Sabarmati Gas Ltd.
(A Joint Venture of GSPC and BPCL)

SABARMATI GAS LIMITED

Laying, Installation, Testing and Commissioning of 8" dia. Steel gas pipeline connectivity in PATAN GA (Patan to Chansma)

RESONANCE ENERGY PVT. LTD.

Specification for GIS based software solution for Pipeline Construction Project Management using mobility

Tender No. REPL/SGL/STPL/015/22

Contents

SOW Steel Pipeline Construction Management Solution

Implementation of GIS based software solution for Pipeline Construction Project Management using mobility. Preparation of Geo-Referenced As Builts with 25m corridor on either side.

Introduction:

Sabarmati Gas Limited (SGL) intends to implement software based application to capture the data and utilize pre-defined formats / documents to cater to its Steel CITY GAS DISTRIBUTION PROJECT during its project construction so as to utilize it for project monitoring and operating & maintenance.

Objective of Solution:

The objective of the Third party Software Solution is to provide a Physical Location and Physical Condition wise status of each steel pipe from yard to As Laid.
The essential constituents of this Web Based Solution would be to trace each material with unique Tag ID from point of creation to point of use via all inherent installation process.
The primary responsibility of the Solution VENDOR is to ensure the information related to Tag ID based tracking of assets is stored in a single application, from which the information can be accessed by SGL. This access will be provided through a web enabled interface.
The VENDOR shall implement Web based solution such that:

- It is user friendly to collect real time data during construction having the details of all pipelines and assets as per SGL's Geo Data Model.
- Be able to view and monitor the construction activities on the web.
- Use the system for pipe book and mechanical completion purposes.
- Hyperlinked and referenced documents and drawings on GIS like MTC's, IRN, ITR's, As Built, P&ID's etc.

Modules of GIS based Project Management Software

The Main Modules expected from the Software;

Sl.NO	Module	Feature	Description
1	**Construction**	Engineering Design	Integrate/Import Survey Data, Topography, Planned Route, Engineering Parameters.
		Steel Construction	Field Mobility for Construction capture, Generate Daily progress, Pipe-Book, Welder Performance, Crossing Report.
2	**Materials**	Material Tracking	Track Pipes and Fittings from PO, Warehouse, Project Store, Issued for Construction and Consumed.
		Material Reconciliation	Reconcile with Actual utilised. Reconcile contractor Issued with Consumed.
3	**EDMS**	DCI	Create Document Control Index
		EDMS	Upload Documents with Revisions

Execution Methodology – Steel Pipeline Construction:

a. Steel Construction Contractors to Capture GPS coordinates during pipeline joints and installation of various features and fittings using the mobile app.
b. Construction Contractor would use the GNSS GPS receiver (Sub meter accuracy, Bluetooth connectivity on Android smart phone) so as to get good GPS accuracy.

c. Solution Vendor would provide training to the Construction Contractors for effective operation of the mobility app and GNSS device for field data collection.
d. Solution Vendor would prepare the Geo-referenced As-Built and Publish GIS on the GIS portal.

Implementation Responsibility – Steel Pipeline Construction

Implementation Time:
Solution Vendor should implement the solution including mobile Apps within 1 Week of the work order from Construction Contractor.

SL.No	Service	Task/Facility	Responsibility By
1	Setup & Hosting	Hosting Solution and Setup configuration for GA	Solution Vendor
2	Support services	Manage Web Application, Server, Users, Database, security, backups and server uptime, customization, and new application development	Solution Vendor
3	Data Aggregation	Uploading and attaching all real time pipeline construction activity and asset installation reports using Mobile App	Construction Contractor
4	Pipe Tracking (Steel)	Capturing features (that have barcode labels) and directly integrated using Barcode based Mobile app having GPRS	Construction Contractor
5	Coordinator	Provide training to users of SGL and Contractor for Coordination between SGL, PMC and Contractor for correct input of data. Upload and link documentation like procedures, MTC, drawings etc. Perform QC of the construction reports/data and report to SGL Site In-charge and Construction Contractor for corrections.	Solution Vendor
6	Handheld Device	Android based high accuracy (sub meter) GNSS GPS device. For capturing GPS coordinates of pipeline and fitting.	Construction Contractor
7	Offsets	Disto-meter or meter/tape would be used by Construction Contractor for offset at location of each fitting, bend and the resulting digitized asset shall have an accuracy of 10 CM. These will be mentioned in the Green Graph.	Construction Contractor
8	As Builts	Mapping and Preparation of GeoReferenced As Builts Drawings. Delivery to be on CAD and GIS as per predefined GeoDataModel. The As Built to mention the BOQ and North Arrow.	Solution Vendor

Solution Vendor Manpower: - Steel Pipeline Construction

The following manpower and resources would be required at each GA

1) Site Engineer: Mechanical Engineer
    a. Experience: Minimum one year experience in Oil & Gas Project sites.
2) Back Office (Vendor Office):
    a. Project Manager: Mechanical engineer having minimum 5 Years experience in Oil & Gas Projects.
    b. Developer: Having at least 4 years experience in Web application and GIS development.
    c. GIS Analysts: Minimum 2 Analysts per GA for GIS mapping, GIS QC including performing topology checks and network connectivity. Attribution as per data model and standardization of data structures.

SGL's Responsibility: -

a. Configuration data and AFC alignment sheet
b. Coordination for Solution Implementation
c. Coordination with Construction Contractors
d. QC of Vendor submitted GIS Drawings and GIS

Activity Wise Responsibility – Steel Pipeline Construction

Sl. No	Module	Activity	Data Needed	Data Format/ Application	Data Source/ Entry By	Frequency
1	Base Map	GIS	ROW Features	Open Imagery	Solution Vendor	Regular
2	Centerline	Engineering	Detailed Engg Drawing for **Steel**	DWG/SHP	Data by Construction Contractor, Uploading by Solution Vendor	Regular
4	Construction	Steel Activity	Daily activities input (Handheld/Desktop)	Solution	Construction Contractor	Continuous
6	Construction	Coordinates	Joint, Asset Coordinates with Offsets and corridor features on Green Graph)	Solution	Construction Contractor	Continuous
7	EDMS	Documentation	Collection and Uploading of construction related Documents	Various Agencies provide PDF/native file	Construction Contractor	Continuous
8	Asset	Mapping	Mapping all assets, network	Solution	Construction Contractor	Continuous
10	Asset	Inventory	Upload (Pipe tally, Valves, etc)	Solution	Client	Continuous

Final Delivery by Solution Vendor:

- On Completion of a Steel section. Solution Vendor would install the read only solution on Clients server.
- On Completion of a Steel Section, solution vendor would provide the GIS data in SHP files as per SGL's geo data base.
- GeoReferenced as built drawings in DWG and PDF would be submitted.

Pipeline Features to be captured using GPS:

S.NO.	PIPELINE ASSETS	SHAPE	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3
1	**CGS**	**Point**	Name	Location	
2	**Weld Joints**	**Line**	Outer Diameter	X, Y, NGL, Depth	Contractor Name
			2"/ 3"/ 4"/ 6"/ 8"/ 12"/ 16"/ 18"		
3	**CNG**	**Point**	Name	Status	Type
			D-Booster/ Hybrid/ Mother/ Offline/ Online	***COCO/ DODO/ DTC/ OMC***	
4	**REGULATOR**	**Point**	Subtype	Name	Location
			FRS/DRS		
			Commercial/ Industrial		
5	**GAS VALVE**	**Point**	Subtype	Depth	Valvediameter
			SV Point/ Steel Valve		***2"/ 3"/ 4"/ 6"/ 8"/ 12"/ 16"/ 18"/ 32 mm/ 63 mm/ 90 mm/ 125 mm/ 180 mm***
6	**NON CONTROLLABLE FITTINGS**	**Point**	Subtype	Material	
			Bends, Elbows, Flange, Vent Pipe	***STEEL***	
7	**TAP FITTINGS**	**Point**	Material		
			STEEL		
8	**PIPELINE MARKERS**	**Point**	Subtype	SUBTYPE	
			STEEL	***Plate Marker/RCC marker/Pole Markers***	
9	**OFFSET**	**Line**	Subtype		
10	**TRU/TLP/Anode**	**Point**	Location	Number	

Corridor Features to be captured:

S.NO.	PIPELINE ASSETS	SHAPE	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4
1	**Rail Road**	**Line**	Location Description			
2	**Right Of Way**	**Line**	Name			
3	**Street**	**Line**	Name			
4	**Boundary Line**	**Line**	Type			
			Apartment/ Boundary Wall/ Compound Wall/ Village Boundaries/ Others			
5	**Building**	**Polygon**	Type	Building Number	Address	Floor Number
			Apartment/ Commercial/ Educational/ Emergency Service/ Factory/ Financial Service/ Government/ Industrial/ Public Service/ Residential/ Sports/ Worship			
6	**Obstruction Point**	**Point**	Type			
			Electrical Pole/ Transformer/Sewer manhole/ Street Light/Any Other Point of References, etc.			