity 2500L with manhole, lid, and suitable locking arrangements, making holes of suitable diameter for inlet, outlet and overflow pipes. (Custom Made, fabricated by local fabricator referred by NIE-CREST)	1
11	Supply of Mild Steel Stand for Over Head Tank to a height of 6m with necessary Angle iron, I Sections (inclusive of installation) for placing 2500L capacity PVC Tank	1
12	Supply of Mixer tank with stirrer : of net volume 1000L made of mild steel sheet of 3mm thick, mild steel stirrer with solid shaft 75mmdiameter, curved blades of 5mm thick, 1HP/0.75kW, 3 phase electric motor (Custom Made, fabricated by local fabricator referred by NIECREST)	
	Mixer Tank with Stirrer tank 1 @ Grower Shed	1
	Mixer Tank with Stirrer tank 3 @ Breeder Shed	1
		2
13	Supply of Mixer tank with stirrer: of net volume 3000L made of mild steel sheet of 3mm thick, mild steel stirrer with solid shaft 75mmdiameter, curved blades of 5mm thick, 1HP/0.75kW, 3phase electric motor (Custom Made, fabricated by local fabricator referred by NIECREST)	
	Mixer Tank with Stirrer tank 2 @ Plant Area	1
14	Supply of Gas Meter: electronic/mechanical gas meter with accessories for measuring biogas from along pipeline for a nominal flow of 18cu.m per hour at nominal pressure of 400millibar for measurement of biogas generated	1
15	Supply of Weighing scale: electronic weighing scale for measuring mass up to 1000kg	1
16	Supply of Moisture Trap: for removal of moisture	8
17	Supply of Essential spares for repair of machineries like blower and slurry pumps	1
18	Supply of Tools and tackles: spanners and wrench	1
19	Supply of Flare apparatus: for testing fire	1
20	Supply of Stainless Steel Biogas burner with discharge of 32cft per hour	2