



GAIL GAS LTD

(A wholly owned subsidiary of GAIL (India) Limited)

CNG AND CITY GAS DISTRIBUTION PROJECT

BID DOCUMENT FOR

ARC FOR SS TUBE LAYING AND ASSOCIATED WORKS VOLUME – II OF II (TECHNICAL)

(BID DOCUMENT NO: 110290/WGI/GAIL GAS/17-R0)

LIMITED DOMESTIC COMPETITIVE BIDDING



DELIVERS. EVOLVES.

WHOLE LIFE SOLUTIONS FOR PIPELINE AND SUBSEA SYSTEMS

ISSUED BY





**GAIL GAS LIMITED
CITY GAS DISTRIBUTION PROJECT**



SPECIFICATION FOR INSTALLATION OF SS TUBES, FITTINGS & VALVES	CLIENT JOB NO.	0290
	TOTAL SHEETS	06

DOCUMENT NO	11	0290	02	08	02	001
--------------------	----	------	----	----	----	-----

--	--	--	--	--	--

0	27/04/10	ISSUED FOR TENDER	AS	DDS	PKS
A	15/01/10	ISSUED FOR IDC	AS	DDS	PKS
REV	DATE	DESCRIPTION	PREP	CHK	APPR

TABLE OF CONTENTS

1. SCOPE.....3


2. SCOPE OF WORK3

3. LOADING, UNLOADING, TRANSPORTATION & ERECTION OF MATERIAL/EQUIPMENT5

4. LAYING, TESTING & COMMISSIONING OF S.S TUBING.....5

5. SUPPLY, LAYING, TESTING AND COMMISSIONING OF GI/COPPER PIPES.....6

6. PURGING AND COMMISSIONING.....6

	SPECIFICATION FOR INSTALLATION OF SS TUBES, FITTINGS & VALVES	Document No.	Rev
		11-0290-02-08-02-001	0
Sheet 2 of 6			

1. SCOPE

The Technical Specification covers the laying, testing & commissioning of tubing for CNG stations as described in the following pages.

2. SCOPE OF WORK


2.1 TUBING WORKS

2.1.1 Piping & Instrumentation Diagram (P & ID) or schematic drawing for the CNG station, if required, to enable the Bidder to understand the various connections and details of tubing work involved may be handed over to successful bidder. The contractor shall carry out tubing works based on these drawings, reference specification/standards, documents etc. enclosed with this tender document and as per instructions of Owner, Engineer-in-Charge and other provisions of Contract document.



2.1.2 Scope of work indicated shall be read in conjunction with the Schedule of Rates, drawings, specification, standards, and other documents forming a part of the Contract document.

The Contractor's Scope of Work for each CNG station shall consist of, but not limited to, the following:

- a) Providing all equipments, manpower, machinery, consumables for fabrication, installation, inspection, testing and pre-commissioning and assistance during commissioning: all types of safety tools, tackles, devices and apparatus, equipment etc. including ladders and scaffolding etc. complete as required including providing of all types of consumables, tools, tackles and facilities for inspection and interpretation of testing results by Owner/Owner's Representative personnel.
- b) All steel materials such as structural steel, reinforcement steel, shims, wedges, packing plates, pipes, perforated trays, nuts and bolts etc. for all types of supports and foundation as required (Pipes supplied by Company shall not be used for fabrication of supports / saddles etc.). All nuts and bolts, washers, U-bolts, clamps, clips etc. as required for fabrication of support and other structural works. Tube/ Tray supports like MS plates, GI plates, flats, pipe etc.
- c) Furnishing and mobilizing at site(s), of all construction equipment including ladders and scaffolding, tools and tackles, devices, apparatus, etc. fully equipped and fully manned with other required support facilities etc. needed for successful execution of the works.
- d) Installation/Commissioning of SS tubes of all sizes and rating as required for successful completion of work.
- e) Supply/Installation/Commissioning of 300 X 50 mm and 150X50 mm wide MS galvanized perforated tray along with coupler plate (with nuts and bolts for above trays).
- f) "Receiving and taking over" of Owner supplied free issue materials from the designated place(s) of issue, transportation including loading, unloading, handling from Company's designated place(s) of issue to Contractor's own stock yard(s)/work shop(s) including arranging all necessary intermediate storage area(s) there of as required till the permanent installation of materials.
- g) Procurement and supply of all materials and equipments that are included in the scope of supply of Contractor, transportation of all materials/equipments from supplier's/manufacturer's works including loading, unloading, handling, storing and transportation to work site(s)/work shop(s) including arranging all necessary intermediate storage area(s) there of, as required.

	SPECIFICATION FOR INSTALLATION OF SS TUBES, FITTINGS & VALVES	Document No.	Rev
		11-0290-02-08-02-001	0
		Sheet 3 of 6	

- h) Fabrication and installation of all tubing systems including hook-up of tubing with compressors, stationary type cascades/ mobile type cascade facilities, dispensers etc. consisting of fabrication and installation of tubes, valves & fittings.
- j) Clamping of perforated trays with necessary accessories like bolts, supports etc. all bolts and nuts for supports, U-bolts, clamps, clips for tubes, anchor bolts of various sizes for fixing to concrete structure etc.
- k) All types of painting materials including primers, paints, solvents, sand blasting materials, cleaning agents, compressed air etc.
- l) Carrying out cutting, edge preparation wherever required, fit-up, bending wherever required.
- m) Hook-up of new tubing facilities with existing facilities and the battery limit with the facilities installed by others including cutting, fit-up, interface co-ordination as required with other Contractor(s)/ Agencies, including installation of all type of valves, tubes, fittings, hose, & hose coupling, etc including fixing of gaskets, bolts, studs, and nuts of all sizes, ratings and materials.
- n) Fabrication and erection of tubing supports.
- o) All materials required for grouting and concrete works etc.
- p) Testing, pre-commissioning and assistance during commissioning activities of tubing system of all sizes as per specifications enclosed.
- q) Nitrogen for purging of tubing.
- r) Painting of all tray/tube supports and all miscellaneous items with paints. Wherever touch up repair of primer is required, high build epoxy zinc phosphate primer shall be used.
- s) Final clean up and restoration of site, facilities etc. as per the requirement of Owner/ Engineer-in-charge.
- t) Contractor to abide by prevalent safety & work rules of installation.
- u) Co-ordination as required with other Agencies/Contractor(s) till the time the commissioning operations are complete.
- v) Preparation of fabrication drawings, if required, for the purpose of fabrication during execution of work.
- w) Preparation of detailed procedures for fabrication, installation, testing and pre-commissioning. Such procedures shall be submitted to Owner/Engineer-in-charge for review and approval.
- x) Testing the total system i.e. tubing, fittings etc. after installation with Nitrogen at a pressure of 250 barg and carry out leak tests. Leakages, if any, observed during testing shall be rectified without any additional cost to Owner.
- y) Transportation of all surplus company supplied free issue material to company's designated store after completion of works.

 	SPECIFICATION FOR INSTALLATION OF SS TUBES, FITTINGS & VALVES	Document No.	Rev
		11-0290-02-08-02-001	0
		Sheet 4 of 6	

z) Any other works not specifically listed herein but required for satisfactory completion/operation Safety /statutory maintenance of the works in all respects within specified schedule at no extra cost to OWNER.

aa) Preparation and submission of “ As Built Drg.”

3. LOADING, UNLOADING, TRANSPORTATION & ERECTION OF MATERIAL/EQUIPMENT

Following shall constitute the contractor’s scope of work but not limited to as given herein:

- i) Unloading of material at store /site.
- ii) Receiving of material from store/site.
- iii) Loading of material / equipment on trailer/truck from store/site.
- iv) Safe transportation to various site.
- v) Placement and alignment of equipment on foundation
 - on ground
 - above ground +4 to 5 mtrs. roof top(cascade)
- vi) All equipment transported shall be securely boarded and transported without causing any damage to equipment .Any damage caused during loading, Transportation & unloading shall be recoverable from the contractor.

4. LAYING, TESTING & COMMISSIONING OF S.S TUBING

4.1. S.S tubes shall be clamped to the angles trays at every 1000mm using clamps made of galvanized steel/aluminum strips with soft protection material. The practice of flattening tubes for clamping purposes shall be avoided. In case of PVC covered tubes, any exposed portion and connections shall be neatly taped to appropriate thickness.

4.2. Perforated trays/angle shall be properly supported at a regular interval of max. 1000mm. wherever insert plates are not available, supports on concrete structure shall be fixed with a minimum of 10mm expansion bolts (Anchor fasteners). Trays shall be laid generally as per site conditions with the approval of Engineer-in-Charge. Angle supports shall be fabricated from 50m X 50m X 6mm MS angles as minimum with a base plate of 200mm X 200mm X 6mm thick.

4.3 Horizontal and vertical tubes shall be installed using levels and plumb bobs.


4.4 Tubes shall be bent using tube benders only and any hot bending will be totally rejected. Tubes shall be cut using pipe cutting device. Hot cutting is not allowed.

4.5 Minor civil works like chipping of pavement and grouting on pavements the supports, and chipping and refilling of the pavement, removal of sand from tube/pipe trenches etc.

4.5.1 Installation Procedure

4.5.1.1 Tube End Preparation:

- a) Cut the ends square with a hacksaw and a suitable guide. Tube cutters are satisfactory for most tube materials but tend to work hard on stainless steel.
- b) Burrs must be removed inside and outside for proper entry into fitting to prevent contamination and / or restricted flow. Preferably Swagelok deburring tool shall be used.
- c). Remove all fittings, chips, and grit before attachment of fittings.

	SPECIFICATION FOR INSTALLATION OF SS TUBES, FITTINGS & VALVES	Document No.	Rev
		11-0290-02-08-02-001	0
		Sheet 5 of 6	

4.5.1.2 Assembly:

- a) Tube line fabrication must be accurate so that the tube end easily enters the fitting proper alignment. Do not force an improperly fitted tube line into the fittings.
- b) Ensure that the tube end is bottomed against the shoulder in the fitting body. This is necessary to prevent movement of the tube while the nut forces the ferrule to grip the tube and to seal through any imperfections that may exist on the outside tube surface.
- c) Never permit the fitting body to rotate during tube end make-up, use two wrenches. Assemble port connectors to components first and hold with a wrench while making up the tube joint. All types of union bodies must be held while each of the tube ends is made up.
- d) Never attempt to make up by torque.
- e) Always turn the nut the prescribed amount regardless of torque required. Fitting end plug requires only 1 -1/4 turn from finger tight make up in all sizes.

4.5.1.3 Remake of fittings:

A disassembled joint can be remade, simply by retightening the nut to the position of the original make up. For maximum- number of remakes, mark the fitting and nut before disassembly. Before retightening, make sure that the assembly has been inserted into the fitting until the ferrule(s) seats in the fitting. Retighten the nut by hand. Rotate the nut with a wrench to the original position as indicated by the previous marks lining up. (A noticeable increase in mechanical resistance will be felt indicating the ferrule is being re-sprung into sealing position.). Then snug the nut 1/12 turn (1/2 hex flat) past the original position.


5. SUPPLY, LAYING, TESTING AND COMMISSIONING OF GI/COPPER PIPES

Supply and Installation of COPPER/GI Service Pipes CLASS C suitable for supplying air @ 8 kg/cm² with GI/Copper Fittings i.e. (Elbow, Tees, Cross, union, Socket, Reducer, Nipple, End Cap, End Plug all other required fittings, Isolation valve and appliance valve) of NPT Thread.

GI/Copper pipes for dispenser actuation will be partly above ground and partly underground. Underground tubing will be laid in the same tray with the SS tubing. Protection and support for above ground tubing including supply and transportation of protection and support materials shall be in the scope of contractor. This Air compressor will be erect near by to the main CNG compressor by the other contractor. The contractor shall carry out tubing works based on drawings, reference specification/standards, documents etc. enclosed with this tender document and instructions of Owner/ Engineer-in-Charge and other provisions of Contract document. Horizontal and vertical tubes shall be installed using levels and plumb bobs. Tubes shall be bent using tube benders only and any hot bending will be totally rejected. Tubes shall be cut using pipe cutting device. Hot cutting is not allowed. Minor civil works like chipping of pavement and grouting on its pavements the supports, and chipping and refilling of the pavement, removal of sand from tube/pipe trenches, etc.

6. PURGING AND COMMISSIONING

Contractor shall assist in commissioning the complete system including nitrogen purging. Supply of all manpower equipment etc. Contractor shall submit a detailed procedure for Owner/Consultant's approval.

	SPECIFICATION FOR INSTALLATION OF SS TUBES, FITTINGS & VALVES	Document No.	Rev
		11-0290-02-08-02-001	0
		Sheet 6 of 6	

JP KENNY



**GAIL GAS LIMITED
CITY GAS DISTRIBUTION PROJECT**



STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES

CLIENT JOB NO.

-

TOTAL SHEETS

37

DOCUMENT NO

11

0290

02

18

02

001

--	--	--	--	--	--

REV	DATE	DESCRIPTION	PREP	CHK	APPR
0	27/04/10	ISSUED FOR TENDER	AS	DDS	PKS
A	15/01/10	ISSUED FOR IDC	AS	DDS	PKS

1.0 SCOPE

This specification establishes the health, Safety and environment (HSE) management requirement to be complied by Contractors during construction.

Requirements stipulated in this specification shall supplement the requirements of HSE management given in relevant Act (s)/legislations, General Conditions of Contract (GCC), Special Conditions of Contract (SCC) and Job (Technical) Specifications. Where different documents stipulate different requirements, the most stringent shall apply.

2.0 REFERENCES

The document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers (regulation of employment and condition of service) Act, 1996
- Job (Technical) specifications
- Relevant IS Codes refer Annexure-I)
- Statutory requirements

3.0 REQUIREMENTS OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLIED BY BIDDERS

3.1 MANAGEMENT RESPONSIBILITY

3.1.1 HSE Policy & Objectives

The Contractor should have a documented HSE policy & objectives to demonstrate commitment of their organization to ensure health, safety and environment aspects in their line of operations.

3.1.2 Management System

The HSE management system of the Contractor shall cover the HSE requirements including but not limited to what is specified under para 1.0 and para 2.0 above.

3.1.3 Indemnification

Contractor shall indemnify & hold harmless Owner/Consultant & their representatives free from any and all liabilities arising out of non-fulfillment of HSE requirements.

3.1.4 Personnel deployment

Contractor as a minimum requirement shall designate/deploy the following persons at site:

- | | | | |
|----|--|---|--|
| a) | Up to 250 persons
deployed by him at site | - | Designate one safety supervisor |
| b) | For 251 to 500 persons | - | Deploy one qualified &
Experienced safety
Engineer/Office in addition to
Deployed by him at site the
Safety Supervisor as described in
(a) above. |
| c) | For more than 500 persons | - | Deploy an additional Safety |



STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 2 OF 37

Engineer/ Officer for every 500
Persons or part deployed by him
at site thereof, in addition to (b)
above.

No work will be started at site until above safety personnel are mobilized at site. The contractor shall submit a safety organogram clearly indicating the lines of responsibility, reporting system and furnish Bio-Data/Resume/Curriculum Vitae with contact details of the safety personnel he intends to mobilize, at least 1 moth before the intended mobilization.

3.1.5 Implementation & Monitoring

Contactor shall be fully responsible for planning, implementing and monitoring all HSE requirements and compliance of all laws & statutory requirements. The Contractor shall also ensure that the HSE requirements are clearly understood & faithfully implemented at all levels at site.

3.1.6 Awareness

The Contractor shall promote and develop consciousness about Health, Safety and Environment among all personnel working for the Contractor. Regular awareness programs and fabrication shop/work site meetings shall be arranged on HSE activities to cover hazards involved in various operations during construction.

3.1.7 Fire prevention & First-aid

The contractor shall arrange suitable first aid measures such as First Aid Box (Refer Annexure-II for details), trained personnel to administer First Aid, stand-by ambulance or vehicle and install fire protection measures such as: adequate number of steel buckets with sand & water and adequate number of appropriate fire extinguishers (Refer Annexure-III for details) to the satisfaction of OWNER/CONSULTANT.

3.1.8 Documentation

The contractor shall evolve a comprehensive, planned and documented system for implementation and monitoring of the HSE requirements. This shall be submitted to OWNER/CONSULTANT for approval. The monitoring for implementation shall be done by regular inspections and compliance to the observations thereof. The Contractor shall get similar HSE requirements implemented at his sub-contractor(s) work site/office. However, compliance of HSE requirements shall be the responsibility of the Contractor. Any review/approval by OWNER/CONSULTANT shall not absolve contractor of his responsibility/liability in relation to all HSE requirements.

3.1.9 Audit

Non-Conformances on HSE by Contractor (including his sub-contractors) as brought out during review/audit by his internal audit team as well as OWNER/Consultant's representative shall be resolved forthwith by Contractor. Compliance report shall be submitted to OWNER/CONSULTANT.

3.1.10 Meetings

The Contractor shall ensure participation of his top most executive at site (viz. Resident Engineer/Site-in-Charge) in Safety committee/HSE Committee meetings arranged by OWNER/CONSULTANT. The compliance of any observations during the meeting shall be arranged urgently. He shall assist OWNER/CONSULTANT to achieve the targets set by them on HSE during the project implementation.

3.1.11 The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliance or repeated failure in implementation of any of the HSE provisions;

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 3 OF 37	

OWNER/CONSULTANT may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty, up to a cumulative limit of 1.0% (one percent) of the contract value with a ceiling of Rs.10 lacs (Rupees Ten Lacs only). This penalty shall be in addition to all other penalties specified elsewhere in the contract. The decision of imposing stoppage work, its extent and penalty shall rest with OWNER/CONSULTANT. The same shall be binding on the Contractor. The penalty does not make the contractor eligible to continue the work in unsafe manner.

3.2 HOUSE KEEPING

3.2.1 Contractor shall ensure that a high degree of house keeping is maintained and shall ensure interalia; the following:

All surplus earth and debris are removed/disposed off from the working areas to identified location(s). Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas are removed to identified location(s).

All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).

Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete, chips and bricks etc. shall not be allowed on the roads to obstruct free movement of men & machines.

Fabricated steel structural, pipes & piping materials shall be stacked properly for erection. Water logging on roads shall not be allowed.

No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas. Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant area/or these materials shall be transported with top surface wet.

The contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.

At least two exits for any unit area shall be assured at all times.

3.3 HSE MEASURES

3.3.1 Construction Hazards

Contractor shall ensure that during the performance of the work, all hazards have been identified, assessed and eliminated.

A list of construction hazards along with their effects & preventive measures is given in the Annexure-V.

3.3.2 Accessibility

The Contractor shall provide safe means of access to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen and OWNER/CONSULTANT.

3.3.3 Personal Protective Equipments (PPEs)

The contractor shall ensure that all their staff and workers including their sub-contractor(s)'s have been issued & wear appropriate PPEs like safety helmets, safety shoes, safety belt, full body harness, protective goggles, gloves etc. All these gadgets shall conform to applicable IS Specifications/CE or other applicable international standards.

For shot blasting, the usage of protective helmets (approved by the competent authority), gauntlet and protective clothing is mandatory.

For offshore contracts, contractor shall provide PPEs (new) to CONSULTANT & Owner's personnel at his (contractor's) cost. All personnel shall wear life jacket at all time.

3.3.4 Working at height

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 4 OF 37	

The contractor shall issue height permit for working above 3 meters height after verifying and certifying the checkpoints as specified in the attached permit. He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence to personal protective equipments.

The permit shall be issued initially for one week or expected duration of an activity and extended further for the balance duration. This permit shall be applicable in areas where specific clearance from Owner's operation Department/Safety Department is not applicable. CONSULTANT field Engineers/Safety Officers/Area Coordinators may verify and sign this permit during the execution of the job.

In case work is undertaken without taking sufficient precautions as given in the permit, CONSULTANT Engineers may cancel the permit and stop the work till satisfactory compliance is arranged. Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the used permits for verification during audits etc.

Contractor shall arrange (at his cost) and ensure use of Fall Arrester Systems by his workers. Fall arresters are to be used while climbing tall structures. These arresters should lock automatically against the anchorage line, restricting free fall of the user. The device is to be provided with a double security opening system to ensure safe attachment or release of the user at any point of rope. In order to avoid shock, the system should be capable of keeping the person in vertical position in case of a fall.

Contractor shall ensure that Life Lines are used by all personnel while working at height. One end of the life line shall be firmly tied with the worker and the other end with a fixed and rigid structure. The life line should be strong enough to take the load of the worker in case of a fall.

Contractor shall provide Roof Top Walk ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages.

Contractor shall ensure that a proper Safety Net System is used wherever the hazard of fall from height is present. The safety net shall be located not more than 9.0 meters below the working surface extending on either side up to sufficient margin to arrest or to reduce the consequences of a possible fall of persons working at different heights.

3.3.5 Electrical installations

The contractor shall ensure that electrical systems and equipment including tools and tackles are properly selected, installed, used and maintained.

The contractor shall deploy qualified and licensed electricians for proper and safe installation and for regular inspection of construction power distribution lines/points including their earthing. A copy of the license shall be submitted to CONSULTANT for records.

3.3.6 Welding/Gas cutting

Contractor shall ensure that flash back arresters conforming to BS: 6158 or equivalent are installed on all gas cylinders while in use. All cylinders shall be mounted on trolleys. All welding machines shall have effective earthing. To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.

3.3.7 Ergonomics and tools & tackles

The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health. All lifting tools, tackles, equipment, accessories including cranes shall be tested periodically by statutory/competent authority for their condition and load carrying capacity. Valid test and fitness certificates from the authority shall be submitted to Owner/CONSULTANT for their review/acceptance before the lifting tools, tackles, equipment, accessories and cranes are used.

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 5 OF 37	

Contractor shall ensure installation of Safe Load Indicator (SLI) on all cranes (while in use) to minimize overload risk. SLI shall have capability to continuously monitor and display the load on the hook, and automatically compare it with the rated crane capacity at the operating condition of the crane. The system shall also provide visual and audible warnings at set capacity levels to alert the operator in case of violations.

3.3.8 Occupational Health

The contractor shall identify all operations that can adversely affect the health of its workers and issue and implement mitigation measures. For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.

3.3.9 Hazardous substances

Hazardous and/or toxic materials such as solvent coating or thinners shall be stored in appropriate containers, which shall be labeled with the name of the materials, the hazards associated with its use and necessary precautions to be taken.

Where contact or exposure of hazardous materials/Noise pollution exceeds the specified limit or otherwise have harmful affects, appropriate personal protective equipments such as gloves, earmuffs, goggles, aprons, chemical resistant clothing, respirator, etc. shall be used.

3.3.10 Spills

Chemical and other spills shall be contained and cleaned up immediately to prevent further contamination.

3.3.11 Radiation exposure

- a) All personnel exposed to physical agents such as non-ionizing radiation, ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with the type of exposure involved.
- b) For ionizing radiation, requirements of Bhabha Atomic Research Centre (BARC) shall be followed.

3.3.12 Road Safety

The contractor shall ensure adequately planned road transport safety management system. The vehicles shall be fitted with reverse warning alarms. The contractor shall also ensure a separate pedestrian route for safety of the workers and comply with all traffic rules and regulations.

For pipeline jobs, the contractor shall submit a comprehensive plan covering transportation of pipes, movement of side booms, movement of vehicles on the ROW, etc.

3.3.13 Welfare measures

Contractor shall at the minimum, ensure the following facilities at work sites :

A crèche where 10 or more female workers are having children below the age of 6 years.

Reasonable canteen facilities at appropriate location depending upon site conditions.

Rest rooms (separate for male workers and female workers)
Toilets, drinking water, adequate lighting at site and labour camps, commensurate with applicable Laws/Legislation.

3.3.14 Environment Protection

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 6 OF 37	

Contractor shall ensure proper storage and utilization methodology of materials that are detrimental to the environment. Where required, contractor shall ensure that only the environment friendly materials are selected and emphasize on recycling of waste materials such as metals, plastics, glass, paper, oil and solvents.

For pipeline jobs, top soil shall be stacked separately while making ROW through fields. This fertile soil shall be placed back on top after backfilling.

3.3.15 Rules & Regulations

All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules and regulations relating to the hazardous materials, substances and wastes. Contractor shall not dump, release or otherwise discharge or dispose off any such materials without the express authorization of OWNER/CONSULTANT.

3.4 TOOL BOX MEETING (TBM)

Contractor shall conduct daily TBM with workers prior to start of work and shall maintain proper record of the meeting. A suggested format is given below. The TBM is to be conducted by the immediate supervisor of the workers.

TOOL BOX MEETING RECORDING SHEET		
Date & Time		
Subject		
Presenter		
Hazards Involved		
Precautions to be taken		
Worker's Name	Signature	Section
Remarks, if any		

The topics during TBM shall include:

- Hazards related to work assigned on that day and precautions to be taken.
- Any forthcoming HSE hazards/events/instruction/orders, etc.

The above record can be kept in local language, which workers can read. These records shall be made available to OWNER/CONSULTANT whenever demanded.

3.5 TRAINING

Contractor shall ensure that all his personnel possess appropriate training to carryout the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about.

- Potential hazards to which they may be exposed at their workplace
- Measures available for prevention, recurrence and elimination of these hazards

The topics during training shall cover, at the minimum:

- Education about hazardous jobs and precautions required
- Emergency and evacuation plan
- HSE requirements
- Fire fighting and First-Aid

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 7 OF 37	

Use of PPEs

Records of the training shall be kept and submitted to OWNER/CONSULTANT whenever demanded.

For off-shore and jetty jobs, contractor shall ensure that all personnel deployed have undergone structured training on swimming, use of lifeboats, basket landing, etc.

3.6 INSPECTION/AUDIT

The contractor shall carry out daily HSE inspection and record observations at a central location. These inspection records shall be freely accessible to Owner/CONSULTANT representatives. He shall also carry out internal HSE audits as well as cooperate during HSE audits by Owner/CONSULTANT, which will be at least two times during the project execution period.

4.0 DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

4.1 ON AWARD OF CONTRACT

The Contractor shall submit a comprehensive Health, Safety and Environment manual or procedure and HSE Plans for approval by OWNER/CONSULTANT prior to start of work. The Contractor shall participate in the pre-start meeting with OWNER/CONSULTANT to finalize HSE Plans including the following:

Job procedure to be followed by Contractor for activities covering handling of equipments, scaffolding, electric installations, etc. describing the risks involved, actions to be taken and methodology for monitoring each activity.

OWNER/CONSULTANT review/audit requirement.

Organization structure along with responsibility and authority, records/reports etc. on HSE activities.

Procedures for reporting and investigation of accidents and near misses

HSE Training programmes.

Reference to Rules, Regulations and Statutory requirements.

HSE reports.

4.2 DURING JOB EXECUTION

4.2.1 Contractor shall implement approved Health, Safety and Environment management procedure/plan/manual including but not limited to as brought out under para 3.0. Contractor shall also ensure :

to arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc., as applicable

to arrange all HSE permits before start of activities (as applicable), like permits for hot work, confined space, working at heights, storage of chemical/explosive materials and its use and implement all precautions mentioned therein. In this regard, requirements of Oil industry Safety Directorate Standard No. Std-105 "Work Permit Systems" shall be complied with while working in existing plants.

to submit, timely, the completed checklist on HSE activities Monthly HSE report, accident reports, investigation reports etc. as per OWNER/CONSULTANT requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to OWNER/CONSULTANT.

That his top most executive at site attends all the Safety Committee/HSE meetings arranged by OWNER/CONSULTANT. Only in case of his absence from site that a second senior most person shall be nominated by him, in advance, and communicated to OWNER/CONSULTANT.

Display at site office and work locations caution boards, list of hospitals, emergency services available, etc.

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 8 OF 37	

ANNEXURE - II

DETAILS OF FIRST AID BOX

SL.NO	DESCRIPTION	QUANTITY
1.	Small size Roller Bandages, 1 inch wide (Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 inch wide (Hand and Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 inch wide (Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing (Bun Dressing Large)	4 Pkts.
5.	Cotton wool (20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savalon	1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water	1 Bottle
8.	Sal-volatile (20 ml. Ammonia)	1 Bottle
9.	A Pair of Scissors	1 Piece
10.	Adhesive Plaster (1.25 cm x 5 m)	1 Spool
11.	Eye pads in Separate Sealed Packet	4 Pcs.
12.	Tourniquet	1 No.
13.	Safety Pins	1 Dozen
14.	Tine IODINE (100 ml.)	1 Bottles
15.	Ointment for burns (Burnol 20 gms.)	1 Bottole
16.	Polythene Wash cup for washing eyes	1 No.
17.	Potassium Permanganate (20 gms.)	1 Pkt.
18.	Tinc. Benzoine (100 ml.)	1 Bottole
19.	Triangular Bandages	2 Nos.
20.	Band Aid Dressing	5 Pcs.
21.	Iodex (25 gms.)	1 Bottole
22.	Tongue Depressor	1 No.
23.	Boric Acid Powder (20 gms.)	2 Pkt.
24.	Sodium Bicarbonate (20 gms.)	1 Pkt.
25.	Dressing Powder (Nebasulf) (10 gms.)	1 Bottole
26.	Medicinal Glass	1 No.
27.	Duster	1 No.
28.	Booklet (English & Local Language)	1 No. each
29.	Soap	1 No.
30.	Toothache Solution	1 No.
31.	Eye Ointment	1 Bottle
32.	Vicks (22 gms.)	1 Bottle
33.	Forceps	1 No.
34.	Cotton Buds (5 nos.)	1 Pkt.
35.	Note Book	1 No.
36.	Splints	4 Nos.
37.	Lock	1 Piece
38.	Life Saving/Emergency/Over-the Counter Drugs	As decided at site
	NOTE : Type of Box Size	Aluminum 14" x 12" x 4"



**STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES**

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 10 OF 37

TYPES OF FIRE EXTINGUISHERS AND THEIR APPLICATION

	CARBON DIOXIDE	DRY CHEMICAL				WATER TYPE				FOAM
		SODIUM POTASSIUM BICARBONATE		MULTI PURPOSE A B C		STORED PRESSURE	CARTRIDGE OPERATED	WATER PUMP TANK	SODIUM ACID	FOAM
	CO2	CARTRIDGE OPERATED	STORED PRESSURE	STORED PRESSURE	CARTRIDGE OPERATED					
CLASS A FIRES WOOD PAPER TRASH HAVING GLOWING EMBERS	x	x	x	/	/	/	/	/	/	/
(BUT CAN CONTROL MINOR SURFACE FIRES)										
CLASS B FIRES FLAMMABLE LIQUIDS GASOLINE OIL PAINT GRASE ETC.	/	/	/	/	/	x	x	x	x	/
CLASS C FIRES ELECTRICAL EQUIPMENT	/	/	/	/	/	x	x	x	x	x

LEGEND : / : CAN BE USED
X : NOT TO BE USED



STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 11 OF 37

ANNEXURE-IV

INDICATIVE LIST OF STATUTORY ACTS & RULES

Indian Explosives Act, 1984
The Motor Vehicles Act, 1988
The Factories Act, 1949
The Petroleum Act, 2002
Workmen Compensation Act
Static/Mobile Pressure Vessel Act
Indian Electricity Act
Indian Boiler Act, 1923
Water (Prevention & Control Pollution) Act, 1974
Water (Prevention & Control of Pollution) Cess Act-1977
The Mines & Minerals (Regulation & Development) Act-1947
The Air (Prevention & control of Pollution) Act-1981
The Atomic Energy Act-1962
The Radiation Protection Rules-1971
The Indian Fisheries Act-1954
The Indian Forest Act-1927
The Wild Life (Protection) Act-1972
The Environment (Protection) Act-1986
The Environment (Protection) Rules-1986
The Hazardous Wastes (Management & Handling) Rules-1989
The Manufacture, Storage & Import of Hazardous Chemicals Rules-1989
The Central Motor Vehicles Rules-1989
The Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 12 OF 37	

ANNEXURE-V

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION • it Excavation up to 3.0m	➤ Falling into pit	➤ Personal injury	➤ Provide guard rails/barricade with warning signal. ➤ Provide at least two entries/exits. ➤ Provide escape ladders.
	➤ Earth Collapse	➤ Suffocation/ Breathlessness ➤ Buried	➤ Provide suitable size of shoring and strutting, if required. ➤ Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more. ➤ Don't allow vehicles to operate too close to excavated areas. Maintain at least 2m distance from edge of cut. ➤ Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock. ➤ Battering/benching the sides.
	➤ Contact with buried electric cables ➤ Gas/Oil Pipelines	➤ Electrocut ion ➤ Explosion	➤ Obtain permission from competent authorities, prior to excavation, if required. ➤ Locate the position of buried utilities by referring to plant drawings. ➤ Start digging manually to locate the exact position of buried utilities and thereafter use mechanical means.
• it Excavation beyond 3.0m	➤ Same as above plus ➤ Flooding due to excessive rain/ underground water	➤ Can cause drowning situation	➤ Prevent ingress of water ➤ Provide ring buoys ➤ Identify and provide suitable size dewatering pump or well point system
	➤ Digging in the vicinity of existing Building/Structure	➤ Building/Structure may collapse ➤ Loss of health & wealth	➤ Obtain prior approval of excavation method from local authorities ➤ Use under-piling method ➤ Construct retaining wall side by side
	➤ Movement	➤ May	➤ Barricade the excavated

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 13 OF 37	

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	ent of vehicles/equipments close to the edge of cut.	cause cave-in or slides ➤ Persons may get buried	area with proper lighting arrangements ➤ Maintain at least 2m distance from edge of cut ➤ Strengthen shoring and strutting
• arrow deep excavations for pipelines, etc.	➤ Same as above plus ➤ Frequent cave-in or slides	➤ May cause severe injuries or prove fatal	➤ Battering/benching of sides ➤ Provide escape ladders
	➤ Flooding due to Hydro testing	➤ May arise drowning situation	➤ Same as above plus ➤ Bail out accumulated water ➤ Maintain adequate ventilation
• ock excavation by blasting	➤ Improper handling of explosives	➤ May prove fatal	➤ Ensure proper storage, handling & carrying of explosives by trained personnel. ➤ Comply with the applicable explosive acts & rules.
	➤ Uncontrolled explosion	➤ May cause severe injuries or prove fatal	➤ Allow only authorized persons to perform blasting operations. ➤ Smoking and open flames are to be strictly prohibited.
	➤ Scattering of stone pieces in atmosphere	➤ Can hurt people	➤ Use PPE like goggles, face mask, helmets etc.
• ock excavating by blasting (Contd)	➤ Entrapping of persons/animals.	➤ May cause severe injuries or prove fatal	➤ Barricade the area with red flags and blow siren before blasting.
	➤ Misfire	➤ May explode suddenly	➤ Do not return to site for at least 20 minutes or unless announced safe by designated person.
• iling Work	➤ Failure of pile-driving equipment	➤ Can hurt people	➤ Inspect Piling rigs and pulley blocks before the beginning of each shift.
	➤ Noise pollution	➤ Can cause deafness and psychological imbalance.	➤ Use personal protective equipments like ear plugs, muffs, etc.
	➤ Extruding rods/casing	➤ Can hurt people	➤ Barricade the area and install sign boards ➤ Provide first-aid
	➤ Working in the	➤ Can cause	➤ Keep sufficient distance from Live-Electricity as per IS



**STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES**

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 14 OF 37

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	vicinity of 'Live-Electricity'	electrocution/asphyxiation	code. ➤ Shut off the supply, if possible ➤ Provide artificial/rescue breathing to be injured.
(B) CONCRETING	➤ Air pollution by cement	➤ May affect Respiratory System	➤ Wear respirators or cover mouth and nose with wet cloth.
	➤ Handling of ingredients	➤ Hands may get injured	➤ Use gloves and other PPE.
	➤ Protruding reinforcement rods.	➤ Feet may get injured	➤ Use Safety shoes. ➤ Provide platform above reinforcement for movement of workers.
	➤ Earthing of electrical mixers, vibrators, etc. not done	➤ Can cause electrocution/asphyxiation	➤ Ensure earthing of equipments and proper functioning of electrical circuit before commencement of work.
	➤ Falling of materials from height	➤ Persons may get injured	➤ Use hard hats ➤ Remove surplus material immediately from work place ➤ Ensure lighting arrangements during night hours.
	➤ Continuous pouring by same gang	➤ Cause tiredness of workers and may lead to accident.	➤ Insist on shift pattern ➤ Provide adequate rest to workers between subsequent pours.
	➤ Revolving or concrete mixer/vibrators	➤ Parts of body or clothes may get entrapped.	➤ Allow only mixers with hopper ➤ Provide safety cages around moving motors ➤ Ensure proper mechanical locking of vibrator
• super-structure	➤ Same as above plus ➤ Deflection in props or shuttering material	➤ Shuttering/props may collapse and prove fatal	➤ Avoid excessive stacking on shuttering material ➤ Check the design and strength of shuttering material before commencement of work ➤ Rectify immediately the deflection noted during concreting
	➤ Passage to work place	➤ Improperly tied and designed props/planks may collapse	➤ Ensure the stability and strength of passage before commencement of work ➤ Do not overload and stand under the passage
(C) REINFORCEMENT	➤ Curtailment and binding of	➤ Persons may get injured	➤ Use PPE like gloves, shoes, helmets, etc. ➤ Avoid usage of shift tools



STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 15 OF 37

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	rods		
	➤ Carrying of rods for short distance/at heights	➤ Workers may get injured their hands and shoulders.	➤ Provide suitable pads on shoulders and use safety gloves ➤ Tie up rods in easily liftable bundles ➤ Ensure proper staging.
	➤ Checking of clear distance/cover with hands	➤ Rods may cut or injure the finger	➤ Use measuring devices like tape, measuring rods, etc.
	➤ Hitting projected rods and standing on cantilever rods	➤ Persons may get injured and fell down	➤ Use safety shoes and avoid standing unnecessarily on cantilever rods ➤ Avoid wearing of loose clothes
	➤ Falling of material from height	➤ May prove fatal	➤ Use helmets ➤ Provide safety nets
	➤ Transportation of rods by trucks	➤ Protruded rods may hit the persons	➤ Use red flags/lights at the ends ➤ Do not protrude the rods in front of or by the side of driver's cabin. ➤ Do not extend the rods 1/rd of deck length or 1.5 m which is less
(D) WELDING AND GAS CUTTING	➤ Welding radiates invisible ultraviolet and infrared rays	➤ Radiation can damage eyes and skin.	➤ Use specified shielding devices and other PPE of correct specifications ➤ Avoid throated tungsten electrodes for GTAW
	➤ Improper placement of oxygen and acetylene cylinders	➤ Explosion may occur	➤ Move out any leaking cylinder ➤ Keep cylinder in vertical position ➤ Use trolley for transportation of cylinders and chain them ➤ Use flash back arrestors
	➤ Leakage/cuts in hoses	➤ May cause fire	➤ Purge regulators immediately and then turn off ➤ Never use grease or oil on oxygen line connections and copper fittings on acetylene lines ➤ Inspect regularly gas carrying hoses ➤ Use the current for which



STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 16 OF 37

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> ➤ the cable is designed ➤ Always use red hose for acetylene and other fuel gases and black for oxygen
	<ul style="list-style-type: none"> ➤ Opening of cylinder 	<ul style="list-style-type: none"> ➤ Cylinder may burst 	<ul style="list-style-type: none"> ➤ Always stand back from the regulator while opening the cylinder ➤ Turn valve slowly to avoid bursting ➤ Cover the lug terminals to prevent short circuiting.
	<ul style="list-style-type: none"> ➤ Welding of tanks, container or pipes storing flammable liquids 	<ul style="list-style-type: none"> ➤ Explosion may occur 	<ul style="list-style-type: none"> ➤ Empty them before welding ➤ Never attach the ground cable to tanks, container or pipe storing flammable liquids ➤ Never use LPG for gas cutting
(E) RADIOGRAPHY	<ul style="list-style-type: none"> ➤ Ionizing radiation 	<ul style="list-style-type: none"> ➤ Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc. 	<ul style="list-style-type: none"> ➤ Ensure safety regulations as per BARC before commencement of job. ➤ Cordon off the area and install Radiation warning symbols ➤ Restrict the entry of unauthorized persons ➤ Wear appropriate PPE and film badges issued by BARC
	<ul style="list-style-type: none"> ➤ Transportation and Storage of Radiography source 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Never touch or handle radiography source with hands ➤ Store radiography source inside a pit in an exclusive isolated storage room with lock and key arrangement. The pit should be approved by BARC ➤ Radiography source should never be carried either in passenger bus or in a passenger compartment of trains. ➤ BARC have to be informed before source movement. ➤ Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.
	<ul style="list-style-type: none"> ➤ Loss of Radio isotope 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Try to locate with the help of Survey Meter ➤ Inform BARC(*)
(F) ELECTRICAL INSTALLATION AND USAGE	<ul style="list-style-type: none"> ➤ Short circuiting 	<ul style="list-style-type: none"> ➤ Can Cause Electrocution or Fire 	<ul style="list-style-type: none"> ➤ Use rubberized hand gloves and other PPE ➤ Don't lay wires under carpets, mats or door ways. ➤ Allow only licensed electricians to perform on



STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 17 OF 37

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			electrical facilities ➤ Use one socket for one appliance ➤ Ensure usage of only fully insulated wires or cables ➤ Don't place bare wire ends in a socket ➤ Ensure earthing of machineries and equipments ➤ Do not use damaged cords and avoid temporary connections ➤ Use spark-proof/flame proof type field distribution boxes. ➤ Do not allow open/bare connections ➤ Provide all connections through ELCB ➤ Protect electrical cables/equipment's from water and naked flames ➤ Check all connections before energizing
	➤ Overloading of Electrical System	➤ Bursting of system can occur which leads to fire	➤ Display voltage and current ratings prominently with 'Danger' signs. ➤ Ensure approved cable size, voltage grade and type ➤ Switch off the electrical utilities when not in use ➤ Do not allow an authorized connections ➤ Ensure proper grid wise distribution of Power.
	➤ Improper laying of overhead and underground transmission lines/cables	➤ Can cause electrocution and prove fatal	➤ Do not lay unarmored cable directly on ground, wall, roof of trees ➤ Maintain at least 3m distance from HT cables ➤ All temporary cables should be laid at least 750 mm below ground on 100 mm fine sand overlying by brick soling ➤ Provide proper sleeves at crossings/intersections ➤ Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions/termination.
(G) FIRE PREVENTION AND	➤ Small fires can become	➤ Cause burn injuries and may	➤ In case a fire breaks out, press fire alarm system and shout "Fire, Fire"

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 18 OF 37	

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
PROTECTION	big ones and may spread to the surrounding areas	prove fatal	<ul style="list-style-type: none"> ➤ Keep buckets full of sand & water/fire extinguishing equipment near hazardous locations ➤ Confine smoking to 'Smoking Zones' only ➤ Train people for using specific type of fire equipments under different classes of fire ➤ Keep fire doors/ shutters, passages and exit doors unobstructed ➤ Maintain good house keeping and first-aid boxes (for detail refer Annex-2) ➤ Don't obstruct access to fire extinguishers ➤ Do not use elevators for evacuation during fire ➤ Maintain lightning arrestors for elevated structures
	➤ Improper selection of Fire extinguishers	➤ It may not extinguish the fire	<ul style="list-style-type: none"> ➤ Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Annexure-III) ➤ Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/CO2/sand or earth.
	➤ Improper storage of highly inflammable substances	➤ Same as above	<ul style="list-style-type: none"> ➤ Maintain safe distance of flammable substances from source of ignition ➤ Restrict the distribution of flammable materials to only min. necessary amount ➤ Construct specifically designed fuel storage facilities ➤ Keep chemicals in cool and dry place away from heat. Ensure adequate ventilation ➤ Before welding operation, remove or shield the flammable material properly ➤ Store flammable materials in stable racks, correctly labeled ➤ Wipe off the spills immediately
	➤ Short circuiting of electrical system	<ul style="list-style-type: none"> ➤ Same as above ➤ Can cause Electrocutation 	<ul style="list-style-type: none"> ➤ Don't lay wires under carpets, mats or door ways ➤ Use one socket for one appliance ➤ Use only fully insulated wires or cables

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 19 OF 37	

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> ➤ Do not allow open/bare connections ➤ Provide all connections through ELCB ➤ Ensure earthing of machineries and equipments
(H) VEHICULAR MOVEMENT	<ul style="list-style-type: none"> ➤ Crossing the Speed Limits (Rash driving) 	<ul style="list-style-type: none"> ➤ Personal injury 	<ul style="list-style-type: none"> ➤ Obey speed limits and traffic rules strictly ➤ Always expect the unexpected and be a defensive driver ➤ Use seat belts/helmets ➤ Blow horn at intersections and during overtaking operations. ➤ Maintain the vehicle in good condition ➤ Do not overtake on curves, bridges and slopes
	<ul style="list-style-type: none"> ➤ Adverse weather condition 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Read the road ahead and ride to the left ➤ Keep the wind screen and lights clean ➤ Do not turn at speed ➤ Recognize the hazard, understand the defense and act correctly in time.
	<ul style="list-style-type: none"> ➤ Consuming alcohol before and during the driving operation 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Alcohol and driving do not mix well. Either choose alcohol or driving. ➤ If you have a choice between hitting a fixed object or an on-coming vehicle, hit the fixed object ➤ Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive. ➤ Do not force the driver to drive fast and round the clock ➤ Do not drink while driving
	<ul style="list-style-type: none"> ➤ Falling objects/ Mechanical failure 	<ul style="list-style-type: none"> ➤ May prove fatal 	<ul style="list-style-type: none"> ➤ Ensure effective braking system, adequate visibility for the driver, reverse warning alarm ➤ Proper maintenance of the vehicle as per manufacturer instructions
(I) PROOF TESTING (HYDROSTATIC/ PNEUMATIC TESTING)	<ul style="list-style-type: none"> ➤ Bursting of piping ➤ Collapse of tanks ➤ Tanks flying off 	<ul style="list-style-type: none"> ➤ May cause injury and prove fatal 	<ul style="list-style-type: none"> ➤ Prepare test procedure & obtain CONSULTANT/ Owner's approval ➤ Provide separate gauge for pressurizing pump and piping/equipment



STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 20 OF 37

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> ➤ Check the calibration status of all pressure gauges, dead weight testers and temperature recorders ➤ Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range ➤ Provide safety relief valve (set at pressure slightly higher than test pressure) while testing with air/nitrogen ➤ Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/nuts, grouting, etc. before and during testing ➤ Keep the vents open before opening any valve while draining out of water used for hydro testing of tanks ➤ Pneumatic testing involves the hazard of released energy stored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction ➤ A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of the test pressure.
(J) WORKING AT HEIGHTS	➤ Person can fall down	➤ May sustain severe injuries or prove fatal	<ul style="list-style-type: none"> ➤ Provide guard rails/barricade at the work place ➤ Use PPE like safety belts, full body harness, life line, helmets, safety shoes, etc. ➤ Obtain a permit before starting the work at height above 3 meters ➤ Fall arrest systems like safety nets, etc. must be installed ➤ Provide adequate working space (min. 0.6 m) ➤ Tie/weld working platform

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> with fixed support ➤ Use roof top walk ladder while working on a slopping roofs ➤ Avoid movement on beams
	➤	➤ May hit the scrap/ material stacked at the ground or in between	<ul style="list-style-type: none"> ➤ Keep the work place neat and clean ➤ Remove the scrap immediately
	➤ Material can fall down	➤ May hit the workers working at lower levels and provide fatal	<ul style="list-style-type: none"> ➤ Same as above plus ➤ Do not throw or drop material or equipment from height ➤ All tools to be carried in a tool-kit bags or on working uniform ➤ Remove scrap from the planks ➤ Ensure wearing of helmet by the workers at low level
(K) CONFINED SPACES	➤ Suffocation/ drowning	➤ Unconsciousness, death	<ul style="list-style-type: none"> ➤ Use respiratory devices, if required ➤ Avoid over crowding inside a confined space ➤ Provide Exhaust Fans for ventilation ➤ Do not wear loose clothes, neck ties, etc. ➤ Check for presence of hydrocarbons, O2 level ➤ Obtain work permit before entering a confined space ➤ Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange
	➤ Presence of foul smell and toxic substances	➤ Inhalation can pose threat to life	<ul style="list-style-type: none"> ➤ Same as above plus ➤ Check for hydrocarbon and Aromatic compounds before entering a confined space ➤ Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency
	➤ Ignition/ flame can cause fire	➤ Person may sustain burn injuries or explosion may occur	<ul style="list-style-type: none"> ➤ Keep fire extinguishers at a hand distance ➤ Remove surplus material and scrap immediately ➤ Do not smoke inside a



**STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES**

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 22 OF 37

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			confined space ➤ Do not allow gas cylinders inside a confined space ➤ Use low voltage (24V) lamps for lighting ➤ Use tools with air motors or electric tools with max. voltage of 24V ➤ Remove all equipments at the end of the day
(L) HANDLING AND LIFTING EQUIPMENTS	➤ Failure of load lifting and moving equipments	➤ Can cause accident and prove fatal	➤ Avoid standing under the lifted load and within the operating radius of cranes ➤ Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery ➤ Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc. ➤ Allow crane to move only on hard, firm and leveled ground ➤ Allow lifting slings as short as possible and check gunny packings at the friction points ➤ Do not allow crane to tilt its boom while moving ➤ Install Safe Load Indicator
	➤ Overloading of lifting equipments	➤ Same as above	➤ Safe lifting capacity of derricks and winches written on them shall be got verified. ➤ The max safe working load shall be marked on all lifting equipments ➤ Check the weight of columns and other heavy items painted on them and accordingly decide about eh crane capacity, boom and angle of erection ➤ Allow only trained operators and riggers during crane operation
	➤ Overhead electrical wires	➤ Can cause electrocution and fire	➤ Do not allow boom or other parts of crane to come within 3 m reach of overhead HT cables ➤ Hook and load being lifted shall preferably remain in full visibility of crane operator.
(M) SCAFFOLDING, FORMWORK	➤ Person can fall down	➤ Person may sustain severe	➤ Provide guard rails for working at height ➤ Face ladder while climbing

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 23 OF 37	

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
AND LADDERS		injuries and prove fatal	and use both hands ➤ Ladders shall extend about 1m above landing for easy access and tying up purpose ➤ Do not place ladders against movable objects and maintain base at ¼ unit of the working length of the ladder ➤ Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes ➤ No loose planks shall be allowed ➤ Use PPE, like helmets, safety shoes, etc.
	➤ Failure of scaffolding material	➤ Same as above	➤ Inspect visually all scaffolding materials for stability and anchoring with permanent structures. ➤ Design scaffolding for max. load carrying capacity ➤ Scaffolding planks shall not be less than 50x250 mm full thickness lumber or equivalent. These shall be cleared or secured and must extend over the end supports by at least 150mm and not more than 300 mm ➤ Don't overload the scaffolds ➤ Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.
	➤ Material can fall down	➤ Persons working at lower level gets injured	➤ Remove excess material and scrap immediately ➤ Carry the tools in a tool-kit bag only ➤ Provide safety nets
(N) STRUCTURAL WORKS	➤ Personal negligence and danger of fall	➤ Can cause injury or casualty	➤ Do not take rest inside rooms built for welding machines or electrical distribution system ➤ Avoid walking on beams at height ➤ Wear helmet with chin strap and safety belts when working at height ➤ Use hand gloves and goggles during grinding operations ➤ Cover or mark the sharp and projected edges ➤ Do not stand within the operating radius of cranes

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 24 OF 37	

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	➤ Lifting/slipping of material	➤ Same as above	<ul style="list-style-type: none"> ➤ Do not stand under the lifted load ➤ Stack properly all the materials. Avoid slippage during handling ➤ Control longer pieces lifted up by cranes from both ends ➤ Remove loose materials from height ➤ Ensure tightening of all nuts and bolts
(O) PIPELINE WORKS	➤ Erection/lowering failure	➤ Can cause injury	<ul style="list-style-type: none"> ➤ Do not stand under the lifted load ➤ Do not allow any person to come within the radii of the side boom handling pipes ➤ Check the load carrying capacity of the lifting tools and tackles ➤ Use safe Load Indicators ➤ Use appropriate PPEs
	➤ Other	➤ Same as above	<ul style="list-style-type: none"> ➤ Wear gum boots in marshy areas ➤ Allow only one person to perform signaling operations while lowering of pipes ➤ Provide night caps on pipes ➤ Provide end covers on pipes for stoppage of pigs while testing/cleaning operations



STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 25 OF 37

MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT

PROJECT : CONTRACTOR:

DATE : OWNER :

INSPECTED BY:

Note: Write 'NA' wherever the item is not applicable.

MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
1	HOUSEKEEPING				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and clean				
c)	Passageways and Walkways clear				
d)	General neatness of working areas				
e)	Others				
2	PERSONNEL PROTECTIVE EQUIPMENT				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Safety shoes				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Safety Belts				
h)	Safety Helmet/Hard Hat				
l)	Others				
3	EXCAVATIONS/OPENINGS				
a0	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Others				
4	WELDING & GAS CUTTING				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				

	<p align="center">STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES</p>	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 26 OF 37	

MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
d)	Flammable materials protected				
e)	Fire extinguisher(s) accessible				
f)	Others				
5	SCAFFOLDING				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Others				
6	LADDERS				
a)	Extension side rails 1m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle ± 70 from horizontal				
e)	Others				
7	HOISTS, CRANES AND DERRICKS				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes OK				
c)	Inspection and maintenance logs maintained				
d)	Outriggers used				
e)	Signs/barricades provided				
f)	Signals observed and understood				
g)	Qualified operators				
h)	Others				
8	MACHINERY, TOOLS AND EQUIPMENT				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Others				
9	VEHICLE AND TRAFFIC				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Others				
10	TEMPORARY FACILITIES				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Others				
11	FIRE PREVENTION				



STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES

DOCUMENT NO.
11-0290-02-18-02-001

REV
0

SHEET 27 OF 37

MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
a)	Personnel instructed				
b)	Fire extinguishers checked				
c)	No smoking in Prohibited Areas				
d)	Hydrants Clear				
e)	Others				
12	ELECTRICAL				
a)	Use of 3-core armoured cables				
b)	Usage of 'All insulated' or 'double insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (main DB)				
e)	Continuity and tightness of earth conductor				
f)	Covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards				
i)	Others				
13	HANDLING AND STORAGE OF MATERIALS				
a)	Properly stored or stacked				
b)	Passageways clear				
c)	Others				
14	FLAMMABLE GASES AND LIQUIDS				
a)	Containers clearly identified				
b)	Proper storage				
c)	Fire extinguishers nearby				
d)	Others				
15	WORKING AT HEIGHT				
a)	Erection plan and work permit obtained				
b)	Safety nets				
c)	Safety belts, full body harness and lanyards; chute lines				
d)	Others				
16	CONFINED SPACE				
a)	Work permit obtained				
b)	Test for toxic gas and sufficient availability of oxygen conducted				
c)	At least one person outside the confined space for monitoring deputed				
d)	Availability of sufficient means of entry, exit and ventilation				
e)	Fire extinguishers and first-aid facility ensured				
f)	Lighting provision made by using 24V lamps				
g)	Proper usage of PPEs ensured				
17	RADIOGRAPHY				
a)	Proper storage and handling of source as per BARC guidelines				
b)	Working permit obtained				
c)	Cordoning of the area done				

MONTHLY HSE CHECKLIST CUM COMPLIANCE REPORT

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
d)	Use of appropriate PPE's ensured				
e)	Proper training to workers/supervisors imparted				
f)	Minimum occupancy of workplace ensured				
18	HEALTH CHECKS				
a)	Hygienic conditions at labour camps OK?				
b)	Availability of First-aid facilities				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities				
e)	Measures for dealing with illness				
f)	Availability of Portable drinking water for workmen & staff				
g)	Provision of crèches for children				
19	ENVIRONMENT				
a)	Chemical and other effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc. disposed properly				
f)	Disposal of surplus earth, stripping materials, oily rags and combustible materials done properly				
g)	Green belt protection				



STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES

DOCUMENT NO.
11-0290-02-18-02-001

REV
0

SHEET 29 OF 37

ACCIDENT / FIRE REPORT

(To be submitted by Contractor after every accident within 24 hours of accident)

Report:

Name of Site

Date:

NAME OF THE INJURED
FATHER'S NAME
SUB-CONTRACTOR M/S.
DATE & TIME OF ACCIDENT
LOCATION

BRIEF DESCRIPTION OF ACCIDENT

CAUSE OF ACCIDENT

NATURE OF INJURY/DAMAGER

MEDICAL AID PROVIDED/ACTIONS TAKEN

INTIMATION TO LOCAL AUTHORITIES

DATE:

**SIGNATURE OF CONTRACTOR
WITH SEAL**

TO :	OWNER	1 COPY
	RCM/SITE-IN-CHARGE CONSULTANT	1 COPY
	CONSULTANT HO Constr. Through RCM	3 COIES
	Proj.Mgr. CONSULTANT, Through RCM	1 COPY



**STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES**

DOCUMENT NO.

REV

11-0290-02-18-02-001

0

SHEET 30 OF 37

SUPPLEMENTARY ACCIDENT & INVESTIGATION REPORT

Project:

Supplementary to Report No. : (Copy enclosed)

Site: Date:

Contractor:

NAME OF INJURED
 FATHER'S NAME
 SUB-CONTRACTOR M/S.
 DATE & TIME OF ACCIDENT
 LOCATION

BRIEF DESCRIPTION & CAUSE OF ACCIDENT

NATURE OF INJURY/DAMAGE

COMMENTS FROM MEDICAL PRACTITIONER, WHO ATTENDED THE VICTIM/INJURED

SUGGESTED IMPROVEMENT IN THE WORKING CONDITION, IF ANY

LOSS OF MAN HOURS AND IMPACT ON SITE WORKS

ANY OTHER COMMENT BY SAFETY OFFICER

DATE :

**SIGNATURE OF CONTRACTOR
 WITH SEAL**

TO :	OWNER	1 COPY
	RCM/SITE-IN-CHARGE CONSULTANT	1 COPY
	CONSULTANT HO Constr. Through RCM	3 COIES
	Proj.Mgr. CONSULTANT, Through RCM	1 COPY

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 31 OF 37	

**MONTHLY Health, Safety & Environment (HSE) REPORT
(To be submitted by each Contractor)**

Actual work start Date: For the month of :

Project : Report No. :

Name of the Contractor : Status as on :

Name of work : Name of Safety Officer :

<i>ITEM</i>	<i>THIS MONTH</i>	<i>CUMULATIVE</i>
Total strength (Staff + Workmen)		
Number of HSE meetings organized at site		
Number of HSE awareness programmes conducted at site		
Whether workmen compensation policy taken	Y/N	--
Whether workmen compensation policy is valid	Y/N	--
Whether workmen registered under ESI Act	Y/N	--
Number of Fatal Accidents		
Number of Loss Time Accidents (Other than Fatal)		
Other accidents (Non Loss Time)		
Total number of accidents		
Total man-hours worked		
Man-hour loss due to fire and accidents		
Compensation cases raised with Insurance		
Compensation cases resolved and paid to workmen		
Remarks, if any :		

DATE :

**SIGNATURE OF CONTRACTOR
WITH SEAL**

TO : OWNER 1 COPY
RCM/SITE-IN-CHARGE CONSULTANT 1 COPY



**STANDARD SPECIFICATION FOR
HEALTH, SAFETY AND ENVIRONMENT
(HSE) MANAGEMENT AT
CONSTRUCTION SITES**

DOCUMENT NO.	REV
11-0290-02-18-02-001	0
SHEET 32 OF 37	

PERMIT FOR WORKING ABOVE 3 METER HIGHT

(Strike out whichever is not applicable)

Project Site : Sr. No.:
 Name of the work: Date:
 Name of Contractor : Nature of Work :
 Total No.of Workers: Exact location of work :
 Duration of work: from to

The following items have been checked and compliance shall be ensured during the currency of the permit:

Sl.	ITEM	DONE	NOT REQD.
1.	Equipment/Work Area inspected	<input type="checkbox"/>	<input type="checkbox"/>
2.	Considered hazard from other routine/non-routine operations and concerned person alerted	<input type="checkbox"/>	<input type="checkbox"/>
3.	ELCB provided	<input type="checkbox"/>	<input type="checkbox"/>
4.	Proper lighting provided	<input type="checkbox"/>	<input type="checkbox"/>
5.	Area cordoned off.	<input type="checkbox"/>	<input type="checkbox"/>
6.	Precautions against public traffic taken	<input type="checkbox"/>	<input type="checkbox"/>
7.	Sound Scaffolding provided	<input type="checkbox"/>	<input type="checkbox"/>
8.	Adequate protected Platform provided	<input type="checkbox"/>	<input type="checkbox"/>
9.	Acces and Exit to the area (Ladder properly fixed)	<input type="checkbox"/>	<input type="checkbox"/>
10.	Floor Openings covered	<input type="checkbox"/>	<input type="checkbox"/>
11.	Safety Net provided	<input type="checkbox"/>	<input type="checkbox"/>

- A. Following personal protective equipment are provided (√ mark) and used as relevant Safety helmet/Gloves/Goggles/Shoes/Face Shield/Life Line/Safety Belt/Safety Harness.
- B. This permit shall be available at the work site at all times.
- C. Permit shall be issued for maximum one week only (Monday to Sunday).
- D. This permit shall be applicable in non-operational areas.
- E. After completion of the work, used permits shall be preserved for record purposes.
- F. Additional precautions, if any

Permission is granted to work (See overleaf) = Yes/No.

Name of Contractor's Supervisor
(Initiator)

Name of Contractor's Safety Officer
(Issuing Authority)

	<p align="center">STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES</p>	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 33 OF 37	

HEALTH, SAFETY & ENVIRONMENT (HSE) PLAN

Division/Department :				Project Name :				
Activity/Process	Procedure	Code of	Performer	Checker	Appr over	Sampling Plan		Owner's/ PMC's Audit
Description	Number	Conformance		Reviewer		Reviewer	Approver	Requirements

ELECTRICAL

Electrical power is the mainstay of any construction activity, at the same time it requires utmost care in its utilization to avoid accidents due to electrical shock, fire incidents or electric short circuits. Exposure of electrical installation to adverse environmental conditions increase the risk of such accidents. Hence it is necessary to take extra precautions for such installations to ensure safety of personnel and equipment. This standard addresses the safety measures required to be adopted for the electrical installations by all contractors during construction phase.

All electrical connections/work for electrical installations shall be carried out as per provisions of the latest revision of the following codes and standards in addition to the requirements of statutory authorities and ie rules :

Oisd-std-173 : fire prevention and protection system for electrical installations.

Sp-30 (bis) : national electric code.

The installation shall have approval from concerned statutory authorities.

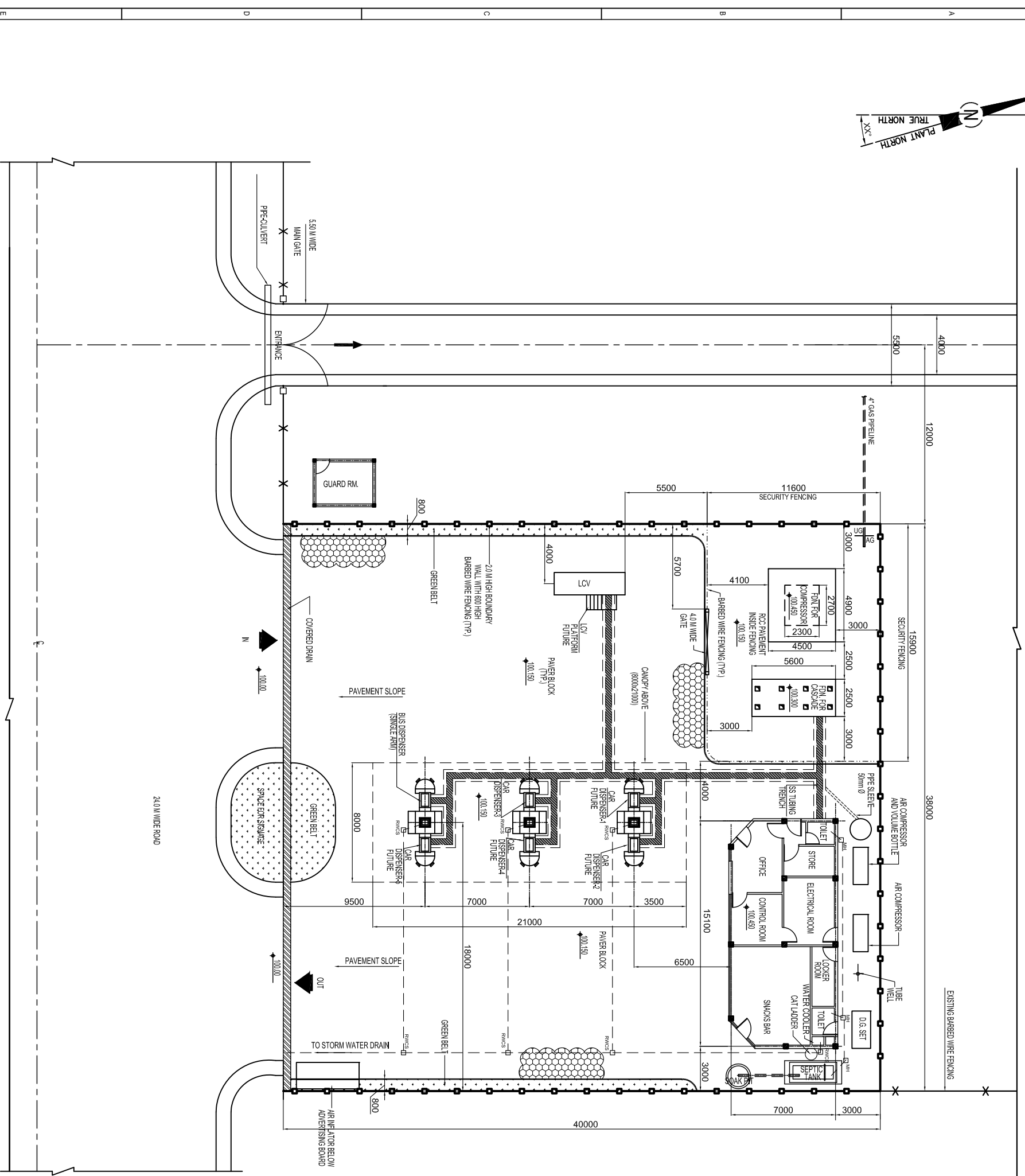
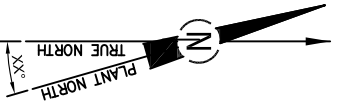
1. All electrical connections shall be done by an electrician with valid licence and to the satisfaction of engineer-in-charge.
2. One competent licenced electrician shall be made available by contractor at site round the clock to attend to the normal/emergency jobs.
3. All switch boards/welding machines shall be kept in well ventilated and covered shed. The shed shall be elevated to avoid water logging. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment/switchboard. Adequate clearances and operational space shall be provided around the equipment.
4. Fire extinguishers and insulating mats shall be provided in all power distribution centres.
5. Temporary electrical equipment shall not be employed in hazardous areas without obtaining safety permit.
6. Proper housekeeping shall be done around the electrical installations.
7. All temporary installations shall be tested before engineering, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.
8. All welders shall use hand gloves irrespective of holder voltage.
9. Multilingual (english, hindi and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name and telephone number(s) of contact person in emergency shall be provided in substations and near all distribution boards/local panels.
10. Operation of earth leakage device shall be checked regularly by temporarily connecting series test lamp (2 bulbs of equal rating connected in series) between phase and earth.
11. The following design features shall be ensured for all electrical installations during construction phase.
 - 12.1 Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 m. The main switch shall be connected to the point of supply by means of armoured cable.
 - 12.2 The outgoing feeders shall be double or triple pole switches with fuses/mcbs. Loads in a three phase circuit shall be balanced as far as possible and load on neutral should not exceed 20% of load in the phase.
 - 12.3 The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be hrc type. Use of rewirable fuses shall be strictly prohibited. The earth leakage device shall have an operating current not exceeding 30 ma.
 - 12.4 All connections to the handtools/welding receptacles shall be taken through proper switches, sockets and plugs.
 - 12.5 All single phase sockets shall be 3 pin type only. All unused sockets shall be provided with socket caps.
 - 12.6 Only 3 core (p+n+e) overall sheathed flexible cables with minimum conductor size of 1.5 mm² copper shall be used for all hand tools.
 - 12.7 Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.
 - 12.8 All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multistrand wires/cables.
 - 12.9 Cables shall be free from any insulation damage.
 - 12.10 Cables shall be laid underground at a minimum depth of 900 mm, covered with sand, brick and soil for ensuring mechanical protection. Cables shall not be laid in water logged area as far as practicable. Cable route markers shall be provided at every 25 m of buried trench route. When laid above ground,

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 36 OF 37	

cables shall be properly cleated or supported on rigid poles of atleast 2 m high. Minimum head clearance of 6 meters shall be provided at road crossings.

- 12.11 Under ground road crossings for cables shall be avoided to the extent feasible. In any case no under ground power cable shall be allowed to cross the roads without pipe sleeve.
- 12.12 All cable joints shall be done with proper jointing kit. No taped/temporary joints shall be used.
- 12.13 An independent earthing facility should preferably be established within the temporary installation premises. All appliances and equipment shall be adequately earthed. In case armoured cables are used, the armour shall be bonded to the earthing system.
- 12.14 All cables and wire rope used for earth connections shall be terminated through tinned copper lugs.
- 12.15 In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour.
- 12.16 Separate core shall be provided for neutral earth/structures shall not be used as a neutral in any case.
- 12.17 On/off position of all switches shall be clearly designated/ painted for easy isolation in emergency.
- 12.18 All insulations shall be inspected by engineer-in-charge atleast once in a month.

	STANDARD SPECIFICATION FOR HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT AT CONSTRUCTION SITES	DOCUMENT NO.	REV
		11-0290-02-18-02-001	0
		SHEET 37 OF 37	



PLOT LAYOUT

REFERENCE DRAWING

S/NO	DRAWING/DOCUMENT NAME	DRAWING/DOCUMENT NO.

- NOTES:-**
1. ALL DIMENSIONS ARE IN MM. LEVELS ARE IN METERS
 2. FOLLOW WRITTEN DIMENSIONS ONLY DO NOT SCALE DRAWING.
 3. INDICATES THE FINISHED GROUND LEVEL (FGL) / ROAD TOP LVL (RTL) FINISHED FLOOR LVL (FFL) TOP OF PROCESS AREA (TOP).
 4. EL. 100.00 CORRESPONDS TO FGL OF EXISTING CGS.

NO	DATE	REVISION	PREPD	CHKD	APPD
B	19.01.10	ISSUED FOR TENDER	NJ	SA	HM
A	15.01.10	ISSUED FOR L.O.C	NJ	SA	HM

CLIENT
GAIL GAS LIMITED
 2nd FLOOR, HHEC BUILDING
 A-2, SECTOR-2, NOIDA 201301

CONSULTANT
J.P. KENNY
 a trading name of
WOOD GROUP ENGINEERING INDIA PVT. LTD.
 NEW DELHI

CITY GAS DISTRIBUTION PROJECT

LAYOUT PLAN CNG ON LINE STATION

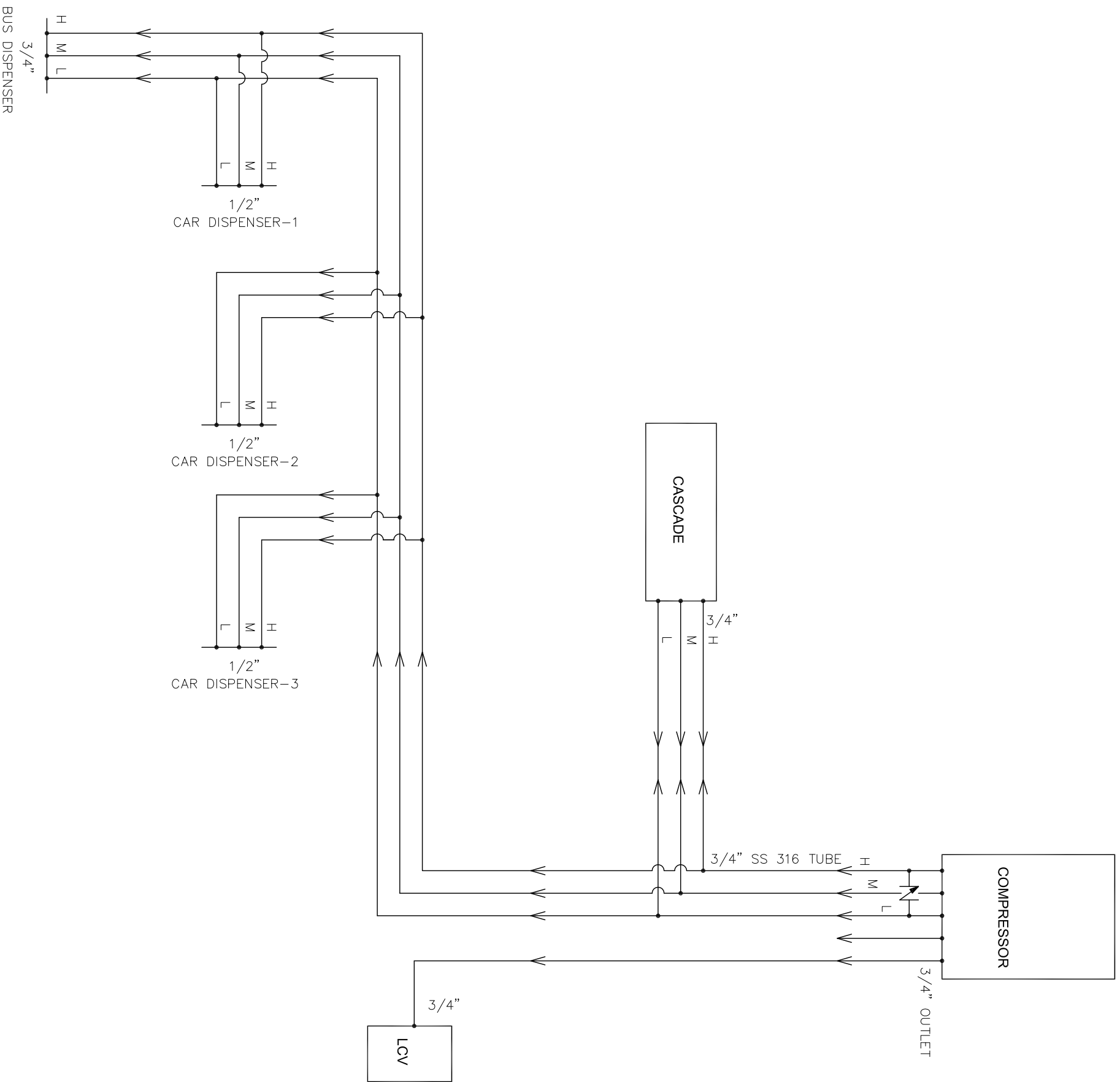
SCALE	SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV
1:150	A1	11-0290	11-0290-02-05-01-001	1 OF 1	B

COPYRIGHT RESERVED: THIS DRAWING SHALL NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF THE CONSULTANT.

- NOTES**
1. SS TUBES SHALL BE LAID OVER PERFORATED TRAYS.
 2. TRAYS SHALL BE LAID AT MIN. 150MM ABOVE THE LOWER SURFACE OF TRENCH.

LEGEND:-

LCV : LIGHT COMMERCIAL VEHICLE
 H : HIGH PRESSURE
 M : MEDIUM PRESSURE
 L : LOW PRESSURE
 NRV : NON RETURN VALVE
 : TUBE SS 316



NO	DATE	REVISIONS	PREP.	CHKD.	APPD.
B	19.01.10	ISSUED FOR TENDER	VSRR	AS	PKS
A	15.01.10	ISSUED FOR IDC	VSRR	AS	PKS

CLIENT :
GAIL GAS LIMITED
 2nd FLOOR, HHEC BUILDING
 A-2, SECTOR-2, NOIDA 201301

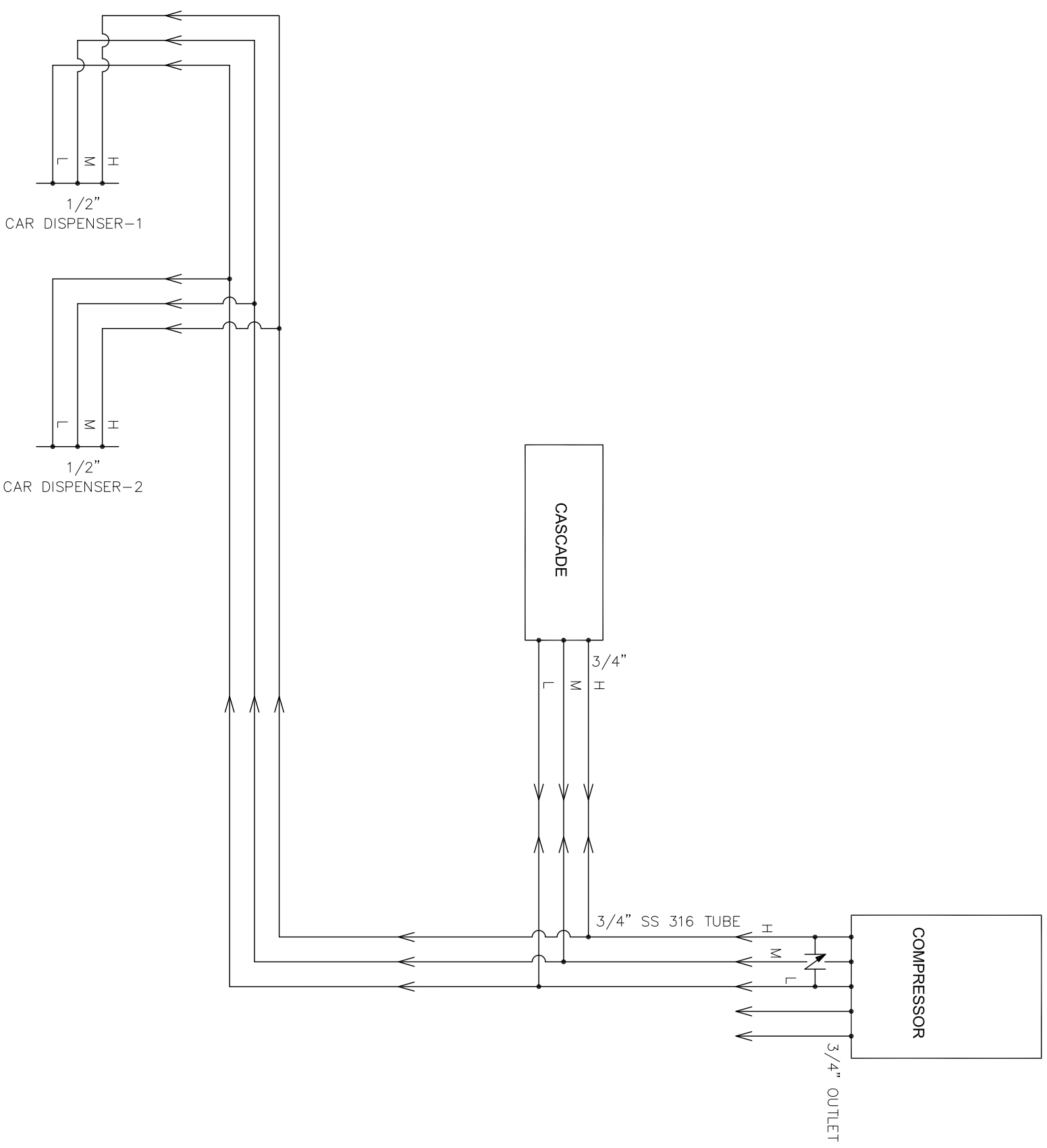
PMC: **J.P.KENNY**
 a trading name of
WOOD GROUP ENGINEERING INDIA PVT. LTD.
 NEW DELHI

PROJECT : **CITYGAS DISTRIBUTION PROJECT**

TITLE: **CNG MOTHER STATION SCHEMATIC LAYOUT**

SCALE	JOB NO.	DRAWING NO.	REV.
AS SHOWN	11-0290	11-0290-02-08-01-001	B

COPYRIGHT RESERVED. THIS DRAWING SHALL NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM THE ENGINEER.



- NOTES**
1. SS TUBES SHALL BE LAID OVER PERFORATED TRAYS.
 2. TRAYS SHALL BE LAID AT MIN. 150MM ABOVE THE LOWER SURFACE OF TRENCH.

LEGEND:-

H : HIGH PRESSURE
M : MEDIUM PRESSURE
L : LOW PRESSURE
NRV : NON RETURN VALVE
: TUBE SS 316

NO	DATE	REVISIONS	PREP.	CHKD.	APPD.
B	19.01.10	ISSUED FOR TENDER	VS/R	AS	PKS
A	15.01.10	ISSUED FOR IDC	VS/R	AS	PKS

CLIENT :
GAIL GAS LIMITED
2nd FLOOR, HHEC BUILDING
A-2, SECTOR-2, NOIDA 201301

PMC: **J.P. KENNY**
a trading name of
WOOD GROUP ENGINEERING INDIA PVT. LTD.
NEW DELHI

PROJECT : CITYGAS DISTRIBUTION PROJECT

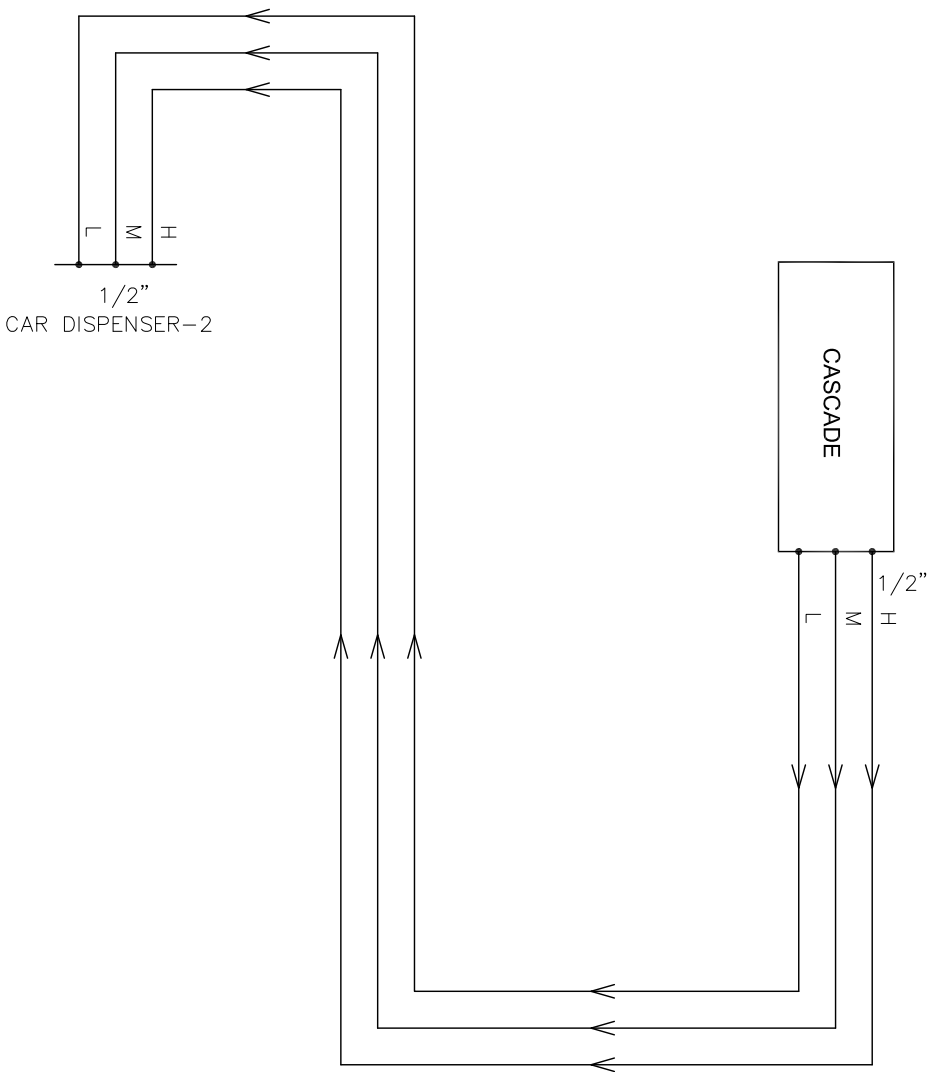
TITLE: CNG ONLINE STATION SCHEMATIC LAYOUT

SCALE	JOB NO.	DRAWING NO.	REV.
AS SHOWN	11-0290	11-0290-02-08-01-002	B


- NOTES**
1. SS TUBES SHALL BE LAID OVER PERFORATED TRAYS.
 2. TRAYS SHALL BE LAID AT MIN. 150MM ABOVE THE LOWER SURFACE OF TRENCH.


LEGEND:-

H : HIGH PRESSURE
M : MEDIUM PRESSURE
L : LOW PRESSURE
— : TUBE SS 316



NO	DATE	REVISIONS	PREP.	CHKD.	APPD.
B	19.01.10	ISSUED FOR TENDER	VSR	AS	PKS
A	15.01.10	ISSUED FOR IDC	VSR	AS	PKS

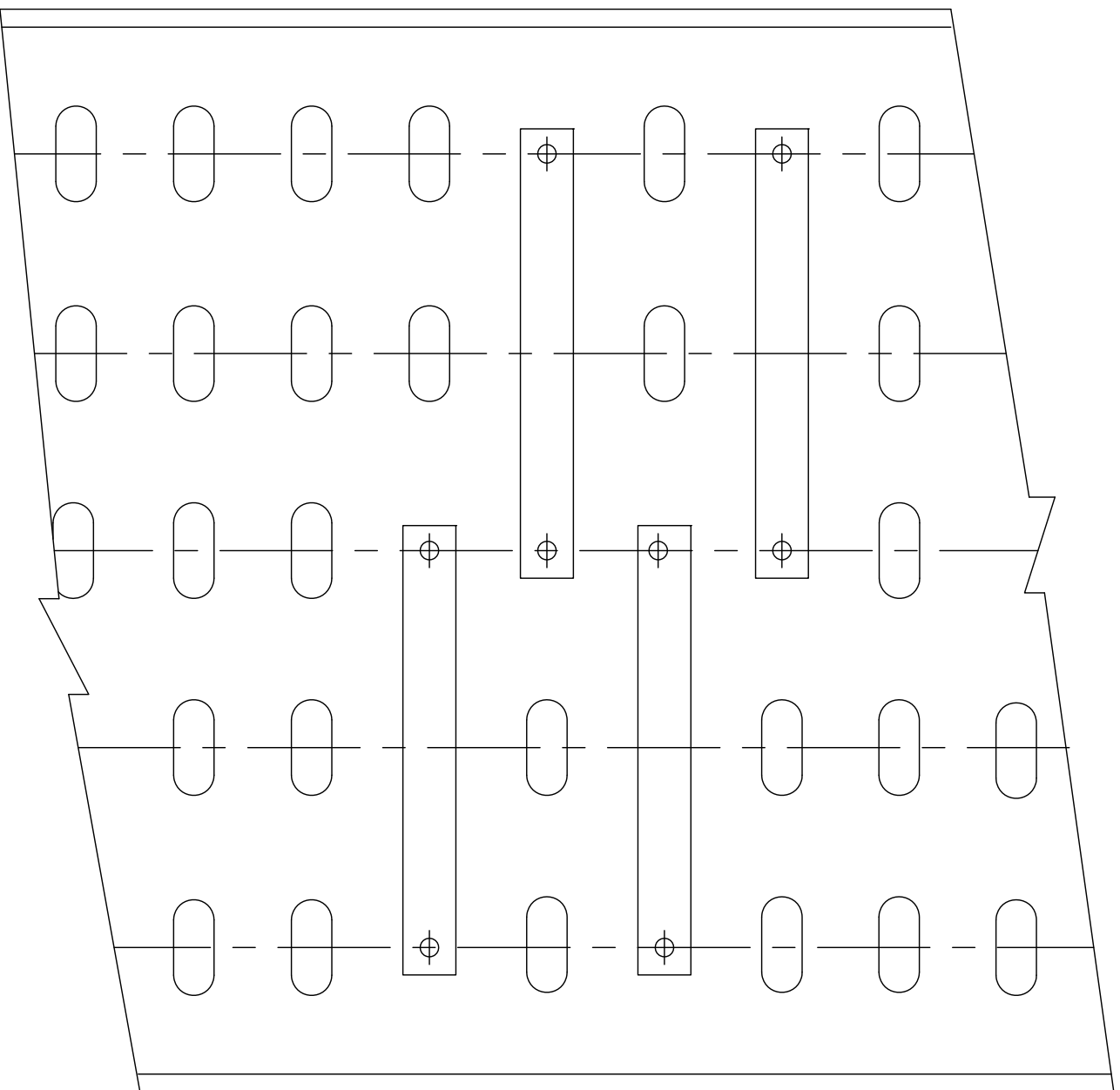
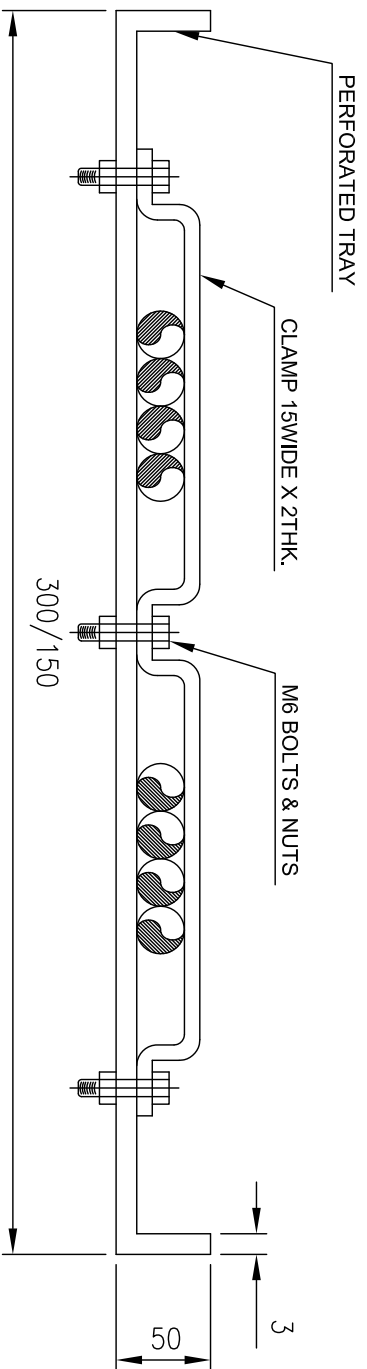
CLIENT :

GAIL GAS LIMITED
2nd FLOOR, HHEC BUILDING
A-2, SECTOR-2, NOIDA 201301

PMC:

J.P. KENNY
a trading name of
WOOD GROUP ENGINEERING INDIA PVT. LTD.
NEW DELHI

PROJECT :
CITYGAS DISTRIBUTION PROJECT

TITLE:
CNG DAUGHTER STATION SCHEMATIC LAYOUT

SCALE	JOB NO.	DRAWING NO.	REV.
AS SHOWN	11-0290	11-0290-02-08-01-003	B



- NOTE:-**
1. TRAY SHALL BE SUPPORTED SUITABLY AT EVERY 1 MTR.
 2. SIZE OF THE TRAY SHALL BE SELECTED AS PER REQUIREMENT DURING DETAILED ENGINEERING.
 3. SUCCESSIVE DISTANCE BETWEEN TWO CONSECUTIVE CLAMPS SHALL BE 1000 MM MAX.
 4. ALL DIMENSION ARE IN MM.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
B	19.01.10	ISSUED FOR TENDER	VSJ	AS	DDS
A	15.01.10	ISSUED FOR I.D.C.	VSJ	AS	DDS

CLIENT		GAIL GAS LIMITED
CONSULTANT		2 nd FLOOR, HREG BUILDING A-2, SECTOR-2, NOIDA 201301
PROJECT		CITY GAS DISTRIBUTION PROJECT FOR MOTHER STATION
TITLE		CLAMPING DETAILS FOR PERFORATED TRAY (TYP.)
SCALE		NTS
SIZE		110290
CLIENT JOB NO.		11-0290-02-08-01-004
DRAWING NUMBER		1 OF 1
SHEET		B
REV.		