Bid Number: GEM/2021/B/1117299
Dated: 13-03-2021

Bid Document

Bid Details	
Bid End Date/Time	08-04-2021 13:00:00
Bid Opening Date/Time	08-04-2021 13:30:00
Bid Life Cycle (From Publish Date)	90 (Days)
Bid Offer Validity (From End Date)	60 (Days)
Ministry/State Name	Ministry Of Petroleum And Natural Gas
Department Name	Oil India Limited
Organisation Name	Oil India Limited
Office Name	Oil India Limited
Total Quantity	1
Item Category	Radar Tank Gauge
Minimum Average Annual Turnover of the Bidder	5 Lakh (s)
Years of Past Experience required	3 Year (s)
MSE Exemption for Years of Experience and Turnover	No
Startup Exemption for Years of Experience and Turnover	No
Document required from seller	Experience Criteria,Past Performance,Bidder Turnover,OEM Authorization Certificate *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Past Performance	50 %
Bid to RA enabled	No
Time allowed for Technical Clarifications during technical evaluation	7 Days
Inspection Required	No
Evaluation Method	Total value wise evaluation

EMD Detail

Required	No

ePBG Detail

Advisory Bank	AXIS BANK LTD
ePBG Percentage(%)	3.00
Duration of ePBG required (Months).	18

(a). EMD & Performance security should be in favour of Beneficiary, wherever it is applicable.

Beneficiary:
CHIEF MANAGER MATERIALS
Oil India Limited, OIL INDIA Limited, OIL INDIA Limited, Ministry of Petroleum and Natural Gas
(Balen Bharali)

Splitting

Bid splitting not applied.

1. The minimum average annual financial turnover of the bidder during the last three years, ending on 31st March of the previous financial year, should be as indicated above in the bid document. Documentary evidence in the form of certified Audited Balance Sheets of relevant periods or a certificate from the Chartered Accountant / Cost Accountant indicating the turnover details for the relevant period shall be uploaded with the bid. In case the date of constitution / incorporation of the bidder is less than 3-year-old, the average turnover in respect of the completed financial years after the date of constitution shall be taken into account for this criteria.
2. Experience Criteria: In respect of the filter applied for experience criteria, the Bidder or its OEM {themselves or through reseller(s)} should have regularly, manufactured and supplied same or similar Category Products to any Central / State Govt Organization / PSU / Public Listed Company for number of Financial years as indicated above in the bid document before the bid opening date. Copies of relevant contracts to be submitted along with bid in support of having supplied some quantity during each of the Financial year. In case of bunch bids, the category of primary product having highest value should meet this criterion.
3. Past Performance: The Bidder or its OEM {themselves or through re-seller(s)} should have supplied same or similar Category Products for 50% of bid quantity, in at least one of the last three Financial years before the bid opening date to any Central / State Govt Organization / PSU / Public Listed Company. Copies of relevant contracts (proving supply of cumulative order quantity in any one financial year) to be submitted along with bid in support of quantity supplied in the relevant Financial year. In case of bunch bids, the category related to primary product having highest bid value should meet this criterion.

Radar Tank Gauge (1 pieces)

Brand Type	Unbranded

Technical Specifications

Buyer Specification Document	Download

Additional Specification Documents

DrawingDocument1	View
DrawingDocument2	View

Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	Dharmendra Kumar Gogoi	781022,CoEEES, OIL INDIA LIMITED, RUKMINIGAON, G S ROAD, GUWAHATI	1	60

Buyer added Bid Specific Additional Scope of Work

S.No.	Document Title	Description	Applicable i.r.o. Items
1	Detailed technical specification	Detailed technical specification with drawing	Radar Tank Gauge(1)

	View		

The uploaded document only contains Buyer specific Additional Scope of Work and / or Drawings for the bid items added with due approval of Buyer's competent authority. Buyer has certified that these additional scope and drawings are generalized and would not lead to any restrictive bidding.

Bid Specific Additional Terms and Conditions

1.Scope of supply (Bid price to include all cost components) : Only supply of Goods

This Bid is also governed by the General Terms and Conditions

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws.

---Thank You---

ऑयल इंडिया लिमिटेड
(भारत सरकार का उद्यम)
Oil India Limited
(A Government of India Enterprise)

PO : Udayan Vihar
Guwahati – 781171, Assam (India)
Phone: +91-361-2595681
Email: balen_bharali@oilindia.in
erp_mm@oilindia.in

TECHNICAL SPECIFICATION

Procurement, Installation and Commissioning of Radar Tank Gauge for Surge Tank at Numaligarh, Assam

Sl.No	Item
10	TECHNICAL SPECIFICATION OF RADAR TANK GAUGE: 1. TYPE OF ANTENNA: Horn/Cone suitable for measuring requirements. 2. POINT OF MOUNTING AND INSTALLATION: The nozzle size (8") and rating of the equipment for radar type of level instrument. The size and rating of the tank level instrument shall be same as the tank nozzle requirement as per the attached diagram (ANNEXURE I). 3. OUTPUT: Analogue 4-20 mA DC current output (HART). 4. HEIGHT OF TANK: The radar type tank level instrument shall be suitable for measuring the entire tank height (11 metres) indicated in the attached diagram Annexure I. Range of Measurement Level 0-15 Meter. 5. PRINCIPLE OF MEASUREMENT: FMCW (Frequency Modulated Continuous Wave). 6. ACCURACY: ± 3 mm or better for storage tanks over the entire tank height.

7. REPEATABILITY:

LESS THAN EQUAL TO ± 1 mm

8. MEASURED RESOLUTION:

1 mm

9. TEMPERATURE:

: 0 degC to 100 degC or better

10. HOUSING:

Dual Compartment with SIL valid certification.

11 TANK SIDE INDICATOR:

11.1 Tank-side indicator shall provide a digital LCD display and shall display the following
Information:

a) Display for level as applicable for the type of tank level
Instrument.
b) Status of tank level instruments including diagnostics information. The parameter to be displayed shall be selectable from the tank side indicator or through separate hand held terminal.

11.2 A test switch shall be available with tank side indicator to test the integrity of display. Where no switch is provided, the testing should be possible from a hand held terminal.

11.3 Intrinsically safe for hazardous area installation.

11.4 Tank side indicator shall be located at grade (tank side) and suitable for 2" pipe mounting. Accessories required for pipe installation shall be supplied by the vendor.

11.5 Unless otherwise specified, the local digital readout provided at the gauge head and at tank side shall read in millimetre. All digital indicators shall have a test push button to check the illumination of all the seven segments of the indicator.

11.6 Separate Canopy to be provided for the Tank Side Indication.

11.7 Enclosure shall be IP65 or better

12. DOCUMENTS AND CERTIFICATES:

Whenever a detailed technical offer is required, vendor's quotation shall include the following:

12.1 A copy of approval for flameproof enclosure, whenever specified, from local statutory authority as applicable such as Petroleum and Explosives Safety Organisation(PESO)/Chief Controller of Explosives (CCE), Nagpur for the electronic instruments installed in electrically hazardous area along with:

i) Test certificate from recognised house Central Institute of Mining and fuel Research (CIMFR)/Electronics Regional Testing Laboratory (ERTL) etc. for flameproof enclosure for the specified hazardous protection class as per relevant Indian standard for all Indian manufactured equipments.

ii) Supporting valid certificate documents for ATEX/IECEx/PESO.

12.2 Deviation on technical requirements shall not be generally entertained. In case vendor has some valid technical reason for not complying with the specific requirements due to superior alternatives and materials, tag wise deviation list must be provided along with the technical justification.

12.3 Catalogues giving detailed technical specifications, model decoding details and other related information for each type of special level instrument covered in the bid.

12.4 The item shall be field proven and should have completed trouble free satisfactory operation for a period of minimum 6 months on the bid due date in the similar application with process conditions similar to those as specified in the purchaser's datasheet. Items with proto-type design or items not meeting proneness criteria specified above shall not be offered. Supported with valid documents

12.5. Detailed drawings, data, catalogues and manuals required from the vendor are indicated by the purchaser in vendor data requirement sheets. The required number of prints and soft copies shall be dispatched to the address mentioned, adhering to the time limits indicated.

12.6. Final documentation consisting of design data, installation, operation and maintenance manual etc submitted by the vendor after placement of purchase order as per vendor data requirement shall include the following, as a minimum:
a) Specification sheet for each special level instrument (including probe insertion length) and its accessories.
b) Overall dimensions of the complete top work instruments in millimetres.
c) Dimensions of antenna in millimetres
d) Dimensions of mounting details of tank side instruments i.e. tank side indicator, power on-off switch etc.
f) Clearance space required for maintenance work.
g) Wiring Diagram for the complete assembly including terminal numbers and cable type.

12.7. Copy of type test certificates.

12.8. Installation procedure for tank level instruments.

12.9. Calibration and maintenance procedure including replacement of its parts/internals to be provided.

12.10. Supporting documents for the electromagnetic compatibility requirements as per IEC 61000-4o compliance of electronic instruments design.

13. POWER SWITCH:

The instrument shall be provided with a flameproof power on-off switch, which shall be located near the tank side indicator.

14.CONFIGURING THE TANK GAUGE:

The tank level instrument shall be configurable either from inbuilt display of the Tank Gauge or by the HART communicator from control room. The configuration should be password protected.

15. FLANGE AND INSTRUMENT CONNECTION:

The connection details shall be as below:
a) Threaded end connections shall be to NPT as per ASME B 1.20.1.
b) Flanged end connections shall be as per ASME B 16.5.
c) Flange face finish shall be as per ASME B16.5. The face finish shall be as follows:

125 AARH : 125 to 250 micro inch AARH
63 AARH : 32 to 63 micro inch AARH

16. POWER SUPPLY:

230 VAC, 50 HZ (+/- 10 %) or 24 VDC (+/-10%)

17. CABLE CONNECTION AND TERMINAL HOUSING:

a) The terminal housing shall be suitable for the hazardous zone I area classification. The enclosure shall comply with the following requirements as a minimum:

Weather proof housing: IP 65 or above as per IEC 60529
Flameproof housing: Flameproof or Explosion proof as per IEC 60079 for explosion proof construction Flameproof Housing shall also be made weather proof.

b) The power cable and signal laying from RTU to field junction box will be carried out by the Purchaser. The power cable and signal cable from the Tank Gauge to the Field Side Junction Box shall be carried out by the

vendor.

Instrument cables: 1.5 sq. mm (2 Pair armoured) --- 700 metres
Power cables : 2.5 sq. mm (5 Core armoured) --- 700 metres
Separate terminal box shall be provided in case instrument terminals available as standard are not suitable to accommodate the specified conductor sizes.

DETAILS PROVIDED IN THE DIAGRAM (ANNEXURE II)

18. ACCESSORIES:

a) All accessories including mounting brackets, blinds and canopy required for installation of tank gauges and tank side indicator shall be supplied by vendor.

b) The signal cables and power cable to be provided by the vendor as per mentioned in the attached diagram in Annexure II.

Signal cables: 1.5 sq. mm (2 Pair) --- 700 metres
Power cables: 2.5 sq. mm (5 Core) --- 700 metres

As per Technical Specification in attached Annexure III and IV

c) The cables glands etc. shall meet the requirements specified in the clause no.17. of the specification.

d) In case of 24 V DC power supply AC-DC converter as per Annexure V to be provided along with the item.

e) Surge Protector for input power supply and barrier for output signal to be provided along with the item.

f) Stillwell not required for the tank gauge.

19. ATTACHMENTS:

1. ANNEXURE I (DETAIL DIAGRAM OF THE TANK AND THE POINT OF INSTALLATION)

2. ANNEXURE II (DETAIL SCHEDULE OF CABLE LAYING)

3. ANNEXURE III (TECHNICAL SPECIFICATION OF 2 PAIR 1.5 SQ. MM INSTRUMENT CABLE

4. ANNEXURE IV (TECHNICAL SPECIFICATION OF 5 CORE 2.5 SQ MM POWER CABLE

5. ANNEXURE V (TECHNICAL SPECIFICATION OF 24 V DC POWER SUPPLY

TECHNICAL CHECK LIST OF RADAR LEVEL TANK GAUGE:

Sl. No	Description	Bidder's Comments Remarks if any
1	FMCW (Frequency Modulated Continuous Wave Technology) Type RADAR Provided.	
2	Make and Model No mentioned	
3	Antenna Type Horn/Cone	
4	POINT OF MOUNTING AND INSTALLATION: The nozzle size (8") and rating of the equipment for radar type of level instrument. The size and rating of the tank level instrument shall be same as the tank nozzle requirement as per the attached diagram (ANNEXURE I).	
5	Output : Analogue 4-20 mA DC current output (HART).	
6	Range of Level 0-15 Meter.	
7	ACCURACY: ± 3 mm or better for storage tanks over the entire tank height.	
8	REPEATABILITY: LESS THAN EQUAL TO ± 1 mm	
9	MEASURED RESOLUTION: 1 mm	
10	TEMPERATURE: 0 degC to 100 degC or better	
11	CONFIGURING THE TANK GAUGE: The tank level instrument shall be configurable either from inbuilt display of	

	the Tank Gauge or by the HART communicator from control room. The configuration should be password protected.	
12	TANK SIDE INDICATOR: 4 1/2 digits, loop powered, Programmable,LCD Digital Indicator for Radar Gauge Provided.	
13	Confirmation in writing to do installation,configuration and commissioning of one (01) set of radar Tank level gauges at OIL's site.	
14	POWER SUPPLY: 230 VAC, 50 HZ (+/- 5 %) or 24 VDC (+/- 5%)	
15	Technical Catalogues/Literature etc provided.	
16	Calibration Data Certificate provided.	
17	Operation and maintenance manual – to be provided along with the Fault Tree Analysis Steps	
18	SS tag plate as per specification provided for Radar Gauge.	
19	Valid PESO/IECEx/ATEX Approval Certificate	
20	Flame-proof/Explosion-proof Housing (As per IEC Standard) Dual Compartment with SIL valid certification.	
21	Separate Canopy to be provided	
22	Comply to all the clauses in the Technical Specification of the Radar Gauge	

REMARK (IF ANY):

DEVIATIONS IF ANY AGAINST THE CLAUSES AND ITS SUB ITEMS OF THE TECHNICAL SPECIFICATION AS MENTIONED IN THE TENDER SHOULD REFLECT CLEARLY IN THE REMARKS.

Annexure V
Technical Checklist of DC power supply

NO	DESCRIPTION	BIDDER'S REMARK
1	Input Voltage Range - 90-250 VAC	
2	Input current consumption: max 0.9 amps at 230VAC	
3	Input frequency range: 50 Hz +/- 5%	
4	Input fuse shall be present for circuit protection	
5	Nominal Output Voltage - 24V DC± 1%	
6	Output Current rating – as per requirement, to power the Radar Level Gauge	
7	Residual output Ripple shall be less than 50 mVpp	
8	Adjustable output Voltage	
9	Buffer Time Facility	
10	Fast Tripping Facility	
11	Operating Temperature : 0°C to + 70°C	
12	Diagnostics: Indicator LED, 24 VDC signal output and Potential free contacts for monitoring the health of Power Supply units as well as suitable for Diagnostic annunciation.	
13	Parallel Connection - Possible without any external component for redundancy application and increasing performance.	
14	Mounting: - DIN Rail Mounted for Easy operating & Maintenance.	
15	Insulation Voltage Input/ Output :-2kV minimum	
16	Shall be EN / VDE / DIN VDE / UL Listed / CE & EMC Compliant	
17	Degree of protection: IP20 or better	
18	Warranty & Guarantee: 12 months from the date of supply.	
19	The electronic unit and sensors should have inbuilt protection against EMI / RFI and any external surge voltages and currents due to lightning strikes.	

ANNEXURE III

TECHNICAL SPECIFICATION OF INSTRUMENT CABLES

S.No.	DISCRIPTION	UNIT	2P x 1.5 Sq.mm (Blue)
1	NAME OF THE MANUFACTURER		
2	PLACE & COUNTRY OF MANUFACTURER		
3	CABLE TYPE		Annealed Copper Conductor, HR PVC insulated, Individual Pair & Overall screened, FR HR PVC inner sheathed, Galvanised Steel Round Wire/Flat Strip armoured and Overall FR HR PVC sheathed Signal Cable. (Single Pair shall be overall shielded only)
4	APPLICABLE STANDARDS		IS: 8130/84, IS: 5831/84, IS:3975, BS 5308-2:2009:PAS or BS EN 50288-7, IS:1554-1/88, ASTMD:-2863, ASTMD-2843, IEC60754-1, IEC :- 60332-1-2, IS:10810(Part 62) Category AF & this Data-Sheet
5	VOLTAGE GRADE	V	**650/1100, Freq = 50 Hz Permissible Voltage/Frequency variation = +/-10 V and +/- 5 Hz**
6	No. of Pair	NO.	**2 PAIR**
7	CONDUCTOR		
a)	Material		**EC grade high conductivity Annealed Bare Copper conductor, Class 2 to IS:8130 - 2013**
b)	Grade		**Electrolytic**
c)	Size	Sq.mm	**1.5**
d)	No. of strands	No.	**As per Class 2 of IS:8130/2013**
e)	Shape of Conductor		**Stranded & circular**
8	INSULATION		
a)	Material		**PVC Type C compound as per IS: 5831/84**
b)	Type		**Extruded**

ANNEXURE III

TECHNICAL SPECIFICATION OF INSTRUMENT CABLES

c)	Thickness (Minimum)	mm	**since 1100V is reqd, as per IS 1554-1 for insulation i.e. thickness = 0.8mm NOM [0.62mm MIN]**	
d)	**Pair**		**Black and Blue**	
e)	**Min. Number of Twists of cores in a Pair**	No.	**10 Twists/meter**	
9	**INDIVIDUAL SHIELDING**			
a)	Material		**Aluminium-Mylar Tape**	
b)	Type		**Helical**	
c)	Thickness(min.)	mm	**0.05**	
d)	Overlap	%	**25**	
e)	Coverage		**100**	
10	**OVERALL SHIELDING**			
a)	Material		**Aluminium-Mylar Tape**	
b)	Type		**Helical**	
c)	Thickness(min.)	mm	**0.05**	
d)	Overlap	%	**25**	
e)	Coverage	%	**100**	
11	**DRAIN WIRE (for ind. Pair & overall screened)**			
a)	Material		**Annealed Tinned Copper**	
b)	Size	Sq.mm	**0.5**	
c)	No. of strands/Approx. dia of each strand	No./mm	**7 / 0.3**	
12	**INNER SHEATH**			
a)	Materials		**PVC Type-ST2 Compound as per IS: 5831/84 With FRLS Properties**	
b)	Type		**Extruded**	
c)	Thickness (Minimum)	mm	**As per IS 1554-1 for inner sheath = 0.3mm**	
d)	Colour		**Black**	
e)	Rip Cord		**Rip Cord Shall be Provided Below Inner sheath.**	

ANNEXURE III

TECHNICAL SPECIFICATION OF INSTRUMENT CABLES

13	**ARMOUR**		
a)	Material		**Galvanised Steel Round Wire 100% coverage** **Single layer of galvanised steel round wire to IS:3975 - 1999**
b)	Type		**Single Layer**
c)	Armour Size (Nominal)	mm	1.4
14	**OUTER SHEATH**		
a)	Material		**Extruded HR PVC Type ST-2 Compound to IS:5831 - 1984 with FR Properties** **(AT & AR Propeties)** **"Heat resisting sheath intended for use in cables operating at a maximum rated conductor temperature 90°C."**
b)	Type		**Extruded**
c)	Thickness (Minimum)	mm	**1.24**
d)	Colour of outer sheath		Blue Black Blue Black
e)	Overall diameter(Approx.)	mm	16.20 ±2.00
f)	Tolerance on overall diameter	mm	**"+/-2"**
h)	Marking on outer sheath		**Manufacturer's name, Year of manufacture, No. of Pairs/Triads, Cross sectional area of cond., Voltage grade (i.e. 650V/1100V), Word "FRLSH" Shall be marked on outer sheath of cable. In addition, sequential length marking shall be printed on outer sheath of cable at every one-meter interval.**
15 (a)	**Drum Length**	**Mitres.**	**AS PER DRUM SCHEDULE ANNEXURE III ENCLOSED**
	(Packing shall be done in non-returnable wooden drum)		
(b)	Tolerance on Individual Drum Length		
(c)	Tolerance on Overall quantity		
17	ELECTRICAL PARAMETERS		
a)	Max. DC resistance of conductor at 20 Deg. C of completed cable	ohm/km	**12.1** **Max. AC resistance at 85°C = 15.2** **LR Ratio (Maximum) = 40 µH/Ω**
b)	Min. Insulation resistance of conductor at 20 Deg. C of completed cable	MΩ/km	**25**

ANNEXURE III

TECHNICAL SPECIFICATION OF INSTRUMENT CABLES

c)	Max. mutual capacitance of pairs/triads or adjacent core at 1 KHz	pf/mtr	**250**
d)	Max. Capacitance between any core or screen at 1 KHz	pf/mtr	**450**
e)	High Voltage Test	KV rms	**1 KV (rms) for 1 minute**
f)	Max. Drain Wire Resistance including shield	Ohm/Km	**30**
g)	Anti-Rodent& Termite Test	dB	**Presence of lead shall be confirmed (Black Precipitate)**
h)	Minimum Electrostatic Noise rejection ratio		**76**
18	**FR PROPERTIES (On Inner & Outer sheath)**		
a)	Min. Oxygen index as per ASTMD 2863	**%**	30 at 27 ±2 degC
b)	Min. Temperature index as per ASTMD 2863	°C	250
e)	Flammability test on completed cable		**Cable shall meet the test requirement of IS:10810 (Part 62) Category AF***
19	Minimum Bending Radius		6 Times the OD

***Flammability test as per IS:10810 (Part 62) Category AF can be reviewed, from our type test certificates. This is a type test and not acceptance test.**

****** Routine test from NABL approved laboratories is mandatory for all cable.**

ANNEXURE IV:

TECHNICAL SPECIFICATION OF CONTROL CABLE

B. 5C X 2.5 mm²

	CABLE SIZE:		5C X2.5 mm²
	PARAMETER	**UOM**	**SPECIFICATION**
A.	**General Particulars**		
1	Type of Cable		2XWY
2	Applicable Standard		IS: 7098 (Part-1) - 1988
3	Voltage Grade	kV	1.1 / 1.5 (A.C / D.C),
4	Frequency	Hz	50
5	Permissible Voltage and Frequency Variation	%	Voltage ±10, Frequency ±5
6	No. Of Core	Nos	5
7	Drum Schedule and Standard drum length with tolerance	mtr	As per Annexure III
8	Recommended minimum bending radius	mm	Cable diameter X 15
9	Approx Overall Diameter	mm	As per IS 7098 (Part -1) 1998
10	Suitable for	--	Earthed & Un-earthed system
11	Packing material	--	Wooden drum
B.	**Design & construction**		
1	**Conductor**		
a	Material	-	High Conductivity Plain Annealed Copper conductor, Class 2 to IS: 8130 - 2013
b	Type of Conductor	-	Class-2, Stranded Round Conductor as per IS 8130
c	Number of wire(minimum)	Nos	7
d	Maximum conductor temperature for cont. use	° C	90
e	Nominal Diameter of wire (Before Stranding)	mm	0.65 - (Min Size shall be corresponding to meet the requirement of Conductor C.R as per IS-8130/2013)
f	Shape of Conductor		Stranded circular

ANNEXURE IV:

TECHNICAL SPECIFICATION OF CONTROL CABLE

g	Maximum conductor temperature allowed for short circuit condition	° C	250
2	**Insulation over Conductor**		
a	Material	-	XLPE to IS: 7098 (Part 1) - 1988
b	Type	-	As per IS:7098 (P-1) Specification
c	Thickness nominal	mm	0.7 Tolerance of Thickness : The Smallest measured values of thickness of Insulation shall not fall below the Nominal value (ti) by more than 0.1mm+0.1mm(ti)
d	Color of core for identification	-	GREY WITH NUMBERING
e	Volume Resistivity test		
1	@ 27 °C	Ohm-cm	1 X 10^{14} min
2	@ 90 °C	Ohm-cm	1 X 10^{12} min
f	Before Aging test		
1	Tensile Strength	N / mm2	12.5 minimum
2	Elongation at break	%	200 minimum
3	**Lay - up**		
a	Lay Direction		Right Hand Direction
4	**Inner Sheath**		
a	Material		Extruded PVC ST2 with FRLSH properties
b	Thickness Min	mm	0.3
c	Color of sheath		Black
5	**Armouring**		
a	Armouring Material		Single layer Galvanized steel wire to IS: 3975 - 1999
b	Lay direction of Armouring		Left Hand Direction
c	Dimension of Wire	mm	1.4
6	**Outer Sheath**		
a	Extruded Material		FRLS PVC ST2 Compound as per IS:5831/84

ANNEXURE IV:

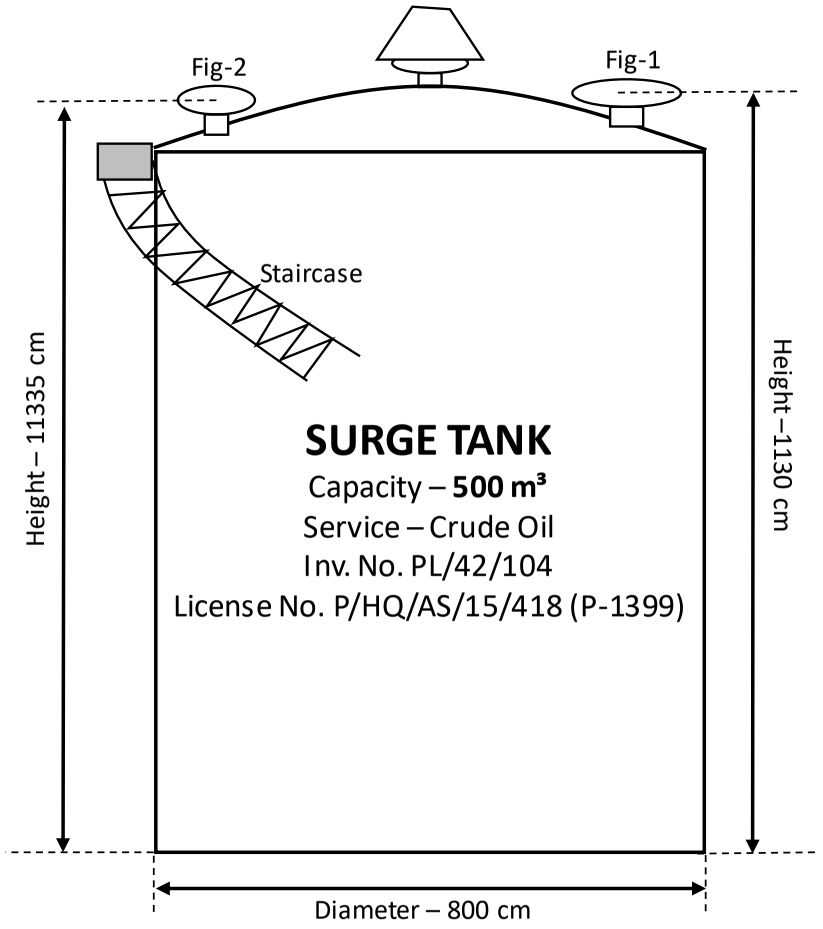
TECHNICAL SPECIFICATION OF CONTROL CABLE

b	Thickness	mm	1.24 mm
c	Color of sheath		Black
d	Approximate Overall Diameter	mm	15.90 ± 2 mm
1	Tensile Strength	N / mm2	12.5 minimum
2	Elongation at break	%	150 minimum
7	**Flammability Test**		
a	Length of undecomposed portion from top clamp	mm	50 minimum
b	Period of burning after removal of flame	sec.	60 maximum
8	**Printing Message**		
a	Make 5C X2.5 SQ.MM 1100V 2XFY ELECTRIC CABLE IS 7098 P-1 CM/L 3781574 ISI +0001m& length per every 25 meter		
9	**Electrical Properties**		
a	High Voltage Test		3kV for 5 minutes
b	Current Carrying Capacity		
1	In Ground @ 30°C	Amps.	24
2	In Duct @ 30°C	Amps.	18
3	In Air @ 40°C	Amps.	21
c	Approx Capacitance	µF/KM	0.18
d	Approx Reactance at 50 Hz	/Km	0.0985
e	Short Circuit Rating for 1 Sec	K.Amps	0.36
f	Maximum conductor resistance at 20° C (D.C)	Ohm/Km	7.41
g	Maximum conductor resistance at 90° C (A.C)	Ohm/Km	9.34
h	Permissible Voltage Variation	%	± 10
i	Permissible Frequency Variation	%	± 5
j	Combined Voltage & Frequency variation	%	± 10

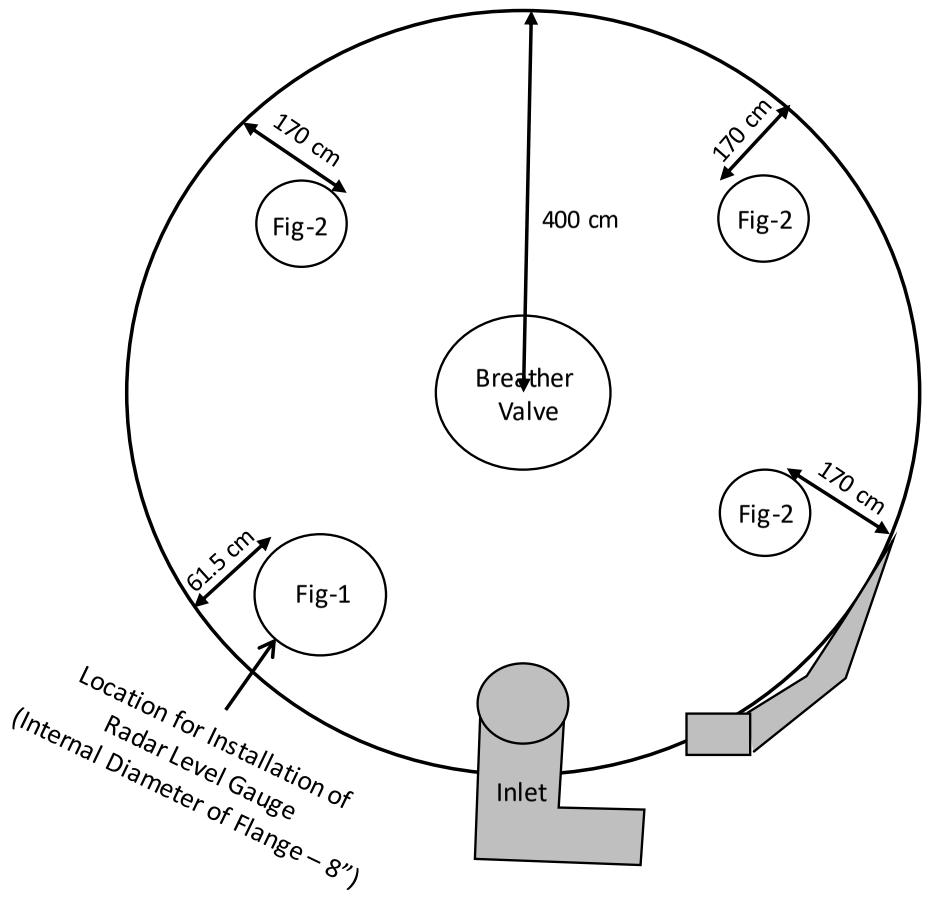
ANNEXURE – I

Surge Tank Dimension at RT-202 (Numaligarh)

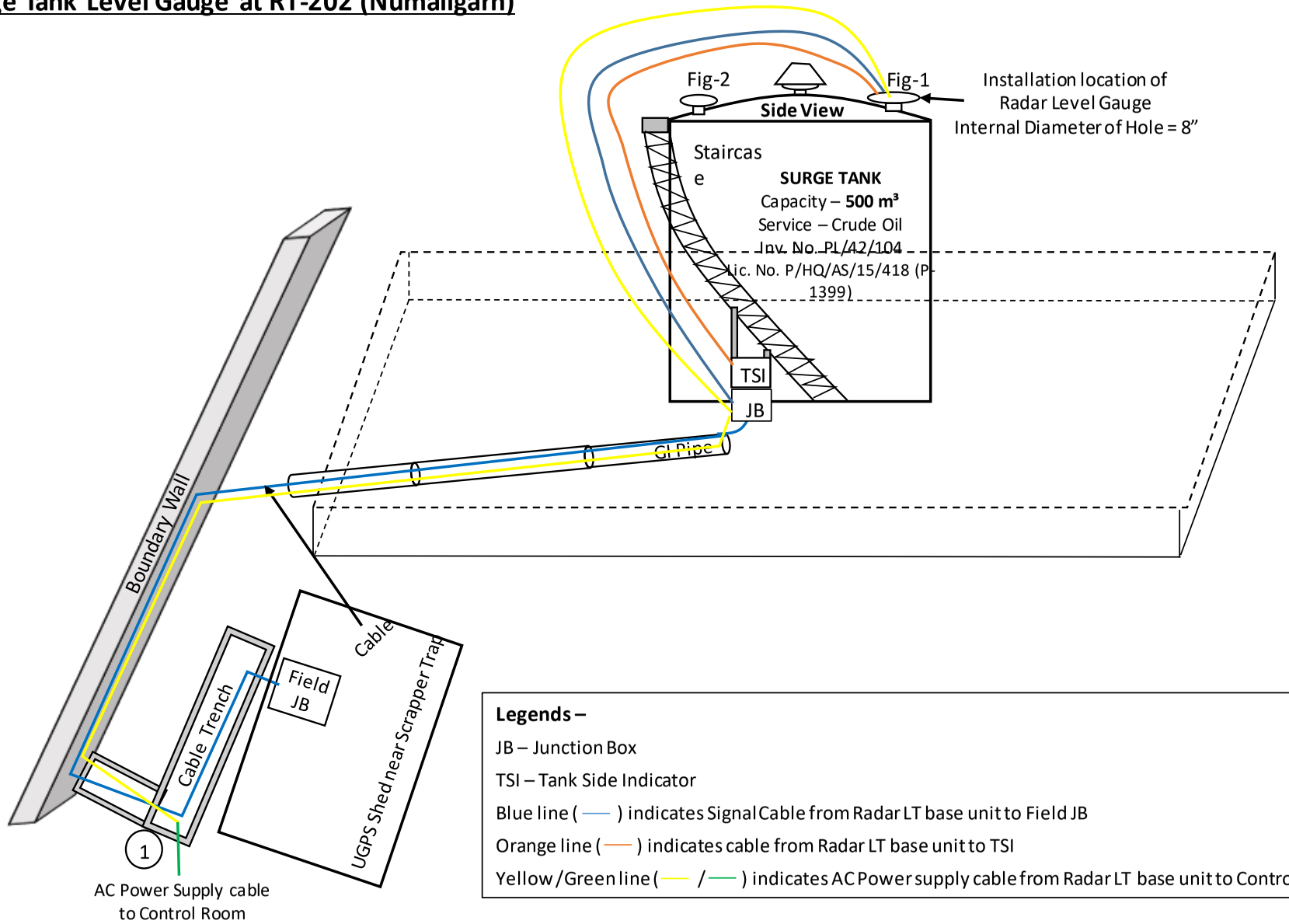
Side View



Top View (Tank Roof)



Installation Plan for Surge Tank Level Gauge at RT-202 (Numaligarh)



Legends –

JB – Junction Box

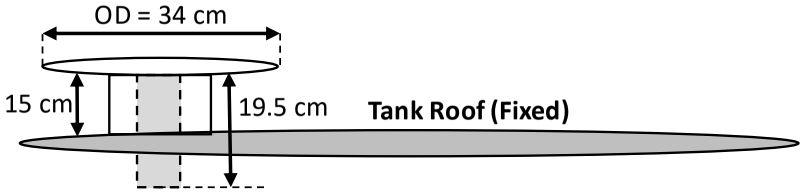
TSI – Tank Side Indicator

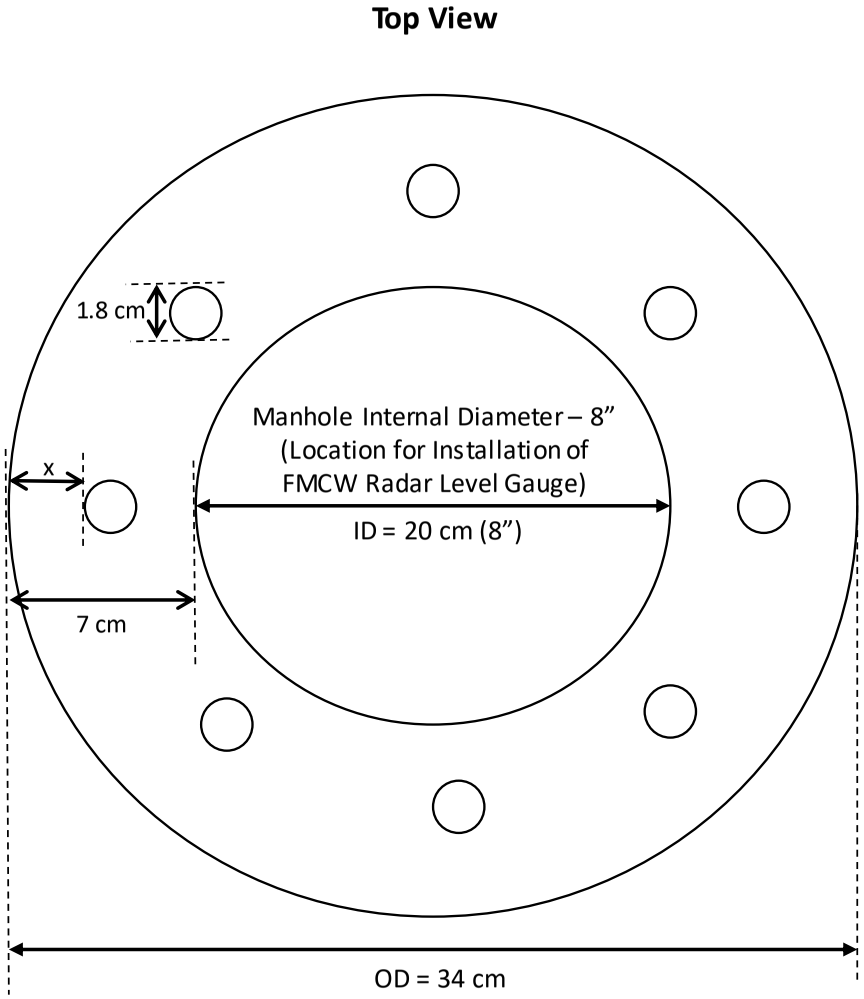
Blue line (——) indicates Signal Cable from Radar LT base unit to Field JB

Orange line (——) indicates cable from Radar LT base unit to TSI

Yellow/Green line (—— / ——) indicates AC Power supply cable from Radar LT base unit to Control Room

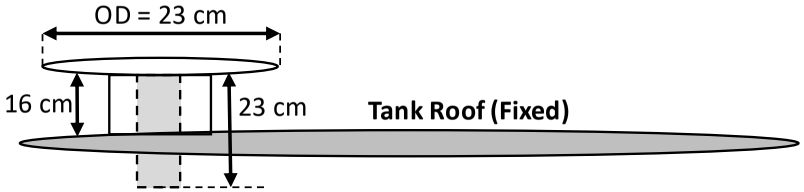
Fig-1 Elaboration (Flange-Big, Total – 1 No. present)

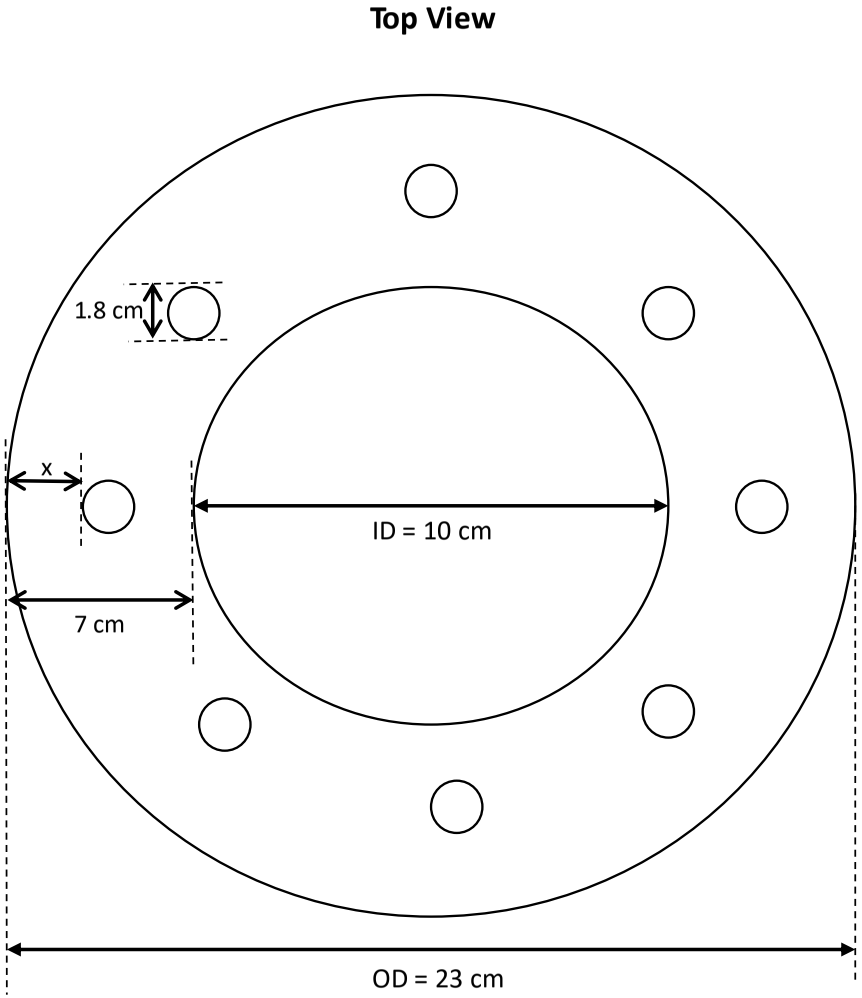




- All dimensions as per actual measurement as on 19-06-2018
- Measurement of Flange height from Tank roof does not include the Top Flange.
- Flange Thickness – 2 cm
- "x" = 1 – 1.5 cm
- All measurements are in centimeters.
- Measurements taken by – Mithilesh Ch. Dev, SE (O) NT
  Parthajyoti Shyam, Sr.E (O) NT
  Santanu Sarmah, TE, NT
- Drawn by – Santanu Sarmah, TE, NT

Fig-2 Elaboration (Flange-Small, Total - 3 Nos. present)

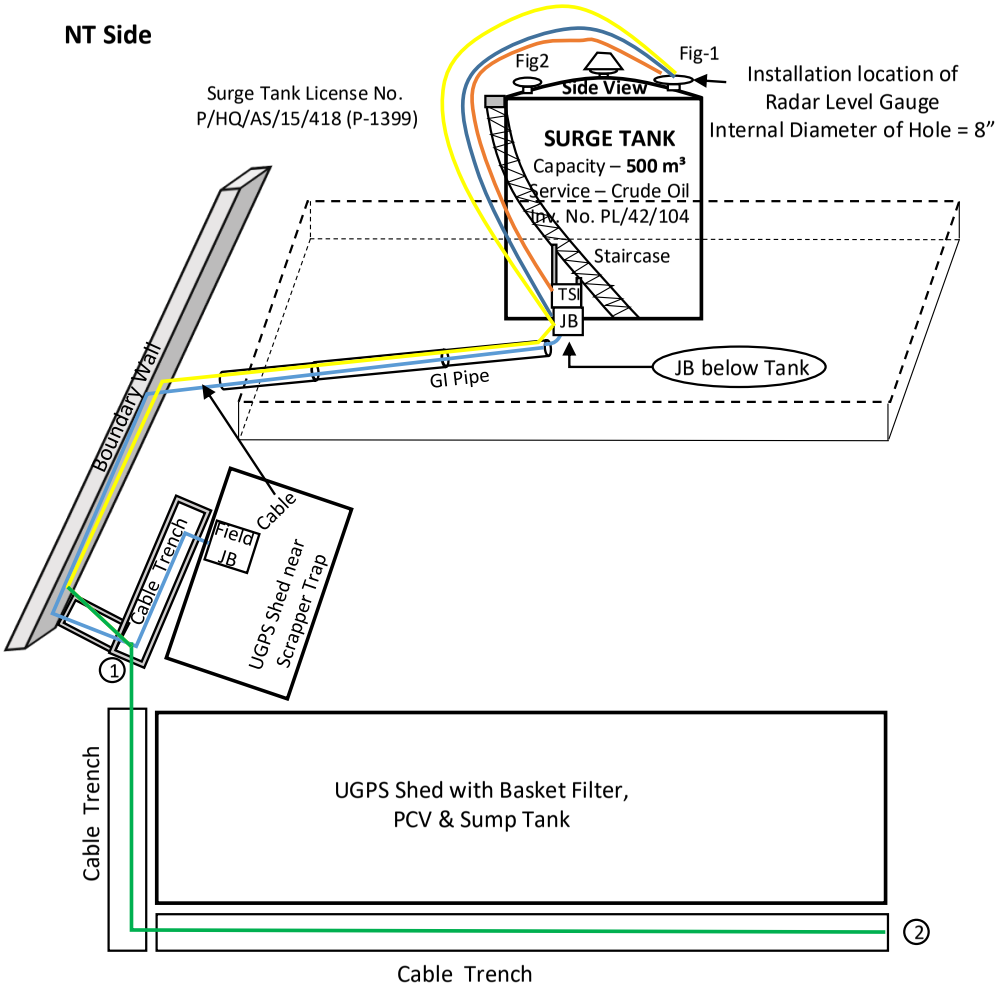


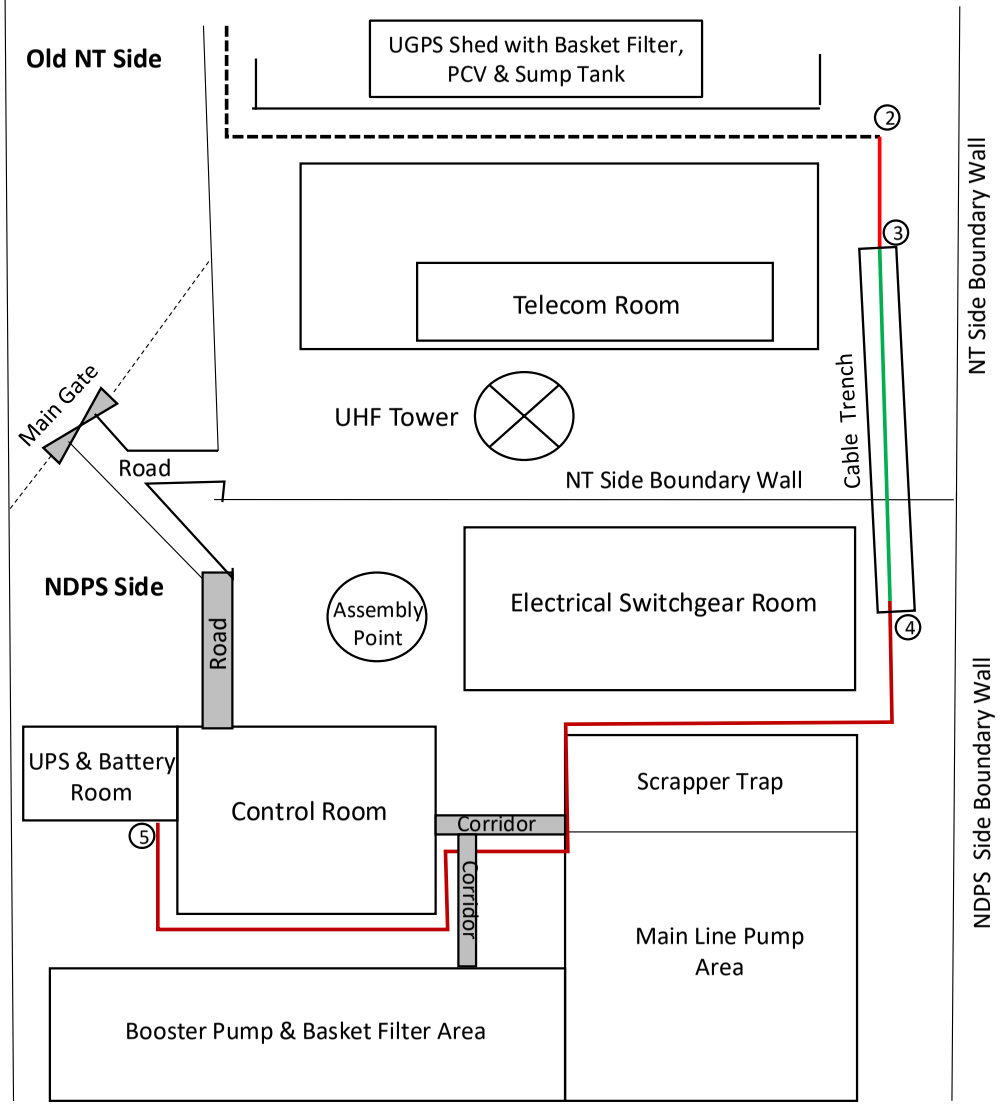


- All dimensions as per actual measurement as on 19-06-2018
- Measurement of Flange height from Tank roof does not include the Top Flange.
- Flange Thickness – 2 cm
- "x" = 1 – 1.5 cm
- All measurements are in centimeters.
- Measurements taken by – Mithilesh Ch. Dev, SE (O) NT
  Parthajyoti Shyam, Sr.E (O) NT
  Santanu Sarmah, TE, NT
- Drawn by – Santanu Sarmah, TE, NT

ANNEXURE – II

Length of Cable from Surge Tank Level Gauge at RT-202 (Numaligarh) to 230 V Power supply at NDPS





***N.B - Please see next slide for Legends ……**

Legends

Red Line (———) indicates AC Power Supply cable laying through tray.

Green Line (———) indicates AC Power Supply cable laying through trench.

Yellow Line (———) indicates AC Power Supply cable laying through Wall, buried GI Pipe, tray upto Radar Level Gauge base Unit at Tank Top.

Blue Line (———) indicates signal cable from Radar Level gauge base unit at Tank top to Field JB near Scrapper Trap Shed via JB below tank

Orange Line (———) indicates Cable from Radar Level Gauge base unit at Tank Top to TSI (Tank Side Indicator).

Length of cable from Installation point above Surge Tank (Fig-1) to JB below Tank = 40 meter (Through Cable Tray)

Length of Cable from JB below Tank to Point (1) = 80 meter (Through Trench, Wall & buried)

Length of Cable from point (1) to point (2) = 50 meter (Through Cable Trench)

Length of Cable from point (2) to point (3) = 50 meter (Through Cable Tray)

Length of Cable from point (3) to point (4) = 240 meter (Through Cable Trench)

Length of Cable from point (4) to point (5) = 200 meter (Through Cable Tray)

*N.B – In case the Radar Level gauge is 24 VDC, then only the Signal cable from Radar Level gauge base unit at Tank top to Field JB in Scrapper Trap shed along with TSI cable would be required and the AC Power supply cable from Control Room would no longer be necessary.