

SCHEDULE - B

NAME OF WORK: CONSTRUCTION OF CENTER OF EXCELLENCE (COE) FOR GREEN HYDROGEN AT GANDHIDHAM

Sr. No	Item Description	Total Qty.	Rate		Unit		Amount
			IN FIG.	IN WORDS	IN FIG.	IN WORDS	
	PART-E : FIRE FIGHTNING SYSTEM						
1	Supplying, installation, testing and commissioning of electric driven terrace pump suitable for automatic operation and consisting of following, complete in all respects, as required: (Terrace) (a) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical confirming to IS : 1520 b) Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325. (c) M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required. (d) Suitable cement concrete foundation duly plastered and with anti vibration pads. 900 lpm at 35 m Head	1.000			Set	One Set	
2	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required : 100 mm dia	286.000			MTR.	One Meter	
3	Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required : Single headed Gunmetal	2.000			Set	One Set	
4	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required : 100 mm dia	3.000			Set	One Set	
5	Supplying and fixing orifice plate made out of 6 mm thick stainless steel (Grade 304) with orifice of required size to be fitted between flange & landing valve of external and internal hydrants to reduce pressure at the outlet to the level of 3.5 kg/cm2 complete as required.	2.000			NO	One Number	
6	Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required : 100 mm dia	3.000			Set	One Set	
7	Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange. 100 mm dia	1.000			Set	One Set	
8	Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required :						
(A)	Gun- Metal	8.000			Set	One Set	
(B)	Stainless Steel (Grade 304)	16.000			Set	One Set	
9	Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office red, conforming to IS 884 complete with the following as required. 20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS: 12585 20 mm nominal internal dia gun metal globe valve & nozzle. Drum and brackets for fixing the equipments on wall. Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket. 30 Mtr	8.000			Set	One Set	
10	Supplying & fixing 63 mm dia gun metal short branch pipe with 20 mm nominal internal diameter size nozzle conforming to IS 903 suitable for instantaneous connection to interconnect hose pipe Stainless Steel (Grade 304)	8.000			NO	One Number	
11	Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required : 2 way-100 mm dia M.S. Pipe	2.000			Set	One Set	
12	Supplying and fixing air vessel made of 250 mm dia, 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia gun metal wheel valve with required accessories, pressure gauge and paintingwith synthetic enamel paint of approved shade as required.	2.000			Set	One Set	
13	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	2.000			NO	One Number	
14	Providing, installation, testing and commissioning of gun metal valves of following sizes as required. 25 MM Dia	9.000			NO	One Number	
15	Providing and fixing hose cabinet of size 900x600x500mm made of 2 mm thick MS sheet with 4 mm thick float glass doors in front painted "FIRE" in red paint i/c necessary locking arrangement suitable to accommodate external hydrant with butterfly valve 2 nos. 15m Long hose pipe, 1 no branch pipe mounted on wall or raised brick platform& duly painted with post office red externally and white internally with synthetic enamel paint complete in all respects for external hydrant, as directed by Engineer-in- Charge.	9.000			NO	One Number	
16	Providing, fixing, testing and commissioning of Air release valve with isolating valve. 25 mm dia.	3.000			NO	One Number	

17	<p>Supply, Installation, Testing, and Commissioning (SITC) of Microprocessor based Networkable Analogue Addressable Fire Alarm Control Panel. The Panel shall be compliant with EN54-2, EN54-4 and approved by LPCB. The Fire Alarm Control Panel shall have inbuilt 6 loops and expandable capacity upto 8 loops. The Panel must have Full colour 800 x 480 LCD with resistive touch screen and automatic backlight dimming. The Panel must also have the capability to take Addressable Intelligent Wired and Wireless Devices on same loop. Each loop shall have a capacity of 127 analogue Addressable devices and 127 Base sounders/Base Sounder Beacons. The panel shall have an event log of minimum 10,000 events @ 1 second resolution, Filterable and Printable. The Panel shall have Three access levels. Panel shall support upto 5000 Cause & Effects entries, with upto 20,000 inputs controlling & 20,000 Controlling outputs across the network. The Panel shall have capability for Peer to Peer networking through RS485 network card. The Panel must have 4 inbuilt programmable sounder circuits, each circuit rated at 2.5A. The Panel must have inbuilt 3 programmable inputs and 5 inbuilt programmable relay outputs. The Panel shall have up to sub-addressable 512 programmable Inputs/Outputs via optional RS485 COMMS serially connected expansion cards. The Panel shall have 240 V AC power supply along with automatic Battery Charger. The Panel shall be fully expandable via common plug in loop driver boards. The user shall have a choice of using the panel with 5.25 Amp or 10.25 Amp power supply unit which is inbuilt in the FACP and should be approved to EN54-4. The Panel shall have configurable via USB port to PC or memory stick. The Panel shall have dedicated RS232 serial port for optional printer. Approved by LPCB Continued</p> <p>supplies in the required quantities as per site requirements for all types of field devices to make the system fully operational. The FAS shall be supplied with necessary hardware and software so as to ensure networking of all panels. This shall include all devices such as modules and interfaces for providing fiber-optics based connectivity between panels and any licenses, as applicable. All the panels of FAS system shall be monitored and controlled from industry standard computer system that shall be supplied with necessary application software having a user-friendly graphical user interface. The software and all licenses for the same shall be supplied by OEM in the name of the client. The FAS system shall be supplied with all functionality including hardware, software and licenses for integration with a third party IBMS system for real-time monitoring, supervision and control. The necessary interfaces and functionality for such networking protocols as BACnet/IP shall be provided by the OEM. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load. The fire alarm control panel (FACP) shall be the central processing unit of the system, receiving and analysing signals from fire sensors, providing audible and visual information to the user, initiating automatic alarm response sequences and providing the means by which the user interacts with the system. User interaction with the system will be by means of an intuitive full colour 800 X480 LCD with resistive touch screen and automatic backlight dimming graphical display. User permissions to access the FACP panel menu and control options will be provided by means of a key switch or a 5 or 6 digit passcode. The FACP shall be certified as meeting the requirements of EN54-2 and EN54-4 by a suitable, notified body. A certificate of product approval and certificate of constancy of performance shall be made available for inspection as evidence of certification. Continued</p> <p>The FACP shall be easily configurable to meet the exact detection zone and output mapping requirements of the building. 2000 detection zones shall be capable of being configured, each with an 80 character location message. For networked systems, it will be possible to map any detection zone to more than one panel, to allow vertical risers (stairwells) to be easily configured and supported. The FACP shall be microprocessor based. Operating programs and configuration data shall be contained in re-configurable non-volatile memory. Retention of the memory shall not rely on any form of battery or capacitor back-up device. The FACP shall incorporate separate processors for loop processing and central processing. The detection loops will continue to work autonomously and will audibly and visually report a fire with the minimum requirements of EN54-2, in the event of a failure of the main display and user interface. Up to 8 detection loops will be supported on a single panel, by means of a number of 2-loop plug in cards. The FACP will have a comprehensive event log, which has a capacity of 10,000 events stored in non-volatile memory, with a time stamp of 1 second resolution. This log will be maintained in the event of a total loss of power and can be downloaded into csv file format using the panel configuration software. Provision shall be made for each addressable loop to be sub-divided into geographical zones. The section of wiring corresponding to each zone circuit shall be protected from faults in other sections by line isolator modules. In order to facilitate re-configuration and system extension, the allocation of addresses to devices shall be independent of their physical arrangement on the loops. Up to 250 individually addressed standard devices shall be configured on each addressable loop. Loop powered sounders incorporated as a sensor bases shall be available. The FACP shall have the capability to support sub-addressing of addressable. Inputs and Outputs should be controlled independently. It shall be possible to fit a 40-column thermal printer to the FACP which will print system events automatically and logged data upon request. The FACP shall incorporate a real-time clock to enable events to be referenced against time and date. In networked systems, a master clock panel will synchronise all panel clocks every 24 hours. Additional Components It shall be possible to fit the FACP with a network board to allow up to 128 control panels and repeater panels to communicate with each other. The network shall be fully fault tolerant and shall continue to function normally under any single fault condition. Continued</p>	1.000			NO	One Number	
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It shall be possible to fit the FACP with plug-in communication board to allow remote monitoring of a network of control panels. This board will support IP, RS485 and RS232 interfaces and will act as a firewall, to prevent malicious attempts to remotely control the FACP and fire system. This communication board will enable connectivity to the fire alarm PC based graphics system. It shall be possible to fit up to thirty-two, sixteen-way input/output modules, relay modules, sounder modules or conventional zone modules or any combination thereof to each control panel. Modules will directly plug into available spare expansion slots within the panel, or via a remote boxed I/O enclosure with backplane assembly and optional power supply unit. It shall be possible to perform configuration updates on site using a portable personal computer and a Microsoft Windows® based configuration utility. This facility shall allow the following parameters to be set: Produce a configuration file which contains data for up to 128 panels or repeaters connected together as a network. Set cause and effect tables for any combination of devices or zones of devices to operate devices, zones of devices or functions on any panel or panels connected to the network. Upload and view graphically the configuration from a single panel or entire network of panels. Control Panel Panel name (network identity, 30 characters minimum). Configure up to 64 user login accounts with up to 28 different profile variations. Select sounder ringing mode as common, zonal or two stage. Select the global first and second stage delay times for any delayed output to between 0 and 10 minutes. Set number of loops on panel as 2 through to 10, in increments of 1 / 2 loops. Set number of zones on panel as 48 or 144. Set the four onboard sounder outputs to either Class A (loop) or Class B (spur with end of line) operation. For each two-loop card. Set loop sounder volume globally Select tone patterns for different event types. Specify the daily calibration time for detection devices. Specify the master clock panel for networked systems. Set start and end times for day night mode for each day of the week. Zones Allocate an 80 character zone location message Detectors Allocate a zone (0-2000) Set a delay before the panel responds to a fire signal from (0-180 seconds) Indicate pre-alarm Bypass any output delays when activated to fire Set day sensitivity and night sensitivity separately. Address loop powered base sounders. Allocate an 80 character location text message. Call points Allocate a zone (0-2000) Continued

Allocate an 80 character location text message Switch units (input) o Allocate a zone for each input and the device itself (0-2000) o Define input action as fire, faulty, pre-alarm, evacuation, alert, security alarm, silence alarm, reset, transparent, disablement or test mode. o Change the input action message from the default to any one of the above or to any one of a user defined library of 10 additional action messages. Set a delay before the panel responds to a fire signal (0-180 seconds) Select whether the input requires the control panel to be reset or is self-clearing upon removal of the input. Bypass any output delays when activated Allocate an 80 character location text message Relay or sounder units (output) Allocate a zone for each input and the device itself (0-2000) o Define whether the device responds to evacuate inputs, alert inputs, as a sounder (default ringing) and switches off when the Silence Alarms control is operated Permit the output to operate on any pre-alarm, technical alarm, security or fault event. Has a delay before operating (0 to 10 minutes in two stages) Allocate an 80 character location text message Loop powered sounders Allocate a zone (0-2000) Permit the output to operate on any pre-alarm, technical alarm, security or fault event. Has a delay before operating (0 to 10 minutes in two stages) Allocate an 80 character location text message. Cause and Effects 2000 cause and effect entries 40000 inputs or outputs can be allocated to these 2000 entries including Zones Input devices Outputs devices All cause and effects operate network wide, allowing any combination of inputs across the network to control any combination of outputs on any panel Network Default to a "peer-to-peer" system, where all events are displayed and processed on all other panels on the network To permit each panel to be configured to display and process selected event types from any other panel on the network Permit each panel to be configured with sequential / unique loop numbers for instances where several panels protect a single building Support daily time synchronisation from a master clock panel, to ensure that all panels event logging information is accurate Panel Construction The housing containing the FACP shall be of metal construction and shall be capable of being surface or semi-flush mounted. It shall be complete with cable knocks-outs in sufficient quantity to accommodate all likely cabling requirements. The housing shall afford a minimum ingress protection to IP30 and it shall not be possible to open the FACP without the use of a special tool or key. Continued

The panel will be constructed in a way that ensures that any complex electronic circuit boards can easily be replaced without the need to disrupt the field wiring connections. All field cable terminations will be made into a passive backplane assembly. The ability to support a family of plug-in addition cards will be provided, so that the product can easily be modified with additional sounder outputs, conventional zone interfaces, plant control relays or switch monitor/indicator driver interfaces. Panel Indications The FACP shall monitor the status of all devices on the addressable loops for fire, short-circuit fault, open-circuit fault, incorrect addressing, unauthorised device removal or exchange, pre-alarm condition and contaminated detector condition. The FACP shall also monitor the status of internal connections and interfaces including charger and batteries. Display In addition to the indications above, the FACP shall have an integral full colour 7" VGA display with resistive touch screen. The display shall incorporate a backlight. An ambient light sensor will be provided to allow automatic adjustment of the display backlight to ensure clear visibility across variable light conditions. A configuration option will be available to maintain the light at maximum brightness unless the panel only being supplied from the standby batteries. The display shall be capable of simultaneously indicating the number of outstanding events and their types as well as the current event. Panel Controls The panel shall be provided the following manual controls via the resistive touch screen Buzzer Silence Silence Alarms / Re-sound Alarms Reset System Activate Controls / Logout Delays Control Only the available controls will be displayed, depending on the panel state and login permissions Support for 24 user defined programmable soft buttons will be provided. These can be configured to be displayed only for selected user login accounts. Remote Monitoring Signals The FACP shall contain at least three programmable inputs to allow interconnection to other systems. The FACP shall contain at least two programmable outputs to allow interconnection to other systems. The FACP shall be capable of monitoring and controlling remote site devices, such as relays for the control of plants and ampers directly from the addressable loops. Continued

	<p>he FACP shall be capable of monitoring fire doors such that, in the event of a fire alarm condition, an event is generated to warn of the failure of a fire door to close. Output to Fire and Fault Routing The FACP will provide monitored outputs to signal to Fire and Fault Routing equipment. Monitored inputs will be provided to signal receipt of the Fire/Fault routing signals from the remote location. A Fire Routing indication will be provided by a separate LED indicator on the panel fascia when the fire routing signal has been operated. Software The FACP shall have, as a standard software enhancement, the ability to annunciate a pre-alarm condition designed to give the earliest possible warning of potential fire condition without raising the full alarm condition. The FACP shall have, as a standard software enhancement, the ability to automatically adjust the alarm threshold levels to compensate for changes in detector sensitivity due to contamination over a period of time. The FACP shall have, as a standard software enhancement, the ability to verify any alarm conditions in accordance with EN54-2 Clause 7.12 Dependency (Type A, B and C) requirements. The FACP shall have, as a standard software enhancement, the ability to provide an indication that a detector is nearing a level of contamination, which requires that it be replaced or serviced. The FACP shall have, as a standard software enhancement, the ability to provide automatic warning that a detector has reached a level of contamination, which requires that it be replaced or serviced. The FACP shall have, as a standard software enhancement, the ability to synchronise loop data transmission to eliminate the possibility of data corruption due to cross-talk or similar effects. Sounder Connections The FACP shall provide the necessary outputs to separately operate a minimum of two monitored circuits of common system sounders. The sounder outputs can be configured as 2 x Class A (loop monitored), 4 x Class B (end of line monitored) or 1 x Class A and 2 x Class B combinations. o Each output shall be capable of driving a sounder load of up to 2.5A. The FACP shall be capable of providing a two-stage alarm sounder facility that can be programmed, either on a zonal basis or common system basis, to meet the requirements of the fire authority. Sounder outputs shall be available as follows Alert, Continued</p> <p>intermittent pulsed tone Evacuate, continuous tone The FACP shall have the facility to change the tones of addressable sounders to provide different tones for different event types. Fault Reporting The FACP shall monitor all critical system components and interconnections, internal and external, such that a failure, which would prevent the correct operation of the alarm functions, causes the GENERAL FAULT indicator to light and a message to be given on the full colour touchscreen display within 100 seconds of occurrence. The following faults shall be reported in the manner described above Loop Short Circuit Loop Open Circuit Unexpected Device Disconnected Device Addressable Device Failure Incorrectly Configured Device Type Double Address Type System Fault (Processor) Low Battery Charger Failure Earth Fault Monitoring Battery Fault Mains Failure Sounder Wiring Open Circuit (Per Circuit) Sounder Wiring Short Circuit (Per Circuit) To help fault finding and repair, the FACP shall provide text messages to indicate the location of where a fault has occurred in the system. System Management The FACP shall incorporate the following system management facilities: Isolate/re-connect individual outputs or inputs of addressable points Isolate/re-connect individual zones (include/exclude call points) Isolate/re-connect individual sounder circuits Isolate/re-connect all sounder devices Isolate/re-connect all volt-free contacts individually Isolate/re-connect any output defined as a plant control output Walk-test of a selected zone to verify detectors and sounders (silent and audible) System Information status information View the event log with filtering of Between dates Event types Selected zones, loops and addresses Print the selected event log on the panel printer View the addressable point status Set date and time Access to the facilities describe above shall be restricted to authorised persons by means of a key switch or 5- or 6-digit passcode. The FACP shall have an event log capable of storing the last 10,000 events that have occurred. It shall be possible to view the content of the log via the graphical display. Events shall be displayed in chronological order with the newest events first. It shall be possible to filter the event log by event type, between selected dates, by zone, loop and addresses. The FACP shall be designed so that, for each type of analogue addressable detector, the overall response time including the sensor, the signal transmission system and the fire decision algorithm, meets the requirement of European Standards. The FACP shall be capable of isolating a group of selected detectors in areas of the building where maintenance work is carried out. END.</p>						
18	Supply, Installation, Testing, and Commissioning (SITC) of Analogue Addressable Multi- Sensor which is fully compatible with Analogue Addressable Protocol, having removable high performance chamber with Twin fire LED's allow 360 degree viewing, User selectable sensitivity modes 1% to 4.5% obs/m, Incorporate Optical and dual Heat elements, lock mechanism (sensor to base), Electronically addressed, Pulsing/non-pulsing controlled from panel. Approved by LPCB & VdS.	593.000			NO	One Number	
19	Supply, Installation, Testing, and Commissioning (SITC) of Analogue Addressable Multi- Heat Sensor which is fully compatible with Analogue Addressable Protocol, having removable high performance chamber with Twin fire LED's allow 360 degree veiwing, User selectable sensitivity modes 0 to 88 degree celsius, Incorporates Fixed Temperature and Rate Of Rise Heat elements, lock mechanism (sensor to base), Electronically addressed, Pulsing/non-pulsing controlled from panel. Approved by LPCB (EN54: Part 5)	3.000			NO	One Number	
20	Supply, Installation, Testing, and Commissioning (SITC) of Optical Beam Detector with transmitter and receiver set. The detector shall have 5 - 100 m range, Automatic compensation, Maximum coverage 1500m2, Automatic Signal strength adjustment, Emitter unit can be powered directly from zone (or loop), Features a Latching or Non- Latching fault relay, Full line continuity options,	2.000			NO	One Number	
21	Supply, Installation, Testing, and Commissioning (SITC) of Analogue Addressable Single Zone Module with integral Short Circuit Isolator which allow Support single independent zones Up to 6 Conventional Detectors. fully monitored for short/open circuit. Addressing via DIL switches,	2.000			NO	One Number	
22	Supply, Installation, Testing, and Commissioning (SITC) of sensor common mounting base, includes stainless steel contacts, slim profile - only 8mm, quick connection via square cable clamps, facility for remote indicator, Approved by LPCB	564.000			NO	One Number	
23	Supply, Installation, Testing, and Commissioning (SITC) of sensor common mounting base, Features integral Short-Circuit isolator, slim profile, Approved by LPCB	32.000			NO	One Number	
24	Supply, Installation, Testing, and Commissioning (SITC) of Response Indicator	270.000			NO	One Number	
25	Supply, Installation, Testing, and Commissioning (SITC) of Analogue Addressable Manual Call Point with Integral Short Circuit Isolator, Analogue Addressable Protocol having, Bi-coloured status LED (red for alarm, amber for (short-circuit), Non-frangible element fitted as standard (conforms to EN54), pulsing/non-pulsing can selectable via panel, Electronically addressed,	11.000			NO	One Number	
26	Supply, Installation, Testing, and Commissioning (SITC) of Intelligent Loop Powered Wall Sounder Beacon, Variable Sound Output 90 ~ 102 dB(A) (±2 dB(A)) output at 1 metre, High Intensity LED technology, 51 User-Selectable Tones (all tones EN54-3 compatible). Approved by	11.000			NO	One Number	
27	Supply, Installation, Testing, and Commissioning (SITC) of Analogue Addressable Single Input Module. which Includes a single monitored input, flying leads for easy installation. Electronically addressed, Approved by LPCB & Vds.	10.000			NO	One Number	
28	Supply, Installation, Testing, and Commissioning (SITC) of Analogue Addressable Single Output Module . which Includes a single output, flying leads for easy installation. Electronically addressed, Approved by LPCB & Vds.	10.000			NO	One Number	
29	Supply, Installation, Testing, and Commissioning (SITC) of Juntion Box for Detectro , Hooter etc...	675.000			NO	One Number	

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