GUIDELINES FOR PROJECT PLAN SUBMISSION – INSTALLATION OF BULK LPG SYSTEM

QF-1802-GL-003
Revision **2**

	Prepared by	Reviewed by
Signature		
Designation	**Gas Installations Senior Supervisor**	**Fuel Installations Head**
Date	22/11/2021	22/11/2021

	Endorsed by	Approved by
Signature		
Designation	**Sales & Marketing Manager**	**CCO**
Date	22.11.2021	22/11/21

Document Authorisation

Document Authority / Owner	Document Controller / Custodian
Sales & Marketing Manager	IMS Administrator
Is overall responsible for the content, quality, adequacy, and continuing applicability of this document.	Is responsible for maintaining updated versions of this document in WOQOD intranet and deleting the previous versions.

Revision Record

Revision Number	Date of Revision	Reason for Revision / Description of Changes	Prepared by	Reviewed by	Endorsed by	Approved by
0	17 October 2017	First Issue	Code Compliance Supervisor	Technical Inspection Lead	-	Gas Operations Manager
1	08 December 2019	Revised the whole document	Gas Installations Senior Supervisor	Fuel Installations Head	-	Sales & Marketing Manager
2	22 November 2021	Revised the process and RACI Matrix	Gas Installations Senior Supervisor	Fuel Installations Head	Sales & Marketing Manager	CCO

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Effectivity
"Effectivity date shall be as per the date this document is signed and approved.

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SECTION 1 INTRODUCTION

WOQOD was awarded exclusive concession under the provisions of Law No. 4 of 2003 to sell, transport, distribute, store and market Fuel & Liquefied Petroleum Gas (LPG) within the State of Qatar.

Acting in accordance with the provisions of the concession, WOQOD proposed to its customers the installation of bulk LPG tanks to facilitate efficient and safe usage of gas. To enhance the installations of bulk LPG tank system for multiple type of projects, approved Gas Contractors (list available at WOQOD website) would be required to attend Project Consultant / Developer query in order to carry out the installation.

1.1 PURPOSE

This purpose of this guideline is to set out the minimum requirements for Project Consultant/ Gas Contractor to follow in order to proceed with the submittal of Bulk LPG Tank(s) Installation project plans at their facilities for WOQOD S&M Fuel Installations review/ approval.

The objective of this Guideline is to define the requirements that are required to be complied by the Project Consultant & Gas Contractors in order to proceed with the approval of Bulk LPG Tank (s) Installation Project plan for their facilities.

This document has been developed in conjunction with the code and WOQOD requirements.

1.2 SCOPE

This guideline covers the activities, requirements for project plans submission and installation of bulk LPG tank system at customer(s) facility.

Moreover, the guideline covers the activities, requirements to be followed for LPG storage tanks ordering, collection and installations at customer(s) facility.

1.3 GLOSSARY OF TERMS

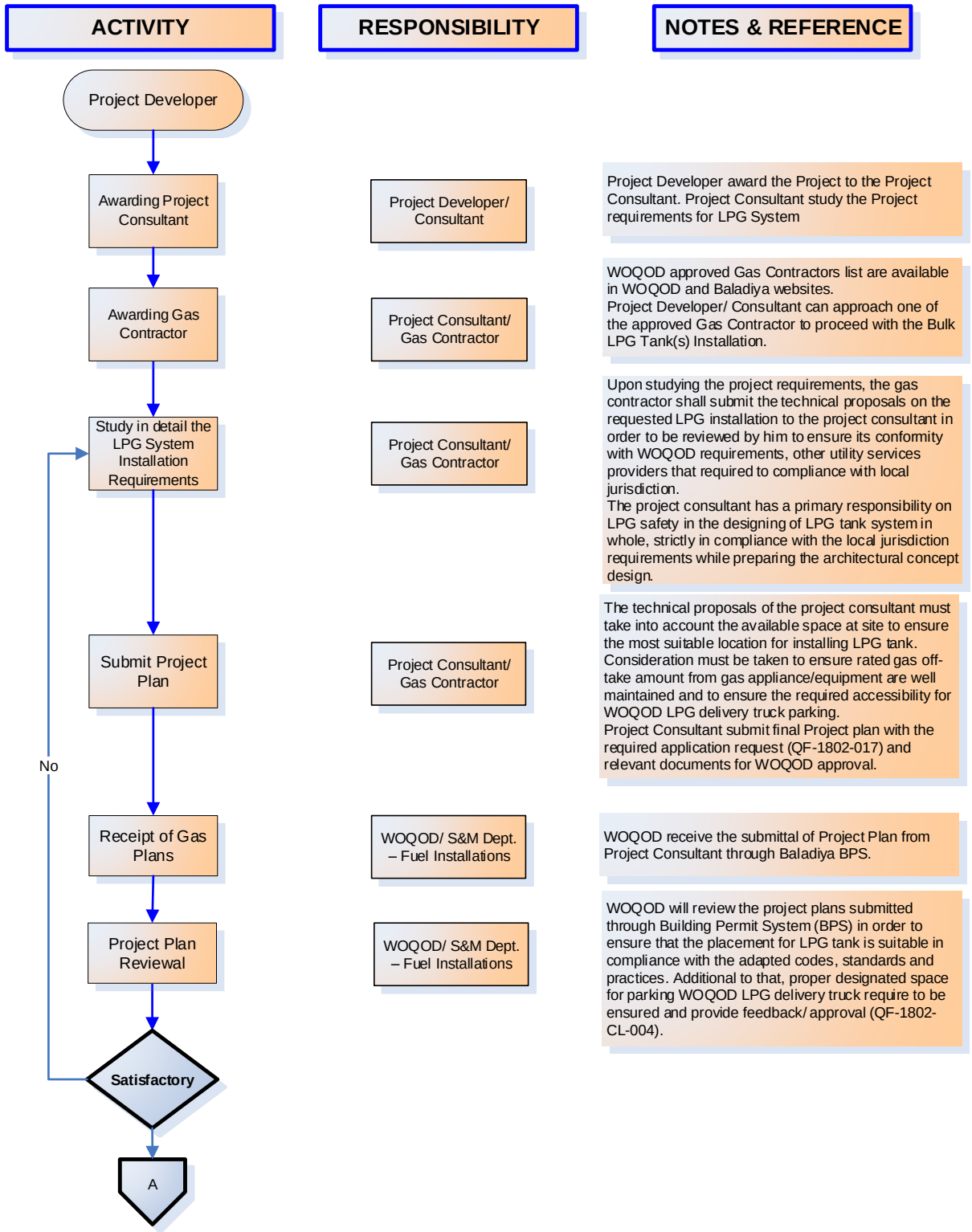
The definition of key technical terms used in this document are provided in the following table.

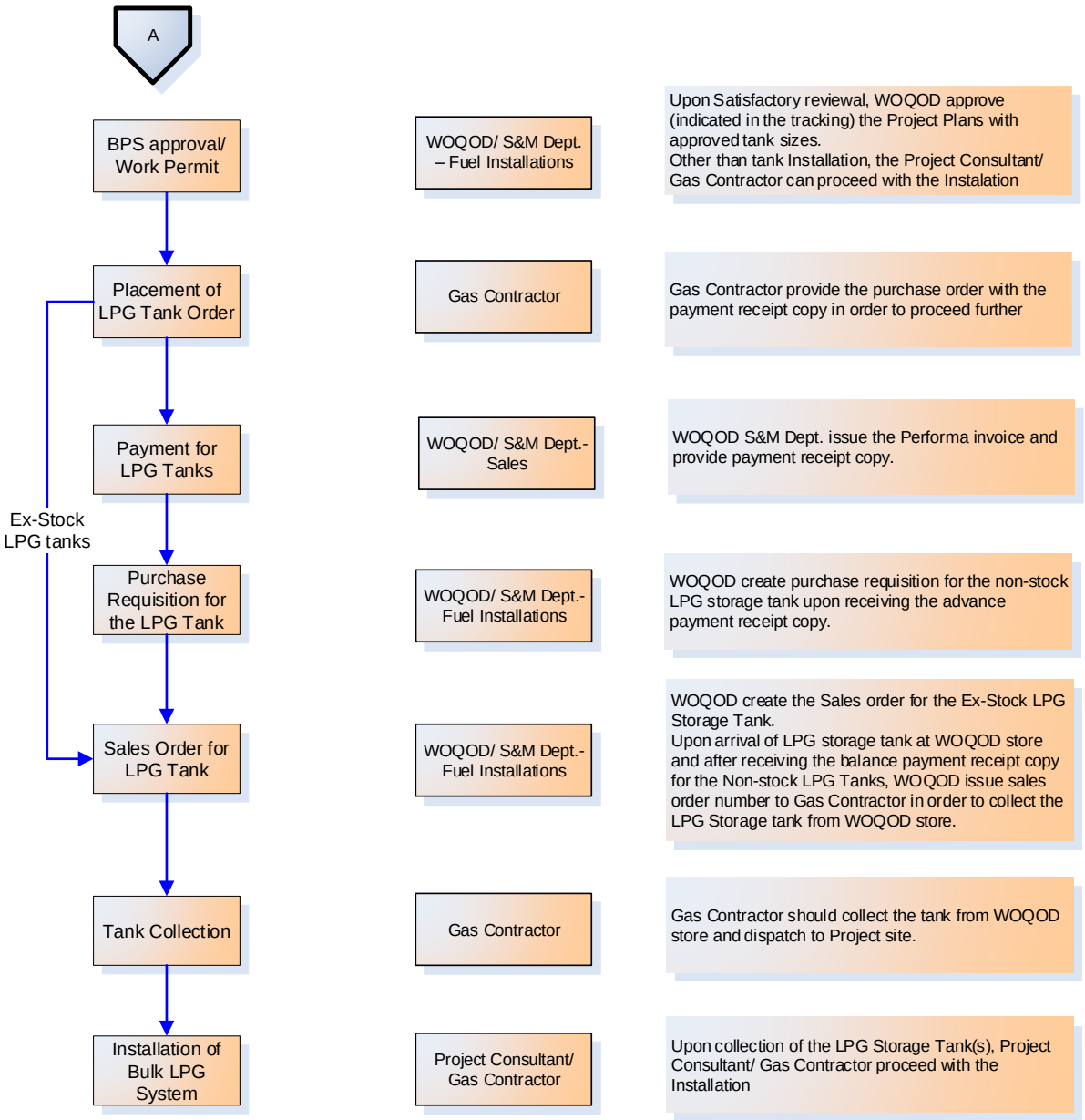
Term	Definition
ACAD	AutoCAD
APM	Annual Preventive Maintenance
ASME	American Society of Mechanical Engineers
BPS	Building Permit System (Baladiya)
Gas Contractor	WOQOD approved gas contractor for bulk LPG system
LPG	Liquefied Petroleum Gas
NFPA	National Fire Protection Association
P&ID	Process and Instrumentation Diagram
PED	Pressure Equipment Directive
Project Consultant	Engineering Consultant of the project
Project Developer	Project Owner/ Representative
QCDD	Qatar Civil Defence Department
S & M	Sales & Marketing

SECTION 2 PROJECT BRIEF SUBMITTAL PROCESS

The Project Consultant / Developer intended to install bulk LPG tank system; it would be required from Project Consultant / developer to follow WOQOD S&M Fuel Installations requirements as provided in this document.

The Project Consultant / Gas Contractor required to submit the project plans with other required documents to WOQOD S&M Fuel Installations as per section 4.1 & 4.2 listed in this document. WOQOD S&M Fuel Installations will review the project submittal in accordance with the approved guidelines and standard code requirements as per the process listed below:





SECTION 3 CODES AND STANDARDS

Project Consultant / Gas Contractor are required to adhere and comply with the international LPG codes (i.e. NFPA 54 & 58) standards and local jurisdiction requirements. It would be required from the Project Consultant to comply with the aspects of NFPA 10, 17A and 96, which reflects industry's best practices that intended to maximize protection for occupants of buildings and to reduce the risk of fire that might occurred in kitchens area and other belongings in it.

SECTION 4 PROJECT SUBMITTAL REQUIREMENTS

4.1 REQUIRED DOCUMENTS

Project Engineering Plans should be submitted in accordance with this guideline including the following.

- Commercial Registration and Establishment card of Project Developer
- Bulk LPG Tank Installation Request with the attached forms (QF-1802-FO-017).
- Letter for nominating gas installation job to Gas Contractor by the Project Consultant.
- Letter confirming acceptance of job awarded to Gas Contractor.
- Undertaking letter from Project Developer ensuring that the bulk LPG tank system with associated equipment's will be well maintained supported with efficient preventive maintenance in accordance with the requirement.

4.2 PROJECT ENGINEERING PLANS

Project Consultant should upload the Project Engineering Plans in ACAD format (Dwg, Dwf) through Baladiya website as follows:

i. Schematic (P&ID) Drawing including comprehensive cause & effect chart for gas detection system.
ii. Site plans for the placement of LPG tank including LPG delivery truck parking / driveway.
iii. Gas pipe route provided with the type of piping starting from main pipeline and the internal piping up to appliance connection.
iv. Underground piping with depth.
v. Typical kitchen isometric.
vi. Approve design for placement of enough gas detectors for each kitchen.

4.3 GAS TANKS SIZING

The proposal for sizing the tank must be computed with the estimates based on project gas consumption as well as WOQOD frequency of delivery in refilling.

Gas demand shall be elaborated in detail with building floor, number of equipment's, pressure rating (high or low).

Table 1: Refilling duration for the Tank's shall be as per WOQOD requirement.

Guidelines for Estimating Frequency in Refilling		
S. No.	**Project Category**	**Approx. Days**
1	Villa	60 - 90 Days
2	Palace	30 Days
3	Multi Stories Building	30 Days
4	Restaurant	7 - 10 Days
5	Catering Business	7- 10 Days
6	Hotel	10 Days
7	Shopping Complex	10 Days
8	Staff Accommodation	10 Days
9	Housing, Education and Healthcare Facilities	30 Days
10	Housing Development (Community)	10
11	Factories / Plants (small scale)	10 Days
12	Factories / Plants (large scale)	5 Days
Note: if the proposed tanks capacity is not meeting the indicated refilling schedule due to certain architecture constrain, it would be required from Project Consultant / Gas Contractor to seek initial approval from WOQOD S&M Fuel Installations. If the tanks capacity found to be undersized, WOQOD shall not be liable to meet future project gas demand with irregular delivery.		

4.4 TYPES OF LPG TANKS

WOQOD S&M Fuel Installations keeps regular stock of small capacity LPG tank sizes, for example, 1000, 2000- and 5000-liters aboveground tanks. These tanks are manufactured in accordance with PED 2014/68/UE and AD-Merkblatter standards. Other sizes of tanks that are required to be procured from WOQOD S&M Sales are manufactured in accordance with PED 2014/68/UE and ASME section VIII Div.1 as required by the Project Consultant / Developer.

Upon satisfactory reviewal of project plans submittal, the LPG tanks are required to be ordered from WOQOD S&M Sales through the Gas Contractor. The order will be processed after receiving a purchase order from the Gas Contractor confirmed by the Project Consultant / Developer.

Gas Contractors are required to provide the purchase order for the ex-stock LPG tanks (small capacity) in order to book the tanks and commencing with the installation. For tanks with large capacities (5,000 Litres and above) including underground types, the Gas Contractors are required to submit 100% advance payment receipt to WOQOD S&M Fuel Installations in order to process the sales order.

4.5 CODE REQUIREMENTS FOR PLACEMENT OF LP-GAS TANKS

The proposed tank sizes intended to be installed shall be placed outside building in a well-ventilated area, taking into consideration the sizes of the tanks and numbers in quantity, and ensuring safety separation distance to adjoining property, and important buildings as well as sources of ignitions etc. (Refer NFPA 58, Section 6). The proposed LPG tanks are aboveground, underground or mounded type.

Note: For tanks up to 1000 liters, maximum of 2 nos. tanks can be kept in a group as per WOQOD requirement.

Certain projects requirements in relation to types of tanks and sizes shall be equipped with fire protection systems (prevention, detection and suppression), which shall be acquired with the approval from Fire Prevention Department of QCDD.

Tanks Capacity (Liters)	Separation Distances from Tanks (Meters) From important buildings and line of adjoining property		
	Underground / Mounded	**Aboveground**	**Between Tanks**
Up to 1000	3	0.5	0.5
1000 - 7600	3	7.6	1
7600 - 114000	15	15	1.5
114000 - 265000	15	23	1/4 x (sum of Tanks diameters)
265000 - 341000	15	30	

4.6 MATERIALS & EQUIPMENT TO BE USED

Materials of LP-Gas systems including piping, valves, pressure regulators, emergency shut-off, materials/appurtenances, vaporizers, pumps/compressors, gas leak detection system shall all comply with NFPA 58 or equivalent accepted standards.

4.7 FACTORS RELATED TO WOQOD LPG DELIVERY TRUCKS

WOQOD maintains a variety of various capacities of LPG trucks dedicated for delivering LPG product to customer's projects facilities.

The Project Consultant must take into consideration the most suitable capacity of truck to deliver the LPG product in relation to the size of the tank in terms of consumption, and the available of suitable space for parking. The following data are required to be applied.

Delivery	Delivery Trucks	
	6 MT	10 MT
Up to 500 Liters per day consumption	√	√
Above 500 Liters per day consumption		√
Project Consultant are required to use this data while choosing the truck capacity.		

Delivery Trucks Dimensions/Weights:

Delivery Truck Sizes (MT)	Dimensions (Length x Width) (meters)	Weights (Tons)
6	7.3 x 2.4	16
10	9.8 x 2.6	28
20	17 x 2.5	45
Note: 20 MT delivery truck is designated for communities, factories and plants.		

4.8 FACTORS RELATED TO POINT OF TRANSFER

While placing the LPG tanks, consideration shall be made in accordance with the following scenarios:

- Up to 4000 liters capacity tanks at aboveground level, direct filling should be performed which require truck hose reel to be extracted up to 25 meters.
- If tank location exceeds 25 meters, Project Consultant shall make a provision to extend filling line provided with filling point at a safe area.
- All underground tank sizes shall be provided with extension of filling line.
- Tank sizes of capacities of 7000 liters and above shall be provided with the extension of liquid and vapor equalization lines at dedicated safe area.
- Tank sizes of capacities above 7000 liters and 7000 liters (2 nos.) shall be equipped with TODO and breakaway couplings.
- Adequate fire hose reel must be provided at unloading point adjacent to bulkhead station in accordance with local jurisdiction.

4.9 LP-GAS PIPES OUTSIDE BUILDINGS

LP-Gas pipe installed outside the building and below ground should be installed 1 meter away from the building. Underground metallic or any other piping should be protected against corrosion as warranted by soil conditions. Moreover, the carbon steel pipe be seamless, and it should be joint by welding.

4.10 LP-GAS PIPES INSIDE BUILDINGS

The maximum operating pressure for piping inside building should not exceed 1.2 bars (17.5 psi). NFPA 54 standard required to be followed for the installation and operation of gas piping and gas equipment on consumers' premises. This standard provides minimum safety requirements for the design and installation of gas piping systems.

Prohibitions:

LP-Gas system piping installations are not permitted under concrete floors within the building, under building foundations, underground floors or basement levels, or within lift shafts and cavity walls in compartments or ducts dedicated for electrical systems, in or through HVAC air-distribution chambers (or through a ducted supply, return or exhaust), a clothes chute, chimney or gas vent, along adjacent building services pipework's, in fire-fighting lobbies, in smoke-stop lobbies, in refuge areas, in fire command center, at protected corridors, at escape corridors, at staircases, in sleeping areas, in rooms housing firefighting and fire alarm equipment's and controls, along adjacent pipework's and static equipment's conveying flammable fluids, along oxidizing corrosive and hazardous materials and in areas employing stationary combustion engines.

LP-Gas system piping installation may be allowed in basement, common corridors and other rooms if the following conditions are met:

- Piping installation should be protected with metal pipe.
- Gas leak detectors shall be installed in the encasement.
- The encasement must be properly vented outside the building.

All piping installed should be elevated not less than 3 1/2 inches (152 mm) above ground and where installed across roof surfaces, should be elevated not less than 3 1/2 inches (152 mm) above the roof surface. Piping installed above ground, outdoors, and installed across the surface of roofs should be securely supported and located where it will be protected from physical damage. Where passing through an outside wall, the piping must also be protected against corrosion by coating or wrapping with an inert material. Where piping is encased in a protective pipe sleeve, seal the annular space between the piping and the sleeve should be sealed.

4.11 HIGH PRESSURE REGULATOR-FIRST STAGE

High pressure regulator is located near the tank area inside an enclosure. This enclosure should be constructed with heavy-duty aluminium / steel sheets with approved lock and locked doors. The following components should be fitted in the enclosure:

- First stage pressure regulator (max. outlet up to 1.2 bars)
- OPSO
- Shut off valves
- Normally closed solenoid valve
- Pressure gauges
- Condensate trap

4.12 MEDIUM/LOW PRESSURE REGULATOR-SECOND STAGE

Second stage vapor pressure regulators should be sized in order to bring down the high pressure of gas to the required pressure level (range of 0.030 to 1 bar) to cope with the equipment. The 2nd stage regulator and its related fittings must be installed in order to protect them from the weather as well as to prevent water to the vent. Enclosure must be provided as per project requirement as considered to be pressure reducing station for multi-kitchen equipment. In addition to that each gas kitchen equipment required to be connected with a designated regulator either medium or low pressure with ball valve and approved hose.

4.13 GAS METER

The gas meter is a device intended for measuring the account of consumption of quantity in terms of vapor gas supply in units of volume measuring in cubic meters. As a guidance, a common gas meter should calculate in cubic meter per hour (m^3/hr) which will satisfy the normal requirements of individual outlet. Refer to NFPA 58, Section 6.17.5 and NFPA 54, Section 5.7.

The following fittings should be incorporated in the gas meter box:

- Gas meter capacity (m^3/hr)
- Pressure regulator
- Fixing bracket for meter connection
- Shut-off ball valve
- Meter compensation connection

4.14 LPG TANK YARD (OTHER REQUIREMENT)

Fire protection provisions for LP-gas tanks and installations shall be in compliance with NFPA 58 latest edition, Section 6.29 and subject to local jurisdiction.

1 Fire Extinguishers

It is recommended that a dry powder type extinguisher with B:C rating should be used:

- (1 x 9kg) dry powder is suitable for a store of up to (**1000**) Liters capacity.
- (2 x 9kg) dry powder is suitable for a store of up to (**2000**) Liters capacity.

2 Water Sprinkler System

- When it is applicable as per the code requirement, the water spray system provided with deluge valve shall be connected to fire protection system of the building and shall be interconnected with gas detection system.

3 Safety Signage

Suitable hazard warning signage including "No Smoking" and "No Naked Lights" restrictions shall be fixed at appropriate points at the tank yard.

4.15 GAS APPLIANCES CONNECTIONS

Approved quality flexible hose along with a shut off valve shall be installed with every appliance. Flexible hose shall be labelled with the manufacturing date and the length of the hose shall be as short as practical, not exceeding 6 feet.

4.16 GAS DETECTION SYSTEM

Gas control panel with detectors shall be installed in order to improve safety to take corrective action when an alarm is sounded with the detector executing an action i.e. shut-off solenoid valve in case of a gas leak.

The Project Consultant shall propose for a fixed gas detection system capable of monitoring the premises or certain areas of the premises, where combustible gas (es) might accidentally accumulate.

The detecting system shall be capable of signalling an early warning of accidental accumulation of combustible or toxic gas(es), and the location, in order to initiate one or more of the following actions, either automatically or under manual control:

- Safe evacuation of premises
- Appropriate firefighting procedures
- Shut down of process or plant
- Ventilation control as per local authority requirement

The gas leak detection system must be installed especially in buildings in order to monitor gas leaks at different locations of the gas network. Gas tank(s) and all open to sky (OTS) gas pipes shall be protected with a gas leak detection system. The gas control panel conditions are to be followed in Cause & Effect chart are as follows:

- A central control panel (including sensors) flashing light alarm and horn for 15% level, closing the gas supply at 30% level and closing the main gas supply at 40% level.
- The gas control panel interfaced with the fire alarm panel.
- Gas leak detector on the tank area shall be explosion proof type.

SECTION 5 RACI MATRIX

The key roles, responsibilities and accountabilities within this Guideline are represented in the form of a RACI matrix. RACI stands for Responsible (R), Accountable (A), Consulted (C) and Informed (I).

Table 1: RACI Matrix for Project Plan Submission Guidelines

Activity	Relevant Functions						
	S & M Manager	Fuel Installations Head	Sales Team	Gas Installations Team	Project Consultant	Gas Contractor	Project Developer
Receipt of Project Plan for reviewal	-	A	-	R	R	R	I
Project Plan Reviewal	-	A	-	R	I	I	-
BPS Approval / Work Permit	-	A	-	R	I	I	-
Placement of Tank Order & Payment	A	I	R	I	-	R	I
Purchase Requisition / Sales Order for LPG Tank	-	A	I	R	-	I	I

SECTION 6 RELATED DOCUMENTS

- Bulk LPG Tank Installation Request Forms QF-1802-FO-017
- Application for Bulk LPG Installation QF-1802-FO-013
- Project Plan Reviewal Sheet QF-1802-CL-004
- Bulk LPG Installation Work Permit QF-1802-FO-004

Note: As per project requirement and gas installation, certain forms and documents are required to be maintained during execution of work in order to ensure operation integrity accomplished at each stage. All these documents are required to be approved and endorsed by Project Consultant, the Gas Contractor will be required to endorse and confirm the same documents. WOQOD S & M Fuel Installations shall revert the application to Project Consultant if any below documents are found to be incomplete

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Bulk LPG Tank Installation Request

Project Plans Submittal Requirement

Project Details			
Project Name			
Location			
Project Consultant Name			
Contractor Name			
Reference No.		**Date**	
Proposed Tank(s) Size		**No(s)**	
Proposed Tank(s) to be Installed	Underground ☐ Aboveground☐		
Project Category	Residential ☐ Commercial☐ Industrial☐		

List of Forms / Documents Required to be Filled by Project Consultant Prior to Submittal of Project Plans				
Forms	**Description**	**Yes**	**No**	**Remarks**
A	Project plans submittal application form	☐	☐	
B	Proposal for tank(s) size and consumption details	☐	☐	
C	Statement of compliance for tank(s) size and placement	☐	☐	
D	Statement of compliance for road tanker size and parking availability along with transfer operation point	☐	☐	
E	Statement of compliance for gas piping outside building (NFPA 58)	☐	☐	
F	Statement of compliance for gas piping inside building (NFPA 54)	☐	☐	
G	Gas detection system cause and effect chart	☐	☐	

These guidelines are intended to provide minimum submittal requirements for obtaining LPG tanks installation permit. Additional requirements and/or information may be required based on the individual project.

Name, Signature and Stamp of Consulting Engineer **Date**

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A. Application for Bulk LPG Installation

Date			
Project Ref. No.		Revision	
Project Name			
Builder / Owner			
Project Consultant			
Contractor			
Project Category	Residential☐ Commercial☐ Industrial☐		
Contact Person			
Tel. No.		Mobile	
Project Location		Zone / Plot No.	

Gas Consumption and Tank Sizes

No(s). of Equipment			
Total Consumption (Liters / Hour)		Revision	
Total Working Hours / Day			
Proposed Tank Size		A/G ☐ U/G☐	
No(s). of Tanks			
Estimated Gas Storage for Days			
Vaporizer Requirement	Yes☐ No☐		
Vaporizer Capacity		Liter / Hour	

Shop Drawings Submittal: Two set of plan required.

Drawings No. :

1		2	
3		4	
5		6	

The above information provided is true and accurate to the best of my knowledge.

Project Consultant Rep. Name		Title	
Signature		Stamp	

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B. Proposal for Tank(s) Size and Consumption Details

Gas Connection(s) Details		
1	No. of kitchen(s) located at ground floor	
2	No. of kitchen(s) located at first floor	
3	No. Boiler rooms (laundry) at basement	
4	Others	

Computation of Gas Consumption
The applicant is required to submit comprehensive estimated consumption for each connection provided with no. of equipment's located at each floor along with operating pressures.

Note: Accumulated consumption shall be estimated per day.

Proposed Tank(s) Size (Liters)	
No. of LPG Tank(s)	
No. of Storage Days	

Name, Signature and Stamp of Consulting Engineer **Date**

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C. Statement of Compliance for Tank Size, Vaporizer and Placement

1. LPG Tank location

Aboveground LPG Tank:

Tank shall be proposed ensuring Safety Separation distance in compliance with NFPA 58, Section 6 as follows.

- Nearest important building.
- Nearest property line which may be built upon.
- Exterior source of ignition. (Pump, A/C etc.)
- Intakes of appliances or ventilation systems.
- Openings to homes that are below the level of the relief valve.
- Stored trash, hay, or other combustible Material (loose or piled).
- Stored flammable liquids (other than LPG).
- Drainage problem area.
- Other LPG tanks; multiple tank installations.
- Cesspools, septic tanks, water or sewage lines, or any underground utility line.

Underground LPG Tank:

Underground LP-Gas Tank shall be proposed ensuring the safety separation distances in compliance with NFPA 58, section 6 as follows.

- Nearest important building.
- Nearest property line which may be built upon.
- Exterior source of ignition. (Pump, A/C etc.)
- Intakes of appliances or ventilation systems.
- Stored trash, hay, or other combustible material (loose or piled).
- Stored flammable liquids (other than LP-Gas).
- Other LPG tanks; multiple tank installations.
- Depth of water table
- Rainwater drainage

Ignition sources nearby LPG Tank shall comply as per NFPA 58, section 6.25.

2. Vaporizer location

Proposal of vaporizer in compliance with NFPA 58, section 5.24, 6.24 and 6.25

Name, Signature and Stamp of Consulting Engineer **Date**

D. Statement of Compliance for Road Tanker & Filling Point

1. Road Tanker

Safe movement of Road Tanker and parking.

2. Filling Point

Distance Between Point of Transfers and Exposures		
Part	**Exposure**	**Min. Horizontal Distance (Meter)**
a	Buildings, mobile homes, recreational vehicles and modular homes with at least 1-hour fire-rated walls	3.1
b	Buildings with other than at least 1-hour fire-rated walls	7.6
c	Building wall openings or pits at or below the level of the point of transfer	7.6
d	Line of adjoining property that can be built upon	7.6
e	Outdoor places of public assembly, including schoolyard, athletic fields and playgrounds	15.0
f	Public ways, including public streets, highways, thoroughfares and sidewalks:	-
	1. From points of transfer in LPG dispensing stations and at vehicle fuel dispensers	3.1
	2. From other points of transfer	7.6
g	Driveways	1.5
h	Mainline railroad track centerlines	7.6
I	Tanks other than those being filled	3.1
J	Flammable and Class II combustible liquid dispensers and the fill connections of Tanks	3.1
k	Flammable and Class II combustible liquid Tanks, aboveground Tanks and Tanks underground	6.1

☐ Refer NFPA 58 2017, Figure A.6.25.2.3 for Filling point

3. Filling Line

☐ Installation of Gas Piping outside the building shall comply as per NFPA 58, Section 5.11 & 6.11.

Name, Signature and Stamp of Consulting Engineer **Date**

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E. Statement of Compliance for Gas Piping Outside Building

LPG Piping Outside Building:

Installation of LPG piping outside building area shall be in compliance with NFPA 58, Section 5.11 and 6.11.

Name, Signature and Stamp of Consulting Engineer

Date

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F. Statement of Compliance for Gas Piping Inside Building

LPG Piping Inside Building:

Installation of LPG piping inside building area shall comply with NFPA 54. (Gas Pipe, Regulator, Gas Meter, Appliance Connection etc.)

Prohibition:

LP-Gas system piping installation are not permitted under concrete floors within the building, under building foundations, underground floors or basement levels, within lift shafts and cavity walls, in compartments or ducts dedicated for electrical systems, in or through HVAC air-distribution chambers (or through a ducted supply, return or exhaust), a clothes chute, chimney or gas vent, along adjacent building services pipe works, in fire- fighting lobbies, in smoke-stop lobbies, in refuge areas, in fire command center, at protected corridors, at escape corridors, at staircases, in sleeping areas, in rooms housing firefighting and fire alarm equipment's and controls, along adjacent pipe works and static equipment conveying flammable fluids, along oxidizing corrosive and hazardous materials

and in areas employing stationary combustion engines.

Name, Signature and Stamp of Consulting Engineer **Date**

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G. Gas Detection System Cause and Effect Chart

Sample of Cause and Effect Chart for Gas Detection System

CAUSE & EFFECT CHART			EFFECT					
			E1	**E2**	**E3**	**E4**	**E5**	**E6**
			Activation of Sounder Near Panel	De-activation of tank through pneumatic actuated SOV	De-activation of Main SOV	Activation of Sounder - kitchen/Equipment	De-activation of SOV - kitchen/Equipment	Signal of FACP
Cause	**Identification & Service**	**Tag No.**	**SO-01**	**SOV-01**	**SOV-02**	**SO-05**	**SOV-03**	
C1	LPG Tank Area - Gas Detector Leak - 15% LEL	EGDS	•					
C2	LPG Tank Area - Gas Detector Leak - 30% LEL		•	•	•			•
C3	LPG Tank Area - Emergency push Button	EP-01		•				
C4	kitchen/Equipment- Gas Detector Leak-15 % LEL	GDS				•		
C5	kitchen/Equipment - Gas Detector Leak-30 % LEL		•			•	•	
C6	kitchen/Equipment - Gas Detector Leak-40 % LEL		•	•	•	•	•	•
C7	kitchen/Equipment- Emergency Push Button	EP-05					•	
C8	Fire at the Building (Signal from FACP)			•			•	

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- **Please specify the availability of the Following in the Tank location, Inside Building and Kitchen**

Fire Alarm System	Yes☐	No☐	Remarks	
Fire Fighting System	Yes☐	No☐	Remarks	
Ventilation System	Yes☐	No☐	Remarks	

Name, Signature and Stamp of Consulting Engineer

Date